



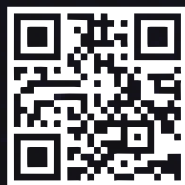
EYES ON THE FUTURE:
INNOVATING
OPHTHALMOLOGY

FEB 5-8, 2026

ABSTRACT
BOOK



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Languages:

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INSTRUCTION COURSES

Academia, Research, Teaching and Education in Ophthalmology

Abstract No.: 207075

Advancing Teaching Skills and Ophthalmic Education Around the World: The Ophthalmology Foundation Initiatives

Chief Instructor: Ana PALIS

Instructor(s): Helena FILIPE, Karl GOLNIK, Eduardo MAYORGA, Berthold SEITZ

Objective: To provide participants with a comprehensive understanding of the Ophthalmology Foundation's global initiatives in education and training. By presenting the objectives, structure, and experiences of programs such as international accreditation, fellowships, examinations, faculty development, and mentoring, the course aims to share best practices, highlight successful implementation across diverse regions, and inspire participants to participate in these programs to enhance their teaching skills and improve their training quality.

Synopsis: An overview of the different initiatives run by the Ophthalmology Foundation will be presented by leaders in each program (international accreditation, fellowships, exams, faculty development, mentoring, simulation, etc.), describing programs' purpose, content and experience with implementation around the world. The course will highlight the global impact of the Ophthalmology Foundation's initiatives, showing opportunities in international accreditation, fellowships, examinations, faculty development, mentoring, and simulation training for ophthalmic educators and ophthalmologists. Participants will find a variety of opportunities to improve training quality, enhance their teaching capacity, and strengthen professional networks, underscoring the Foundation's role in advancing education and capacity-building in diverse settings.

Course Outline: 1. The Ophthalmology Foundation: Mission in Ophthalmic Education Around the World (7 minutes) 2. Teaching Skills for Ophthalmic Educators Teaching Series (7 minutes) 3. Mentoring Programs (7 minutes) 4. Continuing Professional Development (7 minutes) 5. Leaders in Education (7 minutes) 6. Examinations for Ophthalmology (7 minutes) 7.

Accreditation for Residency Programs (7 minutes) 8. Fellowships (7 minutes) 9. Q&A (24 minutes)

Abstract No.: 202651

Fatty Acid and Bile Acid Metabolism in Retinal Health: From Mechanisms to Clinical Application

Chief Instructor: Guzel BIKBOVA

Objective: To provide ophthalmologists with an understanding of how systemic fatty acid and bile acid metabolism influences retinal health, inflammation, and disease progression, with emphasis on diabetic retinopathy and age-related macular degeneration (AMD).

Synopsis: Recent advances reveal that fatty acid bioavailability and integration into retinal membranes require bile acid-mediated absorption, lipoprotein transport, and receptor-regulated pathways (e.g., Mfsd2a, FXR, PPARs, TGR5). Short-chain fatty acids (SCFAs), produced by gut microbiota, exert complementary anti-inflammatory effects. Disruption of these metabolic pathways, through dysbiosis, impaired bile acid synthesis, or hyperglycemia-induced AGE accumulation, contributes to oxidative stress, vascular dysfunction, and retinal degeneration.

Course Outline: Intro: Retinal lipid composition and metabolic dependence Omega-3 and DHA in Photoreceptor Health: Structure, function, and systemic transport Gut-Derived Metabolites (SCFAs): Anti-inflammatory and immunoregulatory effects Bile Acids and Retinal Protection : UDCA, TUDCA, FXR/TGR5 pathways Crosstalk & Dysregulation: How diabetes, AGEs, and dysbiosis impair retinal metabolism Clinical Implications: Nutrition, metabolic modulation, therapeutic targets Debunking Myths: Why nasal/ eyedrop fatty acid delivery is biologically implausible Future Directions: Integrative strategies for prevention and treatment.

Cataract

Abstract No.: 201063

Conquering Capsule Complications: My Best Teaching Videos

*Chief Instructor: David **CHANG***

*Instructor(s): Ashvin **AGARWAL***

Objective: To use more than 30 edited video cases to systematically review techniques of preventing, recognizing, and handling zonular or posterior capsular complications.

Synopsis: Carefully edited videos will illustrate a spectrum of techniques for zonular and posterior capsular complications: capsular dye, torn CCC, secondary CCC enlargement, flap tear-out rescue technique, sulcus fixation with CCC/optic capture, posterior CCC, early recognition of posterior capsule rupture, conversion from top/clear corneal incision to manual ECCE, posterior polar cataracts, IOL fixation with torn anterior or posterior capsule, CTR and capsule retractors for weak zonules, spiral CTR injector, pars plana bimanual anterior vitrectomy ($\pm$ triamcinolone), and dispersive OVD posterior-assisted levitation + trap for descending nuclei.

Course Outline: Part 1: Phaco with zonulopathy. Capsulorhexis pearls, Little technique, secondary CCC enlargement, capsular retractors, CTR, spiral CTR injector, IOL fixation w/Zonulopathy, convert to manual ECCE Part 2: PCR recognition, convert to ECCE, IOL scaffold, anterior vitrectomy, OVD for PAL technique, viscoelastic trap, IOL implantation after PCR Part 3: What to say/discuss with patients following complications.

Abstract No.: 203021

Current Advances and Challenges in Suture and Sutureless Scleral Fixation Techniques for Intraocular Lens: A Comprehensive Review

*Chief Instructor: Wai-ching **LAM***

*Instructor(s): Angie **FONG**, Nicholas **FUNG**, Shrinivas **JOSHI**, Arif **SAMAD**, Sherman **VALERO***

Objective: • Understanding the management approaches of the dislocation or subluxation of the IOL. • Identify the indications for scleral fixation of intraocular lens • Describe the important preoperative evaluation when planning scleral fixation of intraocular lens. • Understand the comparative analysis between suture and sutureless fixation methods • Describe the postoperative complications of scleral fixation of intraocular lens

Synopsis: Implantation of an IOL in the absence of capsular support remains challenging for many surgeons. This instructional course reviews the various techniques of SFIOL, analyzes the advantages and

disadvantages of the different techniques, conducts comparative analysis between suture and sutureless fixation methods, highlights the salient points in the technical approaches, and discusses the postoperative complications for a better surgical outcome.

Course Outline: - Introduction (5 mins) - Dr. Wai-Ching Lam - Management of dislocated/subluxated IOL (10 mins) - Dr. Sherman Valero - Step by step approaches: Sutureless fixation of SFIOL-Yamane (10 mins) – Dr. Angie Fong - Step by step approaches: Suture fixation of SFIOL – Gortex vs Prolene sutures fixation (10 mins) – Dr. Wai-Ching Lam - Special considerations of SFIOL: Gortex, Canabrava, internal fixation techniques, CMT flex IOL technique (10 mins) – Dr. Shrinivas Joshi - Comparative analysis between suture and sutureless fixation methods (10 mins) - Dr. Nick Fung - Management of postoperative complications of scleral fixation of intraocular lens (SFIOL) (10 mins) - Dr. Arif Samad - Panel discussion (15mins).

Abstract No.: 201999

Fix It With a Claw: A Practical Solution for the Aphakic Eye

*Chief Instructor: Nina **HANDAYANI***

*Instructor(s): Aulia **ABDUL HAMID**, Ahmad **THOHIR***

Objective: By the end of this course, participants will: Understand the indications, technique, patient selection and complication of iris claw implantation Be proficient in both anterior and posterior (retropupillary) fixation techniques Understand iris claw implantation in special cases

Synopsis: Aphakia, the absence of the crystalline lens, can occur following complicated cataract surgery, trauma, or congenital conditions. The management of aphakia aims to restore visual function by providing adequate optical correction. Traditional options include spectacles, contact lenses, and intraocular lens (IOL) implantation. Among the surgical approaches, the iris-claw lens has emerged as a reliable option for aphakic correction, particularly in cases where capsular or zonular support is insufficient. The iris-claw lens is a rigid, polymethyl methacrylate (PMMA) lens that is fixated to the mid-peripheral iris stroma using claw-like haptics. It can be implanted either in the anterior chamber (anterior fixation) or behind the iris (retropupillary fixation). Advantages include surgical simplicity, stable centration, reversibility, and avoidance of scleral sutures, which reduces the risk of suture-related complications.

Course Outline: Iris Claw Lens Implantation as Management of Aphakia Target Participants : Ophthalmologist, Residents Session 1 : Management of Aphakia with Anterior or Posterior Iris Claw Session 2 : Iris-Claw Intraocular Lenses: A Viable Option for Aphakic Glaucoma Patients? Session 3 : Surgical Techniques of Iris Claw Implantation in post Vitrectomy Eye with Aphakia Group Discussion and Q&A.

Abstract No.: 201145

Fixation Matters: From Elective Refractive Phakic to Rhexis-Fixated Pseudophakic Implants. Where and How We Place Intraocular Lenses

Chief Instructor: David **LUBECK**

Instructor(s): Robert **ANG**, Haripriya **ARAVIND**, David **BECKERS**, Fam **HAN BOR**, Jod **MEHTA**

Objective: This course has been designed to give ophthalmologists a better understanding and surgical skills transfer of theoretical and surgical aspects of intraocular lens placement.

Synopsis: This all-in-one instruction course explores the full range of IOL fixation strategies used in modern anterior segment surgery: 1) Phakic IOLs – posterior chamber, iris-supported, and anterior chamber lenses for refractive enhancement. 2) Capsule-fixated IOLs – in-the-bag and sulcus techniques for standard and secondary implants. 3) Iris-fixated IOLs – enclavation and iris suturing for capsular-deficient eyes. 4) Anterior chamber IOLs – angle-supported solutions for aphakia without posterior support and 5) Rhexis-fixated IOLs – modern approaches using the capsulorrhexis for secure fixation & ELP.

Course Outline: Participants will learn surgical principles, decision algorithms, case selection, and complication management across all modalities. With step-by-step videos, real-case discussions, and expert faculty, this course offers practical tools to handle both routine and complex IOL challenges with confidence.

Abstract No.: 206067

Hands-On Scleral Fixation IOL Wet Lab

Chief Instructor: Abdul **HANNAN**

Instructor(s): Aziz Jan **ASHIR**, Nauman **HASHMANI**

Objective: To teach young ophthalmologists the basics of the Scleral Fixation IOL technique (Yamane Technique)

Synopsis: The Yamane Technique is currently the gold standard for Scleral Fixation IOL techniques amongst many others. This technique has a sharp learning curve which deters many young ophthalmologists from learning it and ultimately abandoning it altogether. I aim to teach this technique hands-on in such a simple way that any surgeon would get confident enough, after the course, to go back to his institute and practice it much more comfortably. I bring with me a surgical experience of more than 2500 Yamane fixation cases experience. I want to teach others the hacks I have learned across my experience which have made this technique much easier and safer to perform. I believe such a course is a need of the hour and would attract a lot of attention amongst participants.

Course Outline: I, along with 2 other colleagues, can manage 3 wet lab stations. where we can train

between 6-10 people per station. The session would start with a small introduction video to the technique and what hack can make it easier to perform. Instruments required: 1. 3-piece IOL 2. retinal max-grip forcep 3. 3mm keratome 4. IOL injector 5. Visco Elastic 6. Simul eye fixation eyes or animal eyes.

Abstract No.: 207032

Immediate Bilateral Sequential Cataract Surgery

Chief Instructor: Mehran **ZAREI GHANAVATI**

Instructor(s): Mohamed **BAHGAT BADAWI GOWEIDA**, Ahmed **BARDAN**, Christopher **LIU**

Objective: By the end of this session, participants will be able to: 1. Identify appropriate patient selection criteria and apply ISBCS protocols 2. Evaluate strategies to optimize visual outcomes 3. Understand the benefits and risks of ISBCS in comparison with delayed sequential surgery. 4. Apply best practices to streamline workflow and enhance surgical outcomes in bilateral same-day cataract surgery.

Synopsis: Immediate bilateral sequential cataract surgery (ISBCS) has increasingly become a standard offering, with significant uptake in the UK in recent years. This session will provide an evidence-based update on its advantages, risks, and practical considerations, aiming to streamline protocols and enhance patient outcomes.

Course Outline: 1. Introduction • Overview of ISBCS and its growing adoption in the UK and worldwide • Rationale for bilateral same-day cataract surgery 2. Patient Selection and Protocols • Criteria for appropriate patient selection • Contraindications and risk stratification • ISBCS protocol • Strategies to minimize intraoperative and postoperative complications 3. Optimizing Visual Outcomes • Advances in ocular biometry • Considerations in IOL selection for ISBCS • Addressing refractive targets and minimizing postoperative surprises 4. Clinical Evidence and Practical Considerations • Review of current literature and guidelines • Comparative outcomes: • Patient perspectives and satisfaction 5. Case Discussions and Q&A.

Abstract No.: 203875

The Art of Pupilloplasty and Iris Reconstruction: Tips and Tricks

Chief Instructor: Hazem **YASSIN**

Instructor(s): Rania **ZAKI**

Objective: Improve management of surgical complications and develop skills to manage complex cases and master difficult surgical techniques

Synopsis: The course will be video-based, highlighting important aspects of pupilloplasty and iris reconstruction. It will include surgical planning guidelines, basic suturing techniques, advanced iris

repair techniques, materials and methods, artificial iris implantation, and combined iris surgeries. The participants will have the opportunity to gain knowledge from a selection of instructional videos from highly experienced instructors. This will help a smoother learning curve, improve outcomes, and reduce complication rates.

Course Outline: 1-Introduction: -Overview of iris anatomy and physiology - Importance of iris reconstruction in ophthalmic surgery 2-Plan of Surgery: -Preoperative evaluation -Indications of iris repair -Patterns of iris defects - Surgical Plan of iris reconstruction - Surgical Repair Techniques - 3-Basic sutures techniques and surgical principle of iris reconstruction : •Surgical principles of iris reconstruction • Reconstruction techniques : A-Iris defects reconstruction:asModified Seipser Sliding Knot and SingleFour-Throw(SFT) Pupilloplasty B-Iridodialysis Repair: Hang Back technique, Hoffman pocket, Sewing Machine Technique C-Pupil reconstruction: Modified Seipser Sliding Knot, Single Four-Throw (SFT) Pupilloplasty, Iris Cerclage and Laser pupilloplasty Types Of Iris Repair (video based) 1-Pupillary border sutures 2-Pupillary cerclage without iris atrophy 3-Pupillary cerclage with iris atrophy 4-Iridodialysis repair 5- Combined iridodialysis repair and pupillary cerclage 6- Change pupil location 7-Iris Prosthesis 4-Prosthetic Iris devices 5-Complications of Iris surgery 6- Discussion.

Cornea, Dry Eyes, External Eye Diseases and Eye Banking

Abstract No.: 206579

How to Avoid the Mistakes We Made Starting DMEK and DSO

Chief Instructor: Federico **BADALA**

Instructor(s): Sadeer **HANNUSH**, Shaowei **LI**, Theophilos **TOURTAS**

Objective: Attendees will learn simple steps that help avoid common complications in DMEK surgery and DSO procedures. The instructors will show different graft preparation, insertion, and positioning techniques, supplemented by videos to emphasize surgical challenges and how to overcome them.

Synopsis: All DMEK and DSO complex cases will be presented. The handout outline will include different steps with references, that will lead to fewer complications and a greatly shortened learning curve.

Course Outline: Course will enable participants to learn from our mistakes and avoid complications while shortening the learning curve for DMEK and DSO. Videos and panel discussion will illustrate how to avoid

the most common pitfalls in DMEK and DSO surgery in both straightforward and complex cases (phakia, anterior chamber IOLs, post glaucoma surgery etc).

Abstract No.: 206388

Intracorneal Ring Implantation for Keratoconus and Other Irregular Astigmatism: An Understanding Course From A to Z

Chief Instructor: Marta **SARTORI**

Instructor(s): Carlos **ARCE**, Sandra **BEER**, Claudia **FRANCESCONI**, Bernardo **MOSCOVISC**, Pablo **RODRIGUES**, Walton **NOSE**, Marta **SARTORI**

Objective: To take an overview of the disease and the mandatory tools to identify suitable candidates, explain choices of treatment, choose the appropriate device and placement plan, with individualized ICRS procedures, perform the surgical steps safely and recognize intraoperative issues. Detect and manage complications.

Synopsis: Provides a structured understanding of intracorneal ring segments (ICRS) implantation in keratoconus covering corneal biomechanics, patient selection, device types, surgical planning and technique, complications outcomes and evolving combined approaches, with both theoretical foundations and practical training.

Course Outline: 1-Foundations of keratoconus and Corneal Biomechanics 2- Patient Selection and Clinical Decision-Making 3-ICRS devices and Nomograms 4-Surgical Planning 5-Surgical Technique 6-Postoperative Care, Complications and Management 7-Outcomes and Evidence 8-Combined and Future Approaches. 9- Practical and Case-based Simulation.

Abstract No.: 206429

Optimizing the Ocular Surface Before Ocular Surgery

Chief Instructor: Purnima **DHAND**

Instructor(s): Sheetal **BRAR**, Sonu **GOEL**, Sonal **KALIA**, Tushya **OM PARKASH**, Namrata **SHARMA**

Objective: This instruction course will provide ophthalmic surgeons with a comprehensive framework to evaluate and optimize the ocular surface prior to intraocular and corneal surgeries. Participants will learn why the ocular surface is central to surgical success across subspecialties and how to detect subtle ocular surface disease that compromises outcomes.

Synopsis: The ocular surface is a silent determinant of surgical outcomes across cataract, refractive, and glaucoma procedures. This course highlights why surface health matters, how to detect hidden disease preoperatively, and the consequences of ignoring it- ranging from inaccurate biometry in premium Intra Ocular Lens to poor epithelial healing after

Photorefractive Keratectomy and bleb failure in glaucoma surgery. Through didactic lectures and case-based discussions, participants will gain a structured approach to integrate ocular surface management into routine surgical planning ensuring better and faster recovery, and higher patient satisfaction.

Course Outline: Why the Ocular Surface Matters across Surgeries Spotting the hidden Enemy: Preoperative Diagnostics Cataract and Premium IOLs: Biometry Lies Without a healthy Surface PRK Success Lies in the Surface Ocular Surface optimization Before LASIK Calm The conjunctiva, Save the Bleb: Ocular surface Management Before Glaucoma Surgery Panel Discussion Question and Answers.

Glaucoma

Abstract No.: 200401

Anterior Segment OCT in Glaucoma: From Angle Assessment to Surgical Monitoring

Chief Instructor: Tanyaba MALIK

Objective: To equip participants with the knowledge and skills to use anterior segment OCT for comprehensive angle assessment, diagnosis of angle-closure mechanisms, and monitoring of glaucoma surgical outcomes.

Synopsis: A one-hour instructional course on Anterior Segment OCT (AS-OCT) in Glaucoma is a timely and practical topic, especially with the increasing availability of swept-source and Fourier-domain AS-OCT in clinics. It helps bridge the gap between anatomical understanding and clinical decision-making, particularly in angle-closure disease, filtering surgery, and MIGS.

Course Outline: 1. Introduction to AS-OCT (5 minutes) 2. AS-OCT in Angle Assessment (15 minutes) • Identifying angle structures: scleral spur, Schwalbe's line, iris root • Quantitative parameters: • Classification of angle closure: 3. Pre- and Post-Laser Imaging (10 minutes) • Before and after Laser Peripheral Iridotomy (LPI) 4. AS-OCT in Glaucoma Surgery (15 minutes) • Filtering surgery: 5. Summary & Take-Home Messages (5 minutes).

Abstract No.: 200600

Glaucoma Laser Therapy: Innovations and Advice for Primary Open Angle Glaucoma Eyes and Primary Angle Closure One

Chief Instructor: Michele LANZA

Instructor(s): Rosa BOCCIA, Luigi SERRA

Objective: This course will provide information about all the last innovations in glaucoma care, and, particularly, about laser treatments that could be a very valuable option in difficult cases too.

Synopsis: The course will provide details of indications, techniques and recent innovations concerning laser procedures to treat the different kinds of glaucoma. Topics will include laser trabeculoplasties - selective (SLT), micropulsed (MLT) and direct (DSLT); transscleral cyclophotocoagulation - threshold (FT-TSC) and micropulse (MP-TSC); iridotomy and iridoplasty. Moreover, last innovation about the use of femtosecond laser and excimer one in glaucoma eyes will be included. Videos, results and complications of these procedures in primary open angle glaucoma, primary angle closure glaucoma and secondary glaucoma will be covered. Particular attention will be focused on complex cases and the decision making involved. At the conclusion of this course, the attendee will be aware of the latest innovations in laser treatment of glaucoma and able to select the appropriate procedure for their patients.

Course Outline: Introduction: Michele Lanza; Innovations in trabeculoplasty: Michele Lanza; How to properly perform iris laser procedures: Rosa Boccia; What has changed in transscleral cyclophotocoagulation?: Luigi Serra; Femto and excimer laser in glaucoma: Michele Lanza; Complex Cases: Rosa Boccia, Luigi Serra (15 min); Discussion

Intraocular Inflammation, Uveitis and Scleritis

Abstract No.: 207401

Episcleritis and Scleritis: A Patient Is Walked In, How Do I Deal With This in My Clinic?

Chief Instructor: Somasheila MURTHY

Instructor(s): Peter MCCLUSKEY, Uwe PLEYER, Namrata SHARMA, Jay SHETH

Objective: Episcleral inflammation is a common condition which has several etiologies. Scleritis, though rare, is often missed and additionally is often an enigma to the general ophthalmologist. In this course, we intend to provide clear guidelines on how the general ophthalmologist can diagnose and manage cases of episcleral and scleral inflammation, and when they should refer these cases to specialists.

Synopsis: Episcleritis and scleritis are inflammation of the outer coats of the eye. Often immune mediated, scleritis can be associated with systemic disease, whereas episcleritis can be associated with other ocular conditions. In this course, the participants will be able to differentiate between the two conditions, be able to manage episcleritis and also be able to investigate and start initial therapy for scleritis.

Course Outline: 1. Overview of episcleritis: differential diagnosis and management 2. Overview of scleritis: classification, clinical features presented through cases

3. Non-infectious scleritis: learning through cases
 4. Infectious scleritis: what to look for? 5. Posterior scleritis: often-missed entity.

Ocular Imaging

Abstract No.: 206613

Corneal Imaging for Modern Cataract Surgery

Chief Instructor: Mazen SINJAB

Objective: Understand the critical role of corneal imaging in preoperative assessment for cataract and refractive lens exchange surgeries. Recognize the importance of detecting corneal irregularities before planning for toric, EDOF, or trifocal IOL implantation. Interpret corneal aberrometry and apply its findings to clinical decision-making. Plan surgical incisions based on corneal tomography data. Strategize appropriate methods for astigmatic correction. Appreciate the impact of undetected corneal irregularities on biometric accuracy. Identify the influence of prior corneal surgeries on biometry and surgical outcomes.

Synopsis: Corneal Imaging for Modern Cataract Surgery

Course Outline: Detection of corneal irregularities and previous corneal surgeries before cataract - 15 min
 Mazen Sinjab Impact of corneal irregularities on the accuracy of biometry - 15 min
 Mehran Importance of corneal imaging in astigmatic management - 15 min
 Mazen Corneal wavefront and IOL selection - 15 min
 Mazen Case discussion - 15 min
 Christopher Liu Q&A 15 min.

Abstract No.: 200173

Instructional Course on Ultrasound and UBM: Basic Exam and Clinical Cases

Chief Instructor: Mario DE LA TORRE ESTREMADOYRO

Objective: Describe the possibilities and limitations of ocular ultrasound. Explain basic physical principles, diagnostic potential and limitations of Standardized A-mode, B mode and UBM. Perform systematic and comprehensive examinations, developing skills for probe positions and scanning techniques in A- and B-Scan (8, 15, 20 and 50MHz) Differentiate normal from abnormal findings, making presumptive diagnoses. Present new technologies, including annular devices.

Synopsis: This course covers when and how to use ocular ultrasound. Despite the emergence of new imaging studies, it remains valuable for diagnosis. Many ophthalmologists are unfamiliar with its precise indications, scope, limitations, proper use of the equipment, and image interpretation. This course aims to fill this gap.

Course Outline: Basic examination with A and B mode, Basic definitions in sound physics: acoustic impedance, phenomena of sound versus tissues (absorption, reflection, acoustic shadow, sound attenuation). Transducers. Signal processing. Types of amplification. Impact of standardization: Gain (dB), time-gain-compensation, gain adjustment, T, T+9, CT, Cineloop and Varigain, zoom types: orbit eye and 20 μ s, A scan modes: Tumor Q1, Retina A1, Retina Q11, Muscle Profile, Axial Length. Kappa Angle Eye examination (scanning, special techniques) Longitudinal and transverse projections. Paraocular and transocular, with Mode A and Mode B. Study of the vitreous, retina and choroid, PVD, RD hemorrhage Asteroid hyalosis. Intraocular tumors: differential diagnosis, melanoma, hemangioma, nevus, retinoblastoma etc. Uveitis endophthalmitis, Study of the Orbit, Tumors, examination of the optic nerve, extraocular muscles pathology, UBM in glaucoma, tumors, trauma, infections and other conditions, Sulcus to sulcus measurements for ICL implantation.

Ocular Oncology and Pathology

Abstract No.: 205798

Challenges in Ocular Oncology

Chief Instructor: Duangnate ROJANAPORN

Instructor(s): Hung-da CHOU, Vishal RAVAL, Gavin TAN

Objective: By course end participants will (1) recognize presentations and mimics of intraocular tumours; (2) apply multimodal diagnostic pathways; (3) choose evidence-based local and systemic treatments; (4) manage complications and coordinate multidisciplinary care.

Synopsis: This practical, case-driven course reviews diagnostic pitfalls, staging, and modern management of intraocular tumours (retinoblastoma, uveal melanoma, choroidal metastasis, vascular tumors, other benign retinal and choroidal tumors). Through case-based presentation, high-resolution imaging, operative/video highlights and interactive cases with audience polling, learners receive concise algorithms for diagnosis, treatment selection (plaque brachytherapy, intra-arterial and intravitreal chemotherapy, systemic options, enucleation) and follow-up — with emphasis on resource-adapted care and patient communication.

Course Outline: 1. Intro & learning goals (5 min) 2. Four case presentations by leading ocular oncologists (each 10 min): diagnostic challenge, imaging pearls, critical decision point, and practical tip (40 min) 3. Panel discussion: Management strategies highlighted by cases — treatment selection and complication

avoidance (25 min) 6. Audience polling, take-home algorithms, Q&A (10 min).

Abstract No.: 206694

Retinoblastoma - Protocols, Challenges and Solutions: An Asian Insight

Chief Instructor: Shaifali **CHAHAR**

Instructor(s): Jason **CS YAM**, Julie D. **BARLIANA**, Fairouz P. **MANJANDAVIDA**, Purnima **RAJKARNIKAR STHAPIT**, Duangnate **ROJANAPORN**, Junyang **ZHAO**

Objective: To provide a comprehensive overview of retinoblastoma and its management in the Asia-Pacific region, highlighting unique challenges, innovative approaches, and evolving protocols that aim to improve life, eye, and vision salvage, while fostering cross-country collaboration and learning.

Synopsis: The Asia-Pacific region carries the highest burden of retinoblastoma worldwide. This instruction course will cover the entire spectrum of care — from early detection, referral pathways, and advances in management, to success stories in orbital retinoblastoma. Distinguished faculty from across the region will share practical insights while addressing the unique socio-economic, cultural, and infrastructural challenges faced in Asia-Pacific. Drawing on region-specific experiences, the course will equip participants with evidence-based strategies to optimize outcomes, improve survival, preserve vision, and enhance quality of life for children with retinoblastoma. Importantly, we will also highlight how Asia, with its largest disease burden, is poised to lead the way in shaping the future of retinoblastoma care.

Course Outline: 1. The Global Landscape of Retinoblastoma: Where We Stand Today 2. Retinoblastoma in Nepal: Overcoming Diagnostic Delays and improving outcomes 3. From Late Presentation to Life and Vision Salvage: Insights from the Indian Experience 4. Evolving Protocols and Multidisciplinary Care for Retinoblastoma in Hong Kong 5. Retinoblastoma Management in Thailand: Advances and Remaining Gaps 6. Socio-economic Barriers and Innovative Solutions in Retinoblastoma Care: The Indonesian Perspective Panel- How can Asia lead way in Retinoblastoma care?

Abstract No.: 205743

Systematic Approach to Transscleral Resection of Anteriorly Located Uveal Tumors

Chief Instructor: Andrey **YAROVVOY**

Objective: To present the different techniques of transscleral resections of anteriorly located uveal tumors of different size, location, extension, and origin.

Synopsis: Over 250 anterior intraocular tumor resections were fulfilled from 1992 to 2025 in patients aged from 1 to 83 years. The size of anterior uveal tumors was from 1.5 to 9.0 mm in thickness, from 3

to 15.1 mm in basal diameter, located in the iris (58), iris and ciliary body (101), iris, ciliary body and choroid (92), ciliary body and choroid (1). Seven tumors had extraocular growth of different extension. Special attention will be focused on various surgical techniques of blockexcision. Every kind of technique depends on tumor size, location, extension, and invasion into neighboring tissues, including sclera and cornea. Iris stromal cysts were resected partially after internal de-epithelization. Histological diagnoses included uveal melanoma (132), leiomyoma (22), iris cysts (22), adenoma, adenocarcinoma, nevus, melanocytoma, epithelioma, medulloepithelioma, metastasis. Eye preservation, mortality data, and functional results will be presented in brief. Follow up is from 6 to 259 months, mean 43 months. Conclusions: Transscleral resection is a successful treatment method of anterior uveal tumors and needs to take into account various special features of the tumor and the eye, and possible advantages over radiotherapy.

Course Outline: Surgical techniques of blockexcision will be presented – iridectomy, iridocyclectomy, partial lamellar sclerouvectomy, and full thickness eyewall resections with different size and shape (round or irregular) donor sclera patch grafting.

Orbital and Oculoplastic Surgery

Abstract No.: 208467

Controversies in Thyroid Eye Disease/Graves' Orbitopathy (TED/GO) – East Meets West From the International Thyroid Eye Disease Society (ITEDS) and Asia Pacific Society of Ophthalmic Plastic & Reconstructive Surgery (APSOPRS)

Chief Instructor: Kam Lung **CHONG**

Instructor(s): Kasturi **BHATTACHARJEE**, Peter **DOLMAN**, Constantin **HINTSCHICH**, Dong Mei **LI**, Suryasnata **RATH**, Diego **STRIANESE**, Tim **SULLIVAN**, Jack **TSAI**

Objective: After this course, the attendees will understand the latest management algorithm across the TED/GO spectrum and the diversity of patient presentations, the pros and cons of various medical and surgical treatments, their combinations, and treatment-related complications.

Synopsis: This course aims to engage the audience through scenarios that are often encountered in daily practice to highlight important controversies in thyroid eye disease/Graves orbitopathy (TED/GO). Established consensus on and emerging evidence for various management options will be explained by colleagues from around the world. Individualized treatment plans and step-by-step demonstrations of surgical techniques

will be discussed, using video clips and pre-/post-treatment photos. The debate topics will range from initial assessment to management of mild, moderate-to-severe, vision-threatening TED/GO and surgical rehabilitation, highlighting the dilemmas and distinct features in different age and ethnic groups.

Course Outline: 1. Assessing and treating mild TED/GO-“Clinical” and “injectables”-experiences from the West 2. Assessing and treating low CAS, progressive TED/GO-“Radiological” and “triple therapy”-experiences from the East 3. Visual loss in TED/GO- “investigations”-experiences from the West 4. Treating mild TED/GO-»antioxidants»-experiences from the East 5. Treating moderate-to-severe TED/GO-“biologics”-experiences from the East 6. Treating moderate-to-severe TED/GO-“biologics”-experiences from the West 7. Surgical rehabilitation of TED/GO-experiences from the East 8. Surgical rehabilitation of TED/GO-experiences from the West 9. Panel discussion-“Controversies in TED/GO-where East meets West”.

Abstract No.: 203900

Cutting-Edge Techniques in Minimally Invasive Aesthetic Eyelid and Periocular Surgeries

Chief Instructor: Naseem Vanessa **MANSURALI**
Instructor(s): Cat **BURKAT**, Dong Mei **LEE**, Min Joung **LEE**, Micheal **YEN**, Stephanie **YOUNG**

Objective: The demand for minimally invasive and quick recovery periocular aesthetic procedures is on the rise. Hence, it is beneficial for doctors to master techniques to enhance surgical outcomes. The aim of this course is to teach the participants simple, minimally invasive aesthetic eyelid procedures that enhance appearance and improve patient satisfaction.

Synopsis: Minimally invasive aesthetic eyelid and periocular surgeries are designed to have small hidden incisions which minimize tissue damage, reduce scarring, promote quick recovery, reduce complications rate and cut costs. The course teaches common surgeries by Oculoplastic Aesthetic Experts that one can perform to beautify the appearance of the eyebrows, upper and lower eyelids. This is a surgical video-based skill transfer course.

Course Outline: The course starts off with a minimally invasive technique for brow contouring. From eyebrow, we then move on to the important section of minimally invasive eyelid procedures. The procedures covered will be lid crease formation with sutures, mini incision blepharoplasty and scarless cosmetic ptosis surgery, followed by a technique on scarless epicanthoplasty. The course will then end with mini pin hole transconjunctival lower eyelid blepharoplasty for eye bag correction.

Abstract No.: 200502

Orbital Infections and Inflammation in Asia: Clinical Experience and Emerging Insights

Chief Instructor: Kyung In **WOO**
Instructor(s): Kelvin **CHONG**, Tarjani **DAVE**, Pimkwan **JARU-AMPORN PAN**, Min Joung **LEE**, Dongmei **LI**, Sunny **SHEN**

Objective: To provide a regionally tailored and up-to-date overview of orbital infections and inflammatory diseases in Asia, emphasizing diagnostic challenges, emerging regional patterns, and advances such as artificial intelligence and immunomodulatory therapies.

Synopsis: Orbital infections and inflammatory disorders manifest with diverse clinical features across Asia, influenced by regional pathogens, genetic factors, and variable healthcare resources. Despite this, most clinical guidelines are based on Western populations, limiting their applicability in Asian settings. This course brings together leading experts from the region to share practical experiences and emerging insights. Topics include atypical and challenging presentations of orbital cellulitis, shifting trends in orbital fungal infections in the post-COVID era, and the distinctive phenotypes and management strategies of thyroid eye disease (TED) in Asian populations. The session will also explore the role of artificial intelligence in enhancing diagnostic accuracy of TED, and provide practical updates on the use of immunomodulatory agents in orbital inflammation. The course also covers idiopathic orbital inflammation and IgG4-related ophthalmic disease, both of which pose diagnostic dilemmas in Asia.

Course Outline: Atypical Orbital Cellulitis (Jarupornpan) Post-COVID Orbital Fungal Infections (Dave) TED in Asia: Clinical Patterns & Management (Chong) AI in TED Diagnosis (Li) Idiopathic Orbital Inflammation in Asians (Lee) IgG4-related Ophthalmic Disease (Woo) Immunomodulatory Therapy: Asian Updates (Shen) Discussion and Q&A.

Abstract No.: 202471

Surgical Techniques of Ptosis Correction: Pearls & Pitfalls

Chief Instructor: Ben **LIMBU M.D.**
Instructor(s): Sayeed Mehbub **AL KADIR**, Golam **HAIDER**, Akshay **NAIR**, Samata **SHARMA**

Objective: To provide concise, targeted knowledge on selecting the appropriate surgical approach for each type of ptosis, with the goal of maximizing surgical effectiveness and minimizing complications.

Synopsis: The instructional course delivers extensive training about ptosis surgical management for ophthalmologists and oculoplastic surgeons and residents who want to improve their eyelid surgery skills and knowledge. The course begins with an examination of ptosis anatomy followed

by preoperative evaluation methods and decision-making algorithms for selecting appropriate surgical approaches. The course provides attendees with video demonstrations and case discussions and expert commentary to teach them how to select surgical approaches according to levator function and patient-specific factors and etiology. The course will focus on achieving optimal functional and cosmetic results with reduced postoperative complications.

Course Outline: Duration: 80 minutes (60 minutes lectures + 20 minutes of panel discussion, Q&A) Target Audience: Ophthalmologists, Oculoplastic Surgeons, Residents and Fellows Format: Didactic lectures, surgical videos, interactive case discussions, Q&A.

Abstract No.: 204737

When the First Time Fails – Revision Oculoplastic Surgery

Chief Instructor: Gangadhara **SUNDAR**

Instructor(s): Peter **DOLMAN**, Ana **DUARTE**, Santosh **HONAVAR**, Yunia **IRAWATI**, Timothy **SULLIVAN**

Objective: To share experts input from various countries, on why and what happens resulting in failure of primary management and what measures they take to deliver optimal outcomes

Synopsis: Despite best intervention, primary surgery or medical intervention may fail - in various Eyelid, Lacrimal & Orbital disorders. This Instruction course shall share experts' inputs on delivering the best outcome when common oculoplastic surgeries, such as Congenital ptosis correction, Adult ptosis correction, Lacrimal drainage Surgery (DCR), Orbitotomies for tumors and Orbital reconstruction following trauma fails with functional and structural consequences.

Course Outline: When congenital ptosis surgery fails Yunia Irawati, Indonesia When adult ptosis surgery fails Tim Sullivan, Australia When an external DCR fails Peter Dolman, Canada Managing recurrent/residual orbital tumors Santosh Honavar, India When IVMP firstline doesn't work for Active TED Ana Duarte, Portugal Revision Orbital Fractures Gangadhara Sundar, Singapore.

Pediatric Ophthalmology and Strabismus

Abstract No.: 206153

Ocular Genetics: From Principles to Practice

Chief Instructor: Seo Wei **LEO**

Instructor(s): Saadia **FARROOQUI**, Beau **FENNER**, Savleen **KAUR**

Objective: To equip ophthalmologists with a practical understanding of ocular genetics, covering inheritance

patterns, major genetic eye diseases, testing strategies, counselling, and emerging therapies. The clinically orientated and interactive course aims to provide participants with confidence to recognise genetic eye disease, make informed decisions on genetic testing, and integrate genetic advances into clinical care.

Synopsis: Ocular genetics is reshaping the way ophthalmologists diagnose, manage, and counsel patients with inherited eye diseases. With genetic testing, gene therapy, and precision medicine becoming increasingly available, ophthalmologists in every subspecialty now face situations where genetic knowledge is directly relevant to patient care. This introductory instructional course offers a structured and clinically oriented overview of ocular genetics. It is designed for practising ophthalmologists with no prior genetics training, focusing on practical applications rather than laboratory details. The course highlights inheritance principles, common genetic eye conditions, and the growing impact of gene-based therapies.

Course Outline: 1. Foundations of Ocular Genetics • Principles of inheritance relevant to ophthalmology • Pitfalls in family history assessment 2. Genetic Eye Diseases • Inherited retinal diseases • Paediatric cataracts • Glaucoma and corneal dystrophies 3. Genetic Testing in Practice • When to order tests • How to interpret reports • Applying results to clinical care 4. Genetic Counselling and Ethics • Communicating results with patients and families • Ethical considerations and implications for relatives 5. Emerging Therapies • Gene replacement and RNA-based interventions • Genome editing approaches • Clinical trial updates in the Asia-Pacific region.

Abstract No.: 203794

Surgical Management of Superior Oblique Palsies (Congenital and Acquired)

Chief Instructor: Maria **THEODOROU**

Instructor(s): Janice **LAM**, Leena **PATEL**

Objective: 1. To 'demystify' the orthoptic assessment 2. To be able to individualise surgical planning 3. To revise different surgical techniques

Synopsis: The aetiology of superior oblique palsies can range from straightforward decompensated longstanding/congenital to acquired with consequential disabling torsion, which acts as a barrier to fusion. Surgical management requires careful assessment and at times, a staged approach.

Course Outline: In this short course, we will describe the pre-operative assessment of superior oblique palsies, and the surgical decision-making process. We will then discuss the different surgical techniques (inferior oblique recession/myectomy/anterior or antero-nasal transpositioning, inferior rectus recess & resect, superior oblique tuck/Harada-Ito) and work through cases. Talk 1: The pre-operative

assessment of the patient with superior oblique palsy
 Talk 2: Surgical Techniques: Inferior Oblique, Inferior Rectus, Superior Oblique surgeries Case Discussions
 Target audience: • Ophthalmology trainees / residents
 • Orthoptists • Paediatric Ophthalmology/ Strabismus consultants • General ophthalmologists interested to brush up on their knowledge on superior oblique palsies.

Refractive Surgery

Abstract No.: 204172

Refractive Lensectomy and Premium (Multifocal, EDOF and Accommodative) Intraocular Lenses: Unveiling the Mystery of How to Match Patients With Lenses

Chief Instructor: Jorge L. ALÍO

Instructor(s): John CHANG

Objective: This course will offer the audience updated information on how to make a correct indication of refractive lensectomy based on evidence and how to distinguish and use different premium lenses, (multifocal, EDOF, accommodative) in the different types of patients, according to refractive error, eye anatomy, age and patient needs in order to accomplish spectacle independence at all distances.

Synopsis: Refractive lensectomy is used to correct refractive errors of the eye using a variety of intraocular lenses. The goal is to correct the refractive defect and to achieve emetropia and, as much as possible, spectacle independence at all distances. This course will make an overview of the best clinical practice to follow in order to accomplish this goal within ethical limits

Course Outline: 1. Introduction: what is the dysfunctional lens syndrome? 2. Methods for the diagnosis and categorization of the dysfunctional lens syndrome. The new definition of cataract. 3. Surgical techniques for refractive lens exchange: minimally invasive lens surgery 4. Patient indications and selection. Red lines not to cross for the safety of the patient. 5. Intraocular lens choice for spectacle independence. How to choose the best based on objective criteria: multifocal, EDOF, monofocal? 6. IOL calculation 7. Results, outcomes, complications. 8. Panel discussion.

Abstract No.: 204974

The Art of PTK (Photo Therapeutic Keratectomy)

Chief Instructor: Sami ALRABIAH

Objective: PTK is applying laser treatment on the corneal surface for corneal disease, other than correcting refractive errors. The objective is to

simplify it for ophthalmologists and promote more understanding and working with such an important tool.

Synopsis: It is to differentiate between types of PTK, either customized or non-customized. A- Customized PTK 1- Topography Guided PTK (Auto-topo PTK, Contact lens fitting PTK, Customized selective PTK) 2- Ocular Wave Front Guided PTK 3- Regular cornea to induce Irregular cornea, inducing high spherical aberration in one eye to increase depth of focus to treat presbyopia B- Non Customized PTK 1- Dry Plain PTK 2- Wet Plain PTK according to the severity of corneal irregularities a- thin fluid shield technique b- thick fluid shield technique

Course Outline: First: to discuss different broad types of PTK either a- customized or b- plain non-customized. Second: Each has subdivisions that need special techniques and for special indications. Videos and slides will assist the course.

Retina (Surgical)

Abstract No.: 201998

Early Use of Intravitreal Triamcinolone to Inhibit Traumatic Proliferative Vitreoretinopathy: A Randomized Clinical Trial

Chief Instructor: Hua YAN

Objective: To evaluate the efficacy and safety of intravitreal triamcinolone acetonide (TA) injection at the end of emergency surgery for open globe injury (OGI) to suppress traumatic proliferative vitreoretinopathy (TPVR).

Synopsis: This randomized clinical trial investigates the early use of intravitreal TA administered the end of emergency surgery for OGI as a means to suppress the development of TPVR. The study involved 68 patients with zone III globe rupture, randomly assigned to receive either 0.1 mL TA or 0.1 mL balanced salt solution at the end of emergency surgery. Primary outcomes focused on TPVR assessment during subsequent vitrectomy performed 10±3 days later, while secondary outcomes included visual acuity, retinal and macular attachment rates, PVR recurrence, and side effects at 6 months post-vitrectomy.

Course Outline: The trial was conducted as a single-center, participant-masked, prospective, randomized controlled study. Results demonstrated a statistically significant reduction in TPVR severity ($p=0.028$) and improved TPVR scores in the TA group (9.30 ± 0.82) compared to controls (6.44 ± 1.06) during vitrectomy ($p=0.036$). Final visual acuity improvement was observed in 92% of TA-treated eyes versus 63.64% in the control group ($p=0.008$). Retinal attachment rates

were also significantly higher in the TA group (88%) than in the control group (63.64%) ($p=0.049$). However, no significant differences were found in macular repositioning or PVR recurrence between groups.

Abstract No.: 204523

Old Tricks and New Trends in MTM Surgeries - Flaps, Belts, Amnions, Viscoat Plus Heavies, But Gasless

Chief Instructor: Chi-chun LAI

Instructor(s): Hung-da CHOU, Shu Yen LEE, Simon SZETO, Gavin TAN, Andrew TSAI

Objective: This evidence-based, state-of-the-art session focuses on the surgical management of myopic traction maculopathy. Experienced surgeons from Taiwan, Singapore, and Hong Kong will discuss both established strategies and the latest advances in the field.

Synopsis: Each presentation will provide a concise review of historical perspectives and current literature, followed by narrated surgical videos that highlight key techniques. The faculty will also introduce novel technical approaches and instrumentation, and present six cutting-edge papers published in 2025. Topics include sub-perfluorocarbon viscoat injection, no gas surgery, amniotic membrane grafting, internal limiting membrane flaps, macular buckling, and optimal timing of surgical intervention. By the end of the course, participants will gain a comprehensive understanding of the surgical options, techniques, and expected outcomes in the management of myopic traction maculopathy.

Course Outline: Session 1: Close the hole on the SPOT - macular hole retinal detachment made easy (10 min) Speaker: Hung-Da Chou (Male, Taiwan) Session 2: Amniotic membrane cradles the macular hole retinal detachment like a baby (10 min) Speaker: Chi-Chun Lai (Male, Taiwan) Session 3: Does macular buckling still have a chance when vitrectomy rules (10 min) Speaker: Gavin Tan (Male, Singapore) Session 4: Early vitrectomy in myopic foveoschisis before it's too late (10 min) Speaker: Andrew Tsai (Male, Singapore) Session 5: High myopic holes are not regular holes (10 min) Speaker: Shu-Yen Lee (Female, Singapore) Session 6: No Bubble, no trouble: gas-free macular hole closure (10 min) Speaker Simon Szeto (Male, Hong Kong) Discussion (20 min).

FREE PAPERS

AI, Digital Innovation and Virtual Health

Abstract No.: 206111

A Deep Learning Model for Recognising Leukemia Retinopathy From Retinal Fundus Images

First Author: Wenzhou XIAO

Co-Author(s): Kinji HASHIMOTO, Yumeng LI, Wenbo LIU, Xuan SHI

Purpose: To develop a deep learning model to achieve non-invasive methods for leukemia recognition and diagnosis through the assessment of fundus photography.

Methods: A total of 675 participants were included, comprising 315 leukemia patients and 360 non-leukemia patients. All participants underwent fundus imaging with the Optos California non-dilated ultra-wide field fundus camera. The dataset was split into a training set (n=540) and an internal test set (n=135) via stratified random sampling. A dual-branch convolutional neural network (2 ResNet-50 LVM) was employed. Patient-level predictions were produced by calculating the average of the probability outputs from both eyes, resulting in a binary leukemia risk label. An independent external validation set (n=169) was used to assess model generalizability. Performance was evaluated by the area under the receiver operating characteristic curve (AUROC), precision, recall, specificity, accuracy, and F1-score.

Results: In the internal validation, the model achieved an AUROC of 0.9054. And in the external validation, our model achieved an AUROC of 0.8946, precision of 0.8452, recall of 0.8659, specificity of 0.8506, accuracy of 0.8580, and an F1-score of 0.8554.

Conclusions: We construct a deep learning model providing an effective non-invasive way of recognising patient's leukemia risk only by fundus images and it may offer clinical assistance for ophthalmologists to recognise leukemia by retinal fundus photography.

Abstract No.: 203608

A Lattice Boltzmann Method for Simulating Blood Flow in Complex Anterior Segment Vessels

First Author: Yicong PENG

Co-Author(s): Deteng HANG, Xinli YU

Purpose: Ocular hemodynamic alterations are implicated in numerous ophthalmologic pathologies. Traditional computational fluid dynamics methods rely on macroscopic continuity assumptions and have limitations when simulating complex microvascular networks. In this study, the lattice Boltzmann method (LBM) was used to simulate the anterior segment blood flow, and a simulating method that is more suitable for simulating the microvascular blood flow of the eye was proposed.

Methods: A three-dimensional vascular segment was reconstructed from OCTA images using MATLAB. A custom 3D LBM solver was implemented to simulate hemodynamics. Boundary conditions were handled via a modified bounce-back scheme at the walls and a non-equilibrium extrapolation method at the inlets/outlets. Blood was modeled as a Newtonian fluid using literature-derived density and viscosity parameters.

Results: The developed LBM simulation demonstrated robust stability and successfully computed the flow field for the prescribed case, yielding clear visualization of flow patterns. This model establishes a validated computational framework for quantifying physiological parameters in ocular vasculature.

Conclusions: This study demonstrates LBM's utility in ocular hemodynamic modeling. The framework provides a foundation for investigating microcirculatory flow alterations under pathological conditions, potentially offering insights into the hemodynamic mechanisms of ocular diseases.

Abstract No.: 202123

A Mixture-of-Experts Network for Infectious Keratitis Classification Using Multimodal Slit-Lamp Images

First Author: Fen-fen LI

Co-Author(s): Qi DAI

Purpose: Infectious keratitis remains one of the leading causes of corneal blindness worldwide, and subtype distinguishing continues to pose significant clinical challenges. Existing deep learning approaches typically

rely on a single imaging modality, which overlooks the distinct diagnostic cues present in other modalities.

Methods: To address this limitation, we propose KeraFusionNet, a novel deep learning framework that simultaneously processes three imaging modalities—diffuse white light, slit beam, and cobalt blue light with fluorescein staining. The model integrates three modality-specific expert subnetworks, and employs a dynamic gating network to adaptively fuse their feature representations for final classification. We validated the method using a multicenter dataset comprising 3236 images from 820 patients at Zhejiang Eye Hospital (ZEH) and 862 images from 261 patients at Aier Guangming Eye Hospital (AGEH).

Results: On the ZEH dataset, the model achieved an overall classification accuracy of 87.40%, with AUCs of 0.9899, 0.9177, 0.9653, 0.9803, and 0.9635 for normal cornea, herpes simplex keratitis, bacterial keratitis, fungal keratitis, and other cornea abnormalities, respectively. On the independent AGEH dataset, the accuracy reached 83.49%. Moreover, the model outperformed ophthalmologists (66.7%).

Conclusions: These results demonstrate the effectiveness and generalizability of our multimodal fusion framework, offering a promising tool for automated IK diagnosis and subtype differentiation.

Abstract No.: 206802

A Multimodal AI Agent for Clinical Decision Support in Ophthalmology

First Author: Danli SHI

Co-Author(s): Xiaolan CHEN, Mingguang HE

Purpose: To develop and validate EyeAgent, the first interpretable, multimodal agentic framework designed to support complex clinical decision-making in ophthalmology.

Methods: EyeAgent was constructed by integrating a large language model with 53 validated ophthalmic tools, enabling dynamic orchestration across 23 imaging modalities and multiple task types (classification, detection, segmentation, generation, and quantitative analysis). The framework was grounded in domain-specific knowledge using retrieval-augmented generation from 14 ophthalmology textbooks. Validation was performed across 862,490 samples from both internal and external datasets, including: Agentic ablation analysis to measure tool contribution. Benchmarking against GPT-4o on complex and adversarial ophthalmic tasks. Real-world validation on clinical cases with expert evaluation. A multi-center human–AI reader study comparing EyeAgent with ophthalmologists at different experience levels.

Results: Diagnostic accuracy increased from 69.7% (5 general tools) to 80.8% (all 53 specialized tools) in agentic ablation analysis. EyeAgent outperformed GPT-4o in complex and adversarial ophthalmic tasks. In real-

world clinical cases, EyeAgent achieved 93.7% tool-selection accuracy and high expert-rated performance in clinical accuracy (88.0%), reasoning (94.0%), and interpretability (88.5%). In a multi-center human–AI reader study, EyeAgent matched or exceeded senior ophthalmologists' performance, and as an assistant improved diagnostic accuracy by 18.5% and report quality by 19%, with the largest benefit observed among junior clinicians.

Conclusions: EyeAgent represents a scalable agentic AI framework for medicine, shifting from static models to dynamic, task-driven systems. It demonstrates real-world clinical utility, achieving senior-clinician performance and enabling effective human–AI collaboration.

Abstract No.: 205481

AI-Driven Insights Into Pegcetacoplan: Preserving EZ and RPE in Geographic Atrophy

First Author: Anna TAN

Co-Author(s): Caroline BAUMAL, Philip FERRONE, Amir SADEGHIPOUR, Ursula SCHMIDT-ERFURTH, Roy SCHWARTZ

Purpose: To report the effect of pegcetacoplan on geographic atrophy (GA) progression and ellipsoid zone (EZ)/retinal pigment epithelium (RPE) ratio loss.

Methods: The 24-month OAKS and DERBY studies evaluated the efficacy and safety of intravitreal pegcetacoplan vs sham in GA. Upon completion, patients could enter the GALE open-label extension. Patients on pegcetacoplan monthly (PM) or every-other-month (PEOM) in OAKS and DERBY continued the same regimen in GALE, and those on sham crossed over to active treatment (delayed treatment). The main efficacy outcome was the change in fundus autofluorescence (FAF)-based GA growth. Optical coherence tomography (OCT)-based AI further quantified EZ and RPE changes with pegcetacoplan treatment. Data was analyzed with a mixed model for repeated measures.

Results: In OAKS and DERBY, pegcetacoplan reduced GA growth by 26% (PM) and 22% (PEOM) in nonsubfoveal (NSF) GA compared to sham. With continuous treatment for 48 months, PM and PEOM reduced GA growth by 32% and 27%, respectively, compared to the projected sham (all $p < 0.0001$). GALE results demonstrated that patients receiving early treatment experienced better outcomes than delayed treatment. Change from baseline in EZ and RPE loss (Month 24) was significantly reduced with pegcetacoplan (all $p < 0.001$): PM reduced EZ loss by 52.8% and 46.9% vs sham in OAKS and DERBY, respectively; PEOM by 46.0% and 46.4%. PM reduced RPE loss by 22.3% and 27.1% vs sham in the respective trials; PEOM by 19.7% and 20.6%. Patient cases will be presented.

Conclusions: Long-term efficacy and safety of pegcetacoplan were demonstrated in GA with support for earlier treatment.

Abstract No.: 202976

AI-Enhanced OCT Angiography- Retinal and Choroidal Biomarkers for Predicting Preclinical Diabetic Retinopathy

First Author: Chethan N MURTHY

Co-Author(s): Ranjitha KC

Purpose: To identify quantitative OCT angiography (OCTA) biomarkers associated with preclinical diabetic retinopathy (DR) and to develop a machine learning (ML) model for accurate detection of subclinical disease.

Methods: Cross-sectional study included 240 eyes from 130 patients with type 2 diabetes without clinically visible DR (ETDRS level 10) and 80 age-matched control eyes. Swept-source OCTA (Topcon Triton) was used to quantify foveal avascular zone (FAZ) area and circularity, superficial capillary plexus vessel density (SCP VD) and deep capillary plexus vessel density (DCP VD), perfusion density (PD), choriocapillaris flow void density, and choroidal vascularity index (CVI). Independent t-test/Mann-Whitney U test for healthy vs preclinical DR was used. Between-group differences were analysed using ANCOVA adjusting for age and diabetes duration. Data were split into training (70%) and testing (30%) cohorts. Random forest (RF), support vector machine (SVM), and logistic regression (LR) models were trained.

Results: Preclinical DR eyes exhibited significant alterations compared to controls: larger FAZ area (0.32 ± 0.12 vs. 0.25 ± 0.10 mm² ($p < 0.01$), lower FAZ circularity (0.70 ± 0.07 vs. 0.78 ± 0.05 , $p < 0.01$), reduced SCP VD: 47.0 ± 3.2 vs. $49.8 \pm 2.5\%$ ($p = 0.02$) reduced DCP VD (51.2 ± 3.5 vs. $54.5 \pm 3.0\%$ ($p = 0.01$), increased choriocapillaris flow void density ($34.8 \pm 4.0\%$ vs. $28.2 \pm 3.5\%$ ($p < 0.001$), reduced CVI (0.61 ± 0.05 vs. 0.66 ± 0.04 ($p = 0.03$). ROC analysis showed: SCP VD (AUC = 0.74), DCP VD (AUC 0.86), FAZ area (AUC = 0.78), and CVI (AUC 0.80) were strong discriminators. Random Forest: AUC = 0.92, accuracy = 87%, sensitivity = 84%, specificity = 89%, SVM: AUC = 0.88, accuracy = 83%, Logistic Regression: AUC = 0.84, accuracy = 80 Feature importance analysis ranked CC FV density, FAZ area, SCP VD as top predictors.

Conclusions: Quantitative OCTA biomarkers reliably detect subclinical microvascular compromise in diabetes. Integrating these biomarkers into an ML model further improves predictive accuracy, supporting OCTA-based AI frameworks as a powerful, non-invasive tool for early DR risk stratification and screening.

Abstract No.: 201719

AIM-Net: A Deep Learning System for Detecting Myopia Onset and Predicting Myopia Progression in School-Aged Children

First Author: Mark WONG

Co-Author(s): Marcus ANG, Joey CHUNG, Gilbert LIM

Purpose: To develop and validate a deep learning system for the detection of myopia onset and prediction of 1-year myopia progression in school-aged children.

Methods: The Artificial Intelligence in Myopia in Singapore (AIM) study follows a prospective cohort of 1000 children aged 5-7 recruited from a national school health screening program. All participants underwent cycloplegic refraction and fundus photographs obtained using tabletop fundus camera, with a subset also having fundus photographs acquired using a handheld camera. 'Myopia onset' was defined as spherical equivalent (SE) $\leq -0.5D$ at baseline with no previous diagnosis or prescription. 'Myopia progression' was defined as an increment in SE $\leq -0.5D$ in 1 year. AIM-Net was trained on baseline fundus photographs with and without clinical meta-data using transfer learning from a DenseNet-121 model.

Results: For detection of myopia onset ($n=538$), AIM-Net achieved an AUC of 0.90 [0.86-0.93] compared to clinical demographics alone (AUC 0.60 [0.54-0.65]). For prediction of myopia progression ($n=790$), AIM-Net attained an AUC of 0.77 [0.72-0.82]. AIM-Net also performed comparably when using handheld-acquired retinal images for myopia detection (AUC 0.82 [0.72-0.90]). AIM-Net also achieved an AUC of 0.74 [0.72-0.76] for baseline myopia detection on an external cohort.

Conclusions: AIM-Net demonstrates potential in detecting myopia-onset and predicting myopia progression in children aged 5-7 who could benefit from early intervention. AIM-Net also performed robustly on handheld-acquired retinal images, supporting deployment in mobile screening settings.

Abstract No.: 209946

An Innovative Diagnostic Method for Myopia Using Blood-Based Biomemristor

First Author: Zhirong LIU

Purpose: To address the limitations of conventional myopia diagnostic methods (e.g., reliance on patient cooperation, unsuitability for young children, and challenges in large-scale screening), this study aims to develop a blood-based biomemristor for myopia diagnosis. We designed and fabricated an Ag/ZIF-8:PVP/FTO-structured biomemristor using ZIF-8 as the core functional material to detect and differentiate physiological states associated with high myopia. The memristor's resistive switching stability, multi-mechanism conduction behavior, and

sensitivity to subtle physiological changes in blood samples were verified, particularly its capability to distinguish phenotypic differences (rather than genetic consistency) via an identical twin family model. Ultimately, this work seeks to provide a novel solution for early myopia screening, phenotypic stratification, and minimally invasive monitoring in children and high-risk groups.

Methods: For the methods, peripheral venous blood was collected from healthy individuals and patients with high myopia, with plasma separated and stored. ZIF-8 nanoparticles were synthesized via a solution process. The Ag/ZIF-8:PVP/FTO memristor was fabricated using spin-coating, and its structure and properties were characterized by FE-SEM, XRD, XPS, FTIR, and electrical measurements. Key experiments included optimizing parameters (ZIF-8 concentration, voltage scan rate, maximum bias), conducting reliability tests through 100 consecutive I-V cycles, and clinically validating the device by comparing samples from healthy and myopic individuals, as well as identical twins.

Results: The results demonstrated that the memristor had a uniform layered structure and stable bipolar resistive switching. Optimal parameters were identified as 10 mg/mL ZIF-8, a 1 V/s scan rate, and a ± 2.0 V bias. The device exhibited mixed conduction mechanisms (Schottky emission, Ohmic conduction, and hopping transport) and could distinguish between blood samples from high myopia patients and healthy individuals: devices with patients' blood showed linear I-V curves without hysteresis, while those with healthy individuals' blood exhibited significant resistive switching. In the identical twin model, the memristor differentiated phenotypic differences despite genetic similarity.

Conclusions: In conclusion, this study realizes the first application of a ZIF-8-based memristor in myopia diagnosis. The Ag/ZIF-8:PVP/FTO memristor overcomes the shortcomings of traditional optical diagnostics (no requirement for patient cooperation, minimally invasive) and can distinguish between high myopia and healthy populations, even phenotypic differences in genetically identical individuals. However, limitations exist, such as a small sample size and unclear specific biochemical substances in blood that affect memristor signals. Future research will focus on elucidating the biochemical-electrical correlation, miniaturizing the device, and integrating machine learning to enable dynamic myopia monitoring and personalized ophthalmic care.

Abstract No.: 201416

Application of Artificial Intelligence in Uveal Malignant Melanoma

First Author: Yungang DING

Co-Author(s): Wei CHEN, Yongping LI, Ying WEN

Purpose: This study aims to explore the potential application of artificial intelligence (AI) in the diagnosis, treatment, and prognosis evaluation of uveal malignant melanoma, as well as to discuss its role in assisting clinical decision-making for ophthalmologists and pathologists.

Methods: A retrospective review of literature from PubMed and Web of Science was conducted to analyze the research findings on the application of machine learning and deep learning techniques in uveal malignant melanoma.

Results: Various models were used in the AI research on uveal malignant melanoma, with convolutional neural networks (CNNs) being the most commonly employed. The research mainly focused on differential diagnosis and prognosis evaluation. In terms of differential diagnosis, models based on color fundus photography, ocular ultrasound, and magnetic resonance imaging (MRI) were used to distinguish small choroidal malignant melanoma from pigmented nevi. In prognosis evaluation, models were primarily based on patient clinical characteristics and histopathological images. AI-driven prognostic evaluation using digital pathological images of biopsy cell smears can reach the level of gene expression profiling classification tests.

Conclusions: AI shows significant potential in optimizing the management of patients with uveal malignant melanoma. Convolutional neural network models are expected to play an essential role in clinical diagnosis and prognosis evaluation. However, challenges remain, including the limited sample size for this tumor, inconsistent image quality, and the interpretability of AI models. Future research should focus on addressing these issues to fully realize the application potential of AI technologies.

Abstract No.: 201846

Artificial Intelligence-Based Screening of Diabetic Retinopathy Using RetCAD Software: Results From a Mongolian Population

First Author: Tumenjargal ERDENEBAATAR

Co-Author(s): Bayasgalan PUREVDORI

Purpose: To evaluate the diagnostic accuracy of the AI-based RetCAD software for the early detection and staging of diabetic retinopathy.

Methods: A total of 359 patients aged 19–82 years were recruited using random sampling, including both diabetic and relatively healthy control groups. Sample size was calculated using standard epidemiological formulas (Fig. 1). All participants underwent a

comprehensive ophthalmic examination performed by an ophthalmologist, including staging of DR. Fundus photographs were processed with RetCAD, which applies convolutional neural networks (CNNs) to detect DR and age-related macular degeneration (AMD). The AI outputs were graded on a 0–5 scale (Table 1), corresponding to the International Council of Ophthalmology DR classification, ranging from no DR to proliferative DR. RetCAD's results were compared with ophthalmologists' clinical diagnoses to evaluate sensitivity, specificity, and diagnostic concordance (Figs. 2–3).

Results: • The mean age of participants was 39.41 ± 4.50 years. • Distribution of DR among diabetic patients: o Mild non-proliferative DR: 40% o Moderate non-proliferative DR: 20% o Severe non-proliferative DR: 30.9% o Proliferative DR: 9.1% • Diagnostic agreement between ophthalmologists and RetCAD: o Mild DR: 93.5% o Moderate DR: 87.5% o Severe DR: 95.0% o Proliferative DR: 100% • Overall performance of RetCAD in fundus image evaluation: o Sensitivity: 95.0% o Specificity: 96.8%

Conclusions: The AI-based RetCAD software provides rapid, reliable, and highly accurate early detection of diabetic retinopathy. Its integration into screening programs could significantly enhance the prevention of DR-related vision loss in Mongolia, reduce the burden on ophthalmic services, and lower treatment costs for patients.

Abstract No.: 202019

Automated Annotation in Iridocorneal Angle Imaging: AI-Driven Precision Mapping for Enhanced Glaucoma Diagnostics

First Author: Prasanna Vekatesh **RAMESH**

Purpose: This study explores an AI model developed for automated annotation of iridocorneal angle landmarks, providing precise measurements and classifying angles as open, narrow, or closed. Building on extensive research that underscores AI's transformative potential in ophthalmology, this study examines AI's role in enhancing diagnostic accuracy and streamlining efficiency in the management of glaucoma.

Methods: A total of 1,500 high-resolution Anterior images were analyzed, with 1,370 (91%) used for training and 130 (9%) for testing. Training was conducted in three sessions (Train-1, Train-2, Train-3), monitoring metrics such as train/box loss, precision, and recall. The AI identified key angle structures—scleral spur, trabecular meshwork, and angle apex—mapped the iridocorneal angle, and classified it as closed, narrow, open, or wide. Testing involved sequential evaluation of the 130 test images, split into three groups with each group assessed over five-day intervals. Predictions were refined through incremental training, enhancing angle status accuracy.

Results: The AI showed improved prediction in angle configuration annotation across testing phases. The percentage of images with fully correct predictions was 88% (Test 1), 91% (Test 2), and 96% (Test 3). Sensitivity scores improved from 82.61% to 95.24% across the tests, and specificity increased from 92.59% to 95.83%.

Conclusions: This AI system shows promising potential in automating iridocorneal angle analysis for glaucoma diagnostics, accurately categorizing angle configurations as closed, narrow, open, or wide. Its high sensitivity and specificity demonstrate potential as a precision diagnostic tool for AI-assisted glaucoma care.

Abstract No.: 200311

Automated Posterior Scleral Topography Assessment for Enhanced Staphyloma Visualization and Quantification With Improved Maculopathy Correlation

First Author: Xi **CHEN**

Purpose: Subjective assessment of posterior staphylomas based on morphology lacks reproducibility and scalability, and its association with myopic macular degeneration (MMD) remains unclear. This study aims to develop a precise, quantitative method to characterize posterior scleral shape.

Methods: Using deep learning, we automatically segmented surface points of the eyeball from MRI scans to reconstruct posterior scleral topography. In a three-dimensional Cartesian coordinate system, we calculated distances (D) from each point to a pre-elongation eye center and local curvatures (C). Derived parameters included Dmean, Cmean, Dmax, Cmax, Dvar, and a composite curvature-depth index (C-D). These were analyzed for concordance with traditional staphyloma classifications and their correlation with MMD grades. Staphylomas were categorized into three types: type-0 (symmetrical elongation without focal protrusion), type-1 (symmetrical elongation with conical protrusion), and type-2 (asymmetrical nasal/temporal protrusion).

Results: In 6528 eyes (6528 participants), segmentation achieved a Dice coefficient of 0.935. C-Dmax (AUC: 0.923) and Dvar (AUC: 0.981) were the most effective parameters in differentiating between staphyloma types. All key parameters showed strong discriminative power (AUC > 0.900). Dvar ($\beta = 0.75 \text{ mm}^{-2}$, $p = 0.02$) and C-Dmax ($\beta = 2.44$, $p = 0.02$) were significantly associated with MMD grade, independent of age and axial length.

Conclusions: This MRI-based automated analysis enables objective visualization and quantification of posterior staphyloma morphology, offering a scalable tool for classifying staphyloma subtypes and assessing their relationship to macular degeneration.

Abstract No.: 206741

Benchmarking Next-Generation Reasoning-Focused Large Language Models in Ophthalmology

First Author: Minjie Killian ZOU

Co-Author(s): Qingyu CHEN, Thaddaeus Wai Soon LO, Sahana SRINIVASAN, Yih Chung THAM

Purpose: Large language models (LLMs) with the advent of “reasoning-focused” show promise in healthcare yet remain understudied in specialized domains like ophthalmology. This study comprehensively evaluated the accuracy and reasoning capabilities of four reasoning-focused LLMs: DeepSeek-R1, OpenAI o1, OpenAI o3-mini, and Gemini 2.0 Flash-Thinking.

Methods: Each model was assessed via its respective APIs using 5,888 multiple-choice ophthalmology exam questions from the MedMCQA dataset. Accuracy, Macro-F1, text-generation metrics (METEOR, ROUGE-L, BERTScore, BARTScore, AlignScore) and inference time were assessed. Memorization test for exact token matches was conducted to address potential data leakage. Three ophthalmologists reviewed reasoning quality of LLMs’ outputs on 40 differential-diagnosis MCQs, rated on factuality, completeness, brevity, and safety using a five-point Likert scale.

Results: O1 (0.902) and DeepSeek-R1 (0.888) showed highest accuracy ($p < 0.001$). Meanwhile, inconsistencies across text-generation metrics were detected. O1 performed best on METEOR (0.232, $p < 0.001$), while o3-mini led on ROUGE-L (0.151) and AlignScore (0.181). DeepSeek-R1 (0.673) and o3-mini (0.673) tied for BERTScore; DeepSeek-R1 (-4.105) and Gemini 2.0 Flash-Thinking (-4.127) excelled on BARTScore. Inference time varied, with DeepSeek-R1 slowest (40.3s) and Gemini 2.0 Flash-Thinking fastest (6.7s). Memorization analysis found no exact matches, confirming models did not rely on memorized content. Models performed similarly well on factuality and safety, but o3-mini (12.925) scored lowest for completeness and Gemini 2.0 Flash-Thinking (10.500) in brevity.

Conclusions: Reasoning-focused LLMs show promise for ophthalmology, though trade-offs exist between accuracy, reasoning quality, and inference speed. The absence of a clear best-performing model underscores the need for multi-metric benchmarking before considering clinical deployment.

Abstract No.: 207281

Benchmarking Performance of an Agentic Pipeline in Conducting Meta-Analysis

First Author: Wai Chak CHOY

Co-Author(s): Oscar Hou In CHOU, Yam Cheuk Sing JASON, Hin Wah Lotus YU

Purpose: To investigate the accuracy and performance of a large language model-based agentic pipeline in performing steps of meta-analysis.

Methods: Three published meta-analyses were extracted from the JAMA Ophthalmology, covering pars-plana vitrectomy outcome, anti-vascular endothelial growth factor injection approach, and ocular adverse events for semaglutide. Abstracts and full-texts were retrieved manually from literature search engines following the specified search strategy and time frame from the original studies. We then tested the performance of the pipeline in abstract screening, full-text, screening, and extraction of study details. Manual labels were created and compared with pipeline outputs. Meta-analyses were repeated on the extracted dataset, with result compared to the original study.

Results: 712, 102, 3000 abstracts were retrieved. Across the 3 published meta-analyses, abstract screening achieved accuracy, precision, recall and AUC of 96.00 (95.13-96.87), 91.85 (90.68-93.02), 96.70 (94.76-98.64), and 92.22 (90.25-94.19) respectively. Full-text screening achieved accuracy, precision, recall and AUC of 96.00 (95.13-96.87), 95.95 (95.02-96.88), 96.70 (94.76-98.64) and 96.22 (94.25-98.19) respectively. Extraction of study parameters from full text achieved accuracy, precision, recall and AUC of 84.91 (82.41 – 87.41), 85.15 (82.62 – 87.68), 83.69 (78.02 – 89.36), and 86.26 (81.57 – 90.95) respectively. For the completed meta-analysis, the direction of conclusion aligns with the original study. Pooled estimate was found to have a mean difference of -0.1083 (-0.313-0.096). Paired t-test found no statistically significant differences ($P=0.2308$)

Conclusions: The advancement of language models may assist in literature review with careful design of the workflow. Human-in-the-loop approach may improve reliability with increased efficiency. Caution is still needed for model inaccuracy and hallucination.

Abstract No.: 207141

Beyond Grading: Non-Invasive Prediction of Angiographic Concepts From Fundus for Personalized Management and Treatment Planning in Diabetic Retinopathy

First Author: Hui TANG

Co-Author(s): Xiaomeng LI, Yanchun ZHANG

Purpose: Fundus Fluorescein angiography (FFA) provides critical information on retinal ischemia, vessel leakage for clinical managing diabetic retinopathy (DR)

but is invasive and resource-intensive. We aim to non-invasively predict these essential FFA concepts directly from fundus images to revolutionize DR management.

Methods: Current AI systems for fundus images perform grading or fundus lesion detection, but do not predict the FFA concepts required for personalized treatment planning. We introduce CURE (Cross-modality Understanding for Diabetic Retinopathy Evaluation), a pioneering model that uses cross-modality concept learning to predict FFA concepts from fundus images, enabling continuous, non-invasive monitoring.

Results: For DR grading, CURE achieves superior accuracy (78.0% vs. 62.0%), F1-score (76.4% vs. 58.6%), sensitivity (76.3% vs. 58.2%), and specificity (95.6% vs. 92.6%) compared to senior ophthalmologists. For predicting FFA concepts, CURE demonstrates a functional breakthrough, identifying five microvascular lesions undetectable by the naked eye. For three physician-detectable symptoms, it shows higher accuracy (90.0% vs. 87.3%), F1-score (72.9% vs. 71.2%), and sample-level accuracy (72.0% vs. 66.0%).

Conclusions: CURE non-invasively predicts crucial FFA concepts from fundus images, filling a critical gap in current AI systems. It enhances diagnostic performance, provides interpretable insights for risk stratification, and reduces the need for invasive FFA. This tool is poised to improve personalized treatment planning, guide timely referrals, and optimize patient outcomes in DR management.

Abstract No.: 200938

Can 'Deep Research' Agents and General Agentic System Autonomously Perform Systematic Review and Meta-Analysis?

First Author: Wan Ting **LOKE**

Co-Author(s): Pearse **KEANE**, Sahana **SRINIVASAN**, Yih-chung **THAM**, Gabriel Dawei **YANG**

Purpose: 'Deep Research' agents and general agentic systems have recently emerged, claiming to actively search and evaluate web content to generate insights. Their ability to conduct complete systematic reviews and meta-analyses, however, remains largely untested. We evaluated three 'Deep Research' agents (OpenAI, Google Gemini, Perplexity) and one agentic system (Manus AI) on performing these tasks autonomously.

Methods: Using a recently published review on screen time and myopia risk across 45 studies as a reference standard, we applied a structured two-part prompt and assessed outputs in five domains: sources cited, search term generation, study retrieval, figures and tables generation, and synthesis of findings. Three reviewers independently rated each domain as "Good," "Borderline," or "Poor," with ratings determined by majority consensus.

Results: For search term generation, Manus AI was rated "Good", while the other three agents were "Borderline." For study selection, Manus AI retrieved 10 papers, whereas the others retrieved the correct total count of 45 studies. In extracting key findings, OpenAI and Perplexity performed well, Manus AI was "Borderline," and Gemini performed poorly. None produced scientifically robust figures or tables (OpenAI being "Borderline", the rest being "Poor"). Manus AI uniquely provided detailed search steps and completed the meta-analysis autonomously but fabricated all its 10 selected studies and 5 of 40 citations.

Conclusions: While these agents may assist with early-stage literature exploration, their current capacity to execute rigorous systematic reviews and meta-analyses remains limited. Robust evaluation methods are needed before autonomous agents can be reliably integrated into routine research workflow.

Abstract No.: 207380

Can Corneal Epithelial Mapping Predict Postoperative Visual Quality and Patient Satisfaction in Cataract Surgery?

First Author: Gaurav **PANDE**

Co-Author(s): Abha **SHAH**, Rohit **SHETTY**, Vibha **SINGH**

Purpose: To evaluate how preoperative corneal epithelial mapping impacts postoperative visual quality and patient-reported quality of life (QoL) in cataract surgery patients, using Artificial Intelligence (AI) to identify predictive markers.

Methods: 250 patients underwent pre and postoperative evaluation, including epithelial mapping (Placido Ocular Coherence Tomography and Ray-tracing based system) and tear biomarker analysis using the BioM Pathfinder kit. Based on epithelial status, Group 1 (n=169) had regular epithelium and Group 2 (n=81) had irregular epithelium. Postoperative assessments included Uncorrected Visual Acuity (UCVA), Patient-Reported Outcomes with LASIK (PROWL) scores, Optical Quality Analysis System (OQAS), and epithelial/corneal Higher order aberrations (HOAs). AI algorithms were applied to identify predictors of visual and QoL outcomes.

Results: UCVA gains were comparable across groups. However, Group 1 had significantly better visual quality and QoL scores (PROWL<80 in 162/169 patients), while Group 2 had poorer outcomes (PROWL>120 in 48/81). Corneal HOAs and inflammatory biomarkers were markedly elevated in Group 2 (p<0.05). AI identified epithelial irregularity as a key predictor of both reduced visual quality and lower QoL.

Conclusions: Corneal epithelial mapping and tear biomarkers serve as effective surrogate markers for predicting both visual outcomes and postoperative quality of life following cataract surgery. Preoperative

epithelial mapping helps predict and optimize visual quality after cataract surgery.

Abstract No.: 202323

Community-Based External Validations of a Retinal Photo-Based Deep Learning Model for Disease-Related Visual Impairment Detection

First Author: Samantha YEW

Co-Author(s): Yibing CHEN, Jocelyn GOH, Xiaofeng LEI, Yih-chung THAM

Purpose: To externally validate deep learning (DL) models (foundation model, convolution neural network, vision transformers) in detecting disease-related visual impairment (VI) using retinal images, in a community screening setting.

Methods: Using 15,227 dilated retinal images from the Singapore Epidemiology of Eye Disease (SEED) population cohort, we developed four different models of different backbone architectures, namely foundation model RETFound, ResNet50+XGBoost, ViT-base, and SwinV2. We then retrospectively tested the four models externally on 519 undilated retinal images from 272 participants (age: >50 years old) collected from a community vision screening program. Disease-related VI was defined as pinhole visual acuity worse than 6/12 with an ophthalmologist-confirmed eye disease. Model performance was assessed using the area under the receiver operating characteristic curve (AUC), with statistical comparisons of traditional models against RETFound performed using DeLong's test.

Results: In this community-based external validation, RETFound recorded an AUC of 0.785 (95% CI: 0.735-0.832), followed by 0.789 (95% CI: 0.741-0.834) in ViT-base, 0.777 (95% CI: 0.721-0.823) in SwinV2, and 0.751 (95% CI: 0.691-0.805) in ResNet50+XGBoost. There were no significant differences between these models (all $P \geq 0.36$). At 80% sensitivity, RETFound showed marginally higher specificity (62.2%) compared to SwinV2 (60.3%), ViT-base (58.8%), and ResNet50+XGBoost (53.8%).

Conclusions: When tested externally on a non-dilated, community-based dataset, neither retinal-based foundation model, convolutional neural network, nor vision transformer model architectures achieved optimal performance. This underscores the persisting challenges of deploying DL models in real-world community settings. Future strategies in mitigating the domain gap and improving generalisability are needed.

Abstract No.: 204383

Comparative Analysis of Deep Learning Architectures for Cardiovascular Risk Classification in Fundus Imaging

First Author: Mujeeb Ur REHMAN

Co-Author(s): David MASIP RODÓ

Purpose: To compare five deep learning architectures for cardiovascular risk classification using retinal fundus images and establish optimal hyperparameter configurations for automated, non-invasive screening. Carotid intima-media thickness (CMT) was utilized as a surrogate marker for cardiovascular risk.

Methods: Five models (RetFound, ResNet18, ConvNeXt, DINOv2, EfficientNet) were evaluated on the China Fundus CMT dataset, comprising 5,806 images from 2,903 patients. A patient-wise data split (80/20) was used to prevent data leakage. Nine experimental setups varied learning rates, batch sizes, optimizers, and loss functions per model were performed. A CMT threshold of $\geq 0.9\text{mm}$ defined high cardiovascular risk. The primary performance metric was the area under the receiver operating characteristic curve (AUC-ROC), supplemented by accuracy, F1-score, precision, and recall.

Results: RetFound achieved the highest performance with an AUC of 0.849, 78.66% accuracy, and an F1-score of 0.838, using a low learning rate (1×10^{-5}), the AdamW optimizer, and weighted Cross-Entropy loss. Vision Transformer-based models, particularly RetFound, dominated the top results. ConvNeXt was the best-performing CNN (AUC = 0.844), and DINOv2 showed excellent recall (93.4%). Low learning rates and the AdamW optimizer were consistently linked to better performance, whereas high learning rates led to training instability.

Conclusions: Transformer-based architectures with domain-specific pretraining, like RetFound, represent the state-of-the-art for fundus-based cardiovascular risk assessment. This study highlights that meticulous hyperparameter optimization, especially using very low learning rates, can be crucial for clinical AI applications. These findings support the potential of automated retinal analysis for scalable, non-invasive cardiovascular screening.

Abstract No.: 200543

Construction of a Deep Learning-Based AS-OCT Image Analysis System and Its Application in Auxiliary Diagnosis of Corneal Diseases

First Author: Dongfang LI

Purpose: To develop an anterior segment optical coherence tomography (AS-OCT) image analysis system based on deep learning and evaluate its performance in the automatic recognition and localization of common corneal lesions and features.

Methods: A total of 4,026 patients (5,617 eyes) who visited our hospital were enrolled. Their AS-OCT images were used as the training set. Clinical physicians manually annotated 16 types of corneal features with their locations, as well as the tissue stratification of the corneal epithelium and stroma. The corneal feature pre-inspection model was evaluated using accuracy, sensitivity, and specificity, while the corneal stratification model was evaluated using the overlap rate (Dice coefficient) between model-annotated regions and manually annotated regions.

Results: In the 5,617 images of the training set, 1,472 cases of corneal epithelial defect, 2,416 cases of epithelial thickening, 2,001 cases of corneal thinning, 780 cases of corneal anterior protrusion, 2,064 cases of corneal thickening, 358 cases of subepithelial blisters, 486 cases of subepithelial opacity, 1,010 cases of corneal ulcer, 3,635 cases of stromal opacity. Compared with manual annotations, the corneal feature detection model showed an average sensitivity of 96.5% and an average specificity of 96.1% for the 16 features. There were 15 images with missed features, resulting in a missed detection rate of 0.93%.

Conclusions: This system can provide physicians with information on the types and locations of corneal features in AS-OCT images with high accuracy, which may help ophthalmologists improve diagnostic efficiency and accuracy.

Abstract No.: 206720

Deep Learning Prediction of Childhood Myopia Progression Using Fundus Image and Refraction Data

First Author: Mengtian **KANG**

Co-Author(s): Shi-ming **LI**

Purpose: To develop and validate a deep learning method for predicting myopia progression trajectory and high myopia risk in children using only fundus images and baseline refraction data.

Methods: Longitudinal school-based cohort study conducted from February 2012 to 2018 with 5 years of annual follow-up (analysis reported in 2025). Grade 1 students enrolled in the Anyang Childhood Eye Study (ACES). Myopia was defined as spherical equivalent refraction (SER) ≤ -0.5 D and high myopia as ≤ -6.0 D by cycloplegic autorefraction. Children who received myopia control treatments, had amblyopia, or underwent strabismus surgery were excluded. Area under the curve (AUC) for predicting myopia and high myopia risk and mean absolute error (MAE) for SER prediction using a deep learning model combining convolutional (ResNet34) and recurrent (LSTM) neural networks analyzing 16,211 fundus images.

Results: Among 3048 Chinese children (mean age 7.1 ± 0.4 years, 43.74% males), baseline prevalence of myopia and high myopia were 5.71% and 0.49%.

The deep learning model achieved AUC scores of 0.941 (95% CI, 0.936-0.946) for myopia risk prediction and 0.985 (95% CI, 0.982-0.988) for high myopia risk prediction, with an overall MAE of 0.322 D per year for SER prediction. External validation in Beijing ($n=130$, primarily Han Chinese) and Lhasa ($n=1039$, 96.9% Tibetan) cohorts demonstrated maintained cross-ethnic performance with MAE of 0.355 D and 0.261 D per year, respectively.

Conclusions: In this cohort study of Chinese children, deep learning accurately predicted myopia progression using minimal baseline data. This approach demonstrates promise for large-scale screening and early intervention in resource-limited settings.

Abstract No.: 202287

Deep Learning-Derived Retinal Aging Marker Reflects Multisystem Physiological Dysregulation: Findings From the UK Biobank

First Author: Krithi **PUSHPANATHAN**

Co-Author(s): Ching-yu **CHENG**, Yih-chung **THAM**, Can Can **XUE**, Gabriel Dawei **YANG**, Marco **YU**

Purpose: Retinal imaging-based markers are promising, non-invasive indicators of biological aging. RetiPhenoAge, a deep learning-derived estimate of phenotypic age from retinal photographs, has shown associations with multiple morbidities and mortality. However, its relationship with multisystem physiological dysregulation, a fundamental driver of aging-related health risks, remains unclear.

Methods: This cross-sectional study included 25,958 UK Biobank participants with complete data on RetiPhenoAge and relevant clinical measures. Biological Health Score (BHS), derived from 13 biomarkers across cardiovascular, metabolic, inflammatory, liver, and kidney systems, captured cumulative physiological dysregulation. Higher BHS indicate greater dysregulation. Associations between RetiPhenoAge and BHS were examined using multivariable linear regression adjusted for demographic, socioeconomic, lifestyle, and systemic health factors. Comparative analyses were performed between RetiPhenoAge and established aging markers, including telomere length, physical activity, handgrip strength.

Results: Higher RetiPhenoAge was associated with greater BHS (per SD increase, $\beta=0.01$, 95% CI: 0.01–0.02, $p<0.001$), independent of confounders. Highest RetiPhenoAge quartile showed 0.05 greater BHS (95% CI: 0.04–0.06, $p<0.001$) than the lowest. When BHS was segregated into system-specific measures, RetiPhenoAge showed strongest associations with immune- ($\beta=0.02$, $p<0.001$) and cardiovascular-specific BHS ($\beta=0.02$, $p<0.001$). Across the overall cohort and within demographic and clinical strata, RetiPhenoAge largely outperformed other aging biomarkers. Furthermore, significant interaction effects were observed between older RetiPhenoAge and

hypertension, as well as obesity ($\text{BMI} \geq 30$), in amplifying BHS (both $p < 0.001$).

Conclusions: Older RetiPhenoAge is associated with greater systemic physiological dysregulation, supporting its validity as a non-invasive retinal marker of systemic aging. Future longitudinal studies are warranted to evaluate the role of RetiPhenoAge in tracking BHS.

Abstract No.: 206177

Development and Validation of DeepOrient: A Deep Learning-Based System for Automatic Standard Orientation Recognition of Pediatric Fundus Images

First Author: Ping **LIU**

Co-Author(s): Zhenquan **WU**, Guoming **ZHANG**, Xinyu **ZHAO**

Purpose: To develop and validate DeepOrient, a deep learning system for automatic standard orientation recognition of pediatric fundus images, addressing the low efficiency and poor accuracy of manual interpretation, especially for conditions like retinopathy of prematurity (ROP).

Methods: Retrospective analysis was conducted on 19,166 RetCam fundus images (from 3,651 children, 2005–2023) from two hospitals, covering 10 standard and 1 non-standard orientations. Two models were compared: a cascaded Model 1 (using You Only Look Once version 8 [YOLOv8] for optic disc/macula detection, combined with Gaussian Mixture Model [GMM] and vascular features) and an end-to-end YOLOv8-based Model 2. Evaluation metrics included accuracy, F1-score, and area under the receiver operating characteristic curve (AUC).

Results: Model 2 outperformed Model 1 (internal/external AUC: 0.992/0.991 vs 0.924/0.874) with no performance decay, while Model 1 showed overfitting (external F1-score dropped to 0.730). Merging similar orientations further improved Model 2 (external F1-score: 0.917 vs 0.851).

Conclusions: DeepOrient fills the gap in automatic fundus orientation recognition, with strong generalization. It enhances the standardization of ROP/diabetic retinopathy (DR) screening, and prospective multi-center validation is needed.

Abstract No.: 206657

Development and Validation of a Foundation Model for ROP Screening Based on Self-Supervised Learning and Uncertainty Estimation

First Author: Kunliang **QIU**

Co-Author(s): Qianqian **HE**, Jianwei **LIN**, Mingzhi **ZHANG**

Purpose: To develop a self-supervised foundation model for ROP screening with an uncertainty-based referral strategy, and to validate its performance and generalizability across multiple datasets.

Methods: A ConvMAE-based self-supervised model was pretrained on 168,713 unlabeled infant fundus images from the Joint Shantou International Eye Center (JSIEC) ROP database (2010–2020). The model was fine-tuned on 48,540 annotated images from four institutions according to the International Classification of ROP. Uncertainty scores were computed by modeling the predicted probabilities with a beta distribution, and an optimal referral threshold was determined via the Youden Index to enable human–AI collaborative diagnosis.

Results: On the internal validation set (4,813 images), the model achieved an F1 score of 0.769 and an AUC of 0.9652; after uncertainty-based referral, the F1 score increased to 0.928 and AUC to 0.9687. On the internal test set (7,492 images), the F1 score improved from 0.810 to 0.954 and the AUC from 0.9844 to 0.9910. Robust performance was maintained in the SZEI (756 images) and HVDROPDB (185 images) external datasets, with further gains after referral. t-SNE visualizations confirmed class separability.

Conclusions: This ConvMAE-based self-supervised model, combined with uncertainty estimation, achieves high diagnostic accuracy and enhances reliability, offering a robust tool for real-world ROP screening.

Abstract No.: 200915

Development of an AI-Based Triage System for Myopic Tractional Maculopathy With a Focus on Maculoschisis

First Author: Anas **ABU SAID**

Co-Author(s): Shihao **CHEN**, Mingxin **DAI**, Yanfeng **SU**

Purpose: To develop and evaluate an artificial intelligence (AI)-based triage system for classifying maculoschisis stages in high myopia and providing consistent referral recommendations.

Methods: A retrospective study was conducted using 2,267 OCT images from 497 high myopia patients, each labeled for maculoschisis stage (0–4) by retina specialists. A DenseNet161 deep learning model was trained to classify stages, both with and without integration of patient metadata (age, axial length, visual acuity, gender). Model performance was

assessed by classification accuracy, Cohen's Kappa agreement with retina specialists, and comparison with non-retina specialists in staging and referral tasks.

Results: The DenseNet161 model achieved a classification accuracy of 92.97%, improving to 93.69% with metadata integration. Agreement with retina specialists was high (Cohen's Kappa = 0.867). The AI system outperformed non-retina specialists in both staging accuracy and referral decision-making, demonstrating particular value in non-specialist and resource-limited settings.

Conclusions: The AI-based triage system reliably classifies maculosis stages and improves referral consistency, matching retina specialist performance and surpassing non-specialist accuracy. This approach has the potential to enhance early detection and management of myopic tractional maculopathy in settings lacking subspecialty expertise.

Abstract No.: 201721

Diagnostic Accuracy of Artificial Intelligence in Detecting Diabetic Retinopathy in a Real-World Setting in Nepal

First Author: Arjun **SHRESTHA**

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Purpose: Manual grading of retinal images for diabetic retinopathy (DR) is resource-intensive and time-consuming, particularly in low-resource settings. Artificial Intelligence (AI) offers a scalable alternative for DR screening. The purpose of this study is to evaluate the diagnostic performance of Cheers AI system, an AI-based screening tool, in detecting diabetic retinopathy compared to human graders in a clinical setting in Nepal.

Methods: Patients with diabetes underwent fundus imaging using a nonmydriatic portable camera. One macula-centered image per eye was analyzed by Cheers AI system which was based on deep learning model with Inception-v3 architecture. Retina image was independently graded by a retina specialist also. Sensitivity, specificity, positive prediction value, negative prediction value and accuracy of artificial intelligence in detecting diabetic retinopathy was compared with human grader (Retina Specialist) as standard. Computing was done using statistic test.

Results: A total of 281 eyes were assessed. Cheers AI demonstrated a sensitivity of 73.44%, specificity of 96.77%, PPV of 85.06%, NPV of 93.58%, and overall accuracy of 91.75%, all within acceptable confidence intervals.

Conclusions: Cheers AI achieved high specificity and accuracy in detecting diabetic retinopathy, meeting recommended thresholds for screening. Further algorithm training may enhance sensitivity, supporting its potential role in expanding DR screening in resource-limited settings.

Abstract No.: 200885

Domain Adaptation of Glaucomatous Optic Neuropathy (GON) Model Across OCT Vendors

First Author: Anni **LING**

Co-Author(s): Carol Y. **CHEUNG**, Anran **RAN**, Clement C. **THAM**, Bowen **XU**

Purpose: Glaucoma is the foremost cause of irreversible blindness worldwide. Detecting glaucomatous optic neuropathy(GON), which is a pivotal diagnostic marker, has been greatly advanced by artificial intelligence(AI) analysis of 3D optical coherence tomography(OCT) volumes. However, marked variation in imaging characteristics across OCT vendors produces a domain shift that undermines model performance outside the source-device. This study proposes and validates a robust domain-adaptation framework that transfers a high-performing GON-classification model to another OCT vendor.

Methods: A retrospective paired dataset built from a cohort of 256 participants encompassing patients with various types of glaucoma, and healthy controls. All participants underwent same-day imaging with Cirrus(Carl Zeiss Inc.) and Maestro 2(Topcon Inc.) OCT devices. Our framework included:(1) Automated pseudo-label transfer from Cirrus to paired Maestro 2 scans using an established GON classifier; (2) Adaptation via fine-tuning using pseudo-labelled Maestro 2 data only; (3) Validation on a non-overlapping test set from Maestro 2 and labelled by an experienced grader.

Results: The analysis included 498 eyes from 256 participants(age: 63.37 ± 15.18 years; female: male = 138:118), training: validation = 4:6. Before adaptation, the model achieved: accuracy 0.73, F1 score 0.71, sensitivity 0.71, specificity 0.76 and AUROC 0.78. After adaptation, the model achieved: accuracy 0.89, F1 score 0.88, sensitivity 0.87, specificity 0.90, and AUROC 0.95, effectively restoring diagnostic performance to near source-device level.

Conclusions: This domain adaptation markedly improves cross-device generalizability of OCT-based AI, potentially enabling future deployment on different OCT vendors without exhaustive retraining.

Abstract No.: 207839

Economic Outcomes of AI-Based Diabetic Retinopathy Screening: A Systematic Review and Meta-Analysis

First Author: Yue **WU**

Co-Author(s): Xiaotong **HAN**, Mingguang **HE**, Yueye **WANG**

Purpose: Artificial Intelligence (AI) has emerged as a promising tool to improve diabetic retinopathy (DR) screening efficiency, accessibility and cost-effectiveness. This study conducted a systematic

review of literature and meta-analysis on the economic outcomes of AI-based DR screening.

Methods: A systematic review of studies published before September 2024 was conducted across five databases. Eligible studies were included if they (1) were conducted among the adult diabetic population; (2) compared an AI-based DR screening strategy to a non-AI screening; and (3) performed a cost-effectiveness analysis. Meta-analysis was applied to pool incremental net benefit (INB) across studies stratified by country income and study perspective using a random-effects model. Statistical heterogeneity among studies was assessed using the I², Cochrane Q and meta regression.

Results: Nine studies were included in the analysis. From a healthcare system/payer perspective, AI-based DR screening was significantly cost-effective compared to non-AI-based screening. Subgroup analysis showed robust cost-effectiveness in high-income countries with low heterogeneity. From a societal perspective, AI-based DR screening was generally cost-effective, though the result lacked statistical significance and showed high heterogeneity. Besides, our meta-regression analysis showed that AI specificity was positively correlated with the INBs from a healthcare system perspective ($p=0.031$), in addition to status quo comparator type ($p=0.031$ and $p=0.011$ in societal and healthcare perspective, respectively).

Conclusions: AI-based DR screening is generally cost-effective from a healthcare system perspective, particularly in high income countries. Heterogeneity across different perspectives highlights the importance of contexts specific evaluations, to accurately evaluate the potential of AI-based DR screening in reducing global healthcare disparities.

Abstract No.: 201838

Evaluating the Utility of Multimodal ChatGPT-4 in Detecting Strabismus Using Anterior Segment Images

*First Author: Kirandeep KAUR
Co-Author(s): Bharat GURNANI*

Purpose: Strabismus is a common pediatric ocular disorder requiring timely diagnosis to prevent amblyopia and long-term visual impairment. Access to specialized care remains limited in many regions. This study aimed to evaluate the diagnostic accuracy of ChatGPT-4 in identifying strabismus using ocular imaging without prior training or fine-tuning.

Methods: The Ocular Imaging Strabismus Dataset (OISD), containing 300 test images, was used. ChatGPT-4 was tasked with classifying each image as “Likely Strabismus” or “Likely Non-Strabismus.” No domain-specific retraining or fine-tuning was performed, ensuring that diagnostic performance reflected baseline capacity. A confusion matrix was

constructed, and standard metrics, including accuracy, sensitivity, specificity, precision, and F1 score, were calculated with 95% confidence intervals.

Results: ChatGPT-4 correctly identified 87% of cases overall (accuracy: 87%, 95% CI: 83–91%). The model detected strabismus with a sensitivity of 65% (95% CI: 55–75%), capturing the majority of true positives, though missing some subtle presentations. Specificity was robust at 92% (95% CI: 87–97%), minimizing false positives and demonstrating strong reliability in confirming normal alignment. Precision was 60% (95% CI: 50–70%), indicating that 6 in 10 positive predictions were true strabismus cases, while the negative predictive value was 89%, highlighting the model’s ability to confidently exclude non-strabismus cases. The F1 score of 0.62 suggested a balanced though imperfect trade-off between sensitivity and precision.

Conclusions: ChatGPT-4 achieved high accuracy and specificity in detecting strabismus without fine-tuning, supporting its potential as a screening tool in resource-limited settings.

Abstract No.: 207250

Evaluation of a Scalable AI-Assisted Optometrist Model for Posterior Segment Conditions and Public Awareness of Diabetic Retinopathy Screening at the World’s Largest Religious Mass Gathering

*First Author: Kaushik MURALI
Co-Author(s): Jayamadhury GUDIMETLA, Ranjitha K, Payal NARESH, Anusha PURUSHOTHAM, Praveen REDDY*

Purpose: Across Asia-Pacific and Low- and Middle-Income Countries (LMIC), health systems face dual burden of rising diabetes and limited access to specialists. We evaluated whether an AI-assisted optometrist model using a smartphone-based fundus camera (Remidio Fundus on Phone, FOP NM10) could deliver accurate posterior segment screening at Mahakumbh 2025—the world’s largest religious gathering—and assessed whether such mass events can also raise public awareness of diabetic retinopathy (DR) screening.

Methods: Non-mydratic retinal images were collected from 4,329 participants using FOP NM10 with integrated offline MediosHI 3-in-1 AI (diabetic retinopathy, glaucoma, age-related macular degeneration). Subset of gradable images independently assessed by two ophthalmologists (reference standard) and compared with grading by two optometrists, one aided by AI and one unaided. 1,477 attendees completed survey on demographics, diabetes status, prior awareness of DR screening and knowledge gain post-exposure at Khumb.

Results: Referrable DR in 13.5% and glaucoma suspected in 8.5% screened. 736 participants graded

(1,472 eyes; mean age 52.6±14.4 years, 38% female), ophthalmologists found 98.1% gradable, with 2.4% showing pathology (DR 0.3%, AMD 1.35%, glaucoma 0.3%, BRVO 0.15%, choroiditis 0.15%, macular hole 0.15%). Inter-ophthalmologist agreement was 91.2%. AI-assisted optometrists achieved 95% agreement with the reference standard and AI reduced false positives by 28% (31 to 19 cases). 7% had prior DR awareness; 54% diabetics were unaware, but 68% reported improved awareness after the event.

Conclusions: Smartphone-based AI enables scalable, reliable screening in high-volume, resource-limited LMIC settings. Large mass gatherings can serve as effective public health platforms, providing opportunity to educate and offering a replicable model to reduce avoidable blindness.

Abstract No.: 204354

Exploration of Clinical Predictive Models for Rotational Stability After Toric Intraocular Lens Implantation

First Author: Ruihong JU

Purpose: This study aims to explore the clinical predictive models for rotational stability after toric IOL lens implantation.

Methods: A retrospective case series study was conducted. This study analyzed clinical data from patients who underwent Phaco combined with Toric IOLs implantation between 2018 and 2023, with complete follow-up examinations at 1 week and 1 month postoperatively. A large-scale clinical database was established to evaluate visual acuity, refractive status, residual astigmatism (RAS), and rotational stability following Toric IOL implantation. The construction and analysis of the predictive model included data set division and preprocessing, model training and validation, model explainable SHAP analysis, and model application with WeChat mini-program.

Results: Five machine learning (ML) models were constructed and evaluated, namely Random Forest (RF), XGBoost, LightGBM, Logistic Regression (LR), and Support Vector Machine (SVM). Among them, the RF model was determined as the optimal predictive model (AUC=0.740). According to SHAP values, the feature importance ranking from high to low was as follows: outpatient, ACP during surgery, age, IOL Loop design, Emery, axial length (AXL) and high intraocular pressure on the first day after surgery (Higher IOP, > 21 mmHg). Based on the results of the optimal predictive model, a WeChat mini-program titled "Postoperative Rotation Risk Prediction Calculator for Toric IOLs" was developed to apply the predictive model in clinical practice.

Conclusions: The primary clinical predictive factors identified were outpatient, ACP, age and IOL loop

design. The WeChat mini-program (Postoperative Rotation Risk Prediction Calculator for Toric IOLs) provided a convenient and practical risk prediction tool for ophthalmologists and patients.

Abstract No.: 206615

EyeDiff: Text-to-Image Generative Foundation Model Improves Rare Eye Disease Diagnosis

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Co-Author(s): Xiaolan CHEN, Mingguang HE, Bowen LIU, Shunming LIU, Danli SHI, Pusheng XU, Weiye ZHANG

Purpose: Data scarcity and imbalance persist in training robust diagnostic models, particularly for rare cases. This study aims to introduce a generative foundation model designed to synthesize lesion-preserving ophthalmic images from textual descriptions, namely EyeDiff.

Methods: EyeDiff was trained using a stable diffusion architecture with paired textual instructions and ophthalmic images across 14 modalities, including color fundus photography (CFP), fundus fluorescein angiography (FFA), optical coherence tomography (OCT), etc. Quantitative (VQAScore) and human evaluations were conducted to assess EyeDiff's ability to generate diagnostic lesions as guided by textual instructions. We utilized RETFound, an established foundation model, as the backbone and evaluated EyeDiff's generalizability across ten global datasets for minority class augmentation and disease diagnoses, encompassing various common and rare retinal diseases. The performance of retinal disease diagnosis was measured using the area under the receiver operating characteristic curve (AUROC) and the area under the precision-recall curve (AUPR).

Results: The average VQAScore for lesions diagnosed based on OCT, CFP, and multimodal imaging is 0.822, 0.776, and 0.670, respectively. Authenticity evaluations by two clinicians indicated that the synthetic images were difficult to distinguish from real ones (Turing test: 50.0%–54.5%). EyeDiff-generated images can augment minority classes across ten datasets and enhance the diagnostic accuracy of the state-of-the-art RETFound model. These improvements were supported by increased AUROC and AUPR for multiple common and rare diseases.

Conclusions: EyeDiff demonstrates potential as a generalist model, offering an effective solution for obtaining rare ophthalmic images from simple text cues, thereby boosting the performance of expert-level disease detection models.

Abstract No.: 201771

FFA Sora: Generating Fundus Fluorescein Angiography Videos for Healthcare Data Sharing

First Author: Xinyuan WU

Co-Author(s): Ruoyu CHEN, Mingguang HE, Danli SHI

Purpose: To address patient privacy concerns in cross-centre data sharing, we developed a text-to-video model that converted textual description into dynamic FFA videos, facilitating diverse visual representations of retinal vascular and structural abnormalities.

Methods: The text-to-video model named FFA Sora was trained on 3,625 anonymized paired FFA videos and text reports (train: validation: test = 8:1:1). The model integrated two key components: the Wavelet-Flow Variational Autoencoder (WF-VAE) and the diffusion transformer (DiT). Its performance was rigorously assessed through objective metrics and human evaluations. FFA domain-specific evaluation was measured using the Bidirectional Encoder Representations from Transformers Score (BERTScore), and privacy-preserving performance was evaluated through retrieval evaluations using Recall@K.

Results: The generated FFA videos demonstrated high authenticity, as validated by objective metrics: Fréchet Video Distance (FVD) = 2273, Learned Perceptual Image Patch Similarity (LPIPS) = 0.48 ± 0.04 , and Visual-question-answering Score (VQAScore) = 0.61 ± 0.08 . Domain-specific evaluations showed high alignment between generated videos and textual prompts, with BERTScore of 0.35 ± 0.09 . Human assessments indicated visual quality, with an average score of 1.57 ± 0.44 (1=best, 5=worst). Additionally, the model demonstrated privacy-preserving capabilities in retrieval evaluations, achieving an average Recall@K of 0.073.

Conclusions: This study demonstrated that AI-driven text-to-video generation could potentially improve privacy-preserving data sharing. The diverse synthetic generated videos might also serve as an interactive learning tool for clinical and educational applications.

Abstract No.: 207267

From Baseline to Fine-Tuned: Evaluating MedGemma, Gemma-3, and Gemini-2.5-Flash in Ophthalmology Knowledge and Reasoning

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Purpose: We evaluated MedGemma-4B, Gemma-3-4B, and Gemini-2.5-Flash on ophthalmology-specific knowledge and reasoning tasks under zero-shot and fine-tuned conditions.

Methods: To prepare fine-tuning materials, we first converted 25 American Association of Ophthalmology Preferred Practice Patterns covering multiple ocular conditions and topics into 1,179 question-answer text-only (QA) pairs. Additional visual QA data were drawn from OphthalVQA (600 short-answer questions from 10 ophthalmological modalities) and EyeWiki (5,095 4-choice questions). These datasets were used to fine-tune all three VLMs. All baseline and fine-tuned VLMs were evaluated on BELO, an independent test set, consisting of 900 four-choice QA items. Accuracy was used to assess knowledge, while BERTScore (semantic similarity) and AlignScore (factual alignment) were used to evaluate reasoning. Statistical testing was performed using ANOVA with Tukey post hoc analysis.

Results: Baseline Gemini-2.5-Flash (0.86, 95% CI, 0.80-0.89) achieved the highest score in terms of accuracy ($p < 0.01$ compared with other models except for fine-tuned Gemini-2.5-Flash ($p = 0.89$)). Fine-tuned MedGemma achieved the highest BERTScore (0.71 95% CI, 0.71-0.71) ($p < 0.01$ compared with other models, except for baseline Gemma ($p = 0.16$)). Fine-tuned Gemma achieved the highest AlignScore (0.25 95% CI, 0.24-0.26; $p < 0.01$ compared with other models except for fine-tuned MedGemma ($p = 1.00$)).

Conclusions: Fine-tuning general-purpose VLMs with ophthalmology-specific data significantly improves reasoning performance, and may be sufficient without relying on medical-specific models. Further studies involving larger datasets will help to elucidate this aspect further.

Abstract No.: 206721

Global, Regional, and National Temporal Trends in Prevalence and Years Lived With Disability of Blindness and Vision Impairment, 1990–2021

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Purpose: This study comprehensively assessed the burden of blindness and vision impairment from 1990 to 2021, analyzing temporal trends in disease burden and associations with age, period and birth cohort.

Methods: The prevalence and years lived with disability (YLDs) were calculated by the Global Burden of Disease (GBD) study from 1990 to 2021. These indicators were stratified by sex, age and socio-demographic index (SDI). We calculated the correlation between them and SDI. Age-period-cohort analysis evaluated the independent effects of age, period and cohort. The temporal trends were examined using the annual average percentage change (AAPC) and joinpoint regression.

Results: Between 1990 and 2021, the number or rate of prevalence and YLDs witnessed an overall upward

trend worldwide, with a notably higher burden in females compared to males. Blindness has a decreasing trend, while moderate to severe visual impairment and presbyopia have an increasing trend. Age-stratified analysis revealed a progressive increase in the burden of blindness and vision impairment with age. YLDs rate analysis further demonstrated distinct leading causes across age groups. The highest YLDs were observed in the middle and low-middle SDI regions, while the lowest were in the low and high SDI regions, with substantial differences across countries.

Conclusions: This analysis revealed the urgent need for targeted geriatric care, gender-sensitive approaches, and equitable health policies to address this evolving public health crisis.

Abstract No.: 203689

Large-Scale Primary Strabismus Screening Employing a Smartphone-Based Digital Ruler: A Prospective Real-World Study

First Author: Ruixin **WANG**

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Purpose: Strabismus can adversely affect visual development in children, highlighting the importance of early detection and screening. Yet systematic screening in primary care remains lacking. This study evaluates the performance of the smartphone-based Digital Ruler of Strabismus in large-scale, real-world screening in primary care.

Methods: We developed the Digital Ruler of Strabismus (DRS), an automated smartphone-based application for strabismus diagnosis. Primary care physicians (PCP) recorded standardized 15-second cover test videos at a distance of 33 cm for each participant. All videos were independently assessed by the DRS and by strabismus specialists remotely, and diagnostic performance was evaluated against expert judgment under real-world conditions. In addition, PCPs completed a questionnaire regarding their perceptions of the DRS.

Results: In May 2025, a total of 18,657 participants were screened (9,794 female and 8,863 male, 3-19 years) in Fengqing, Yunnan Province. The DRS demonstrated high diagnostic performance with a sensitivity of 91.1%(87.7%-94.6%), specificity of 92.7%(92.4%-93.2%), and overall accuracy of 92.7%(92.3%-93.1%) compared with remote specialists' diagnosis. The one-time video acquisition success rate of DRS was 99% and the entire screening program was completed within 22 consecutive working days. The questionnaire indicated that over 85% of PCPs considered DRS greatly facilitated their screening work.

Conclusions: The DRS provides a practical paradigm for strabismus screening, achieving specialist-level diagnostic accuracy with consumer-grade smartphones.

It demonstrates strong potential for large-scale implementation and future contributions to public eye health.

Abstract No.: 205519

Latent Retinal Archetypes as a Potential Platform for Screening Glaucoma

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Purpose: To develop a method for quantifying individualized retinal characteristics from real-world optical coherence tomography (OCT) data, where multiple conditions coexist; to characterize normative aging changes in the retina; and to evaluate the utility of this approach for screening age-related diseases such as glaucoma.

Methods: We analyzed 189,387 OCT scans from 22,494 individuals. Latent retinal archetype modeling was applied to identify 36 archetypes describing spatial patterns in the macula and peripapillary regions. Associations between archetypes and age were examined, including subgroup analyses in myopic eyes. To assess clinical applicability, we evaluated whether archetypes reflecting macular ganglion cell-inner plexiform layer (mGCIPL) alterations, including temporal raphe sign-like patterns, improved glaucoma detection. Logistic regression models incorporating age and archetype features were validated with stratified 5-fold cross-validation.

Results: Age-related archetypes demonstrated diffuse or superior macular thinning, as well as inferior mGCIPL thinning in myopic individuals. In the peripapillary region, archetypes captured age-dependent vessel-trajectory-related changes. Archetypes resembling glaucomatous mGCIPL morphologies were strongly associated with glaucoma, and a parsimonious predictive model using age and selected archetypes achieved an AUC of 0.82.

Conclusions: This framework enables quantification of individualized retinal phenotypes from heterogeneous real-world OCT data. Latent retinal archetypes capture both physiological aging and disease-specific signatures, supporting their use as screening biomarkers for glaucoma and other age-related disorders.

Abstract No.: 201657

MM-Fundus-CLIP: A Multi-Modality Fundus Foundation Model Leveraging Large Language Model and Contrastive Language-Image Pre-Training

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Purpose: This study aimed to develop MM-Fundus-CLIP, a multi-modality fundus foundation model (FM) using contrastive language-image pre-training (CLIP). We investigated its generalizability and performance using open-source datasets (color-fundus photographs [CFP], ultra-widefield fundus photographs [UWF], and optical coherence tomography [OCT]) and compared it with previously reported multi-modality FMs, including FLAIR, Eye-CLIP, and RET-CLIP. Performance was evaluated using zero-shot inference and linear probing.

Methods: A total of 2.0 million fundus images across 11 imaging modalities and 0.8 million electronic medical records (EMRs) were collected from Seoul National University Hospital (SNUH). We generated synthetic summaries from the EMRs using Qwen 2.5. After matching the laterality of images and summarized texts, a total of 1.2 million image-text pairs were included for CLIP pre-training. Our final model, MM-Fundus-CLIP, was evaluated on 11 open-source datasets (6 CFP datasets, 3 UWF datasets, and 2 OCT datasets).

Results: MM-Fundus-CLIP consistently demonstrated good zero-shot performance. On UWF datasets, it achieved AUCs of 0.910 (OUWFD) and 0.841 (TOP). In OCT datasets, MM-Fundus-CLIP outperformed EyeCLIP, showing AUCs of 0.835 (OCTDL) and 0.944 (OCTID) compared to EyeCLIP (0.776 and 0.800, respectively). Across 6 CFP datasets, MM-Fundus-CLIP generally achieved the highest average AUCs (0.809) compared to FLAIR (0.670), EyeCLIP (0.714) and RET-CLIP (0.482). After linear probing, MM-Fundus-CLIP showed the highest average AUC on internal validation set (0.944) and external validation set (0.837) compared with FLAIR (internal: 0.887, external: 0.779), RET-CLIP (internal: 0.892, external: 0.766) and RETFound (internal: 0.785, external: 0.603).

Conclusions: MM-Fundus-CLIP, integrating 1.2 million image-text pairs, demonstrated superior performance to existing models across 11 open-source datasets.

Abstract No.: 203389

MRI-Based Radiomics and Deep Learning of Thyroid Eye Disease for Treatment Response Prediction: One-Slice Strategy

First Author: Huijie ZHANG

Co-Author(s): Duo Jin XIA, Haiyang ZHANG, Huifang ZHOU

Purpose: Magnetic resonance imaging (MRI)-based radiomics analysis demonstrates considerable potential in predicting the response to intravenous glucocorticoid (IVGC) treatment in thyroid eye disease (TED). Nevertheless, the conventional approach involving manual segmentation of the entire orbital region is characterized by a substantial investment of time and resources. Hence, our study explores the feasibility of leveraging single-slice MRI as an alternative avenue for the construction of prediction models.

Methods: In this retrospective cohort investigation, we enrolled a total of 127 patients diagnosed with TED who received 4.5 g of IVGC and underwent thorough follow-up assessments. Pre-treatment orbital T2-weighted imaging was acquired for all subjects. Two distinct segmentation approaches, including multi-slice segmentation and single-slice segmentation of the extraocular muscles, were employed. Subsequently, radiomics analysis, including three distinct machine learning algorithms, alongside deep learning (DL) algorithms, was applied to construct prediction models.

Results: Among the single-slice-based models, the model utilizing the third retrobulbar slice exhibited superior performance compared to the other three slices. Furthermore, it is noteworthy that single-slice-based models demonstrated comparable performance with multi-slice-based models. (radiomics: AUC = 0.850 vs. 0.863, respectively; DL: AUC = 0.900 vs. 0.908, respectively).

Conclusions: The study yielded favorable outcomes for models constructed utilizing both single-slice and multi-slice in the prediction of IVGC response among TED patients, with performance metrics showing comparability. This suggests that single-slice segmentation may serve as a cost-effective alternative strategy suitable for clinical implementation.

Abstract No.: 201151

MoEA-Net: Modality-Incremental Expert Aggregation Network for Retinal Prognostic Prediction

First Author: Jianing WANG

Co-Author(s): Hua WANG, Xiaobing YU, Xiaodan ZHANG, Yue ZHANG

Purpose: This study addresses challenges in automated retinal prognostic prediction using multi-modal temporal images: modality imbalance (uneven sample distribution) and heterogeneous visual patterns,

which hinder knowledge integration and perception of disease progression.

Methods: The proposed MoEA-Net unifies inter-modal integration and intra-modal perception. It employs Incremental LoRA (I-LoRA) layers on a Large Language Model (LLM) backbone to progressively incorporate new modalities without retraining, mitigating modality imbalance. Complementing this, a Spatiotemporal-aware Expert (SAE) module enhances intra-modal perception: its Spatial Context Aggregation (SCA) submodule captures anatomical structures via shared self-attention and diagnostic-aware pooling, while the Temporal Difference Aggregation (TDA) submodule identifies disease progression by highlighting lesion changes through patch-wise subtraction and confidence-weighted pooling. Extracted SAE features are projected into the LLM's embedding space and fused with textual prompts for joint prediction of subretinal fluid absorption and visual recovery.

Results: MoEA-Net achieved state-of-the-art performance on a longitudinal retinal dataset with 3,102 samples, attaining 90.1% accuracy for subretinal fluid absorption and 63.2% F1-score for visual recovery. It outperformed CNNs, multimodal fusion methods, and MLLM baselines by more than 5% in key metrics. Ablation studies confirmed the necessity of the SAE module, which increased the F1-score by approximately 5.8%, and demonstrated the effectiveness of integrating incremental modalities.

Conclusions: By dynamically integrating modalities via I-LoRA and enhancing spatiotemporal perception with SAE, MoEA-Net effectively addresses data bias in retinal prognosis, enabling continual learning and superior performance for clinical decision support.

Abstract No.: 207157

Novel Teleoptometry Using World's First Wearable, Wireless Subjective Refractor With Advanced Liquid Lens Technology in Community Eye Care

First Author: Disha AGARWAL

Co-Author(s): Namratha HEGDE, Kavita KUMAAR P K, Kaushik MURALI, Venkatakrishnan S, Kousar SIDIQ

Purpose: To validate the digital wearable subjective refractor and explore the feasibility of conducting remote subjective refraction in a remote setting for community eye care.

Methods: 3nethra Specto, equipped with liquid lenses that are controlled electronically, allowing fine regulation for subjective refraction, was validated on 540 eyes, comparing accuracy, agreement, and reliability of refractive measurements to conventional subjective refraction. Remote testing was conducted in a college, vision center and outreach camp. An optometrist operated the device remotely via teleoptometry with Real-time lens adjustments, guiding

on-site operators assisting patients. Results compared to standard refraction by an experienced optometrist at each site. Data from both eyes were included in the analysis.

Results: Mean spherical values were -0.97 ± 1.80 D (Specto) and -0.93 ± 1.77 D (subjective), with closely matching cylinder values (-0.52 D), axis variability clinically acceptable. Test-retest showed minimal deviation (-0.91 ± 1.82 D). Wilcoxon Signed-Rank testing revealed no significant difference in spherical equivalents ($p > 0.05$). Differences were noted in power vector components J0 and J45 ($p < 0.05$). Additionally, the percentage of measurements with agreement within ± 0.25 diopters was high, ranging from approximately 93.7% to 96.97%, and even higher within ± 0.50 diopters (97.4% to 98.5%), suggesting variation in cylindrical axis representation. Device performance depended on stable internet, with unstable connections limiting efficiency in some locations.

Conclusions: 3nethra Specto, with portability and teleoperated design demonstrates clinical accuracy in refractive assessment, validated through both controlled and remote community screening settings. Our approach validated across a variety of clinical settings demonstrates enhanced service efficiency by allowing expert oversight without physical presence, addressing resource constraints in community eye care.

Abstract No.: 203346

Predicting Visual Field Pattern Deviation Probability Maps From Volumetric OCT Scans

First Author: Deming WANG

Co-Author(s): Fei LI, Zefeng YANG, Xiulan ZHANG

Purpose: This study aims to develop a deep learning model that predicts visual field (VF) pattern deviation probability (PDP) maps from optical coherence tomography (OCT) scans, addressing the need for efficient glaucoma detection.

Methods: Using the EVA02 framework, the model was trained on 8,908 OCT-VF pairs from 5,604 participants. The focus was on OCT scans centered at the fovea and optic nerve head (ONH). Model performance was evaluated for accuracy on both macular and ONH scans.

Results: The model achieved accuracies of 0.84 for macular scans and 0.85 for ONH scans. Clinical validation with 200 samples demonstrated strong agreement in glaucoma diagnoses between senior and junior ophthalmologists, with Cohen's κ values of 0.86 and 0.73 when comparing OCT reports with clinically obtained or generated PDP maps.

Conclusions: The findings confirm that deep learning models utilizing OCT scans can effectively predict clinically useful PDP maps. This approach may enhance glaucoma diagnosis, particularly when traditional

VF data are unavailable, thereby facilitating timely intervention for patients.

Abstract No.: 204914

Real-World Evaluation of Online Visual Acuity Self-Testing and Remote Consultation: Three Years of Implementation Experience in a Paediatric Ophthalmology Service

First Author: Fengyi LIU

Co-Author(s): Raisa AHMED, Louise ALLEN, Bethany ELLIS, Deborah MULLINGER

Purpose: Our previous validation studies indicated that automated best corrected visual acuity (BCVA) testing using the DigiVis DVA web application is comparable to standard testing. Here, we evaluate real-world experience of digital BCVA self-testing (DVA) and remote consultation (RC) in a paediatric ophthalmology service.

Methods: Electronic records of children assigned follow up RC with home DVA testing for their routine clinical care between March 2021 and October 2024 were reviewed. Demographic and clinical features, test duration and usability scores were analysed. Serial clinician-tested BCVA and DVA results were compared using Bland-Altman statistical methods. Clinical outcomes and service adaptations were assessed.

Results: 205 RCs with DVA testing were scheduled for children (aged 4-14, median 6 years). DVA results were available for 192 (93.7%) RCs, with 166 (86.5%) tests undertaken asynchronously with telephonic consultation. The mean bias between serial clinician-tested BCVA and DVA was -0.005 logMAR ($p < 0.001$) with upper and lower limits of agreement of +0.182 (95%CI: 0.169 to 0.195) and -0.173 (-0.186 to -0.160) logMAR respectively. Expedited follow-up face-to-face consultations (f2fC) were arranged for 13 families unwilling or unable to self-test, 5 children with poor concentration and 9 with self-detected deterioration of BCVA. Informative DVA results were available for 187 (91.2%) encounters. 116 (81.7%) of 142 families voluntarily completing Likert scoring rated the application good/excellent.

Conclusions: In this real-world evaluation, 91.2% of offered DVA tests were informative and contributed to clinical decision-making. DVA correctly identified unexpected deterioration in 9 children supporting the utility of this innovative service model.

Abstract No.: 201623

Retinal Parameter Analysis for Cardiovascular and Cerebrovascular Diseases (CVDs) Risk Prediction in Diabetes: A Machine Learning Approach

First Author: Huanyan CHEN

Purpose: To evaluate the predictive potential for cardiovascular and cerebrovascular diseases (CVDs) risk stratification of retinal parameters extracted from fundus photos using automated image analysis, combined with clinical features.

Methods: Fundus images were processed using the Automorph to extract 64 quantitative retinal metrics, covering optic disc morphology, cup-to-disc ratios, vessel density, fractal dimensions, tortuosity indices, and arterial/venous measurements across global and zonal (B and C) regions. These were combined with 18 clinical and demographic variables, resulting in 84 tabular predictors. A range of machine learning classifiers were implemented—including Logistic Regression, Random Forest, CatBoost, LightGBM, XGBoost, Naïve Bayes and Decision Tree. Model performance was evaluated using the area under the receiver operating characteristic curve (AUROC), accuracy, recall, precision, and F1 score.

Results: Among the tested models, the top-performing one—Random Forest Classifier—achieved the AUC of 0.7678, surpassing traditional classifiers. Analysis of feature importance indicated that disc width, average vein width, tortuosity density, squared curvature tortuosity in zone C, and Knudtson-calculated AVR in zone B were the most influential predictors, outperforming most individual clinical risk factors. Moreover, combining retinal vascular metrics with demographic and biochemical variables further improved the AUROC compared with models based solely on clinical data.

Conclusions: AI-enabled quantitative retinal analysis combining with clinical features enhances prediction of CVDs risk in diabetes. This approach demonstrates that non-invasive, image-based risk stratification is feasible and holds potential for screening and precision medicine to facilitate earlier detection and intervention. .

Abstract No.: 202300

SCAR-AI: Smartphone-Based Community Assessment of Corneal Opacities and Referral for Keratoplasty Using Artificial Intelligence

First Author: Tavish GUPTA

Co-Author(s): Noopur GUPTA, Vivek GUPTA, Neiwete LOMI, Radhika TANDON, Jeewan Singh TITIYAL, M VANATHI, Praveen VASHIST

Purpose: There is a large burden of corneal blindness, most of which is avoidable. Our purpose was to create an Artificial Intelligence (AI) based smartphone

platform that can detect corneal opacities from smartphone images and identify patients requiring corneal transplantation, and to validate it in a community setting.

Methods: This was a population-based cross-sectional observational study to create the AI application, in which 2000 images of the cornea (1000 corneal opacities and 1000 normal) were used for training. The images were pre-processed and used to train an AI model. Once trained, the model was integrated into an Android application along with a questionnaire and tested in a population-based cross-sectional survey of 4954 participants to evaluate the applicability of the platform.

Results: The trained model achieved an accuracy of 92.25% with sensitivity, specificity, PPV and NPV above 90% during internal validation. In the field, the model demonstrated an accuracy of 94.59% in identifying corneal opacities, with a sensitivity and PPV of 72.4% (95% CI - 52.8% to 87.3%) and specificity and NPV of 97% (95% CI - 94.2% to 98.7%). Cohen's Kappa was determined to be 0.6942, indicating a significant agreement of the AI model diagnosis with that of the ophthalmologist. There was excellent correlation between the model and the ophthalmologist for determining the need for referral.

Conclusions: We developed a novel smartphone image-based AI system, which is widely accessible and scalable and can be used by healthcare workers at the community level to connect underserved populations to sight-restoring interventions.

Abstract No.: 200459

Smartphone Cataract Detection From a Selfie: Autonomous Eye Screening for Every Home

First Author: Pradipta **CHOWDHURY**

Co-Author(s): Prakash Kumar **CHOWDHURY**, Anureet **KAUR**

Purpose: To develop a clinical-grade Artificial Intelligence (AI) model which can detect and stage cataracts from selfies on smartphones.

Methods: This prospective study included 10,236 eyes clinically graded via slit-lamp as normal, immature and mature cataract. Anterior segment images were captured using front-facing smartphones under standardised lighting and preprocessed using CLAHE, HSV conversion, and red-channel extraction. YOLOv8 model was used to localise the pupil. A hybrid AI model combined Swin Transformer features with tabular metrics (brightness, red reflex percentage and entropy) for dual-output heads: categorical staging and continuous opacity scoring (0-5 scale). Adults ≥ 18 with clear, clinically graded selfies were included; blurry/obscured pupils or ocular pathology without cataract were excluded.

Results: The model produced an overall accuracy of 96.0%, achieving 97.1% sensitivity (detecting cataract images) and 94.3% specificity (ruling out non-cataract images). Stage-wise classification displayed a strong correlation with clinical grading ($r = 0.88$, $p < 0.001$). The mean absolute error (MAE) for continuous opacity scoring was 0.21 with R^2 of 0.85. A reliability score of 99.2% was achieved with YOLOv8 for pupil localisation.

Conclusions: This model allows accurate detection and staging of cataracts, simply from smartphone selfies - no slit-lamp, attachments, or training needed. The AI guides users to capture a selfie, detects cataracts instantly, and directs them to clinics. It enables accessible, offline cataract screening from homes to even the most remote locations.

Abstract No.: 201941

StrabNet-CQ: An Integrated Deep Learning Framework for Automated Strabismus Classification and Quantification Using Ocular Landmark Detection

First Author: Savleen **KAUR**

Co-Author(s): Akshat **ARYA**, Debabrata **GHOSH**, Jaspreet **SUKHIJA**

Purpose: Strabismus is a common ocular misalignment that can impair binocular vision if untreated.

Conventional diagnosis and treatment rely on clinical prism diopter (PD) readings, which quantify deviation along with base direction. However, these values are coarse, manual, and subject to inter-clinician variability. We present the development and results of StrabNet-CQ (Strabismus Network for Classification and Quantification), a newly developed deep learning-based framework for automated strabismus classification and quantification.

Methods: Six hundred eye images, with and without strabismus, were analyzed by the model. A YOLOv8 model performs classification into normal and abnormal as well as subsequent classification (normal, esotropia, exotropia, hypertropia, hypotropia), with refined classification via ResNet101 on segmented eye regions from the images. Ocular landmarks are detected using ResNet18, from which horizontal and vertical deviation indices and angular deviation are computed.

Results: The system achieved 94% accuracy in strabismus detection and 90% in strabismus classification, with high sensitivity for normal (0.91–1.00), esotropia (0.89), and hypotropia (0.90). The derived parameters show a good correlation with manual PD values ($r=0.733$) that can be utilized for the quantification of strabismus.

Conclusions: StrabNet-CQ supports objective diagnosis and holds promise for deployment in clinical settings for strabismus detection as well as quantification.

Abstract No.: 208282

The Application of Artificial Intelligence in Epiretinal Membrane From Detection to Prognosis Prediction

First Author: Muxin **XU**

Co-Author(s): Shirong **CHEN**, Yuqiang **HUANG**, Jianwei **LIN**

Purpose: Epiretinal membrane (ERM) is a prevalent vitreoretinal interface disorder characterized by fibro-cellular proliferation on the inner retinal surface. The prevalence increases markedly with age, and progressive membrane contraction distorts retinal architecture, producing metamorphopsia and irreversible visual impairment thereby significantly impairing patients' quality of life. This highlights the need for more accurate and efficient diagnostic and therapeutic strategies. Artificial intelligence (AI) has emerged as a promising tool to address such challenges. This review summarizes and evaluates recent studies on the applications of AI in ERM management, identifying current limitations and future research directions.

Methods: A comprehensive literature search was conducted in PubMed, Web of Science, Embase, and Cochrane Library databases, focusing on studies related to AI and ERM published over the past decade.

Results: The findings indicate that while research on treatment and prognosis prediction remains limited, and new technologies are expected in image processing, current AI models demonstrate substantial potential in the ERM management, especially in detection and diagnosis. Nonetheless, current evidence is constrained by challenges such as single-center design, limited external validation across devices or ethnicities, insufficient multimodal imaging, and a lack of health-economic or workflow integration data.

Conclusions: Future multicenter prospective studies, federated learning platforms, publicly annotated imaging dataset and cost-effectiveness analyses are warranted to develop robust, generalizable models that can be seamlessly integrated into clinical workflows, substantially optimizing ERM management and delivering tangible benefits to both patients and clinical practice.

Abstract No.: 207335

Validation of Anterior Curvature Metrics Measured by a Handheld Topography Device in Normal Eyes and Keratoconic Eyes

First Author: Neelima **BALAKRISHNAN**

Co-Author(s): Rashmi **DESHMUKH**, Mohit **PUSHPWAN**

Purpose: The purpose of this study was to evaluate the reliability of keratometric values measured by a handheld, placido-based topography device in healthy and keratoconic eyes by comparing it to the values

measured by Scheimpflug based device (Pentacam HR) for the same patients.

Methods: The InstaKC is a placido-disc-based, hand-held, portable, smart-phone-based, topography device which captures Sim K1, Sim K2, average K, axial and tangential maps. This prospective, observational study comprised of a cohort of 300 healthy eyes, who had presented to the refractive clinic for laser vision correction, and 298 eyes of patients with keratoconus, who had not undergone any previous ocular surgeries. All recruited subjects underwent imaging with the hand-held topography device and the topography of these eyes was repeated on the Pentacam HR device. The keratometry values of flat K, steep K, mean simulated keratometry and astigmatism power measured were compared to assess reliability.

Results: A total of 598 eyes of 299 patients with valid measurements for all parameters were available for analysis. In healthy eyes, there was no statistically significant difference noted in steep K, mean K and astigmatism between the hand-held topographer and Pentacam. In eyes with keratoconus, the mean k1 and k2 measured by the handheld device were 45.8 and 49.9, respectively, and those measured by Pentacam were 47.02 and 51.2, respectively. There was no significant difference in the astigmatism measured between both the devices in both normal and keratoconic eyes.

Conclusions: The handheld topography device provides reliable measurements for the metrics assessed in healthy and keratoconic eyes.

Academia, Research, Teaching and Education in Ophthalmology

Abstract No.: 207087

A Prospective Study of Whole Genome Sequencing (WGS) Impacting Diagnostic Outcome of Genetic Eye Disorders

First Author: Tsz Ha Randa **LI**

Co-Author(s): Nicola **CRONBACH**, Mariya **MOOSAJEE**, Ana **RODRIGUEZ MARTINEZ**, Elena **SCHIFF**, Meei Fang **WONG**

Purpose: To review molecular diagnostic yields after the introduction of WGS into routine use in our Ocular Genetics Service including both children and adults seen at Moorfields Eye Hospital (MEH).

Methods: A total of 91 consecutive families who presented to our ocular genetics service over a 12-month period who underwent whole genome sequencing (WGS) with panels for (1) bilateral congenital or childhood onset cataract (R31) (2) retinal

disorders (R32) and (3) structural eye disease (R36) were recruited and followed up prospectively to review their genetic results. 49 of the probands were males and 42 were females.

Results: For the period from 1 October 2022 to 30 September 2023, the overall molecular diagnostic rate was 33.0%. The diagnostic yield for cataract was 14.2%, retinal disorders 45.7% and structural eye diseases 31.4%. The introduction of WGS has improved the overall rates of diagnosis however there remains a great gap between that for non-retinal developmental eye disorders compared with inherited retinal diseases.

Conclusions: To further improve overall diagnostic yields and narrow the difference for non-retinal developmental eye disorders, we need to improve our knowledge about the genes involved in eye development, raise awareness via training and widen access to appropriate genetic testing to all those involved in their management.

Abstract No.: 205321

Building a Framework for Public and Patient Involvement (PPI) in Dry Eye Disease Research

First Author: Helena Maria **PRIOR FILIPE**

Co-Author(s): Tess **AMES**, Laurence **FITZHENRY**, Evan **MATHEWS**, Alison **REYNOLDS**

Purpose: Patient and Public Involvement (PPI) remains limited in preclinical vision research, which may create a gap between laboratory outcomes and patient needs. Using Dry Eye Disease (DED) as a case study, this project aimed to strengthen collaboration between patients, caregivers, clinicians, researchers, and pharmaceutical stakeholders, and to develop a benchmark framework for integrating PPI in preclinical ocular therapeutics.

Methods: An international team (South East Technological University, University College Dublin, Instituto de Retina de Lisboa, Hospital de Egas Moniz, Egas Moniz Center for Interdisciplinary Research, and University of Warwick) conducted patient semi-structured interviews, surveys, social media listening, one “world-café” encounter (Lisbon) and semi-guided round-table discussions. These open, semi-structured conversations brought together patients, clinicians, pharmaceutical representatives, and preclinical researchers. Insights were analyzed to capture patient needs, research objectives, and clinical priorities, particularly regarding DED severity and impact on daily life.

Results: PPI activities highlighted the substantial burden of DED on quality of life and identified unmet treatment needs. Patient insights redirected researcher perspectives, encouraging alignment of laboratory work with outcomes meaningful to patients. Collaborative forums fostered mutual understanding

across diverse stakeholders and demonstrated the value of embedding PPI throughout the research process.

Conclusions: Our ongoing framework highlights how PPI can be meaningfully integrated into preclinical vision research. Aligning laboratory priorities with lived patient experiences can accelerate the development of patient-centred, longer-lasting treatments for DED and provide a transferable model for other ocular conditions.

Abstract No.: 202659

Correlation Between Expression of PPAR- γ M-RNA in Macrophages, With TGF- β 1 M-RNA and IL-1 β M-RNA in Hyperglycemic Model Rat Wounds

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Co-Author(s): Shanti Fitrianti **BOESOERIE**, Wijana **HASANSULAMA**, Arief Sulaksan **KARTASASMITA**

Purpose: PPAR- γ expressed by macrophages is very important in the wound healing process and regulates the inflammatory phenotype. However, in conditions of acute or chronic hyperglycaemia, PPAR- γ activity may be inhibited, affecting TGF- β 1 and IL-1 β . This study aims to analyse the relationship between macrophage PPAR- γ mRNA expression and TGF- β 1 mRNA and IL-1 β mRNA, as well as blood glucose levels in skin wounds of hyperglycaemic rat models.

Methods: Experimental research using Wistar rats as test animals was conducted at the Central Laboratory and the Physiology Division Laboratory of the Department of Basic Medical Sciences, Faculty of Medicine, Padjadjaran University from May 2023 to October 2023. The research sample consisted of 30 rats, divided into 15 hyperglycemia model rats and 15 control rats.

Results: This study shows that there are significant differences in PPAR- γ mRNA expression between control rats and hyperglycemic rats on day 5 ($p = 0.011$) and day 7 ($p = 0.000$); IL-1 β mRNA expression on day 3 ($p = 0.015$), day 5 ($p = 0.015$) and day 7 ($p = 0.001$). However, there was no difference in TGF- β 1 mRNA expression ($p > 0.05$) and a difference in blood glucose levels was found on all days between control and hyperglycemic rats ($p < 0.000$). This study also found a strong negative correlation between PPAR- γ mRNA expression and TGF- β 1 on day 5 ($r = -0.728$; $p = 0.002$). A very strong negative correlation was found between PPAR- γ mRNA expression and blood glucose on day 7 ($r = -0.833$; $p = 0.000$); however, there was no correlation between PPAR- γ mRNA expression and IL-1 β on all days. The significant cutoff points for PPAR- γ mRNA expression to distinguish between control and hyperglycemic conditions were 23.11 (day 5) and 23.49 (day 7), with blood glucose levels capable of causing changes in PPAR γ mRNA expression being 314.6 mg/dL on day 5 and 329.3 mg/dL on day 7.

Conclusions: The blood glucose cut-off point that can cause changes in the cycling threshold of PPAR- γ mRNA expression is 314.6 mg/dL on day 5 and 329.3 mg/dL on day 7.

Abstract No.: 203740

Embedding Feedback Loops to Strengthen Ophthalmology Training: Insights From Five Years of Trainee and Supervisor Surveys in Australia and New Zealand

First Author: Santosh KHANAL

Co-Author(s): Victoria BAKER-SMITH, Justin MORA

Purpose: To evaluate how structured feedback drives systemic improvement in ophthalmology training in Australia and New Zealand, using five years of trainee and supervisor survey data.

Methods: Annual surveys (2020 to 2024) were administered to all trainees (N=158-185/year) and supervisors (~650/year) across eight training networks covering Australia and New Zealand, encompassing 68 sites and 178 training posts. Response rates were 45 to 60 percent. Surveys included Likert scale and free text questions across clinical and surgical supervision, examinations, workplace-based assessments, teaching, wellbeing, and workplace culture. Quantitative data were analysed longitudinally and qualitative responses underwent thematic analysis to identify systemic issues and guide reform.

Results: Overall satisfaction remained high, but declines were noted in adequacy of case discussion time (79.2% in 2021 to 52.3% in 2024), posting duration satisfaction (65.6% in 2020 to 40.8% in 2024), and one-to-one surgical supervision (49.1% in 2020 to 43.2% in 2024). Trainees and supervisors highlighted structured feedback as essential but inconsistently delivered. Survey-driven reforms included psychometric adjustment of examination pass marks, redesign of workplace-based assessments (40.0% in 2023 $\rightarrow$ 76.5% in 2024 approval), and redevelopment of the surgical logbook to support reflective learning. Free text insights highlighted bullying issues, inequities in training opportunities and exam misalignment, prompting targeted policy and curricula changes.

Conclusions: Embedding structured feedback across training networks enabled measurable reforms in ophthalmology training. Feedback shifted from monitoring to a strategic driver of change, improving supervision, assessment validity and equity. This framework offers a model for responsive and future-ready training programs internationally.

Abstract No.: 206432

Gut Dysbiosis Exacerbates Choroidal Neovascularization via the CYR61-FGF2 Angiogenic Pathway, Regulated by lncRNA NEAT1_2-Driven RBM14 Recruitment to Paraspeckles

First Author: Jia-qi PAN

Co-Author(s): Jian-huan CHEN

Purpose: Emerging evidence links gut dysbiosis to vascular dysfunction in eye diseases, with the role of long non-coding RNAs (lncRNAs) still unclear. Our study revealed how lncRNA NEAT1 and its long NEAT1_2 isoform were involved in gut dysbiosis-exacerbated CNV.

Methods: Comparative epitranscriptome and single-cell RNA sequencing analysis were performed on retinas from AMD patients and laser-induced CNV mice. Gut dysbiosis was induced in C57BL/6 mice with 2×10^8 CFU/day Escherichia coli via gavage for 1 week, plus laser-induced CNV on day 5, followed by subsequent in vivo and in vitro experiments.

Results: NEAT1 and its NEAT1_2 isoform were identified as the most upregulated retinal lncRNA in both AMD patients and CNV mice. Moreover, gut dysbiosis promoted CNV and retinal expression of NEAT1_2, cysteine-rich angiogenic inducer 61 (CYR61), and fibroblast growth factor 2 (FGF2), accompanied by a compromised intestinal barrier and elevated levels of systemic LPS and inflammation. NEAT1_2 was essential for CNV, as confirmed by intravitreal injection of antisense oligonucleotide in mice and siRNA knockdown in human retinal microvascular endothelial cells. Fluorescence in situ hybridization and chromatin immunoprecipitation showed that NEAT1_2 recruited RBM14 protein from the CYR61 promoter to paraspeckles, thereby relieving RBM14 transcriptional suppression and enhancing CYR61 expression and paracrine secretion, crucial for endothelial FGF2 production.

Conclusions: Our findings reveal a conserved role of NEAT1_2/paraspeckle-RBM14 in regulating the CYR61-FGF2 angiogenic pathway during gut dysbiosis.

Abstract No.: 209431

KLF10-IN-1 Attenuates Retinal Pigment Epithelial Cell Apoptosis and Experimental Diabetic Retinopathy via the KLF10/PERK/eIF2 α /ATF4/CHOP Pathway

First Author: Weiwen HU

Co-Author(s): Qiong ZHOU

Purpose: To investigate the role of Krüppel-like factor 10 (KLF10) and its inhibitor, KLF10-IN-1, in regulating high-glucose hypoxia-induced RPE cell apoptosis and to explore their potential implications in diabetic retinopathy (DR).

Methods: A DR mice model was established using a high-fat, high-glucose diet combined with streptozotocin. An RPE cell model of high-glucose hypoxia injury was created under high-glucose (30 mM) and cobalt chloride (200 μ M) conditions. KLF10 expression, apoptosis, and endoplasmic reticulum (ER) stress levels were assessed. KLF10 expression was regulated with small interfering RNA and overexpression plasmids. Dual luciferase reporter assays evaluated KLF10's regulation of PERK. The PERK pathway was activated with CCT020312 and inhibited with GSK2606414 in rescue experiments. The protective effects of KLF10-IN-1 were validated in vitro and in vivo.

Results: KLF10 was highly expressed in RPE cells of DR mice. After 48 hours of high-glucose hypoxia treatment, hypoxia, inflammation, ER stress, and apoptosis were significantly exacerbated, accompanied by upregulation of KLF10. KLF10 knockdown suppressed apoptosis and ER stress, while overexpression had the opposite effect. Western blotting confirmed KLF10's regulation of PERK phosphorylation, and dual luciferase assays showed KLF10 transcriptionally activates PERK. KLF10 mediated apoptosis through the PERK/eIF2 α /ATF4/CHOP pathway. Inhibition of this pathway with KLF10-IN-1 reduced high-glucose hypoxia-induced damage in RPE cells and improved retinal damage in diabetic mice.

Conclusions: KLF10 is upregulated in DR mice and high-glucose hypoxia RPE models. It modulates apoptosis and ER stress through the PERK/eIF2 α /ATF4/CHOP pathway. KLF10-IN-1 offers protective effects, suggesting its potential for early intervention in DR.

Abstract No.: 201707

Netarsudil 0.02% (Rho-Kinase Inhibitor) Administration in Preventing Retinal Ganglion Cell Death Caused by Ethambutol-Induced Toxic Optic Neuropathy Among Wistar Rats Model: An Animal Study

First Author: Raphael **GUMAFELIX**

Co-Author(s): Marianne **CARABEO**

Purpose: The purpose of the study was to evaluate the effect of Netarsudil 0.02% eye drops on damaged RGCs in an ETON-induced rat model by assessing RGC layer thickness and density.

Methods: This experimental study involved 15 male Wistar rats, randomized into three groups: negative control (sterile distilled water), positive control (ethambutol 35 mg/kg/day with normal saline eye drops daily), and the treatment arm (ethambutol 35 mg/kg/day with netarsudil 0.02% eye drops daily). After 30 days, all rats underwent bilateral enucleation for histopathologic analysis.

Results: Histopathology revealed that the treatment group exhibited significantly lower RGC layer thickness

and higher RGC density compared to the positive control group ($p < 0.001$). Ethambutol administration resulted in RGC damage, characterized by cytoplasmic vacuolization and structural disruption—changes that were notably attenuated in rats receiving topical Netarsudil. These findings suggest that ROCK inhibition via Netarsudil 0.02% eye drops may offer a protective effect against ethambutol-induced damage to retinal ganglion cells.

Conclusions: The reduction in histopathological abnormalities indicates its potential as an adjunctive therapy for ETON, although further studies are necessary to validate its efficacy and elucidate the underlying mechanisms.

Abstract No.: 210237

Professional Quality Training and Competency Enhancement of Ophthalmic Nurses Based on the ORBIS STEER Platform

First Author: Liu **CUIHONG**

Co-Author(s): Hu **BING**, Liu **XIN**

Purpose: To improve the professional quality and ability of ophthalmic nurses with scientific teaching methods, based on the ORBIS STEER project platform.

Methods: Through participating in ORBIS STEER project, we trained 29 ophthalmic nurses in county hospitals. We adopt the advanced teaching methods of ORBIS, such as PBL teaching method, problem list, failure model, hand-held teaching, etc. on the basis of completing the teaching syllabus, we have carried out targeted theoretical and skill training according to the needs of advanced nurses, improving the teaching quality and learning effect; At the same time, the above methods were applied to the eye standardized training of nurses in our hospital, and the special training of flipped classroom, integrated medical care teaching ward round, «clinical special disease knowledge + operation room cooperation + symptom care + nursing routine» was carried out. The medical treatment, nursing, and operation were integrated to improve the overall understanding of nurses on eye diseases, and the nursing specialty was cultivated for the development of an integrated medical care mode in the hospital talents.

Results: Through the development of the STEER project, the effect of “To-Teach-Is-To-Learn” has been significantly reflected. Our hospital has not only established a standardized management process for advanced nurses, with high satisfaction of advanced nurses, and successfully completed the STEER training task, but also significantly improved the teaching level and professional quality of nurses, the comprehensive ability, and academic influence of the nursing team. The integration mode of nursing and medical team has been successfully carried out, and the sense of gain and achievement of nurses has been significantly improved,

and the patient satisfaction is clear significantly improved.

Conclusions: The STEER project has an advanced training concept, scientific teaching methods, and is suitable for adults' learning and education. It can promote the standardization of ophthalmic nurses' training, the establishment of nurses' clinical comprehensive thinking ability, the improvement of nurses' comprehensive quality and specialized nursing ability, and establish standards and criteria for the cultivation of ophthalmic specialized nurses.

Abstract No.: 206398

Protective Role of SIRT1 Activation Against Retinal Injury Caused by Polystyrene Micro/Nanoplastics Exposure

First Author: Junfeng **PIAO**

Co-Author(s): Yujiao **JIN**, Woojin **KIM**, Ria **KANG**, Dong Hyun **KIM**, Jong Suk **SONG**

Purpose: Plastic particles are persistent environmental pollutants that can accumulate in ocular tissues and potentially contribute to retinal damage. Sirtuin 1 (SIRT1), a key regulator of oxidative stress and cellular senescence, may play a protective role against plastic-induced retinal injury, but its role remains unclear.

Methods: In this study, human retinal pigment epithelial (RPE) cells and rat retinas were directly exposed to polystyrene microplastics (PS-MPs, 2 µm) and nanoplastics (PS-NPs, 50 nm). Cell viability, intracellular reactive oxygen species (ROS), SIRT1 expression, antioxidant enzyme levels (SOD1, SOD2, catalase), and senescence were assessed. In vivo, rats received intravitreal injections of plastic particles, with or without the SIRT1 activator SRT1720.

Results: Results showed that PS-MPs and PS-NPs reduced RPE cell viability in a dose- and time-dependent manner, suppressed SIRT1 and antioxidant enzymes, and increased ROS and senescence. PS-NPs induced stronger ROS and senescence than PS-MPs in vitro. Co-treatment with SRT1720 restored SIRT1 expression, improved antioxidant responses, and attenuated ROS and senescence. In vivo, both particle types induced retinal changes similar to those observed in cell experiments. However, there was no significant toxicity differences between MPs and NPs.

Conclusions: In conclusion, PS-MPs/NPs promote oxidative stress and senescence in RPE cells and retinal tissue via downregulation of SIRT1 and antioxidant defenses, while SRT1720 provides protective effects. These findings SIRT1 as a potential therapeutic target for plastic-induced retinal injury.

Abstract No.: 206379

Sema4D Knockout Attenuates Choroidal Neovascularization by Inhibiting M2 Macrophage Polarization via Regulation of the RhoA/ROCK Pathway

First Author: Kaixuan **CUI**

Co-Author(s): Guoming **ZHANG**

Purpose: The aim of this study was to elucidate the role of Sema4D in the pathogenesis of senescence-associated choroidal neovascularization (CNV) and to explore its underlying mechanisms.

Methods: In this study, we utilized a model of laser-induced CNV in both young (3 months old) and old (18 months old) mice, including those with or without Sema4D knockout. The expression and localization of Sema4D in CNV were assessed using PCR, Western blot and immunostaining. Subsequently, the morphological and imaging examinations were employed to evaluate the size of CNV and vascular leakage. Finally, the expression of M2 markers, senescence-related markers, and molecules involved in the RhoA/ROCK pathway was detected.

Results: We found that Sema4D was predominantly expressed in macrophages within CNV lesions, and both the mRNA and protein levels of Sema4D progressively increased following laser photocoagulation, a trend more pronounced in old mice. Moreover, Sema4D knockout markedly inhibited M2 polarization in senescent macrophages and reduced the size and leakage of CNV, particularly in aged mice. Mechanistically, aging was found to upregulate RhoA/ROCK signaling, and knockout of Sema4D effectively suppressed the activation of this pathway, with more significant effects observed in aged mice.

Conclusions: Our findings revealed that the deletion of Sema4D markedly inhibited M2 macrophage polarization through the suppression of the RhoA/ROCK pathway, ultimately leading to the attenuation of senescence-associated CNV. These data indicate that targeting Sema4D could offer a promising approach for gene editing therapy in patients with neovascular age-related macular degeneration.

Abstract No.: 206250

Six Sigma Quality Analysis of 1,500 Cataract Surgeries Using a 33-Point Surgical Safety Checklist

First Author: Amod **NAYAK**

Purpose: Surgical safety checklists enhance consistency and reduce preventable errors in ophthalmic surgery. This study evaluates compliance and quality in a high-volume cataract surgery setting using Six Sigma methodology.

Methods: A retrospective audit of 1,500 consecutive cataract surgeries was conducted over 9 months.

Each surgery was evaluated across 33 checklist steps covering preoperative (sign-in), intraoperative (time-out), and postoperative (sign-out) processes. A total of 49,500 opportunities for error (1,500 surgeries × 33 steps) were analysed. Errors were documented, categorized, and analysed to calculate the Defects Per Million Opportunities (DPMO) and Sigma level

Results: 109 errors were identified (DPMO ≈ 2,202), corresponding to a process performance of ~4.35 Sigma. Most errors involved documentation or process delays, with no critical adverse events or wrong-site surgeries reported.

Conclusions: High compliance with the 33-step checklist resulted in a high-reliability process, with Six Sigma analysis confirming a 4+ Sigma performance level. Focused training and monitoring can drive further improvement toward 5 Sigma and enhance surgical safety.

Abstract No.: 203251

Study on the Molecular Mechanism of MAMs-Mediated Dysfunction in Trabecular Meshwork Cells in Primary Open-Angle Glaucoma

First Author: Fang **CHAI**

Co-Author(s): Xiquan **ZHAO**

Purpose: To investigate the structural and functional alterations of Mitochondria-Associated ER Membranes (MAMs) in trabecular meshwork (TM) cells under pathological conditions, elucidate the key signaling pathways involved in MAMs dysfunction in TM cells, and evaluate the regulatory effects of targeted inhibitors on MAMs function in TM cells.

Methods: An endoplasmic reticulum (ER) stress model in human trabecular meshwork (HTM) cells (induced by tunicamycin) was established, with pre-treatment intervention using the inhibitor 4-PBA. The following analyses were conducted: (1) Transmission electron microscopy (TEM) to analyze MAMs structural characteristics; (2) qRT-PCR/Western blot to detect the expression of key molecules in the GRP78, IP3R-VDAC1, and PERK-eIF2 α -ATF4 pathways; (3) Confocal microscopy combined with flow cytometry to monitor intracellular Ca²⁺ oscillations and ROS generation.

Results: In the HTM ER stress injury model, the length of MAMs domains increased and the distance between the ER and mitochondria decreased post-injury. The expression of GRP78-IP3R-VDAC1 and PERK-eIF2 α -ATF4 was elevated, intracellular Ca²⁺ concentration increased, and ROS expression enhanced. Intervention with 4-PBA effectively reversed these abnormalities. Compared to HTM cells, GTM3 cells showed basal high expression of PERK and IP3R-VDAC1. Under stress stimulation, the expression levels of this signaling axis were synergistically upregulated, accompanied by a significant increase in ROS generation and

higher cell apoptosis rates. PERK overexpression led to upregulated expression of GRP78-IP3R-VDAC1, increased intracellular Ca²⁺ concentration, decreased mitochondrial membrane potential, and increased cell apoptosis.

Conclusions: Oxidative/ER stress disrupts the stability of the IP3R-VDAC1 complex, leading to an imbalance in MAMs calcium homeostasis, thereby inducing apoptosis in trabecular meshwork cells.

Abstract No.: 202696

Transcriptional Responses in a Mouse Model of Silicone Wire Embolization Induced Acute Retinal Artery Ischemia and Reperfusion

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Co-Author(s): Ting **CHEN**, Jiaqing **FENG**, Ying **LI**, Yuwei **WAN**, Chuansen **WANG**, Yuedan **WANG**, Anhuai **YANG**

Purpose: To develop a novel mouse model that accurately mimics acute retinal artery occlusion (RAO) and to investigate the transcriptional and cellular changes during ischemia and reperfusion.

Methods: A unilateral pterygopalatine ophthalmic artery occlusion (UPOAO) model was established using silicone wire embolization and carotid artery ligation. Retinal structure, function, and cellular changes were assessed via immunofluorescence, OCT, ERG, and transcriptomic analysis at various ischemia (30/60 min) and reperfusion (0/3/7 days) time points.

Results: Sixty minutes of ischemia caused significant loss of retinal ganglion cells, inner retinal thinning, and reduced ERG b-wave and oscillatory potentials. Transcriptome analysis revealed distinct phases: immune cell migration during ischemia, oxidative stress at 3 days reperfusion, and immune inflammation at 7 days. Increased microglial activation and leukocyte infiltration were observed. UPOAO showed unique lipid and steroid metabolism pathways compared to other models.

Conclusions: The UPOAO model effectively simulates RAO and highlights key pathophysiological mechanisms, offering a valuable tool for studying ischemic retinopathy and screening neuroprotective therapies.

Abstract No.: 202181

Validation of SiEyeVR: Virtual Reality for Physical Examination Training in Ophthalmology

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Purpose: To validate SiEyeVR, a Virtual Reality (VR) prototype designed to train ophthalmic examination

skills, specifically the detection of Relative Afferent Pupillary Defect (RAPD) and measurement of visual acuity (VA).

Methods: This randomized prospective study was conducted in two phases following the development of SiEyeVR. In Phase 1, a structured rubric was created to assess performance both on real patients and in VR. Twenty participants (10 experts and 10 novice medical students) were video-recorded performing RAPD and VA assessments. Experts provided Likert-scale ratings, converted into Content Validity Index (CVI) scores, while three blinded ophthalmologists independently scored performance for validity and reliability analyses. In Phase 2, the finalized rubric was applied to 70 participants (10 experts and 60 novices). Novices were randomized to either a non-VR group, which received traditional instruction and peer practice, or a VR group trained with SiEyeVR. All novices completed pretests on real patients, followed by posttests on real patients (both groups) and in VR (VR group).

Results: In Phase 1, expert Likert-scale ratings indicated strong content validity, with mean CVI values of 0.94 (SD 0.08). Inter-rater reliability of the rubric was high, with intraclass correlation coefficients (ICC) ranging from 0.87 to 0.99. Experts scored significantly higher than novices across most tasks.

Conclusions: Phase 1 findings demonstrate that SiEyeVR possesses strong content validity and reliable inter-rater agreement in rubric, supporting its use as a valid and reliable assessment tool. Phase 2 analyses will further evaluate its effectiveness for training novices and the potential of VR as an alternative to traditional methods.

Abstract No.: 206376

miR-15a-5p Inhibits Angiogenesis and Suppresses Inflammation and Fibrosis via Targeting VEGF and smad2 in Ocular Neovascularization

First Author: Hui **ZHANG**

Co-Author(s): Xiaorong **LI**, Xinyue **YU**, Xiaomin **ZHANG**

Purpose: We aim to determine the therapeutic role of miR-15a-5p on fundus neovascularization and reveal its advantages in comparison to anti-VEGF therapy.

Methods: Elevated miR-15a-5p was found in plasma, plasma sEVs, and vitreous of diabetic (DM, NPDR, PDR) patients. In OIR and CNV models, intravitreal miR-15a-5p potentially inhibited pathological neovascularization, with efficacy comparable to anti-VEGF. It also improved retinal structure (OCT) and function (ERG), and reduced inflammatory and pro-fibrotic markers. Systemic safety was confirmed. Mir-15a-5p KO mice exhibited exacerbated neovascularization. In vitro, miR-15a-5p inhibited HRMEC tube formation, TGF- β -induced EndMT in RPE cells, and inflammatory activation in

rMC-1 cells. It directly targeted smad2 and VEGF, as shown by dual-luciferase assays, WB, and PCR.

Results: MiR-15a-5p was elevated in NPDR and PDR patients' plasma sEVs and vitreous, but not in plasma. In OIR and CNV models, miR-15a-5p inhibited neovascularization similarly to anti-VEGF treatment, but improved retinal non-perfusion area recovery better. Compared to anti-VEGF, miR-15a-5p reduced Müller cell activation, decreased retinal inflammation, promoted vascular attachment to astrocytes, and facilitated reconstruction. MiR-15a-5p knockout mice showed enhanced neovascularization, which could be reversed by miR-15a-5p injection. Additionally, miR-15a-5p improved retinal structure/function and was safer than anti-VEGF in growing mice. MiR-15a-5p inhibited TGF β -induced endothelial cell proliferation/transition and suppressed Müller cell activation and VEGF secretion. Dual-luciferase assays confirmed miR-15a-5p directly down-regulated VEGF and smad2.

Conclusions: MiR-15a-5p decreases retinal neovascularization, supports normal vascular growth, reduces inflammation/fibrosis, and is safer than anti-VEGF for mouse body development and lipid metabolism. MiR-15a-5p may be a potential treatment for pathological neovascularization.

Cataract

Abstract No.: 202995

5-Year Trifocal IOL Outcomes in Chinese Cataract Patients: Visual Performance, Stability, and Satisfaction

First Author: Lulu **CHEN**

Co-Author(s): Lu **SUN**, Shunhua **ZHANG**, Xia **ZHANG**

Purpose: To evaluate the 5-year visual outcomes, refractive stability, IOL centration, patient satisfaction, and complications following trifocal intraocular lens (IOL) implantation in a Chinese cohort.

Methods: This study included 33 patients (66 eyes) with bilateral implantation of trifocal IOL. Postoperative assessments at 5 years included uncorrected and corrected distance, intermediate and near visual acuity, refractive outcomes, contrast sensitivity (CS), defocus curves, reading speed, and patient-reported outcomes (VFQ-25 questionnaire). IOL tilt/decentration and aberrometry were analyzed using anterior segment optical coherence tomography (AS-OCT) and iTrace visual function analyzer.

Results: At 5 years, mean UDVA, UIVA, and UNVA were 0.06 ± 0.16 , 0.10 ± 0.14 , and 0.09 ± 0.12 logMAR, respectively. 92.4% of eyes achieved a postoperative spherical equivalent within ± 1.0 D. Over 87.9% of patients achieved spectacle independence. Mean IOL tilt was $4.19 \pm 1.46^\circ$ and mean IOL decentration was

0.21 ± 0.11 mm. Contrast sensitivity declined under glare, particularly at mesopic conditions. Moderate-to-severe halos were reported by 21.2% of patients, correlating significantly with IOL tilt ($4.79 \pm 1.16^\circ$ vs. $3.75 \pm 1.45^\circ$ in mild cases, $p=0.021$). Posterior capsule opacification necessitated Nd:YAG capsulotomy in 63.6% of eyes (mean intervention time: 22.0 ± 9.9 months), with no complications post-procedure. Patient satisfaction remained high (VFQ-25 score: 93.9 ± 13.7), despite persistent dysphotopsias.

Conclusions: Trifocal IOLs provided long-term efficacy in visual acuity, refractive stability, and exceptional patient satisfaction among Chinese populations. However, PCO remains a prevalent late complication, requiring timely Nd:YAG intervention. IOL tilt significantly influences halo severity.

Abstract No.: 203611

A Multi-Center Clinical Observational Study: Cataract Surgery Patients With Binocular Full-Range Intraocular Lens (Synergy) Implantation in Northwest China

First Author: Kaiyun **ZHANG**

Co-Author(s): Ting **MA**, Cheng **PEI**, Yuecong **REN**, Changrui **WU**, Hong **YAN**, Jiejing **YAN**

Purpose: To evaluate the postoperative visual performance of age-related cataract (ARC) patients who have undergone binocular implantation of the new full-range intraocular lens (TECNIS Synergy™, Johnson & Johnson Surgical Vision) in northwest China.

Methods: This is a multi-center, single-arm, prospective observational study. ARC patients who underwent binocular phacoemulsification with Synergy implantation were enrolled at three hospitals. The study analyzed the distance, intermediate, and near visual acuity of both eyes postoperatively, as well as the defocus curve and subjective visual quality assessment (VF-14 questionnaire and patient-reported measure assessing spectacle independence questionnaire (PRSIQ)) postoperatively.

Results: A total of 40 participants have been included in this study. One month postoperatively, 95% of right eyes and 85% of left eyes had UCDVA ≥ 0.8 . Three months postoperatively, 100% of right eyes and 95% of left eyes had UCDVA ≥ 0.8 . Compared to one month post-operation, UCDVA of most patients' eyes remained stable or improved at three months. The defocus curve shows full-range visual acuity of single or both eyes was ≥ 0.6 , and distant and near visual acuity was better than intermediate vision. Based on VF-14 and PRSIQ, most patients were satisfied with visual quality and achieved glasses-free life and work.

Conclusions: This study is the first to evaluate the postoperative visual outcomes of ARC patients who received Synergy implantation binocularly in northwest China. The findings indicate that Synergy provides

patients with excellent postoperative visual acuity at all distances, superior visual quality, and a high rate of spectacle independence, particularly at a near distance of 33-40 cm.

Abstract No.: 205320

A Multicenter Time-and-Motion Study Assessing the Efficiency Impact of the Next Generation of Phacoemulsification System on Cataract Surgery

First Author: Neda **SHAMIE**

Co-Author(s): Nicole **FRAM**, Carine **HSIAO**, Arjan **HURA**, Li-chen **PAN**, Lawrence **WOODARD**

Purpose: To evaluate the workflow efficiency impact of UNITY VCS (UVCS) when compared to CENTURION™ Vision System with ACTIVE SENTRY™ (CAS) during cataract surgery.

Methods: Prospective, observational, multi-center comparative time-and-motion study assessing patients with non-complicated, age-related cataracts were recruited from two US ambulatory surgical centers (Georgia, California) and surgeries were performed by one of four surgeons. The study received IRB-approval and patients consented to participate. Primary and secondary endpoints were captured through videographic analysis, while exploratory endpoints were obtained from the console metrics. Study outcomes included comparisons of console set-up time (primary endpoint), surgery turnover time (secondary endpoints), CDE, ultrasound time, and BSS fluid use (exploratory endpoints).

Results: A total of 303 patients underwent cataract surgery ($n=161$ CAS; $n=142$ UVCS), with the majority of patients in both arms having $\leq 2+$ grade cataract density. In a multivariate regression analysis for the primary and secondary endpoints, adjusting for technician factors (e.g., technician years of experience), use of UVCS was associated with a significant reduction in console set-up time (adjusted mean difference: -229 seconds, $p<0.001$) and surgery turnover time (adjusted mean difference: -52.81 seconds, $p<0.016$) compared with CAS. For the exploratory endpoint, after adjusting for patient factors (e.g., age, cataract density), CDE and ultrasound time was reduced by 34.5% ($p<0.001$) and 7.5% ($p=0.028$), respectively.

Conclusions: This study's results provide real-world evidence that UNITY VCS improves operating room workflow efficiency in cataract surgery across surgeons and sites.

Abstract No.: 205960

A Novel Nomogram Based on the Total Corneal Astigmatism for Paired Anterior Penetrating Femtosecond Laser Arcuate Keratotomy

First Author: Zhe ZHANG

Co-Author(s): Suhua ZHANG

Purpose: To develop a nomogram for paired anterior penetrating femtosecond laser arcuate keratotomy (FLAK) based on the total corneal refractive power (TCRP) astigmatism (CATot) during femtosecond laser-assisted cataract surgery (FLACS).

Methods: Retrospective case series designed. Paired anterior penetrating FLAKs were created at an 8.0 mm optical zone with a depth of 90% by LenSx laser. CATot measurements were obtained preoperatively and after 1 year with Scheimpflug tomography (Pentacam HR; Oculus, Wetzlar, Germany) for 3- and 5-mm diameter zones, respectively. Vector analysis using the Alpins method to describe the surgically induced astigmatism (SIA) and correction index (CI). The Holladay-Cravy-Koch formula was used to calculate the corneal net changes in a 3-mm diameter zone caused by the FLAKs. Multiple regression analysis with generalized estimating equations was used to develop the nomogram.

Results: The study included 64 eyes of 64 patients. The mean preoperative CATot (3-mm: 1.50 ± 0.59 D; 5-mm: 1.45 ± 0.52 D) were significantly reduced to 0.73 ± 0.46 D and 0.76 ± 0.49 D, respectively, at a 1-year follow-up period (both $P < 0.05$). The 3-mm and 5-mm SIA were 1.16 ± 0.61 D and 1.03 ± 0.56 D, respectively ($P < 0.01$). The 3-mm and 5-mm CI were 0.72 and 0.64 ($P > 0.05$). The mean corneal net changes were -0.97 D in the 3-mm zone, -0.85 D in the 5-mm zone, respectively. A nomogram is established based on age, length, and location of the FLAKs.

Conclusions: Paired anterior penetrating FLAKs showed efficient and stable corneal astigmatism reduction 1 year postoperatively. The nomogram is proposed according to the CATot, which considers the effect of posterior astigmatism of the cornea, and may further improve correction accuracy.

Abstract No.: 203445

A Safety Study on Different Intraocular Pressure Settings During Surgery for High Myopia Combined With Cataract

First Author: Kaili TANG

Co-Author(s): Liwei MA, Jing WANG, Jinsong ZHANG

Purpose: Compare the safety of different intraocular pressure Settings during the operation for high myopia combined with cataract surgery.

Methods: A total of 100 patients with high myopia who underwent cataract surgery in our hospital from May 2023 to January 2025 were included. The safety

and prognosis of different IOP settings—the low IOP group & the high IOP group—during the operation for high myopia combined with cataract surgery were compared. Including intraoperative parameters, such as the total case time, total CDE, total U/S time, aspiration time, the number of ASM, EFU and the occurrence of intraoperative complications, as well as changes in corneal thickness and corneal endothelial cell parameters before and after the operation.

Results: The intraoperative parameters only showed statistical differences in ASM ($P = 0.013$). One case of PCR occurred during the operation in the high IOP group. There was a statistically significant difference in the changes of central and vertical corneal thickness before and after the operation between the two groups ($P < 0.05$). There was no significant difference in the absolute values of ECD changes in all directions before and 1 day after surgery between the two groups ($P > 0.05$). There was no statistically significant difference in the changes of CD, CV and 6A in the central cornea between the two groups before the operation and 6 months after the operation ($P > 0.05$).

Conclusions: For patients with high myopia and cataract undergoing phacoemulsification surgery for cataract, a lower intraoperative IOP setting can significantly reduce the occurrence of intraoperative surges, and it did not increase the side effects on corneal thickness in the early postoperative period or on corneal endothelial cells in the long term.

Abstract No.: 201556

A Single-Cell Transcriptomic Atlas of Human Lens Epithelium: Identification and Functional Insights Into Lens Stem/Progenitor Cells

First Author: Qiuli FU

Co-Author(s): Lu CHEN, Yuzhou GU, Ke YAO

Purpose: The existence of stem/progenitor cells in the lens epithelium has been demonstrated, but their identification remains challenging.

Methods: Eight pairs of human donor lens epithelium samples were collected for single-cell RNA sequencing (scRNA-seq). Subsequent analyses involved cell (sub) type characterization, trajectory inference, and cell-cell communication and validated using many models.

Results: Six groups were identified via UMAP mapping of scRNA-seq data. One of the four LEC clusters exhibited a distinct gene expression profile and was identified as transient amplifying cells (TACs). TACs specifically express TOP2A and are localized at the lens equator. CytoTRACE analysis to the LEC and LFC data sets provided a differentiation trajectory. The TAC group was determined as stage 2 in the trajectory and LFCs last. The 3 sub groups were labelled early, mid and late LECs and corresponded to stage 1, 3 and 4 in the path. While cell population demographics remained stable with age, transcriptomic changes in LECs were

observed, including weaker intercellular crosstalk and adhesion, and fewer TACs in S phase. Lens progenitor-like cells (LPLCs) were identified as a sub-population in early LECs and express ID1. In addition, pleiotrophin (PTN) signaling was prevalent at all differentiation stages, with a notable weakening of PTN signaling in aged LPLCs.

Conclusions: This study identified four subclasses of LECs within the human lens epithelium that follow a progressive staged development pathway from progenitor cells to mature LECs. TOP2A can serve as a biomarker for TAC in the lens, and LPLCs sustain their dedifferentiated state by expressing ID1.

Abstract No.: 200165

AI-Enabled Smartphone Cataract Screening: A Low-Cost Solution for Community Eye Care

First Author: Siddharam **JANTI**

Co-Author(s): Raghavendra Rao, Kalpana **MALI**, Hari Kumar S

Purpose: The aim of this study was to assess the clinical performance of a smartphone-based cataract screening application that uses an AI module to identify cataracts in photos taken with the device's camera. The study compared the application's results with diagnoses made by ophthalmologists using a slit lamp.

Methods: A total of 495 patients participated in a prospective clinical trial at the Institute of National Importance, India. The AI-based screening solution examined smartphone images that were taken in accordance with a set protocol to identify whether cataracts were present. The results of the application were then compared with the diagnoses made by ophthalmologists based on slit-lamp tests.

Results: The study included 990 eye images. The AI screening application demonstrated an overall accuracy of 90.01% for cataract detection. Specific metrics include a sensitivity of 89.50%, specificity of 89.73%, precision of 91.43%, and an F1 score of 90.36%. The positive predictive value (PPV) was approximately 91.3%, based on 485 true positives and 46 false positives. The negative predictive value (NPV) was approximately 87.6%, based on 402 true negatives and 57 false negatives.

Conclusions: The smartphone-based cataract screening application proves to be an effective tool for community-level cataract screening in remote areas where access to expensive equipment and specialized ophthalmic care is limited. Its high accuracy and efficiency make it a valuable option for low-resource settings and suitable for home screening, particularly in the post-COVID era.

Abstract No.: 202729

AMD IOL – a Visual Oasis in Old Dry Desert – a Case Report

First Author: Mamta **KUMARI**

Co-Author(s): Bhavin **DHARANI**, Anjali **ISRANI**, Uma **THAKUR**

Purpose: Detailing the use of eyemax mono IOL as Low Vision Aid in a centre involving macular scar and cataract.

Methods: A 75 years female presented with poor vision both eyes since few years. On Examination -Her right eye best-corrected distance visual acuity (BCDVA) was 20/400 and best-corrected near visual acuity (BCNVA) was N36. In left eye BCDVA was 20/200 and BCNVA was N24. She had nuclear sclerosis grade 2 in both eyes. Fundus showed both eyes center involving macular scar approximately 1DD. Rest examination was within normal limits. Intervention - Standard topical phacoemulsification was performed in both eyes with capsular bag implantation of EyeMax Mono , a single-piece, hydrophobic, acrylic IOL designed to optimize image quality across the macula. The surgery was uneventful and Standard follow-up protocols were applied.

Results: Visual acuity progressively improved following surgery and was stable by 6 months. Postoperative BCVA OD - 20/200, OS - 20/60. Binocular near vision was N12. The patient reported subjective improvement immediately after surgery for distance vision. With near vision, incremental improvements were reported, consistent with a neuro-adaptive component that may occur with such types of IOL.

Conclusions: This is the first case undertaken at our center, where cataract extraction and EyeMax Mono implantation were done as an LVA. The subjective and objective outcomes were good. Present available LVAs are usually cumbersome to use. Our case report indicates that this extended macular vision IOL has a safety profile comparable with standard IOLs, with the additional benefit of providing magnified vision in patients with such macular disorders undergoing cataract surgery.

Abstract No.: 203763

Accuracy of AI-Based and PK-Enhanced IOL Power Calculation Formulas in Post-Refractive Surgery Eyes With Long Axial Lengths

First Author: Qian **TAN**

Purpose: To evaluate the accuracy of artificial intelligence (AI)-based and posterior keratometry (PK)-enhanced intraocular lens (IOL) power calculation formulas in post-refractive surgery eyes with long axial length (AL $\geq$ 26.0 mm).

Methods: This retrospective study analyzed 197 eyes from 138 post-LASIK/PRK patients undergoing cataract

surgery. Thirteen no-history formulas were compared: regression-based (Haigis-L, Haigis-E, Haigis-K, Shammas-PL, Triple-S, Potvin-Hill), AI-based (EVO 2.0, DGS, HQST), the non-AI no-history Barrett True K, and PK-enhanced formulas (Barrett TKPK, EVOPK, HQSTPK). Refractive prediction error (RPE) was calculated using the implanted IOL power. Accuracy metrics included mean prediction error (MPE), median absolute error (MedAE), mean absolute error (MAE), root mean square absolute error (RMSAE), and the percentage of eyes within ± 0.25 D, ± 0.50 D, ± 0.75 D, and ± 1.00 D. Subgroup analyses were performed according to AL, posterior/anterior corneal radius ratio (P/A), and keratometry (Km).

Results: In the overall cohort, MPE ranged from -0.44 to $+0.33$ D. Only EVOPK, EVO 2.0, DGS, and Triple-S showed no significant deviation from emmetropia ($P > 0.05$). Barrett TKPK achieved the lowest MedAE (0.38 D) and RMSAE (0.59 D), significantly outperforming Haigis-K ($P \leq 0.025$). EVO 2.0 yielded the highest proportion of eyes within ± 0.50 D (64.0% , $P < 0.05$ vs. DGS and Haigis-K) and maintained consistent accuracy across AL and P/A subgroups. In eyes with $AL \geq 28.0$ mm, Barrett TKPK and EVOPK provided the lowest RMSAE, while EVO 2.0 showed superior robustness in eyes with higher P/A ratios. GEE analysis confirmed that AL, Km, and P/A significantly influenced prediction errors, with P/A strongly impacting AI- and PK-based formulas.

Conclusions: AI-based and PK-enhanced formulas demonstrated superior refractive prediction accuracy compared with traditional no-history methods in long AL post-refractive eyes. EVO 2.0 showed the most consistent performance across subgroups, while Barrett TKPK achieved the lowest absolute errors. These results support the clinical adoption of AI-driven and PK-enhanced approaches to reduce refractive surprises and improve outcomes in challenging post-refractive cataract cases.

Abstract No.: 201585

Advantages of Femtosecond Laser Assistance in Refractive Lens Exchange: A Comparative Analysis

First Author: Maiia **NEMSITSVERIDZE**

Co-Author(s): Ernest **BOIKO**, Ekaterina **SIMAK**

Purpose: To evaluate the benefits of femtosecond laser-assisted phacoemulsification (FLACS) in refractive lens exchange with implantation of advanced technology intraocular lenses (ATIOLs).

Methods: The study included 200 patients with various degrees of ametropia after conventional phacoemulsification (CPS) or in combination with FLACS, followed by implantation of different ATIOLs models. Exclusion criteria comprised extreme degrees of ametropia, corneal astigmatism, concomitant ocular pathology potentially limiting best-corrected visual

acuity (BCVA), and background of keratorefractive surgery. In all cases, the intended postoperative refraction was emmetropia. The primary outcome measure was the postoperative spherical equivalent (SE).

Results: The study groups did not differ significantly in demographic characteristics. In the 2nd group, we made a 5.0-5.5mm femtosecond capsulotomy, and the lens was pre-fragmented into four parts. The groups were also comparable with biometric parameters and visual acuity ($p > 0.05$). All patients demonstrated excellent functional outcomes postoperatively. However, the FLACS group showed a significantly lower residual SE (0.07 ± 0.43 D) compared to the CPS group (-0.13 ± 0.40 D; $p < 0.05$).

Conclusions: Femtosecond laser assistance in refractive lens exchange offers superior refractive precision, resulting in a smaller postoperative spherical error and potentially enhanced visual performance. We believe that, the ideal shape and size of the capsulotomy makes us expect symmetrical contraction of the capsular bag in the postoperative period that results in minimal lens decentration and an effective lens position close to the calculated one.

Abstract No.: 208135

Alpha and Kappa Angle on Postoperative Visual Quality in Cataract Surgery

First Author: Jia **WEI**

Co-Author(s): Xiaona **CHEN**, Yali **GAO**, Yingshi **ZOU**

Purpose: To explore the effect of Alpha and Kappa angles before multifocal intraocular lenses (MIOLs) implantation on the postoperative visual quality of patients.

Methods: Before and 3 months after cataract surgery, Alpha and Kappa angles were measured via IOL Master 700, iTrace, and Pentacam. Postoperatively, iTrace was used to collect visual quality indicators (high-order aberrations [HOA], modulation transfer function [MTF], point spread function [PSF]). Multiple linear regression analyzed correlations of Kappa/Alpha angles with age, axial length (AL), anterior chamber depth (ACD), keratometry (K), lens thickness (LT), and corneal white-to-white distance (WTW). Pearson correlation coefficient assessed the Alpha-Kappa angle correlation, while Bland-Altman analysis evaluated consistency of pairwise measurements across the three devices.

Results: $\text{Alpha} = 2.230 + 0.003 \times \text{age} - 0.036 \times \text{AL} - 0.025 \times \text{K} - 0.058 \times \text{WTW}$, and the Kappa angle model was $\text{Kappa} = 0.685 + 0.003 \times \text{age} - 0.013 \times \text{K} - 0.061 \times \text{WTW}$. The total Alpha and Kappa angles of the three instruments showed weak positive correlation ($r = 0.291$, $P = 0.000$). Among the three instruments, only IOL Master 700 and iTrace had good consistency in Kappa angle measurement ($P = 0.4254$). At 3 months post-surgery, Alpha and Kappa angles decreased significantly

($P=0.011$, 0.018 ; $P=0.008$, 0.036). $\square$ Kappa=1.136-0.021 $\times$ AL-0.013 $\times$ K. Kappa angle positively predicted HOA ($\beta=0.18$, $P=0.000$), MTF ($\beta=0.171$, $P=0.000$) and PSF ($\beta=0.088$, $P=0.000$), while Alpha angle did not ($P>0.05$).

Conclusions: Patients with older age, flatter K, and shorter WTW should be alert to larger Alpha and Kappa angles; AL should also be considered for Alpha angle. For MIOL implantation candidates, Kappa angle requires careful evaluation. The preoperative <0.5 mm standard for Kappa angle can refer to $\square$ Kappa=1.136-0.021 $\times$ AL-0.013 $\times$ K and be appropriately relaxed.

Abstract No.: 203861

Analysis of Retinal Defocus in Pseudophakic Eyes Based on VPR System

First Author: Jing **WANG**

Co-Author(s): Luan **LI**, Lang **WEI**, Jinsong **ZHANG**

Purpose: To explore the variation patterns in retinal defocus topographic distribution in pseudophakic eyes.

Methods: A cross-sectional study. Patients who underwent phacoemulsification combined with monofocal IOL implantation for more than 3 months were enrolled. Inclusion criteria are uncorrected distance visual acuity (UCVA, LogMAR) ≤ 0.1 , postoperative MRSE $\leq 0.5D$, and the morphology of the macula was normal. All enrolled patients underwent data collection and recording of VPR measurement (fast whole-field peripheral refraction, Earth 100, China). Refraction Difference Value at 5° from the fovea (RDV 0°-5°), refraction difference value at 12.5° from the fovea (RDV 5°-12.5°), refraction difference value at 25° from the fovea (RDV 12.5°-25°), and refraction Difference Value at $\square 25^\circ$ from the fovea (RDV $>25^\circ$) were collected. Also with RDV in the Superior Quadrant (RDV-S), Inferior Quadrant (RDV-I), Nasal Quadrant $\square$ RDV-N $\square$ and Temporal Quadrant (RDV-T).

Results: A total of 126 subjects were enrolled. RDV (0°-5°) was $0.081\pm 0.108(D)$, RDV (5°-12.5°) was $-0.149\pm 0.248(D)$, RDV(12.5°-25°) was $-0.708\pm 0.692(D)$ and RDV $>25^\circ$ was $-1.377\pm 1.196(D)$. Except for the 5-degree area centered on the fovea, the retina in other areas showed myopic defocus changes. As the distance from the fovea increases, the retinal myopic defocus shows an increasing trend. The superior, inferior, nasal, and temporal retinal quadrants all showed myopic defocus changes (RDV was -0.338 ± 0.491 , -0.621 ± 0.767 , -0.318 ± 0.711 , and -0.704 ± 0.735 , respectively). The myopic defocus amount was smaller in the superior and nasal quadrants, while it was larger in the temporal and inferior quadrants.

Conclusions: Analysis of eyes implanted with monofocal IOLs based on VPR revealed a trend of retinal myopic defocus.

Abstract No.: 203172

Angle-to-Angle Depth Thresholds for Accurate Prediction of Effective Lens Position

First Author: Sunee **CHANSANGPETCH**

Co-Author(s): Mantapond **ITTARAT**, Shan **LIN**

Purpose: Although newer intraocular lens (IOL) formulas are generally more accurate, SRK/T remains useful when the measured anterior chamber depth (ACD) does not reflect the true anatomical depth. We compared SRK/T-predicted effective lens position (ELP) with postoperative anterior segment optical coherence tomography (AS-OCT) measurements and identified conditions in which SRK/T predictions may be unreliable.

Methods: This prospective observational study included eyes undergoing uncomplicated cataract surgery. Preoperative biometry was obtained and postoperative lens position was measured by AS-OCT. The SRK/T-predicted ELP was subtracted from the measured value to calculate prediction error (Δ ELP). Nine AS-OCT parameters representing anterior segment and lens dimensions were tested for association with the Δ ELP, with significant factors entered into a mixed-effect regression model. Thresholds associated with an absolute Δ ELP >0.25 mm were estimated.

Results: A total of 125 eyes were analyzed. The mean Δ ELP was 0.05 ± 0.39 mm (range -1.12 to 1.35 mm). Angle-to-angle depth (AAD), and anterior chamber width were included in the multivariable model (all $p<0.05$). In the multivariable model, only AAD was significantly associated with Δ ELP (B 1.22, 95%CI 0.38 to 2.06, $p=0.005$). The cut-off value for Δ ELP >0.25 mm (underestimate ELP) was AAD >3.1 mm, while the cut-off value for Δ ELP <-0.25 mm (overestimate ELP) was AAD <2.6 mm.

Conclusions: In SRK/T, ELP was underestimated in eyes with deeper AAD and overestimated in those with shallower AAD. These findings suggest that AAD, rather than ACD, should be considered, especially for values that exceed the proposed cut-offs, when evaluating the suitability of SRK/T for IOL power calculation.

Abstract No.: 200457

Anterior Capsulotomy Fixation Reduces PCO: A Systematic Comparison of FEMTIS vs. In-the-Bag IOLs With Identical Optic Design

First Author: David **BECKERS**

Purpose: To assess whether the fixation site of an intraocular lens (IOL) independently affects the rate of posterior capsular opacification (PCO), by comparing Nd:YAG capsulotomy rates of the capsulotomy-fixated FEMTIS IOL to conventional in-the-bag IOLs of identical material and edge design.

Methods: A systematic literature review was conducted using PubMed and Embase (through April 2025) to

identify clinical studies reporting Nd:YAG capsulotomy rates for hydrophilic acrylic IOLs with square-edge profiles. Included studies had ≥ 3 months of follow-up and specified fixation type. Capsulotomy rates were extracted for FEMTIS IOLs and comparable in-the-bag LENTIS models and synthesized descriptively.

Results: The FEMTIS IOL showed a lower 12-month YAG rate (3.1%) than the in-the-bag hydrophilic LENTIS IOL (4.7%), despite identical optic design and material. Multifocal in-the-bag IOLs demonstrated even higher early capsulotomy rates ($\geq 10.3\%$). The findings suggest that anterior capsulotomy fixation reduces the potential space for lens epithelial cell migration by promoting optic-posterior capsule apposition, possibly mitigating early PCO formation.

Conclusions: Fixation site appears to be an independent factor influencing PCO risk. Capsulotomy-fixed IOLs such as FEMTIS may provide enhanced early capsular clarity through closer anatomical contact with the posterior capsule. These findings support further prospective trials to evaluate fixation design as a modifiable factor in PCO prevention.

Abstract No.: 200611

Artificial Intelligence-Based Formulas in the Calculation of Intraocular Lens Power

First Author: Chau DINH NGOC BAO

Co-Author(s): Huong BUI THI THU

Purpose: To compare the accuracy of artificial intelligence-based formulas in the calculation of intraocular lens power, such as Barrett Universal II, Kane, Hill-RBF, and Hoffer Q.

Methods: In this retrospective series, 123 eyes of patients who had undergone phacoemulsification surgery with intraocular implantation from January 2025 to February 2025 at Vietnam-Russia International Eye Hospital-HCMC were investigated. Mean numerical error (MNE) and mean absolute error (MAE) were recorded at 4 weeks postoperatively.

Results: Kane formula demonstrated the lowest MAE (0,21; SD=0,19D), MedAE (0,14D) and highest percentages of eyes with prediction errors $< 0,25D$ and $< 0,5D$ although there was no statistically significant difference between Barrett Universal II, Hill-RBF and Kane. In the short-eye subgroup, Kane also demonstrated the lowest MAE, while Hill-RBF took this placement in the long-eye subgroup. There was statistically significant difference between formulas in eyes which had multifocal lens implantation where Kane exhibited the lowest MAE (0,19; SD=0,15D), MedAE (0,14D).

Conclusions: Kane was proved the most accurate formula in terms of MAE and MedAE, especially in multifocal implantation.

Abstract No.: 207610

Association Between Retinal Vascular Morphology and Incident Treatment for Sight-Threatening Diabetic Retinopathy

First Author: Paul NDERITU

Co-Author(s): Mark CHIA, Asterios DIAFAS, Urvi KARAMCHANDANI, Pearse KEANE, Christine KIIRE, Sarah MATTA, Yukun ZHOU

Purpose: Retinal vascular morphology (RVM) has been linked to diabetic retinopathy (DR), yet large longitudinal data connecting RVM with the first treatment for sight-threatening DR (STDR) are scarce.

Methods: We conducted a retrospective analysis of the Moorfields Diabetic imAge dataSet Study (MIDAS, 2000–2022) and included 20,858 patients (33,865 unique eyes) with graded macula-centered fundus images. We extracted arterial and venous macula RVM metrics of fractal dimension (FD), vessel density (VD), and average width (AW) using the AUTOMORPH deep learning tool. Eligible eyes were treatment-naïve at baseline with no to severe non-proliferative DR and no or mild diabetic macular oedema. Outcomes included initiation of treatment for proliferative DR (PDR) or clinically significant macula oedema (CSMO). Cox proportional hazards regression, adjusted for age, sex, ethnicity, baseline DR, and inter-eye dependence, was applied.

Results: Compared with the lowest quartile (Q1), eyes in the highest FD quartile (Q4) had markedly reduced risk of incident PDR/CSMO treatment: arterial FD HR = 0.52 (95% CI 0.45–0.59), venous FD HR = 0.66 (95% CI 0.57–0.75). Higher arterial VD conferred protection to incident PDR/CSMO treatment (Q4 vs Q1 HR = 0.47, 95% CI 0.41–0.54); higher venous VD was protective for incident PDR treatment alone (HR = 0.66, 95% CI 0.57–0.75). Wider venules increased the risk of PDR/CSMO treatment (HR = 2.53, 95% CI 2.24–2.86), while narrower arterioles raised incident PDR treatment risk alone (HR = 0.62, 95% CI 0.52–0.75). Associations were consistently stronger for PDR treatment vs CSMO treatment.

Conclusions: AUTOMORPH-derived macula RVM metrics demonstrate robust associations with incident STDR treatment and are promising biomarkers for DR progression.

Abstract No.: 203526

Association of Accelerometer-Monitored Physical Activity With Incident Cataracts: Epidemiologic and Genetic Evidence

First Author: Chenxiao SHEN

Co-Author(s): Jiahui CAO, Zijiang DU, Ting SU, Qiaowei WU, Honghua YU, Xiayin ZHANG

Purpose: To investigate the association and potential causal relationship between accelerometer-assessed physical activity (PA) and the risk of senile cataract (SC).

Methods: The study population was derived from the UK Biobank database. Triaxial accelerometer data from wearable devices were utilized to define domains of PA at specific intensities: light, moderate, and vigorous. Multivariable Cox proportional hazard models explored the association between PA and SC incidence. Furthermore, Two-sample Mendelian randomization analyses were conducted using genome-wide association data from multiple large-scale prospective study cohorts (UK Biobank for PA and FinnGen for SC) to elucidate potential causal links between them.

Results: The study ultimately enrolled 77,123 participants with a mean age of 55.67 ± 7.8 years. Among them, 1,194 subjects were diagnosed with SC during a mean follow-up period of 6.3 years (interquartile range [IQR]: 5.3-7.3 years). The findings indicated that engaging in 150-600 minutes of moderate to vigorous-intensity PA (MVPA) per week was associated with a significant 21% reduction in the risk of SC, with a clear dose-response relationship observed. Additionally, a robust and significant causal association was demonstrated between MVPA and SC risk (OR=0.56, 95% CI: 0.38-0.83, P=0.004).

Conclusions: Adhering to the PA guidelines established by the World Health Organization emerges as a novel and modifiable protective measure to slow the progression of SC.

Abstract No.: 200907

Biocompatibility and the Effect of Glistening on the Optical Quality in Four Different Hydrophobic-Acrylic Intraocular Lenses

First Author: Xiaomin LIU

Purpose: To study the biocompatibility at the level of tissue fibrosis and the impact of glistening on the optical quality of four hydrophobic acrylic intraocular lenses (IOLs).

Methods: Four hydrophobic acrylic IOLs were evaluated: i-Sert XY1 with ultraviolet-ozone treatments (Hoya, Japan); i-Sert 251 with no-special treatments (Hoya, Japan); ZCB00 with no-special treatments (Johnson & Johnson, USA); SN60WF with argon-plasma treatment (Alcon, USA). Twelve New Zealand rabbits were divided into four groups based on the implanted IOL type. Slit lamp and histopathology examinations were conducted to assess the posterior capsular opacification (PCO) postoperatively. Simulating aging test to evaluate glistening by light microscopy and image analysis. Optical performance, including modulation transfer function (MTF), IOL power and United States Air Force Target test, was measured using an OptiSpheric IOL PRO 2 optical bench.

Results: The mean PCO score of i-Sert XY1 was significantly lower than that of the others (P<0.05). SN60WF showed the highest glistening density, followed by i-Sert 251 and i-Sert XY1, with ZCB00 being

the lowest. After the aging test, all four IOLs showed a declining trend MTF curve, but only SN60WF had a significant difference (P<0.05), while i-Sert XY1, i-Sert 251 and ZCB00 did not. All four IOLs exhibited increased power after aging, with the greatest change in SN60WF and the smallest in ZCB00.

Conclusions: Ultraviolet-ozone-treated IOL surfaces effectively improve biocompatibility and reduce PCO. Among the tested IOLs, i-Sert XY1, i-Sert 251 and ZCB00 show high glistening resistance with little impact on optical performance, while SN60WF induces more glistening and impairs optical quality.

Abstract No.: 204472

Capsular Bag Defects and the Intraocular Lens in Dead Bag Syndrome

First Author: Shu Wen Nicole CHAN

Co-Author(s): Soon-phaik CHEE, Jia Xu LIM

Purpose: To describe the characteristics of the intraocular lens (IOL) and capsular bag defects in eyes with dead bag syndrome.

Methods: Retrospective review of a single-surgeon series of eyes with out-of-the-bag IOL dislocation. Data collected included patient demographics; history of ocular trauma/eye rubbing; IOL model and placement; location and size of the capsular bag rip and defect, respectively.

Results: Eye rubbing, the only form of trauma, was reported in 34 (68.0%) of 50 eyes (45 patients). The average posterior capsule (PC) defect size was $53.8 \pm 15.5\%$. The PC defect was most commonly nasal (25 eyes; 50.0%), followed by central (13 eyes), then temporal (10 eyes). The PC rip originated across the PC in 34 eyes (68.0%). The haptic was partially attached to the bag in 27 of these eyes; the rip location (obliquely nasal (20 eyes), obliquely temporal rip (7 eyes)) coincided with the optic edge of obliquely- (17 eyes) or vertically- (10 eyes) aligned IOLs. The other 7 eyes had single-piece hydrophobic acrylic IOLs with square anterior and posterior edges that dislocated into the vitreous through oblique PC rips. Circumferential equatorial rips seen in the remaining 16 eyes (32.0%) were mostly nasal (13 eyes), coinciding with the previous haptic location.

Conclusions: The predominantly nasal location of capsular bag rips in dead bag syndrome may be accounted for by eye rubbing. Rips across the PC may be related to the square edge of the optic, while equatorial rips may be related to the haptic.

Abstract No.: 201239

Capsular Tension Ring Implantation Improves Intraocular Lens Power Prediction Accuracy in Cataract With Retinitis Pigmentosa

First Author: Siyan LI

Co-Author(s): Yun-e ZHAO

Purpose: To evaluate the impact of capsular tension ring (CTR) implantation on the predictive accuracy of 12 intraocular lens (IOL) power calculation formulas in patients with retinitis pigmentosa (RP) receiving cataract surgery.

Methods: The predictive accuracy of 12 IOL formulas was assessed using refractive prediction error (PE), mean absolute error (MAE), root-mean-square absolute error (RMSAE), and the percentage of eyes achieving target refraction within ± 0.25 D to ± 1.00 D. These metrics were compared between eyes with (n=23) and without (n=30) CTR implantation. The influence of lens thickness (LT) on formula accuracy was also evaluated.

Results: In the overall cohort of 53 eyes from 38 RP patients, the BUII formula yielded the lowest numerical MAE (0.45 D) and RMSAE (0.56 D), though no formula was statistically superior in RMSAE. In the CTR group, significantly lower MAE was observed for Cooke K6 (P=0.016), EVO 2.0 (P=0.021), Kane (P=0.024), and PEARL-DGS (P=0.040) compared to the non-CTR group. The CTR group also exhibited a significantly higher percentage of eyes within ± 0.50 D (P = 0.016), ± 0.75 D (P < 0.001), and ± 1.00 D (P < 0.001) of target refraction. Increasing LT correlated with a hyperopic shift for all formulas; however, BUII demonstrated relatively stable MAE across LT quartiles.

Conclusions: Implantation of a CTR significantly improved the predictive accuracy of several IOL formulas in RP patients. The BUII formula demonstrated the best overall calculation accuracy.

Abstract No.: 206730

Carbon-Foot Print and Day Surgeries: Building a Platform for Ongoing Review

First Author: Tim ROBERTS

Co-Author(s): Kylie BENNETT, Chris HODGE

Purpose: Climate change represents a significant ongoing concern to society. Understanding the estimated carbon footprint of day surgery operations represents an important step to evaluating both best practice and opportunities for improvement.

Methods: Based on readily available metrics, we developed a basic calculation to derive the cataract-based carbon footprint of both a single practice and group-wide surgical procedures performed in Vision Hospital Group facilities (Australia-wide privately owned ophthalmic day surgeries), analysing surgery time, mean number of surgical procedures, estimated staff and patient travel.

Results: Eleven-day surgeries were included. Mean number of cataract surgeries ranged from 10 to 254 per month (median 132). The number of pre- and post-operative patient visits ranged from 1 to 4 per eye in total. Staff surveyed included administration, surgeon, nursing, and sterilising staff. The mean total procedure time was considered as 15 minutes. The estimated inclusive monthly CO2 emissions overall were 90,355kg for all sites. Staff travel represented 59% to 84% of emissions.

Conclusions: Staff and patient travel are responsible for the majority of total procedure-related emissions. Consideration of the number of pre- and post-op visits may represent a simple opportunity with reference to ongoing patient safety. Further analysis of equipment usage and prioritisation of bookings may be a further avenue.

Abstract No.: 203889

Characterization of Mechanical Stress in the Occurrence of Cortical Opacification in Age-Related Cataracts Using Three-Dimensional Finite Element Model of the Human Lens and RNA-Seq

First Author: Lu CHEN

Co-Author(s): Zhe CHEN, Qiuli FU, Ke YAO

Purpose: Cataract is the leading cause of blindness worldwide, with age-related cataract (ARC) being the most common type. The lens, as the only adjustable refractive medium of the eye, undergoes lifelong deformation during accommodation. However, the contribution of mechanical stress to ARC pathogenesis remains unclear. This study aimed to characterize dynamic stress distribution in the human lens and its potential role in cortical opacification using finite element modeling and experimental validation.

Methods: A three-dimensional finite element model (3D-FEM) of the human lens was constructed based on anatomical and biomechanical parameters to simulate stress distribution under physiological loading. In parallel, human lens epithelial cells (HLECs) were exposed to cyclic mechanical stretch. Senescence markers, PIEZO1 expression, and mechano-responsive pathways were assessed using qPCR, western blot, and RNA-seq followed by pathway enrichment analysis.

Results: 3D-FEM simulations revealed asymmetric stress distribution, with highest concentration in cortical regions corresponding to typical sites of cortical opacity. In stretched HLECs, senescence-related markers were significantly upregulated, indicating sensitivity to mechanical stimulation. Notably, PIEZO1 mRNA expression increased in a stretch duration-dependent manner, peaking at 9 hours. Transcriptomic profiling further identified enrichment of mechanosensing and mechanotransduction pathways, suggesting downstream signaling of PIEZO1 under mechanical stress.

Conclusions: This study demonstrates that accommodation-induced mechanical stress predominantly affects the lens cortex, aligning with cortical ARC localization. Mechanical stretch promotes senescence in HLECs and upregulates PIEZO1, implicating PIEZO1-mediated mechano-transduction as a potential biomechanical driver of cortical ARC formation.

Abstract No.: 202129

Chopper Assisted Positioning Hook for Intraocular Lens Exchange in Patients With Intraocular Lens Opacification

First Author: Yani WANG

Purpose: To report the surgical technique of intraocular lens (IOLs) exchange and outcomes of IOLs exchange in patients with IOLs opacification after cataract surgery.

Methods: The medical data from 111 eyes of 111 patients who were diagnosed with IOLs opacification after cataract surgery undergoing IOLs exchange were retrospectively reviewed between May 2019 and May 2024 in Qingdao Eye Hospital. Complications, the rate of IOLs implantation in the bag, postoperative best corrected visual acuity (BCVA) are analyzed.

Results: Patients with average age of 70.7 ± 10.8 years presenting IOLs opacification occurred at an average time of 4.6 ± 2.3 years after cataract surgery. All extracted IOLs were identified as hydrophilic single-piece, which were extracted successfully without other complications in 96.4% of patients; only 1.8% and 1.8% of cases requiring capsular tension ring implantation and vitrectomy. As result, the percentage of IOLs implantation in the bag successfully was 78.4%. Patients with LogMar < 0.3 after surgery accounted for 70.3%, and BCVA at postoperative 1 month was 0.3 ± 0.3 LogMar, which improved significantly than 1.4 ± 1.0 LogMar before surgery ($P < 0.001$).

Conclusions: Chopper assisted positioning hook for intraocular lens exchange is an effective method for increasing the success rate of intraocular lens replacement in the bag and reducing the complications.

Abstract No.: 206459

Clinical Efficiency and IOL Stability Following Novel 8-Point Quadrilateral Looping Scleral Fixation in Dislocated Loop-Haptic IOLs

First Author: Shravanthi NAGARAJ

Co-Author(s): Nagesha Chokkahalli KRISHNAPPA, Rohitha NAYAK, Naren SHETTY

Purpose: This study aims to describe quadrilateral 8-exit 4-knot fixation of dislocated loop haptic design IOLs. To analyse IOL positioning by imaging and postoperative visual outcomes.

Methods: Consecutive patients with posteriorly dislocated loop haptic design IOLs following capsular

bag loss underwent internal scleral refixation. The 2 farthest points in the haptic loops on either side of IOL are looped using 9-0 polypropylene or Gore-Tex suture in ab externo manner. The radial orientation of the thread holds the IOL at 1.5 mm to 3.5 mm from the limbus, aiming for the positioning of the IOL with good iris clearance. Postoperative tilt, decentration were measured using anterior segment optical coherence tomography. Visual outcomes and frequency of immediate and late complications were analyzed.

Results: A total of 11 eyes underwent scleral fixation, among which 8 were loop haptic design monofocals, 2 AcrySof A60, and 1 Zeiss Sphere lens. All underwent complete vitrectomy, and 6 eyes had polypropylene, and 5 had Gore-Tex sutured. Mean tilt was 3 degrees, and decentration was 236 microns. Mean best corrected visual acuity improved from 0.2 logMAR to 0.1 logMAR units. One transient vitreous haemorrhage, one postoperative CME were reported. Lately, one eye developed a macular hole, which required gas tamponade. IOL positioning was stable over a mean follow-up of 6 months.

Conclusions: Quadrilateral loop scleral fixation of loop haptic-design lenses generates equivocal torque in 4 directions thereby maximising stability, centration and minimising tilt. This technique can be extended to toric and multifocal IOLs in eyes with capsular bag loss.

Abstract No.: 200375

Clinical Outcomes of Cataract Surgery Using New-Generation Monofocal Intraocular Lenses With Enhanced Intermediate Vision

First Author: Altangerel

Co-Author(s): Jiwon JEONG, Sohyeon KIM, Tae-im KIM

Purpose: In our study, we conducted a retrospective case series to compare the clinical outcomes of two new-generation monofocal intraocular lenses (IOLs) designed to enhance intermediate vision.

Methods: The study included cataract surgery patients with either TECNIS Eyhance ICB00 or Precizon Go 580 IOLs between May 2020 and December 2024. We evaluated various visual acuity measures, including uncorrected distance visual acuity (UDVA), uncorrected intermediate visual acuity (UIVA), uncorrected near visual acuity (UNVA), as well as corrected distance visual acuity, defocus curves were evaluated at week 2, week 3 and at 3 months, contrast sensitivity, and ocular aberrations at 1 month and 3 months postoperatively. All 207 eyes underwent phacoemulsification with IOL implantation, and no complications occurred during or after the surgery.

Results: Our findings showed that three months after surgery, the Precizon Go group had significantly better postoperative CDVA. Precizon GO demonstrated superior outcomes in both monocular and binocular photopic UIVA and UNVA when compared to the

Eyhance ICB00 group. Specifically, the Precizon Go group exhibited better outcomes in the binocular and monocular defocus curve within the range of -2.00 to -3.50 D compared to the Eyhance ICB00 group.

Conclusions: At one month, the Eyhance ICB00 group showed superior internal spherical aberration results. Overall, the results indicated that the Precizon Go group showed superior performance in both intermediate and near vision.

Abstract No.: 201068

Color Discrimination in Cataract Patients Under Day and Night Conditions: Assessment and Correlation With Lens Opacity

First Author: Yuchen **WANG**

Co-Author(s): Anqi **GUO**, Xuemin **LI**

Purpose: To investigate color discrimination performance and its relationship with lens opacity in cataract patients under daytime and nighttime conditions.

Methods: Color discrimination of 7 hues (red, orange, yellow, green, cyan, blue, and purple) was assessed in 68 cataract patients using a dedicated software tool. Pairwise Spearman correlation analyses were conducted to examine relationships between color discrimination thresholds under daytime and nighttime conditions. Lens opacity was quantified and correlated with color resolution thresholds, defined as the minimal distinguishable wavelength difference within each color range.

Results: All 68 patients successfully completed the color vision assessment. In cataract patients, scores for red and green were the lowest ($p < 0.05$). Under daytime condition, orange and blue scores showed a negative correlation ($r = -0.57$, $p < 0.05$). At nighttime, purple and green ($r = 0.59$, $p < 0.05$), purple and blue ($r = 0.52$, $p < 0.05$), and blue and green ($r = 0.46$, $p < 0.05$) scores were positively correlated. Analysis of lens density and fine color discrimination revealed negative correlations between lens density and cyan and purple scores during daytime ($p < 0.05$), and between lens density and purple scores at nighttime ($p < 0.05$).

Conclusions: Cataract-related lens opacity impairs color discrimination. Due to protein aggregation, increased lens scattering, and alterations in the refractive index of the central region, cataractous lenses lead to declines in red and green visual function, alter inter-color relationship, and reduce resolution of short-wavelength light. These findings underscore the importance of comprehensive color vision assessment in cataract and highlight potential targets for preserving visual function in aging populations.

Abstract No.: 200250

Combination of Panel-Based Next-Generation Sequencing and Clinical Findings in Congenital Ectopia Lentis Diagnosis in Chinese Patients

First Author: Tianhui **CHEN**

Co-Author(s): Yongxiang **JIANG**

Purpose: To evaluate the diagnostic yield of congenital ectopia lentis (EL) in a Chinese cohort combined panel-based next-generation sequencing with clinical findings.

Methods: In total, 175 patients with congenital EL and their available family members ($n = 338$) were enrolled. All congenital EL patients underwent genetic testing. Genotype-phenotype analyses were conducted to assess the biometric and structural ocular manifestations of congenital EL.

Results: In total, 175 patients with congenital EL and 338 of their relatives were included in this study. In these patients, 92.57% (162/175) of disease-related variants were detected in FBN1 (83.43%), CPAMD8 (1.71%), COL4A5 (0.57%), ADAMTSL4 (3.43%), LTBP2 (1.71%), and CBS (2.29%). Based on the genetic and clinical findings, the primary diagnostic rate was elevated to 40.57% from 19.43% except for the 91 diagnoses of potential MFS, though a new diagnostic strategy of congenital ectopia lentis was developed. Within this group of patients harboring FBN1 mutations, 16.44% (19/141) probands were re-diagnosed with ectopia lentis syndrome (ELS) and 2.13% (3/141) were re-diagnosed with Marfan syndrome (MFS).

Conclusions: The results of this cohort study expand the genomic landscape associated with congenital EL in Chinese cohorts. FBN1 mutations represent the most common cause of congenital EL in this population, and we developed a new diagnostic strategy of congenital EL subtypes via a well-designed panel-based next-Generation Sequencing (NGS) which can be used to efficiently and precisely diagnose patients with congenital EL in a cost-effective manner.

Abstract No.: 201138

Comparison of Intracameral Injection of Mydriatics and Anaesthetic Combination Versus Topical Tropicamide + Phenylephrine Drops in Cataract Surgery

First Author: Ezhilvendhan **KALAIMAMANI**

Co-Author(s): Jeyaprakash **BALASUBRAMANIAN**

Purpose: To compare the safety and efficacy of intracameral injection of tropicamide + phenylephrine + lidocaine versus topical tropicamide+phenylephrine. To evaluate if intracameral injection has a positive influence on the pupil size, which could

minimize complications due to a small pupil during phacoemulsification.

Methods: In this comparative study, 100 eyes of 50 patients with bilateral senile cataract who underwent phacoemulsification were studied. Each patient's eyes were randomly assigned to two groups. One eye was operated on after instillation of a topical mydriatic (1 drop every 10 mins for 40 mins). The fellow eye was operated on only with intracameral injection of mydriatic and anaesthetic (injected after entering the anterior chamber). Pupil size is assessed during capsulorhexis, hydro-dissection, phacoemulsification, cortex wash, and IOL implantation. Blood pressure and pulse rate were also monitored.

Results: Patients with topical mydriatics had better dilatation than intracameral mydriatics, but pupil size was consistent throughout the procedure with intracameral injection. Surgeon's comfort was better with intracameral injection. Intra and postoperative complications were significantly less in the intracameral group.

Conclusions: Intracameral injection of mydriatics and anaesthetic is safe as it has no effect on the blood pressure, pulse rate and it is effective in phacoemulsification as it has significantly reduced the complications due to small pupil. It is extremely beneficial in patients undergoing toric IOL implantation.

Abstract No.: 201482

Comparative Analysis of 0.3% Nepafenac Once Daily, 0.1% Nepafenac Thrice Daily, and 0.5% Loteprednol Thrice Daily for Postoperative Inflammation Control After Uneventful Phacoemulsification

First Author: Ayushi **BANSAL**

Co-Author(s): Sahleen **AHMAD KHAN**

Purpose: To evaluate and compare the efficacy and safety of 0.3% Nepafenac once daily, 0.1% Nepafenac thrice daily, and 0.5% Loteprednol thrice daily in controlling postoperative inflammation and preventing cystoid macular edema (CME) following uneventful phacoemulsification cataract surgery.

Methods: A prospective comparative study was conducted on 600 patients undergoing phacoemulsification cataract surgery at Rajshree Hospital, Bareilly, between December 2023 and December 2024. Patients were equally randomized into three groups: 0.3% Nepafenac once daily, 0.1% Nepafenac thrice daily, and 0.5% Loteprednol thrice daily. Postoperative assessments were performed at baseline, week 1, and week 6. Parameters evaluated included anterior chamber (AC) cells, pain scores, conjunctival hyperemia, central macular thickness (CMT), and intraocular pressure (IOP). Data were analyzed using ANOVA and Chi-square tests.

Results: All groups demonstrated significant reduction in AC cells, pain, and hyperemia by week 6. The 0.3% Nepafenac group showed the least increase in CMT, indicating superior CME prevention. IOP profiles and safety outcomes were comparable across groups.

Conclusions: All regimens effectively controlled postoperative inflammation. However, 0.3% Nepafenac once daily provided comparable efficacy to 0.1% Nepafenac thrice daily and 0.5% Loteprednol thrice daily, with the added advantages of simplified dosing, better compliance, and enhanced CME prevention.

Abstract No.: 202802

Comparative Analysis of Iris Blood Flow After First and Second Cataract Surgeries: Insights Into Increased Pain Perception in the Second Eye

First Author: Jitong **ZHOU**

Co-Author(s): Yuxi **CHEN**, Wenwen **HE**, Yi **LU**, Jiaqi **MENG**, Xiangjia **ZHU**

Purpose: To investigate quantitative changes in iris blood flow after first and second cataract surgeries and its correlation with increased pain in the second eye.

Methods: In this prospective study, 88 eyes of 44 participants who underwent uneventful cataract surgery were followed up at enrollment, 1 day before, and 1 day, 1 week, and 1 month after each eye surgery. Iris blood flow was quantified by swept optical coherence tomography angiography, and intraoperative pain was evaluated. Participants were divided into 3 groups according to time intervals between two eye surgeries: ≥ 1 to < 2 weeks (short), ≥ 2 to ≤ 4 weeks (medium), and greater than 4 weeks (long).

Results: The second eye experienced two significant increases in iris blood flow following cataract surgery: one after the first eye and the other after its own, with the latter being significantly higher than the increase observed in the operated eye after the first surgery ($P < .05$). Additionally, the second eye showed higher iris blood flow density in the short interval group compared to the long and medium at specific time points ($P < .05$). The bilateral pain index difference positively correlated with second eye iris blood flow density ($P < .05$) and was significantly greater in the short interval group than the long interval group ($P < .05$).

Conclusions: Iris blood flow increased in the second operated eye post-surgery compared to the first eye, which may correlate with second-eye pain. However, due to the variability in individual pain perception, a larger sample size is needed to prospectively validate our findings to improve their generalizability.

Abstract No.: 203696

Comparative Analysis of Surgical Efficiency and Postoperative Corneal Clarity With Circumferential Sequential Nucleotomy vs Deep Vertical Nucleotomy in Dense Cataract

First Author: Bharti **KASHYAP**

Co-Author(s): Nidhi **GAJENDRAGADKAR**, Nilendu Dutta **MISHRA**, Nagendra **PRASAD**

Purpose: To compare intraoperative parameters CDE, Aspiration volume and time with circumferential sequential nucleotomy (Gr1) vs deep vertical nucleotomy (Gr2) in dense cataract and its effect on 1st and 7th day postop endothelial cell count, central corneal thickness, uncorrected distance visual acuity and 1month postop uncorrected distance visual acuity.

Methods: Prospective comparative study between circumferential sequential nucleotomy (Gr1) vs deep vertical nucleotomy (Gr2) in dense cataract for Intraoperative outcomes measure were CDE, Aspiration vol and time. 1&7 day postop outcomes measure were Endothelial Cell Count, Central Corneal Thickness, UCDVA & 1month postop outcome measures UCDVA. 100eyes each group, Single surgeon. Preop data comparable. Inclusion criteria: 4+ nuclear sclerosis on LOC III scale, sequential cataract surgery, Age 50-75yrs, ECD>2000 cells/mm², No Astigmatism & ocular morbidity, same viscoelastic and phaco machine with similar parameters in each group, Axial eye length variations upto 0.4mm. No zonular laxity, 5.5mm dilatation.

Results: Intra op CDE values & Asp.Time significantly less in Gr1 p=.0001, 95% CI (7.81,9.96) & p=0.03, 95% CI (1.49,34.5). Postop day 1 CCT significantly more in Gr2 p=.04, 95% CI (0.018,25.94), Preop ECC comparable. P=0.097, 95% CI (-2.60,30.64). Postop Day1 ECC is significantly higher in Gr1, Mean diff.=-119, p=.0001, 95% CI (-141.26,-96.74), Mean reduction in ECC significantly higher in Gr2, P<.0001, 95% CI (121.05,145.15). Post op day 1 Photopic UCDVA significantly better in Gr1 p=.0001, 95% CI (0.278,0.282). Post op day7 CCT & ECC and Post op 1month UCDVA comparable.

Conclusions: Intra op significantly less CDE and Asp by circumferential sequential nucleotomy results in sig. less Central Corneal Thickness, sig. better Endothelial cell count in early post op period which results in significantly better Uncorrected visual acuity on post op day 1.

Abstract No.: 200607

Comparative Evaluation of Corneal Endothelial Cell Loss in Grade 3 Cataract Following Femtosecond Laser-Assisted Cataract Surgery, Four Quadrant Versus Full Softening

First Author: Arnav **SINGHAL**

Co-Author(s): Rishi **SETHI**

Purpose: The primary objective is to compare the mean corneal endothelial cell loss by analyzing the decrease in endothelial count (in absolute numbers per mm²) using a specular microscope preoperatively and postoperatively in both groups. The secondary objectives are to compare central corneal thickness by analyzing changes in corneal thickness (in microns) using a specular microscope preoperatively and postoperatively in both groups, and to compare visual acuity in postoperative patients of both groups using Snellen's chart.

Methods: This was a single-center randomized controlled trial evaluating femtosecond laser-assisted cataract surgery (FLACS) with two nucleus softening techniques: four-quadrant fragmentation and full softening. Cataract patients reporting to the Ophthalmology Department who met the inclusion and exclusion criteria were considered for the study. Sample Size At 95% confidence level and 90% power, taking mean reduction in endothelial count in four quadrant nucleus fragmentation group as 1.66±0.50 and mean reduction in endothelial cell count in full softening nucleus fragmentation group as 0.58±0.75, sample size was calculated as 20 per group. Patients were recruited after being advised for cataract surgery and intraocular lens (IOL) implantation by a consultant ophthalmologist. Informed written consent was obtained from each patient after explaining the study objectives, methodology, and follow-up requirements. Patients were randomized into two groups using a concealed allocation method.

Results: Full softening method resulted in lower endothelial cell loss and better visual acuity and less edema.

Conclusions: Full softening technique in FLACS surgery is highly efficient and better prognosis than four quadrant.

Abstract No.: 207451

Comparative Evaluation of Preoperative Bromfenac and Nepafenac Eye Drops in Sustaining Intraoperative Mydriasis During Small Incision Cataract Surgery

First Author: Asam **NAVEENA**

Co-Author(s): Megha **VARNIKA**, Bhavishya

Purpose: To compare the effectiveness of preoperative topical Bromfenac Nepafenac in maintaining

intraoperative mydriasis during small incision cataract surgery, and to assess their efficacy in relation to the duration of surgery.

Methods: This prospective, comparative study was done on 102 patients undergoing cataract surgery. Patients were equally divided into two groups by simple randomization and received either Bromfenac or Nepafenac eye drops preoperatively. Pupillary diameter was measured before entering the anterior chamber and at the end of surgery, and the mean difference in pupillary diameter is calculated. The data were analyzed to compare the percentage loss of pupillary diameter between groups and to correlate maintenance of mydriasis with the duration of the surgical procedure.

Results: Both the Bromfenac and Nepafenac groups showed minimal and statistically insignificant reduction in mean pupillary diameter overall. However, when the duration of surgery was prolonged, Bromfenac demonstrated a superior ability to maintain pupillary dilation compared to Nepafenac.

Conclusions: Preoperative administration of both Bromfenac and Nepafenac effectively sustains intraoperative mydriasis during cataract surgery. Notably, Bromfenac offers a significant advantage in maintaining dilation during longer surgical procedures, making it the preferred Non steroidal anti inflammatory drug of choice for extended operations, especially while trainee surgeons are operating.

Abstract No.: 206069

Comparative Evaluation of Traditional and AI-Based Intraocular Lens Power Calculation Formulas in Highly Myopic Eyes

First Author: Xiaopeng **JIANG**

Co-Author(s): Jiangjie **WANG**, Fei **XIA**

Purpose: To assess the accuracy of artificial intelligence (AI)-based intraocular lens (IOL) power calculation formulas compared with traditional methods in highly myopic eyes, and to evaluate their performance across varying axial lengths and corneal curvatures.

Methods: This retrospective case series included 115 highly myopic eyes that underwent phacoemulsification with IOL implantation. IOL power was calculated using four conventional formulas (SRK/T, Haigis, Holladay 2, Barrett Universal II) and seven AI-based formulas (Hill-RBF 3.0, Karmona, Hoffer QST, PEARL-DGS, Ladas Super Formula, Kane, HM-ZL). The outcomes were evaluated using standard deviation (SD), assessed with the Heteroscedastic test; root-mean-square absolute error (RMSAE), assessed with the bootstrap-t method; mean absolute error (MAE), assessed with the Friedman test; and the percentage of eyes within ± 0.25 D to ± 1.00 D of prediction error, assessed with Cochran's Q test. Subgroup analyses were performed based on axial length (AL) and corneal curvature (Kmean).

Results: Most AI-based formulas—especially Hill-RBF 3.0, PEARL-DGS, and Kane—demonstrated higher accuracy than traditional formulas. Overall, the MAEs of Hill-RBF 3.0, PEARL-DGS, and Kane were significantly lower than those of Holladay 2 ($P < 0.05$). The SD of PEARL-DGS also differed significantly from Holladay 2 ($P < 0.05$). In the long axial length group, Hill-RBF 3.0, PEARL-DGS, and Kane showed significantly lower MAEs than Holladay 2 ($P < 0.05$). In the moderate corneal curvature group, Hill-RBF 3.0, Hoffer QST, PEARL-DGS, and Kane had significantly lower MAEs than Holladay 2, and the SDs of Hill-RBF 3.0 and PEARL-DGS differed significantly from both Holladay 2 and SRK/T ($P < 0.05$). Trend lines showed that AI-based formulas exhibited more consistent and stable performance across different AL and Kmean.

Conclusions: AI-based formulas provide superior refractive prediction in highly myopic eyes compared with traditional methods. Tailored formula selection based on biometric profiles may enhance refractive outcomes in cataract surgery.

Abstract No.: 201088

Comparative Outcomes of Femtosecond Laser-Assisted Arcuate Keratotomy (FSAK) With Multifocal IOL Implantation Versus Multifocal Toric IOL Implantation in Cataract Patients With Varying Astigmatism Patterns

First Author: Zunxia **HU**

Co-Author(s): Li **LI**, Jing **SIMA**

Purpose: Comparison of FSAK and Multifocal Toric IOLs in Correcting Corneal Astigmatism in Different Types of Cataract Patients

Methods: Prospective Cohort Study on FLACS with Low-to-Moderate Corneal Astigmatism. A total of 91 eyes received FSAK combined with ZMB00 IOL implantation (37 WTR, 44 ATR, and 10 OBL), while 89 eyes were implanted with ZMT150/ZMT225 (32 WTR, 45 ATR, and 11 oblique). Postoperative outcomes at 3 months were compared, including UDVA, UNVA, BCDVA, Residual total astigmatism, Defocus curves, Astigmatic correction efficacy using Alpíns vector analysis.

Results: There was no statistically significant difference in best-corrected distance visual acuity (BCDVA) between the two groups. However, the ZMT group demonstrated superior uncorrected distance and near visual acuity (UDVA: 0.08 ± 0.09 vs 0.12 ± 0.12 , $P = 0.027$; UNVA: 0.14 ± 0.08 vs 0.21 ± 0.11 , $P = 0.002$). The ZMT group showed significantly less residual total ocular astigmatism (-0.51 ± 0.49 D) compared to the FSAK group (-0.84 ± 0.51 D, $P = 0.012$). Defocus curves revealed comparable visual performance across all distances. The FSAK group exhibited significantly lower overall CI values (0.73 ± 0.43 vs 1.07 ± 0.44 , $P < 0.001$) and particularly for with-the-rule astigmatism (0.61 ± 0.47 vs 1.30 ± 0.37 , $P < 0.001$). No significant differences were

observed in CI values for against-the-rule (0.75 ± 0.40 vs 0.89 ± 0.42 , $P=0.270$) or oblique astigmatism (0.75 ± 0.39 vs 1.20 ± 0.37 , $P=0.058$).

Conclusions: Multifocal TIOLs provide better astigmatic correction than FSAK combined with MIOLs. However, overcorrection was observed in WTR and OBL cases with toric IOLs.

Abstract No.: 200458

Comparative Patient Study: Lentis Quantum vs. Acunex Quantum – Is There a Difference in Visual Performance and Subjective Quality of Vision?

First Author: Lena **BECKERS**

Co-Author(s): David **BECKERS**, Florian **KRETZ**

Purpose: To compare the clinical and subjective visual performance of the Lentis Quantum (hydrophilic, clear) and the Acunex Quantum (hydrophobic, blue-light filtering) intraocular lenses (IOLs) in a paired-eye patient study.

Methods: Ten patients (20 eyes) undergoing bilateral cataract surgery received the Lentis Quantum in one eye and the Acunex Quantum in the fellow eye. At 3 months postoperatively, patients were evaluated monocularly and binocularly. Objective assessments included corrected distance visual acuity (CDVA), corrected intermediate visual acuity (CIVA), corrected near visual acuity (CNVA), defocus curves (mono- and binocular), and contrast sensitivity testing. Subjective evaluation addressed perceived differences in visual quality, specifically color perception and contrast, when comparing the two eyes.

Results: Both IOLs provided excellent visual acuity across all tested distances. Defocus curves revealed comparable depth of focus in both groups. Contrast sensitivity was slightly reduced in the eye with the blue-light filtering IOL in some patients. Subjectively, several patients reported subtle differences in color and contrast perception between the two eyes, with a tendency to notice a warmer hue or reduced brightness in the Acunex Quantum eye. However, these differences were minimal under binocular conditions and did not affect overall satisfaction.

Conclusions: This intraindividual comparison highlights the clinical equivalence of the Lentis Quantum and Acunex Quantum in terms of visual acuity and defocus performance. However, differences in material and chromophore design may lead to slight subjective variations in color and contrast perception. These findings underscore the value of tailored IOL selection based on patient-specific visual preferences and sensitivities.

Abstract No.: 205841

Comparison Among Topical 2% Rebamipide, 3% Diquafosol, and 0.1% Hyaluronic Acid in Post-Cataract Surgery Dry Eye Patients

First Author: Jae Yong **KIM**

Co-Author(s): Ho-seok **CHUNG**, Tae Hun **KIM**, Hun **LEE**

Purpose: To compare preoperative and postoperative changes at 1 and 3 months in post-cataract surgery dry eye patients treated with topical 2% rebamipide (G1), 3% diquafosol (G2), and 0.1% hyaluronic acid (G3).

Methods: This was a single-center prospective study. Ocular Surface Disease Index (OSDI), tear break-up time (TBUT), NEI corneal/conjunctival staining score, Schirmer test, tear osmolarity, and MMP-9 levels were measured in G1, G2, and G3 at baseline and 1 and 3 months after surgery. Between-group comparisons were performed using ANOVA on the changes (Δ = 1 month or 3 months – baseline), while within-group changes were assessed with paired t-tests.

Results: For OSDI, intergroup differences in change were significant at both 1 and 3 months ($p < 0.05$). All three groups showed significant reductions at 1 month (G1: $35.07 \pm 19.65 \rightarrow 16.95 \pm 11.24$, $p < 0.001$; G2: $38.78 \pm 21.81 \rightarrow 22.98 \pm 16.31$, $p = 0.018$; G3: $45.34 \pm 23.27 \rightarrow 12.28 \pm 12.55$, $p < 0.001$). At 3 months, significant reductions persisted in the diquafosol and hyaluronic acid groups (G2: $38.78 \pm 21.81 \rightarrow 20.79 \pm 10.85$, $p = 0.018$; G3: $45.34 \pm 23.27 \rightarrow 13.41 \pm 20.07$, $p < 0.001$). In the Schirmer test, the hyaluronic acid group showed a significant increase at 3 months (G3: $9.29 \pm 5.42 \rightarrow 12.06 \pm 5.74$, $p = 0.026$). For NEI corneal staining, intergroup differences at 1 month were significant ($p < 0.05$), with hyaluronic acid showing a significant reduction (G3: $4.88 \pm 2.42 \rightarrow 2.35 \pm 1.66$, $p < 0.001$).

Conclusions: After cataract surgery, rebamipide improved symptoms in the early postoperative period, diquafosol contributed to sustained improvement up to 3 months, and hyaluronic acid showed significant benefits not only in symptoms but also in tear secretion and corneal status.

Abstract No.: 202981

Comparison and Evaluation of New Artificial Intelligence-Based Formulas With Regression Formulas for Intraocular Lens Power Calculations

First Author: Abhishek A T M

Co-Author(s): Harish **ARAVINDABABU**, Amod **HANSDAK**, Hannah **RANJEE WILLIAMS**

Purpose: Accurate IOL power calculation is critical for optimal postoperative refractive outcomes after cataract surgery. Traditional regression formulas (SRK II, Haigis, Hoffer Q, Holladay I) may falter in eyes with atypical biometry. AI-driven formulas—Hill RBF and the Ladas Super Formula (LSF)—offer enhanced

adaptability across diverse biometric profiles. This study compares the predictive accuracy of Hill RBF and LSF versus four regression methods in routine cataract patients and evaluates performance across axial length (AL) and keratometric values.

Methods: In this analytical cross-sectional study (Nov 2022–May 2024), 222 eyes who underwent uneventful cataract surgery were enrolled and had IOL power calculated by six formulas; actual postoperative spherical equivalents were recorded. Prediction errors (MNE, MAE, MeAE) were computed. Subgroup analyses addressed axial lengths (short, average, long) and keratometry ranges (flat, normal, steep).

Results: SRK II achieved the lowest MAE, followed by Holladay I; Haigis showed the greatest error spread. AI-based formulas maintained stable error metrics across axial length extremes, unlike regression formulas, which were sensitive to biometric outliers. Bland–Altman analysis revealed Holladay I's bias and agreement limits closely matched SRK II, while AI models exhibited minimal systematic bias relative to target refraction.

Conclusions: Regression formulas, SRK II and Holladay I, remain reliable for refractive predictions. AI-driven formulas excel in eyes with atypical axial lengths, offering consistent accuracy without bias. Combining conventional and AI-based approaches tailored to biometric profiles may improve outcomes. Future multicenter trials with larger cohorts and extended follow-up are needed to validate and refine AI formula performance.

Abstract No.: 204260

Comparison of Axial Length and Predictive Error Using Swept-Source Optical Coherence Tomography (SS-Oct) Based Biometer and Scheimpflug-cum- Partial Coherence Interferometry (PCI) Based Biometer Post Phacoemulsification

First Author: Pankhudi **VERMA**

Co-Author(s): Amit **RAJ**, Devkant

Purpose: To compare biometric measurements and postoperative refractive outcomes between Pentacam AXL (PCI with Scheimpflug) and IOLMaster 700 (SS-OCT) in cataract surgery patients.

Methods: This prospective observational study included 102 eyes undergoing phacoemulsification at a tertiary care hospital. Biometric parameters, including axial length (AL), anterior chamber depth (ACD), central corneal thickness (CCT), keratometry (K1, K2, ΔK), and white-to-white (WTW), were recorded on both Pentacam AXL and IOL Master 700. Then, patients were randomly allocated to Group A (Pentacam AXL–based IOL calculation) or Group B (IOLMaster 700–based calculation). Postoperative uncorrected visual acuity (UCVA), best corrected visual acuity(BCVA), and

predictive error (PE) were assessed at 6 weeks and 3 months.

Results: AL measurements showed no significant difference ($p > 0.05$). K1 values demonstrated strong agreement (CCC = 0.972), while K2 and ΔK showed poor concordance. ACD values were comparable, though IOLMaster 700 recorded slightly higher means. Significant differences were observed in CCT and WTW ($p < 0.001$). At 6 weeks, mean PE was -0.280 ± 0.290 D with Pentacam AXL and -0.411 ± 0.295 D with IOLMaster 700 ($p = 0.039$). At 3 months, differences were not significant ($p = 0.239$). At both follow-ups, >85% of eyes achieved refraction within ± 0.50 D, with Group B slightly higher at 3 months (90.20% vs. 86.27%).

Conclusions: Both devices showed reliable biometric accuracy and high refractive predictability. Pentacam AXL is a clinically viable alternative to IOLMaster 700 for IOL power calculation.

Abstract No.: 200684

Comparison of Clinical Outcomes in Cataract Surgery at Near Physiologic Intraocular Pressure Using the Active Fluidics System Versus Higher IOP

First Author: Kun **ZENG**

Co-Author(s): Lishi **LUO**, Yuanjiao **QIAO**, Ye **YE**

Purpose: This study aims to compare the need for additional topical anesthetic due to breakthrough discomfort during cataract surgery at a low intraocular pressure (IOP) of 30 mmHg using the Centurion active fluidics system with Active Sentry (AS) versus the traditional (higher) IOP (≈ 80 mmHg at 110 cm bottle height) using the Stellaris system.

Methods: Conducted at Shenzhen Eye Hospital, this prospective, randomized, comparative study enrolled 80 eyes scheduled for phacoemulsification surgery. Participants were randomly assigned to two groups: Group A underwent cataract surgery at near physiologic IOP (30 mmHg) using Centurion with AS while the control group underwent cataract surgery at traditional IOP at 110 cm bottle height (≈ 80 mmHg) using Stellaris. Preoperative evaluation was performed, including ophthalmologic exams, IOP measurement, central corneal thickness (CCT), and corneal endothelial count. Breakthrough pain was managed with additional topical anesthetic and recorded. Patients rated their intraoperative pain on a visual analog scale (VAS), in which 0 was 'no pain' and 10 was 'unbearable pain'. Visual acuity, IOP, and CCT were recorded on the first day post-surgery and one week later.

Results: The study found a significant difference in the primary outcome, with only 2.5% of patients (1 of 40 eyes) in Group A needing additional anesthetic compared to 12.5% (5 of 40 eyes) in Group B ($p < 0.05$). Phacoemulsification times were similar, though Group

A had a slight, non-significant reduction. Group A also reported lower mean VAS scores (1.17) than Group B (2.5) ($p < 0.01$). Post-surgery, both groups showed no statistically significant differences in visual acuity and IOP. However, Group B experienced a greater increase in central corneal thickness (CCT) on the first day ((9.04% vs. 5.85%, respectively) ($p < 0.05$)). After one week, both changes in CCT and corneal endothelial cell count were not significantly different between the groups.

Conclusions: Near Physiologic Intraocular pressure cataract surgery using the Centurion system reduces intraoperative discomfort and early postoperative corneal edema compared to the Stellaris system, offering potential benefits for patient comfort and recovery without compromising visual outcomes.

Abstract No.: 203698

Comparison of Visual Performance and Astigmatism Tolerance Between Five Presbyopia-Correcting Intraocular Lenses

First Author: Xiaofei HU

Co-Author(s): Lixia LUO, Xuhua TAN, Jiaqing ZHANG, Yu ZHANG

Purpose: To compare the impact of astigmatism on the visual performance of five presbyopia-correcting IOLs in patients following cataract surgery.

Methods: This prospective, observational study enrolled cataract patients who underwent uncomplicated phacoemulsification with implantation of ZXR00, ZMB00, ZFR00V, Vivity or TFNT00. Uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), uncorrected intermediate visual acuity (UINA), uncorrected near visual acuity (UNVA), and refractive outcomes 3 months postoperatively were collected. Astigmatism was induced with a negative cylinder from -0.25 to -2.00 diopters (D) in 0.25-D steps for different astigmatic orientations, and the corresponding distance visual acuity was recorded.

Results: A total of 214 patients (214 eyes) were included. For the ZMB00, TFNT00, and ZFR00V, -0.50D of astigmatism significantly affects UDVA, UIVA and UNVA. In contrast, for the Vivity and ZXR00, -0.75D astigmatism primarily impacts UDVA (all $P < 0.05$). Regarding the ZMB00, TFNT00, and ZFR00V, when with-the-rule (WTR) astigmatism is $\leq 1.00D$, against-the-rule (ATR) astigmatism is $\leq 0.75D$, and oblique astigmatism is $\leq 0.75D$, UDVA remains better than 0.2 logMAR. For the Vivity and ZXR00 IOLs, when WTR astigmatism is $\leq 1.50D$, ATR astigmatism is $\leq 1.25D$, and oblique astigmatism is $\leq 1.00D$, UDVA exceeds 0.2 logMAR. Across all five PC-IOLs, WTR astigmatism demonstrates the least impact on visual acuity in all types of astigmatism (all $P < 0.05$).

Conclusions: Extended depth-of-focus (EDOF) IOLs demonstrated greater tolerance to astigmatism compared to multifocal and full visual range IOLs.

Abstract No.: 202734

Comprehensive Analysis of Ocular Biometry in Cataract Patients: A Large-Cohort Retrospective Study at a Tertiary Eye Hospital in Hong Kong

First Author: Wai Ting CHAN

Co-Author(s): Julia Yan Yu CHAN, Chung Chai CHI, Vanessa Wing-see CHOW, Nai Man LAM, Ke LIU, Rachel Wing Yan TSUI

Purpose: To evaluate the accuracy of ocular biometry and refractive outcomes in patients undergoing cataract surgery at a regional tertiary eye referral center in Hong Kong.

Methods: This was a cross-sectional, retrospective study of patients ($n = 1133$) who underwent uneventful phacoemulsification with intraocular lens (IOL) implantation at Hong Kong Eye Hospital between April and August 2024. Data collected included demographics, preoperative parameters (axial length, anterior chamber depth, target spherical equivalent, biometry machine and formula), and postoperative outcomes (IOL model, IOL power, postoperative SE). Exclusion criteria included ECCE or ICCE, combined procedures and complicated surgeries involving AV or PCR.

Results: A total of 1133 eyes from 1133 patients were analyzed (614 female [52.4%], 519 male [45.8%], mean age: 75.6 ± 8.5 years, range: 36–96 years). Biometry was performed by qualified personnel using the IOLMaster 700 (1103 eyes, 97.4%, Barrett Universal II formula) or Nidek biometer (30 eyes, 2.6%, SRK/T formula). Overall, 95.7% (1084/1133) achieved postoperative SE within $\pm 1.0 D$ of the target refraction (mean absolute difference: $0.37 \pm 0.32 D$, range: 0–2.49 D). Subgroup analysis demonstrated high accuracy across IOL models: ZCB00 (96.2%, 428/445), ICB00 (95.6%, 644/677), and SN60WF (81.8%, 9/11). Stratified by AL, outcomes were within $\pm 1.0 D$ in 90.0% (28/31) with AL < 22 mm, 95.0% (927/972) with AL 22–26 mm, and 99.0% (129/130) with AL > 26 mm.

Conclusions: Cataract surgery at our centre achieved excellent biometry accuracy, with 95.7% of patients within $\pm 1.0 D$ of target refraction which is well above the 85% benchmark set by the RCO Cataract Surgery Guidelines. These underscore the need to consider advanced formulas (e.g., EVO, Kane formula) for nanophthalmic eyes.

Abstract No.: 204356**Decoding Toric IOL Performances in Real-World: A Study on Postoperative Rotational Stability and Influencing Factors***First Author: Ruihong JU*

Purpose: This study aims to investigate the rotational stability of Toric IOLs in real-world clinical settings and to identify independent risk factors that may influence their rotational stability.

Methods: This retrospective case series study included 732 patients with 913 eyes who underwent phacoemulsification and implantation with Toric IOLs for cataracts with astigmatism at our hospital between 2018 and 2023. Postoperative uncorrected distance visual acuity (UDVA), best-corrected visual acuity (BCVA), residual astigmatism (RAS), and Toric IOL rotation were evaluated at 1 week and 1 month postoperatively.

Results: Postoperative UDVA was 0.22 ± 0.15 on the 1st day, 0.13 ± 0.13 at 1st week, and 0.11 ± 0.12 at 1st month. BCVA was 0.04 ± 0.08 at 1st week and 0.03 ± 0.09 at 1st month postoperatively ($P > 0.05$). The proportion of eyes with equivalent spherical refraction (SE) within $\pm 0.5D$ was 85.9% at 1st week and 85.29% at 1st month ($P > 0.05$). The mean preoperative astigmatism was $1.81 \pm 0.67D$, and the expected RAS was $0.14 \pm 0.09D$, with a statistically significant difference ($P < 0.001$). Postoperative RAS was $0.45 \pm 0.32D$ at 1st week and $0.40 \pm 0.32D$ at 1st month, significantly reduced comparing to the preoperative values ($P < 0.001$). The mean rotation of Toric IOLs was $3.26^\circ \pm 0.82^\circ$ at 1st week and $3.36^\circ \pm 2.80^\circ$ at 1st month, with no statistically significant difference ($P = 0.137$). Using the rotation of Toric IOLs $\geq 5^\circ$ at 1st month as the observation indicator, four independent risk factors were identified after univariate regression analysis, multicollinearity testing, interaction term verification, and multivariate regression analysis: mean keratometry (K), anterior segment length (ASL), anterior capsule polishing (ACP), and postoperative hospital observation ($P < 0.05$).

Conclusions: Patients with cataracts and corneal astigmatism who underwent Toric IOL implantations mostly achieved good astigmatic correction, postoperative visual acuity, and rotational stability. Furthermore, ASL, K, intraoperative ACP and 1-day postoperative hospital observation were identified as independent predictive factors influencing the rotational stability of Toric IOLs.

Abstract No.: 203869**Early Real-World Experience With a Full Visual Range, Non-Toric Intraocular Lens***First Author: Chameen SAMARAWICKRAMA*

Purpose: To present a case series documenting real-world outcomes following implantation with the

enVista ENVY (EN) non-toric intraocular lens (IOL) in patients undergoing cataract surgery.

Methods: EN is a full visual range IOL that provides up to 4 D of continuous vision with enhanced tolerance to dysphotopsia. In this interim case series, five eyes of five patients were implanted with the EN IOL by one ophthalmologist at one center in Australia from January to March 2025. Additional cases will be collected (~20 patients), and all patient cases with adequate follow-up will be presented. Key outcomes include uncorrected distance visual acuity (UDVA), uncorrected near visual acuity (UNVA), and mean refractive spherical equivalent (MRSE).

Results: In the interim case collection, the mean $\pm$ SE target spherical equivalent (SEQ) was $0.13 \pm 0.05 D$ ($n=5$). A monocular UDVA of 6/6 or better was achieved in three of five eyes; one eye achieved 6/9, and one achieved 6/12. A monocular UNVA of J4 or better was achieved in three of five eyes; one eye achieved J6, and one achieved J8. The mean $\pm$ SE MRSE was 0.15 ± 0.22 ($n=5$), and the mean $\pm$ SD delta SEQ was 0.02 ± 0.21 ($n=5$).

Conclusions: In this real-world case series, most patients implanted with the FVR IOL achieved good distance vision and functional near vision.

Abstract No.: 203365**Effect of Angle Kappa on the Refractive Prediction Accuracy in Cataract Patients After Myopic LASIK/PRK***First Author: Xuhua TAN**Co-Author(s): Haorui YUAN*

Purpose: To evaluate the impact of angle kappa on prediction accuracy in patients after myopic laser-assisted in-situ keratomileusis (LASIK)/photorefractive keratectomy (PRK).

Methods: This retrospective, consecutive case-series study included 127 post-myopic-LASIK/PRK cataract patients (176 eyes). Three different keratometry (K) values measured by 2 devices were assessed, including simulated keratometry (SimK) obtained by IOLMaster 700 at 2.5-mm ring centered on corneal vertex and SimK derived from Pentacam AXL in 3-mm zone centered on corneal vertex (Pentacam [CV]) and pupil center (Pentacam [PC]). The performance of the Barrett True-K formula based on vertex-centered K values (IOLMaster 700; Pentacam [CV]) and pupil-centered K values (Pentacam [PC]) was compared. The polynomial regression curve was the best-fit curve to illustrate the variation in arithmetic prediction error (PE) with angle kappa. Subgroup analysis was performed based on the inflection point suggested by curves (angle kappa < 0.4 mm; angle kappa ≥ 0.4 mm).

Results: The hyperopic PE of the IOLMaster 700 and Pentacam (CV) modes increased with larger angle kappa. Both in total and in eyes with angle kappa < 0.4 mm, compared with other modes, the IOLMaster

700 mode showed no systematic bias and relatively lower absolute PE. For eyes with angle kappa ≥ 0.4 mm, IOLMaster 700 and Pentacam (CV) modes demonstrated hyperopic PE (0.43 to 0.46 D, $P < 0.05$), while the Pentacam (PC) mode displayed no systematic bias, relatively lower mean absolute PE (0.70 D vs 0.90-0.96 D) and the highest percentage of eyes with PE within ± 0.5 D (51.22% vs 36.59%-41.46%).

Conclusions: In post-myopic-LASIK/PRK patients, the prediction accuracy decreased with greater angle kappa when using the corneal vertex-centered K values. The pupil-centered K values were preferred for these patients with angle kappa ≥ 0.4 mm.

Abstract No.: 206458

Effect of Capsular Tension Ring on Toric IOL Stability and Visual Outcomes: A Cohort Study Stratified by Axial Length

First Author: Jian **DENG**

Co-Author(s): Hui **GUO**, Liduo **PAN**, Xi **SONG**, Xiaoyi **YU**

Purpose: Rotational stability of toric intraocular lenses (IOLs) is key to effective astigmatism correction, particularly in long eyes at higher risk of mispositioning. This study compares toric IOL rotational stability and visual outcomes with and without a capsular tension ring (CTR), to define the optimal axial length for CTR use.

Methods: A prospective cohort study enrolled eyes receiving toric IOL (ZMT) with or without CTR. All affected eyes underwent phacoemulsification and toric IOL implantation, with CTRs implanted in the eyes of the CTR group. Eyes were stratified by axial length (AL): non-myopic (AL:22-24.5mm), mild-moderate myopic (AL:24.5-26mm), and highly myopic (AL ≥ 26 mm). Patients were followed up at 1 day, 1 week, 1 month, and 3 months. Key outcome measures included TIOL rotation, tilt, decentration, residual astigmatism, refractive error, and objective visual quality.

Results: Of 116 eyes (93 patients) analyzed, the CTR group showed significantly less IOL rotation than controls at 1 week (2° vs 3° , $p < 0.05$). CTR implantation also reduced residual astigmatism and improved rotational stability in both mild-to-moderate and highly myopic eyes. Additionally, the CTR group had significantly lower total tilt (4° vs 5° , $p < 0.05$), horizontal tilt (3.7° vs 4.6° , $p < 0.05$). The CTR group demonstrated significantly lower coma (0.07 vs 0.08, $p < 0.05$), with highly myopic eyes also exhibiting significantly lower coma compared to controls ($p < 0.05$). A significant correlation was found between IOL rotation and residual astigmatism ($R=0.38$, $p < 0.001$). Multivariable analysis confirmed CTR implantation as an independent factor for reduced rotation.

Conclusions: CTR implantation significantly improves stability and visual outcomes of toric IOL in eyes with axial length ≥ 24.5 mm, but provides no benefit in non-

myopic eyes. These findings support the selective use of CTR in longer eyes to optimize surgical outcomes. Further validation with a larger sample size and longer-term follow-up is warranted.

Abstract No.: 203851

Effect of Neodymium:Yttrium-Aluminum-Garnet Laser on Capsular Convexity and Capsulorrhexis in Intumescent Cataracts: Anterior Segment Optical Coherence Tomography Assessment

First Author: Vaibhav **VISHAL**

Co-Author(s): Rohitha **NAYAK**, Naren **SHETTY**

Purpose: To evaluate anterior segment changes and intraoperative challenges following Neodymium:Yttrium-Aluminum-Garnet (Nd:YAG) laser pretreatment in different types of intumescent cataracts, as classified by anterior segment optical coherence tomography (AS-OCT).

Methods: This prospective study included 90 eyes with intumescent mature cataracts diagnosed on slit-lamp examination and categorized using AS-OCT. Biometry was performed with immersion ultrasonography, intraocular lens (IOL) Master, and Argos devices. A single Nd:YAG laser shot was applied 30 minutes before surgery. CASIA-2 AS-OCT scans were obtained before and after treatment. Parameters analyzed included lens biometry, circumferential lens rise, and anterior chamber depth. Intraoperative complications were recorded.

Results: Nd:YAG laser was most effective in type II and type III intumescent cataracts. Following treatment, anterior capsule convexity and circumferential lens rise decreased, while anterior chamber depth increased. No intraoperative complications such as Argentinian flag sign, capsulorrhexis extension, or posterior capsule rupture were observed.

Conclusions: Nd:YAG laser pretreatment reduces anterior capsule convexity and deepens the anterior chamber, thereby preventing intraoperative complications in intumescent cataracts. AS-OCT is a valuable tool for classifying cataract morphology, predicting Nd:YAG laser effects, and selecting suitable cases to improve surgical safety.

Abstract No.: 201647

Efficacy and Safety of a Selective Laser Device to Create Centered Capsulotomies in White Intumescent Cataracts: A International Multicenter Study (LC – WIC Study)

First Author: Jai **KELKAR**

Co-Author(s): Aditya **KELKAR**, Richard **PACKARD**, Sathish **SRINIVASAN**

Purpose: To evaluate the efficacy and safety of a centered anterior capsulotomy creation with a new

selective laser device in eyes with white intumescent cataracts.

Methods: Prospective multicentre interventional study across five clinical sites in United Kingdom, Bulgaria, India and Saudi Arabia. A total of 84 eyes of – subjects with white intumescent cataracts were recruited after anterior segment OCT (AS-OCT) established the presence of intralenticular fluid pockets indicative of raised intralenticular pressure. In all cases, prior to phacoemulsification, selective laser capsulotomy (SLC) was performed by staining the anterior capsule with a customised 0.4 % trypan blue. Capsulotomies were created with a diameter of 5.5 mm. Subjects were followed up at one day, one week, one and three months postoperatively.

Results: In all cases, the capsulotomy was successfully created as planned. No intraoperative complications were observed. At 3 months postoperatively the mean capsulotomy diameter measured 5.3 mm (range: 5.2 to 5.5 mm). No cases of capsular phimosis were observed during the three-month follow-up period. In all cases, visual acuity improved from preoperative light perception to mean postoperative uncorrected distance visual acuity (UDVA) of 0.28 LogMAR (range: 0.0 to 1.0).

Conclusions: The use of SLC in this series of eyes with white intumescent cataracts achieved consistently sized, continuous and well-centred capsular openings. There were no complications such as the Argentine flag sign or anterior capsular tears. These results highlight the precision and safety of using selective laser capsulotomy for creating anterior capsulotomies in white intumescent cataracts.

Abstract No.: 205070

Endothelium's BFF: Miloop to the Rescue in Tough Cataracts

First Author: Sneha G V

Co-Author(s): Sriganesh, Sadhwini HARISH, Supriya SRIGANESH

Purpose: To compare intra-operative phaco energy and post-operative endothelial cell density(ECD) with and without a nuclear fragmentation device.

Methods: Patients aged more than 45 years with NS grade ≥ 3 were included. Total of 64 eyes were included, 32 in control group and 32 in miLOOP group. Single surgeon, using the same phaco machine (Centurion Vision System, Alcon Surgicals) performed all surgeries. Phaco energy parameters, day 1 post-operative corneal edema and ECD on day 15 & 3 months were noted.

Results: Mean Cumulative Dissipated Energy (CDE) was 15.21 ± 3.28 units in miLoop group and 21.73 ± 10.27 units in the other. Mean total ultrasound time was $01:05.19 \pm 00:15.77$ minutes in miLOOP group and $01:29.95 \pm 00:34.42$ minutes in control group. On

post-op day 1, grade 3 corneal edema was seen in 6.3% of miLOOP group eyes and 21.9% of control group eyes. Mean post-operative ECD at 3 months was 1898.52 ± 455.52 cells/mm² in miLOOP group and 1361.53 ± 408.12 cells/mm² in the other. The comparisons were statistically significant.

Conclusions: miLOOP is a useful tool in managing hard cataracts. Phaco power, time & endothelial cell loss at 3 months is significantly lower compared to routine phacoemulsification, with low incidence of corneal edema on day 1.

Abstract No.: 200988

Enhanced Wet Lab Training With the Microwave-Induced Nucleus Cataract Model Eye

First Author: Kosei TOMITA

Co-Author(s): Takenori INOMATA, Ken NAGINO, Shintaro NAKAO

Purpose: This study is to develop reproducible cataract model eyes in porcine eyes using a microwave surgical device, aiming to simulate key steps of cataract surgery and enhance the effectiveness of wet lab training.

Methods: Fresh porcine eye was used to create the nucleus cataract model eye. A pencil-type electrode was inserted 4 mm posterior to the limbus and activated at 50 mW for 30 seconds at the lens center to create the nucleus cataract model eye. The nucleus cataract model eyes (n=23) were evaluated using cumulative dissipated energy (CDE) during phacoemulsification.

Results: Microwave thermal coagulation successfully created hardened nucleus cataract models without affecting corneal transparency. Trypan blue staining simulated a poor red reflex, allowing capsulorhexis practice. The hardened nucleus enabled training in divide-and-conquer and phaco-chop techniques with tactile feedback similar to actual cataract surgery. The mean CDE value of the 23 nucleus cataract model eyes was 8.25 ± 2.68 (mean $\pm$ SD).

Conclusions: Microwave-induced thermal denaturation in porcine eyes provides a reproducible method for simulating the nucleus cataract. The nucleus cataract model eye offers realistic wet lab conditions for surgical training, particularly in capsulorhexis under low visibility and advanced phacoemulsification techniques.

Abstract No.: 204608

Epidemiological Characteristics, Distribution of Axial Length, and Prevalence of Ocular Abnormalities Associated With Congenital Cataract in Northwest China

First Author: Xu HOU

Co-Author(s): Guorui DOU, Min GONG, Mengmei HE, Jian ZHOU

Purpose: We aimed to identify epidemiological characteristics, distribution of axial length and ocular abnormalities associated with congenital cataract in Northwest China.

Methods: This observational cross-sectional study evaluated patients with congenital cataracts who underwent surgery between 2008 and 2023. Patient characteristics were compared among different age groups and hospitalization years.

Results: A total of 527 patients (527 eyes) underwent cataract surgeries. Of these, 323 patients (61.29%) resided in rural areas and 204 (38.71%) in urban regions. Rural patients exhibited a higher median age at surgery [36[6,72] months) compared to urban counterparts [23.5[4,64] months), with a significant difference between them ($Z = -2.543$, $p = 0.011$). Median surgical age differs significantly across hospitalization year subgroups ($\chi^2 = 40.636$, $p < 0.001$). Axial length demonstrated accelerated growth prior to 2 years of age, with statistically significant interocular differences in unilateral cases below 24 months ($p < 0.05$). Congenital cataract cases were predominantly diagnosed between 2 and 6 years (32.26%). Age distribution patterns significantly varied across hospitalization periods ($\chi^2 = 70.394$, $p < 0.001$). Ocular abnormalities alone were present in 293 cases (55.60%), while 40 patients (7.59%) exhibited concurrent systemic abnormalities. Amblyopia emerged as the most frequent ocular comorbidity (23.34%).

Conclusions: Rural patients constituted a higher proportion of congenital cataract. The median surgical age demonstrated a significant difference across hospitalization year subgroups. Axial growth patterns showed significant correlations with surgical timing, sex, and laterality. These findings indicate enhanced parental awareness of pediatric ocular health and provide an evidence-based rationale for early intervention strategies in congenital cataracts in Northwest China.

Abstract No.: 203589

Establishment and Validation of Evaluation Model for Zonula Stability Before Cataract Surgery Based on Multimodal Imaging

First Author: Hao YUAN

Co-Author(s): Xuemin LI

Purpose: To establish the evaluation model for zonula stability before cataract surgery based on multimodal

images by artificial neural network and other algorithms, and verify their diagnostic efficiency.

Methods: A total of 182 patients who would undergo cataract surgery in Peking University Third Hospital were included. They were divided into the zonula abnormality group (58 patients) and the control group (124 patients). Anterior segment optical coherence tomography (AS-OCT) and ultrasound biomicroscope (UBM) were performed to measure the anterior segment structural parameters before and after cycloplegia. Three diagnostic prediction models were established respectively: binary logistic model based on logistic regression (LR) algorithm, artificial neural network model based on multilayer perceptron (MLP) algorithm and decision tree (DT) model based on Chi square automatic interaction detector (CHAID) algorithm. The subjects were randomly divided into training groups at the ratio of 7 to 3.

Results: In the logistic diagnostic model, the curvature radius of anterior surface of the lens ($\beta = -0.664$, $P = 0.018$), the change of lens diameter before and after cycloplegia ($\beta = 1.437$, $P = 0.008$), and ciliary process-equatorial lens distance ($\beta = 1.437$, $P < 0.001$) were essential, and the fitting degree of the regression model was significantly high ($P = 0.088$). In the ANN model, ciliary process-equatorial lens distance (100.0%; 0.230), the curvature radius of anterior surface of the lens (63.0%; 0.145), and the change of lens diameter before and after cycloplegia (55.4%; 0.128) were important. In the decision tree model, ciliary process-equatorial lens distance, the curvature radius of anterior surface of the lens and lens decentration were remarkable. The AUC of different models were compared by Delong test: ANN model was significantly better than the preoperative suspicious signs ($P < 0.001$), the logistic regression model ($P = 0.010$) and the decision tree model ($P = 0.003$).

Conclusions: The Logistic, ANN and DT diagnostic models based on multimodal imaging that combined the data of AS-OCT and UBM were superior to subjective signs in the diagnosis of zonula abnormality before cataract surgery, and ANN model showed the best comprehensive diagnostic performance, which was of great significance in evaluating preoperative zonula stability.

Abstract No.: 204379

Evaluation and Decision Making in Cataractous Eyes of Coloboma

First Author: Nishi SATISH

Co-Author(s): Sangeeta ABROL

Purpose: To evaluate the preoperative and intraoperative difficulties in the management of patients with coloboma who present with cataract.

Methods: This observational case series was done on 35 patients with colobomas who presented to us with

cataract. Different intraocular lenses were implanted according to the technical difficulties faced during surgery. Analysis of preoperative and intraoperative findings was clubbed with postoperative findings of each patient.

Results: No patient was left aphakic. All patients with coexisting fundal colobomas were first given barrage laser sessions before surgery for scleral fixated IOL, and after surgery for in-the-bag PCIOL. No patient developed retinal or choroidal detachment. Among secondary IOLs, 3-piece PMMA IOLs performed the best; iris claw IOL was implanted in 4 patients, and all 4 patients had an anterior chamber reaction. Hydrophilic acrylic single-piece IOLs inserted as SFIOL also experienced mild anterior chamber reaction but good postoperative vision gain.

Conclusions: The best option we documented is to stabilise the bag with a lack of zonules by use of a capsular tension ring or segment and place a posterior chamber IOL; however, when a secondary IOL is needed, the best outcome was seen with a 3-piece PMMA optic SFIOL with Hoffmann pockets.

Abstract No.: 201091

Evaluation of Femtosecond Laser-Assisted Arcuate Keratotomy (FSAK) With Multifocal IOL Implantation for the Correction of Against-the-Rule Astigmatism in Cataract Surgery

First Author: Zunxia HU

Co-Author(s): Li LI, Jing SIMA

Purpose: Compare the efficacy of FSAK combined with MIOL versus toric multifocal IOL for cataract patients with against-the-rule corneal astigmatism.

Methods: The FSAK group (45 eyes) received ZMB00 IOL implantation, while the toric group (41 eyes) received ZMT150/ZMT225 IOLs. Patients were followed up at 1 week, 1 month, and 3 months postoperatively. UDVA, UNVA, BCDVA, residual total astigmatism, defocus curves, and objective visual quality were compared at 3 months postoperatively.

Results: There were no significant differences in UNVA and BCDVA between the two groups. However, the ZMT showed better UDVA compared to the FSAK. The residual total astigmatism was -0.79 ± 0.45 D in the FSAK and -0.64 ± 0.47 D in the ZMT ($P = 0.165$). The defocus curve indicated that the ZMT group had better distance visual acuity than the FSAK group. The surgically induced astigmatism (SIA) and correction index (CI) were 1.00 ± 0.58 and 0.76 ± 0.45 in the FSAK group, respectively, compared to 0.88 ± 0.46 and 0.76 ± 0.33 in the ZMT group, with no statistically significant differences between the two groups. iTrace analysis showed that PSF and MTF in the FSAK were 0.17 ± 0.16 and 0.37 ± 0.11 , respectively, while in the ZMT, they were 0.09 ± 0.09 and 0.27 ± 0.09 . FSAK demonstrated

better corneal optical quality. There were no statistically significant differences in total ocular PSF and MTF between the two groups.

Conclusions: Cataract patients with low-to-moderate ATR, there was no significant difference in postoperative visual function between those treated with FSAK and those implanted with multifocal toric intraocular lenses (IOLs).

Abstract No.: 201069

Evaluation of the Protective Effect of Mannitol-Containing Ophthalmic Viscosurgical Devices on Corneal Endothelial Cells During Phacoemulsification in Patients With Low Endothelial Cell Density

First Author: Huynh Phuc NGUYEN

Co-Author(s): Van Nam PHAN

Purpose: To assess the safety and efficacy of mannitol-containing OVDs in protecting corneal endothelial cells during phacoemulsification in patients with low preoperative ECD ($1000\text{--}2000$ cells/ mm^2).

Methods: In this randomized trial, patients were assigned to receive one of three OVDs: (A) SH 2.0% + mannitol 0.5%, (B) SH 1.4%, or (C) HPMC 2.4%. ECD and corneal thickness were measured preoperatively and at 1 week, 1 month, and 3 months post-surgery.

Results: Group A had significantly lower ECD loss (11.2% at 1 week, 14.7% at 3 months), less corneal edema, and better early visual acuity than groups B and C ($p < 0.001$).

Conclusions: OVDs with 2% SH and 0.5% mannitol offer better endothelial protection in low ECD patients, reducing corneal edema and aiding early visual recovery. This formulation is a suitable option for high-risk cases, such as glaucoma, to enhance surgical safety and visual outcomes.

Abstract No.: 200752

Factors Affecting the Efficacy of pFSAK in Correcting Corneal Astigmatism in Chinese Cataract Patients

First Author: Zunxia HU

Co-Author(s): Li LI, Jing SIMA

Purpose: To analyze the factors influencing the efficacy of symmetric FSAK in correcting corneal astigmatism in Chinese cataract patients.

Methods: A total of 123 patients (157 eyes) undergoing symmetrical FSAK were consecutively enrolled and followed up for 6 months postoperatively. The arcuate incision diameter was set at 8 mm with a depth of 85%, and the DONO algorithm was applied. The correction index was calculated using the Alpíns method. Multiple linear regression analysis was performed to assess the relationship between the correction index

and factors including age, axial length, intraocular pressure (IOP), mean keratometry (Km), central corneal thickness (CCT), and peripheral corneal thickness (PCT). Additionally, the corrective effects were compared among different types of astigmatism.

Results: TIA 1.22 ± 0.40 D, SIA 0.76 ± 0.49 D, DV 0.76 ± 0.43 D, CI 0.62 ± 0.33 . The CI values for WTR, ATR, and OBL were 0.51 ± 0.28 , 0.76 ± 0.33 , and 0.71 ± 0.31 , respectively. The correction effect was significantly better in ATR than in WTR ($P = 0.000$), and oblique astigmatism also demonstrated superior correction compared to WTR astigmatism ($P = 0.049$). However, there was no statistically significant difference in correction efficacy between ATR and oblique astigmatism ($P = 0.648$). Axial length, IOP, Km, CCT, and PCT showed no correlation with the CI. Age is a positive correlation—older age was associated with better correction outcomes. The derived regression equation was: $CI = 0.407 + (Age \times 0.008)$.

Conclusions: pFSAK demonstrated the optimal corrective effect for ATR. Age was identified as a factor influencing CI. $CI \approx 1$ was observed at 74 years.

Abstract No.: 204208

Femtosecond Laser-Assisted Cataract Surgery for Morgagnian Cataract: A Case Report

First Author: Shiqi DONG

Purpose: The fully developed Morgagnian kind of cataract is incredibly uncommon in this day and age of readily available medical facilities. Few clinical trials have been conducted on this highly rare kind of cataract, despite the fact that femtosecond laser-assisted cataract surgery (FLACS) offers considerable benefits in a variety of complicated cataract operations.

Methods: This paper reports successful femtosecond laser-assisted cataract surgery with implantation of a Toric IOL in the capsular bag for a case of unilateral Morgagnian cataract.

Results: During surgery, anterior capsulotomy was performed with the LenSx femtosecond LASER (Alcon, USA), setting the truncated anterior lens capsule diameter at 5.2 mm. Upon capsule rupture, a large amount of chylous fluid filled the anterior chamber, releasing like a smoke bomb. After laser completion, the anterior chamber was irrigated to remove the fluid. The anterior lens capsule was then stained with 0.5% indocyanine green dilution, and a secondary continuous curvilinear capsulorhexis was done with forceps along the laser path. The lens nucleus was fragmented and aspirated using a Centurion phacoemulsification machine (Alcon, USA). An intraocular lens (IOL; SN6AT4, +11D, Alcon, USA) was implanted into the capsular bag and axially aligned at 95° , with no intraoperative complications. On postoperative day 1, the left eye's uncorrected visual acuity (UCVA) was 20/20.

Conclusions: FLACS combined with functional intraocular lens implantation can maximize the safety of surgery and improve the visual quality of patients with Morgagnian Cataract.

Abstract No.: 203549

Follow-Up Analysis of 4-Haptic Bitoric Intraocular Lens Implantation in Chinese Patients With Cataract and Regular Astigmatism: A Multicenter Study

First Author: Jing WANG

Co-Author(s): Jinsong ZHANG

Purpose: To evaluate the visual and refractive outcomes of 4-haptic bitoric intraocular lens (IOL) implantation in Chinese patients with cataract and astigmatism.

Methods: A post-market, prospective, multicenter, single-arm study was conducted. 709M IOLs were implanted in 318 subjects and evaluated at 1-day, 1-week, 1-month and 3 to 6 months postoperatively. An objective photographic method was used to determine postoperative IOL rotation and postoperative 1 day IOL axis was set as the baseline. Uncorrected distance visual acuity (UDVA), postoperative residual astigmatism, subjective refraction, visual quality, and patient satisfaction were assessed. Safety assessment of surgical complications and adverse side events was recorded.

Results: A total of 318 subjects from 23 centers were enrolled. Uncorrected distance visual acuity improved significantly after surgery, from 0.85 ± 0.42 preoperatively to 0.24 ± 0.28 (1-day), 0.17 ± 0.20 (1-week), 0.14 ± 0.18 (1-month) and 0.13 ± 0.17 (3 to 6 months) postoperatively. Mean refractive cylinders also decreased significantly, from -1.72 ± 1.25 to -0.62 ± 0.52 (1-day), -0.55 ± 0.45 (1-week), -0.49 ± 0.48 (1-month) and -0.46 ± 0.42 (3 to 6 months). The mean magnitude of the SIA vector (1.74 diopters [D]) was almost the same as the mean magnitude of the TIA vector (1.75 D) at the last follow-up. The mean difference vector was 0.46 D, and the mean correction index was 1.03 , all indicating an effective astigmatism correction effect that remained stable during the follow-up. The mean absolute IOL rotation was 0.92 ± 2.68 (1-week), 0.80 ± 2.70 (1-month) and $0.55 \pm 2.2^\circ$ (3 to 6 months) postoperatively, showing good stability. Patients were very satisfied or satisfied with overall visual outcomes.

Conclusions: Implantation of 4-haptic bitoric IOL proved effective for correcting regular astigmatism in Chinese eyes.

Abstract No.: 204526**Ganglion Cell Intracellular Edema as a Reason of Early Visual Quality Decline After Cataract Surgery: An OCT-Based Clinical Study***First Author: Li LI*

Purpose: To investigate the mechanism of macular ganglion cell intracellular edema (GCIE) in early postoperative visual quality decline after cataract surgery.

Methods: We identified 18 patients (21 eyes) who developed subjective visual quality decline within the early postoperative period after cataract surgery and demonstrated OCT findings consistent with GCIE. All patients underwent comprehensive evaluation including comprehensive medical history, visual quality assessment, slit-lamp examination, and macular OCT scans. All patients received periocular injections of Triamcinolone Acetonide (20mg); 21 eyes received one injection, 4 eyes received a second injection after 3 weeks due to incomplete response.

Results: Visual decline manifested as: 1-2 lines of visual acuity loss (12 eyes; associated with subtle corneal Descemet's membrane wrinkles and faint anterior chamber Tyndall effect) or blurred vision without acuity loss (9 eyes; no significant anterior chamber reaction). OCT findings uniformly demonstrated GCIE characterized by: increased GCL reflectivity (width/color), indistinct GCL boundaries. The central macular thickness (CMT) values of 259.19 ± 21.08 μ m preoperatively, 280.33 ± 27.91 μ m at the time of macular edema onset, and 281.0 ± 16.42 μ m two weeks after intravitreal triamcinolone acetonide (IVTA) injection ($P \leq .001$). The macular volume thicknesses were 273.95 ± 12.15 μ m, 286.24 ± 16.63 μ m, and 289.0 ± 10.03 μ m ($P \leq .001$), while average ganglion cell layer (GCL) thicknesses were 84.48 ± 10.4 μ m, 85.0 ± 16.10 μ m, and 85.55 ± 8.57 μ m ($P = 0.65$).

Conclusions: Macular GCIE may be one of the mechanisms underlying early postoperative visual quality decline after cataract surgery.

Abstract No.: 207406**Hidden Macular Threats: Preoperative OCT As the Game-Changer for Cataract Surgery Outcomes***First Author: Harshitha C**Co-Author(s): Nishitha NARUKULLA*

Purpose: To determine the prevalence of occult macular pathology detectable only by preoperative optical coherence tomography (OCT) and evaluate its impact on postoperative visual outcomes in eyes scheduled for routine cataract surgery.

Methods: This prospective observational study included consecutive eyes undergoing routine cataract surgery with no clinically evident macular disease

on dilated fundus examination. All eyes underwent preoperative spectral-domain macular OCT. Detected abnormalities were categorized as epiretinal membrane, macular edema, vitreomacular interface disorders, or early age-related macular degeneration. Postoperative best-corrected visual acuity (BCVA) was measured at 1 month. Visual outcomes were compared between eyes with and without OCT-detected pathology, and multivariate logistic regression identified predictors of suboptimal visual gain.

Results: Of 200 eyes evaluated, 38 (19%) harbored previously unsuspected macular pathology. Epiretinal membrane (10%) and early AMD (5%) were the most frequent. Mean postoperative BCVA was significantly worse in eyes with OCT-detected pathology (0.52 ± 0.08 logMAR) compared with normal maculae (0.18 ± 0.04 logMAR, $p < 0.001$). OCT findings independently predicted suboptimal postoperative vision (OR 4.2; 95% CI 2.1–8.3). Early detection allowed modification of surgical planning and optimized patient counseling, preventing unrealistic expectations.

Conclusions: Nearly one in five cataract surgery candidates harbors a hidden macular lesion detectable only by OCT. Routine preoperative macular OCT is a game-changer—it unmasks silent threats, predicts postoperative visual outcomes, guides surgical decision-making, and elevates patient satisfaction. These results strongly support the adoption of preoperative macular OCT as a global standard of care in cataract surgery work-up.

Abstract No.: 202925**Impact of Tear Film Stability on Visual Outcomes After Trifocal Intraocular Lens Implantation***First Author: Lan WANG**Co-Author(s): Kaiwen CHENG, Wenwen HE, Yi LU, Jiaqi MENG, Xiangjia ZHU*

Purpose: To investigate the impact of tear film stability on visual outcomes in patients undergoing trifocal intraocular lens (IOL) implantation.

Methods: Patients scheduled for cataract surgery with trifocal IOL implantation were enrolled in this prospective study. Postoperative follow-up was conducted at 3 months after surgery. Patients were categorized into four groups according to postoperative tear breakup time (TBUT): normal (≥ 10 s), mild (≥ 5 s but < 10 s), moderate (≥ 2 s but < 5 s), and severe (< 2 s) tear film instability groups. Postoperative visual outcomes encompassing visual acuity, defocus curves, contrast sensitivity (CS), objective visual quality metrics such as the corneal performance index (CPI), higher-order aberrations (HOA), modulation transfer function (MTF), and subjective visual quality questionnaires were evaluated. Totally, 97 eyes of 97 patients were analyzed.

Results: The severe group showed significantly worse uncorrected near visual acuity compared to the normal and mild groups, and significantly worse intermediate visual acuity compared to the normal group. The defocus curve of the severe group was also significantly poorer at near or intermediate distances. Relative to the normal group, both moderate and severe groups exhibited a significantly reduced CS at low-to-mid spatial frequencies, as well as worse corneal visual quality metrics, including lower CPI, higher corneal HOAs and coma, and reduced corneal MTF. The severe group was more likely to report severe glare, blurred vision and hazy vision, with significantly lower VF-14 scores and higher ocular surface disease index (OSDI) scores.

Conclusions: Tear film instability may adversely affect visual outcomes following trifocal IOL implantation.

Abstract No.: 203354

Implantation of Trifocal Intraocular Lens in Mild Pathologic Myopia: Visual Outcomes and Influence of Fundus Structures

First Author: Meiyi ZHU

Co-Author(s): Guangbin ZHANG

Purpose: To compare the visual outcomes of simple high myopia (HM) and mild pathologic myopia (PM) following implantation of a trifocal intraocular lens (IOL), and investigate the influence of fundus structures.

Methods: We retrospectively studied 63 high myopic eyes of 63 patients underwent femtosecond laser-assisted cataract surgery with implantation of AT LISA tri 839MP IOL (Carl Zeiss Meditec AG, Germany) between July 2020 and September 2024. 34 eyes in the HM group and 29 eyes in the PM group. Main visual outcomes including monocular corrected distance (4 m, CDVA), distance-corrected intermediate (80 cm, DCIVA), distance-corrected near (40 cm, DCNVA) visual acuity, defocus curves, and subjective refraction. Optical coherence tomograph was employed to evaluate macular tilt degree (MTD), central foveal thickness, and subfoveal choroidal thickness (SFCT). Multiple linear regression analysis was used to evaluate the independent predictors of visual acuity in the PM group.

Results: The CDVA, DCIVA, and DCNVA were 0.00 ± 0.00 , 0.08 ± 0.05 , and 0.09 ± 0.07 logarithm of the minimum angle of resolution (logMAR) in the HM group, 0.02 ± 0.05 , 0.15 ± 0.09 , and 0.17 ± 0.09 logMAR in the PM group, respectively. In the PM group, mean MTD was $17.13 \pm 6.79^\circ$. The MTD demonstrated a significant predictive effect on CDVA (regression coefficient: 0.005; $P = 0.026$) and DCNVA (regression coefficient: 0.015; $P = 0.003$), and the SFCT was associated with DCIVA (regression coefficient: -0.001; $P = 0.05$).

Conclusions: Trifocal IOL implantation yielded favorable visual outcomes in simple high myopic eyes, though results were comparatively poorer in PM cases. MTD was associated with the expected visual outcomes.

Abstract No.: 206500

Inflammation Factors Mediate Association of Dietary Habits and Senile Cataract: Insights From a Mendelian Randomization Study

First Author: Jian DENG

Co-Author(s): Yonghao LI, Liduo PAN, Meng WANG, Tao WANG

Purpose: Senile cataract (SC), a leading cause of global blindness, poses a major public health challenge. This study employed Mendelian randomization (MR) to assess the causal effects of 83 dietary habits on SC.

Methods: Initially, we employed bidirectional and replication sample MR to identify dietary habits associated with SC. Multivariable MR(MVMR) was then applied to adjust for confounders and assess their independent causal effects. Two-step MR also examined mediating mechanisms related to inflammatory biomarkers. Finally, to validate the core findings, additional analyses employed independent datasets for the overall cataract phenotype and the cataract surgical endpoint.

Results: The bidirectional MR initially identified 13 dietary habits potentially associated with SC risk. After false discovery rate correction, four associations remained significant. Validation in an independent cohort indicated that current drinkers consuming alcohol exclusively with meals, unlike those drinking apart from meals, demonstrated a substantial and robust protective causal effect against SC (OR = 0.67; 95% CI: 0.55–0.82; $P = 5.86 \times 10^{-5}$). MVMR sustained this independent protective effect after adjusting for 15 outcome-related confounders. Mediation analysis supported partial mediation by inflammation, of which IL-6 explained 11% of the effect and CRP 6%. Further analyses also linked this drinking pattern to a reduced likelihood of undergoing cataract surgery (OR=0.99; 95%CI: 0.98-0.99; $P=2.34 \times 10^{-6}$) and a lower risk of overall cataract (OR=0.83; 95%CI: 0.76–0.91; $P=5.26 \times 10^{-5}$).

Conclusions: The study illustrates that drinking with meals significantly reduces SC risk compared to drinking alone. CRP and IL-6 are emphasized as mediating biomarkers in this protective correlation, providing essential insights for clinical preventative and public health measures addressing SC.

Abstract No.: 204798**Influence of Anterior Capsule Polishing on Capsular Bag and Intraocular Lens After Phacoemulsification**

First Author: Jeyaprakash **BALASUBRAMANIAN**
Co-Author(s): Ezhilvendhan **KALAIMAMANI**

Purpose: To evaluate if anterior capsule polishing could minimize the chance of posterior capsular opacification which needs Nd-Yag capsulotomy and anterior capsular opacification / anterior capsular contraction syndrome which influences the effective lens position (ELP).

Methods: In this prospective study, 120 eyes of 60 consecutive patients with bilateral age-related cataract who underwent phacoemulsification were evaluated. Each patient's eyes were randomly assigned to two groups. One eye received 360-degree anterior capsule polishing (Group-A: Cases) and the fellow eye without anterior capsule polishing (Group-B: Controls). In this study, capsulorrhexis size is uniform as we used a corneal capsulorrhexis marker (5mm at the anterior capsule). All eyes were implanted with a similar type of intraocular lens. Eyes were evaluated at 1st week, 1st, 3rd, 6th month and 1st year.

Results: All eyes were evaluated with slit lamp biomicroscope, A-SCAN ultrasonography and anterior segment OCT. Significant reduction in the formation of posterior capsular opacification, anterior capsular opacification, and anterior capsular contraction syndrome was noted in Group-A (eyes which received 360 degrees of anterior capsule polishing).

Conclusions: Anterior capsule polishing had a positive influence by reducing the formation of PCO which minimized the need for Yag capsulotomy (which has its own complications such as Cystoid macular oedema, post Yag uveitis, raise in IOP and retinal detachment), reducing post operative refractive error (due to ACCS).

Abstract No.: 203102**Interferometric Optical Metrology of Diffractive Multifocal Intraocular Lenses: A Comparative Bench Study**

First Author: Seung Pil **BANG**

Purpose: To quantitatively characterize the optical performance of commercially available diffractive multifocal intraocular lenses (IOLs) and assess their functional behavior under varying pupil sizes.

Methods: Eight +20.0 D diffractive multifocal IOLs—PanOptix (Alcon), Odyssey and Synergy (Johnson & Johnson), Envy (Bausch & Lomb), Elana (Zeiss), Gemetric and Gemetric Plus (HOYA), and Intensity (Hanita)—were evaluated using a Mach-Zehnder interferometer (NIMO TEMPO) in accordance with ISO 11979-2 standards. Optical path difference maps were converted into wavefront profiles, point spread

functions, and modulation transfer functions (MTFs). Diffractive step structures and through-focus MTFs at 50 lp/mm were compared across pupil diameters of 2.0, 3.0, and 4.5 mm.

Results: All IOLs except Envy exhibited uniform diffractive step heights. Odyssey and Synergy employed higher-order diffractive designs that introduced primary and secondary spherical aberrations, extending the depth of focus and enhancing near vision. At a 3.0 mm pupil, all IOLs except Gemetric Plus showed far-dominant energy distribution. At 2.0 mm, Elana and Gemetric maintained far dominance, whereas other lenses shifted toward intermediate or near foci. At 4.5 mm, Elana and Intensity demonstrated balanced energy distributions, while the remaining lenses stayed far-dominant.

Conclusions: Interferometric optical metrology provides detailed, quantitative profiling of multifocal IOLs. Combining such optical data with patient-specific ocular parameters may enable more personalized IOL selection and improve postoperative visual outcomes.

Abstract No.: 201590**Intermediate Task Performance and Predictors of Difficulty After Bilateral Vivity EDOF IOL Implantation: A Patient Perspective**

First Author: Muskan **MANGAL**

Co-Author(s): Aditya **KELKAR**, Jai **KELKAR**, Sabyasachi **SENGUPTA**

Purpose: To evaluate visual outcomes, task-specific intermediate vision, and patient satisfaction following bilateral implantation of the AcrySof IQ Vivity Extended Depth of Focus (EDOF) intraocular lens (IOL).

Methods: This prospective single-centre study included patients who underwent bilateral phacoemulsification with Vivity EDOF IOL. Postoperative assessments at one month included uncorrected distance (UCDVA), intermediate (UIVA), and near visual acuity (UNVA), as well as responses to a modified Catquest-9SF questionnaire. Two additional items were included to assess difficulty in computer use and reading large-font text on mobile phones, tasks relevant to Vivity's intended optical benefits. Multivariable logistic regression was used to identify predictors of reported difficulty.

Results: A total of 170 patients (340 eyes) were enrolled. At one month, all patients achieved UCDVA and UIVA of 6/6, and 87% achieved UNVA of N8 or better. However, 26.3% of patients reported "Some Difficulty" with computer use or reading mobile phone text. Multivariable analysis identified shorter axial length (<23.3 mm) and worse preoperative visual acuity (<0.35 logMAR) as independent predictors of this difficulty. Visual disturbances were infrequent (occurring in ≤2% of patients), and 98.4% of patients reported overall satisfaction with their vision.

Conclusions: While the Vivity EDOF IOL delivers excellent distance and intermediate visual acuity with high patient satisfaction, a notable proportion of patients may experience difficulty with intermediate digital tasks, though this requires confirmation with longer follow-up. These findings highlight the importance of tailored patient selection and task-specific outcome assessment in evaluating EDOF lens performance.

Abstract No.: 201589

Interocular Axial Length Asymmetry: Developing a Better Understanding of Red Flag Presentations

First Author: Christopher GO

Co-Author(s): Uday BHATT, Christopher HODGE, Michael LAWLESS, Christolyn RAJ

Purpose: Accurate biometry is critical for optimal refractive outcomes post-cataract surgery. While inter-eye axial length differences are often flagged as pathological, they may reflect stable anatomical variation. This study aims to improve characterisation of biometric asymmetry and develop a metric to identify true outliers.

Methods: A retrospective cohort analysis of biometric data from 15,245 patients (Vision Eye Institute) was conducted. Predictor variables included anterior chamber depth (ACD) difference, lens thickness (LT) difference, posterior segment difference, and derived anatomical ratios. Stepwise linear regression identified significant contributors to axial length asymmetry. A composite metric was developed using z-scores of key predictors to quantify anatomical disproportion. Outliers were flagged based on the top 5% of composite scores.

Results: Mean interocular axial length difference was 0.24 ± 0.44 mm. ACD and LT differences were statistically significant predictors. LT/ACD ratio difference showed weaker association but was retained for proportional context. The composite metric effectively highlighted cases with multi-dimensional anatomical deviation.

Conclusions: Most interocular axial length differences reflect proportional anatomical variation. The development of a composite metric offers a novel, objective tool to identify eyes with disproportionate biometry, potentially reflecting patients at risk of reduced refractive accuracy post-IOL implantation and representing a true "red flag". This approach may enhance preoperative surgery planning and patient counselling.

Abstract No.: 206627

Intraocular Lens Calculation Formula Selection for Short Eyes: Based on Axial Length and Anterior Chamber Depth

First Author: Ruoxi GAO

Co-Author(s): Lixia LUO, Xuhua TAN, Jiaqing ZHANG

Purpose: To evaluate the predictive accuracy of 11 intraocular lens (IOL) calculation formulas in eyes with an axial length (AL) less than 22.00 mm.

Methods: New-generation formulas (Barrett Universal II [BUII], Emmetropia Verifying Optical [EVO] 2.0, Hill-Radial Basis Function [Hill-RBF] 3.0, Hoffer QST, K6, Kane, Pearl-DGS) and traditional formulas (Haigis, Hoffer Q, Holladay 1 and SRK/T) were evaluated for predictive accuracy. Subgroup analyses were performed based on AL and anterior chamber depth (ACD).

Results: The study enrolled a total of 184 eyes of 184 patients. The BUII, Hoffer QST, Hoffer Q, Holladay 1, and SRK/T showed myopic shifts (-0.49 to -0.18 diopters [D], $P < 0.05$), whereas K6 displayed a hyperopic shift (0.11 D, $P = 0.03$). The Kane exhibited no systematic bias (-0.07 D), and yielded lower mean absolute error (MAE) (0.48 D, $P < 0.05$) and root mean square absolute error (RMSAE) (0.65 D, $P < 0.01$). For eyes with an $AL \leq 21.5$ mm and an $ACD > 2.5$ mm, the Pearl-DGS displayed the smallest MAE (0.43 D) and lowest RMSAE (0.57 D), while other new-generation formulas showed relatively worse performance (MAE: 0.46 to 0.67 D; RMSAE: 0.60 to 0.84 D).

Conclusions: The Kane formula showed the highest accuracy in short eyes, whereas the Pearl-DGS had superior performance in eyes with a relatively shorter AL and deeper ACD.

Abstract No.: 206820

Intraocular Lens Power Calculation in Post-Myopic-LASIK Eyes: Comparison of Two Different Corneal Refractive Power Measurements by Pentacam

First Author: Qingying YANG

Co-Author(s): Wenwen HE, Xiangjia ZHU

Purpose: To compare the accuracy of corneal refractive power measurements centered on corneal apex (K_{apex}) and pupil center (K_{pupil}) by Pentacam in intraocular lens (IOL) power calculation in post-myopic-LASIK eyes, and to help with improving visual outcomes after cataract surgery.

Methods: Post-myopic-LASIK patients scheduled for cataract surgery were enrolled. Corneal refractive power centered on the corneal apex (K_{apex}) and pupil center (K_{pupil}), decentration of the ablation zone, and Kappa angle were measured by Pentacam. Predicted postoperative spherical equivalence (SE) was calculated with K_{apex} and K_{pupil} using the Barrett True-K (no history) formula, respectively. Prediction error was

calculated as actual SE minus predicted SE. Mean error (ME), mean absolute error (MAE), and median absolute error (MedAE) were compared between Kapex and Kpupil groups, with subgroup analysis in terms of decentered ablation and Kappa angle. The backward stepwise multiple linear regression analysis was also performed to identify the factors influencing prediction errors with each K value.

Results: Totally 92 eyes from 92 patients were analyzed. Fewer eyes had a prediction error of more myopic than -1.00 D with Kapex than with Kpupil (17/92 vs. 29/92, $P = 0.041$). ME, MAE, and MedAE with Kapex were all lower than those with Kpupil (-0.42 ± 1.06 vs. -0.64 ± 1.21 D, 0.89 ± 0.71 vs. 1.01 ± 0.92 D, 0.69 vs. 0.76 D, respectively; $P < 0.05$ for ME and MedAE). In both subgroups of larger decentration of ablation zone and larger Kappa angle, ME with Kapex was lower than that with Kpupil to a higher degree (both $P < 0.05$). Average Kapex was higher than average Kpupil ($P < 0.001$), and the difference between them was higher with larger decentration of ablation zone or larger Kappa angle. Multivariate analysis demonstrated that prediction error with Kpupil was associated with decentration of ablation zone ($\beta = -0.264$, $P = 0.019$), while no such association was found in prediction error with Kapex.

Conclusions: The Kapex achieved better accuracy in IOL power calculation than Kpupil in post-myopic-LASIK eyes, especially in eyes with large decentration of the ablation zone or large Kappa angle.

Abstract No.: 204436

Investigating the Protective Effect and Mechanism of Ellagic Acid on Cataract by Network Pharmacology, Molecular Docking, and Experimental Validation

First Author: Li **TANG**

Purpose: Ellagic acid (EA) is a natural polyphenol with well-documented antioxidant and anti-inflammatory activities; however, its precise mechanism against cataract remains unclear. This study aimed to identify the bioactive components of EA and elucidate its mode of action in cataract prevention.

Methods: Putative targets of EA were retrieved from TargetNet, TCMSP, TargetPrediction, PharmMapper and SEA. Cataract-related genes were collected from multiple databases. The common targets were imported into String to construct a protein-protein interaction (PPI) network. The “drug-component-target-disease” network was visualised with Cytoscape. KEGG and GO enrichment analyses were performed in R. Molecular docking was carried out using MOE. The therapeutic efficacy of EA was further evaluated in a sodium-selenite-induced cataract model in rat pups.

Results: A total of 43 common targets shared by ellagic acid and cataract were identified. PPI network analysis

revealed TP53, SIRT1, NFE2L2, AKT1, BCL2, CASP3, TNF, IL6 and TGFB1 as hub genes, with TP53 showing the lowest binding energy to ALB. Experimentally, EA markedly reduced ROS and MDA levels, elevated GSH content, and enhanced the activities of the antioxidant enzymes GST, SOD, GPx and CAT. After EA treatment, TNF- α and IL-6 concentrations were significantly decreased, Bcl-2 mRNA was up-regulated, p38 and JNK phosphorylation was suppressed, while caspase-3 and Bax mRNA expression were down-regulated.

Conclusions: EA protects against cataract by attenuating oxidative stress and inflammation, inhibiting p38/JNK phosphorylation, decreasing ROS/MDA generation, maintaining GSH/GSSG homeostasis, and ultimately lessening oxidative damage and lens opacification in experimental models.

Abstract No.: 204824

Is Astigmatism Correction Necessary for Patients With Cataract Who Have Corneal Astigmatism of Less Than 0.75 D?

First Author: Xiaohang **XIE**

Purpose: To investigate the proportion of patients with predicted refractive astigmatism (PRA) of 0.75 diopters (D) or greater and associated risk factors among cataract surgery candidates with low corneal astigmatism.

Methods: A retrospective cross-sectional study was conducted in Zhongshan Ophthalmic Center, Guangzhou, China. Patients with cataract who had preoperative simulated keratometric astigmatism of less than 0.75 D were recruited. The PRA was calculated by Barrett toric calculator using posterior corneal astigmatism (PCA) measured by the IOLMaster 700 (Carl Zeiss Meditec AG) and corneal surgically induced astigmatism (SIA). Two corneal incision locations (temporal $[0^\circ/180^\circ]$, 135° incision) and varying magnitudes (0.10 to 0.60 D) were considered for SIA. Multiple logistic regression analysis was used to explore risk factors associated with PRA of 0.75 D or greater and build a predictive model. Sensitivity analysis was performed using PRA threshold of 0.50 D.

Results: A total of 1,750 eyes from 1,750 patients were included (mean age: 60.14 ± 13.24 years, 42.91% male, 1,010 right eyes and 740 left eyes). The 135° incision (odds ratio [OR]: 17.86) and against-the-rule (ATR) astigmatism (OR: 37.55) are the major risk factors for PRA of 0.75 D or greater. Higher simulated keratometric astigmatism (OR: 2.03), larger PCA (OR: 1.64), and surgically induced astigmatism (OR: 1.29) also significantly increased the risk of PRA of 0.75 D or greater. Nomogram model were constructed with an area under curve of 0.90.

Conclusions: For patients with corneal astigmatism ≤ 0.75 D, temporal incision and measured PCA is

preferred. Patients with ATR and 135° incision should consider astigmatism correction.

Abstract No.: 203839

Is Preoperative Mydriasis Indicative of Intraoperative Floppy Iris Syndrome? A Multivariate Analysis

First Author: Argyrios TZAMALIS

Co-Author(s): Chrysanthos CHRISTOU, Ioannis TSINOPOULOS, Nikolaos ZIAKAS

Purpose: The study's objective was to examine how dilated pupil diameter (PD) may serve as a risk factor for the development of Intraoperative Floppy Iris Syndrome (IFIS) and its relationship with complications during and after cataract surgery.

Methods: A total of 1178 cataract patients were identified and included in a multivariate cross-sectional analysis at a tertiary care ophthalmic center. Each case had a thorough preoperative documentation of potential predisposing risk factors for the occurrence of IFIS, and pupil size was assessed one week before surgery, after maximum pharmacologic dilation.

Results: In a study of 1,294 eyes undergoing cataract surgery, IFIS was noted in 44 cases, amounting to 3.4%. The preoperative pupil diameter (PD) was significantly lower in patients who developed IFIS (PDIFIS=6.23±1.4mm compared to PDNON-IFIS=7.38±0.9mm, $p<0.001$), and this significant difference persisted among patients using α -blockers for benign prostatic hyperplasia (PD IFIS=5.86±1.5mm vs PD NON-IFIS=6.78±0.9mm, $p=0.01$). Pupil diameter was found to have a negative correlation with rates of posterior capsular rupture and iris trauma ($p=0.03$ and $P<0.001$, respectively). A cut-off value of 6.8mm in all patients and 6mm in patients taking α 1 blockers was found indicative of predicting the appearance of IFIS with high sensitivity and specificity.

Conclusions: The degree of pupillary dilation before surgery appears to play a crucial role in the appearance of floppy iris and may serve as a predictive indicator for surgeons to help reduce the possible severe outcomes of unexpected IFIS.

Abstract No.: 203424

Lens Morphology in Cataract Patients With Zonula Dialysis by Anterior Segment Optical Coherence Tomography

First Author: Hao YUAN

Co-Author(s): Xuemin LI, Ziyuan LIU

Purpose: To investigate the morphologic characteristics of the lens in cataract patients with zonula dialysis (ZD) before and after cycloplegia by anterior segment optical coherence tomography (AS-OCT).

Methods: A total of 56 eyes from 56 participants who would undergo cataract operations were included,

with 29 eyes of normal controls and 27 eyes of zonula dialysis patients. Lens morphologic parameters were then evaluated by AS-OCT, including anterior chamber depth (ACD), lens thickness (LT), lens diameter, lens vault, anterior curvature radius, posterior curvature radius, decentration and tilt of lens. After participants were treated with three-time tropicamide solution, AS-OCT was repeated to acquire the post-cycloplegia results. SPSS Software 22.0 was used for statistical analysis.

Results: The comparison of basic lens morphologic parameters without cycloplegia found only anterior curvature ($P=0.039$) showed significant differences between normal and ZD groups. AS-OCT measured after 30-min cycloplegia treatment showed significantly increased ACD, lens diameter, posterior curvature and decreased vault in both groups, decreased lens thickness in normal group, increased anterior curvature and decreased lens decentration in ZD group (all $P<0.05$). The logistic regression model showed ZD group had greater alterations of ACD ($P=0.014$), anterior curvature ($P=0.009$) and decentration ($P=0.031$) after cycloplegia treatment when compared with the normal group.

Conclusions: Lens in ZD patients was characterized by steeper anterior curvature, and greater alterations of ACD, anterior curvature and decentration after cycloplegia. The comparison of lens morphologic parameters before and after cycloplegia might be the potential method to evaluate the stability of zonula.

Abstract No.: 200527

Lens Position Change Following Cataract Surgery in Eyes With Thick Lenses: An SS-OCT-Based Study

First Author: Xiangjia ZHU

Purpose: To evaluate the impact of intraocular lens (IOL) positional change following cataract surgery by swept-source optical coherence tomography (SS-OCT) in eyes with different lens thicknesses (LTs), and its influence on the accuracy of IOL power calculation.

Methods: This prospective cohort study enrolled patients who planned to undertake phacoemulsification and monofocal IOL implantation, and were divided into three groups according to the LT ($LT<4\text{mm}$, $4\text{mm}\leq LT<5\text{mm}$, $LT\geq 5\text{mm}$). Lens position change (δLP), measured by the anterior segment SS-OCT, was defined as the difference between the position of postoperative IOL and the equatorial plane of preoperative lens. The prediction errors (PEs) of Barrett Universal II (BUII), Kane, Emmetropia Verifying Optical and Pearl-DGS formulas were evaluated at least one year postoperatively.

Results: Totally 90 eyes of 90 patients were analysed. The overall average δLP was $-0.12\pm 0.60\text{mm}$. Eyes with $LT\geq 5\text{mm}$ had more negative δLP (-0.44 ± 0.65 vs

0.02±0.65 and 0.04±0.49mm) and myopic PE of all four formulas than the LT<4mm and 4mm≤LT<5mm groups, respectively ($p<0.05$). δ LP was negatively correlated with LT ($r=-0.264$, $p=0.012$) and positively correlated with anterior chamber depth (ACD) ($r=0.263$, $p=0.012$). Multiple linear regression analyses further revealed LT was the only independent influencing factor of δ LP ($p<0.05$). ACD and δ LP were the independent influencing factors of the PE with the BUII formula, while LT and δ LP were the independent influencing factors of the PE with the other formulas ($p<0.05$).

Conclusions: Postoperative forward IOL movement contributes to myopic PEs of eyes with thick lenses.

Abstract No.: 206103

Leveraging Generative AI-Based Chatbot to Complement Cataract Surgery Consultation

First Author: Dayna **YONG**

Co-Author(s): Ziyou David **CHEN**, Naimah Binte **ISMAL**, How Sheng Rubin **YONG**

Purpose: To evaluate the accuracy and patient acceptance of a novel Generative AI-based (GenAI) chatbot designed to complement cataract surgery consultation and identify suitable patients for surgery.

Methods: A study was conducted at a tertiary institute's ophthalmology clinic from December 2024 to August 2025. Patients who attended the consultation for only cataract review were recruited. The ophthalmologist's recommendation for cataract surgery was recorded. Patients also engaged with the chatbot to generate recommendations for the cataract condition. The agreement between the chatbot and the ophthalmologist's recommendation was analysed. Patients' acceptance of the chatbot was evaluated using a modified Website User Survey.

Results: 149 eligible responses were analysed. 72 patients who were reviewed in the cataract clinic were offered cataract surgery by the ophthalmologist. Our chatbot recommended 77 patients for cataract clinic review. Sensitivity of the chatbot was 84.7% whilst specificity was 79.2%. Concordance was 81.9%. Patient feedback was positive, with 139 (92.6%) agreeing it is user-friendly, and 53 (35.6%) were willing to use the chatbot to replace their routine cataract clinic visits with this format of consultation.

Conclusions: Our GenAI chatbot demonstrated good agreement with the clinician's assessment of suitability for surgery. Its utility could be more as an adjunct to identify patients who might require surgery before consultation.

Abstract No.: 206969

Long-Term Clinical Outcomes of Bilateral Implantation of a Non-Diffractive Spherical Aberration-Based Increased Range of Focus Toric Intraocular Lens in Filipino Eyes

First Author: Keshia Lourdes **DUYONGCO-LENON**

Co-Author(s): Victor Jose **CAPARAS**, Isabel Mara **CAPARROS**, Maria Isabela **DE GUIA**, Maureen Anne **REYES**

Purpose: To evaluate the long-term astigmatic correction, rotational stability, and visual performance of the non-diffractive spherical aberration-based Increased Range of Focus RayOne EMV® Toric intraocular lens (IOL) [Rayner, Worthing, UK] in Filipino patients up to 6-12 months after cataract surgery.

Methods: Adults above 18 years old with corneal astigmatism ≥ 0.75 D underwent bilateral phacoemulsification with implantation of the RayOne EMV® Toric IOL targeted at emmetropia. Exams at 7-14 days, 30-45 days, and 6-12 months were manifest refraction(MR), monocular and binocular uncorrected/corrected visual acuity (UDVA/CDVA) at distance(4m), intermediate(UIVA/DCIVA 80cm and UIVA/DCIVA 63cm), and near(UNVA/DCNVA 40cm). Rotational stability, defocus curve, contrast sensitivity(CS), photic phenomena (Halo/Glare Simulator, ViSU-L GmbH), and quality of vision(QOV) using the McAlinden questionnaire were evaluated.

Results: Fourteen patients ($n=28$ eyes) were included. At 6-12 months, mean refractive spherical equivalent was $-0.19(\pm 0.30)$ D. Binocular uncorrected visual acuities(logMAR) were UDVA $-0.19(\pm 0.08)$, UIVA 80cm $0.37(\pm 0.07)$, UIVA 63cm $0.30(\pm 0.08)$, and UNVA 40cm $0.26(\pm 0.11)$. Binocular corrected visual acuities(logMAR) were CDVA $-0.19(\pm 0.08)$, DCIVA 80cm $0.40(\pm 0.08)$, DCIVA 63cm $0.32(\pm 0.10)$, and DCNVA 40cm $0.27(\pm 0.12)$. Mean rotation was $5^\circ \pm 4^\circ$ with 89% of eyes rotating $\leq 10^\circ$. Post-op mean refractive cylinder was $0.20(\pm 0.57)$ D. Binocular defocus curve showed CDVA ≤ 0.20 logMAR from +2.0D to -2.5D. Mean halo size/intensity were 25/100 and 27/100; glare 23/100 and 27/100. CS(logCS) 1m and 40cm were $1.53(\pm 0.14)$ and $1.58(\pm 0.11)$. Mean QOV was 91.4/100.

Conclusions: The RayOne EMV® Toric IOL effectively provides long-term astigmatic correction with good rotational stability, increased range of vision from distance to functional near when targeted at emmetropia, minimal photic phenomena, good contrast sensitivity and high quality of vision in Filipino patients.

Abstract No.: 203010

Mechanistic Study of the Novel Peroxidase Mimetic DhHP-6 in Metabolic Cataracts

First Author: Zhuoya LI

Co-Author(s): Hui ZHANG

Purpose: Metabolic disorders such as diabetes and hypergalactosemia often induce oxidative damage and mitochondrial dysfunction in the lens, leading to metabolic cataracts. Although surgical intervention remains the primary treatment, its associated risks and complications underscore the demand for pharmacological alternatives with multifaceted protective effects. This study aims to further elucidate the underlying mechanisms of the novel microperoxidase mimetic Deuteroheemin- β Ala-His-Thr-Val-Glu-Lys (DhHP-6) in attenuating the progression of metabolic cataracts.

Methods: To investigate the mechanisms, galactose-induced rat cataract models and high-galactose-treated lens epithelial cells were established. Lens opacity and ocular toxicity were assessed via slit-lamp examination. In both models, activities of antioxidant enzymes superoxide dismutase (SOD) and catalase (CAT), as well as levels of malondialdehyde (MDA), glutathione (GSH), and adenosine triphosphate (ATP) were measured. Western blot was used to analyze the Nrf2/Keap1/HO-1 pathway and apoptosis-related proteins (Bax, Bcl-2, cleaved caspase-3). Further in vitro assays included mitochondrial membrane potential, Mito-SOX fluorescence, Nrf2 nuclear translocation by immunofluorescence, and mitochondrial dynamics proteins. The role of Nrf2 was verified using a specific inhibitor to evaluate downstream effects.

Results: The results revealed that DhHP-6 significantly alleviated lens opacity by activating the NRF2/KEAP1/HO-1 pathway, thereby boosting antioxidant enzyme activity, restoring ATP levels, and inhibiting apoptotic signaling. Crucially, in vitro analyses confirmed DhHP-6's ability to maintain mitochondrial structural integrity and functional homeostasis through this pathway, thereby preventing the initiation of apoptosis cascades.

Conclusions: These findings demonstrate that DhHP-6 attenuates metabolic cataract progression through multi-target mechanisms orchestrated by the NRF2/KEAP1/HO-1 pathway, integrating antioxidative defense, mitochondrial homeostasis restoration, and apoptosis inhibition into a unified therapeutic strategy.

Abstract No.: 201523

Not All Monofocals Are Equal: Defocus Curve Analysis of Clarion, Magnifient, Tecnis Eyhance, and Vivinex Impress Advanced Monofocal Intraocular Lenses

First Author: Ayushi BANSAL

Co-Author(s): Sahleen AHMAD KHAN

Purpose: To compare visual performance across distance, intermediate, and near ranges of four advanced monofocal intraocular lenses (IOLs)—Clarion, Magnifient, Tecnis Eyhance, and Vivinex Impress—using standardized defocus curve analysis.

Methods: This prospective observational study included pseudophakic patients aged 50–75 years, 1–3 months after uncomplicated phacoemulsification with in-the-bag implantation of one of the four IOLs. Monocular best-corrected visual acuity (logMAR) was measured under standardized photopic conditions at defocus levels from +1.50 D to –3.00 D in 0.50 D steps, starting from best distance correction. Defocus curves were plotted, and the area under the curve (AUC) and visual acuity at key defocus points (0.00 D, –1.50 D, –2.00 D) were compared. Statistical analysis was performed using one-way ANOVA with post-hoc testing ($p < 0.05$).

Results: All IOLs provided excellent distance vision (mean logMAR ≤ 0.05 at 0.00 D). Tecnis Eyhance and Clarion demonstrated superior intermediate vision, with significantly better acuity at –1.50 D (mean logMAR 0.12 ± 0.05) compared with Magnifient and Vivinex Impress ($p = 0.02$). Magnifient achieved peak performance at –1.00 D (mean logMAR 0.10 ± 0.04) but showed reduced near performance beyond –2.00 D. Vivinex Impress provided balanced intermediate and near outcomes with moderate decline at higher defocus levels. AUC ranking was: Tecnis Eyhance (1.85), Clarion (1.78), Vivinex Impress (1.70), Magnifient (1.60; $p = 0.03$).

Conclusions: All advanced monofocal IOLs achieved excellent distance vision, but defocus curve profiles differed. Tecnis Eyhance and Clarion enhanced intermediate vision, Magnifient excelled midrange, and Vivinex Impress provided balanced performance, underscoring individualized IOL selection.

Abstract No.: 203565

Novel Tear Biomarkers as Predictors of Postoperative Discomfort After Cataract Surgery

First Author: Naren SHETTY

Co-Author(s): Ravi Krishna KANARADI, Swaminathan SETHU

Purpose: To investigate the relationship between inflammatory tear film biomarkers and postoperative discomfort, specifically pricking sensation, in patients undergoing cataract surgery, and to explore the

potential of preoperative biomarker profiling in predicting and managing such symptoms.

Methods: This prospective observational study was conducted on 100 eyes of 100 patients undergoing cataract surgery. Pre-operatively steroids and NSAIDs were deferred. Tear samples were collected at two time points: pre-operatively on the day of surgery and postoperatively on day 1 using Whatman Filter Paper 41 strips and inflammatory biomarkers were analyzed. On postoperative day 1, patients were divided into two groups based on symptoms: Group 1 (n = 50): no pricking sensation and Group 2 (n = 50): pricking sensation present. Patients with ocular surface disease, uveitis and systemic conditions affecting tear production, or surgical complications were excluded.

Results: Patients with postoperative pricking sensation demonstrated elevated levels of IL-17A and TNF α compared to asymptomatic patients, indicating an underlying inflammatory state of the ocular surface. The findings suggest that these biomarkers may serve as predictors for postoperative discomfort

Conclusions: IL-17A and TNF α are potential inflammatory markers linked to postoperative discomfort following cataract surgery. Preoperative biomarker screening could identify at-risk patients, enabling targeted anti-inflammatory therapy to improve postoperative comfort and satisfaction. This biomarker-driven approach may enhance personalized care in cataract surgery.

Abstract No.: 200545

One Surgery, Two Worlds: The First Cross-Continental Carbon Footprint Study of Cataract Surgery Between the UK NHS and South Asia

First Author: Pradipta **CHOWDHURY**

Co-Author(s): Mandeep Singh **BINDRA**, Prakash Kumar **CHOWDHURY**, Anureet **KAUR**

Purpose: This study evaluates the environmental footprint of phacoemulsification within the UK National Health Service (NHS). It benchmarks this against a high-volume South Asian eye hospital to uncover how resource-lean surgical systems achieve comparable outcomes with dramatically lower carbon emissions.

Methods: This prospective study analyzed 1,000 standalone phacoemulsification surgeries, comprising 500 surgeries at Stoke Mandeville Hospital NHS Trust (UK) and 500 surgeries at the Bangladesh Eye Hospital (BEH, Bangladesh). Surgical waste was measured bin by bin, and energy data were collected from hospital records. Travel emissions were survey-based. CO₂e was calculated using the EPA's TRACI 2.1. Post-op infection rates and patient satisfaction were also assessed.

Results: Each NHS phacoemulsification generates 128.3 kg CO₂e (primarily from disposable procurement) and 3.7 kg of solid waste. Averaging 12 cases/day, per-

surgery energy use reaches 33.8 kWh (HVAC 30.4 kWh; autoclave 2.18 kWh) due to constant climate control and underfilled sterilisers. In contrast, Bangladesh Eye Hospital averages 37 cases/day, using just 8.4 kWh/case (HVAC 2.8 kWh; autoclave 0.093 kWh). BEH generates 17.1 kg CO₂e and 0.45 kg waste per case - reductions of 86% and 87.84% respectively, compared to the NHS. This is achieved through reusable tools, batch sterilization, and multi-use medications. No endophthalmitis occurred. Patient satisfaction was 95.1% in the UK and 90.9% in BEH.

Conclusions: This study demonstrates that sustainability is a reproducible strategy for high-quality, low-carbon surgery rather than a compromise. Ophthalmology can now adapt.

Abstract No.: 201940

Optimizing Post-Phacoemulsification Protection: The Role of Intracameral Levofloxacin

First Author: Kristo Hadi Audric **SUGIAMAN**

Co-Author(s): Stefenie, Gede **PARDIANTO**, Diyah **PURWORINI**

Purpose: To evaluate the efficacy of intracameral levofloxacin 0.5% in preventing postoperative infection following phacoemulsification cataract surgery.

Methods: A total of 2864 eyes from 2032 patients underwent phacoemulsification and intraocular lens (IOL) implantation at SMEC, Medan, Indonesia, performed by a single surgeon. At the end of each procedure, 0.5% levofloxacin was administered intracamerally. Observations included signs of inflammation or infection (uveitis, conjunctivitis, keratitis, endophthalmitis), and measurements of uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), and intraocular pressure (IOP) preoperatively and one month postoperatively. Data were analyzed using SPSS v29.0 with a paired t-test; p<0.05 was considered statistically significant.

Results: No cases of postoperative infection or inflammation were observed. Significant improvements were noted in UCVA (from 0.16 to 0.84), BCVA (from 0.23 to 0.94), and IOP (from 19.06 mmHg to 12.10 mmHg), all with p<0.001.

Conclusions: Intracameral levofloxacin 0.5% appears to be highly effective in preventing post-phacoemulsification infections. Improved UCVA, BCVA, and reduced IOP further support the safety and clinical benefits of this prophylactic approach in cataract surgery.

Abstract No.: 201413

Outcomes of Toric Intraocular Lenses for High Astigmatism Post-Penetrating Keratoplasty

First Author: Yunhai **DAI**

Co-Author(s): Fanqian **SONG**

Purpose: To evaluate the efficacy and predictability of cataract extraction and bi-toric intraocular lens (IOL) implantation in patients with high corneal astigmatism after penetrating keratoplasty (PKP).

Methods: Prospective, non-randomized cohort study. Eighteen eyes in 18 patients were included and divided into the Toric (n = 9) and Non-Toric (n = 9) groups. The main outcomes included uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), manifest refraction, refractive prediction errors, intraocular pressure (IOP), and endothelial cell counts for 3 months postoperatively.

Results: At postoperative month 3, UDVA and CDVA were significantly improved in all patients. UDVA and CDVA were significantly better in the Toric group compared with the Non-Toric group ($P = 0.004$, $P = 0.003$). UDVA and CDVA reached $\geq 20/30$ in 56% and 89% of the Toric group, respectively, versus 0% and 33% in the Non-Toric group. Astigmatism was significantly decreased from 9.89 ± 3.55 D diopters (D) to 2.89 ± 0.82 D ($P < 0.001$) in the Toric group. The mean errors of spherical power, astigmatism, and spherical equivalent were all under 1 D in the Toric group. IOP and corneal endothelial cell counts had no significant changes from preoperative values ($P = 0.5$ and $P = 0.9$, respectively) in both groups.

Conclusions: Toric IOLs can be safe and effective in PKP patients with high regular astigmatism, improving UDVA and CDVA and reducing the manifest refraction cylinder to predictable low values.

Abstract No.: 200196

PERK Regulates Epithelial–Mesenchymal Transition Through Autophagy and Lipid Metabolism in Lens Epithelial Cells

First Author: Xiaoran **WANG**

Purpose: Pathological epithelial–mesenchymal transition (EMT) of lens epithelial cells (LECs) plays a crucial role in the formation of lens fibrosis, particularly in fibrotic posterior capsular opacification and anterior subcapsular cataract (ASC). Here, we investigated the potential roles of endoplasmic reticulum (ER) stress in the development of lens fibrosis.

Methods: RNA sequencing analyzed gene expression in ASC patients, TGF β 2-treated human lens explants, and rabbit LECs. Rabbit LECs were treated with TGF β 2 $\pm$ PERK inhibitor ISRIB or autophagy modulators. A mouse fibrosis model assessed ISRIB's effects. Techniques included lipidomics, TEM, immunostaining, qPCR, and Western blot.

Results: ER stress genes were upregulated in patients with ASC, TGF β 2-stimulated human explants and primary LECs. Pharmacologic ER stress induction promoted EMT, while its inhibition reduced TGF β 2-induced mesenchymal gene levels. Blocking the PERK axis of ER stress with ISRIB or targeting downstream factor ATF4 suppressed EMT, whereas the IRE1 axis showed no effect. Consistent with these in vitro observations, anterior chamber injection of ISRIB also reduced subcapsular plaque formation in a mouse model of lens fibrosis by suppressing SMAD2/3 activation. Mechanistically, ISRIB suppressed LC3-II conversion and P62 degradation, indicating autophagy suppression. Lipidomics revealed phosphatidylethanolamine (PE), essential for autophagosome formation, was downregulated in TGF β 2-treated LECs and upregulated with ISRIB cotreatment. Inducing autophagy with rapamycin significantly rescued the mesenchymal gene suppression by ISRIB, whereas autophagy inhibitor CQ produced opposite effects.

Conclusions: ER stress, particularly the PERK axis, promotes LECs' EMT through autophagy and PE metabolism, offering potential therapeutic targets for the treatment of lens fibrosis.

Abstract No.: 207542

Partial Resection of Iris Cysts by a Fluid-Jet ("Water-Knife") Surgical Technique During Cataract Surgery

First Author: Wenjie **LIU**

Co-Author(s): Yin **CHANG**, Zeqi **FAN**, Jiewei **LIU**, Lichun **YANG**

Purpose: To evaluate the feasibility and clinical outcomes of a new fluid-jet "water-knife" technique for partial excision of iris cysts complicating cataract surgery.

Methods: A prospective interventional case series included three patients (five eyes) with iris cysts interfering with cataract surgery. A 5-mL syringe with a bent cannula was used to deliver targeted fluid-jet impulses onto the cyst surface. Initial jets ruptured the cyst wall and decompressed its contents, followed by stepwise jets directed approximately 1 mm from the rupture edge to detach adjacent cyst wall segments. Irrigation/aspiration was performed to clear residual material. Standard phacoemulsification and intraocular lens implantation were subsequently completed. Postoperative follow-up included slit-lamp examination and ultrasound biomicroscopy (UBM).

Results: All five surgeries were successfully completed in a single session. Intraoperatively, the fluid-jet technique removed the majority of the cyst wall, effectively clearing the pupillary axis and facilitating safe phacoemulsification. No intraoperative complications occurred. On postoperative day 1, no visible cyst was observed under natural or dilated pupil examination.

At 1 month, UBM demonstrated only minimal residual wall tissue or small cyst remnants. During 3–4 months of follow-up, no recurrence or secondary complications were observed.

Conclusions: The fluid-jet “water-knife” technique provides a simple, minimally invasive, and effective approach for managing iris cysts encountered during cataract surgery. By enabling substantial cyst wall removal while preserving iris architecture, this method improves surgical visualization, minimizes intraoperative risks, and avoids staged interventions. Preliminary outcomes suggest strong clinical applicability and potential for broader adoption, warranting further multicenter validation.

Abstract No.: 202374

Patient Reported Experience Measures (PREM) Tool for Enhancing Cataract Surgery Safety in Indian Hospitals

First Author: Samina **ZAMINDAR**

Purpose: This study aimed to develop and validate a PREM tool to assess patient experiences related to cataract surgery safety across Indian hospitals.

Methods: A multiphase study was conducted across 16 Indian hospitals. Phase 1 involved tool development via expert panel discussions (n=31), literature review, and content validation (Content Validity Index [CVI] ≥ 0.8). Phase 2 piloted the 14-item tool with 240 patients (KR-20=0.801). Phase 3 implemented the tool in a baseline study (n=582 patients) to evaluate reliability and domain-specific performance (e.g., communication, safety). Data were analysed using descriptive statistics and validity indices.

Results: The tool demonstrated high validity (mean CVI=0.982) and reliability (KR-20=0.801). Over 95% of patients reported adherence to hand hygiene (97.6%), identity verification (99.7%), and post-operative guidance (99.0%). Gaps were noted in anaesthesia understanding (92.1%) and financial counselling (95.7%). Domain-wise, Patient Communication scored highest (M=3.90, SD=0.33), followed by Clinical Care (M=1.96, SD=0.19).

Conclusions: The validated PREM tool effectively captures patient experiences in cataract surgery, identifying strengths (e.g., safety protocols) and areas for improvement (e.g., preoperative counselling). Its integration into routine practice can enhance patient-centred care and surgical safety in resource-limited settings.

Abstract No.: 206057

Planned vs Intraoperative Aberrometry Guided IOL Power Calculation in Post-Corneal Transplant Cataract Surgery

First Author: Lekha **CHANDEL**

Co-Author(s): Shivam **GARG**, Amit **GUPTA**, Deeksha **SHARMA**, Vipasha **SHARMA**

Purpose: To evaluate whether the use of intraoperative biometry (Optiwave Refractive Analysis, ORA) improves visual and refractive outcomes compared to planned IOL power calculations in eyes with clear corneal grafts undergoing cataract surgery.

Methods: This retrospective series reviewed 10 post-keratoplasty eyes from 9 patients who underwent cataract surgery. Preoperative IOL power calculations based on standard optical biometry were compared against intraoperative aphakic refractive measurements using the ORA system. The primary outcome was the refractive prediction error, with analysis of the percentage of eyes achieving a spherical equivalent (SE) refraction within ± 0.50 D and ± 1.00 D of the target for both methods.

Results: Intraoperative biometry demonstrated superior predictive accuracy. With ORA, 50% and 90% of eyes were within ± 0.5 D and ± 1.0 D of target refraction, respectively, compared to 40% and 80% with the planned preoperative biometry. The mean refractive spherical equivalent (MRSE) improved significantly from -6.09 ± 5.28 D preoperatively to -0.25 ± 0.395 D postoperatively. All eyes achieved a final best-corrected visual acuity (BCVA) of 20/70 or better.

Conclusions: Intraoperative wavefront aberrometry is a valuable tool for IOL power calculation in challenging post-keratoplasty eyes. The use of ORA demonstrated improved refractive prediction accuracy over standard preoperative biometry, contributing to better postoperative refractive outcomes in this complex patient population.

Abstract No.: 200701

Post-Operative Outcome Comparison Between Phacoemulsification and Manual Small-Incision Cataract Surgery in Patients With Posterior Polymorphous Corneal Dystrophy

First Author: Md Dedarul **HASSAN**

Co-Author(s): Zaman **SAKIB**

Purpose: Posterior polymorphous corneal dystrophy (PPCD) is a rare, typically bilateral endothelial dystrophy that can complicate cataract surgery due to altered corneal morphology and endothelial fragility. This study aims to compare the postoperative outcomes of phacoemulsification and manual small incision cataract

surgery (MSICS) in PPCD patients to determine the safer and more effective surgical approach.

Methods: A retrospective cohort study was conducted, analyzing 60 eyes of 45 patients with PPCD who underwent cataract surgery between January 2020 and June 2025. Patients were divided into two groups: 30 eyes treated with phacoemulsification and 30 eyes with MSICS. Outcome measures included BCVA, endothelial cell density, corneal thickness, and postoperative corneal decompensation at one week, one month and three months follow-up.

Results: Both groups demonstrated significant improvement in BCVA postoperatively. However, the phacoemulsification group exhibited a statistically higher rate of endothelial cell loss compared to the MSICS group ($p < 0.05$). Corneal edema was more frequent and persistent in the phaco group during the early postoperative period. In contrast, MSICS, though associated with a slightly larger incision and slower visual recovery in the first week, showed better corneal clarity and endothelial preservation at three months.

Conclusions: Phacoemulsification appears to be safer and more effective than MSICS, but in patients with PPCD, MSICS offers a safer profile with less endothelial trauma and better post-operative corneal clarity. Surgical choice should be made individualized, considering the extent of corneal involvement and surgeon experience but MSICS is preferred in cases with advanced endothelial compromise.

Abstract No.: 204340

Precision Perfected: Advancing Toric IOL Axis Planning With IOL Master 700 Total Keratometry

First Author: Ankita **SANJAY KULKARNI**

Co-Author(s): Sri **GANESH**, Sushmitha **SAMAK SRIGANESH**

Purpose: To compare the accuracy of IOL Master 700 vs online calculators for toric IOL axis planning.

Methods: A retrospective analysis of 145 eyes undergoing toric IOL implantation with Tecnis Eyhance or Hoya Vivinex lenses was performed. Preoperative planning used the IOL Master 700 with total keratometry, incorporating anterior and posterior corneal astigmatism, and was compared to standard online calculators based on anterior measurements. Axis prediction from the IOL Master and toric calculator was evaluated. Postoperative UCVA, BCVA, spherical equivalent, cylinder, and astigmatic axis were assessed on days 7 and 15.

Results: The IOL Master 700 demonstrated superior precision in axis prediction, achieving $\leq 5^\circ$ axis deviation from postoperative alignment in 64.4% of eyes, outperforming online calculator estimations. Both Tecnis Eyhance and Hoya Vivinex groups exhibited robust visual acuity gains postoperatively (mean UCVA

LogMAR improved from 0.652 ± 0.343 preoperatively to 0.042 ± 0.081 at day 15, $p < 0.001$; BCVA improved from 0.354 ± 0.325 to 0.010 ± 0.039 , $p < 0.001$). Importantly, the significant discrepancy between preoperative online calculator axis and postoperative IOL position ($p < 0.001$) underscores the advantage of total corneal astigmatism incorporation. Although spherical and cylindrical refractive components showed trends towards improvement, axis alignment accuracy correlated strongly with better refractive outcomes and patient visual satisfaction.

Conclusions: Incorporation of total keratometry with the IOL Master 700 significantly improves toric IOL axis alignment and refractive predictability compared to anterior surface-based calculations. This refinement enhances the precision of toric IOL performance and supports personalized refractive cataract surgery. Comparative evaluation of Tecnis Eyhance and Hoya Vivinex toric lenses demonstrates consistent efficacy across platforms, reinforcing the clinical relevance of this approach. Integration of posterior corneal curvature into online calculators is expected to further improve axis predictability and refractive outcomes.

Abstract No.: 204508

Predictors of Surgically Induced Astigmatism: A Step Towards Customizing the Toric IOL Calculation

First Author: Nilesh **KUMAR**

Purpose: To identify predictors of the direction and magnitude of surgically induced astigmatism (SIA) after phacoemulsification and to quantify their impact using odds ratios.

Methods: Retrospective analytical study from the clinical records of a single surgeon where the data from 618 eyes were analyzed. Variables included preoperative astigmatism (ΔK), incision size, and the angular distance between incision axis and steep meridian. SIA direction (positive or negative) was modeled using multivariate logistic regression.

Results: Mean SIA was $+0.015$ D (SD 0.38). Pre-op ΔK significantly predicted SIA polarity (OR 0.636, $p=0.0012$), with each diopter reducing the odds of positive SIA by $\sim 36\%$. Axis distance was also significant (OR 1.009, $p=0.0052$), increasing the odds of positive SIA by $\sim 0.9\%$ per degree of misalignment.

Conclusions: Both pre-op astigmatism and incision-axis alignment are significant and independent predictors of SIA direction after cataract surgery.

Abstract No.: 200888**Preoperative Diquafosol vs Intense Pulsed Light With Gland Expression for MGD: Effects on Refractive Accuracy and Tear Film Stability in Cataract Surgery***First Author: Takeshi TESHIGAWARA**Co-Author(s): Tatsukata KAWAGOE, Akira MEGURO, Nobuhisa MIZUKI, Yuki MIZUKI*

Purpose: To compare the effects of two preoperative dry eye treatments—3% diquafosol sodium (DQS) and intense pulsed light with meibomian gland expression (IPL-MGX)—on refractive accuracy in cataract surgery, and to identify tear break-up time (TBUT) thresholds predictive of refractive success.

Methods: In this prospective, paired-eye study, 62 patients (124 eyes) with meibomian gland dysfunction underwent bilateral cataract surgery with the same trifocal IOL. One eye received DQS, and the fellow eye underwent four IPL-MGX sessions before biometry. Postoperative absolute prediction error (P-SE) was compared. TBUT and higher-order aberrations (HOAs) were evaluated. Logistic regression identified predictors of refractive accuracy, and ROC analysis assessed the predictive value of TBUT for P-SE thresholds of <0.25 D and <0.50 D.

Results: P-SE was significantly lower in IPL-MGX-treated eyes than in DQS eyes (mean paired difference -0.11 D, $p < 0.001$). Success rates within <0.25 D and <0.50 D were higher with IPL-MGX ($p < 0.01$). TBUT and HOAs were predictors in univariate models, but only TBUT remained significant in multivariable analysis (OR 4.90 per 1-s increase, 95% CI 1.92–12.51, $p < 0.001$). ROC analysis supported TBUT cutoffs of 7 s (<0.25 D) and 6 s (<0.50 D).

Conclusions: IPL-MGX may improve refractive accuracy compared to DQS. TBUT appeared to be the most consistent predictor, and achieving ≥ 6 s was associated with a higher likelihood of refractive success.

Abstract No.: 203576**Prophylactic Topical Steroids in Cataract Patients and Its Impact on Postoperative Tear Inflammatory Biomarkers***First Author: Naren SHETTY**Co-Author(s): Arkasubhra GHOSH, Tejal S J, Swaminathan SETHU*

Purpose: To evaluate the impact of pre-operative topical steroids on ocular surface immune cell subsets and tear fluid inflammatory cytokines in cataract surgery patients.

Methods: A prospective study was conducted on 40 cataract patients (ages 45–65), divided into a control group ($n=20$) without pre-operative steroids and a case group ($n=20$) receiving prednisolone acetate 1% eye drops (4x/day for 3 days pre-operatively, continuing

post-operatively per standard tapering). Patients with retinal, glaucoma, or corneal pathologies, steroid use, or complicated cataracts were excluded. Tear fluid biomarkers (Schirmer's test) were assessed pre-surgery, at 1 and 3 months post-op, with additional pre-op assessments in the case group. Statistical analysis included the Shapiro-Wilks test for data distribution and two-way repeated measures ANOVA ($P < 0.05$).

Results: Patients in the case group who received pre-operative steroids exhibited a significant reduction in key inflammatory biomarkers, including TNF- α , IL-6, IL-17A, VEGF-A, and ICAM-1, at both 1-month and 3-month post-operative time points which was not noticed in the control group. The findings suggest that pre-operative steroid use helps regulate the ocular surface immune response, potentially reducing post-surgical inflammation and improving recovery outcomes.

Conclusions: Pre-operative topical steroid use effectively modulates inflammatory cytokines, contributing to better ocular surface stability and reduced inflammatory response following cataract surgery. These findings support the potential benefits of pre-operative steroid administration in optimizing post-operative healing.

Abstract No.: 203706**Prospective Study on Efficacy and Safety Profile of Topical Pilocarpine in Management of Presbyopia***First Author: Nishi SATISH**Co-Author(s): Harinder Singh SETHI, Ritu SINGH*

Purpose: To study the efficacy and safety profile of topical Pilocarpine in the management of presbyopia.

Methods: Phakic patients of age >40 years were included. Exclusion criteria were uveitis, history of ocular surgery, concomitant systemic morbidity, known allergy to the concerned drug, and media opacity. The patients were followed up monthly for repeat evaluation of near vision and the onset of any adverse effects. Results- 153 patients were recruited with a mean age of 46 ± 4.03 years. The majority of the patients were homemakers, followed by working professionals with near-range work, such as software engineers, etc.

Results: A total of 153 patients were recruited with a mean age of 46 ± 4.03 years. The majority of the patients were homemakers, followed by working professionals with near-range work, such as software engineers, etc. The results showed a significant reduction in refraction after 2 weeks. The patients complained of minimal side effects like hyperemia ($n=82$) and brow ache ($n=59$). Conclusion- Topical 1% Pilocarpine nitrate aids in better near-vision within 2 weeks with no serious side effects.

Conclusions: The study revealed significant improvement in near vision after use of topical Pilocarpine nitrate 1% OD. It proves to be a safe alternative to glasses for the presbyopic age group. Although it is a temporary option, one can enjoy spectacle independence for near with minimal side effects.

Abstract No.: 203942

Pumping Up the Performance: A Comparative Analysis of Triple-Pump vs Quattro-Pump Phacoemulsification System on Corneal Endothelial Health

First Author: Grace SETIAWAN

Co-Author(s): Budiman, Mayasari KUNTORINI, Emmy SUGIHARTI

Purpose: To compare the safety of the triple-pump and quattro-pump phacoemulsification systems in regard to endothelial cell changes.

Methods: This is an experimental study with a double-blind randomized clinical trial method. The sample was selected using randomization with permutation blocks and was conducted at Cicendo Eye Hospital National Eye Center. There were a total of 23 subjects, of which 11 subjects underwent phacoemulsification with a triple-pump system and 12 subjects with a quattro-pump system. All subjects underwent specular biomicroscopy examinations preoperatively, 1-week, and 1-month postoperatively.

Results: The mean endothelial cell density (ECD) change in the triple-pump group was higher than in the quattro-pump group both at 1 week postoperatively (464.27 ± 319.58 vs 163.42 ± 131.85 , $p=0.007$) and 1 month postoperatively (456.55 ± 458.78 vs 88.50 ± 90.74 , $p = 0.001$). The mean coefficient of variation (CV) change was significantly higher in the triple-pump group (5.27 ± 7.79 , 16.3%) compared to the quattro-pump group (0.67 ± 2.30 , 2.07%) with $p = 0.011$. Changes in hexagonality (HEX) and central corneal thickness (CCT) were greater in the triple-pump group than the quattro-pump group at both 1 week and 1 month postoperatively, although these differences were not statistically significant.

Conclusions: The quattro-pump phacoemulsification system resulted in more minimal changes in ECD one month postoperatively compared to the triple-pump system.

Abstract No.: 201560

Rescue of a Dislocated Intraocular Lens With Silicone Tip Aspiration: A Novel Technique

First Author: Haibo LI

Co-Author(s): Xiaoxi LI

Purpose: To evaluate the clinical efficacy of a novel surgical technique using a 25-gauge active aspiration of

flute needle for treating posterior intraocular lens (IOL) dislocation.

Methods: This retrospective study included 12 eyes in 12 patients with posterior dislocated IOL. All patients underwent comprehensive ophthalmic evaluations before surgery. Surgery was performed with three-port pars plana vitrectomy, the dislocated IOL was aspirated to the anterior vitreous by 25-gauge flute needle, and then managed by different surgical corrections. Comprehensive ophthalmologic evaluations were performed preoperatively and postoperatively, including best-corrected visual acuity (BCVA), intraocular pressure (IOP), slit-lamp biomicroscopy and fundus examination. Postoperative assessments were conducted at 1 week, 1 month, and 3 months.

Results: Twelve eyes were treated. All surgeries were successfully completed using a 25-gauge silicone tip with active aspiration. IOL repositioning without sutures in 1 case (8.3%), IOL repositioning with scleral sutures in 4 cases (33.3%), IOL exchanged with Yamane technique in 4 cases (33.3%) and IOL exchange with scleral sutures in 3 cases (25.0%). The mean BCVA preoperatively was log MAR 0.48 ± 0.33 (range 0.2-1.3), decreasing to log MAR 0.34 ± 0.22 (range 0.2-0.7) at three-month postoperatively. IOP remained stable except for one patient who developed transient high IOP, but well controlled by medications.

Conclusions: The use of an active aspiration of flute needle with silicon tip provides a simplified, efficient and safe method for IOL dislocation, minimizing the need for perfluorocarbon liquids and forceps.

Abstract No.: 202553

Retropupillary Iris Claw Lens Implantation in Pediatric Subluxated Lenses: A Clinical Study

First Author: Pravalika PAMULAPATI

Co-Author(s): Jagadheesh Kumar Reddy, Vandhana SUNDARAM

Purpose: To evaluate the visual and anatomical outcomes, as well as the safety profile, of lensectomy followed by retropupillary iris-claw intraocular lens (IOL) implantation in children under 18 years with subluxated crystalline lenses of various etiologies.

Methods: A retrospective analysis was conducted on pediatric patients (≤ 18 years) who underwent anterior segment lensectomy with retropupillary iris-claw IOL implantation for subluxated lenses between 2011 and 2024 at a tertiary eye care center. Data collected included demographic details, preoperative and postoperative best corrected visual acuity (BCVA), intraocular pressure, endothelial cell count, intraoperative and postoperative complications, and follow-up outcomes over a period of 2 years.

Results: A total of 34 eyes from 24 patients were included, with a mean age of 8.5 years. Significant improvement in BCVA was noted postoperatively

(mean pre-op LogMAR BCVA: 0.85 ± 0.30 , mean post-op LogMAR BCVA at 12 months: 0.38 ± 0.20 , $p < 0.0001$). Mean postoperative intraocular pressure was 15.5 mm Hg. The mean endothelial cell density reduced from 2907.35 ± 387.07 cells/mm² to 2612.02 ± 435.90 cells/mm² post-surgery. No cases of endophthalmitis or retinal detachment were observed. IOLs remained well-centered in >90% of cases.

Conclusions: Lensectomy combined with retropupillary iris-claw IOL implantation is a safe and effective surgical option for visual rehabilitation in children with subluxated lenses. It offers good visual outcomes with an acceptable complication profile, making it a viable alternative in cases where capsular support is inadequate.

Abstract No.: 206076

Risk Factors for Late Presentation With Advanced Cataract in the Hong Kong Adult Population

First Author: Yan Yin **LO**

Co-Author(s): John **BUCHAN**, Catey **BUNCE**, Jonathan Cheuk Hung **CHAN**, Hon Chi Angie **FONG**

Purpose: Cataract is the main cause of blindness and impaired best-corrected visual acuity (BCVA) in Hong Kong. This study aims to analyse the risk factors for late presentation of patients with advanced cataract, while also investigating the motivation factors for eye screening programme attendance.

Methods: The study is a case-control study. Participants in the Southern District Eye Examination Scheme were classified into cases and controls by their BCVA at primary diagnosis. BCVA and demographic data were collected from the database, and information on other risk factors was collected by questionnaire.

Results: 175 participants (99 females) were recruited for this study, mean (SD) age 69 (8) years old, with 86 cases. Univariate analysis shows that low socioeconomic status is associated with late presentation of advanced cataract, as measured by monthly household income, housing type, education level, and occupation. Other significant factors include increasing age, lack of social support, diabetes, hypertension, heart disease, no primary family history of cataract and lowered mobility. Presence of symptoms and recommendations from friends or family were the common reasons for attending screening programme. The general level of knowledge about cataract was low; word-of-mouth and healthcare providers were the most frequently reported channels for receiving cataract information by patients.

Conclusions: Identification of risk factors for late presentation with cataract in Hong Kong provides useful information to guide policy. Targeted interventions to improve access for those of lower socioeconomic status, increasing age, lack of social

support and medical co-morbidities could be expected to be most impactful in reducing late presentation.

Abstract No.: 201035

Rotational Stability of Three Toric Intraocular Lens Platforms in Patients Undergoing Repositioning Surgery

First Author: Honglei **LI**

Co-Author(s): Xiaoming **WU**

Purpose: To evaluate the rotational stability of three toric intraocular lens (TIOL) platforms in patients undergoing repositioning surgery.

Methods: This comparative retrospective study enrolled eyes that underwent cataract surgery and were implanted with an AcrySof, AT TORBI/LISA, or TECNIS TIOL. Patients who experienced TIOL misalignment $\geq 10^\circ$ postoperatively and underwent repositioning surgery were included. The incidence of repositioning surgery after cataract surgery and the misalignment degree before and after repositioning surgery of the three TIOL platforms were mainly compared.

Results: Of the 2598 eyes implanted TIOLs, 56 eyes (2.156%) undergoing repositioning. The repositioning rates for the AcrySof, AT TORBI/LISA, and TECNIS platforms were 0.848% (10/1179), 2.935% (28/954), and 3.871% (18/465), respectively, showing significant differences ($P < 0.001$). Misalignment degrees before repositioning surgery for the AcrySof, AT TORBI/LISA, and TECNIS TIOLs were $27.90 \pm 15.74^\circ$, $60.79 \pm 18.79^\circ$, and $31.61 \pm 20.84^\circ$, respectively ($P < 0.001$). AT TORBI/LISA platform had a significantly greater misalignment degree compared to AcrySof (Difference: 32.89° , $P < 0.001$) and TECNIS platforms (Difference: 29.18° , $P < 0.001$). There was no significant difference between AcrySof and TECNIS (Difference: 3.71° , $P = 0.629$). After repositioning, the AT TORBI/LISA platform showed significantly higher misalignment degrees compared to AcrySof and TECNIS (Difference: 6.63° ; 5.49° , $P = 0.009$).

Conclusions: AcrySof TIOLs had a lower incidence of repositioning surgery compared with AT TORBI/LISA and TECNIS, while AT TORBI/LISA TIOLs exhibited a higher degree of axis misalignment both before and after repositioning.

Abstract No.: 201501

Safety and Efficacy of Intracameral Steroids in Controlling Post-Operative Inflammation in Phacoemulsification: A Meta-Analysis

First Author: Lorenz Jacob **MANGAHAS**

Co-Author(s): Ian Ben **BATCAGAN**, Richmond **SIAZON**

Purpose: This study aimed to compare intracameral steroid use, a recent innovation, with traditional topical corticosteroid application to understand their efficacy and safety.

Methods: The meta-analysis design and method were reported in line with Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) guidelines. We included all randomized control clinical trials (RCT) with completed manuscripts or abstracts published online regardless of publication date or publication status.

Results: Four studies were included in this meta-analysis. The pooled mean difference showed no significant difference in the reduction of inflammation scores in anterior chamber cells (MD=-0.11, 95%CI=-0.22 to 0.01, p=0.07), anterior chamber flare between (MD=0.04, 95%CI=-0.04 to 0.13, p=0.29), and in IOP (MD=-0.06, 95%CI=-0.54 to 0.42, p=0.81) between the two groups. Two studies reported on adverse events which observed the absence of serious adverse events in the topic group and one case in intracameral group.

Conclusions: There is evidence that supports the equivalence of intracameral steroid injections and topical steroids in reducing postoperative inflammation after phacoemulsification. There are also minimal adverse events, including ocular surface toxicity, in both intracameral steroid injections and topical steroids. Postoperative intraocular pressure is also comparative in both treatments. It is recommended that intracameral steroid injections be used as a safe and effective alternative to topical steroids for managing postoperative inflammation after phacoemulsification. Additionally, intracameral steroid injections may offer the added benefit of improved patient compliance due to their convenience and reduced frequency of administration.

Abstract No.: 201819

Safety of Immediate Sequential Bilateral Cataract Surgery (ISBCS) Enhanced With Patient Selection and High Standard Protocols in a Tropical Region

First Author: Givenchy Angela **WINARJO**

Co-Author(s): Ruth **ANASTASIA**, Clarissa **LISTER**, Gede **PARDIANTO**, Diyah **PURWORINI**

Purpose: Given the heightened risk of dual-eye infection in tropical climates, the purpose of this study was to determine if strict patient selection and maintained surgical standards could successfully improve the safety and efficacy of Immediate Sequential Bilateral Cataract Surgery (ISBCS) in a hot and humid climate.

Methods: Thirty-nine patients (78 eyes) meeting stringent inclusion criteria underwent ISBCS. The stricter criteria included absence of systemic disease, absence of ocular abnormalities, and presence of physiological cataract (no traumatic cataract, complicated cataract, pseudoexfoliation, etc). ISBCS was performed using the phaco-chop technique with a venturi phaco machine, bimanual irrigation/aspiration, and hydro-implantation of the intraocular

lens (IOL). Intra-operative complications (posterior capsule rupture (PCR), and vitreous loss) and post-operative outcomes (corneal edema, toxic anterior segment syndrome (TASS), and endophthalmitis) were monitored. Uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), and intraocular pressure (IOP) were measured and compared pre- and post-operatively. Statistical analysis was performed, with $p < 0.05$ considered significant.

Results: Zero intra-operative complications (PCR, vitreous loss) or major post-operative complications (TASS, endophthalmitis, visual-disturbing corneal edema) were observed. Minimal corneal edema occurred but did not affect vision. Significant improvements were seen in UCVA and BCVA ($p < 0.001$), along with a significant reduction in IOP ($p < 0.001$).

Conclusions: Strict patient selection and standards may improve ISBCS safety in tropical regions, preventing complications, offering rapid visual recovery, corneal stability, and reduced intraocular pressure. Further studies with a larger sample size are needed to establish this as a healthcare policy reference.

Abstract No.: 201649

Scaling Up Cataract Surgery in the Community: A Decade of Experience From Malaysia's Cataract Satellite Centre

First Author: Wan Radziah **WAN NAWANG**

Co-Author(s): Norasyikin **MUSTAFA**, Mohamad Aziz **SALOWI**, Siti Nurhuda **SHARUDIN**

Purpose: To describe the establishment, objectives, and outcomes of a community-based cataract centre, created through strategic partnerships to expand access, increase surgical coverage, and deliver high-quality eye care.

Methods: The cataract satellite centre was detailed based on its design, partnerships, and service model. Patient and surgical outcomes were obtained from the Cataract Surgery Registry within the National Eye Database and analyzed descriptively.

Results: Established in 2012 under Malaysia's National Blue Ocean Strategy through a partnership between the Ministry of Health and a statutory religious council, the cataract satellite centre was located in a commercial shop lot and functioned as a static outreach facility and one-stop centre for pre-operative, operative, and post-operative care. It catered to low-risk patients, operating five days per week with a capacity of 20-30 surgeries daily. Since commencing services in January 2013, the centre has served over 100,000 patients and performed more than 30,000 cataract operations. Among patients without ocular comorbidities, 96% achieved good visual outcomes (6/12 or better), while the posterior capsule rupture rate was 1.5%. The centre also accepted referrals nationwide, reduced waiting times, and helped decongest operating theatres in

nearby hospitals. It further set benchmarks for cataract pathways, surgical outcomes, training, and community engagement.

Conclusions: This cataract satellite centre demonstrates that high-quality cataract surgery can be effectively delivered through a community-based, partnership-driven model. By expanding access, increasing coverage, and defining national standards, it offers a scalable framework for cataract care in resource-limited settings.

Abstract No.: 202434

Spectacle Independence and Near Task Performance in Eyes Implanted With a Small Aperture IOL Following Corneal Inlay Removal

First Author: Robert ANG

Purpose: Evaluate spectacle independence and near task performance in patients undergoing cataract surgery with monocular implantation of a small-aperture IOL following removal of a corneal inlay.

Methods: In this prospective study, 13 patients with cataracts who had previously had a Kamra inlay implanted in one eye were enrolled. The inlay was removed, and the eye was monitored for stability prior to implantation of the IC-8 Aphera IOL. Visual outcomes, defocus curves and subjective questionnaire data were collected at 1, 3, 6, and 12 months (M) following IOL implantation.

Results: Mean monocular uncorrected distance, intermediate, and near visual acuity were 0.10 logMAR (20/25), 0.05 logMAR (20/22), and 0.05 logMAR (20/22), respectively, 12M after Aphera IOL implantation. Monocular defocus curves show a depth of focus of approximately 4.0 D at 0.2 logMAR or better, with a negative intercept of -2.33 D. Spectacle independence increased for tasks at all distances and there was a mean improvement of 1 to 2 rating levels for near vision tasks and minimal change in distance vision task performance from the screening visit to 12M.

Conclusions: The Aphera IOL provides an extended range of vision from distance to near with improved spectacle independence and near visual function in patients with prior Kamra inlay.

Abstract No.: 203922

Study on the Clinical Effect of Aligning Astigmatic Lens Axis With Corneal Steep Axis

First Author: Fanqian SONG

Co-Author(s): Yunhai DAI

Purpose: This study aims to investigate the clinical efficacy of aligning the axis of toric intraocular lenses (IOLs) with the corneal steep axis in patients undergoing cataract surgery.

Methods: This is a prospective randomized controlled trial included seventy cataract patients with regular corneal astigmatism of more than 1 diopters (D), who underwent phacoemulsification combined with implantation of a Tecnis Toric IOL. Patients were randomly divided into two groups, each group enrolled 35 patients. In the control group, SIA was set as 0.5 D, alignment axis were set according to the Tecnis Toric Aspheric IOL Calculator. In the experimental group, SIA was set as 0 D and the alignment axis was the same as the steep axis of corneal astigmatism. Main outcome measurements, including visual acuity, expected residual astigmatism (PRA), residual astigmatism, and toric IOLS alignment axis, were detected at 3 months postoperatively. SIA and error of refractive astigmatism (ERA) were analyzed by vector analysis.

Results: Measurements of postoperative uncorrected and corrected distance visual acuity (UDVA and CDVA), toric IOL rotation(°), total and vector analysis of SIA showed no differences between the two groups ($P > 0.05$). The ERA of the experimental group (0.15 ± 0.32 D) was significantly smaller than the control group (0.58 ± 0.48 D) ($P < 0.001$). Vector analysis of total error vector (EV) was smaller in the experimental group (0.30 ± 0.24 D) than the control group (0.60 ± 0.46 D) ($P = 0.001$), mainly in the vertical/horizontal direction (XEV) (0.0 ± 0.26 D in the experimental group and 0.24 ± 0.66 D in the control group) ($P < 0.05$). The experimental group showed lower postoperative cylinder (0.49 ± 0.23 D) than the control group (0.71 ± 0.49 D), although had no significant differences ($P = 0.055$).

Conclusions: This study suggests that aligning the toric IOL axis with the corneal steep axis shows better predictability of corneal astigmatism correction and provides a reliable therapeutic strategy for correcting corneal astigmatism during cataract surgeries.

Abstract No.: 202127

Surgical Outcomes of Cataract Surgery Following Rapid Glycemic Correction During the Preoperative Period

First Author: Yani WANG

Purpose: To evaluate the effects of rapid glycemic control during preoperative period on outcomes of cataract surgery for type 2 diabetes patients with high HbA1c levels.

Methods: The medical data of patients with type 2 diabetes who underwent cataract surgery were respectively reviewed between January 2023 and May 2024. The rapid control group consisted of 152 patients (222 eyes) with HbA1c $> 9.0\%$ following rapid glycemic correction (average duration: 17.3 ± 6.6 days), and the good control group consisted of 111 patients (162 eyes) with HbA1c $< 7.0\%$. Complications and visual outcomes were analyzed between the two groups during the 6-month postoperative follow-up.

Results: Macular edema and vitreous hemorrhage were the main postoperative complications in rapid control group (11.7%) and good control group (4.9%) ($P = 0.005$). Multivariate analysis showed that rapid glycemic correction and moderate to severe non-proliferative diabetic retinopathy were the main risk factors of complications ($P = 0.004$, $P = 0.003$). However, only 3.8% of patients with timely intervention for diabetic retinopathy developed severe complications in rapid control group ($P = 0.019$). At the final follow-up, the average best correction visual acuity in rapid control group was 0.30 ± 0.32 logMAR, with significant improvement compared with 1.26 ± 0.74 logMAR before surgery ($P < 0.0001$).

Conclusions: It seems to be unnecessary to prolong the duration of glycemic control before cataract surgery. Timely intervention may prevent the severe complications of diabetic retinopathy after cataract surgery following rapid glycemic control.

Abstract No.: 202395

Sutureless Intrasceral IOL Fixation: Outcomes and Efficacy of the Modified Yamane Technique

First Author: Purendra **BHASIN**

Co-Author(s): Priyamvada **BHASIN**

Purpose: To evaluate the postoperative outcomes, visual acuity, and intraocular lens (IOL) stability following the Modified Yamane technique for intrasceral fixation of three-piece IOLS.

Methods: This retrospective observational study included 33 eyes from 31 patients who underwent secondary IOL implantation using the Modified Yamane technique. The study included patients with dislocated/subluxated IOLs or crystalline lenses, poor capsular support/weak zonules, or spherophakia who underwent scleral-fixated IOL surgery using the Modified Yamane technique, with a minimum follow-up period of 3 months postoperatively. Patients were excluded if they underwent SFIOL surgery using other techniques, had a postoperative follow-up of less than 3 months, or did not consent to using their clinical data for research purposes.

Results: The study included 33 eyes from 31 patients, of whom 20 were male and 11 were female. Postoperative best-corrected visual acuity (BCVA) ranged from 6/6 to 6/9 in 12 eyes (39.3%), 6/12 to 6/18 in 10 eyes (30.3%), 6/24 to 6/36 in 4 eyes (12.1%), and 6/60 or worse in 5 eyes (15.1%). Pre-existing ocular comorbidities were present in 11 patients. Corneal edema and iritis were observed in 5 eyes on postoperative days 1-4, resolving within one week with conservative management. Postoperative complications included hypotony in 1 eye, vitreous hemorrhage in 1 eye, and conjunctival erosion due to haptic protrusion in 1 eye, which was managed by haptic trimming.

Conclusions: The Modified Yamane technique appears to be simple, safe, and time-efficient.

Abstract No.: 203852

Tear Metabolomics for Differentiating Bacterial, Viral, and Fungal Endophthalmitis

First Author: Vaibhav **VISHAL**

Co-Author(s): Vrushali **DESHPANDE**, Arkasubhra **GHOSH**, Padmamalini **MAHENDRADAS**, Naren **SHETTY**

Purpose: This prospective case-control study aimed to identify metabolite biomarkers in ocular fluids that distinguish bacterial, viral, and fungal endophthalmitis, enabling accurate diagnosis and risk stratification.

Methods: Tear and aqueous humor samples were analyzed using ultra-performance liquid chromatography-mass spectrometry (UPLC-MS) and multivariate statistical models. Patients were stratified by infection type and severity, and differentially expressed metabolites were compared across etiologies.

Results: Distinct metabolic profiles were observed. Bacterial endophthalmitis was associated with elevated methyl linolenate, palmitoleamide, and myristoleoyl carnitine. Viral cases showed alterations in cholesterol- and triglyceride-related metabolites. Fungal infections demonstrated changes in sterol and ergosterol pathways.

Conclusions: Metabolomic analysis of ocular fluids can differentiate bacterial, viral, and fungal endophthalmitis. The identified biomarkers may facilitate early diagnosis, guide targeted therapy, and support personalized clinical management, ultimately improving visual outcomes and reducing complications.

Abstract No.: 203716

The Art of Minimalist Correction: Low Astigmatism Strategies in Cataract Operations

First Author: Ankita **SANJAY KULKARNI**

Co-Author(s): Sri **GANESH**, Supriya **SAMAK SRI GANESH**

Purpose: To compare the effectiveness of manual limbal relaxing incisions (LRI), femtosecond laser arcuate keratotomy (FLAK), and toric intraocular lenses (IOL) against conventional non-toric IOL implantation in correcting low corneal astigmatism during cataract surgery.

Methods: In this prospective study, 200 eyes from patients over 50 years with cataracts and 0.75–1.5 diopters of regular corneal astigmatism were assigned to one of four groups: conventional phacoemulsification with non-toric IOL (control), manual LRI, FLAK, or toric IOL implantation. Surgeries were performed via a 2.8 mm clear corneal incision under topical anesthesia. Postoperative assessments included visual acuity, refraction, keratometry, and

vector analysis of astigmatism (Alpins method) at day 1, 15, and 3 months.

Results: At 3 months, toric IOLs showed remarkable superiority, with 92% of eyes achieving residual cylinder <0.5 D and excellent uncorrected visual acuity (0.046 logMAR). FLAK outperformed manual LRI by providing more predictable correction with lower residual astigmatism vectors (DV 0.77 D vs ~ 1.2 D, $p < 0.001$) and better visual outcomes. Manual LRI, while less precise, remains an important technique when laser technology is unavailable. Differences in surgically induced astigmatism were minimal among groups

Conclusions: Our data highlight toric IOL implantation as the leading choice for managing low corneal astigmatism in cataract patients, delivering precise, consistent visual improvement. FLAK offers a cutting-edge, laser-based alternative with superior accuracy compared to manual methods. These results mark a pivotal step toward refined, personalized cataract surgery—guiding surgeons to optimize outcomes based on available resources and patient needs

Abstract No.: 203864

The Effect of Exosomes Derived From Human Umbilical Cord Mesenchymal Stem Cells on Lens Regeneration

First Author: Jing **WANG**

Co-Author(s): Xiaotong **LI**, Wei **ZHANG**

Purpose: To investigate the effect of exosomes derived from human umbilical cord mesenchymal stem cells on lens regeneration.

Methods: We co cultured human umbilical cord mesenchymal stem cells and human lens epithelial cells using a transwell chamber, and then investigated the changes in LEC proliferation and migration through CCK-8 and cell scratch assays. Exosomes were isolated from hucMSC using ultracentrifugation and identified by transmission electron microscopy and nanoparticle tracking. Co culture the extracted exosomes with LEC and verify the expression of LEC related markers through PCR and immunofluorescence. Exosomes were injected into the eyes of adult Wistar rats that underwent extracapsular resection, and the regeneration of intraocular lenses was evaluated by OCTA.

Results: Compared with the control group, the proliferation and migration of LECs increased after co culture of the two types of cells (both $P < 0.05$), while treatment with HucMSC Exo exacerbated this phenomenon. The PCR results showed that the relative mRNA expression levels of PAX6, BMI-1, SOX2, and Nanog in LECs treated with HucMSC Exo were 1.52 ± 0.27 , 1.87 ± 0.40 , 1.71 ± 0.45 , and 2.12 ± 0.51 , respectively. Compared with the control group, the expression levels of PAX6 ($P < 0.01$), BMI-1 ($P < 0.01$), SOX2 ($P < 0.001$), and Nanog ($P < 0.01$)

were significantly increased, which was confirmed by immunofluorescence results. Meanwhile, OCTA results showed that the lens regeneration in Wistar rats treated with HucMSC Exo was significantly better than that in the untreated group.

Conclusions: This study indicates that the stem cell characteristics of LECs are enhanced and their proliferation and migration abilities are promoted after treatment with HucMSC Exo. The regeneration of the lens is improved after treatment with HucMSC Exo.

Abstract No.: 200685

The Effect of Pupil Dilation on Pre-Operative Optical Biometry Results for Phacoemulsification: A Meta-Analysis

First Author: David **CHEN**

Co-Author(s): Krystal **KHOO**, Angeline **LAI**, Shen **LIANG**, Jocelyn **YEO**

Purpose: Modern cataract surgery blends sight restoration and refractive correction through the implantation of intraocular lenses, with modern formulas utilizing seven or more parameters from optical biometers. Dilation affects these measurements, in turn compromising post-operative refractive outcomes. The effect of cycloplegia on ocular parameters is therefore of increasing interest for pre-surgical planning. This systematic review and meta-analysis summarizes the effects of pupil dilation on optical biometry results, and its impact on intraocular lens power calculations.

Methods: The study protocol was pre-registered in the PROSPERO registry (CRD42021248502). Eligible articles from inception to 5 December 2024 from three databases (PubMed, Embase, Cochrane) were independently screened and quality assessed by two reviewers.

Results: Pupil dilation was associated with significantly increased ACD by 0.08 mm (95% confidence interval [CI], 0.06 – 0.09 mm; $I^2 = 97.40\%$), reduced LT by 0.02 mm (95% CI, 0.01 – 0.03 mm; $I^2 = 97.57\%$), and increased WTW by 0.12 mm (95% CI, 0.04 – 0.19 mm; $I^2 = 97.59\%$). The increase in ACD was dependent on the type of dilating agent used; when compared to using tropicamide, cyclopentolate resulted in a significantly greater increase in ACD by 0.03 mm (95% CI, 0.00 – 0.07 mm) and decrease in LT by 0.04 mm (95% CI, 0.00 – 0.06), while phenylephrine significantly less by 0.06 mm (95% CI, 0.02 mm – 0.10 mm).

Conclusions: Pupil dilation significantly affects calculations from the later generation IOL calculation formulas. It would be prudent to consider performing biometry in a non-dilated state to avoid impacting on IOL calculation and subsequently final refractive outcome.

Abstract No.: 205089

The Environmental Impact of Phacoemulsification in a Private Tertiary Hospital in Metro Manila, Philippines

First Author: Isabella BONDOC

Co-Author(s): Victor Jose CAPARAS

Purpose: Phacoemulsification is one of the most frequently performed surgical procedures worldwide, yet little is known about its environmental impact in developing nations. This study quantified the carbon footprint of phacoemulsification in a Philippine tertiary hospital to identify opportunities for improving efficiency and sustainability.

Methods: All phacoemulsification cases performed over 1 month were included. Data collected included (1) energy consumption, (2) disposable waste, (3) pharmaceuticals, and (4) surgical duration. The EyeEfficiency application (eyeEfficiency.org) and life cycle assessment (LCA) methodology were used to estimate greenhouse gas emissions (CO₂ equivalents, CO₂e) per case.

Results: A total of 240 cases were recorded with a mean surgical time of 17 minutes. Waste and consumables converted to CO₂e were: Electricity (8–14 kW per case): 2.24–3.92 kg/case Disposable items (drapes, gowns, gloves): 1.7 kg, ~4.25 kg/case Phaco machine Fluid Management System (cassette/tubing): 0.25 kg, ~0.63 kg/case Pharmaceuticals: ~0.2–0.6 kg/case The average carbon footprint per surgery was 7.3–9.4 kg CO₂e, equivalent to burning 3–4 liters of fuel. This is lower compared to the global average and well within the recommended carbon footprint levels.

Conclusions: Given the global volume of cataract surgery, improving the environmental efficiency of phacoemulsification is imperative. This study provides valuable baseline data for operational and financial planning and supports efforts to reduce the carbon footprint of cataract surgery in the local setting. On a broader scale, benchmarking against international best practices can guide strategies to lower costs and minimize emissions in ophthalmic care.

Abstract No.: 200904

The Impact of Corneal Spherical Aberration on the Optical Performance of Extended Depth of Focus Intraocular Lenses

First Author: Xiaomin LIU

Purpose: To assess the optical performance of four extended depth of focus (EDOF) intraocular lenses (IOLs) with different designs under varying corneal spherical aberrations (SAs).

Methods: Three refractive EDOF IOLs (ES60, EDA601, AcrySof IQ Vivify), one diffractive hybrid EDOF IOL (ZFR00), and a monofocal IOL (SY60WF, control) (all 20.0D) were tested using OptiSpheric® IOL PRO 2. USAF

resolution, modulation transfer function (MTF), and MTF area (MTFa) with defocus were measured under three SA conditions (0 μ m, +0.13 μ m, +0.28 μ m) and 3.0 mm/4.5 mm apertures.

Results: At SA was 0 μ m, refractive EDOF IOLs showed better far-focus quality with larger apertures (opposite for diffractive hybrid/monofocal IOLs). Intermediate focus quality declined with larger apertures, but diffractive hybrid IOLs had better near focus. With 3.0 mm aperture, far-focus MTF was stable across SAs. With 4.5 mm aperture, all EDOF IOLs performed better than with 3.0 mm; diffractive hybrid/monofocal IOLs improved with higher SA, while refractive EDOF IOLs were less affected. MTFa showed diffractive hybrid IOLs covered far/intermediate/near foci, refractive ones covered far/intermediate foci, with varying depth of focus.

Conclusions: EDOF IOLs differ in depth of focus but are little affected by SAs, with better performance at 4.5 mm aperture. This aids clinical selection based on patient needs.

Abstract No.: 204648

The LISA-PPV Formula: An Ensemble Artificial Intelligence-Based Thick Intraocular Lens Calculation Formula for Vitrectomized Eyes

First Author: Jiaqing ZHANG

Co-Author(s): Lixia LUO, Xuhua TAN

Purpose: To investigate the relationship between effective lens position (ELP) and patient characteristics, and to further develop a new intraocular lens (IOL) calculation formula for cataract patients with previous pars plana vitrectomy (PPV).

Methods: A total of 2793 age-related cataract patients (group 1) and 915 post-PPV cataract patients (group 2) who underwent phacoemulsification with IOL implantation were included. The ELP of two groups was compared and the association between ELP and patient characteristics was further evaluated using standardized multivariate regression coefficients. An ensemble artificial intelligence-based ELP prediction model was developed using a training set of 810 vitrectomized eyes, and a thick-lens IOL formula (LISA-PPV) was constructed and compared with seven existing formulas on an external multi-center testing set of 105 eyes.

Results: Compared to eyes with age-related cataract, vitrectomized eyes showed a similar ELP distribution ($P = 0.19$), but different standardized coefficients of preoperative biometry for ELP. The standardized coefficients also varied with the type of vitreous tamponade, history of scleral buckling, and ciliary sulcus IOL implantation. The LISA-PPV formula showed the lowest mean and median absolute prediction error (MAE: 0.63 D; MedAE: 0.44 D), and the highest

percentages of eyes within ± 0.5 D of prediction error (57.14%) in the testing dataset.

Conclusions: The ELP prediction required optimization specifically for vitrectomized eyes based on their biometric and surgical characteristics. The LISA-PPV formula is a useful and accurate tool for determining IOL power in cataract patients with previous PPV.

Abstract No.: 200329

The Relationship Between Age at Secondary Intraocular Lens Implantation and Visual Outcomes & Complications in Bilateral Congenital Cataract

First Author: Kun **HU**

Co-Author(s): Weirong **CHENG**, Qiwei **WANG**

Purpose: To Report the Visual Acuity and Complications in Children With Bilateral Aphakia After Lensectomy for Pediatric Cataracts, Undergoing Secondary IOL Implantation at Different Ages

Methods: This single-center prospective observational cohort study, conducted from 2014 to 2023, is a 7-year follow-up study. The 158 children (316 eyes) underwent lensectomy before the age of 2 years, followed by secondary IOL implantation between the ages of 2 and younger than 6 years in bilateral pediatric cataracts. The main outcome was Best-corrected VA (BCVA) outcomes at age 7 years after secondary IOL implantation in children with bilateral pediatric cataracts.

Results: At age 7 years, the mean (SD) BCVA for children who underwent secondary IOL implantation was 0.49 (0.35) logMAR (Snellen equivalent, 20/62) at 2 to younger than 3 years, 0.59 (0.36) logMAR (Snellen equivalent, 20/78) at 3 to younger than 4 years, 0.60 (0.30) logMAR (Snellen equivalent, 20/80) at 4 to younger than 5 years, and 0.65 (0.34) logMAR (Snellen equivalent, 20/89) at 5 to younger than 6 years ($P = .20$). Glaucoma-related adverse events occurred in 47 eyes in total: 6 eyes (8.8%), 7 eyes (9.0%), 10 eyes (15.6%), and 24 eyes (22.6%) across the groups, respectively, with a statistical difference among the groups ($P = .03$).

Conclusions: These findings suggest that secondary IOL implantation performed between the ages of 2 and younger than 6 years following bilateral pediatric cataract lensectomy can achieve comparable visual outcomes; however, the risk of glaucoma increases with older implantation age.

Abstract No.: 203574

Tolerance to IOL Decentration and Tilt in Five Presbyopia-Correcting IOLs: A SS-AS-OCT-Based Study

First Author: Xuhua **TAN**

Co-Author(s): Xiaofei **HU**, Lixia **LUO**, Jiaqing **ZHANG**, Yu **ZHANG**

Purpose: To compare the impact of intraocular lens (IOL) decentration and tilt on the visual performance of five presbyopia-correcting IOLs in patients following cataract surgery.

Methods: This is a prospective observational study. Cataract patients who underwent uncomplicated phacoemulsification with implantation of ZXR00, ZMB00, ZFR00V, Vivity or TFNT00 were enrolled. Each IOL group was stratified based on the third quartile (Q3) of IOL tilt and decentration measured by CASIA2. Intraocular higher-order aberrations (HOAs), contrast sensitivity (CS), modulation transfer function (MTF), Strehl ratio and patient-reported outcomes 3 month postoperatively were compared between subgroups.

Results: A total of 260 patients (260 eyes) were included. Based on the Q3 values, eyes were categorized into tilt subgroups T1 ($<5.63^\circ$) and T2 ($\geq 5.63^\circ$), and decentration subgroups D1 (<0.24 mm) and D2 (≥ 0.24 mm). No significant differences in visual quality were observed between Vivity and ZXR00 subgroups. In contrast, T2 subgroups of TFNT00, ZMB00 and ZFR00V exhibited significantly higher HOAs and coma, along with decreased CS, compared to their respective T1 subgroups (all $P < 0.05$). The D2 subgroup of ZFR00V showed increased HOAs and coma, and reduced CS under photopic conditions and mesopic conditions with glare (all $P < 0.05$). The D2 subgroup of ZMB00 demonstrated higher HOAs and coma, as well as lower MTF (all $P < 0.05$). The D2 subgroup of TFNT00 reported significantly lower patient satisfaction (3.25 ± 0.46 vs 3.83 ± 0.38 , $P = 0.008$).

Conclusions: Extended depth-of-focus (EDOF) IOLs demonstrated greater tolerance to tilt and decentration compared to multifocal and full visual range IOLs.

Abstract No.: 201587

Total Versus Standard Keratometry in a Large Australian Cohort

First Author: Christopher **GO**

Co-Author(s): Uday **BHATT**, Christopher **HODGE**

Purpose: Accurate biometry is essential to achieving accurate postoperative outcomes in cataract surgery. Utilising both anterior and posterior surfaces in deriving an overall value (total keratometry or TK) should provide for greater accuracy; however, despite availability, TK use is not universal. Analysing differences between standard and total keratometry values may help improve general clinician

understanding of this new value and drive greater utility.

Methods: Retrospective audit of TK and standard keratometry (K) in a large multicentre cohort utilising Swept-Source OCT imaging (IOLMaster 700). Linear regression was undertaken to assess contributing factors, identifying differences between standard and total keratometry values.

Results: A total of 14,889 eyes were included. Mean difference in corneal cylinder between K and TK values was $0.03 \pm 0.21D$ with K value representing a higher value in 63.3% of eyes. Axis orientation matched in 89.3% of eyes. Against-the-rule orientation was dominant in TK eyes (26.2% vs. 21.1%). Age, flat keratometry, posterior keratometry and corneal cylinder magnitude were significant contributors to the difference between K and TK values.

Conclusions: Although differences between standard and total keratometry values may not reflect clinical significance, changes across demographic and biometric characteristics still warrant consideration prior to surgical intervention and may impact particular scenarios. This analysis represents the largest current analysis globally, with further surgical implications discussed.

Abstract No.: 207901

Uncovering the Metabolic Landscape of Aqueous Humor in Posterior Subcapsular Cataract Associated With Hyperuricemia

First Author: Yang SUN

Co-Author(s): Ling LI, Yongjie QIN, Hongyang ZHANG

Purpose: To investigate the metabolic alterations underlying posterior subcapsular cataract (PSC) associated with hyperuricemia and to identify key metabolic pathways contributing to disease progression.

Methods: Untargeted metabolomic profiling was conducted on aqueous humor samples obtained from twelve cataract patients classified into four groups based on PSC status and serum uric acid levels. Comparative analyses among hyperuricemic PSC (HP), normouricemic PSC (NP), hyperuricemic non-PSC (HC), and normouricemic non-PSC (NC) groups were performed. Pathway enrichment analysis identified key dysregulated pathways. Targeted amino acid profiling and $^{13}C5$ -glutamine metabolic flux analysis were conducted in uric acid-treated lens epithelial cells (LECs). Experimental validation of glutathione metabolism was carried out via immunofluorescence and western blot in both LECs and capsular specimens.

Results: Untargeted metabolomics identified 46 differentially expressed metabolites (DEMs) between HP and NP groups, with enrichment in pathways related to glutathione metabolism and amino acid biosynthesis. Comparative profiling showed that

PSC under hyperuricemia exhibits distinct metabolic features beyond those observed in hyperuricemic non-PSC patients, especially in glutaminolysis and redox regulation. Targeted analysis confirmed glutamine accumulation in LECs treated with uric acid. Metabolic flux tracing demonstrated increased incorporation of labeled glutamine into tricarboxylic acid cycle intermediates and glutathione. Despite increased glutamine utilization, redox balance was impaired. At the protein level, GPX4 was downregulated, while GLS1 and GLS2 was upregulated in response to elevated uric acid levels.

Conclusions: Disruption of glutaminolysis and glutathione metabolism is identified as the potential hallmark of PSC associated with hyperuricemia, indicating the role of glutamine-dependent redox regulation in linking systemic metabolic disturbance to PSC development.

Abstract No.: 206630

Vision on Waves: A Mobile Ophthalmology Unit Framework for Small Island Nations

First Author: Saraa YOOSUF

Purpose: To propose an innovative mobile ophthalmology service model tailored for small island nations, where geographic fragmentation creates significant barriers to equitable eye care access.

Methods: Using principles of clinical service operations and health systems design, we developed the "Vision on Waves" framework. Core components include: 1. Mobile Surgical Unit — a retrofitted vessel or mobile van equipped for cataract and minor ophthalmic procedures. 2. Teleophthalmology Integration — remote screening and triage using portable fundus cameras and cloud-based image transfer. 3. Rotational Staffing Model — scheduled deployments of ophthalmologists, optometrists, and nurses across island communities. 4. Community Partnership — local health workers trained to provide follow-up and patient recall between visits. Feasibility was assessed through resource mapping, workflow simulations, and alignment with existing Maldivian healthcare logistics.

Results: The model addresses three major challenges: • Accessibility: reduces travel costs and time for patients from remote atolls. • Continuity: teleophthalmology enables between-visit monitoring and early referrals. • Efficiency: rotational deployment optimizes scarce specialist workforce distribution. (Conceptual)

Conclusions: "Vision on Waves" offers a pragmatic, scalable framework for expanding ophthalmic services in geographically fragmented nations. By combining mobile surgical capacity with teleophthalmology and community partnerships, this model can reduce inequities in access, improve early disease detection, and strengthen surgical coverage in small island states.

Abstract No.: 203258

Visual Performance After Bilateral Implantation of a Nondiffractive Extended Depth-of-Focus Intraocular Lenses Targeted for Mini-Monovision in a Chinese Population

First Author: Yijing **WANG**

Co-Author(s): Xiteng **CHEN**, Fang **TIAN**

Purpose: To evaluate the visual outcomes, patient satisfaction, spectacle independence, and photic phenomena after bilateral implantation of a new non-diffractive extended depth-of-focus intraocular lens using a mini-monovision approach in the Chinese cataract population.

Methods: This is a single-center prospective study including 50 patients who underwent bilateral cataract surgery. To achieve mini-monovision, the spherical equivalent was calculated between -0.25 and +0.25 D for the dominant eye, and between -0.5 and -0.75 D for the non-dominant eye. The main outcomes were uncorrected and corrected distance visual acuity (UDVA, CDVA), uncorrected and distance-corrected near visual acuity, and intermediate visual acuity at 40 cm, 66 cm (UNVA, CNVA, UIVA, CIVA) 3 months postoperatively. Secondary outcome parameters were the binocular defocus curve, patient satisfaction, including spectacle independence and photic phenomena.

Results: A total of 17 patients are currently enrolled. Binocular UDVA and CDVA were $0.02 \pm 0.05 \log \text{MAR}$ and $0.01 \pm 0.03 \log \text{MAR}$, respectively, three months after surgery. Meanwhile binocular UNVA and CNVA achieved $0.18 \pm 0.05 \log \text{MAR}$, $0.16 \pm 0.08 \log \text{MAR}$ respectively, while, UIVA and CIVA was $0.09 \pm 0.06 \log \text{MAR}$, $0.08 \pm 0.04 \log \text{MAR}$ respectively. The defocus curve showed that when the diopter ranged from -2.0D to -3.0D, the average binocular visual acuity was less than 0.22 logMAR, indicating a better intermediate to near visual performance than monocular visual acuity. All patients experienced spectacle independence for distance and intermediate vision tasks after surgery, and were quite satisfied with their vision. No visual disturbances were reported in this study.

Conclusions: Patients implanted with EDOF IOL using mini-monovision technique showed improved distance and intermediate visual acuity, reduced need for glasses, and expressed a high degree of satisfaction.

Abstract No.: 203868

Visual Performance of Small-Aperture IOL in Cataract Patients With Preexisting Corneal Comorbidities

First Author: Chameen **SAMARAWICKRAMA**

Purpose: To evaluate the outcomes of small-aperture IC-8 IOL in cataract patients with significant preexisting corneal comorbidities.

Methods: Case records of patients with preexisting corneal comorbidities who underwent cataract surgery and IC-8 IOL implantation were retrospectively reviewed. Outcome measures included uncorrected distance visual acuity (UDVA), spherical equivalent refraction (SER), and spherical equivalent refractive prediction accuracy of various IOL formulas (Barrett Universal 2, EVO, Kane, Hill RBF, Pearl DGS) using biometry measurements from IOLMaster 700 and Pentacam.

Results: Of the 67 eyes analyzed, 56 underwent implantation of IC-8 IOL only, and 11 required piggyback IOL as a secondary procedure. Mean postoperative UDVA in IC-8 only eyes was $0.24 \pm 0.30 \log \text{MAR}$, and 61.1% eyes achieved UDVA of 6/9 or better. Mean postoperative SER in IC-8 eyes was $-0.17 \pm 1.27 \text{ D}$, with 54.2% and 81.3% of eyes achieving postoperative SER within 0.50 and 1.00 D, respectively. IOL formulas showed similar refractive prediction accuracy with no significant differences in the precision and accuracy of IOL formulas and biometry measurements evaluated. Eyes that underwent piggyback implantation had a mean UDVA of $0.42 \pm 0.39 \log \text{MAR}$, with 36.4% of eyes achieving UDVA of 6/9 or better postoperatively.

Conclusions: IC-8 IOL implantation in patients with preexisting corneal comorbidities was safe and effective, yielding good visual and refractive outcomes in this niche population, who typically have suboptimal outcomes.

Abstract No.: 205621

Visual Performance of the RayOne Galaxy Spiral Full-Range of Vision IOL in Filipino Eyes

First Author: Victor **CAPARAS**

Co-Author(s): Maria Isabella **CAPARROS**, Maria Isabela **DE GUIA-MAYUGA**, Keshia **DUYONGCO**, Maureen **NAGUIT-REYES**

Purpose: To evaluate visual outcomes after bilateral implantation of the full-range of focus RayOne Galaxy Spiral intraocular lens (Rayner, Worthing, UK).

Methods: Fifteen patients (30 eyes) underwent phacoemulsification with bilateral RayOne Galaxy implantation, targeting emmetropia. Post-op visits were at 7–14 days (V1), 30–45 days (V2), 90–105 days (V3). Monocular/binocular and uncorrected/corrected visual acuity (VA) at 4m, intermediate VA at 63cm, and near VA at 40 and 33cm were measured. Defocus curve, contrast sensitivity (CS), photic phenomena (Halo and Glare Simulator, ViSU-L GmbH), and quality of vision (McAlinden QOV questionnaire) were also assessed.

Results: At V2, mean spherical refraction was $-0.36 (\pm 0.75 \text{ std dev}) \text{ diopter (D)}$. Mean monocular uncorrected distance, intermediate, near 40cm, and 33m VA were: $0.05 (\pm 0.23)$, $0.35 (\pm 0.10)$, $0.25 (\pm 0.09)$

and 0.22 (± 0.09) logMAR, respectively. Binocular uncorrected distance, intermediate, near 40cm, and 33cm VA were: -0.08 (± 0.16), 0.27 (± 0.09), 0.14 (± 0.04), and 0.10 (± 0.04) logMAR, respectively. Binocular defocus curve showed corrected distance VA ≤ 0.2 logMAR from +2.0D to -3.25D. Binocular mean halo size/intensity were 13/100 and 17/100; glare size/intensity 16/100 and 20/100. Far (1m) and near (40cm) binocular CS were 1.59 (± 0.08) and 1.62 (± 0.10) logCS, respectively. Mean QOV was 89/100. Additional follow-up results (V3) will be presented at the Congress.

Conclusions: Bilateral RayOne Galaxy implantation provided a full range of clear distance to near vision with excellent contrast sensitivity, minimal photic disturbance, high spectacle independence, and excellent patient-reported quality of vision.

Abstract No.: 204131

Visual and Refractive Outcomes After Bilateral Implantation of a Low-Addition Segmental Varifocal Intraocular Lens

First Author: Hao **ZHANG**

Co-Author(s): Jorge L. **ALIÓ**, Jorge L. **ALIÓ DEL BARRIO**, Mario **CANTÓ-CERDÁN**, Antonio **MARTÍNEZ ABAD**, Pilar **YEBANA-RUBIO**

Purpose: To evaluate the clinical outcomes of cataract patients undergoing implantation of a novel low-addition hydrophobic segmental refractive varifocal intraocular lens (Acunex Vario, Teleon Surgical).

Methods: This prospective study enrolled 25 patients (50 eyes) who underwent bilateral implantation of the Acunex Vario lens. Examinations were performed preoperatively and at 1, 3, and 6 months, including uncorrected and corrected distance (UDVA, CDVA), intermediate (UIVA, DCIVA), and near (UNVA, CNVA, DCNVA) visual acuities, manifest refraction, defocus curves, contrast sensitivity, and aberrometry. Patient-reported outcomes were assessed using the Quality of Vision (QoV) and Near Activity Visual Questionnaires (NAVQ).

Results: Significant postoperative improvements were observed in UDVA, CDVA, UNVA, CNVA, Sphere, and Cylinder (0.08 ± 0.09 , 0.03 ± 0.06 , 0.23 ± 0.11 , 0.10 ± 0.07 logMAR; -0.01 ± 0.25 D, -0.51 ± 0.49 D; $p < 0.05$). CNVA (0.10 ± 0.07 logMAR) and Spherical Equivalent (-0.26 ± 0.35 D) showed no significant change ($p > 0.5$). UIVA, DCIVA, and DCNVA remained stable postoperatively (0.14 ± 0.13 , 0.14 ± 0.09 , and 0.30 ± 0.13 logMAR, respectively). Defocus curve analysis demonstrated excellent distance vision (0.02 ± 0.06 logMAR at 0.0D), with a gradual decline at intermediate (-1.5 D: 0.16 ± 0.09 logMAR) and near (-2.5 D: 0.31 ± 0.11 logMAR) distances. Defocus curve demonstrated excellent distance vision (0 D: 0.02 ± 0.06 logMAR with a gradual decline at intermediate (-1.5 D: 0.16 ± 0.09) and near (-2.5 D: 0.31 ± 0.11) foci. Contrast sensitivity and ocular aberrometry remained

stable. Patient-reported outcomes showed minimal halo disturbances (64.7% never, 35.3% occasional, none significant). and high satisfaction with daily near activities.

Conclusions: The low-addition varifocal IOL provides excellent distance and intermediate visual outcomes, functional near acuity, high refractive accuracy, and strong patient-reported satisfaction with minimal dysphotopsias.

Abstract No.: 203621

WOcular Manifestations of a Family With Marfan Syndrome and Osteogenesis Imperfecta

First Author: Nikolai Thadeus **MAPPATAO**

Co-Author(s): Pia Regina **GALVANTE**

Purpose: To report a case series of a Filipino family with ocular manifestations of Marfan syndrome and Osteogenesis Imperfecta.

Methods: Comprehensive ophthalmologic evaluation was performed on all patients. Fundus photography was conducted for each individual, and two patients received 360-degree retinal barrier laser treatment. Corneal tomography was performed on one patient to assess corneal structure. All patients were monitored for progression of ocular manifestations related to Marfan syndrome and Osteogenesis Imperfecta.

Results: The three sons (ages 30, 27, and 22) exhibited blue sclerae, superior ectopia lentis, and lattice degeneration. The second son had lens coloboma in both eyes, pathologic myopia, and lenticular astigmatism. The third son showed lenticular astigmatism and keratoconus in the right eye. Corneal tomography revealed corneal thinning without keratoconus in the second son. No surgical interventions have been performed to date; however, special considerations for scleral-fixated intraocular lens implantation are ongoing due to the integrity of the bluish sclera.

Conclusions: This case series highlights the diverse ocular manifestations of Marfan syndrome and osteogenesis imperfecta, especially in a family with multiple affected members. The presence of vision-threatening features emphasizes the need for early diagnosis and personalized management. Ongoing monitoring is essential to track progression, especially regarding lens subluxation and retinal detachment. Careful attention to scleral integrity is critical for planning potential surgical interventions, such as scleral-fixated intraocular lens implantation.

Abstract No.: 202945**Yap1 Is Essential for Lens Development and Exhibits Dose-Dependent Effects***First Author: Jingyu MA**Co-Author(s): Fei CHEN, Lixia LUO, Qihang SUN*

Purpose: The Hippo-YAP pathway, which is crucial for regulating organ size, has been shown to play critical roles in lens development and homeostasis. However, Yap1's specific role in early lens morphogenesis is unclear. This study aims to investigate lens defects in Yap1 conditional knockout mice and explore the underlying mechanisms.

Methods: Lens-specific Yap1 deletion was induced using P0-3.9GFP-Cre in both Yap1^{fl/fl} and Yap1^{fl/+} mice. Slit-lamp and brightfield imaging were used to observe the ocular phenotype. Lens histology was examined by H&E staining, while marker expression was analyzed using immunofluorescence and Western blot. Cellular proliferation and apoptosis were assessed via BrdU and TUNEL assays, respectively.

Results: Yap1 was consistently expressed throughout lens development. Deletion of Yap1 resulted in a range of phenotypes, from no visible abnormalities to microphakia, and in severe cases, aphakia. The severity of these phenotypes correlated with Yap1 expression levels, demonstrating a dose-dependent effect. The reduced lens size was primarily attributed to decreased proliferation and a modest increase in apoptosis in lens epithelial cells (LECs). Additionally, some Yap1-deficient lenses exhibited defects in the separation of the lens vesicle from the surface ectoderm, accompanied by downregulation of key transcription factors such as FoxE3 and Ap2α.

Conclusions: Yap1 is essential for early lens development, regulating lens size, cell proliferation, and the separation of the lens vesicle from the surface ectoderm, with its effects being dose-dependent.

Abstract No.: 200890**miR-497-5p/FGF7 Axis Promotes the Formation of m6A Methyltransferase Complex WTAP by Activating Autophagy to Inhibit Posterior Capsule Opacification***First Author: Jinfei WEI**Co-Author(s): Yingyan MAO, Xiuhua WAN*

Purpose: Pathological epithelial-mesenchymal transition (EMT) of lens epithelial cells (LECs) is key to posterior capsule opacification (PCO), with autophagy inhibited. This study explored how the miR-497-5p/FGF7 axis regulates LEC autophagy via m6A methylation to affect PCO-associated EMT, revealing new pathogenesis.

Methods: TNFα induced EMT in HLEB3 cells (with/without siFGF7 transfection). CCK8, EDU staining and flow cytometry assessed cytotoxicity/proliferation.

Western blot, immunofluorescence and q-RT-PCR detected autophagy, EMT markers and m6A levels. CO-IP and RNA pull-down verified target interactions. RNA-seq, meRIP-seq and meRIP-qPCR confirmed FGF7-m6A correlation. Microfluidics packaged PLGA nanoparticles (METTL3 inhibitor) to modify intraocular lenses (IOLs) for PCO efficacy evaluation.

Results: In the TNFα-induced EMT model, FGF7 gene was significantly upregulated, while miR-497-5p expression was markedly decreased, with impaired autophagy. Transfection of si-FGF7 significantly activated autophagy to inhibit EMT, which was alleviated by transfection of miR-497-5p inhibitor. m6A RNA dot blot and WB showed that m6A modification was significantly activated during TNFα-induced EMT. On this basis, knockdown of methyltransferase WTAP attenuated m6A modification and reduced EMT markers, which was reversed by FGF7 overexpression. The correlation between FGF7 and m6A methylation was verified by RNA-seq, MeRIP-seq and MeRIP QPCR. After phacoemulsification, rabbit eyes were grouped for intraocular lens (IOL) implantation. Slit-lamp photography at 1–4 weeks postoperatively showed that IOLs loaded with METTL3 inhibitor significantly suppressed the occurrence of PCO.

Conclusions: The miR-497-5p/FGF7 axis influences PCO-associated EMT via regulating LEC autophagy and m6A methylation, offering potential therapeutic targets and highlighting m6A as a PCO treatment entry point.

Cornea, Dry Eyes, External Eye Diseases and Eye Banking**Abstract No.: 206234****A Case Series of Overnight Orthokeratology-Related Acanthamoeba Keratitis in Northwest China: Clinical Presentation, Management, and Outcomes***First Author: Yan CHENG*

Purpose: To report a series of cases of overnight orthokeratology-related Acanthamoeba Keratitis (OK-AK) at a tertiary transfer care eye hospital in China from January 1, 2021, to February 29, 2024, and to provide a reference for its treatment.

Methods: This was a single-center, retrospective case study. Records of patients with a history of OK lens use who were diagnosed with AK were analyzed. Data on clinical presentation, management, and outcomes were analyzed. We also preliminarily investigated behaviors associated with the risk of OK-AK.

Results: A total of 11 patients were included. Topical anti-amoebic agents (a combination of topical polyhexamethylene biguanide [PHMB], metronidazole, and voriconazole) were used in all infected eyes once the AK diagnosis was made. Systemic metronidazole and/or voriconazole were added in stromal keratitis. Eight eyes (57.1%) were cured by medication. The remaining eyes (6/14, 42.9%) underwent therapeutic keratoplasty surgery because of poor response or rapid progression of the disease. The surgeries included two lamellar keratoplasty (ALK), one deep lamellar keratoplasty (DALK), and three therapeutic penetrating keratoplasty (TPK). Recurrence occurred in two cases (2/6, 33.3%), one after 1 year following DALK and the other 3 months after TPK. All patients had improved visual acuity after treatment.

Conclusions: These findings indicate that OK-AK is a serious problem in Northwest China. The medication cure rate in OK-AK was 57.1%. The early keratoplasty surgery rate was 42.9%, and the risk of post-operation recurrence should be a concern.

Abstract No.: 205553

A New Approach to Assessing Pterygium Progression and Volume Using SII and Anterior Segment OCT

First Author: Rui NIU

Co-Author(s): Zhe DU, Wei HE, Chen XING, Zhongyang YAN

Purpose: To compare the clinical manifestations and prognosis of 90 patients with pterygium. The occurrence and progression of pterygium are associated with the systemic immune inflammatory index (SII) and clinical characteristics. The size of pterygium was assessed by anterior segment phase and anterior segment OCT.

Methods: According to the pterygium score, the patients were divided into group A, group B, and group C. The evaluation parameters included gender, age, onset time, signs and symptoms of underlying diseases, anterior segment OCT, NLR, PLR, MLR, and SII values. The postoperative pterygium tissue was weighed. The clinical characteristics of each group were analysed by a nonparametric test and a chi-square test. Ordered logistic regression analysis evaluated the parameters related to pterygium area and volume.

Results: Compared with the control group, the SII, NLR, and MLR values of pterygium patients were significantly increased. The incidence of both eyes, NLR, MLR, SII values and other markers in group C were significantly higher than those in groups A and B. The incidence of both eyes and SII value would affect the severity of pterygium. The SII value was significantly correlated with the area of pterygium progression and weighing volume. The combination of anterior segment phase and anterior segment OCT can effectively evaluate the volume of pterygium.

Conclusions: SII can be used as a biomarker to predict the severity and prognosis of pterygium. Compared with traditional methods, imaging data can better evaluate the progression of pterygium by calculating the volume of pterygium.

Abstract No.: 206901

A Smartphone-Based Blink Training Application for Alleviating Dry Eye Signs and Symptoms

First Author: Liang HU

Purpose: In this prospective, randomized study, we assessed whether a smartphonebased blinktraining application alleviates the signs and symptoms of Dry eye disease (DED).

Methods: This prospective, randomized study was conducted in young adult daily smartphone users. Forty participants were randomly assigned to either an intervention group that used the application or a control group without intervention, and they were followed for 30 days. Primary outcomes were Ocular Surface Disease Index (OSDI) score, blink rate (BR), percentage of incomplete blinks (IB), Ocular Protection Index (OPI), fluorescein/noninvasive breakup time (FTBUT/NIBUT) and tear meniscus height (TMH). An exploratory post-cessation visit occurred at Day 60 in the training arm.

Results: After 30 days, the intervention group showed significant improvements in blink behavior and ocular surface parameters, whereas the control group showed no meaningful changes. Between-group comparisons at Day 30 favored the intervention for OSDI, IB (both eyes), FTBUT (OS), and OPI (OS). Generalized estimating equations indicated that time on intervention (Day 30), training duration, OPI, BR, and sex were independently associated with changes in the OSDI scores. OPI was inversely related to symptoms, whereas BR showed a modest positive association. Gains partially regressed by Day 60 yet remained improved from baseline in the training arm, and no adverse events were reported.

Conclusions: These findings suggested that a simple, app-based behavioral intervention yields measurable benefits for DED management and provided a scalable, cost-effective strategy for ocular health preservation in digital environments.

Abstract No.: 203824

A Study on the Influencing Factors and Efficacy of Insular Infraorbital Neurovascular Pedicle Labial Salivary Gland Transplantation for the Treatment of Severe Dry Eye Disease

First Author: Yinghui WANG

Co-Author(s): Ying JIE

Purpose: To study the effect of labial salivary gland flow rate (LSGFR) and infraorbital artery hemodynamics

(IOAH) on the postoperative outcomes of insular infraorbital neurovascular pedicle labial salivary gland transplantation (IINPLSGT) for the treatment of severe dry eye disease (DED).

Methods: This was a prospective, observational, self-controlled before-and-after study. From July 2022 to June 2024, 11 eyes of 10 severe DED patients underwent IINPLSGT, with follow-up at least 6 months. The changes in ocular symptoms and signs were analyzed, and factors influencing surgical efficacy were explored.

Results: With a mean follow-up of 17.56 ± 11.72 months. BCVA improved in 5 eyes and stabilized in 6. Ocular Surface Disease Index score decreased from 59.33 ± 14.37 to 26.27 ± 10.14 ($P < 0.001$). Schirmer I test (SIT) improved from 0.00 ± 0.00 mm to 5.44 ± 2.01 mm ($P < 0.0001$). Tear break-up time increased from 0.23 ± 0.48 s to 5.48 ± 4.67 s ($P = 0.008$). Corneal fluorescence staining scores decreased from 12.56 ± 2.65 to 7.56 ± 3.09 ($P < 0.001$). IOAH did not change pre- and postoperatively ($p > 0.05$). Preoperative peak systolic velocity of the infraorbital artery positively affects LSGFR ($B = 0.034$, $P = 0.042$), while end-diastolic velocity had a negative effect ($B = -0.070$, $P = 0.039$). LSGFR was positively associated with improvement in SIT post-op ($P < 0.05$). ROC analysis showed an AUC of 0.714, with an optimal LSGFR cutoff at $0.41 \mu\text{L}/\text{min}/\text{cm}^2$. IOAH did not correlate with ophthalmology results ($P > 0.05$).

Conclusions: IINPLSGT has shown a positive effect in the treatment of severe DED. LSGFR reflected postoperative lubrication, while IOAH monitored graft blood flow and helped prevent adverse events.

Abstract No.: 202876

A Superoxide Anion-Responsive Persulfide Prodrug for Remedying Dry Eye Diseases via Scavenging ROS and Inhibiting Apoptosis

First Author: Panpan YE

Co-Author(s): Mingzhi SU, Weixin ZHENG

Purpose: Dry eye disease (DED) is a prevalent ocular disorder in which excessive reactive oxygen species (ROS) drive oxidative stress, inflammation, and apoptosis. This study aimed to design a superoxide anion ($\text{O}_2^{\cdot-}$)-responsive persulfide prodrug (Ac-SOPD) capable of sustained hydrogen sulfide (H_2S) release to alleviate oxidative stress and interrupt the vicious cycle of DED.

Methods: Ac-SOPD was synthesized as a peptide-persulfide conjugate and characterized for its morphology, self-assembly, and $\text{O}_2^{\cdot-}$ -triggered H_2S release. Its biocompatibility, antioxidant, and anti-apoptotic effects were evaluated in human corneal epithelial cells using cell viability assays, fluorescence probes, flow cytometry, and transcriptomic analysis. Therapeutic efficacy was validated in benzalkonium

chloride (BAC)-induced DED mouse model. Clinical assessments, histological analyses, and immunofluorescence staining were performed to evaluate corneal repair, tear stability, inflammation, and apoptosis.

Results: Ac-SOPD exhibited excellent cytocompatibility and controlled H_2S release under oxidative stress conditions. It significantly reduced intracellular ROS, enhanced antioxidant enzyme expression, preserved mitochondrial function, and suppressed apoptosis. Transcriptomic analyses and molecular experiments together confirmed enrichment of oxidative phosphorylation and downregulation of Hippo signaling. In vivo, Ac-SOPD markedly promoted corneal epithelial repair, improved tear secretion and tear film stability, reduced IL-1 β and MMP-9 expression, and decreased apoptosis in BAC-induced DED model. No ocular toxicity was observed in safety evaluations.

Conclusions: With its dual functions of ROS scavenging and sustained H_2S release, Ac-SOPD effectively alleviates oxidative stress, inflammation, and apoptosis both in vitro and in vivo. Collectively, Ac-SOPD represents a promising therapeutic candidate for DED and other oxidative stress-related diseases.

Abstract No.: 202870

AAV-Mediated Corneal Gene Therapy for Prevention and Treatment of Neurotrophic Keratopathy

First Author: Lin CONG

Co-Author(s): Benxiang QI, Lixin XIE, Bi Ning ZHANG

Purpose: Neurotrophic keratopathy (NK) is a degenerative disease caused by corneal nerve damage. Clinical management primarily relies on symptomatic treatments, which yield suboptimal outcomes in some patients and may eventually require tarsorrhaphy to reduce exposure and secondary infection risks. AAV-mediated gene therapy represents a safe, innovative, and etiologically targeted approach. This study aimed to develop a novel, simple, and efficient gene therapy for preventing and treating NK.

Methods: The high-efficiency AAV.rh10 serotype was selected, followed by a 1-year long-term observation. Multiple assays were performed to evaluate corneal immune responses post-AAV treatment for safety assessment. Three-dimensional imaging of GFP (self-expressed) co-immunofluorescence with ZO-1 and tubulin via corneal whole mounts was used to observe AAV transfection, anterograde, and retrograde transport. The preventive and therapeutic effects of single stromal injection of AAV-Ngf on NK of varying severity were evaluated in murine models, including capsaicin-induced, herpes simplex keratitis, two diabetic models, and alkali burn models.

Results: Stromal injection of AAV.rh10 efficiently transfected corneal stromal cells, with anterograde

transport to the subepithelial nerve plexus and retrograde transport to the trigeminal ganglion, exerting therapeutic effects at both corneal stroma and trigeminal ganglion. Single AAV-Ngf injection significantly promoted corneal nerve regeneration, accelerated epithelial repair, reduced stromal edema, and improved corneal sensitivity across NK models of varying severity. Its therapeutic efficacy was comparable to long-term, continuous rhNGF eye drop administration.

Conclusions: This proof-of-concept study demonstrates that AAV.rh10-Ngf gene therapy holds promising potential for NK prevention and treatment. The safety and efficacy findings strongly support its clinical translation prospects.

Abstract No.: 201899

Adjunct Topical Recombinant Deoxyribonuclease Therapy in Dry Eye Disease

First Author: Khatheeya **SALWA**

Co-Author(s): Sandeep **JAIN**, Maroof A **KHAN**, Radhika **TANDON**, Murugesan **VANATHI**, Thirumurthy **VELPANDIAN**

Purpose: Recent evidence points to the role of extracellular DNA and neutrophil extracellular traps (NETs) in the pathogenesis of dry eye disease (DED). The aim of this study is to evaluate adjunct topical recombinant deoxyribonuclease (r-DNase) in moderate to severe refractory Dry Eye Disease.

Methods: This longitudinal double blinded Randomized Control Trial enrolled 80 patients with moderate to severe DED into two groups: standard treatment and standard treatment plus topical r-DNase (0.02% QID for 3 months) group. Assessments at baseline, week-2, Month-1,3 and 6 included Ocular Surface Disease Index (OSDI), conjunctival hyperemia (CH), tear break-up time (TBUT), non-invasive TBUT (NIBUT), Schirmer's test, conjunctival and corneal staining score (SS); lipid layer thickness (LLT), tear meniscus height (TMH), meibography for meibomian gland loss (MGL) and treatment grading scores for steroids and lubricants.

Results: In 40 patients (80 eyes) [mean age 46.375 ± 12.45 yrs] in r-DNase group and 40 patients (79 eyes) [mean age 38.75 ± 13.95 yrs] in standard treatment group, significant improvement was noted in the adjunctive DNase group at Month-3 and 6 [CH ($p < 0.0001$), TBUT ($p = 0.0002$), NIBUT ($p = 0.0027$), Schirmer's ($p < 0.0001$), conjunctival SS ($p < 0.0001$), NEI corneal SS ($p = 0.0175$), and TMH ($p < 0.0001$) along with greater OSDI reduction with significant within-group change ($p < 0.0001$) and decrease in need for topical steroids ($p = 0.0060$) and lubricants ($p = 0.0224$) at M-6 follow-up]. No significant changes were noted in LLT or MGL. Topical r-Dnase was well tolerated with no adverse events.

Conclusions: Adjunct Topical r-DNase 0.02% for 3 months provides significant improvement in both subjective and objective clinical parameters in moderate to severe refractory Dry Eye Disease, suggesting it to be a novel therapeutic option.

Abstract No.: 207276

Advanced Imaging of Conjunctival Collagen in Cicatrizing Conjunctivitis using Second Harmonic Generation and its Correlation with Clinical Severity

First Author: Hon Shing **ONG**

Co-Author(s): Jodhbir **MEHTA**, Andri **RIAU**, Ralene **SIM**

Purpose: Cicatrizing conjunctivitis (CC) is a major cause of visual morbidity. Differentiating progressive from non-progressive disease is critical, as progressive CC often requires timely immunosuppression. Current clinical assessment of conjunctival scarring may lack sensitivity for early progression. This study used two-photon excitation with second harmonic generation (SHG) imaging to quantitatively assess conjunctival collagen in CC and explore associations with clinical severity, aiming to identify sensitive biomarkers of progression.

Methods: Conjunctival tissues from patients with chronic CC due to Stevens-Johnson Syndrome were imaged with SHG microscopy. Severity was graded using a validated CC clinical tool incorporating inflammation, scarring, and morbidity. Collagen morphometry in regions of interest was quantified with FibroIndex software (HistoIndex, Singapore), including collagen fiber density (CFD), collagen area ratio (CAR), and collagen fiber number (CFN) per mm².

Results: Eighteen participants were analyzed (7 CC, 11 controls; mean age 60.7 ± 14.4 years, $p = 0.89$). CC patients showed lower CAR ($p < 0.01$) and CFN ($p < 0.01$) but higher CFD ($p = 0.03$) versus controls. In CC, CAR correlated with inflammation ($R = -0.55$, $p = 0.011$), scarring ($R = 0.61$, $p = 0.0034$), morbidity ($R = 0.46$, $p = 0.035$), and composite score ($R = 0.52$, $p = 0.017$). Across all participants, CFN inversely associated with inflammation ($R = -0.50$, $p < 0.01$), morbidity ($R = -0.37$, $p < 0.01$), and composite score ($R = -0.33$, $p = 0.02$).

Conclusions: This study highlights distinct collagen remodeling patterns in CC. CAR correlated strongly with all clinical severity domains, supporting its potential as a reliable diagnostic marker. CFN, uniquely demonstrating consistent negative associations with severity measures, may serve as a promising predictor of disease progression.

Abstract No.: 206696**Amorphous Layered Double Hydroxide-Based Nano-Enzyme Eye Drops Against Dry Eye Disease by Inhibiting Mitochondrial Damage and Pyroptosis***First Author: Dandan CHU**Co-Author(s): Tingting HU, Jingguo LI, Zhanrong LI, Chaoliang TAN*

Purpose: Dry eye disease (DED) is a prevalent ocular disorder characterized by chronic inflammation and oxidative stress. Reactive oxygen species (ROS) and downstream NLRP3 inflammasome activation trigger pyroptosis, exacerbating inflammation. This study aims to develop amorphous layered double hydroxide (a-LDH)-based nano-enzyme eye drops (Needs) to treat DED by targeting mitochondrial damage and pyroptosis.

Methods: a-LDH nanoparticles were synthesized via acid etching-mediated crystalline-to-amorphous phase engineering. The ROS scavenging capacity was assessed using methylene blue, 3,3',5,5'-tetramethylbenzidine, dihydroethidium, and electron spin resonance assays. In vitro models of hyperosmotic stress in human corneal epithelial cells and in vivo DED mouse models were used to evaluate antioxidative, anti-pyrototic, and therapeutic effects. RNA sequencing, immunofluorescence, and western blotting were employed to investigate underlying mechanisms.

Results: a-LDH exhibited superior ROS scavenging ability, with $\cdot\text{OH}$ and $\cdot\text{O}_2^-$ elimination capacities 1.77- and 1.20-fold higher than crystalline LDH, and 3.38- and 1.43-fold higher than CeO_2 , respectively. This enhancement was attributed to $\text{Cu}^+/\text{Cu}^{2+}$ redox cycling and oxygen vacancies. a-LDH significantly reduced intracellular and mitochondrial ROS, suppressed the NLRP3/Caspase-1/GSDMD-mediated pyroptosis pathway, and inhibited N-GSDMD-induced mitochondrial damage. In DED mice, Needs promoted corneal epithelial repair, restored goblet cell density, enhanced tear secretion, and downregulated inflammatory cytokines without toxicity.

Conclusions: a-LDH-based nano-enzyme eye drops represent a safe and effective therapeutic strategy for DED by mitigating oxidative stress, inhibiting pyroptosis, and preserving mitochondrial function. This study provides a novel insight into LDH-based nano-enzyme applications for DED treatment.

Abstract No.: 203034**Anti-Swelling Properties of XTRA4 Maintain the Thickness of Pre-Loaded DSAEK Grafts for Up to Six Days***First Author: Jameson CLOVER**Co-Author(s): Braedon BRADDY, Mark ELLISON, Megan STRAIKO, Khoa TRAN*

Purpose: To compare the graft thickness and cell viability of preloaded DSAEK grafts in a new cold storage solution XTRA4, using Optisol-GS as a reference.

Methods: Cornea pairs were prepared as preloaded DSAEK grafts, with one stored in Optisol-GS and the mate in XTRA4. Two carriers were tested (Weiss Glass Cannula and Endoglide Ultrathin, N=5 pairs each). OCT was performed after pre-cutting, after pre-loading, and on subsequent storage days at the same location. Endothelial cell loss (ECL) was assessed by Calcein-AM vital dye staining and fluorescence microscopy.

Results: In the glass cannula group, grafts cut to $105 \pm 27 \mu\text{m}$ and stored in XTRA4 swelled 28% after pre-loading but remained stable for 6 days ($P=0.97$), whereas Optisol-GS grafts (cut to $101 \pm 1 \mu\text{m}$) swelled 32% after pre-loading and increased by 70% over 6 days. In the Endoglide group, grafts cut to $105 \pm 17 \mu\text{m}$ and stored in XTRA4 swelled 18% after pre-loading and remained stable ($P=0.71$), while Optisol-GS grafts swelled 14% initially and thickened 48% over 6 days. ECL was 21% vs. 23% in the glass cannula ($P=0.73$) and 11% vs. 14% in the Endoglide ($P=0.08$). Greater cell loss was associated with graft overlap in the narrower glass cannula ($P<0.01$).

Conclusions: XTRA4 preserves graft thickness during hypothermic storage and minimizes swelling in pre-cut, preloaded DSAEK grafts. These properties enhance logistics and the feasibility of long-distance shipping, including transcontinental transport.

Abstract No.: 209405**Antibiotic Nanozyme Hydrogel Depot for Single-Injection MDR Bacterial Keratitis Therapy via Localized Antibacterial, Pro-Healing and Corneal Reinforcement***First Author: Hongwei WANG*

Purpose: Bacterial keratitis (BK), a severe ocular infection caused by pathogenic bacterial invasion, requires urgent therapeutic development due to the limitations of conventional antibiotics, such as drug resistance and systemic toxicity caused by frequent dosing.

Methods: To address these challenges, we developed an injectable antibiotic nanozyme hydrogel depot (ANHD) for single-dose therapy of BK. The ANHD was prepared by synthesizing the Ce-gatifloxacin nanozyme through metal-organic coordination between cerium

nitrate and gatifloxacin, followed by co-precipitation, and subsequently incorporating CGN into an injectable xanthan-PEG hydrogel constructed via Schiff base linkages. The antibacterial activity of the nanozyme-composite hydrogel was assessed in vitro, along with its scavenging capacity against reactive oxygen species ($O_2^-/H_2O_2/\cdot OH$), its ability to promote corneal wound healing, and its effect on enhancing corneal mechanical strength. Finally, a mouse model of multidrug-resistant *Staphylococcus epidermidis* keratitis was established, and a single intrastromal injection of ANHD was administered as the treatment intervention.

Results: The resulting hierarchical composite exhibited multiple functional synergistic effects, including antibacterial activity, scavenging of reactive oxygen species ($O_2^-/H_2O_2/\cdot OH$), promotion of corneal wound healing, and reinforcement of corneal mechanical strength. Furthermore, nanozymes and hydrogels were ubiquitous in the corneal stroma and can exert their functions without penetration across the corneal surface, which distinguishes them from the eye drop formulations. In a murine model, a single injection of ANHD into the corneal stroma effectively treated multidrug-resistant *Staphylococcus epidermidis* keratitis, with complete bacterial eradication, significant inflammation reduction, and accelerated epithelial repair.

Conclusions: These results demonstrated the potential of ANHD in the treatment of ocular infectious diseases.

Abstract No.: 206953

Assessing the Impact of Losartan on Visual Rehabilitation in a Tertiary Care Centre

First Author: Shweta **DEV**

Co-Author(s): Gairik **KUNDU**, Swaminathan **SETHU**, Rohit **SHETTY**

Purpose: To assess clinical and imaging outcomes of corneal scars treated with topical losartan (0.8 mg/mL) for 6 months, targeting TGF- β -mediated fibrosis.

Methods: In this prospective study, 45 eyes were evaluated (mean age: 32.6 ± 4.6 years) with etiologies mainly scars post-fungal keratitis, post-corneal tear, and post-refractive surgery. Losartan stock was aseptically prepared, 0.2 μm filter-sterilized, labelled, and sterility-verified before use at our lab. Patients received losartan drops 6 times daily for 6 months. Drop comfort and side effects were recorded.

Results: At 3 months, mean BCVA improved from 0.25 ± 0.17 to 0.17 ± 0.09 logMAR ($p=0.12$). Visual acuity improved in 35 eyes, stable in 10. OCT showed reduced scar depth and densitometry in 35 eyes. No significant side effects were noted.

Conclusions: Topical losartan may reduce corneal fibrosis by inhibiting TGF- β pathways, improving clarity and scar depth.

Abstract No.: 207455

Assessment of Intraocular Pressure After Pterygium Excision Using Goldmann Applanation Tonometry and Non-Contact Tonometry, Adjusted for Corneal Structural Abnormalities

First Author: Inchara **NAGARAJ**

Co-Author(s): Karan **SINGH**

Purpose: To evaluate the effect of pterygium and its surgical excision on intraocular pressure (IOP) measurements and to compare Goldmann applanation tonometry (GAT) with non-contact tonometry (NCT), accounting for corneal structural alterations.

Methods: A prospective observational study included 40 patients with primary nasal pterygium undergoing excision with conjunctival autograft. IOP was measured preoperatively and postoperatively using GAT and NCT. Central corneal thickness (CCT) and corneal curvature (K values) were recorded with pachymetry and keratometry. Statistical analysis included paired t-tests and correlation studies.

Results: Preoperative mean anterior curvature was 41.09 ± 3.38 D / 44.33 ± 2.29 D, which changed postoperatively to 43.13 ± 1.79 D / 43.98 ± 2.17 D. NCT readings decreased by approximately 5–6 mmHg, while GAT values showed reductions of about 2 mmHg. Both changes correlated with alterations in corneal curvature, indicating biomechanical effects of pterygium and its removal on IOP measurement.

Conclusions: Pterygium excision modifies corneal biomechanics, resulting in falsely elevated preoperative IOP values and apparent postoperative reductions with both GAT and NCT. Adjusting IOP readings for corneal thickness and curvature is essential to avoid misinterpretation in glaucoma evaluation and management.

Abstract No.: 206691

Association of Work Productivity and Activity With Dry Eye Outcomes in Mild to Moderate Dry Eye Disease Patients: A Study of a Hong Kong Cohort

First Author: Yiu Man **WONG**

Co-Author(s): Kam Lung Kelvin **CHONG**, Zhichao **HU**, Chi Pui Calvin **PANG**, Chee Yung Clement **THAM**

Purpose: To investigate the association of work productivity and activity level with dry eye parameters in mild to moderate dry eye disease (DED) subjects.

Methods: Work productivity and activity level are assessed via the Work Productivity and Activity Impairment (WPAI:GH) questionnaire, a 6-item instrument that yields absenteeism (work time missed), presenteeism (reduced on-the-job effectiveness), work productivity loss (overall work impairment), and activity impairment. Associations between WPAI:GH

scores and DED outcomes, including Tear Break Up Time (TBUT) and Ocular Surface Disease Index (OSDI), are analyzed using Spearman's correlation in SPSS Version 29. (ClinicalTrials.gov ID: NCT06089317)

Results: For 198 included subjects (153 females, 76.9%) aged 54.69 ± 14.58 years, their 4 WPAI:GH mean scores of absenteeism, presenteeism, work productivity loss, and activity impairment are 1.54 ± 10.73 , 30.78 ± 22.25 , 31.07 ± 22.26 and 28.59 ± 20.00 respectively, while the mean of OSDI and TBUT are 22.99 ± 11.92 and 3.65 ± 2.36 . Significant positive correlations with OSDI score are observed for presenteeism ($r = 0.318$, $P = 0.002$), work productivity loss ($r = 0.326$, $P = 0.002$), and activity impairment ($r = 0.374$, $P < 0.001$), while interestingly TBUT also has positive correlations with presenteeism ($r = 0.223$, $P = 0.036$) and work productivity loss ($r = 0.222$, $P = 0.038$) only.

Conclusions: The patient-reported symptom severity (OSDI) has a significant positive association with DED-affected Work Productivity and Activity Impairment.

Abstract No.: 208279

Associations of Warm Compression, Eyelid Massage and Lid Hygiene With Ocular Surface Changes in Cocaine and Methamphetamine Users: A Longitudinal Study

First Author: Stephany Wing Lam **TAI**

Co-Author(s): Kelvin Kl **CHONG**, Kenneth Ka Hei **LAI**, Calvin Cp **PANG**, Clement Cy **THAM**

Purpose: To evaluate longitudinal changes in ocular surface parameters over six months following warm compression, eyelid massage, and cleaning intervention in cocaine and methamphetamine users.

Methods: A longitudinal study was conducted in Hong Kong (Jan 2024 - Sep 2025). Primary users of cocaine and/or methamphetamine, averaging 24 intakes within 6 months over the past 2 years, were included. Those with significant medical comorbidities or mental retardation were excluded. Between visits separated by 6 months, subjects received standardized instructions for daily warm compression, eyelid massage, and cleaning. Ocular surface evaluations included lipid layer thickness and meibography (LipiView® II), tear meniscus height and non-invasive keratography break-up time (NIKBUT) (Keratograph® 5M), Schirmer Test, slit-lamp examination conducted by ophthalmologists, and Ocular Surface Disease Index (OSDI). Meibomian glands were graded 0-3 by consistent graders.

Results: Paired data from twenty-nine subjects (15 males, age 39.1 ± 11.4 years) were analyzed. First NIKBUT improved (left: $+4.75$ seconds, $P=0.008$), as did average NIKBUT (left: $+3.63$ seconds, $P=0.016$). Meibomian gland distortion decreased: upper lid distortion (right: -0.31 , $P=0.009$; left: -0.38 , $P=0.002$), lower lid distortion (left: -0.32 , $P=0.008$). Papillae grading improved (left: -0.38 , $P=0.039$). Conversely,

under the National Eye Institute (NEI) scheme, increased corneal and conjunctival staining were observed in multiple regions at both eyes (all $P < 0.05$). Foaming increased at left eyes ($+0.38$, $P=0.025$).

Conclusions: Warm compression, eyelid massage, and cleaning yield mixed effects in drug abusers: improving tear film stability and meibomian gland morphology but increasing ocular surface staining and inflammation. Longer-term, controlled trials are warranted to fully evaluate their effectiveness on drug abusers.

Abstract No.: 206360

Asymmetric Intracorneal Ring Segments Implantation for Management of Keratoconus – 3-Year Follow-Up

First Author: Marta **SARTORI**

Co-Author(s): Armando **BRITO**, Carlos **ARCE**, Sandra **BEER**, Claudia **FRANCESCONI**, Walton **NOSE**

Purpose: To evaluate the clinical and tomographical outcomes in patients submitted to asymmetric corneal rings (AS-ICRS) implantation to treat keratoconus.

Methods: Prospective observational study, AS-ICRS were implanted asymmetric topographic patterns of keratoconus assigned to four groups: A-160 arc length with thicker clockwise or counterclockwise tips (like a "smoking pipe"). B – 180 arc length with thicker midbody (like a "moustache"). C – 330 arc length with thicker sites at 6h (midbody) (like a "goatee"). D – 320 arc length with 3 and 9 h location thicker than the tips and the midbody – (like a "sideburn"). Patients with the "duck" or "snowman" phenotype received one or two "smoking pipe" AS-ICRS (A), patients with the "DMP-like" phenotype received one "moustache" AS-ICRS (B) and "nipple" phenotype received "goatee" (C) or "sunburd" (D) AS-ICRS depending in quantitative amount of topographic astigmatism, less than or greater of 3 Dioptries. The visual, refractive, astigmatism, keratometric, and corneal aberrometry changes were evaluated over a three-year follow-up period.

Results: Forty-four eyes were analyzed. Significant differences were observed between pre and post operative outcomes in uncorrected logmar vision, (1.02 to 0.53 ± 0.21), corrected (0.37 to 0.14 ± 0.13) (maximum keratometric (KM) values (57.96 D to 52.13 D ± 4.43 D), spherical equivalent (-7.81 D to -3.67 D ± 2.30), anterior toric elevation (KCA index) (56.32 to 26.31 ± 14.14) and HOA coma (1.70 D to 1.29 D ± 0.70) on the 4 AS – ICRS types analyzed ($p < 0.05$). There were significant differences in surgery outcomes between AS-ICRS types, specially in Spherical Equivalent values ($p < 0.01$) and refractive ($p < 0.02$) and topographical ($p < 0.01$) cylinder. Goatee" and "Sunburn" ring models show a difference in Anterior KCA index when comparing "to" "pipe" or "moustache" ($p < 0.05$). No difference between "goatee"

and “sunburn” in decreasing cylinder($p,0,x$), ($p < 0.01$). Anterior KCA index was the most important index analyzed, showing significant differences, in all follow-up periods of time (3,6,12,24,36 mo) ($p < 0.01$) and in 4 AS – ISCR types individually.

Conclusions: Asymmetric ICRS did improve the outcomes. The “sunburn” and “goatee” are better at flattening and correcting corneal anterior asymmetries.

Abstract No.: 204510

BOT-Graft (Botropase) vs. Conventional Fixation: Comparative Outcomes in Primary Pterygium Surgery

First Author: Nilesh KUMAR

Purpose: To evaluate the outcomes of various conjunctival autograft fixation techniques in primary nasal pterygium surgery, and to assess the safety, efficiency, and cost-effectiveness of the novel Botropase-Optimized Conjunctival Tissue Grafting (BOT-Graft) technique.

Methods: A total of 104 primary nasal pterygium surgeries performed by the same surgeon were analyzed. Patients were divided into four groups based on graft fixation technique: autologous blood (40 cases), sutures (10 cases), fibrin glue (2 cases), and BOT-Graft using Botropase (52 cases). Mean surgical duration and postoperative complications, including graft displacement, retraction, or recurrence, were recorded. Follow-up was maintained for up to 10 months.

Results: Mean surgical times were 26.2 minutes (autologous blood), 29.1 minutes (sutures), 20.7 minutes (fibrin glue), and 18.3 minutes (BOT-Graft). The autologous blood group showed 2 cases of graft displacement and 3 cases of retraction, while BOT-Graft demonstrated only one minor displacement. Both suture and fibrin glue groups were uneventful. Botropase provided rapid fibrin formation, stable graft adhesion, and hemostasis throughout the 10-month follow-up. These findings highlight BOT-Graft as a safe, efficient, and affordable technique that combines the advantages of conventional methods while minimizing their limitations.

Conclusions: BOT-Graft leverages botropase’s dual hemostatic and adhesive properties for rapid, stable, and cost-effective graft fixation, making it a strong first-line option for pterygium surgery in diverse clinical settings. BOT-Graft demonstrated significant cost savings (95% less) over fibrin glue.

Abstract No.: 202259

Beyond the Demarcation Line: Optical Correlates of Corneal Remodeling After Collagen Cross-Linking

First Author: Srishti KHULLAR

Purpose: To determine whether demarcation line depth predicts changes in wavefront aberrations following collagen cross-linking in progressive keratoconus.

Methods: A prospective observational study carried out at a tertiary care center in Maharashtra, India, enrolling patients with progressive keratoconus treated with standard epithelium-off CXL

Results: A total of 108 patients were enrolled, including 52 males (48%) and 56 females (52%). The mean age was 18.52 ± 2.6 years. The average demarcation line depth was $210 \pm 10.82 \mu\text{m}$. A significant correlation was observed between deeper DL depth and reduction in total higher-order aberrations (HOAs) ($p < 0.05$), with coma aberration showing the strongest association ($p < 0.01$). Eyes with shallower DL depth demonstrated minimal improvement or even worsening of wavefront abnormalities postoperatively.

Conclusions: A deeper demarcation line following CXL is associated with greater improvements in corneal wavefront abnormalities, particularly coma aberration. While demarcation line depth serves as an established OCT biomarker for the efficacy of CXL, this study is the first to systematically explore its correlation with wavefront abnormalities, a relationship that has not been adequately addressed in existing literature.

Abstract No.: 206942

Can Immune Modulators Help in Stabilizing Keratoconus (KC): An Algorithmic Approach

First Author: Shweta DEV

Co-Author(s): Panaah SHETTY, Arka SUBHRA, Swaminathan SETHU

Purpose: Keratoconus is an ectatic inflammatory disease characterized by elevated biomarkers. This study explores the impact of biomarkers on KC progression and potential therapies for stabilization.

Methods: The cohort was divided into two groups ($n=178$ eyes). Group 1 received a placebo, while Group 2 received targeted biomarker therapy through randomization. Tears from untreated mild-to-moderate KC eyes were collected using Schirmer’s strip and analyzed for biomarkers using a point-of-care diagnostic kit. Corneal topography, epithelial and stromal mapping, and collagen imaging were performed at baseline and 8 months post-treatment.

Results: Group 1 showed progression in 78 eyes, with collagen weakening, Bowman’s layer (BL) thinning, and an unchanged biomarker profile. Conversely, Group 2 exhibited stabilization of KC in 86 eyes, with a change in maximum keratometry (K max) by $0.99D \pm 0.5D$,

improved collagen orientation, stable BL, and a 50-60% reduction in biomarker levels.

Conclusions: Biomarker therapy stabilizes early-to-moderate KC by reducing inflammation, promising new therapeutic avenues.

Abstract No.: 204613

Changes in Corneal Endothelial Cell After Phacoemulsification in Patients With Acute Angle-Closure Patients: A Prospective Study

First Author: Minh Man **TRAN**

Co-Author(s): C.T. T. Truyen **NGUYEN**, Ke To **TRAN**, Minh Huy **TRAN DINH**

Purpose: To evaluate changes in corneal endothelial cell density and morphology following phacoemulsification in patients diagnosed with acute angle closure.

Methods: This prospective, longitudinal study included 35 patients with acute angle closure and coexisting cataracts who underwent phacoemulsification. Corneal endothelial parameters were assessed preoperatively and at 1 month postoperatively using the specular microscope. Intraoperative metrics, including phacoemulsification time, cumulative dissipated energy (CDE), and total ultrasound energy, were recorded.

Results: The mean age of participants was 58.9 ± 7.3 years, with a predominance of female patients. Significant improvements in best-corrected visual acuity and intraocular pressure (IOP) were observed at 1 month postoperatively ($p < 0.05$). Endothelial cell density, coefficient of variation, and central corneal thickness showed statistically significant reductions. A positive correlation was identified between endothelial cell loss and intraoperative parameters, including phacoemulsification time, CDE, and ultrasound energy.

Conclusions: Acute angle closure is a common condition in the elderly, particularly among Asian populations and women. Phacoemulsification is a safe and effective procedure to lower intraocular pressure and improve visual acuity while mitigating progression to chronic angle-closure glaucoma. However, endothelial cell loss is significantly associated with intraoperative energy parameters, underscoring the importance of surgical technique and phacoemulsification energy modulation in preserving corneal health.

Abstract No.: 209232

Clinical Application of Keratoplasty in the Acute Stage of Fungal Keratitis

First Author: Dan **WU**

Co-Author(s): Hui **HUANG**, Qianqian **LAN**

Purpose: To observe the clinical efficacy and complications of optical keratoplasty (OPK) for Fungal Keratitis (FK) at the acute infective stage, one year after the operation.

Methods: Patients with acute fungal corneal ulcer in the People's Hospital of Guangxi Zhuang Autonomous Region from March 2019 to March 2024 who were treated with interventional surgery due to poor effect of active antifungal treatment were retrospectively selected. The patients were divided into two groups according to the extent and invasion of the corneal lesion. The first group was patients with the diameter of the corneal lesion ≤ 8 mm and the margin of the lesion ≥ 2 mm from the clear limbal zone, and the second group was patients with the diameter of the corneal lesion > 8 mm or the margin of the lesion < 2 mm from the clear limbal zone. According to the different surgical methods, the patients in the two cases were divided into one-stage group (optical keratoplasty was performed in the first stage) and two-stage group (conjunctival flap covering was performed in the first stage, and optical keratoplasty was performed in the second stage). The baseline data, medical history characteristics, time of fungal clearance, fungal recurrence, rejection after keratoplasty, other postoperative complications, and outcomes were recorded. The clinical efficacy of the one-step method group and the two-step method group at 1 year after operation was compared.

Results: (1) A total of 68 eyes of 68 patients were enrolled. There were 18 patients (18 eyes) in the first condition, including 13 patients (13 eyes) in the one-step group and 5 patients (5 eyes) in the two-step group. There were 50 patients (50 eyes) in the second condition, 27 patients (27 eyes) in the one-step group, and 23 patients (23 eyes) in the two-step group. The baseline data of the two conditions were not statistically significant. (2) In the first case, the average time of first fungal clearance in the one-step group and the two-step group was 0.32 ± 0.36 months and 2.97 ± 1.60 months, respectively, and the difference was statistically significant ($P < 0.001$). The number of patients with fungal recurrence in the one-step group and the two-step group was 1 (7.70%) and 0 (0.00%), respectively, and the difference was not statistically significant ($P = 0.72$). Rejection occurred in 3 patients (23.08%) in the one-step group and 4 patients (80.0%) in the two-step group, and the average time of rejection was 4.33 ± 3.51 months and 7.25 ± 4.5 months, respectively. The difference was statistically significant ($P = 0.047$). The 1-year graft survival rate of the one-step group and the two-step group was 11 (84.62%) and 1 (20.00%), respectively ($P = 0.01$). (3) In the second case, the average time of first fungal clearance in the one-step group and the two-step group was 0.37 ± 0.39 months and 1.69 ± 1.14 months, respectively, and the difference was statistically significant ($P < 0.001$). The number of patients with fungal recurrence in the one-step group and the two-step group was 4 (14.81%) and 0 (0.00%), respectively, and the difference was statistically significant ($P = 0.05$). There were 17 cases (62.96%) and 19 cases (82.61%) of rejection in the one-step group and the two-step group, respectively. The

average time of rejection was 4.77 ± 3.19 months and 3.13 ± 3.59 months, respectively, and the difference was not statistically significant ($P=0.12$). The 1-year graft survival rates of the one-step group and the two-step group were 11 (40.74%) and 6 (26.09%), respectively, without a significant difference ($P=0.062$).

Conclusions: (1) In the first case, the first time of fungal clearance in the one-step group was significantly shorter than that in the two-step group, the rejection rate in the one-step group was lower than that in the two-step group, and the 1-year survival rate in the one-step group was significantly higher than that in the two-step group. (2) In the second case, the first fungal clearance time of the one-step group was significantly shorter than that of the two-step group, the fungal recurrence rate of the one-step group was higher than that of the two-step group, and the 1-year graft survival rate was similar between the two groups.

Abstract No.: 206416

Clinical Efficacy of Platelet-Rich Plasma in the Treatment of Severe Dry Eye Secondary to Sjögren's Syndrome

First Author: Jianzhang YE

Co-Author(s): Jiannan LIU

Purpose: To evaluate the efficacy and safety of platelet-rich plasma (PRP) in treating severe dry eye secondary to Sjögren's syndrome.

Methods: A retrospective study was conducted at Dongguan Aier Eye Hospital from May 2023 to April 2025, including 53 patients with severe dry eye. The PRP group ($n=29$) received topical PRP (4 times/day), while the control group ($n=24$) received autologous serum (4 times/day). Both groups were additionally treated with cyclosporine eye drops (2 times/day) and carbomer gel (once nightly) for 8 weeks. Outcomes assessed included Schirmer's test, tear breakup time (TBUT), conjunctival hyperemia, corneal staining, tear lymphotoxin- α concentration, OSDI score, and adverse events.

Results: Baseline characteristics were comparable. After treatment, Schirmer's test and TBUT showed no significant difference ($P>0.05$). However, the PRP group had significantly lower conjunctival hyperemia, corneal staining scores, tear lymphotoxin- α levels, and OSDI scores compared with the control group ($P<0.05$). No adverse events occurred in either group.

Conclusions: PRP effectively improves signs and symptoms of severe dry eye in patients with Sjögren's syndrome, with no observed adverse reactions.

Abstract No.: 208188

Comparative Analysis of Ocular Surface Signs Associated With the Severity of Dependence Scale and Ocular Surface Disease Index in Cocaine, Methamphetamine and Poly-Substance Users

First Author: Hoi Nap TSANG

Co-Author(s): Kelvin KI CHONG, Kenneth Ka Hei LAI, Calvin Cp PANG, Stephany Wing Lam TAI, Clement Cy THAM

Purpose: To compare how the Severity of Dependence Scale (SDS) and standard reporting of Ocular Surface Disease Index (OSDI) each associate with clinical signs of Dry Eye Disease (DED) in cocaine, methamphetamine and poly-substance users.

Methods: A cross-sectional study was conducted on primary users of cocaine, methamphetamine, and poly-substance users who reported a use frequency of equal to or more than twice per month over 6 months within the last 2 years. Exclusions: other psychotic drug use and history of ocular surgery. SDS and OSDI scores were correlated with tear meniscus height, bulbar redness grading and non-invasive keratography break-up time by Keratograph® 5M, Lipid Layer Thickness by LipiView® II, Schirmer's test, pupil size by NeuroLight Pupillometer, and slit-lamp examination conducted by ophthalmologists.

Results: Comparison included right eyes of forty-one substance users (aged 39 ± 9 years; 25 male), comprising 7 cocaine, 12 methamphetamine and 22 poly-substance users. SDS and OSDI were not correlated ($P=0.109$). Significant correlations were observed between SDS and staphylococcal lash crusting ($r=0.330$, $P<0.05$), as well as demodex cylindrical collarettes ($r=0.345$, $P<0.05$). Neither was associated with the substance-use group suggested by Chi-Square analysis ($P=0.77$). Comparatively, OSDI correlated significantly with pupil size ($r=0.428$, $P<0.01$), bulbar conjunctival hyperaemia ($r=-0.349$, $P<0.05$), and lower tear meniscus height ($r=-3.76$, $P<0.05$).

Conclusions: Association between SDS and asymptomatic Meibomian Gland Dysfunction is established, suggesting a reduced adherence to ocular hygiene. This is distinct from the symptomatic DED signs correlated with the standard OSDI, demonstrating that addiction severity provides novel clinical insights beyond symptomatic reporting. Such results warrant future research with larger sample sizes.

Abstract No.: 203660**Comparative Therapeutic Potential of Keratocytes and Stem Cells in Corneal Stromal Repair***First Author: Qianwen GONG**Co-Author(s): Liang HU, Jodhbir MEHTA, Andri RIAU*

Purpose: To evaluate the comparative effects of corneal stromal keratocytes (CSK), corneal stromal stem cells (CSSC), and human umbilical cord mesenchymal stem cells (UCMSC) on corneal opacity.

Methods: We investigated the therapeutic potential of the three cell types following intrastromal injection in our validated rat model of corneal haze induced irregular phototherapeutic keratectomy (irrPTK). A multimodal analytical framework was employed, including clinical imaging via slit-lamp biomicroscopy, anterior segment-optical coherence tomography (AS-OCT), and in vivo confocal microscopy (IVCM), along with ultrastructural characterization with small-angle X-ray scattering (SAXS) and transmission electron microscopy (TEM).

Results: We found pronounced central stromal haze in untreated Injured eyes, which persisted in the PBS and SF groups. The UCMSC group showed variable improvement, with some corneas displaying partial central clearing but others retaining dense opacity. In contrast, CSK- and CSSC-treated corneas appeared clearer, with stromal transparency closely resembling that of normal controls. In the normal group, collagen fibrils were densely packed, forming a regular lamellar structure. In the Injured group, large collagen-free “lakes” were observed throughout the stroma, indicating significant disruption of the extracellular matrix. In contrast, the CSK, CSSC, and UCMSC groups showed markedly improved stromal architecture, with collagen fibrils reorganized into rather a compact and organized manner, resembling the Naïve group. CSSC and UCMSC groups, collagen fibrils were generally well defined and regularly aligned, but appeared slightly less compacted as compared to the Naïve and CSK groups.

Conclusions: CSK injection resolved corneal scarring, while the other two stem cells have comparative but some variable effects.

Abstract No.: 200735**Comprehensive Bioinformatics Analysis to Reveal Key Non-Coding RNA Biomarkers of Keratoconus (KC) Patients***First Author: Jingwen WANG**Co-Author(s): Ying LI, Shuai OUYANG, Jia QU*

Purpose: This study aimed to reveal core non-coding RNA biomarkers and hub competitive endogenous RNA (ceRNA) network and explored the potential regulatory mechanisms of ceRNA in KC patient.

Methods: The high-throughput sequencing datasets were analyzed to screen core non-coding RNA biomarkers for KC patients.

Results: We revealed that 428 differentially expressed mRNA and 68 differentially expressed lncRNA were shared between the public datasets. Functional enrichment results innovatively showed that the ubiquitin-dependent protein catabolic process, NF- κ B signaling and neurodegenerative pathway was upregulated in KC patients. In addition, we uncovered the top 20 hub genes in which FBXW11, FBXO9, RCHY1, and CD36 were validated by qPCR. Moreover, we innovatively discovered four core miRNAs (miR-4257, miR-4494, miR-4263, and miR-4298) and constructed a ceRNA network that contained 165 mRNA, eight lncRNAs, and four core miRNAs. Finally, we proposed a potential regulatory mechanism for KC.

Conclusions: We uncovered miR-4257, miR-4494, miR-4263, and miR-4298 could be valuable biomarkers and provided core RNAs therapeutic targets for KC patients.

Abstract No.: 207066**Conventional Corneal Collagen Cross-Linking Versus Accelerated Corneal Collagen Cross-Linking in Progressive Keratoconus: A Comparative Study***First Author: Madhusmita MAHAPATRA**Co-Author(s): Balmukund AGARWAL, Ankit AHIR, Harsha BHATTACHARJEE, Sangeeta KALITA*

Purpose: To compare the conventional corneal collagen cross-linking (C-CXL) with accelerated corneal collagen cross-linking (A-CXL) in terms of efficacy in cases of progressive keratoconus. Primary objectives: 1. To study the effect of the C3R on corneal curvature and corneal thickness in conventional and accelerated approaches. 2. Changes in topographical indices and endothelial cell density after the C3R procedure. Secondary objective: To study the effect of accelerated and conventional corneal collagen cross-linking (CXL) on the visual status.

Methods: We have taken 54 eyes of 52 patients with progressive keratoconus and have randomly assigned them to two groups, i.e., conventional C3R (C-CXL) and accelerated C3R(A-CXL). All the patients underwent standard clinical examination for the diagnosis of keratoconus. Pentacam and specular microscopy have been used to collect all the data. CXL system (PESCHSE, Germany, model UV-X-1000, using UV-A) was used in this study.

Results: The comparison of both CXL treatments in our study has shown promising results and supported the efficacy of the treatment. In case of acceptance cylinder correction, the changes were more significant in C-CXL than A-CXL at all visits, showing more efficacy of C-CXL in decreasing the cylinder power in treated eyes. Both C-CXL and A-CXL procedures are safe and

efficacious. Accelerated C3,R being faster than the conventional CXL procedure, is more beneficial for both patient and surgeon.

Conclusions: To conclude, Collagen Crosslinking treatment seems to be an effective conservative management option in halting the disease progression in keratoconus. It improves vision by significantly reducing the spherical power and astigmatism.

Abstract No.: 206478

Cornea Thickness and Curvature in Elderly Patients With Dry Eye Disease Versus Age-Matched Controls

First Author: Ka Yu Vanessa CHEUNG

Co-Author(s): Kendrick CO SHIH

Purpose: To evaluate and compare cornea thickness and curvature in Chinese elderly patients with dry eye disease versus age-matched controls.

Methods: This cross-sectional, random population-based study included Chinese subjects aged ≥ 50 between 27 September 2021 and 31 August 2023. In total, 1209 consecutive subjects underwent comprehensive dry eye assessment in order from least to most invasive, including dry eye questionnaire (OSDI score), non-invasive keratographic tear breakup time, tear meniscus height, and NEI cornea staining score. The OCULUS Keratograph 5M was used to determine OSDI, non-invasive keratographic tear breakup time, and tear meniscus height. Dry eye was defined per the Asia Dry Eye Society criteria. Swept Source-Optical Coherence Tomography was used to determine central cornea thickness (CCT), cornea astigmatism, average K, and KMax values. The right eye was used for analysis.

Results: Of 1209 subjects, 244 had dry eye disease, and 965 served as controls. The mean CCT was found to be significantly lower in dry eye patients (0.528 ± 0.067 mm) compared to controls (0.536 ± 0.044 mm). Cornea astigmatism was noted to be significantly higher in dry eye disease (0.858 ± 0.725 diopter) compared to controls (0.762 ± 0.639 diopter). No significant differences were observed in KMax and average K values between groups.

Conclusions: Elderly patients with dry eye disease had thinner corneas and greater corneal astigmatism compared to controls. Differences in cornea thickness and curvature may play a role in predisposing certain patients to dry eye disease. When investigating the underlying etiology of dry eye disease in patients, it is worthwhile to consider the possible impact of cornea shape on tear film stability.

Abstract No.: 207210

Corneal Biomechanics and Ocular Biometrics in Thyroid Eye Disease: A Systematic Review and Meta-Analysis

First Author: Fatema ALJUFARI

Co-Author(s): Kelvin, Kam Lung CHONG, Kenneth LAI, Chi PANG, Clement THAM

Purpose: This systematic review evaluated corneal biomechanics and ocular biometrics in TED.

Methods: A comprehensive search of PubMed, Web of Science, Medline via EBSCOhost, Medline Ovid, Scopus, and the Cochrane Library identified 727 articles; after removal of 152 duplicates and application of eligibility criteria, 18 studies were included. These studies investigated corneal biometric and biomechanical parameters in relation to TED activity, severity, treatment effects, and thyroid function status. Ocular assessments encompassed biometric, endothelial, topographic, tomographic, and biomechanical measures to assess structural and functional changes.

Results: TED was consistently associated with reduced corneal hysteresis and resistance factor, increased endothelial cell size variability, epithelial thinning, and keratoconus-like tomographic patterns, many of which progressed with disease severity. Orbital decompression induced further alterations, including axial length changes and shifts in dynamic corneal response metrics. Collectively, these findings highlight the potential of corneal biomechanical and tomographic indices as non-invasive tools for early detection, disease monitoring, and surgical planning in TED.

Conclusions: This systematic review and meta-analysis demonstrates that TED is associated with significant corneal structural and biomechanical alterations, including reduced corneal hysteresis and resistance factor, epithelial thinning, endothelial cell variability, and keratoconus-like tomographic changes that progress with disease severity. These findings suggest that corneal indices may serve as valuable biomarkers for early detection, disease monitoring, and risk assessment, while also guiding surgical planning and postoperative evaluation. The observed biomechanical shifts following orbital decompression further highlight the dynamic nature of corneal responses in TED and the importance of individualized ocular assessment.

Abstract No.: 202815

Corneal Lesion Characteristics in Microsporidial Keratoconjunctivitis

First Author: Thi Nga Duong NGUYEN

Co-Author(s): Thi Thu Thuy NGUYEN, Ngoc Dong PHAM, Huyen Trang TRAN

Purpose: To describe the morphological features of corneal lesions in patients with microsporidial keratoconjunctivitis.

Methods: A cross-sectional descriptive study was conducted on patients with microsporidial keratoconjunctivitis at Vietnam National Eye Hospital from January 2025 to August 2025. Collected data included: age, gender, duration of disease, onset factors, prior medications, visual acuity, and the morphological features of corneal epithelial lesions classified according to the criteria proposed by Amrita Mohanty MS et al. (2021).

Results: A total of 46 eyes from 41 patients (11 males, 30 females) were included, and the mean age was 17.31 years (11-80). Corneal epithelial lesions were categorized into three main morphological groups: 33 eyes (71.7%) in type 1, 1 eye (2.2%) in type 2, and 12 eyes (26.1%) in type 3. The most common were subtypes 1b and 1c, with each accounting for 11 eyes (23.9%). There were no significant differences among the types regarding age, gender, duration, previous medications, BCVA, or the severity of conjunctival congestion, corneal edema, and anterior chamber reaction. Subtype 1a had the highest rate of post-traumatic onset (80%). Conjunctival edema was most common in type 1 and was most frequently observed in subtypes 1b and 1c. The longest treatment duration was for subtype 1d (35.4 days), while the shortest was for 1b and 1c (9.22 and 8.04 days, respectively).

Conclusions: The corneal epithelial lesions of microsporidial keratoconjunctivitis present with diverse morphological features. Traumatic factors and conjunctival lesions are associated with the clinical manifestations of the disease.

Abstract No.: 208314

Corneal Toxicity of Belantamab Mafodotin in Relapsed Myeloma: A Longitudinal Clinical Analysis

First Author: Jing **TANG**

Co-Author(s): Hao **ZHANG**

Purpose: To characterize the incidence, progression, and reversibility of belantamab-associated keratopathy.

Methods: Prospective cohort study (May 2021-March 2025) at West China Hospital. Eight relapsed/refractory myeloma patients receiving BM underwent triweekly comprehensive ophthalmic evaluations. A key component of these evaluations was in vivo confocal microscopy, used to characterize and track the progression of belantamab-associated keratopathy at the cellular level.

Results: Among evaluable patients (median age 61.0, 87.5% male), 67% (4/6) developed keratopathy at first exposure (median onset: 17.0 days). Four patients (50%) developed corneal AE within 29 days of initial BM administration (median onset: 17.0 days), presenting with foreign body sensation (75%), dry eye (75%), and blurred vision (50%). In vivo confocal microscopy revealed that the presence of hyperreflective vesicles

in the corneal epithelium, neuropathic changes in Bowman's layer and stromal cell injury, which were associated with cumulative drug exposure. All corneal adverse events necessitated treatment interruption, with symptom recurrence upon rechallenge at reduced doses. Two long-term treated patients (31 months for one patient and 41 months for the other) exhibited irreversible epithelium, Bowman's layer and stroma off-target injury, persisting at final follow-up.

Conclusions: Belantamab mafodotin induces progressive, potentially incomplete irreversible corneal toxicity in most treated patients, with severity linked to treatment duration. Early confocal microscopy detects subclinical microcysts preceding visual symptoms. These findings advocate for ophthalmologic surveillance during treatment cycles, including cornea detection performed by corneal confocal microscopy.

Abstract No.: 203097

Deciphering Mitochondrial Dysfunction in Keratoconus: Insights Into ACSL4 From Machine Learning-Based Bulk and Single-Cell Transcriptome Analyses and Experimental Validation

First Author: Tianyi **ZHOU**

Co-Author(s): Yuchen **CAI**

Purpose: Keratoconus (KC) is a prevalent ectatic corneal disease and the leading cause of corneal transplantation globally. Despite evidence of mitochondrial abnormalities in KC, the underlying mechanisms remain unclear. Our aim was to investigate the role of mitochondrial dysfunction in this pathological condition.

Methods: Based on transcriptomics datasets of KC, mitochondria-related differentially expressed genes (mDEGs) were identified and analyzed for potential functional pathways, protein-protein interaction (PPI), and gene regulatory networks. Hub genes were further screened and validated by multiple machine learning (ML) algorithms, followed by a comprehensive visualization of the single-cell atlas and immune landscape. Additionally, bioinformatic results were validated through quantitative PCR, Western blot, and transcriptomics analysis in an in vitro KC model based on matrix stiffness using human stromal keratocytes.

Results: In total, 104 mDEGs were identified, enriched in pathways related to oxidative stress, apoptotic mitochondrial changes, ferroptosis, and inflammatory responses. Nine characteristic genes (CYP24A1, ACSL4, ACADL, HELZ2, AMT, DEPTOR, TUBA1A, TYMS, and ACSL5) were selected and validated using multiple ML models. Single-cell sequencing data highlighted ACSL4 as the most promising biomarker, primarily expressed in corneal stromal cells (CSCs). Immune infiltration analysis revealed that ACSL4 was positively associated with monocytes and negatively correlated with eosinophils in KC. In cellular experiments, ACSL4

expression was significantly upregulated in response to decreased substrate stiffness, suggesting its critical role in KC development.

Conclusions: These findings suggest a mitochondrial-related molecular mechanism implicated in KC pathogenesis. The identified pivotal biomarker ACSL4 provides a novel framework for future mechanistic and therapeutic studies of KC.

Abstract No.: 200446

Dematiaceous Fungi in the Eye: Emerging Threats and Antifungal Resistance From South India

First Author: Joveeta **JOSEPH**

Co-Author(s): Bhupesh **BAGGA**, Sourav **DAS**

Purpose: Ocular mycoses are a major cause of corneal blindness globally. Dematiaceous molds are the third most common fungal pathogens in keratitis and are increasingly associated with antifungal resistance, despite the lack of defined clinical breakpoints. This study evaluated species diversity and antifungal susceptibility profiles of melanized fungi causing ocular infections.

Methods: A total of 151 dematiaceous fungal isolates (Jan 2022–Mar 2025) from ocular infections were subjected to antifungal susceptibility testing (AFST) per CLSI M38 guidelines. Identification was based on LPCB mount and ITS sequencing, with phylogenetic analysis performed for 20 nonsporulating or rare isolates.

Results: Dematiaceous fungi were predominantly isolated from keratitis and included members from multiple taxonomic orders, with Pleosporales (43%) being the most common. *Curvularia* was the leading genus, followed by *Bipolaris*, *Exserohilum*, and *Colletotrichum*. Natamycin showed the least in vitro activity (MIC_{50}/MIC_{90} : 8/32 $\mu\text{g/ml}$), while voriconazole was the most active (0.12/4 $\mu\text{g/ml}$), followed by ketoconazole (0.25/4 $\mu\text{g/ml}$). Caspofungin had a high MEC_{90} (16 $\mu\text{g/ml}$). Posaconazole, amphotericin B, and itraconazole showed moderate activity (MIC_{90} : 8 $\mu\text{g/ml}$). Notably, 4.6% of isolates were pan-resistant. Sordariales were susceptible to all antifungals except natamycin, while Microascales, Glomerellales, Botryosphaerales, and Pleosporales showed higher resistance. Rare genera identified via phylogenetics included *Podospira*, *Humicola*, *Canariomyces*, *Cladosporium*, *Colletotrichum*, *Corynespora*, *Macrohomina*, and *Edenia*.

Conclusions: Voriconazole demonstrated the best in vitro activity against dematiaceous ocular pathogens, while natamycin was least effective. Large-scale AFST data help inform evidence-based antifungal choices, especially in the context of rare or resistant species.

Abstract No.: 202881

Demographic, Microbiological and Management Profile of Infective Corneal Ulcer at a Tertiary Center in Bangladesh

First Author: Rajashree **DAS**

Co-Author(s): Nawreen **ANWAR**

Purpose: To assess the demographic, microbiological and management profile of infective corneal ulcer at presentation.

Methods: Clinically diagnosed infective corneal ulcer patients were included in this prospective longitudinal study. Demographic profile, causative organisms, clinical signs, and treatment profile were the outcome variables of this study. Patients were clinically diagnosed as bacterial, viral, and fungal corneal ulcer after fluorescein dye test and slit lamp examination. Corneal scraping specimens were sent for microbiological examination for Gram staining, KOH initially, and Calcofluor White Staining whenever necessary. Culture-negative ulcers were treated as per clinical diagnosis. Patients were followed up for 1 month. Surgical measures were performed in cases with perforation or impending perforation.

Results: The overall mean age was 48.72 ± 16.95 years. Male: female ratio was 1.7:1. Majority (66.7%) of the patients came from rural areas. Fungal corneal ulcer had the highest incidence (52%) followed by bacterial corneal ulcer (18.1%). *Aspergillus* was the most common causative organism (38.9%) followed by *Fusarium* (13.9%), Gram positive cocci (12.5%), virus (4.2%) and candida (4.2%). In about 20.8% cases no causative microorganism could be isolated. Bacterial corneal ulcer had better response (92.3%) to medical management than Fungal corneal ulcer (71.2%). Fungal corneal ulcer required more surgical interventions than other corneal ulcers within 1 month of their initial presentation. Presence of hypopyon and fungal corneal ulcer were not statistically significant predictive factors for perforation and the need for surgical intervention.

Conclusions: *Aspergillus* keratitis is the most common infective keratitis presented in this study. Males and rural people had higher rate of infective keratitis.

Abstract No.: 201693

Descemet Stripping Only for Fuchs Endothelial Corneal Dystrophy in Chinese: A Five-Year Experience

First Author: Vanessa Ws **CHOW**

Co-Author(s): Jacqueline Wt **CHAN**, Julia Yy **CHAN**, Ke LIU, Rachel Wy **TSUI**, Vincent Lc **YUEN**

Purpose: To assess the clinical outcomes of Descemet stripping only (DSO) in the treatment of Fuchs endothelial corneal dystrophy (FECD) in the Chinese population, and to identify preoperative factors predictive of surgical success.

Methods: This retrospective cohort study included all patients who underwent DSO at the Hong Kong Eye Hospital from 2020 to 2025. Patient records were reviewed for demographic data, pre- and postoperative ocular parameters, including best-corrected visual acuity (BCVA), corneal clearance, central corneal thickness (CCT), endothelial cell density by specular microscopy, and use of ripasudil. The primary outcome was corneal clearance following DSO. Secondary outcomes included predictive factors of corneal clearance and BCVA over the follow-up period.

Results: A total of 20 eyes from 17 patients were included. All patients were ethnic Chinese, with a mean follow-up duration of 14.3 months and 25% (n=5) were followed for over 2 years. Corneal clearance was achieved in 50% (n=10) of cases, with a mean time to clearance of 7.3 weeks. BCVA improved in 55% (n=11) of cases, which sustained up to 24 months postoperatively (mean increase in logMAR 0.152, $P = 0.030$). Preoperative BCVA was significantly associated with successful corneal clearance ($P = 0.048$), whereas age, preoperative CCT, preoperative endothelial cell density, concomitant cataract surgery, and use of ripasudil were not predictive.

Conclusions: This is the first study to report outcomes of DSO in Chinese with FECD. Preoperative BCVA is significantly associated with surgical success and should be considered as a prognostic factor during evaluation for surgery.

Abstract No.: 203703

Development and Temporal Validation of an Interpretable Machine Learning Model for Long-Term Graft Survival Prediction of Moderate to High Risk Penetrating Keratoplasty

First Author: Zhewen **ZHENG**

Co-Author(s): Xueqin **GONG**

Purpose: To develop interpretable machine learning models for predicting the long-term graft survival probabilities of moderate to high-risk penetrating keratoplasty (PK).

Methods: We collected clinical features and survival status of moderate to high-risk grafts that underwent PK at Zhongshan Ophthalmic Center from January 2012 to December 2021. Feature selection was performed through multivariate Cox regression. Five machine learning prediction models were developed based on these predictors. Model performance was assessed through area under the receiver operating characteristic curve (AUC), calibration curves, and decision curve analysis (DCA). The final model was interpreted using the ranking of variable importance and implemented as a web-based platform.

Results: The study cohort comprised 2,298 grafts undergoing moderate to high risk penetrating

keratoplasty (PK) at Zhongshan Ophthalmic Center, divided into three datasets: training (n=1,338), internal validation (n=573), and temporal external validation (n=387). Six independent predictors for moderate to high risk penetrating keratoplasty were identified. Five machine learning models were constructed using these predictors, among which the random survival forest (RSF) model demonstrated superior performance in predicting graft survival in the internal validation set (7-year AUC=0.852). The RSF model maintained outstanding performance in the external validation set with an AUC of 0.810. Variable importance ranking identified 'the quadrants of corneal neovascularization' and 'recipient graft size' as dominant prognostic contributors. Additionally, we developed a web based on the RSF model for clinical use: https://webs-pred.shinyapps.io/RSF_model/.

Conclusions: The RSF model developed based on these risk factors demonstrated excellent predictive accuracy for long-term graft survival rates of moderate to high risk penetrating keratoplasty patients.

Abstract No.: 200601

Diabetic Corneal Neuropathy Precedes and Is Linked With Diabetic Retinopathy

First Author: Chang **LIU**

Co-Author(s): Ching-yu **CHENG**, Isabelle Xin Yu **LEE**, Yu-chi **LIU**, Cancan **XUE**, Mingyi **YU**

Purpose: To investigate the relationship between diabetic corneal neuropathy (DCN) and diabetic retinopathy (DR) by examining corneal nerve imaging features, clinical manifestations, and tear mediators in patients with type 2 diabetes.

Methods: This cross-sectional study included 1654 eyes of 822 participants. All subjects underwent ocular surface subjective and objective assessments and fundus examination. In-vivo confocal microscopy (IVCM) scans were performed to assess 7 corneal nerve metrics, 5 dendritic cell variables, and 3 microneuroma parameters. Tear cytokines were analyzed using an enzyme-linked immunosorbent assay.

Results: Compared to controls, eyes with no DR, non-proliferative DR (NPDR) and proliferative DR (PDR) had significantly impaired corneal nerve metrics (all $P < 0.001$). As DR progressed, eyes with NPDR and PDR showed a significant reduction in corneal nerve parameters compared to those with no DR ($P < 0.050$). Furthermore, PDR eyes presented significantly worse ocular surface clinical manifestations than controls, as well as eyes with no DR and NPDR (all $P < 0.005$). Tear Substance P concentrations were significantly lower across all stages of DR compared with controls (all $P < 0.001$), and tear MMP-9 concentrations were significantly increased in PDR eyes (all $P < 0.050$). These cytokines were significantly correlated with corneal nerve parameters and ocular surface assessments.

Conclusions: DCN precedes the onset of DR, and the impairment of corneal nerves worsens with the progression of retinopathy. Corneal nerve status holds the potential as an early indicator and predictor for DR.

Abstract No.: 206222

Diagnostic Accuracy of the 'Hong Kong Workflow' in Diagnosing Dry Eye Disease in a Hong Kong Population-Based Study

First Author: Shing Wai Joselyn **CHENG**

Co-Author(s): Arthur Chak Kwan **CHENG**, Kendrick Co **SHIH**

Purpose: The 2024 'Hong Kong Streamlined Dry Eye Workflow' streamlines dry eye diagnosis, severity grading, and classification in busy high-volume outpatient clinics. This study investigates its accuracy with reference to the optimal workflow, based on the Asia Dry Eye Society guidelines, as the gold standard.

Methods: This cross-sectional random population-based study initiated on 27 September 2021 and is ongoing. Chinese subjects aged 50+ were recruited through randomized mail invitations in Hong Kong's Southern District. Response rate was 96%, and cooperation rate was 49%. In total, 1075 consecutive subjects underwent comprehensive dry eye assessment from least to most invasive, including dry eye questionnaire (OSDI score), non-invasive keratographic tear breakup time, tear meniscus height, NEI cornea staining score, and meiboscore. We compared the accuracy of two proposed Hong Kong workflows (optimal vs streamlined) in diagnosis, classification, and severity grading. Optimal workflow requires OSDI score, tear breakup time (TBUT), staining, and tear volume measurements, and is based on the Asia Dry Eye Society guidelines, while the streamlined workflow needs only some dry eye symptoms in combination with TBUT and staining.

Results: The optimal workflow diagnosed dry eye disease in 15.6% of subjects, while the streamlined workflow diagnosed it in 10.9% of subjects. Overall, the streamlined pathway had 69.6% sensitivity, 100% specificity, and 95.3% accuracy ($df=1$, $p<0.001$) versus the optimal pathway, missing 51 cases. AUC was 0.760 (95% CI: 0.717-0.802, $p<0.001$) for the accuracy of the streamlined pathway result matching the optimal pathway result, showing only moderate performance. Among diagnosed dry eye disease cases, severity distributions were similar (optimal: mild 26.8%, moderate 13.7%, severe 59.5%; streamlined: mild 19.7%, moderate 19.7%, severe 60.7%; chi-square >39 , $p<0.001$). Regarding dry eye type classification, distributions between the two pathways were similar, but the streamlined pathway had marginally higher ADDE and lower DWDE proportions.

Conclusions: The streamlined pathway showed high specificity but low sensitivity for dry eye diagnosis. It performed similarly in classification and severity

grading to optimal. Therefore, the streamlined pathway suits monitoring/follow-up more than initial diagnosis. We still recommend the optimal pathway for the initial screening of symptomatic patients.

Abstract No.: 206267

Drug Depository (Reservoir) Contact Lens Reduces Antimicrobial Treatment Burden in Bacterial Keratitis: Results of a Randomized Controlled Study

First Author: Lional Raj **DANIEL RAJ PONNIAH**

Purpose: Microbial keratitis can lead to unilateral blindness, but drug delivery options are limited. Therefore, we evaluated the efficacy of a novel therapeutic drug-depository contact lens (DDCL) as an anti-microbial reservoir for bacterial keratitis (BK) treatment & its role in reducing the treatment burden. The lens was designed to increase the corneal lesion drug interaction time.

Methods: An open-labelled randomized controlled study to compare topical antimicrobial administration and antimicrobial administration with DDCLs for treating BK. Bacterial Keratitis (BK) patients were randomized (1:1) into two groups: topical antimicrobial treatment only, with an intensive loading dosage of hourly for the first two days and 2-hourly for the next 12 days (Group 1), and DDCL plus reduced antimicrobial treatment with 2-hourly for the first two days followed by 4-hourly for next 12 days (Group 2). Both groups received 0.5 % moxifloxacin. We evaluated BK recovery, anterior chamber (AC) reactions, corneal haze, and pain (on a 10-point scale) 12 hours and 1, 3, 5, and 14 days after treatment.

Results: The baseline corneal-infiltration (i.e., BK severity) values were comparable for Groups 1 (18 cases) and 2 (17 cases) ($P = 0.92$). After 12 hours, the scores improved in both groups and continued to improve throughout the follow-up period; the improvements were more pronounced in Group 2 than in Group 1 (all $P < 0.05$). Complete recovery occurred on Days 14 and 5 in Groups 1 and 2, respectively. Furthermore, the AC reaction was resolved by Day 3 in Group 2. The baseline pain scores were also comparable between Groups 1 and 2 ($P = 0.52$) and decreased throughout the follow-up period (all $P < 0.05$); the decrease was more pronounced in Group 2.

Conclusions: Novel DDCLs augment the drug-lesion interaction time by prolonging corneal antimicrobial availability, which hastens corneal healing in Bacterial Keratitis. Thus, a DDCL may decrease the antibiotic regimen and improve patient tolerance, eliminating the necessity for a loading dose.

Abstract No.: 206935**Dry Eye Disease in Cocaine and Methamphetamine Users: The Influence of Use Chronicity***First Author: King Him Cyrus **CHEUNG****Co-Author(s): Kam Lung Kelvin **CHONG**, Ka Hei Kenneth **LAI**, Chi Pui Calvin **PANG**, Chee Yung Clement **THAM*****Purpose:** To evaluate the impact and long-term effects of substance use on dry-eye disease parameters.**Methods:** Cross-sectional study of cocaine and methamphetamine users in the prior 24 months from CCPSAs under the support of Beat Drugs Fund (BDF210067). Symptoms were quantified through the Ocular Surface Disease Index (OSDI), dry-eye parameters were assessed through OCULUS_Keratograph_5M, TearScience™ LipiView™ II Interferometer, and the degree of MGD was examined by ophthalmologists.**Results:** Forty-six right eyes from substance-users (10 cocaine, 20 methamphetamine, 16 poly-substance) and 46 age-sex-matched controls (age: 36.50(44.25-31.00) years; $p=0.928$) were compared. Post-hoc analysis specified poly-substance users had worse OSDI (24.03(60.80-13.98) vs. 6.25(18.75-0.00); adj. $p=0.003$) and more meibomian gland capping (1.50(2-1) vs. 1.00(1-0); adj. $p=0.041$) compared to control. Overall group comparisons for First_NIKBUT($p=0.039$) and Meibomian_Gland_Yielding_Secretion_Score($p=0.048$) were significant, with substance-users showing lower-scores. However, no significant group-to-group differences were found. Pure-cocaine and methamphetamine users were stratified into long- and short-term use groups. Long-term-users have a lower Lipid_Layer_Thickness (LLT_Avg) compared to short-term-users (54.50(63.50 - 43.25) vs. 72.50(91.75-54.25); $p=0.040$). OSDI was also significantly lower for long-term-users (10.89(25.52-4.45) vs. 42.52(56.93-18.23); $p=0.003$). Long-term-users also presented a lower score for individual symptoms of sensitivity-to-light (0(0.00-0.00) vs. 2.00(3.75-0.00); $p=0.027$) and poor-vision (0.50(1.25-0.00) vs. 2.50(3.75-1.00); $p=0.024$). Correlation-analysis suggests chronicity is negatively-correlated with both LLT_Avg ($r = -0.383$, $p=0.036$) and OSDI ($r = -0.532$, $p=0.003$).**Conclusions:** Substance use is associated with a compromised ocular surface, with clear evidence of MGD, particularly in poly-substance users who exhibited more severe signs and symptoms. Among long-term users, despite worse objective parameters, fewer subjective symptoms were reported, including less light sensitivity and perceived poor vision, suggesting sign-symptom disparity. The potential substance-induced neurotrophic effect that developed over long-term use warrants further investigation.**Abstract No.: 209720****Effect of Different Fibroblast Subtypes in Corneal Transplant Rejection***First Author: Shudan **WANG****Co-Author(s): Hong **ZHANG*****Purpose:** Corneal transplant rejection has remained a major challenge in recent years. This study seeks to explore the functions of different types of fibroblasts in corneal transplantation, aiming to uncover their role in modulating immune responses and improving graft survival outcomes.**Methods:** C57BL/6 mice were selected as donors and BALB/c mice were selected as recipients to establish a mouse allogeneic corneal transplantation model. The cornea was obtained at the sixth week after surgery. High-quality transcriptomes were generated from single-cell RNA sequencing (scRNA-seq) data from 18 mouse corneas in each group. Cluster analysis was performed on the scRNA-seq data by known cell marker genes in order to identify different cell types. Immunofluorescence was used to verify the cell subtypes.**Results:** Eight cell types, including epithelial cells, fibroblasts, endothelial cells, T cells, macrophages, neutrophils, vascular endothelial cells, and schwann cells, were detected in the cornea after corneal transplant. Fibroblasts were divided into four clusters based on differences in cell gene expression, namely antigen-presenting cell (APC) type, inflammatory type, angiogenic type, and myofibroblasts. Additionally, we observed a significant increase in the proportion of inflammatory fibroblasts and myofibroblasts in the rejection group. Immunofluorescence verified the above four subtypes with Mrc2, Ly6c, Gpc, and α SMA, respectively. Th1 cells and fibroblasts showed strong connection networks, especially in VCAM, TGF β , and SEMA4 pathways.**Conclusions:** In conclusion, we applied scRNA-seq to rejection after corneal transplantation to deconstruct its heterogeneity. This study facilitates the understanding of the pathogenesis of corneal transplant rejection and identifies new targets for personalized therapeutic approaches.**Abstract No.: 207479****Effect of Limbal Stem Cell Deficiency on the Cosmesis Results Following Corneal Tattooing: A Retrospective Analysis***First Author: Raj Shekhar **PAUL*****Purpose:** To report corneal tattooing or keratopigmentation (KP) cases and their follow-up in the past 3 years. This study highlights the techniques, intraoperative and postoperative complications, and suggests measures for better aesthetic outcomes.

Methods: A total of 24 eyes (n=24) were included in this retrospective, hospital-based study conducted at an Eastern Indian tertiary care centre from December 2021 to November 2024. Preoperative anterior segment examination also included ocular surface staining, limbus analysis, pachymetry and intraocular pressure. Most eyes (n=18) underwent automated superficial KP; two underwent manual intrastromal KP. In 21 eyes, a commercially available India Ink dye was used for KP. In one eye, freshly prepared soot was used for manual intrastromal KP. Following a clinical grading of Limbal stem cell deficiency (LSCD), the eyes were classified into mild, moderate, and severe.

Results: There were fourteen males and ten females, aged 18 to 40. The most common preoperative ocular condition seeking cosmesis was post-traumatic corneal opacity (47.6%). Fourteen eyes had satisfactory cosmesis noted in their follow-up visits. Concerning complications were intraoperative perforation (n=1), corneal ulcers (n=2), immediate fading of dye (n=3), corneal melt with perforation (n=2), and endophthalmitis (n=1). 80% of eyes classified as severe LSCD had poor cosmesis following KP.

Conclusions: There was an overall increase in our success rate and reproducibility, with a notable decrease in fading (33% in the first year versus 14% in the last year), once ancillary surgeries such as pre-operative diamond burr polishing, amniotic membrane transplantations, and concurrent tarsorrhaphies were performed to combat ocular surface irregularities.

Abstract No.: 205149

Effect of Preservative-Free Versus Preserved Diquafosol Sodium 3% Eye Drops on Tear Film Inflammatory Markers and Clinical Severity of Dry Eye Disease: A Single-Center Randomized Controlled Trial

First Author: Joanna Mae O'SANTOS

Co-Author(s): Ruben LIM BON SIONG, Raymond Nelson REGALADO

Purpose: To compare the effects of preservative-free diquafosol sodium 3% (Diquas-S) versus preserved diquafosol eye drops on tear cytokine levels, ocular symptoms, and tear film stability in patients with dry eye disease.

Methods: This was a randomized, controlled, single-center, single-masked comparative study of 86 patients with DED. Patients received either preservative-free diquafosol (Diquas-S, Santen Pharmaceutical Co., Ltd., Japan) (n = 43) or preserved diquafosol (Diquas, Santen Pharmaceutical Co., Ltd., Japan) (n = 43) for 8 weeks. Tear concentrations of interferon gamma, interleukin-6, interleukin-17A, and tumor necrosis factor alpha were measured at baseline and after 8 weeks using the ProcartaPlex™ Human Mix & Match Panels (Thermo Fisher Scientific, USA). Associations between cytokine suppression and clinical measures, including SPEED

questionnaire scores, fluorescein tear break-up time, Schirmer's test, and ocular surface staining, were analyzed.

Results: Eighty-five eyes completed the study. Preservative-free Diquas-S achieved significantly greater reductions in cytokine levels compared with preserved diquafosol (mean reductions: IFN- γ -65.4%, IL-6 -72.1%, IL-17A -61.8%, TNF- α -70.3% vs. -18.7%, -22.9%, -24.1%, and -15.6%, respectively). Responder rates were markedly higher with Diquas-S across all markers. Cytokine suppression correlated with improvements in SPEED score, TBUT, and ocular surface staining, with IL-6 and TNF- α showing the strongest associations. Schirmer's test values showed weaker correlation. Subtype analysis indicated the greatest cytokine suppression in aqueous-deficient DED, particularly for TNF- α , while evaporative and mucin-deficient subtypes exhibited variable responses.

Conclusions: Preservative-free diquafosol provides superior cytokine suppression and clinical improvement compared with preserved formulations, underscoring its role in long-term DED management and supporting the utility of cytokines as biomarkers for treatment monitoring.

Abstract No.: 203341

Effectiveness of a Heparin-Like Glycosaminoglycan From Snail Mucus in a Murine Model of Dry Eye

First Author: Shangkun OU

Co-Author(s): Hao GU

Purpose: Dry eye disease (DED) is a prevalent multifactorial ocular disorder characterized by tear film instability, inflammation, and corneal epithelial damage. Despite the availability of treatments, effective and safe topical therapies remain limited. Heparin-like glycosaminoglycans have shown potential in epithelial regeneration and anti-inflammation. This study investigates the therapeutic effects and mechanisms of a purified glycosaminoglycan derived from *Achatina fulica* snail mucus (AFG) on DED.

Methods: This study employed both in vitro and in vivo approaches. Human corneal epithelial (HCE) cells were treated with varying concentrations of AFG to assess cytotoxicity, proliferation, migration, and gene expression related to epithelial regeneration and mucin secretion. A benzalkonium chloride (BAC)-induced DED mouse model was established, and animals were treated with AFG eye drops for 7 days. Corneal integrity, tear secretion, histological changes, inflammatory cell infiltration, and the expression of key markers were evaluated using fluorescein staining, Schirmer test, qRT-PCR, Western blotting, and immunofluorescence.

Results: AFG showed no cytotoxicity and significantly promoted HCE cell proliferation, migration, and mucin

gene expression (K14, KI67, MUC1, MUC4). In DED mice, AFG treatment markedly improved corneal integrity and tear secretion. It upregulated corneal expression of epithelial and mucin-related genes (K12, PAX6, MUC1, MUC4), while downregulating inflammatory markers (IL-1 β , IL-6, TNF- α , MMP-9, CD45). Histological analysis confirmed increased epithelial thickness and reduced inflammatory infiltration.

Conclusions: AFG demonstrates significant therapeutic potential for DED by restoring corneal epithelial homeostasis through cell proliferation, mucin secretion, and anti-inflammatory effects. This study provides a foundation for the development of AFG-based topical treatments for dry eye disease.

Abstract No.: 202794

Effects of Sympathetic Nerve Activity on Tear Components Secreted From Lacrimal Gland

First Author: Qun **WANG**

Co-Author(s): Qingjun **ZHOU**

Purpose: As the major component of the tear film, the aqueous phase is secreted principally by the lacrimal gland, a process controlled by neural regulation. This study aimed to evaluate the effects of sympathetic nerve activity on tear components secreted from the lacrimal gland.

Methods: We employed both pharmacological (isoproterenol, noradrenaline, 6-hydroxydopamine) and surgical (superior cervical ganglionectomy) approaches to manipulate sympathetic nerve activity in normal mice. Basal and reflex tear secretion were first assessed, followed by collection of tear samples for electrolyte concentration analysis. Subsequently, the collected tear fluid was subjected to proteomic sequencing, with functional enrichment analysis and selected targets validation through ELISA measurements. Finally, we established a dry eye disease model to systematically assess the therapeutic efficacy of the identified candidate targets.

Results: Sympathetic activity significantly influenced both basal and reflex tear secretion dynamics, modulated tear electrolyte concentrations and protein composition within the tear film. Importantly, sympathetic inhibition markedly improved the functional quality of tear proteins, as demonstrated through comprehensive proteomic and functional analyses. Subsequent validation studies identified two specific protein targets— α -amylase 2a (Amy2a) and amyloid precursor-like protein 1 (Aplp1)—that exhibited significant therapeutic potential in dry eye disease mouse model, effectively restoring tear film homeostasis and ocular surface integrity.

Conclusions: This study systematically investigated how sympathetic nerve activity regulates lacrimal gland-

derived tear components, providing critical insights for developing targeted therapies for dry eye disease.

Abstract No.: 204266

Efficacy and Safety of Mihe Keratoprosthesis in Chinese Population: A Retrospective Single-Center Study

First Author: Ying **JIE**

Co-Author(s): Yiran **HAO**

Purpose: To quantify anatomical and functional outcomes of the Mihe keratoprosthesis (KPro) in a Chinese population over 1 to 3 years and analyze the possible causes of postoperative complications.

Methods: Patients who completed both stage 1 and stage 2 Mihe KPro surgery more than or equal to one year were included. The interval between stage 1 and stage 2 of the procedure, specifications of the keratoprosthesis, prognosis, postoperative complications and any subsequent surgeries were documented. Indications, intraoperative characteristics, postoperative visual acuity and complications were analyzed.

Results: Twenty-nine eyes of 29 patients who underwent PK were reviewed with a mean follow-up of 14.3 ± 5.2 months. Chemical burn was shown to be the most common indication for keratoprosthesis surgery with 14 cases (48.3%). The final postoperative best-corrected visual acuity (BCVA) improved in 22 eyes (75.9%). Postoperative BCVA improved to 20/67 or better in 9 eyes (31.0%) and 20/400 or better in 14 eyes (48.3%) at 12 months. The retention rate of Mihe KPro was 100% (29 eyes). Complications including anterior proliferative membrane (24.1%), exposure of the keratoprosthesis stent (10.3%), glaucoma (6.9%), exposure of autologous auricular cartilage (6.9%), retroprosthetic membrane (3.4%), proliferative growth on the surface of the autologous auricular cartilage (3.4%), central retinal artery occlusion (3.4%), endophthalmitis and retinal detachment (3.4%).

Conclusions: Mihe KPro's wholly domestic design and production mark a pivotal milestone for Chinese ophthalmology. By delivering consistent visual restoration with an acceptable safety margin, it converts end-stage corneal blindness from an irreversible condition into a treatable one.

Abstract No.: 208602

Emerging Microsporidia Keratoconjunctivitis in China: A Call for Consensus

First Author: Hong **QI**

Co-Author(s): Yingyu **LI**, Zihan **SHEN**, Zhengze **SUN**, Pei **ZHANG**

Purpose: China is currently facing a newly emerging ocular infectious disease, microsporidia keratoconjunctivitis (MKC). However, no consensus

has yet been established on the diagnosis or treatment of MKC. This study aims to share our clinical experience with MKC to facilitate the development of a standardized consensus.

Methods: Since September 2024, more than twenty cases of MKC have been diagnosed and treated in our clinic. Detailed medical histories were obtained, and the patterns of corneal lesions were documented. Each patient underwent a comprehensive panel of ocular pathogen detection tests, including in vivo confocal microscopy, corneal scraping, conjunctival scraping, ocular bacterial culture, ocular viral PCR, and metagenomic next-generation sequencing (mNGS). Based on evidence from previous literature, a treatment regimen was developed, and its clinical efficacy was assessed.

Results: Our findings indicated that parrot exposure was the most significant risk factor for MKC. Early recognition of MKC required integrating a patient's animal exposure history, previous treatments, and the presence of diffuse, coarse corneal epithelial defects, which were characteristic of MKC. We recommend corneal scraping and mNGS as the primary diagnostic approaches for MKC. The proposed treatment regimen, consisting of two fluoroquinolones and one antifungal agent, produced favorable clinical outcomes. Co-infections were not uncommon in MKC patients and should be managed simultaneously.

Conclusions: Although it is still considered a rare condition, MKC may emerge as a more common ocular infectious disease in future clinical practice. At this pivotal moment, it is imperative to develop a unified consensus for MKC and to enhance microbiological diagnostic capacity across hospitals nationwide.

Abstract No.: 204987

Empagliflozin Attenuates High-Glucose-Induced Corneal Epithelial Injury and Wound Healing Delay

First Author: Zhitong **CHEN**

Co-Author(s): Kuangqi **CHEN**, Jiayun **GE**, Ye **SHEN**, Liusi **YANG**

Purpose: Diabetic keratopathy (DK), a vision-threatening complication of diabetes, is characterized by impaired corneal wound healing, epithelial erosion, and nerve dysfunction. Current treatments remain palliative, highlighting the need for mechanism-based therapies. This study aimed to investigate the therapeutic potential of empagliflozin (EMPA), an SGLT2 inhibitor, for DK treatment.

Methods: We employed an integrated approach combining in vivo, in vitro, and bioinformatics strategies to evaluate EMPA's effects and mechanisms in DK.

Results: EMPA treatment in diabetic mice significantly reduced corneal injury and improved corneal epithelial

wound healing, while preventing hyperglycemia-induced epithelial thinning. In vitro, EMPA protected human corneal epithelial cells (HCECs) against high glucose-induced damage, enhancing cell viability and migration. Mechanistically, EMPA reduced intracellular ROS, preserved mitochondrial membrane potential, and prevented mitochondrial loss. Bioinformatics analysis revealed 14 shared EMPA-DK targets, with MAPK1/3, ICAM1, and VCAM1 as core regulators of inflammation and metabolic pathways. Molecular docking confirmed strong binding affinity between EMPA and these targets.

Conclusions: EMPA demonstrates potential as a novel therapy for DK, addressing both systemic metabolic dysfunction and local corneal damage. Our findings provide the preclinical evidence supporting the repurposing of EMPA to prevent vision loss in diabetic patients.

Abstract No.: 207261

Epidemiological Insights Into Paediatric Infectious Keratitis: Exploring the Role of Vitamin A Deficiency

First Author: Nandita **TRIVEDI**

Co-Author(s): Ritu **ARORA**, Avani **HARIANI**, Parul **JAIN**

Purpose: Pediatric infectious keratitis (PIK) is a vision-threatening condition with limited data on nutritional risk factors. This study investigates the association between serum vitamin A deficiency and PIK, alongside microbial profiles and clinical outcomes, in children presenting to a tertiary eye care center in India.

Methods: In this prospective observational study, 45 children (53 eyes) with clinically diagnosed bacterial and/or fungal keratitis were enrolled. Age- and gender-matched non-ocular controls were included for serum vitamin A measurement. Clinical, microbiological, nutritional, and immunization data were collected. Serum vitamin A levels were quantified using ultra-high performance liquid chromatography. Associations between vitamin A status and keratitis risk were assessed by logistic and Cox regression analyses.

Results: The mean age was 4.0 ± 5.4 years; 44.4% were under 6 months. Bilateral involvement occurred in 18%, with younger children exhibiting higher odds (OR 3.79, $p=0.235$). Vitamin A deficiency was significantly more prevalent in cases than controls, notably in infants <6 months (0.088 ± 0.028 mg/L vs. 0.182 ± 0.047 mg/L, $p<0.001$). Vitamin A deficiency increased the risk of corneal ulceration by 3.89-fold (95% CI: 1.97–7.7, $p=0.000$) and by 36-fold in infants under 6 months. Bacterial pathogens predominated (54.7%), with *Staphylococcus aureus* most common. Clinical outcomes were poor, with 35.8% experiencing corneal perforation and 77.6% healing with corneal opacity.

Conclusions: Vitamin A deficiency is an independent, significant risk factor for PIK, particularly in early

infancy. This study is among the first to directly correlate serum vitamin A levels with pediatric corneal ulcer risk, underscoring the importance of nutritional interventions, exclusive breastfeeding, and immunization in preventing childhood corneal blindness.

Abstract No.: 208074

Evaluating the Efficacy and Feasibility of Manual Digital Meibomian Gland Compression in Meibomian Gland Dysfunction

First Author: Yingying GAO

Co-Author(s): Jingru WANG, Ling ZHANG

Purpose: To evaluate the therapeutic efficacy and clinical feasibility of manual digital meibomian gland compression compared to instrument-assisted mechanical compression in patients with meibomian gland dysfunction (MGD).

Methods: Medical records of 70 MGD patients were retrospectively analyzed. Participants were divided into manual (n=35) and mechanical compression groups (n=35). Primary outcomes included Ocular Surface Disease Index (OSDI) scores and ocular surface parameters at 2-week follow-up (14±2 days), and 8-week follow-up (56±2 days). Secondary outcomes assessed manipulation pain intensity (Visual Analogue Scale, VAS), treatment duration, and learning curve length.

Results: Both groups showed significant improvements in OSDI scores, gland plugging, Schirmer I test, and non-invasive break-up time (NIBUT) at both follow-ups (all $P < 0.05$). The manual group demonstrated earlier meibum quality improvements (2-week follow-up and 8-week follow-up, $P < 0.05$) compared to the mechanical group's 8-week follow-up improvement ($P = 0.01$), along with superior lid margin regularity at 8-week follow-up ($P = 0.04$). Significant intergroup differences favored manual compression in gland plugging ($P = 0.02$), meibum quality ($P = 0.03$), and NIBUT ($P < 0.001$) at 8-week follow-up. Manual compression consistently yielded lower pain scores (all $P < 0.001$) and required fewer training cases (13 vs 20).

Conclusions: Manual digital compression offers effective MGD management with enhanced patient comfort and faster clinical proficiency compared to mechanical methods. Its demonstrated therapeutic advantages support broader clinical implementation.

Abstract No.: 206081

Evaluation of Ocular Surface Inflammation and Systemic Conditions in Patients With Autoimmune Rheumatic Diseases

First Author: Yan HE

Co-Author(s): Xiang LI, Yingyi LIU

Purpose: To investigate the relationship between ocular surface inflammation and psychological, physiological, and disease characteristics, as well as systemic hematologic indices in patients with autoimmune rheumatic diseases (ARDs).

Methods: The study included 79 patients with ARDs (26 with rheumatoid arthritis, 33 with systemic lupus erythematosus, and 20 with primary Sjögren's syndrome) and 30 controls. Participants underwent ocular surface evaluations, including symptom and sign assessments, conjunctival impression cytology, and tear cytokine profiling. Systemic disease characteristics such as duration, activity, and serological markers were documented. Quality of life, anxiety/depression, daily functioning, and sleep quality were assessed using SF-36, HADS, HAQ-DI, and PSQI.

Results: Patients with systemic lupus erythematosus exhibited a lower incidence of dry eye and lower levels of proinflammatory tear cytokines compared to those with rheumatoid arthritis or primary Sjögren's syndrome. However, ocular surface squamous metaplasia was more severe in patients with systemic lupus erythematosus and primary Sjögren's syndrome than in those with rheumatoid arthritis. ARDs patients reported lower SF-36 scores and higher anxiety and HAQ-DI scores compared to controls. The Ocular Surface Disease Index showed moderate correlations with quality of life, anxiety, depression, and sleep quality.

Conclusions: The distinct patterns of dry eye and ocular surface immune inflammation observed across different ARDs are associated with underlying systemic conditions. Comprehensive ophthalmic assessments are essential for patients with ARDs. Effective treatment approaches should integrate both systemic management and psychological support.

Abstract No.: 203277

Evaluation of a Drug–Food Homologous and Health-Grade Traditional Chinese Medicine Formula (Jue-Ming Granules) for Dry Eye Disease

First Author: Ziming LIU

Co-Author(s): Yuanlong AN, Wei HE, Zongming PU, Zhenli YUAN, Donglei ZHANG

Purpose: Dry eye disease (DED) is characterized by chronic inflammation and a lack of effective long-term treatment options. Jue-Ming Granules (JMGs), a modified traditional herbal formulation composed entirely of drug–food homologous or health-grade

ingredients, may offer multi-target anti-inflammatory benefits. This study investigates both the mechanisms and clinical efficacy of JMGs using a multilevel, integrative approach.

Methods: Network pharmacology and molecular docking were applied to identify JMGs' active compounds and predicted key inflammatory targets. In vitro assays using human corneal epithelial cells assessed cell viability under benzalkonium chloride-induced damage. In vivo efficacy was evaluated in a murine DED model. A single-center randomized controlled clinical trial (n=88) evaluated JMGs' therapeutic outcomes.

Results: JMGs' active components—quercetin, caffeine, and luteolin—were associated with inflammation-related pathways such as PI3K/AKT, based on network analysis and pathway inhibition assays. In vitro, JMGs improved cell viability and mitigated BAC-induced cytotoxicity. In vivo, JMGs enhanced tear secretion, reduced corneal staining, downregulated inflammatory cytokines (TNF- α , IL-6, IFN- γ), and restored goblet cell density. Clinically, JMGs significantly improved Ocular Surface Disease Index (OSDI) scores, TCM symptom scores, quality of vision (QoV), corneal fluorescein staining (CFS), and corneal sensitivity, without adverse events.

Conclusions: JMGs exert multi-target anti-inflammatory effects against DED, supported by both preclinical and clinical evidence. These findings highlight the therapeutic potential of modified TCM formulas composed entirely of drug–food homologous and health-grade materials as safe adjunctive interventions for ocular surface diseases.

Abstract No.: 203929

Experimental Studies to Enhance the Efficacy of Corneal Crosslinking

First Author: Yu **LIU**

Co-Author(s): Dan **CHEN**, Lan **KE**, Xinlan **LEI**, Mengying **QI**, Jin **QUE**, Qingyan **ZENG**

Purpose: To evaluate chitosan (CS) as an adjunct to corneal cross-linking (CXL) for improving treatment outcomes in keratoconus.

Methods: Ninety rabbit right eyes were divided into groups: accelerated CXL (ACXL), ACXL with 0.2% chitosan soaking after de-epithelialization for 20 minutes (CS-ACXL), and controls. Riboflavin concentration was measured via Ultra-high performance liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS). CCT, SSI, and collagen modulus (k1) using finite element analysis (FEA) were assessed at 7, 14, and 28 days. Imaging and histology via slit-lamp examination, OCT, IVCN, HE staining, second-harmonic generation (SHG) microscopy, two-photon (TP) fluorescence microscopy were performed. Quantitatively comparing fluorescence integrated

intensity (FI) was performed to examine structural changes at 0, 7, 14, and 28 days after surgery.

Results: The median riboflavin concentration of the corneal stroma of rabbits in the conventional mechanical debridement group was approximately 145 ng/mL. No significant difference was observed between the traditional mechanical de-epithelialization group and the group soaked in 0.2% chitosan solution ($P > 0.05$). At 14 days, k1 was significantly increased in both ACXL (36.94 ± 5.84 MPa) and CS-ACXL (37.98 ± 4.56 MPa) groups compared to controls (27.85 ± 1.57 MPa, $P < 0.001$). At 28 days, stiffness in the CS-ACXL group (36.72 ± 6.89 MPa) remained significantly higher than both controls ($P < 0.001$) and the ACXL group (31.46 ± 5.72 MPa, $P = 0.03$). The CS-ACXL group also showed notably higher fluorescence intensity at 7 days ($P = 0.007$), reduced inflammation, and a more regular collagen structure.

Conclusions: Using 0.2% chitosan in CXL is safe for at least 28 days. While it doesn't enhance riboflavin absorption, it improves corneal stiffness, promotes organized collagen remodeling, and suppresses inflammation.

Abstract No.: 202868

Exploration of Gene Therapy Targeting Corneal Endothelial Cells for Macular Corneal Dystrophy

First Author: Lin **CONG**

Co-Author(s): Lixin **XIE**, Bi Ning **ZHANG**, Qingjun **ZHOU**

Purpose: The corneal endothelium, a critical monolayer structure maintaining corneal optical properties and stromal nutrient metabolism, relies on its hexagonal cellular arrangement, intercellular tight junctions, and active transport functions for physiological homeostasis. Our preliminary studies identified corneal endothelial dysfunction as a primary pathogenic driver in macular corneal dystrophy (MCD). This study aimed to develop a novel gene therapy targeting corneal endothelial cells in MCD mice and evaluate its long-term efficacy.

Methods: AAV serotypes with high efficiency and specificity for corneal endothelial cells were screened. Dose-response experiments determined the minimum safe and effective AAV titer for anterior chamber injection. The therapeutic efficacy of AAV-Chst5 was validated in adult and juvenile MCD mouse models.

Results: One specific AAV was identified as the optimal serotype, enabling efficient and specific endothelial transfection. A single injection of 10^8 AAV particles was confirmed as the minimum effective dose, inducing no significant immune responses with transgene expression sustained for at least 1.5 years. AAV-Chst5 delayed corneal opacity progression in adult MCD mice and prevented corneal clouding in 90% of juvenile MCD mice, maintaining long-term corneal transparency.

Mechanistically, the Chst5-Wnt5a signaling pathway in corneal endothelial cells was found to participate in MCD pathogenesis, providing novel insights into disease mechanisms.

Conclusions: This study establishes a safe, effective, and endothelium-specific AAV-mediated gene therapy strategy. A single anterior chamber injection of AAV-Chst5 achieves long-term prevention of MCD-induced corneal opacity. Mechanistic explorations identify new therapeutic targets, offering theoretical foundations for translational application of gene therapy in MCD.

Abstract No.: 204807

Five-Year Follow-Up of Telocyte Cells in Fresh Lenticule Transplantation for Advanced Keratoconus

First Author: Ceren Ece **SEMİZ**

Co-Author(s): Merjem **PURELKU**, Faruk **SEMİZ**, Gamze **TANRIVERDI**

Purpose: To investigate the presence and potential of telocytes in the stroma extracted via SMILE (Small Incision Lenticule Extraction) surgery from keratoconus patients several years post-treatment.

Methods: This retrospective study included 60 eyes with stage 2–3 keratoconus (Amsler–Krumeich), corneal thickness between 300–419 μm , and indication for penetrating keratoplasty. Exclusion criteria were active anterior segment pathology, corneal thickness $\geq 420 \mu\text{m}$, and prior corneal or anterior segment surgery. Fresh convex-shaped lenticules harvested from myopic SMILE donors were implanted into recipient corneas. To characterize telocytes and progenitor cells, six lenticule samples (one untreated and five postoperatively explanted at 1–5 years) were analyzed using CD34 immunohistochemistry, CD34/PDGFR- β and CD34/c-kit double immunofluorescence, and transmission electron microscopy.

Results: In the untreated keratoconic lenticule, CD34 staining revealed irregular, thinned collagen fibers and reduced stromal cell density with degenerative changes. At 1–3 years post-surgery, stromal cell density increased, including CD34-positive progenitor cells and telocytes, but declined after 4–5 years. Double immunofluorescence staining confirmed the unique immunophenotype and morphology of telocytes. At the 5-year follow-up, uncorrected distance visual acuity improved from 1.34 to 0.58 logMAR and corrected distance visual acuity from 1.11 to 0.43 logMAR. Central corneal thickness increased from 367.5 μm to 480.4 μm . K1 and K2 decreased from 53.16/59.93 to 51.35/54.89. The Q-value improved from –0.75 to –0.47. All changes were statistically significant ($p < 0.001$).

Conclusions: Fresh lenticule transplantation is a safe, cost-effective, and reliable procedure that enhances

corneal thickness, improves visual acuity, and facilitates corneal restoration.

Abstract No.: 206869

Gender Differences in Ocular Surface Health Metrics Among Drug Users

First Author: Yan Hei Yannis **CHAN**

Co-Author(s): Kelvin Kl **CHONG**, Kenneth Kh **LAI**, Calvin Cp **PANG**, Clement Cy **THAM**, Kin Yip **YIN**

Purpose: This study investigates gender differences in ocular surface health among drug users, focusing on disparities in ocular health metrics between males and females.

Methods: 53 participants (16 females, 37 males) reporting regular drug use (cocaine or ice use within the past 24 months, at least 6 months which the subject used 24 times) were recruited, under the project supported by Beat Drug Fund (BDF210067). Comprehensive ocular assessments were conducted using the OCULUS Keratograph 5M, TearScience LipiView II Interferometer, and OSDI to evaluate ocular surface health.

Results: Significant gender-based differences were observed. Males had worse bulbar redness scores (median: 1.05) than females (median: 0.75, $p = 0.012$), indicating worse conjunctival hyperemia. Males showed a lower tear interferometric pattern score (median: 3) compared to females (median: 4, $p = 0.0295$), suggesting poorer tear film stability. Signs of meibomian gland dysfunction were more pronounced in males, with more shortening of the lower lid (median: 3 vs. 2, $p = 0.0391$) and higher meiboscores (median: 3 vs. 2, $p = 0.0111$). However, interestingly, females reported greater ocular discomfort, with a median OSDI score of 19.64 compared to 12.5 in males ($p = 0.0247$).

Conclusions: The findings highlight significant gender differences in ocular surface health among drug users. Males exhibited more severe signs of dysfunction and inflammation, yet females reported increased discomfort. These results underscore the need for gender-specific approaches in diagnosing and managing ocular surface diseases in drug users, warranting further research into underlying factors.

Abstract No.: 207285

Graft Detachment Rate Following Descemet Membrane Endothelial Keratoplasty Using a Short-Term High Intraocular Pressure Air Tamponade: A Clinical Observation

First Author: Chang LIU

Co-Author(s): Jie BAI, Zexia DOU, Ling LI, Shaowei LI, Lin ZHAO

Purpose: To evaluate the rate of graft detachment following DMEK using a Short-term High Intraocular Pressure Air Tamponade (SHPAT) technique.

Methods: In this retrospective study, 124 consecutive patients who underwent DMEK with SHPAT application between January 2023 and August 2025 were included. The surgical procedure involved optical coherence-assisted air injection into the anterior chamber to position the graft, followed by air filling to maintain an intraocular pressure >40 mmHg for 2 hours. Half of the air was then released to prevent pupillary block. The primary outcome was the postoperative graft detachment rate.

Results: Among the 124 DMEK procedures performed with SHPAT, graft detachment occurred in 27 cases (20.8%). The detachment group had a significantly higher proportion of patients with a history of glaucoma surgery (10 cases) or vitrectomy (4 cases) compared to the non-detachment group ($P = 0.006$). Additionally, at 2 hours postoperatively, 16 patients in the detachment group exhibited anterior chamber air filling of less than two-thirds of the chamber depth, which was significantly more frequent than in the non-detachment group ($P = 0.003$). The overall detachment rate in this cohort was lower than the range commonly reported for conventional DMEK procedures in the literature (26–56%).

Conclusions: The application of SHPAT in DMEK surgery is associated with a relatively low graft detachment rate. This technique facilitates faster visual recovery and minimizes potential endothelial cell damage. It appears to be a safe and effective adjunct for improving early graft adherence, particularly in high-risk eyes. Further prospective studies are warranted to validate its efficacy across broader populations.

Abstract No.: 202890

Helicobacter pylori Infection's Dual Impact on the Ocular Surface: Tear Secretion Disruption and Ocular Surface Microbiome Alteration

First Author: Yinjie GUO

Co-Author(s): Xiaobo XIA

Purpose: To investigate the impact of *Helicobacter pylori* (*H. pylori*) infection on ocular surface homeostasis, including dry eye symptoms, ocular microbiota alterations, and related immune responses.

Methods: A total of 31 *H. pylori*-positive (*Hp_pos*) and 30 *H. pylori*-negative (*Hp_neg*) subjects underwent dry eye assessments, including the Schirmer I test, non-invasive keratograph tear breakup times (NIKf-BUT, NIKav-BUT), tear meniscus height, meibomian gland loss, and the Ocular Surface Disease Index (OSDI). Sterile swabs were used to collect samples from each eye of subjects for 16S rRNA sequencing. Additionally, a murine *H. pylori* infection model was established to evaluate dry eye phenotypes and immune responses in the lacrimal gland.

Results: Compared with *Hp_neg* subjects, *Hp_pos* subjects showed significantly reduced Schirmer I test results, NIKf-BUT, and NIKav-BUT, along with higher OSDI scores (all $p < 0.05$), whereas tear meniscus height and meibomian gland loss did not differ between the two groups. The ocular surface microbiota of *Hp_pos* subjects exhibited altered alpha and beta diversity, with 10 enriched genera (dominated by *Veillonella* and *Capnocytophaga*), which were characteristically associated with dry eye manifestations. In the murine model, infected mice at 6 weeks post-infection displayed aqueous tear deficiency, corneal epithelial barrier impairment, lacrimal gland infiltration of CD4+ and CD45+ T lymphocytes, and upregulated proinflammatory cytokines (IFN- γ , IL-17A, IL-4, TGF- β , TNF α , IL-6, IL-1 β). However, no significant differences were observed at 2 or 4 weeks post-infection.

Conclusions: *H. pylori* infection disrupts tear secretion and ocular surface microbiota, potentially via inducing T lymphocyte infiltration and lacrimal gland inflammation, contributing to dry eye pathogenesis.

Abstract No.: 207471

Hexokinase-2 Inhibition Enhances Antiviral Signaling and Corneal Healing in HSK

First Author: Wei CHEN

Co-Author(s): Dan JIANG

Purpose: Herpes simplex keratitis (HSK) is a leading cause of infectious corneal blindness, and type I IFN responses are often blunted in HSV-1-infected corneas due to viral immune evasion and metabolic reprogramming.

Methods: RNA sequencing of corneal tissues from HSK patients identified significant glycolytic upregulation, particularly hexokinase-2 (HK2). HSV-1-infected corneal epithelial cells and mice were treated with HK2 inhibitors (2-DG or Ionidamine), evaluating antiviral signaling, HK2-MAVS interaction, viral load, and corneal healing.

Results: HK2 knockdown or inhibition with 2-DG or Ionidamine reduced viral proteins and enhanced interferon-stimulated gene expression. HK2 inhibition restored MAVS-TBK1-IRF3 signaling. In vivo, topical HK2 inhibition decreased corneal viral load and accelerated epithelial regeneration.

Conclusions: HK2-driven glycolytic reprogramming contributes to HSK pathogenesis. HK2 inhibition restores antiviral signaling, suppresses HSV-1 replication, and promotes corneal healing, offering a promising therapeutic strategy complementary to existing antivirals.

Abstract No.: 206383

Hong Kong Cross-Cluster, Collaboration for Corneal Neurotisation (HKC4N)

First Author: Julia **CHAN**

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Purpose: To report the formation of a cross-cluster, multidisciplinary team (MDT) and early (6-month) outcomes of the first two unilateral corneal neurotization (CN) procedures in Hong Kong.

Methods: An MDT consisting of corneal and oculoplastic surgeons from two cross-cluster tertiary referral eye centers, as well as plastic surgeons from a teaching hospital, was established. The MDT met monthly to develop standard operating procedures for CN-related staff and instrumental preparation. The first CN operation was performed on a 50-year-old Chinese male who suffered right-sided neurotrophic keratopathy (NK) and a Cochet-Bonnet Asthesiometer (CBA) score of 1mm over 4 quadrants after a stroke using autologous sural nerve graft (ASNG) co-apted to the ipsilateral supraorbital and supratrochlear nerves (SON & STN). The second CN procedure was performed on a 42-year-old female for right-sided NK with a CB score of 1mm post-right petroclival meningioma removal using contralateral SON & STN and ASNG.

Results: Both CN operations were successfully conducted, and both patients showed uneventful postoperative recovery without any donor-site or operative-related complications. Early (6-month) outcomes, including vision, corneal structural, and sensation-related parameters, will be updated.

Conclusions: The formation of a cross-cluster MDT facilitated the smooth adoption of CN in HK using existing limited resources, and may continue to benefit CN patients across the rest of the territory.

Abstract No.: 207841

Impression Cytology-Based Quantitative Proteomics and Network Analysis of Conjunctival Cells in Diabetic Patients With Dry Eye

First Author: Sihan **DONG**

Co-Author(s): Guannan **HUANG**, Shu **YANG**, Jing **ZHANG**

Purpose: Dry eye disease (DED) is a common ocular complication in patients with diabetes mellitus (DM), yet its underlying pathophysiological mechanisms remain incompletely understood. This study aimed to investigate conjunctival proteomic alterations and molecular networks in diabetic patients with DED using impression cytology (IC) and advanced bioinformatics.

Methods: Conjunctival epithelial samples were collected via IC from four groups: (A) DM with DED, (B) DM without DED, (C) non-diabetic with DED, and (D) healthy controls (n=15 per group). Proteins were extracted and analyzed using isobaric tags for relative and absolute quantification (iTRAQ)-based proteomics. A total of 650 consistently quantified proteins were subjected to weighted gene co-expression network analysis (WGCNA) to identify key modules and hub proteins. Differential expression was validated by immunohistochemistry (IHC).

Results: iTRAQ analysis identified 1,814 quantifiable proteins, with significantly differentially expressed proteins among groups. WGCNA revealed 16 protein modules, with the Cyan module showing the strongest positive correlation with diabetic DED. Protein-protein interaction network analysis identified HP, HPX, and FGG as central hub proteins, significantly upregulated in diabetic DED. Gene Ontology enrichment highlighted pathways involved in acute-phase response, inflammation, and immune regulation. IHC confirmed elevated expression of HP, HPX, and FGG in conjunctival tissues of diabetic DED mice.

Conclusions: This study provides the first conjunctival proteome profile of diabetic DED using IC-based iTRAQ proteomics. Findings implicate key inflammatory and immune-related proteins in disease pathogenesis, offering potential biomarkers and therapeutic targets for diabetic DED.

Abstract No.: 201643

Improving the Diagnostic Efficiency of Forme Fruste Keratoconus by a New Combined Model With Fourier Parameters and Corneal Epithelial Aberrations

First Author: Rui **NING**

Co-Author(s): Jinhai **HUANG**, Yue **LI**

Purpose: To explore a new method to improve the diagnostic efficiency of forme fruste keratoconus (FFKC) using the combination of Fourier parameters and corneal epithelial aberrations.

Methods: This prospective study enrolled 55 FFKC patients and 68 healthy subjects. The same experienced operator performed Casia 2 and MS-39 examinations to obtain Fourier parameters and corneal epithelial aberrations of the cornea. Independent-samples T tests were applied to compare statistical differences between the two groups. Significant variables were selected through dual logistic regression analysis with a stepwise method. The areas under the receiver operating characteristic curves (AUROC) were calculated to estimate the diagnostic ability for each parameter and the combined model, and the Youden index was used to determine the cut-off value. Delong test was performed to compare the differences among the AUROC in different conditions.

Results: The spherical component in Fourier parameters of the posterior surface of the cornea ($P = 0.002$), the asymmetry of the posterior surface of the cornea ($P \leq 0.001$), the higher-order irregularity in Fourier parameters at the posterior surface of the cornea ($P = 0.026$), and corneal epithelial Z ($3, \pm 1$) coma ($P = 0.035$) were selected as explanatory variables. The combined model demonstrated significantly improved diagnostic efficiency with the highest AUROC value of 0.95. And the AUROC of the combined model was significantly different from that of the single parameter ($P \leq 0.05$).

Conclusions: The integration of Fourier parameters and corneal epithelial aberrations holds potential in enhancing the diagnostic efficacy of FFKC, thus serving as a valuable reference for future clinical applications.

Abstract No.: 202738

In Vitro Killing Effect of Berberine and Niclosamide on Ocular Demodex folliculorum

First Author: Yuwen LIU

Co-Author(s): Shujia GUO, Zuguo LIU

Purpose: To explore the in vitro killing effect of water-soluble berberine and lipid-soluble niclosamide against ocular Demodex folliculorum.

Methods: Demodex with good vigor were collected from patients' eyelashes. These mites were randomly distributed into different groups with 20 mites in each group. Saline, Double Distilled Water (DDW), Polysorbate 80 (TWEEN 80), Polyethylene glycol 300 (PEG 300) and Castor Oil were used to screen solvents and cosolvents. 20 % Tea Tree Oil (TTO) and Anhydrous Ethanol (EtOH) were used as positive controls. 0.2 % Berberine, 0.25 % Niclosamide and 0.5 % Niclosamide, were designated as experimental groups. Following treatment, the analysis of Kaplan-Meier survival curves and survival time of mites and safety of drugs were then performed.

Results: The survival of Demodex in vitro in Saline and DDW, was not significant different. Therefore, DDW, which was more conducive to the dissolution of

berberine, was chosen as the solvent for berberine. 0.2 % Berberine significantly inhibited the survival distribution and survival time ($P < 0.001$) of Demodex in vitro compared with the DDW group. Through the evaluation of several cosolvents, PEG300 had milder effects on Demodex. Hence, the proportion of PEG300 in the niclosamide solvent group was increased to reduce the irritability of the vehicle. Furthermore, niclosamide could significantly inhibit the survival of Demodex compared with the vehicle group, and the effect of 0.5 % Niclosamide was more obvious ($P < 0.001$), and was better than 20 %TTO ($P < 0.001$). In addition, after niclosamide administration, Demodex bodies exhibited gradual distortion along with increased transparency and the presence of blurred dark particles compared to those in the vehicle group. Moreover, both drugs showed good subjective tolerability and safety in a mouse model.

Conclusions: 0.2 % berberine and 0.5 % niclosamide effectively inhibited Demodex survival in vitro, with 0.5 % niclosamide superior to 20 % TTO. These two drugs, with anti-Demodex, anti-bacterial, and anti-inflammatory properties, may offer alternative treatment for Demodex blepharitis.

Abstract No.: 206584

In Vivo Confocal Microscopic Study of Cornea Verticillata and Limbus Deposits in Patients With Fabry Disease

First Author: Chenying BAO

Co-Author(s): Yuan WU, Xuecong ZHOU

Purpose: This study aimed to investigate the microstructure characteristics of cornea verticillata and limbus deposits in patients with Fabry disease (FD) using in vivo confocal microscopy (IVCM).

Methods: A total of 60 eyes from 30 patients diagnosed with FD were examined and compared with 36 eyes from 18 healthy controls in this prospective, cross-sectional, controlled, single-center study. The initial assessment of cornea verticillata (CV) was conducted using slit-lamp microscopy. Subsequently, IVCM was performed to assess deposits in the corneal and limbal epithelium. We compared the differences between the sexes (heterozygous and hemizygous) and phenotypes (classical and non-classical).

Results: The epithelial deposit detection rate with IVCM was statistically higher (52/60, 86.67%) compared to the biomicroscopic evaluation of CV using a slit lamp (46/60, 76.67%) ($p = 0.031$). A higher prevalence of corneal epithelial deposits was observed in the classical phenotype as compared to the non-classical phenotype ($p = 0.023$). Surprisingly, cardiac variants previously lacking cornea verticillata show a high prevalence (85.71%) of corneal epithelial deposits under IVCM. The prevalence and severity of deposits, especially in limbal epithelial rete pegs, were higher in FD than in controls ($p < 0.001$).

Conclusions: Compared with slit-lamp microscopy, IVCN provides a more effective tool for examining epithelial deposits in patients with FD. Patients with FD demonstrated a profound bilateral increase in corneal epithelial deposits and limbal hyperreflective cells compared to controls, with more prominent pathological changes observed in classical phenotype individuals. The high prevalence of epithelial deposits in the cardiac variant highlights the essential ability of IVCN as an effective diagnostic tool.

Abstract No.: 204670

Integrating Clinical and Mitochondrial Insights to Understand Keratoconus Progression

First Author: Shivam SHARMA

Co-Author(s): Seema KASHYAP, Tapas Chandra NAG, Seema SEN, Namrata SHARMA, Lata SINGH

Purpose: Keratoconus (KC) is a progressive corneal ectatic disorder causing visual impairment, primarily in young individuals. This study comprehensively evaluates clinical risk factors, disease severity, management outcomes, alongside mitochondrial DNA (mtDNA) variations, its morphological appearance and oxidative stress gene profiles to better understand KC pathogenesis and therapeutic implications.

Methods: A prospective study involving 710 KC patients documented demographics, environmental and hereditary risk factors, and corneal topographic severity. Outcomes after corneal cross-linking (CXL), deep anterior lamellar keratoplasty (DALK), and scleral lens fitting were assessed over follow-up. Additionally, subset of 50 patients underwent whole mtDNA sequencing of paired blood and corneal tissue, relative mtDNA copy number quantification by qRT-PCR, mitochondrial ultrastructural examination by TEM, and oxidative stress gene expression analysis.

Results: Mean diagnosis age was 21.6 years; 69.3% were males. Key risks included eye rubbing (64.1%) and atopy (62.4%). Disease severity was mild (31.1%), moderate (49.3%), and advanced (19.6%). CXL stabilized early/moderate KC while DALK markedly improved advanced cases. Scleral lenses enhanced vision in irregular astigmatism and post-surgical eyes. Molecular analysis identified 589 mtDNA coding variations, including 297 pathogenic mutations, with significant mtDNA depletion and ultrastructural mitochondrial damage. Oxidative stress-related genes SCARA3, HMOX1, SOD2, GPX4, and NRF2 were downregulated, while PRDX6 and NOX4 were upregulated, reflecting disturbed redox homeostasis.

Conclusions: This integrative clinical and molecular study highlights demographic and treatment features alongside mitochondrial genomic instability and oxidative stress dysregulation as central to KC pathophysiology. These molecular markers

hold promise as biomarkers for progression and personalized therapy guidance.

Abstract No.: 208507

Intense Pulsed Light Therapy for Moderate-to-Severe Perennial Allergic Conjunctivitis: Clinical Efficacy and Tear Fluid Untargeted Metabolomics

First Author: Qiu YAN

Purpose: To evaluate the clinical efficacy of intense pulsed light (IPL) in moderate-to-severe perennial allergic conjunctivitis (PAC) and investigate its potential mechanisms via analysis of tear inflammatory factor and untargeted metabolomics.

Methods: In this prospective self-controlled study, 18 patients received two IPL treatments at two-week intervals. Outcomes included symptom visual analog scale (VAS) scores and sign scores, bulbar redness index (BRI), tear breakup time (TBUT), and tear inflammatory factors (IgE, MMP-9, LTA). Untargeted metabolomics of tear fluid was performed using LC-MS/MS to identify differential metabolites and pathways.

Results: After treatment, symptom VAS scores [median difference: -25.0 (95% CI: -31.0, -21.0); $P < 0.01$] and sign scores [median difference: -4.0 (95% CI: -6.0, -4.0); $P < 0.01$] showed significant improvement. No significant changes were observed in TBUT or BRI. Although tear IgE and MMP-9 levels tended to decrease and LTA tended to increase, these changes didn't reach statistical significance. MMP-9 was positively correlated with BRI post-treatment ($r^* = 0.570$, $P < 0.05$), while LTA was negatively correlated with BRI at baseline ($r^* = -0.573$, $P < 0.05$). Untargeted metabolomics identified 65 differential metabolites. Adenine, guanine, adenosine, inosine, hypoxanthine, and stearic acid were downregulated, while oleic acid, 9-OxoODE, erucic acid, isobutylamine, and L-phenylalanine were upregulated. Key enriched pathways included purine metabolism and unsaturated fatty acid biosynthesis.

Conclusions: IPL alleviates moderate-to-severe PAC by reprogramming purine metabolism and unsaturated fatty acid biosynthesis, which suppresses purine activity and pro-inflammatory lipids while enhancing anti-inflammatory and antioxidant unsaturated fatty acids, thereby restoring ocular surface homeostasis.

Abstract No.: 205794

Interim Clinical Study Results of EndoArt®: A Novel Artificial Corneal Endothelial Layer for the Treatment of Chronic Corneal Edema

First Author: Zelin ZHAO

Co-Author(s): Wei CHEN, Jinyang LI

Purpose: To present interim outcomes of EndoArt® implantation in patients at high-risk for graft rejection.

Methods: EndoArt® (EyeYon Medical, Israel) is a water-impermeable implant that adheres to the posterior cornea, thereby limiting stromal hydration and reducing corneal edema. A prospective, multicenter, randomized, 2-arm-superiority study of 62 patients evaluated the safety and efficacy of EndoArt®. At Wenzhou Medical University Eye Hospital, five patients underwent EndoArt® implantation, and eight were treated with a bandage contact lens as the control arm.

Results: In the EndoArt® group, BCVA (best corrected visual acuity) improved from $1.65 \pm 0.49 \log \text{MAR}$ to $0.66 \pm 0.22 \log \text{MAR}$ ($p < 0.05$). Despite limited visual potential, all EndoArt® group gained ≥ 7 ETDRS (Early Treatment Diabetic Retinopathy Study) lines (range 7–15). CCT (central corneal thickness) decreased from $669 \pm 14 \mu\text{m}$ preoperatively to $485 \pm 28 \mu\text{m}$ at last follow-up (5.1 ± 3.6 months). Re-bubbling was performed in 2/5 eyes for better attachment. No infections, inflammation, or device-related adverse events occurred. Controls remained above normal CCT and showed no significant BCVA improvement ($p = 0.2$).

Conclusions: The implant demonstrated safety and efficacy in treating chronic corneal edema in high-risk patients prone to graft rejection. EndoArt® implantation safely reduced edema and significantly improved vision, demonstrating superiority over bandage lens in restoring corneal deturgescence. As a non-biologic device not subject to rejection, EndoArt® may provide a durable solution for patients at risk of tissue failure.

Abstract No.: 202843

Intraoperative Optical Coherence Tomography Guided Precise Corneal Suture in the Treatment of Acute Keratoconus

First Author: Suxia LI

Co-Author(s): Weiyun SHI

Purpose: This study aimed to observe the clinical efficacy of precise suturing of posterior elastic layer fissures guided by intraoperative optical coherence tomography (iOCT) in conjunction with corneal thermokeratoplasty for the treatment of severe acute edematous keratoconus.

Methods: Eighteen patients in the study group underwent precise suturing of posterior elastic layer fissures guided by iOCT, in combination with corneal thermokeratoplasty. Thirteen patients were in the control group. Preoperative visual acuity, corneal edema diameter, corneal thickness, and posterior elastic layer fissure length were collected. Evaluation was performed to assess the time of initial postoperative corneal edema resolution and closure of the posterior elastic layer fissure. The corneal bed scar repair and visual acuity of the two groups were compared after deep lamellar keratoplasty.

Results: In the suturing group, the cornea of all 18 patients was accurately sutured to the deep stromal layer near the posterior elastic layer. The time for corneal edema resolution was 2.50 (1.00, 6.25) days in the suturing group and 7.00 (6.00, 10.50) days in the control group. The fissure healing time was 7.50 (7.00, 12.00) days in the suturing group and 14.00 (9.00, 14.00) days in the control group. All 18 patients in the suturing group successfully completed deep lamellar keratoplasty.

Conclusions: In the treatment of severe acute edematous keratoconus, precise suturing of posterior elastic layer fissures and corneal thermokeratoplasty can rapidly alleviate corneal edema and promote the healing of posterior elastic layer fissures. The use of iOCT guidance makes more safety, thereby assisting surgeons in precise suturing.

Abstract No.: 207029

Introduction of a Grading System in Descemet Membrane Endothelial Keratoplasty (DMEK) Graft Preparations in Wetlab Training Before Transitioning to Actual Clinical Cases for Successful Outcomes

First Author: Ronak SOLANKI

Purpose: DMEK is fundamentally limited by the steep technical learning curve associated with the preparation and handling of the ultra-thin donor graft. The purpose of the study is to establish a quantitative, objective grading rubric for pre-clinical wet lab assessment, ensuring a surgeon meets defined, evidence-based proficiency benchmarks before undertaking their first procedure.

Methods: This grading system adapts 8 critical steps of donor preparation, i.e., Partial Trephine, Scoring of DM edge, Initial Peeling of DM, Dermal Punch, Stromal F Stamp, Final Donor punch, Final Peeling, and obtaining Free Graft, Loading in glass tube, and evaluation of Mean Donor Graft Preparation Time.

Results: The overall mean Preparation Time across all cases was 16.33 minutes. Time significantly decreased, demonstrating a clear learning curve progression: 19.85 minutes (cases 1–10), 15.55 minutes (cases 11–20), and 13.6 minutes (cases 21–30). Step-specific scoring revealed high proficiency in core technical maneuvers: Partial Trephine (100%), Scoring of DM edge (100%), Initial Peeling of DM (100%), Dermal Punch (100%), and Final Donor Punch (100%). Final integrity steps, including Final Peeling and Graft Loading, were also highly successful (96.7% each). However, critical areas for refinement included the Stromal F-Stamp (13.3% score, often smudged) and the management of Peripheral Tears (13.3% score) and Central Tears (3.3% score), highlighting persistent handling challenges.

Conclusions: Using the grading system improves competence in peeling, punching, marking, peripheral

and central tear management, and highlights the need for targeted training to ensure optimal graft quality, orientation, and, ultimately, improved clinical outcomes when subsequently doing actual clinical cases.

Abstract No.: 206988

Keratitis Due to Pigmented vs. Nonpigmented Fungi: Clinical Features and Outcome

First Author: Sujata DAS

Co-Author(s): Shalvika GUPTA, Smruti PRIYADARSHINI

Purpose: To compare the demographics, clinical characteristics, and treatment outcomes of pigmented versus non-pigmented fungal corneal ulcers.

Methods: A retrospective analysis was carried out on 100 consecutive culture-proven cases of keratomycosis (pigmented [n=50] and non-pigmented [n=50]) who presented between Jan-2024 to Jun-2024 at the L V Prasad Eye Institute, Bhubaneswar, India.

Results: There was no significant difference in ulcer size or presenting visual acuity between the two groups. Macroscopic pigmentation was observed in only 16% of eyes with keratitis due to pigmented fungus. Both groups responded favorably to medical therapy with similar rates of infiltrate resolution and scar formation. The final visual acuity was not significantly different between the groups. However, a trend towards higher frequencies of therapeutic penetrating keratoplasties and eviscerations was observed in the non-pigmented group compared to the pigmented group.

Conclusions: Macroscopic pigmentation was proven to be an unreliable diagnostic indicator. While medical therapy showed similar efficacy in both groups, the requirement for surgical interventions differed. These findings highlight the importance of species-specific treatment protocols and the need for aggressive management of deep ulcers to improve visual outcomes.

Abstract No.: 204158

Keratoconus Severity and Asymmetric Tomographic Patterns Between Eyes in Individuals With Down Syndrome: A Cross-Sectional Study From Southern India

First Author: Anitha VENUGOPAL

Co-Author(s): Nambi NALLASAMY, Meenakshi RAVINDRAN

Purpose: To evaluate the patterns of severity of Keratoconus and tomographic characteristics as classified by the Amsler Krumeich classification among individuals with Down syndrome.

Methods: We conducted a cross-sectional study at two tertiary eye care centres in Tamil Nadu, South India, in 192 eyes of 96 patients with Down syndrome and keratoconus (55 males, 41 females; mean age: 15.7 ± 7.3 years). Participants were classified into four

KC stages using Amsler-Krumeich classification with rotating Scheimpflug imaging (Pentacam HR) and slit-lamp biomicroscopy. Key parameters included mean keratometry (K), corneal thickness (CT), astigmatism, ARTmax, higher-order aberrations (HOA), and pachymetry.

Results: The tomographic indices, such as ARTmax and ZKmax, were the most statistically significant parameters for differentiating KC eyes from non-KC eyes. DSKC groups were divided into stages I (31), stage II (41), stage III (11) and stage IV (13), with 75% in the early stages of disease. As the severity increases, corneal parameters such as mean CT, mean K, astigmatism, ZKmax, HOA, and PE at the thinnest point show significant correlation with disease progression and are comparable to the results from other geographic locations among individuals with Down syndrome and Keratoconus. Logistic regression further confirms that these parameters, particularly mean CT, mean K, and astigmatism, are strongly associated with more severe stages of KC. Conversely, ARTmax, ARC and PRC are negatively related to the severity of KC in DS. I-S value and AVC showed weaker associations

Conclusions: The study highlights the need for early and targeted screening of KC in individuals with DS.

Abstract No.: 206040

Late-Onset Asymmetric Lattice Corneal Dystrophy: Documenting the H626R Phenotype

First Author: Vy LY NGOC PHUONG

Co-Author(s): Anthony J. ALDAVE, Doug CHUNG, Nguyen Viet Huong DUONG, Huan PHAM NGUYEN, Jhuwala VENKATAKRISHNAN

Purpose: To illustrate the characteristic asymmetric presentation of lattice corneal dystrophy through a case of 10-year delayed bilateral involvement in a young female, emphasizing the importance of long-term surveillance.

Methods: Case report.

Results: A 38-year-old female was diagnosed with unilateral lattice corneal dystrophy in the left eye (OS) in 2015. In 2021, she developed keratitis in the affected eye, leading to further deterioration of vision. Clinical examination revealed significant visual impairment in the OS with visual acuity of 4/10 vs 10/10 in the right eye (OD). A slit-lamp examination showed precipitates in the corneal stroma and corneal scarring in the OS. Sclerotic scatter showed lattice-like branching stromal lines in the OS. Initially, AS-OCT revealed hyperreflective deposits in the OS cornea. Genetic analysis of exon 14 of the TGFBI gene identified a pathogenic H626R variant (CAT>CGT heterozygous) associated with Lattice corneal dystrophy. Recent AS-OCT imaging shows the OD is beginning to develop

mild hyperreflective deposits 10 years after the initial diagnosis in the left eye.

Conclusions: This case exemplifies the characteristic asymmetric phenotype of H626R-associated lattice corneal dystrophy, demonstrating the typical delayed bilateral progression that defines this mutation's clinical signature and underscores the critical importance of lifelong bilateral surveillance.

Abstract No.: 203116

Long-Term Outcome and a Risk Score of Moderate to High Risk Corneal Transplantation

First Author: Zhewen **ZHENG**

Co-Author(s): Shiyu **ZHOU**

Purpose: To develop a risk score for moderate to high risk penetrating keratoplasty based on the risk factors of corneal transplantation, using the score to reclassify the moderate to high risk cohort.

Methods: This retrospective cohort study analyzed data from 2,298 moderate-to-high-risk grafts that underwent penetrating keratoplasty at Zhongshan Ophthalmic Center between January 1, 2012, and December 31, 2022. The clinical characteristics and survival status of the patients were obtained from electronic health records. The primary outcome was graft survival probability. We included 14 recipients, 2 transplant procedural, and 2 post-transplant factors. These factors were assessed using multivariate Cox regression (entry criterion: $P < 0.05$). Using the selected variables, we constructed a risk score based on the coefficients derived from the Cox PH (Cox proportional hazards) model. Risk stratification was performed based on the survival curves of risk score.

Results: A total of 2,298 moderate to high risk grafts underwent PK during the study period. The moderate to high risk grafts from January 1, 2012, to December 31, 2021, were randomly grouped into training (1,338 eyes), test (573 eyes), and temporal validation datasets (387 eyes). The 1-, 3-, 5-, and 7-year graft survival rates were 63.0%, 40.3%, 34.6%, and 32.2%, respectively. Six factors were finally identified. The AUC (Area under the Curve) of the risk score in the external validation set was 0.747. The study reclassified the moderate to high risk grafts into three groups: moderate-risk group (0-2 points), high risk group (3-5 points) and extremely high risk group (≥ 6 points), the survival curves across these stratified groups differed significantly (log-rank test, $P < 0.001$).

Conclusions: The risk score demonstrates good discriminatory ability for moderate to high risk corneal grafts and can further stratify these grafts.

Abstract No.: 202894

Long-Term Outcomes of Penetrating Keratoplasty or Lamellar Keratoplasty for Macular Corneal Dystrophy: A Multicenter Retrospective Cohort Study

First Author: Jun **CHENG**

Purpose: To compare the long-term efficacy of penetrating keratoplasty (PKP) and lamellar keratoplasty (LKP) in the treatment of macular corneal dystrophy (MCD).

Methods: Retrospective cohort study from six tertiary ophthalmic clinical centres. Data were collected retrospectively from chart review and electronic patient records for all patients during the study period. A 1:2 performed propensity score matching was used to minimize potential bias between the LKP and PKP groups. Kaplan-Meier survival curves and Cox proportional hazards regression models were used for analyses of graft survival and recurrence risk factors.

Results: A total of 307 eyes of 220 patients with MCD who underwent primary PKP or LKP between January 1, 1992, and December 31, 2023. The average follow-up duration was 9.4 ± 6.1 years (range: 1.0-32.8 years). There were no significant differences in VA between the PKP and LKP groups at 1, 5, and 10 years post-surgery. However, at 15 and 20 years postoperatively, the VA in the LKP group was significantly lower than that in the PKP group ($P = 0.000$ and $P = 0.014$, respectively). The long-term visual prognosis of patients < 40 years after undergoing PKP is better than that after LKP. The median graft survival time was 23.3 years in the PKP group and 9.1 years in the LKP group ($P < 0.0001$). The postoperative recurrence rate in the PKP and LKP groups was 10.2% and 48.1%, respectively ($P < 0.0001$). The risk of recurrence in the LKP group was 8.70 times higher than that in the PKP group (95% CI: 4.595–16.47, $P < 0.0001$). Multivariable analysis revealed that age at surgery ($P = 0.002$) and femtosecond laser preparation of the host bed ($P = 0.005$) were independent risk factors for recurrence after LKP. While no risk factors associated with recurrence after PKP were identified. Endothelium dark areas and guttae were found after surgery in the LKP group. Nine patients (11.4%) developed endothelial dysfunction after LKP, with a mean age of dysfunction of 58.7 ± 6.8 years (range: 45.2-70.0 years). Patients in the PKP group reported significantly higher satisfaction scores than those in the LKP group (8.5 ± 1.9 vs. 7.8 ± 1.8 , $P = 0.030$).

Conclusions: In the long run, PKP is a better option for treating MCD patients, as there is a relatively high recurrence rate after LKP. We should give more consideration to the corneal endothelial function when choosing the surgical method for elderly patients.

Abstract No.: 200320**Mechanism of Corneal Epithelial Wound Healing Defect in Patients With Rheumatoid Arthritis***First Author: Jiang BIAN*

Purpose: To explore the underlying mechanism of poor corneal epithelial wound healing in patients with rheumatoid arthritis (RA).

Methods: Ocular conditions were evaluated by slit-lamp examination, measurement of corneal epithelial repair time, Ocular Surface Disease Index (OSDI) scoring. Proteomic techniques were employed to screen for differential factors in tears. In vitro, corneal epithelial cells were treated with specific concentrations of differential factors. A collagen-induced arthritis mouse model (CIA) was established to observe the repair of ocular injuries, tear secretion, corneal sensitivity, and nerve repair in mice. Transcriptomic analysis was carried out, and combined with bioinformatics analysis, and mitochondrial electron microscopy, the effects of target inflammatory factors on corneal epithelial cells were investigated.

Results: It was found that the repair process of the corneal epithelium in RA patients was significantly slower after injury. Compared with the control group, the repair time was significantly prolonged. Proteomics revealed a significant increase in specific inflammatory factors in the tears of RA patients. Cell experiments demonstrated that the target factors could affect the proliferation, migration, and apoptosis of epithelial cells. CIA mice also exhibited slow corneal epithelial repair after injury, which was highly consistent with the manifestations of clinical patients. Transcriptomic analysis indicated abnormalities in mitochondrial-related biological processes such as mitochondrial translation and mitochondrial ATP synthesis.

Conclusions: Poor corneal epithelial wound healing in RA patients is closely related to the increase in specific inflammatory factors. This study provides a theoretical basis for the clinical treatment of RA-related corneal lesions.

Abstract No.: 203144**Mechanism of Resistance Difference Between C57 and Balb/C Mice to Pseudomonas aeruginosa Keratitis***First Author: Zhang ZHENZHEN*

Purpose: Pseudomonas aeruginosa is a gram-negative bacterium with strong virulence, which can invade the cornea through corneal wounds and cause acute corneal infection and ulcers. Previously we found C57 mouse cornea was highly susceptible to P. aeruginosa infection, while BALB/C showed strong resistance. Here, we studied the mechanism underlying the corneal resistance difference between these two mouse strains.

Methods: Fifteen C57 and BALB/C mice aged 6 to 8 weeks were selected for transcriptome sequencing. Corneal epithelial cells infected with 10^5 P. aeruginosa were collected. Cell invasion assay and Seahorse cell energy phenotype test were conducted.

Results: RNA sequencing showed 2342 genes were differentially up-regulated and 1563 genes were differentially down-regulated in BALB/C epithelium compared with C57. In the functional enrichment analysis, oxidative phosphorylation pathway showed the most significant difference, containing 15 up-regulated genes. The metabolic profiles were measured with the Seahorse XFp Flux Analyzer and XF cell mito stress test kit. Oxygen consumption rate (OCR) and extracellular acidification rate (ECAR) were determined in the presence of specific mitochondrial activators and inhibitors. We found there was no difference between these two mouse corneal epithelia before infection. When applied after infection, the inhibitor of oxidative phosphorylation-rotenone could exacerbate BALB/C corneal infectious severity.

Conclusions: RNA sequencing showed that there were significant differences in metabolism-related genes between BALB/C and C57 mouse corneal epithelial cells, suggesting that the resistance of BALB/C mice cornea to P. aeruginosa was related to oxidative phosphorylation pathway.

Abstract No.: 202826**Mesenchymal Stem Cell-Derived Secretome and Exosomes for Dry Eye: A Systematic Review of Preclinical and Clinical Evidence***First Author: Evelyn KOMARATIH**Co-Author(s): Chandra PRABASWARA, Siti ZAHRA AFIFAH*

Purpose: To systematically assess the therapeutic efficacy and safety of MSC secretome and exosome applications in dry eye, across preclinical and clinical studies.

Methods: Following PRISMA 2020 methodology, PubMed, Embase, Scopus, and Cochrane databases were searched (2015–2025). Eligible studies evaluated secretome or exosome interventions in experimental or clinical dry eye. Primary outcomes included tear volume, tear break-up time (TBUT), and ocular surface integrity. Risk of bias was assessed using SYRCLE's tool (animal studies) and the Newcastle-Ottawa Scale (clinical data).

Results: Ten studies met the inclusion criteria: nine animal experiments (94 subjects) and one randomized controlled trial in humans (n=40). Secretome treatment enhanced tear secretion ($p=0.008-0.01$), prolonged TBUT ($p=0.032$), increased goblet cell density nearly three-fold, and reduced fluorescein staining ($p=0.003$). Exosome administration further demonstrated substantial benefits, with tear secretion

improving more than two-fold, TBUT doubling, goblet cell counts rising significantly, and corneal fluorescein scores dropping by over 50% ($p < 0.001$). The clinical RCT corroborated these findings, showing sustained improvements in OSDI scores, TBUT, tear volume, and staining over 12 weeks (all $p < 0.05$). Importantly, no treatment-related adverse events were reported. Methodological concerns in animal studies included unclear allocation concealment and insufficient blinding.

Conclusions: Evidence from both animal and early clinical trials suggests that MSC-derived secretome and exosomes provide meaningful, safe, and durable improvements in dry eye outcomes. Nevertheless, further large-scale, rigorously designed clinical studies are required to validate these therapies and enable translation into routine ophthalmic practice.

Abstract No.: 202480

Microbiological Screening Methods for Donor Corneas: Impact on Graft Infections and Clinical Outcomes

First Author: Manvi **BANSAL**

Co-Author(s): Tushar **AGARWAL**, Aafreen **BARI**, Nishat **HUSSAIN**, Sridevi **NAIR**, Namrata **SHARMA**, Radhika **TANDON**

Purpose: The study aimed to evaluate the efficacy of microbiological screening methods for donor corneas and their correlation with clinical outcomes, particularly donor-related graft infections. The conjunctival tissue sampling method was compared with tissue storage media swab method and post operative donor rim tissue sampling, to ascertain the more effective technique for detecting microbial contamination of donor corneas.

Methods: This prospective observational study evaluated the microbiological contamination of donor corneal tissues retrieved over a 16-month period through a Hospital Cornea Retrieval Program (HCRP) at a tertiary eye care centre. Donor tissues were tested using 3 methods: tissue storage media swab cultures (conventional method), donor conjunctival tissue cultures (obtained at the time of corneo-scleral rim harvest), and corneo-scleral rim cultures after transplantation. The primary outcome measured was microbial positivity rates with the different testing methods. Secondary outcome measures were the correlation between the different sampling techniques and postoperative graft infection cases.

Results: Among 644 donor corneas analysed, media swab culture was positive in 6.67%. Conjunctival tissue culture showed a positivity rate of 38.09% and donor rim cultures had 38.01% positivity. Conjunctival tissue contamination significantly correlated with donor rim culture contamination ($p < 0.0001$), with no significant correlation with tissue storage media swab contamination ($p = 0.12$). Out of 644 tissues, 334

tissues were transplanted for non-infective indications, of which donor-related graft infection occurred in 1.49% ($n=5$) of keratoplasty cases. Conjunctival tissue cultures predicted the causative organism in 80% ($n=4$) of donor related graft infections, compared to 0% by storage media swabs and 40% predicted by donor rim cultures.

Conclusions: In a tropical setting, donor conjunctival tissue sample, obtained at the time of corneo-scleral rim harvest, can offer an early insight into the causative organism in cases of donor related corneal graft infections and can therefore aid in early institution of appropriate treatment.

Abstract No.: 203194

Motugivatrep, a TRPV1 Antagonist in Dry Eye Patients – Results of a Randomized, Double-Masked, Placebo-Controlled Phase 3 Pivotal Study

First Author: Yuichi **HORI**

Co-Author(s): Minoru **KANAMOTO**, Kazunori **OMATSU**, Tomoyuki **WADA**

Purpose: To confirm the efficacy and safety of motugivatrep 0.3% ophthalmic suspension in patients with dry eye disease.

Methods: A multicenter, randomized, double-masked, placebo-controlled, Phase 3 study was conducted in Japan. Outpatients aged ≥ 18 years with subjective dry eye symptoms (Dry Eye-related Quality of Life Score (DEQS) ≥ 1 , visual analogue scale (VAS) for eye dryness ≥ 40 , and 5-Item Dry Eye Questionnaire (DEQ-5) ≥ 6) and a mean tear break-up time of ≤ 5 seconds in both eyes were enrolled. After a 2-week placebo run-in period, participants were randomized 1:1 to receive either motugivatrep or placebo, four times daily for 8 weeks. The primary endpoint was the change in total DEQS from baseline at week 4.

Results: Of the 535 participants randomized, 268 received motugivatrep, and 267 received a placebo. At week 4, the DEQS score was significantly reduced by motugivatrep compared to placebo ($p=0.0433$). Statistically significant improvements were also observed in DEQS at all visits conducted between week 1 and week 4 and in eye dryness VAS at weeks 1 and 4 ($p < 0.05$). TEAEs were mild or moderate in severity. No serious TEAEs were reported.

Conclusions: Motugivatrep is the first-in-class TRPV1 antagonist that demonstrates efficacy and safety in patients with dry eye disease.

Abstract No.: 209011

Neurotrophic Keratopathy Patients After Minimally Invasive Corneal Neurotization Treated With rhNGF Eyedrops: A Case Series

First Author: Jin LI

Purpose: For patients with neurotrophic keratopathy (NK) induced by trigeminal nerve injury after intracranial surgeries, minimally invasive corneal neurotization (MICN) is a novel approach. However, the process of post-operative neurotization often lasts for over 2 years. Recombinant human nerve growth factor (rhNGF) is a new treatment targeting nerve growth in NK patients. Therefore, the authors applied rhNGF eyedrops to NK patients after MICN.

Methods: The authors highlight five cases that underwent MICN and were subsequently treated with rhNGF eyedrops. These cases include four patients who had undergone MICN over 1 year prior and one patient who had undergone MICN 6 months prior. Three patients who underwent MICN and were treated with conventional medications were enrolled as controls. Evaluation indicators included corneal sensation, sub-basal corneal nerve density, tear secretion and tear break-up time, best-corrected visual acuity, corneal epithelium condition, and clinical symptoms. All patients in the rhNGF group were treated with rhNGF eyedrops for 4 weeks.

Results: After 4 weeks of treatment with rhNGF eyedrops, corneal sensation significantly improved in all five patients. Corneal nerve fiber length and nerve branch density increased, and corneal nerve trunk diameter improved. Corneal damage was reduced, and best-corrected visual acuity improved. Compared to patients treated with conventional medications postoperatively, corneal sensation and nerve density, as well as corneal morphology, recovered more rapidly in the rhNGF group.

Conclusions: rhNGF eyedrops may accelerate the healing process of corneal neurotization and enhance corneal sensation. The optimal timing for initiating rhNGF eyedrops may depend on the baseline corneal nerve condition and the presence of Tinetti's sign, which typically occurs about 1 year after MICN.

Abstract No.: 200392

New Approaches of Corneal Epithelium Reconstruction in a Patient With Limbal Stem Cell Deficiency (LSCD)

First Author: Svetlana KALINNIKOVA

Co-Author(s): Sergey BORZENOK, Svetlana IZMAILOVA, Boris MALYUGIN

Purpose: To present the novel surgical methods of corneal epithelial reconstruction - Glueless Simple Limbal Epithelial Transplantation (G-SLET) with using Femtosecond laser assisted techniques.

Methods: The first modification of GSLET is to use the femtosecond laser (FSL) at the tunnel formation stage; n=65 patients were operated using this technology (FSL GSLET). The next generation of GSLET aims to develop program software and algorithms for the excision and fragmentation of limbs, which represents the most critical phase of the operation, n=10 (Full FSL GSLET). The last version of the GSLET technique was Femtosecond laser-assisted anterior (or deep) lamellar keratoplasty combined with GSLET, n=15. The follow-up period was 5 years. All these patients had LSCD after Ocular Burns.

Results: In the group of patients after FSL G-SLET, the anatomical success rate was 81% (stable re-epithelization), and functional success (improved visual acuity) 51,5%. The Full FSL GSLET group anatomical success was 70%, functional 50%. DALK combined with GSLET shows anatomical success 75%, functional 80%. Undoubtedly, the last two groups require more observations to conclude the results.

Conclusions: The FSL-assisted G-SLET is a new technique for autologous limbal stem cell transplantation in patients with unilateral LSCD. It allows for standardizing the corneal tunnel localization and dimensions, which increases the safety of the surgical procedure. Combined FSL-assisted DALK with autologous modified G-SLET is a preferred option for patients with unilateral LSCD and corneal opacity. It not only provides a stable ocular surface, but also significantly improves visual outcomes.

Abstract No.: 200647

Non-Contact Brill Esthesiometer: Large Cohort Study Investigating the Agreement With Contact Esthesiometer and Correlation With Corneal Nerve Metrics and Ocular Surface Assessments

First Author: Yu-chi LIU

Co-Author(s): Isabelle Xin Yu LEE, Chang LIU, Jodhbir MEHTA, Hon Shing ONG, Louis TONG, Regina Kay Ting WONG, Mingyi YU

Purpose: To evaluate the repeatability of the non-contact Brill esthesiometer (NBE), determine its agreement with Cochet-Bonnet esthesiometer (CBE), and investigate the relationship between corneal sensitivity, corneal nerve parameters, and ocular surface assessments.

Methods: This study included 880 eyes, comprising healthy controls (80 eyes), dry eye disease (DED, 170 eyes), neuropathic corneal pain (NCP, 140 eyes), post-refractive surgery (P-RS, 176 eyes), and diabetes mellitus (DM, 314 eyes). NBE and CBE measurements, in-vivo confocal microscopy for seven corneal nerve parameters, and four ocular surface parameters were assessed.

Results: NBE presented excellent intra- and inter-observer repeatability (both ICC>0.980, P<0.001). NBE measured significantly higher than CBE in all groups (all P<0.001). These inter-instrument measurements had good agreement in eyes with higher corneal sensitivity and showed significant correlations across all cohorts (all P<0.05). P-RS cohort exhibited the highest proportion of eyes within 95% limits of agreement (98.3%) and the strongest correlation ($r=0.853$, P<0.001) between NBE and CBE measurements. NBE measurements significantly correlated with corneal nerve parameters in control, DED, P-RS, and DM groups ($r=-0.157$ to -0.545 , all P<0.05), whereas CBE correlated with fewer nerve parameters. NBE measurements, to a greater extent than CBE, significantly correlated with ocular surface parameters in the control, NCP, and DM groups ($r=-0.126$ to -0.465 , all P<0.05).

Conclusions: NBE and CBE measurements showed good agreement at higher corneal sensitivity and are not interchangeable. NBE is potentially superior in reflecting corneal nerve and functional changes than CBE.

Abstract No.: 205953

Ocular Manifestations in Juvenile Xanthogranuloma and Histopathological Co-Relation: A Retrospective Case Series From a Tertiary Eye Care Centre in India

First Author: Swetha **BUGGAREDDIGARI**

Co-Author(s): Geetha K **VEMUGANTI**, Muralidhar **RAMAPPA**

Purpose: To describe the clinical spectrum, histopathological features, ocular involvement, and outcomes of juvenile xanthogranuloma in patients presenting to a tertiary eye care centre in India.

Methods: A retrospective review was conducted of 28 patients diagnosed with Juvenile Xantho Granuloma between 2002 and 2025 at a tertiary eye care centre. Data collected included demographics, site of involvement, clinical features, histopathology and immunohistochemistry, treatment, and outcomes.

Results: The cohort comprised 28 patients (17 females, 9 males, with ages ranging from neonates to 65 years). Eyelid and orbital lesions were the most frequent ocular adnexal manifestations. Intraocular involvement was rare ($n=2$; iris lesions with spontaneous hyphema with secondary glaucoma). Histopathology consistently demonstrated xanthogranulomatous inflammation with Touton giant cells, and IHC positivity for CD68 and Factor XIIIa with negativity for CD1a, S100, and Langerin. Surgical excision or debulking for extraocular lesions was effective, while topical, systemic, or intralesional corticosteroids were used in recurrent or diffuse lesions. Compared with published series, our findings highlight eyelid and orbital involvement as more frequent sites than the iris, which has been

reported as the predominant site in Western studies. The age spectrum extended beyond childhood, with adult-onset JXG accounting for several cases.

Conclusions: This represents one of the largest ocular juvenile xanthogranuloma case series reported from India. Juvenile xanthogranuloma is a benign, self-limiting histiocytic disorder, usually presenting as cutaneous lesions. Ocular and rarely systemic involvement necessitate careful evaluation, particularly in patients without skin lesions or with systemic associations. Early recognition and management are vital to prevent vision loss or systemic complications.

Abstract No.: 204788

Ocular Surface Toxicity of Novel Anti-Tumor Targeted Agents and Their Characteristics Under Confocal Microscopy

First Author: Wen Xin **ZHAO**

Co-Author(s): Li **LI**

Purpose: To characterize the ocular surface manifestations and in vivo confocal microscopy (IVCM) features associated with novel anti-tumor targeted therapies.

Methods: A retrospective analysis of 8 patients who developed ocular surface toxicity during treatment with novel targeted agents was conducted. All patients underwent detailed ophthalmic evaluation, including slit-lamp examination, corneal fluorescein staining, and IVCM.

Results: This study included a total of 8 patients, comprising 6 HER2-positive breast cancer patients on antibody-drug conjugate (ADC) therapy and 2 patients with advanced solid tumors treated with erlotinib. Two distinct toxicity profiles were identified: 1. ADC-associated ocular toxicity manifested as dry eye, characterized by reduced tear secretion, conjunctival injection, and punctate epithelial erosions. IVCM showed hyperreflective deposits in the subepithelial and anterior stromal layers, manifesting as discrete or clustered dots, with significant reduction of subbasal nerve fiber density. These changes were dose- and duration-dependent but reversible upon drug discontinuation. 2. Erlotinib-associated ocular toxicity presented with Stevens-Johnson syndrome-like features, including corneal epithelial defects, melting, perforation, pseudomembrane formation. Ocular involvement typically occurred after cutaneous and oral mucosa lesions. IVCM revealed the presence of abundant inflammatory cells infiltrating the corneal epithelium and stroma. Discontinuation of erlotinib combined with intensive topical immunosuppressive and regenerative therapy, supplemented with bandage contact lenses or corneal transplantation as needed, led to functional recovery.

Conclusions: Novel targeted agents exhibit distinct class-specific ocular toxicity profiles. ADCs are

associated with a dose-dependent keratopathy, while EGFR inhibitors like erlotinib may induce severe SJS-like reactions. Early recognition, multidisciplinary collaboration, and timely drug discontinuation are crucial for preventing sight-threatening complications.

Abstract No.: 206050

Outcomes of Artificial Endothelial Replacement Membrane Implantation, EndoArt, in Patients at High Risk for Human Graft Rejection

First Author: Ofer DAPHNA

Purpose: To compare 12-month safety and efficacy outcomes of EndoArt implantation in adult patients with chronic corneal edema who are at high risk versus those at normal risk for human graft rejection.

Methods: A retrospective analysis of 45 high-risk patients and 71 normal-risk patients. High-risk patients were defined as those who either failed multiple keratoplasties or had a condition placing them at risk for human graft failure. Safety and efficacy data, including central corneal thickness (CCT), best corrected visual acuity (BCVA) and pain score (measured by visual analogue scale, VAS) are presented for the first 12 months post implantation.

Results: At 12-month follow-up, an average CCT decrease of around 190µm was seen in both groups (p -value<<0.05). CCT improvement was stable and significant throughout follow-up. Pain (VAS) was markedly reduced from 17 ± 19 and 38 ± 37 pre-op (for high-risk and normal-risk, respectively) to 6 at 12 months post implantation (p -value<0.05). As CCT decreased, patients regained corneal clarity, which correlated with improved visual acuity. Despite presenting similar trendlines for CCT and for corneal clarity, the improvement in BCVA was more prominent in the normal-risk group- from 1.73 ± 0.58 pre-op to 1.22 ± 0.76 at 12-month versus from 1.74 ± 0.59 to 1.45 ± 0.65 in the high-risk group, presumably due to the co-morbidities of the latter population. There were no long-term reported infections or inflammation related to EndoArt implantation. The most common post-op intervention was re-bubbling, which occurred at a rate of 45.5% in the normal-risk population, and reached a rate of 61.9% in the high-risk population.

Conclusions: The implant demonstrated safety and efficacy in treating chronic corneal edema in high-risk patients prone to graft rejection, leading to reduced edema and pain while improving vision in most cases. A comparison with lower-risk patients showed similar trends, though visual acuity outcomes differed, likely due to reduced visual potential. As EndoArt is not subject to rejection, it may offer a durable long-term solution for high-risk patients.

Abstract No.: 202904

Peripheral Neuropathy Symptoms and Ocular Surface Lesions in Patients With Type 2 Diabetes Mellitus and Dry Eye: A Clinical Correlational Study

First Author: Yangyang ZHANG

Co-Author(s): Lixin XIE

Purpose: Reduced corneal sensation in individuals with type 2 diabetes mellitus (T2DM) leads to a dissociation between dry eye disease (DED) signs and symptoms, thereby affecting diagnostic accuracy. To investigate the correlation between ocular surface signs and diabetic peripheral neuropathy (DPN) symptoms in patients with T2DM-associated DED.

Methods: The Michigan Neuropathy Screening Instrument Questionnaire (MNSIQ) was used to categorize patients with T2DM into MNSIQ-DPN and non-DPN groups. Ocular irritation symptoms were evaluated using the Ocular Surface Disease Index (OSDI) questionnaire. Ocular surface lesions were assessed via Cochet-Bonnet esthesiometry, corneal fluorescein staining (CFS), the Schirmer I tear test (SIT), the tear meniscus height (TMH), the noninvasive keratography break-up time (NIKf-BUT), and the meibomian gland loss (MGL) grade detected by OCULUS. Corneal nerve fiber parameters were evaluated using in vivo confocal microscopy (IVCM).

Results: A total of 116 patients with T2DM, comprising 76 non-DPN patients and 40 MNSIQ-DPN patients, along with 51 age-matched participants without diabetes, were enrolled. Although OSDI scores were equivalent between MNSIQ-DPN patients and non-DPN patients, MNSIQ-DPN patients presented significantly more severe CFS ($p < 0.001$), meibomian gland dysfunction (MGD) ($p < 0.001$), corneal nerve fiber loss ($p < 0.001$), sensory dysfunction ($p = 0.02$), and corneal microneuromatosis ($p < 0.001$). The MNSIQ score was significantly positively correlated with CFS ($p < 0.001$); MGD ($p < 0.01$); corneal nerve fiber loss, including corneal nerve fiber density and length and branch density, in the paracentral (all $p < 0.001$) and inferior-whorl areas ($p < 0.01$, $p < 0.05$ and $p < 0.01$, respectively); and corneal microneuromatosis, characterized by increased microneuroma numbers ($p < 0.001$) and areas ($p < 0.001$) in these regions.

Conclusions: MNSIQ scores were significantly and robustly correlated with the presence of corneal epithelial defects, MGD, and nerve fiber loss in patients with T2DM. These findings suggest that DPN is a critical factor in diabetic ocular surface complications, highlighting the importance of the MNSIQ for assessing these conditions.

Abstract No.: 203302

Preclinical study of limbal niche cells as Drug

First Author: Guigang LI

Purpose: To Introduce the Preclinical Study of Limbal Niche Cells As a Drug by Reviewing the Literature and Preliminary Data From Our Group and Others Around the World.

Methods: LNC cells were first identified by Dr. Xie Huatao and Professor Scheffer C. G Tseng et al., reported in Miami, USA. Li Guigang et al. further studied its cultivation method and biological characteristics and found that LNC adhered to the surface of the plastic culture plate coated with Matrigel for growth; Expressing CD73, CD90, CD105, as well as positive markers such as CD34, CD31, but not CD45; It can induce differentiation into bone cells, chondrocytes, and adipocytes; It has the characteristics of vascular progenitor cells and can be induced to differentiate into vascular endothelial cells and vascular Pericyte.

Results: LNC could be expanded in vitro for more than 12 generations, and has a better effect than BMMSC in treating limbal stem cell deficiency in the rabbit eye with alkali burn. Subconjunctival injected LNC could be traced by CellTracker™ CM Dil in vivo.

Conclusions: LNC is a group of promising cell drug that deserves more attention.

Abstract No.: 206372

Preoperative Endothelial Cell Reserve as a Predictor of Corneal Outcomes After Phacoemulsification: The First Report From the Land of Kawanua

First Author: Andika Adiputra WITONO

Co-Author(s): Laya RARES, Novanita SATOLOM, Eugeni SUMANTI, Roy UMBOH

Purpose: Phacoemulsification risks endothelial cell loss and corneal edema. Preoperative Corneal Endothelial Cell Density (CCD) is a vital reserve indicator, its precise predictive value for early corneal stability is often unclear. This prospective cohort study aimed to determine if preoperative CCD significantly predicts post-phacoemulsification corneal stability and to evaluate key confounders (age, sex, phaco-time). We sought to establish a robust predictor model for optimizing surgical case selection. Although many previous studies have been conducted, this is the first study carried out in North Sulawesi, Indonesia, where accessibility of ophthalmology facilities remains a significant challenge.

Methods: The study was conducted in the northern peninsula of Sulawesi Island, Indonesia, from April to September 2025. We analyzed medical records of 22 eyes with nuclear sclerosis grade 3-4 cataracts who underwent phacoemulsification. The primary

independent variable was preoperative CCD. Data were coded, entered, and analyzed using SPSS version 24.

Results: The mean age was 58.41±11.86 years, with 95.5% having normal preoperative CCD. Bivariate analysis showed no significant correlation between CCD D+1 and phaco-time ($P=0.098$) or Cumulative Dissipated Energy (CDE) ($P=0.0237$). However, multivariate analyses revealed two key findings: 1) Preoperative CCD significantly lowered the odds of early edema ($OR=0.96$; $P=0.038$); and 2) Preoperative CCD was a highly significant predictor for postoperative Central Corneal Thickness ($P<0.001$, Standardized $\beta=0.632$).

Conclusions: Preoperative CCD is the critical determinant of early postoperative corneal health. This research conclusively establishes that endothelial cell reserve significantly reduces the risk of edema and is the key predictor of corneal thickness, outweighing standard surgical parameters. High preoperative CCD leads to better early corneal outcomes.

Abstract No.: 206740

Preserving the Globe: A Retrospective Study on Scleral Patch Graft in Corneal Perforation at a Tertiary Hospital

First Author: Nadida NURFADHILA

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Purpose: This study explores the clinical characteristics, causes, and complications in patients with corneal perforation who underwent scleral patch graft procedures at a Tertiary Hospital.

Methods: A retrospective cross-sectional review was performed on the medical records of patients treated with scleral patch grafts between January 2021 and December 2022. Inclusion criteria consisted of cases managed solely with a scleral patch graft and a minimum follow-up of three months. Data collected included age, sex, lateralization, etiology of perforation, microbiological findings, prior history of tectonic surgeries, and postoperative complications.

Results: Of 156 eyes included, most patients were male, with an average age of 47.7 years. The predominant cause of perforation was infectious corneal ulcer (84%), followed by autoimmune peripheral ulcer, trauma, and descemetocoele. Bacterial infection, especially gram-positive cocci, was the most frequent organism isolated from infectious cases. Most ulcers were 3 mm or larger in size, centrally located, and tested negative with the Scheidel test. Secondary glaucoma (26%), reoperation (15%), and complicated cataract (3%) were the main postoperative complications. Fourteen eyes with reoperation required evisceration, while anatomical globe integrity was successfully maintained in 85% of cases following the scleral patch graft procedure.

Conclusions: Scleral patch graft is a reliable option for saving eyes with corneal perforation, particularly when donor corneas are unavailable. This technique maintains anatomical integrity for most patients, although close postoperative monitoring for complications remains crucial.

Abstract No.: 203905

Prevalence, Risk Factors, and Environmental Associations of Dry Eye Disease in the Hong Kong Population Aged 50 and above

First Author: Pui Yui **NGAN**

Co-Author(s): Victor H **HU**, Kendrick Co **SHIH**

Purpose: Dry eye disease (DED) is a common condition, with age, female sex, and Asian ethnicity identified as risk factors. Given Hong Kong's (HK) aging population, subtropical climate, and high pollution levels, this study aimed to determine the prevalence and environmental associations of DED among adults aged 50 and above in the Southern District (SD) of HK.

Methods: This cross-sectional study included 1,230 participants who underwent dry eye assessments between September 2021 and August 2023. Examinations were performed with the OCULUS Keratograph 5M in a least-to-most invasive order, consisting of the Ocular Surface Disease Index questionnaire, non-invasive keratographic break-up time (NIKBUT), and corneal staining. SD environmental data were obtained from the HK Observatory and HK Environmental Protection Department databases. DED prevalence was reported separately for the Dry Eye Workshop (DEWS) II and Asia Dry Eye Society (ADES) definitions. Associations between ADES-defined DED and same-day environmental data were evaluated.

Results: The crude prevalence of DED was 15.0% (185/1230) for the ADES definition and 18.1% (222/1230) for the DEWS II definition. Age- and sex-standardised prevalence adjusted to the 2024 HK population was 14.3% for ADES-defined DED and 16.8% for DEWS II-defined DED. The prevalence of symptomatic DED (OSDI ≥ 13) and asymptomatic DED (NIKBUT < 10 s) was 9.11% and 46.42% respectively. Female sex (aOR: 1.99, 95%CI: 1.36–2.83; $p < 0.001$), increasing age (aOR: 1.03 per year increase, 95%CI: 1.01–1.06; $p = 0.002$), and higher nitrogen dioxide exposure (aOR: 1.19 per 10 $\mu\text{g}/\text{m}^3$ increment, 95%CI: 1.01–1.41; $p = 0.048$) were significantly associated with ADES-defined DED in both univariable and multivariable analyses.

Conclusions: DED prevalence among adults aged 50 and above in HK was lower than pooled estimates from Asian countries but consistent with the global range. A large portion of subjects had short NIKBUT without symptoms. Female sex, increasing age, and higher nitrogen dioxide exposure were associated with DED.

Abstract No.: 207399

Ray-Tracing Guided Customized Laser Ablation for Progressive Keratoconus

First Author: Prabhjot **SINGH**

Co-Author(s): Anushree **LINGAIAH**, Rohit **SHETTY**

Purpose: To evaluate clinical outcomes of ray-tracing-guided customized ablation combined with accelerated cross-linking in progressive keratoconus.

Methods: A total of 106 eyes with progressive keratoconus underwent customized ablation using ray-tracing software with a high-frequency excimer laser (2 kHz), followed by accelerated corneal cross-linking. Assessments at 1, 3, and 6 months included visual acuity, corneal tomography, and higher-order aberration (HOA) analysis.

Results: At 1 month, Kmax reduced by 6.3 ± 3.9 D ($p < 0.05$) and Kmean by 3.2 ± 1.5 D ($p < 0.05$), stable through 6 months. UCDVA and BCDVA improved ≥ 3 lines ($p < 0.05$). Mean spherical equivalent decreased by 1.4 D ($p < 0.05$). HOA reduced from 2.32 μm to 1.43 μm ($p < 0.05$).

Conclusions: Ray-tracing-guided ablation with cross-linking provides effective corneal regularization and visual rehabilitation.

Abstract No.: 200241

Regenerative Potential of Limbal Epithelial Stem Cells for Graft-Host Junction Modulation in Post-Penetrating Keratoplasty Corneal Haze

First Author: Srishti **KHULLAR**

Co-Author(s): Vijay **KUMAR SHARMA**, Prabhjot **SINGH**

Purpose: To evaluate the efficacy of microscope-integrated optical coherence tomography-guided, precisely placed limbal epithelial stem cells for modulating the graft-host interface.

Methods: Prospective interventional pilot study with a sample size of 7 patients with a mean age of 46 ± 20.09 years. Collaborative corneal transplantation study group hosts corneal clarity grade ≤ 2 , presence of superficial punctate keratopathy, epithelial defects at graft-host junction, epithelial defects, microcystic edema, ASOCT signs of visible gap $\geq 50\mu\text{m}$ between host and donor epithelium, difference in epithelial thickness $\geq 20\mu\text{m}$ were the inclusion criteria (≥ 3 months post penetrating keratoplasty) and eyes with previous ocular comorbidities, history of graft rejection/failure were excluded from the study. Selected patients underwent precise placement of limbal stem cells with amniotic membrane. The follow-up period for these patients was 3 months.

Results: Mean change in corneal clarity grade was 2 ± 0.5 . Mean BCVA prior to surgery was logMAR 0.72 ± 0.17 , and post-procedure was logMAR 0.43 ± 0.14 .

There was a significant improvement at the graft-host interface and regularised the junction.

Conclusions: Graft-host junction irregularities are a major but overlooked challenge post-PK. This is the first study to explore the application of iOCT-guided precisely placed limbal epithelial stem cells for addressing graft-host junction abnormalities and persistent corneal haze after PK. No major complications or adverse events were observed during the study period. However, longer follow-up is required.

Abstract No.: 206462

Reliability of Intraoperative Biometry (Optiwave Refractive Analysis) in Post-Radial Keratotomy Eyes Undergoing Cataract Surgery

First Author: Vipasha SHARMA

Co-Author(s): Lekha CHANDEL, Amit GUPTA, Chintan MALHOTRA, Garg SHIVAM

Purpose: To evaluate the refractive accuracy of intraoperative biometry using Optiwave Refractive Analysis (ORA) compared to preoperative IOL power calculations using the Barrett True-K formula in eyes with prior radial keratotomy (RK) undergoing cataract surgery.

Methods: This retrospective case series included 32 eyes of 24 patients with a history of RK (4–16 incisions) who underwent uncomplicated cataract surgery. Preoperative biometry was performed using IOLMaster 700 with Barrett True-K formula, and intraoperative aphakic measurements were obtained using ORA. Target refraction was adjusted based on RK incision count. Primary outcomes included mean absolute error (MAE), arithmetic mean error (AME), and the percentage of eyes achieving postoperative spherical equivalent (SE) refraction within ± 0.50 D, ± 1.00 D, and ± 2.00 D of predicted values.

Results: ORA demonstrated lower MAE (0.91 ± 1.18 D) compared to Barrett (1.38 ± 1.37 D), though not statistically significant ($p = 0.103$). Both methods showed a myopic bias (AME: ORA -0.63 ± 1.37 D; Barrett -0.46 ± 1.88 D). Mean postoperative SE was -1.73 ± 1.38 D. A higher proportion of eyes achieved refractive outcomes within ± 0.50 D, ± 1.00 D, and ± 2.00 D using ORA.

Conclusions: Intraoperative wavefront aberrometry with ORA offers reliable refractive outcomes in post-RK eyes undergoing cataract surgery. Although not statistically superior to Barrett True-K, ORA showed lower variability and better performance trends, suggesting its potential utility in complex corneal cases.

Abstract No.: 206916

Screening of Dry Eye Disease in Cocaine and Methamphetamine Users

First Author: King Him Cyrus CHEUNG

Co-Author(s): Kam Lung Kelvin CHONG, Ka Hei Kenneth LAI, Chi Pui Calvin PANG, Chee Yung Clement THAM

Purpose: To evaluate dry-eye disease-related ocular surface parameters among substance users in Hong Kong.

Methods: Cross-sectional study of cocaine and methamphetamine users in the prior 24 months recruited from CCPSAs. This study is supported by the Beat Drugs Fund (BDF210067). Dry-eye parameters included Fluorescein Tear Film Breakup Time (F-TBUT), Corneal staining (Modified Oxford / NEI), and grading of MGD by ophthalmologists. Subjective dry-eye symptoms were reported through the Ocular Surface Disease Index (OSDI). DED was diagnosed per the recent Hong Kong Dry Eye Disease Framework.

Results: Forty-six right eyes of substance-users and 46 age-sex-matched controls (male=29) were compared (age: 36.50(44.25-31.00) years; $p=0.928$). DED symptoms were more prevalent in substance-users than controls (58.7% vs. 13.0%; $p<0.001$), as were positive objective DED tests (82.6% vs. 58.7%; $p=0.021$). DED was diagnosed in 45.7% of substance-users vs. 4.3% of controls ($p<0.001$). Compared to controls, substance users had a lower F-TBUT (4.08(5.80-2.05) vs. 4.67(7.56-3.55) secs; $p=0.022$), worse capping (1.00(2.00-0.75) vs. 1.00(1.00-0.00); $p=0.045$), lid margin rounding (1.00 (2.00 – 1.00) vs. 0.00 (1.00 – 0.00); $p<0.001$) and worse Meibomian Gland Yielding Secretion Score (16.00(30.00-9.50) vs. 26.50(37.00-14.00); $p=0.011$). Substance users also reported higher OSDI (16.29(45.11-8.52) vs. 6.25(18.75-0.00); $p<0.001$) and higher scores for the individual symptoms of gritty eyes (0.50 (2.00 – 0.00) vs. 0.00 (1.00 – 0.00); $p=0.011$) and poorer vision (1.00 (2.25 – 0.00) vs. 0.00 (1.00 – 0.00); $p=0.002$).

Conclusions: As the first study to investigate dry-eye parameters in substance users, we found that substance use is associated with worsened parameters and a significant sign-symptom disparity. While symptom-based questionnaires may not truly reflect the dry-eye condition among substance users, active screening of the ocular surface is warranted.

Abstract No.: 200289

Seasonal Variation of Microsporidial Keratitis in Eastern Uttar Pradesh: A Retrospective Observational Study at a Tertiary Eye Care Centre

First Author: Akanksha DASS

Co-Author(s): Smriti GAUR, Anshupa PATNAIK

Purpose: To evaluate the seasonal trends and incidence patterns of microsporidial keratitis in

Eastern Uttar Pradesh over a defined one-year period. Seasonal and environmental factors may influence the incidence, but limited data are available from North India. Understanding the risk factors and transmission patterns aids in early diagnosis and management.

Methods: A retrospective observational study -conducted at a tertiary eye care center in Eastern Uttar Pradesh. Medical records of 283 patients diagnosed with microsporidial keratitis between September 2023 to September 2024 were reviewed. Diagnosis was confirmed through smear and staining techniques, including KOH, calcofluor white, and Gram staining. The monthly and seasonal distribution of cases was analyzed and correlated with regional climatic data—specifically temperature, humidity, and rainfall.

Results: Seasonal distribution showed a significant increase in cases from June to October, accounting for 76.4% of total cases. A positive correlation was noted between relative humidity levels above 70% and increased incidence ($r = 0.67$, $p < 0.05$). Predominantly affecting outdoor male workers (M:F = 6.8:1), this infection underscores the role of occupational and environmental exposure. This is the highest sample size studied to date, hence essential in identifying seasonal trends, so that the healthcare providers can be more vigilant during those times and offer timely intervention, potentially improving patient outcomes.

Conclusions: This study demonstrates a distinct seasonal pattern in the incidence of microsporidial keratitis, with a notable rise during humid months. Recognizing these trends is crucial for prompt diagnosis, timely management, and implementation of preventive strategies—particularly among high-risk populations during vulnerable seasons.

Abstract No.: 206803

TAZ-TGF Beta 1 Gene Driven Fibrotic Signalling in Chronic Ocular Chemical Injury Cases With Total Limbal Stem Cell Deficiency

First Author: Renu VENUGOPAL

Co-Author(s): Seema KASHYAP, Nikhil KUMAR, Seema SEN, Namrata SHARMA, Lata SINGH

Purpose: Chronic ocular chemical injury with total limbal stem cell deficiency (LSCD) is characterized by conjunctivalization and pannus formation, often leading to irreversible vision loss. Fibrosis in conjunctival pannus poses a major challenge to ocular surface reconstruction after injury. This study investigated the molecular mechanisms of fibrosis in this setting, focusing on emphasizing the interplay between Hippo pathway effectors and TGF- β 1 signalling in ocular chemical injury cases.

Methods: Conjunctival pannus specimens ($n = 58$) from patients with chronic ocular chemical injury and normal conjunctival controls ($n=4$) were analysed. Quantitative reverse transcription PCR (qRT-PCR) measured

mRNA expression of TAZ, YAP, TGF- β 1 (TGFB1), and TEAD1, normalized to ACTB (beta actin). Comparative expression profiling was performed between diseased and control tissues.

Results: Pannus tissues exhibited a distinctive fibrotic molecular signature. TAZ and TGF- β 1 were significantly upregulated ($p < 0.01$), while YAP1 expression was reduced and TEAD1 expression was negligible. These results implicate TAZ as the dominant Hippo pathway effector in fibrotic remodeling. The absence of TEAD1 suggests TAZ mediates profibrotic signaling via alternative transcriptional partnerships, likely involving Smad proteins, to amplify TGF- β 1-driven extracellular matrix deposition.

Conclusions: This study identifies a novel TAZ-centered, TEAD1-independent signaling axis as a key driver of conjunctival fibrosis. By revealing TAZ-Smad crosstalk as a central mechanism of ocular surface scarring, these findings highlight an innovative therapeutic target for antifibrotic strategies. This molecular insight advances the understanding of ocular surface repair biology and opens new avenues for improving long-term outcomes in patients with vision-threatening ocular surface injuries.

Abstract No.: 206879

Tackling the Untreatable: Long-Term Outcome of Sublingual Immunotherapy in Refractory Ocular Allergy

First Author: Gaurav PANDE

Co-Author(s): Yathish SHIVANNA, Vibha SINGH

Purpose: To evaluate indications and long-term outcomes of Sub Lingual Immunotherapy (SLIT) in the management of severe chronic ocular allergy.

Methods: Clinical records of allergic eye disease (AED) patients were studied as a retrospective observational study design. Refractory cases underwent allergen testing; SLIT was started based on results and history. Outcomes were measured by steroid use and allergy episodes.

Results: Of 805 AED patients, 121 refractory cases were referred; 52 were started on Allergen-specific immunotherapy (AIT) after allergen testing. 90% improved, with significant steroid reduction ($p<0.01$). Potent topical steroid use decreased from 32 to 15 patients ($p<0.05$). The mean follow-up of 25.5 months showed good control and minimal side effects.

Conclusions: SLIT improves long-term control in severe refractory AED by reducing symptoms, steroid use, and flare-ups via targeted immunotherapy. Early allergist referral and SLIT should be considered in refractory AED for personalized, steroid-sparing treatment and improved quality of life.

Abstract No.: 203962

Technique and Outcomes of 'Combined Single-Stage Keratoprosthesis Implantation With Mucous Membrane Grafting'

First Author: Gaurav VERMA

Co-Author(s): Jagadeesh Kumar REDDY, Vandhana SUNDARAM, Shruthi TARA

Purpose: To evaluate the clinical outcomes and benefits of a single-stage surgical approach combining Type I Keratoprosthesis (KPro) implantation with mucous membrane grafting (MMG) in adult patients with severe ocular surface disease.

Methods: A retrospective, interventional case series was conducted on 15 eyes of 15 adult patients who underwent single-sitting KPro implantation with MMG. All patients had a poor prognosis for traditional penetrating keratoplasty due to severe ocular surface disorders, including chemical injuries, Stevens-Johnson syndrome. Primary outcome measures were anatomical retention of the KPro, best-corrected visual acuity (BCVA), and postoperative complications.

Results: The mean patient age was 55.13 years (range:40-71), and anatomical retention of the KPro was achieved in 13 of 15 eyes (86.7%). Preoperatively, all eyes had a BCVA of light perception or hand motions. Postoperatively, 60% achieved a BCVA of 20/200 or better, with 26.6% achieving 20/40 or better. The single-stage approach demonstrated significant benefits, including eliminating the need for a second anesthetic event, reducing total recovery time, and facilitating immediate ocular surface rehabilitation. The most common complications were retroprosthetic membrane formation (33.3%), glaucoma progression (13.3%) and endophthalmitis (13.3%).

Conclusions: The single-stage KPro with MMG procedure is a highly effective and viable surgical strategy for visual rehabilitation in patients with complex ocular surface disease. It offers excellent anatomical and functional success rates by consolidating two procedures, thereby reducing surgical burden, enhancing patient convenience and potentially improving long-term outcomes.

Abstract No.: 204004

Ten-Year Graft Survival After Primary Endothelial Keratoplasty: Impact of Rebubbling in Pseudophakic Bullous Keratopathy and Fuchs' Endothelial Corneal Dystrophy in Asian Eyes

First Author: See Teng TAN

Co-Author(s): Marcus ANG, Hla Myint HTOON

Purpose: To compare 10-year graft survival after Descemet stripping automated endothelial keratoplasty (DSAEK) and Descemet membrane endothelial

keratoplasty (DMEK) in Asian eyes and to evaluate the impact of rebubbling.

Methods: Consecutive primary EK procedures recorded in the Singapore Corneal Transplant Registry (April 2006–May 2023) were analyzed. Eyes with pseudophakic bullous keratopathy (PBK) or Fuch's endothelial cornea dystrophy (FECD) undergoing DSAEK or DMEK were included; other aetiologies and repeat high-risk grafts were excluded. The primary outcome was 10-year graft survival (Kaplan–Meier, log-rank; Cox regression). Subgroup analyses were stratified by indication (PBK vs FECD) and rebubbling status.

Results: Of 1174 eligible eyes (mean age 69.0±10.9 years), 939 (80.0%) underwent DSAEK and 235 (20.0%) DMEK; 580 had PBK, and 594 had FECD. Rebubbling occurred in 4.6% (DSAEK) and 10.2% (DMEK). The 10-year cumulative probability of graft failure was higher in participants with rebubbling than those without in both DSAEK and DMEK (61.5% vs 76%; HR 2.4 (95% CI, 1.3–4.4; p<0.05; 77.2% vs 81%; HR 2.6 (95% CI 0.95–7.3, p=0.06). PBK eyes undergoing DSAEK had markedly poorer survival when rebubbling was required (41.3% vs 60.1%; HR 2.17, 95% CI 1.09–4.33, p<0.05). In FECD, the effect of rebubbling differed by procedure: non-significant for DSAEK (90.9% vs 89.8%; HR 2.40, p=0.24) but significant for DMEK (81.3% vs 86.6%; HR 4.56, 95% CI 1.13–18.43, p<0.05). Multivariable modelling identified surgical indication as the strongest independent predictor of survival, with FECD outperforming PBK.

Conclusions: Over 10 years, DMEK demonstrated superior late survival compared with DSAEK, while the adverse impact of rebubbling was most pronounced in PBK-DSAEK and FECD-DMEK. Indication and comorbid glaucoma outweigh procedure choice in prognostication.

Abstract No.: 203207

Ten-Year Outcomes of Descemet Stripping Endothelial Keratoplasty Versus Penetrating Keratoplasty in Chinese Patients: A Retrospective Cohort Study

First Author: Anson Chun Long WU

Co-Author(s): Ka Wai KAM, Stephanie Hiu Wai KWOK, Eugenie MOK, Alvin Lerrmann YOUNG

Purpose: To investigate and compare the long-term survival outcomes of primary penetrating versus endothelial keratoplasty in Chinese patients with Fuchs endothelial dystrophy (FED) or pseudophakic bullous keratoplasty (PBK).

Methods: Retrospective cohort study.

Results: A total of 74 eyes received primary keratoplasty, comprising 40 Descemet stripping endothelial keratoplasties (DSEK) and 34 penetrating keratoplasties (PKP), for FED or PBK between 2006–2015 with a mean follow-up of 95 months. Overall

graft survival rates were 76.1% at 5 years and 55.0% at 10 years. DSEK demonstrated higher survival rates than PKP, with 81.7% vs 69.0% at 5 years and 63.5% vs 43.6% at 10 years, although the differences were not statistically significant. Predictive factors of graft failure include older age, poorer preoperative best-corrected visual acuity (BCVA) and longer operative time. Postoperative BCVA was significantly better for DSEK compared to PKP at 5 years ($p=0.006$) but this difference diminished by 10 years. Graft ulcers occurred in fewer eyes receiving DSEK (5.0%) compared to PKP (20.6%) at 10 years ($p=0.04$). The cumulative rejection rate at 10 years were 12.5% for DSEK and 8.8% for PKP while 15.0% of DSEK and 11.8% of PKP required further transplantation.

Conclusions: Both primary DSEK and PKP yielded satisfactory survival outcomes among Chinese patients with FED or PBK. Patients undergoing DSEK experienced superior BCVA at 5 years and a lower risk of graft ulcers at 10 years, with similar rejection and regraft rates compared to PKP.

Abstract No.: 200300

Ten-Year Outcomes of Large-Diameter (9mm) Deep Anterior Lamellar Keratoplasty (DALK)

First Author: Gunjan **BUDHIRAJA**

Co-Author(s): Massimo **BUSIN**, Angeli **YU**

Purpose: To report the long-term outcomes of large-diameter deep anterior lamellar keratoplasty (DALK).

Methods: This single-center interventional case series included 643 eyes that underwent 9mm diameter DALK for keratoconus ($n=421$), infectious keratitis ($n=126$), corneal dystrophy ($n=32$), failed anterior lamellar keratoplasty (ALK) ($n=19$), other stromal disease ($n=42$), using a modified big bubble technique with stromal clearance limited to a central 6mm optical zone. Best corrected visual acuity, endothelial cell loss, and complications were evaluated annually postoperatively with 5- and 10-year follow-up available in 643 and 111 eyes, respectively.

Results: At 5 and 10 years, a Snellen BCVA of $\geq 20/40$ was achieved in 96% and 93% of eyes, while BCVA of $\geq 20/20$ was achieved in 41% and 39%, respectively. Mean ECL was $18 \pm 6\%$ at 5 years and $24 \pm 9\%$ at 10 years. Refractive astigmatism was greater than 4.5D in 36 eyes (5%). The 5- and 10-year cumulative probability for stromal rejection was 2% at 5 years and 3% and for graft survival was 99% and 98%, respectively.

Conclusions: The study provides evidence that 9mm DALK provides visual outcomes superior to those reported for PK, with excellent graft survival rates better than those reported for 8.0mm PK. These findings may encourage corneal surgeons to adopt large-diameter big-bubble DALK for stromal disease.

Abstract No.: 206963

Tenon's to the Rescue: Indications and Results in Corneal Melt Management

First Author: Smruti **PRIYADARSHINI**

Co-Author(s): Sujata **DAS**, Nisha **RANI**

Purpose: To study the indications, aetiology, outcomes, and complications of autologous Tenon's Patch Grafting in corneal melts.

Methods: This retrospective analysis included 51 eyes of 51 patients with corneal melts who underwent autologous Tenon's patch grafting between January 2021 and May 2025 at a tertiary eye care institute. Details about demographics, clinical features, aetiology, postoperative outcome were extracted from the electronic medical records.

Results: The average age was 45.24 ± 17.20 years (range 4 - 79 years), with a male-to-female distribution of 36:15. The most common indication was immune-mediated corneal melt in Stevens-Johnson Syndrome (15), trauma (9), microbial keratitis (6), viral keratitis (4), mycoplasma-induced rash and mucositis (3), chemical/thermal injuries (3), Sjögren's syndrome (2), descemetocoele following keratoplasty (2), ocular cicatricial pemphigoid (1), peripheral ulcerative keratitis (1), and miscellaneous causes (4). Eight patients were on systemic immunosuppressive therapy. Anatomical integrity was restored in 43 eyes (84.3%) with corneal scarring and vascularization. The procedure was effective in maintaining reasonable visual acuity ($>20/80$) in 14 cases (27.4%). Two patients (4%) had infection post Tenon's patch graft, and 3 (5.8%) had persistent leak, which required resurgery.

Conclusions: Autologous Tenon's patch grafting represents a simple yet effective surgical technique for restoring ocular integrity. It serves as a viable alternative to amniotic membrane transplantation and offers the advantage of deferring or even avoiding the need for therapeutic keratoplasty.

Abstract No.: 200843

The Effect of Perfluorohexyloctane on a Mouse Model of Blue Light-Induced Meibomian Gland Dysfunction

First Author: Zixuan **YANG**

Co-Author(s): Caihong **HUANG**, Zuguo **LIU**, Ya **SHI**, Ruochen **WANG**, Mingwu **ZHENG**

Purpose: Blue light exposure is a potential exacerbator of meibomian gland dysfunction (MGD), a leading cause of evaporative dry eye disease. Perfluorohexyloctane (SHR8058) has shown promise in stabilizing the tear film and delaying MGD progression. This study evaluated the protective effects of SHR8058 on meibomian glands in a mouse model of blue light-induced MGD.

Methods: C57BL6/J mice were divided into five groups: normal control (Ctrl), blue light exposure (BL), Perfluorohexyloctane treatment (BL+SHR8058), 0.55% NaCl Eye Drops control (BL+NaCl), and Dextran 70 Glycerol Eye Drops control (BL+Glycerol). All groups, except Ctrl, were exposed to blue light for 6 hours per day over 28 days to induce MGD. Treatment groups received their respective eye drops four times daily. On Day 28, lid margin examinations assessed gland function, while qPCR and Western blot analyzed inflammatory and fibrotic markers in meibomian tissues.

Results: Blue light exposure induced significant meibomian gland atrophy and openings obstruction, validating the MGD model. SHR8058 treatment partly decreased the corneal sodium fluorescein staining score, significantly reduced the number of obstructed gland openings and increased the relative meibomian gland areas compared to BL, BL+NaCl and BL+Glycerol. Besides, SHR8058 markedly decreased mRNA levels of inflammatory cytokines (IL-1 β , IL-6, TNF- α , IFN- γ) and protein levels of IL-1 β , IL-4, TNF- α , NOX4, and NF- κ B compared to the BL group.

Conclusions: Perfluorohexyloctane demonstrated significant protective effects against blue light-induced MGD by reducing gland obstruction, preserving glandular structure, and suppressing inflammation and fibrosis. These findings highlight its potential as an innovative therapeutic agent for MGD management.

Abstract No.: 203296

The Efficacy of Minimally Invasive Platelet-Rich Plasma Injection in the Treatment of Dry Eye Caused by Meibomian Gland Dysfunction

First Author: Xue Song MI

Co-Author(s): Wenting QIU

Purpose: There is a relative lack of consistent or efficient clinical therapy for meibomian gland dysfunction (MGD) at present. Meibomian gland probing is widely recognized for its effectiveness; however, it is not yet promoted widely in clinical settings due to the discomfort, hemorrhage, and expensive instrument costs. Platelet-rich plasma (PRP) injection mesotherapy has a clear effect on eliminating soft tissue inflammation but has not yet been promoted in the field of dry eye. In this study, we designed a new cannula for MG probing to explore the efficacy of the PRP micro-injection scheme on MGD.

Methods: Sixty eyes from patients diagnosed with MGD were randomly recruited into the PRP treatment group and the control group. The Ocular Surface Disease Index (OSDI), lipid layer thickness (LLT), tear meniscus height (TMH), noninvasive tear breakup times (NIBUT), ocular redness, meibomian gland loss (MGL), and meibum quality were measured respectively before and 1 week and 4 weeks after PRP treatment. Data analysis was performed using SPSS 26.

Results: 1. The average age of the treatment group was 51.87 ± 16.72 , and the average age of the control group was 42.46 ± 9.95 . 2. PRP injection therapy significantly alleviated subjective symptoms in patients with MGD. 3. Significant improvements were observed in the treatment group after PRP injection, including OSDI, LLT, TMH, meibum quality, and NIBUT compared to pre-treatment levels ($p < 0.05$). 4. Additionally, compared to the control group, PRP injection demonstrated superior efficacy at the 4-week follow-up in OSDI, LLT, meibum quality, and NIBUT ($p < 0.05$).

Conclusions: 1. The above modified PRP injection scheme is a safe and effective treatment for moderate to severe MGD. 2. The above-designed MG cannula can reduce pain, bleeding, and also be disposable, which will significantly reduce treatment costs.

Abstract No.: 205097

The Eye as a Window to Iron Burden: Uncovering Ocular Surface Disease in Indian Young Thalassemia Patients

First Author: Niharika BATRA

Co-Author(s): Nitika BERI, G.k. DAS, P.k. SAHU, Ankur SINGH, Tavishi SINGHAL

Purpose: To investigate the prevalence of Dry Eye Disease in Indian Young transfusion-dependent thalassemia and normal population, and further correlate its severity with systemic markers of iron overload.

Methods: This was a single-center, hospital-based, case-control study conducted at the Departments of Ophthalmology and Paediatrics at a university hospital in Delhi. The study included 45 thalassemia patients aged 8-18 years and 45 age and sex matched controls. All participants underwent a comprehensive ocular examination, including Schirmer tests, Tear Film Break-Up Time, and Tear Meniscus Height measurement. Outcomes were recorded using the Ocular Surface Disease Index, Dry Eye Workshop scale and Oxford grading. For the case group, data on serum ferritin, transfusion history, and chelation therapy were also collected.

Results: Thalassemic patients exhibited significantly worse Dry eye disease markers with lower Schirmer scores and shorter TBUT compared to controls ($p < 0.05$). A strong negative correlation was found between serum ferritin levels and both Schirmer (schirmer 1, schirmer 2) and TBUT scores ($p = 0.00$). Our study of thalassemic adolescents versus controls showed significantly impaired tear function with a majority of patients experiencing mild to severe Dry Eye Disease, unlike the almost entirely normal controls. Furthermore, the severity of DED as measured by OSDI, DEWS, and Oxford scores showed a significant positive correlation with the total number of blood transfusions ($p = 0.00$). Patients on combination chelation therapy, reflecting a higher iron burden, had the most severe

Dry eye disease ($p < 0.05$). Notably, patients on combination chelation therapy, who typically have the highest iron load, exhibited the most severe ocular surface disease ($p < 0.05$).

Conclusions: This study establishes transfusion-dependent thalassemia as a significant risk factor for Dry Eye Disease in adolescents. The pathology appears mediated by iron-overload-induced oxidative damage to ocular glands, with disease severity directly mirroring the systemic iron burden. These findings underscore the critical need to integrate routine ophthalmic screening into the standard multidisciplinary care for this vulnerable population.

Abstract No.: 203618

The Impact of Viral Load on the Demographics, Clinical Characteristics and Contagion of Quantitative Polymerase Chain Reaction (PCR)-Confirmed Acute Adenoviral Conjunctivitis in Hong Kong

First Author: Phoebe LAM

Co-Author(s): Alex KAN, Allie LEE, Michael NI, Siddharth SRIDHAR, Hunter YUEN

Purpose: This study aims to compare the difference in clinical and demographic parameters between adenoviral-positive and -negative conjunctivitis. It also explores the relationships between viral load and various clinical parameters, and investigates whether viruses may be spread by the conventional air puff tonometry (APT) in eye clinics.

Methods: This is a cross-sectional study. Patients aged 18 years or above with onset of symptoms within 14 days before the study visit, and clinical signs of conjunctivitis in at least one eye were included. Those diagnosed with conjunctivitis of non-infectious causes were excluded. The severity of conjunctival injection, type and severity of discharge in each study eye was graded from 0 to 3. Conjunctival swab samples were obtained and sent for viral PCR. Samples tested positive for adenovirus were called back for APT with air samples tested.

Results: Final analysis was done on 118 subjects, averaging 51.7 years with male-to-female ratio 1:1.36. The mean onset of symptoms to study visit was 4.53 days. 23 (19.5%) subjects tested positive for adenovirus on qPCR. The adenovirus-positive patients were significantly younger (40.5 years) than the adenovirus-negative patients (54.4 years) ($t = 3.50$, $p < .001$); they were also significantly more male-predominant (65.2% versus 36.8%) ($\chi^2 = 6.11$, $p = .01$). They were significantly less likely to have mucoid discharge when stratified by age (likelihood ratio 8.32, $p = .04$), and had significantly more severe conjunctival injection (likelihood ratio 26.1, $p < 0.001$). The severity of conjunctival injection was also positively correlated with the viral load, with a statistically significant ANOVA test. The viral load decreased with an increasing day of onset (Pearson's

correlation -0.30). Among 8 of the adenoviral-positive patients who came back for APT, none of their post-tonometry air samples tested positive for adenovirus.

Conclusions: Adenovirus affected younger males, and produced less mucoid discharge compared to other acute infectious conjunctivitis. The severity of discharge was similar between the two groups, but the degree of conjunctival injection was more severe in the adenovirus group. The viral load of adenovirus was also positively correlated with the severity of conjunctival injection. APT performed on infectious subjects did not appear to contaminate the air with viruses.

Abstract No.: 206350

The Utility of Strip Meniscometry in the Screening and Diagnosis of Dry Eye Disease in a Random Population-Based Cohort Study for Chinese Subjects Aged 50 and Over

First Author: Kendrick SHIH

Co-Author(s): Tin Yue Kaitlyn CHEUNG

Purpose: To investigate the accuracy of strip meniscometry tube (SMTube) in dry eye screening and diagnosis in the context of a Chinese community.

Methods: This cross-sectional random population-based study was initiated on 27 September 2021 and continues to this day. Chinese subjects aged 50 and above were recruited through a randomized mail invitation in the Southern district in Hong Kong. Overall, the response rate was 96%, and the cooperation rate was 49%. In total, 198 consecutive subjects underwent comprehensive dry eye assessment in order from least invasive to most invasive, including dry eye questionnaire (OSDI score), Non-invasive keratographic tear breakup time, tear meniscus height, tear breakup pattern, SMTube, and NEI cornea staining score. The definition of dry eye was adopted from the Asia Dry Eye Society. Incremental (1 mm) strip meniscometry readings were tested for accuracy of dry eye diagnosis. The right eye of each subject was used for analysis.

Results: Among the 298 recruited individuals, the mean age was 62.6 (± 7.20) years. Overall, 19.5% had dry eye disease (OSDI ≥ 13 and TBUT < 10 s). Among dry eye patients, random break was the most common tear breakup pattern, accounting for 62% of cases. Subjects with dry eye disease had significantly lower SMTube readings compared to those who did not have dry eye disease on Student's t-test. A low SMTube result had high specificity and high negative predictive value for dry eye disease, OSDI score ≥ 13 , and presence of significant cornea staining. A cut-off value of 3 mm was shown to achieve optimum specificity and negative predictive value for dry eye disease (90.8% and 80.4%), cornea staining (94.1% and 64.8%), and OSDI score ≥ 13 (91.7% and 78.1%)

Conclusions: In a community setting, where dry eye prevalence is relatively low, an abnormal SMTube

reading had high specificity and negative predictive value, suggesting excellent diagnostic value for an abnormal test result. A cut-off value of 3 mm was proven to have the highest diagnostic accuracy for dry eye disease.

Abstract No.: 206686

To Evaluate the Corneal Biomechanical Parameters Using Corvis ST and to Explore Their Correlation With Pterygium-Induced Astigmatism

First Author: Mehran ZAREI GHANAVATI

Purpose: To evaluate the corneal biomechanical parameters using Corvis ST and to explore their correlation with pterygium-induced astigmatism.

Methods: A total of 31 consecutive patients with unilateral primary nasal pterygium were enrolled. Unaffected fellow eyes of the patients were considered as controls. Corvis ST was used to assess biomechanical parameters and corneal topographical features using Pentacam. Additionally, the pterygium structure was evaluated by slit-lamp photography and AS-OCT.

Results: In the study, there were 23 male and eight female patients with an average age of 50.26 ± 13.35 years. Anterior keratometry astigmatism value in the pterygium-affected eyes ranged from 0.5 to 9.20 D, with a mean value of 3.98 ± 3.04 D. The method used to compare each patient's normal and pterygium eyes was the Generalized Estimating Equations (GEE). The following parameters were significantly different between normal and pterygium eyes: HC Time (p-value = 0.026), Peak Dist (p-value = 0.017), HCDArc Length (p-value = 0.004), dArc Length Max (p-value = 0.002), DARatio Max 2mm (p-value = 0.003), PachySlope (p-value < 0.005), ARTh (p-value < 0.0001), and TBI (p-value < 0.0001). The backward regression method identified a significant correlation between the difference in keratometric astigmatism measured by Pentacam and dArcLengthMax and pterygium extension (measured by AS-OCT).

Conclusions: The study revealed that while pterygium does not affect the biomechanical response of the central cornea, it does alter certain corneal deformation responses in the mid-periphery, which may indirectly indicate the tractional force exerted by the pterygium tissue on the cornea.

Abstract No.: 206298

To Evaluate the Efficacy of Zero-Shot LLMs in the Extraction of Microbial Keratitis Descriptors

First Author: Lokeshwari ARULJYOTHI

Co-Author(s): Tushar MUNGLE, Nambi NALLASAMY, Venkatesh PRAJNA

Purpose: To extract microbial keratitis (MK) descriptors from clinician notes in EHRs using a Large Language Model (LLM) and compare them with those identified by human annotators. In particular, we wished to evaluate LLM performance in MK descriptor extraction using a zero-shot prompting approach as compared to a human expert gold standard.

Methods: A cohort of 215 patients with culture-proven MK seen between 2019 and 2023 from a tertiary eye care Hospital was gathered. Free-text clinical notes from each patient's first encounter's corneal examination were obtained. A cornea specialist without access to additional clinical data, determined each of three binary MK descriptors from the notes: 1) centrality, 2) infiltrate depth, and 3) presence of thinning. Using the LLMs GPT-4o and GPT-4o mini, a zero-shot prompting method was employed to extract the same three MK descriptors. LLM responses were compared to human annotations using agreement measures such as Cohen's Kappa scores at 95% confidence interval, in addition to sensitivity and specificity.

Results: The detection of MK descriptors was influenced by limitations in the quality and consistency of EHR documentation. GPT-4o demonstrated mean sensitivity of 92%, 86%, and 97%, for centrality, depth, and thinning, respectively, and 96%, 93%, and 99% for specificity. Cohen's Kappa scores calculated for centrality, depth, and thinning were 0.88, 0.73, and 0.88, respectively, indicating good agreement.

Conclusions: Both GPT-4o and GPT-4o mini showed good agreement with human annotations in extracting MK descriptors. However, its utility is influenced by the non-deterministic nature of LLMs and limitations in data quality.

Abstract No.: 203164

Topical Azithromycin With or Without Oral Doxycycline for Meibomian Gland Dysfunction: A Prospective Double-Blind Randomized Controlled Study

First Author: Leo Ka Yu CHAN

Co-Author(s): Wing See Vanessa CHOW, Vishal JHANJI, Kee Ming Jasmine LAM

Purpose: To evaluate whether adding oral doxycycline to topical azithromycin improves outcomes in patients with meibomian gland dysfunction (MGD).

Methods: Fifty-two patients with symptomatic MGD unresponsive to lubricants and warm compresses were enrolled. Group 1 ($n = 26$) received topical azithromycin 1.5% and oral placebo for 28 days, and Group 2 ($n = 26$) received the same topical regimen plus oral doxycycline 100 mg daily for 28 days. Subjects were assessed on OSDI and SPEED questionnaires, slit-lamp, lipid layer thickness, non-invasive tear break-up times (NIBUTs), meibography, and bulbar redness at baseline, 2 weeks, 1 and 3 months.

Results: Both groups showed significant symptomatic improvement, starting at week 2 by OSDI and 1 month by SPEED, and continued to improve up to 3 months. Group 1's OSDI dropped 13.0 ± 15.3 ($p=0.000$), and Group 2's dropped 10.7 ± 15.4 at 3 months ($p=0.004$), but with no inter-group difference ($p>0.05$). Group 1 did not show significant improvement in other parameters, but Group 2 demonstrated a significant increase in first NIBUT ($11.87 \pm 6.26s$, $p=0.025$) and average NIBUT ($14.94 \pm 5.34s$, $p=0.001$) at 3 months.

Conclusions: Topical azithromycin improved symptoms of MGD. The effect can be seen at 2 weeks and was sustained at 3 months with only 1 month of therapy. Addition of oral doxycycline did not confer additional symptomatic improvement, but resulted in improved objective measurements of the NIBUT at 3 months.

Abstract No.: 202744

Topical Delivery of Cultivated Limbal Stem Cells via Porous Photocurable Hydrogel: A Noninvasive, Convenient, and Efficient Stem Cells Delivery Strategy for Limbal Stem Cell Deficiency

First Author: Shujia GUO

Purpose: This study aims to develop a non-invasive, efficient delivery system for cultivated limbal stem cells (LSCs) using a porous photocurable hydrogel to treat limbal stem cell deficiency (LSCD).

Methods: A porous Gelatin Methacryloyl (PG) hydrogel was synthesized and evaluated in vitro and in vivo for its ability to encapsulate LSCs, maintain their viability, and promote cell proliferation and migration. The PG hydrogel was applied in a rabbit LSCD model, using corneal bandage lenses to facilitate non-invasive stem cell delivery.

Results: The PG hydrogel, activated by the non-canonical Wnt signaling pathway, successfully maintained LSC viability and self-renewal. In vivo, the PG hydrogel-loaded LSCs significantly promoted corneal epithelial repair, preventing conjunctival invasion and resulting in avascular, scar-free corneal regeneration. Compared to conventional methods, this strategy reduced surgery time and enhanced patient compliance.

Conclusions: The developed PG hydrogel-based delivery system offers a promising non-invasive and

efficient approach for treating LSCD. It overcomes the limitations of direct stem cell eye drops and traditional transplantation techniques, providing a simplified and effective solution for LSCD treatment with strong potential for clinical application.

Abstract No.: 206297

Topical Insulin Eye Drops Enhance Corneal Epithelial Healing After Lamellar Keratoplasty: Results From a Randomized Controlled Trial

First Author: Muhammad AHAD

Purpose: To assess the efficacy and safety of topical insulin eye drops in promoting epithelial healing following lamellar keratoplasty (LKP) for keratoconus.

Methods: In this prospective, randomized controlled trial, 72 eyes of 72 patients undergoing LKP were randomized to receive either conventional therapy (CT: topical steroid, antibiotic, and lubricant) or conventional therapy plus topical insulin (CTI: 25 IU/ml insulin every 6 hours). Epithelial defects were documented intraoperatively with fluorescein staining and monitored at 24, 48, 72, and 96 hours using slit-lamp photography. The defect area was quantified with ImageJ software. The primary endpoint was complete epithelial healing at 96 hours. Secondary endpoints included the rate of epithelial defect reduction and adverse events.

Results: At 96 hours, complete epithelial healing was achieved in 88.9% of eyes in the CTI group compared with 61.1% in the CT group ($p=0.01$). Median time to full re-epithelialization was shorter in the CTI group (3.2 ± 0.7 days) versus CT (4.5 ± 1.1 days). Daily reduction in epithelial defect area was significantly faster with insulin therapy ($p<0.001$). No insulin-related adverse events were reported.

Conclusions: Topical insulin eye drops significantly accelerate corneal epithelial healing after lamellar keratoplasty with a favorable safety profile. These findings suggest that insulin drops may serve as a cost-effective adjunct to improve graft epithelialization and early postoperative outcomes.

Abstract No.: 204094

Transcriptomic Profiling Reveals Neural-Immune-Stromal Dysregulation and Risk-Associated Gene Signatures in Advanced Keratoconus

First Author: Kaiyue DU

Co-Author(s): Jing HONG

Purpose: This study aimed to characterize transcriptomic alterations and the effects of demographic and behavioral risk factors on disease-associated gene expression patterns in late-stage keratoconus (KC).

Methods: Corneal stromal tissues from 31 KC patients and four normal donors underwent bulk RNA sequencing. Differentially expressed genes (DEGs) and weighted gene co-expression network analysis (WGCNA) were used to identify key molecular changes. Subgroup analyses based on sex, allergy status, eye rubbing intensity (ERI), body mass index (BMI), and childhood socioeconomic status (SES) were conducted using gene set enrichment analysis (GSEA) and WGCNA. Key genes from WGCNA modules were validated by quantitative real-time PCR (qRT-PCR) and three public transcriptomic datasets.

Results: Enrichment analyses based on the 4469 identified DEGs ($P_{adj} < 0.05$) revealed suppression of extracellular matrix (ECM) organization, axon guidance, synaptic signaling, and immune activity ($P_{adj} < 0.05$). Subgroup GSEA demonstrated that high ERI correlated with ECM pathways, elevated BMI correlated with mitochondrial dysfunction, and low childhood SES correlated with upregulated mitochondrial metabolism and immune activation ($P_{adj} < 0.05$). Chromatin regulation and antioxidant activity were enriched in females ($P_{adj} < 0.05$). No transcriptomic associations were detected for allergy status. WGCNA revealed ERI-related modules involving Wnt and PI3K-Akt signaling and SES-related modules implicating cholinergic synapse and axon guidance pathways ($P_{adj} < 0.05$). Validation using qRT-PCR and public datasets confirmed the downregulation of all 15 selected genes in KC ($P_{adj} < 0.05$). qRT-PCR also confirmed differential expression of five subgroup-associated genes across KC subgroups ($P < 0.05$).

Conclusions: These findings emphasize the neural-immune-stromal axis dysregulation in KC and elucidate the contribution of common risk factors to disease progression.

Abstract No.: 200889

Ultrasonography Assessments of Meibomian Gland as a Noninvasive Method of Detecting Changes in Morphology

First Author: Hongbo YIN

Purpose: We employed 24 MHz ultrasonography to evaluate the morphological features of meibomian glands (MGs) and compared the differences in morphology between healthy volunteers and meibomian gland dysfunction (MGD) patients.

Methods: 24 MHz ultrasound examinations on both the upper and lower eyelids of healthy volunteers and MGD patients, using transverse and longitudinal sections. The reproducibility of ultrasonographic findings was evaluated, and a comparison of morphological characteristics at different examination sites between the two groups was made.

Results: Among 89 participants, 24 were healthy volunteers, and 65 had MGD. The cross-sectional

ultrasound findings showed well-organized punctate hyperechoic ducts within the tarsal plate, surrounded by hypoechoic acinar formations, which were further classified based on the extent of MG involvement into three categories: normal, $\leq 50\%$ involvement, and $> 50\%$ involvement. Additionally, a typical longitudinal ultrasound appearance of an MG consisted of a thin band-like hypoechoic acinar with uniform thickness, accompanied by an arc-shaped linear hyperechoic duct in its middle region. Furthermore, seven abnormal longitudinal ultrasound manifestations were categorized as distortion, ectasia, central duct truncation, cyst formation, structureless appearance, complete disappearance, or other findings. The intra- and inter-observer agreement for those categories was found to be high ($ICC > 0.6$). MGD patients exhibited a higher likelihood of abnormal ultrasound findings, particularly in relation to the middle part of the upper eyelid.

Conclusions: The study has developed an initial classification method to identify abnormalities in MG morphology using 24 MHz ultrasound in MGD patients.

Abstract No.: 203043

Ursolic Acid Ameliorates Ocular Surface Dysfunction in Dry Eye via Targeting EGFR/RAS/RAF/MAP2K1/MAPK1 Pathway

First Author: Qinghe ZHANG

Co-Author(s): Zuguo LIU

Purpose: To explore the therapeutic effect and mechanism of ursolic acid (UA) on ocular surface dysfunction induced by benzalkonium chloride (BAC) and scopolamine.

Methods: A hyperosmolarity (500 mOsm) culture medium was used to induce a dry eye model in HCEs, and a mouse dry eye model was established with 0.075% BAC eye drops and 0.25% atropine subcutaneous injections to evaluate UA. Potential targets were identified from TCSP, SWISS, and GeneCards databases. Protein-protein interaction (PPI) and GO & KEGG pathway enrichment analyses were conducted using STRING, Metascape, and Cytoscape to identify key targets and pathways. Single-cell analysis and RNA sequencing were performed, along with Western blot (WB) and immunofluorescence staining to explore UA's mechanism in treating dry eye.

Results: The results indicate that UA restores the viability of hyperosmolarity-damaged HCEs, significantly protects the ocular surface functional unit, and alleviates dry eye symptoms. PPI and GO & KEGG enrichment analyses identified core targets and pathways, revealing that the therapeutic effect of UA on dry eye involves the EGFR/RAS/RAF/MAP2K1/MAPK1 pathway. Single-cell sequencing database analysis showed that key proteins in this pathway are distributed in the anterior segment, particularly the cornea. Finally, Western blot (WB) and

immunofluorescence detection confirmed that UA eye drops treat dry eye through the EGFR/RAS/RAF/MAP2K1/MAPK1 pathway.

Conclusions: UA has the ability to treat benzalkonium chloride-induced dry eye-like ocular surface damage by regulating the EGFR-RAS-RAF-MAPK signaling pathway.

Abstract No.: 202899

VIP Improves Hyperglycemia-Induced Limbal Stem Cell Dysfunction During Corneal Wound Healing by Modulating the STAT1/STAT3 Signaling Balance

First Author: Yangyang ZHANG

Co-Author(s): Lixin XIE

Purpose: To explore how the parasympathetic neuropeptide VIP promotes corneal epithelial injury repair in diabetic mice by regulating the LESC cell cycle via its receptor VIPR1.

Methods: Human primary corneal LSCs were isolated from both non-diabetic and diabetic donor corneas and cultured in vitro to evaluate the effects of VIPR1-siRNA and VIP on cell proliferation, colony formation, and migration. Transcriptome sequencing was performed to identify differentially expressed genes (DEGs) following VIPR1-siRNA intervention. To further analyze by using single-cell databases to determine target genes, and then validate in vivo and in vitro. Protein-level interventions using agonists/inhibitors were applied to identify the key signaling pathways through which VIPR1 regulates corneal LESC function.

Results: VIPR1-siRNA significantly inhibited the proliferation, cloning, and migration of normal human primary corneal LSCs, while exogenous VIP enhanced these abilities in diabetic LSCs. VIPR1-siRNA also reduced corneal epithelial healing in normal mice. Transcriptome analysis showed that VIPR1-siRNA downregulated CCNB2, CDC20, CDC25B, and STAT3, but upregulated STAT1 and other cell cycle-related genes. These changes were consistent with those observed in a type I diabetic mouse model. The STAT1 antagonist fludarabine and the STAT3 agonist ML115 improved corneal healing in diabetic mice by increasing the expression of CCNB2, CDC25B, and CDC20, thereby enhancing the proliferation, cloning, and migration of diabetic LSCs.

Conclusions: VIPR1 regulates the expression of corneal LESC cell cycle-related proteins through STAT1/STAT3 signaling, thereby improving delayed corneal epithelial healing, cell cycle arrest, and apoptosis caused by diabetes mellitus.

Abstract No.: 203455

Visual Improvement in Post-CXL Keratoconus Patients With Scleral Contact Lens

First Author: Ashraful Huq RIDOY

Purpose: To assess the visual acuity level in keratoconus patients after 3 months of Collagen Cross-linkage by applying scleral contact lenses.

Methods: This prospective observational study comprised 91 eyes of 50 patients diagnosed with keratoconus treated with scleral contact lenses, all the patients underwent CXL with Isotonic or Hypotonic solution 3 months back of SCL trial. Out of them, 43 were male and 7 were female. The mean age of the patients was 26.74 ± 7.74 (mean $\pm$ SD) years. Before and after lens administration, the right and left eyes' visual acuity was measured in logMAR units. A paired t-test was used to compare the vision measurements for both eyes. The significance level was set at $p < 0.001$.

Results: The right eye had moderate to severe vision impairment, with a mean pre-lens logMAR visual acuity of roughly 0.9 and a Snellen equivalent of roughly 6/50. With an average reduction of 1.20 ± 0.77 units (95% CI: 0.98 to 1.42), the mean logMAR improved markedly after scleral lens fitting, leading to near-normal post-lens vision (about 6/6 on the Snellen scale). A statistically significant improvement was indicated by this difference ($t(49) = 11.07$, $p < 0.001$). Similar to this, the left eye's pre-lens logMAR was roughly 0.9 (about 6/50 Snellen), but after using the lens, it improved by an average of 0.86 ± 0.63 logMAR units (95% CI: 0.68 to 1.04), which translated back to near-normal vision (about 6/6 to 6/7.5 Snellen). This shift confirmed a considerable improvement in visual function and was also statistically significant ($t(49) = 9.71$, $p < 0.001$). All things considered, these results show that scleral contact lenses help patients with keratoconus see more clearly after collagen cross linking, both statistically and clinically.

Conclusions: The study shows strong evidence that scleral contact lenses significantly improve the vision of keratoconus patients after CXL. These findings provide credence to the result that scleral contact lenses are a useful treatment for people with refractive conditions like keratoconus.

Abstract No.: 206631

"Simultaneous Penetrating Keratoplasty With Simple Limbal Epithelial Transplantation: A Case Series"

First Author: Nikita DAS

Co-Author(s): Shilpa TARINI

Purpose: To evaluate outcomes of simultaneous penetrating keratoplasty (PK) with simple limbal epithelial transplantation (SLET) as a single-stage procedure in eyes with limbal stem cell deficiency (LSCD) and corneal scarring.

Methods: This retrospective case series included five eyes of five patients who underwent PK with concurrent SLET. Indications were chemical injury (n=4) and failed therapeutic PK with LSCD (n=1). Three eyes had vascularized corneal scars, one had corneal melt with perforation, and one had a failed large PK. Two eyes underwent PK with autologous SLET, two with cadaveric allogeneic SLET, and one with live-related allogeneic SLET. Demographics, indications, surgical details, visual acuity (VA, logMAR), intraocular pressure (IOP), complications, and graft clarity were analysed.

Results: Median age was 36 years (IQR 30–61); 4 patients were male. LSCD was total in 4 eyes and partial (9 clock hours) in 1. Corneal scarring was diffuse in 4 eyes and central, localised in 1. Median follow-up was 567 days (IQR 438–666). Preoperative VA was median logMAR 2.0 (IQR 2.0–2.3), improving to 0.5 (IQR 0.5–0.8) at 6 months. Paired t-test showed a mean difference of 1.56 ± 0.40 logMAR ($t(4)=8.78$, $p<0.001$; 95% CI 1.07–2.05). Repeated-measures ANOVA confirmed significant improvement across timepoints ($F(3,12)=28.1$, $p<0.001$, partial $\eta^2=0.88$). All grafts were clear and epithelialized by 6 months. Complications included one reversible graft/epithelial rejection and one corneal infiltrate at 3 months, both managed successfully.

Conclusions: Simultaneous PK with SLET is feasible in LSCD with corneal scarring, avoiding staged procedures. This combined approach achieved graft clarity, surface epithelialization, and meaningful visual recovery with manageable complications.

Glaucoma

Abstract No.: 203032

36-Month Multi-Centre Outcomes of XEN45 Gel Stent Implantation in Asian Versus Non-Asian Eyes With Primary Open Angle Glaucoma

First Author: Bryan ANG

Co-Author(s): Bjorn BETZLER, Syril DORAIRAJ, Hani HELWE, Yu Chieh KO, David SOLA-DEL VALLE

Purpose: To report 3-year outcomes of XEN45 Gel Stent (XGS) in Asian versus non-Asian eyes with primary open angle glaucoma (POAG).

Methods: Multicentre, retrospective, comparative study of 149 eyes (149 subjects) receiving XGS with or without phacoemulsification, between January 2017 and March 2023. Primary outcomes included reduction in medicated intraocular pressure (IOP) and medications, and cumulative success probabilities. Complete Success (CS) was defined as IOP reduction $\geq 20\%$ with $5 \leq \text{IOP} \leq 21 \text{ mmHg}$ for two consecutive visits, with no XGS revision and without medications. Qualified Success (QS) was defined as subjects

on $\leq$ baseline number of medications. Secondary outcomes included post-operative interventions and complications.

Results: A total of 90 eyes of Asian and 59 eyes of non-Asian ethnicity were included. Demographics differed in age, gender and baseline medications (Asian vs. non-Asian: 63.3 ± 12.1 vs 70.8 ± 10.2 years, 77.1% vs 45.2% male, 3.1 ± 0.9 vs 2.4 ± 1.2 medications, all $p \leq 0.001$), all of which were controlled for. Both groups experienced IOP and medication reduction at all timepoints. At post-operative month (POM) 12, non-Asian eyes had greater IOP reduction from baseline (Asian: -3.3 ± 5.9 vs non-Asian: -5.3 ± 5.1 mmHg, $p=0.029$). At POM24 and POM36, success probabilities were similar between groups for CS (Asian vs. non-Asian eyes: 18.8% vs. 11.3%, $p=0.54$; 12.7% vs. 7.5%, $p=0.66$) and QS (Asian vs. non-Asian eyes: 28.8% vs. 16.7%, $p=0.62$; 12.7% vs. 7.5%, $p=0.87$). Median survival times for Asian eyes were 171 days (CS) and 183 days (QS), and 273 days (CS) and 351 days (QS) for non-Asian eyes.

Conclusions: Both groups experienced similar long-term surgical efficacy. However, Asian eyes experienced failure earlier than non-Asian eyes.

Abstract No.: 204359

A Comparative Analysis of Measured Goldmann Applanation Tonometry Intraocular Pressure (GAT IOP) vs. Dynamic Scheimpflug Analyzer (CORVIS ST®) Biomechanically Corrected IOP (bIOP) Before and After Photorefractive Keratectomy (PRK) and Laser In-Situ K

First Author: Cristina TAN

Purpose: The Goldmann Applanation Tonometer (GAT) is the most widely used standard for the measurement of intraocular pressure (IOP). However, it heavily relies on central corneal thickness (CCT) and curvature to obtain accurate results. Changes in CCT occur in eyes after PRK and LASIK, resulting in underestimated IOP. Biomechanically-corrected IOP (CORVIS ST® bIOP) is a newer device using corneal biomechanics which is known to be independent of CCT.

Methods: This is a single-center, prospective, cross-sectional study of 212 eyes of 106 patients who underwent Photorefractive keratectomy (PRK) and Laser-in-situ Keratomileusis (LASIK). The level of agreement was compared between the devices pre- and post-operatively (1, 3, 6 months). The correlation with central corneal thickness was also assessed.

Results: PRK and LASIK had a significant decrease in mean GAT IOP in the pre-operative vs. post-operative periods at 1, 3, and 6 months (LASIK: 14.21 ± 1.74 vs. 11.48 ± 1.93 , 11.53 ± 1.63 , 11.66 ± 1.49 ; PRK: 31.14 ± 1.84 vs. 12.66 ± 2.18 , 11.18 ± 1.71 , 11.19 ± 1.59 respectively). CORVIS bIOP maintained consistently 32 higher values than GAT IOP in the post-op

periods (LASIK: 14.53 ± 1.66 vs. 19 ± 1.99 , 14.02 ± 1.57 , 13.94 ± 1.52 ; PRK: 15.01 ± 1.76 vs. 14.61 ± 1.97 , 14.66 ± 1.62 , 14.57 ± 1.55 respectively). Pre- and post-GAT IOP showed a significant correlation to central corneal thickness ($P < 0.05$) for both PRK and LASIK, while no significant correlation was found between bIOP ($P > 0.05$) and CCT.

Conclusions: GAT IOP had significant reductions post-operatively, while CORVIS ST bIOP were not significantly different from the pre- to post-operative periods.

Abstract No.: 201129

A Comparative Evaluation of Two Rapid Strategies for Visual Field Testing: SITA Faster and SPARK Quick

First Author: Cong YE

Purpose: This study compares the diagnostic performance of two rapid visual field testing strategies, SITA Faster (SF) and SPARK Quick (SQ), against the gold standard SITA Standard (SS). The measurement accuracy, agreement, and repeatability were evaluated.

Methods: In this prospective, cross-sectional study, 118 participants from a glaucoma clinic underwent multiple visual field tests. All subjects were naïve to SF and SQ, with SS 24-2 serving as the initial test. SF and SQ were then administered in random order. Among the 71 participants with visual field defects detected by SS, 49 underwent testing twice with both rapid strategies. Parameters were compared using one-way ANOVA with Bonferroni post hoc tests, and repeatability was assessed using intraclass correlation coefficients (ICC). A bootstrap method (5000 samples) evaluated the differences in repeatability. Agreement was analyzed using Bland-Altman plots, and diagnostic performance was assessed via receiver operating characteristic (ROC) curves.

Results: No significant differences in mean deviation (MD) and pattern standard deviation (PSD) were found between SS and SF; however, SQ demonstrated significantly better MD and PSD ($p < 0.001$). Test duration was reduced by 57.6% for SF and 73.9% for SQ compared to SS ($p < 0.001$). Bland-Altman analysis revealed that the mean difference in MD between SS and SF was not significantly different from zero ($p = 0.1775$), while SQ's difference was significant ($p < 0.001$). ICC values indicated excellent repeatability for SF, whereas SQ exhibited significantly lower ICCs ($p < 0.001$). Among the 118 participants, 71 (60.2%) had visual field defects identified by SS, 70 (59.3%) by SF, and 30 (25.4%) by SQ. Sensitivity and specificity for SF were 83.1% and 76.6%, respectively, compared to 40.8% and 97.9% for SQ. ROC analysis yielded AUCs for MD of 0.89 for SF and 0.87 for SQ ($p = 0.385$); for PSD, AUCs were 0.92 and 0.72 ($p = 0.004$). The Conger's Kappa coefficient indicated substantial agreement among the strategies.

Conclusions: Both SF and SQ significantly shorten testing duration. SF yields results comparable to SS, while SQ may underestimate defects. Each strategy offers distinct advantages for different clinical applications.

Abstract No.: 204627

A Cross-Sectional Study to Assess the Prevalence of Depression or Anxiety Among Glaucoma Patients and Examine Their Relationship With Various Factors Related to Glaucoma

First Author: Annamalai ODAYAPPAN

Co-Author(s): Rashmirita KAKOTY, Balagiri SUNDAR, Swati UPADHYAYA, Rengaraj VENKATESH

Purpose: To evaluate the prevalence of depression and anxiety among glaucoma patients compared to the general population. We also explored the association between these psychological disturbances and various factors related to glaucoma.

Methods: A cross-sectional study was conducted from February 2023 to January 2024 with 323 participants: 162 glaucoma patients and 161 age-matched controls from the general population. Participants underwent detailed ocular evaluations and completed the Hospital Anxiety and Depression Scale (HADS). Glaucoma severity was classified using the Hodapp, Parrish, and Anderson criteria.

Results: The prevalence of depression and anxiety was significantly higher in glaucoma patients compared to the general population (30.2% vs. 8.7% for depression, $p < 0.001$; 27.8% vs. 6.2% for anxiety, $p < 0.001$). Multivariable logistic regression showed that lower visual field index (VFI) in the worse eye (OR: 0.96, 95%CI: 0.93–0.98, $p = 0.006$), presence of sleep disturbance (OR: 3.3, 95%CI: 1.51–7.23, $p = 0.003$) and greater number of anti-glaucoma medications (OR: 1.9, 95%CI: 1.10–3.33, $p = 0.022$) were significantly associated with depression. Patients with lower VFI in the worse eye (OR: 0.96, 95%CI: 0.94–0.99, $p = 0.006$) and those with sleep disturbance (OR: 4.22, 95%CI: 1.89–9.46, $p < 0.001$) had significantly higher odds of anxiety.

Conclusions: Glaucoma patients experience significantly higher rates of depression and anxiety. Factors such as advanced disease, visual field loss, and sleep disturbance were identified as key risk factors. Routine psychological screening should be integrated into glaucoma management to identify at-risk patients and provide timely interventions, improving both ocular and mental health outcomes.

Abstract No.: 205274

A Multigroup Comparative Study of Five Trabeculotomy-Based MIGS Procedures in Open-Angle Glaucoma- GKIBT Study

First Author: Devendra **MAHESHWARI**

Co-Author(s): Nimrita **NAGDEV**, Madhavi **PILLAI**

Purpose: To compare the 12-month safety and efficacy of various trabeculotomy-based MIGS procedures—Gonioscopy-assisted transluminal trabeculotomy (GATT), Kahook Dual Blade (KDB) goniotomy, Interventional valve enhancing trabeculotomy (iVent), Bent Ab-interno Needle Goniectomy (BANG), and Tanito microhook trabeculotomy (TMH) combined with phacoemulsification in patients with open-angle glaucoma.

Methods: This prospective study included 234 eyes undergoing GATT (n=53), KDB (n=51), iVent (n=52), BANG (n=34), or TMH (n=44). All the MIGS procedures were combined with phacoemulsification. Baseline characteristics like Intraocular pressure (IOP), Best corrected visual acuity (BCVA), and anti-glaucoma medications (AGMs) were compared at each post-operative visit. Data were collected at 2 weeks, 1 month, 3, 6, and 12 months. Surgical success was defined as IOP ≤ 21 / ≤ 18 mmHg with > 20%/25% reduction from baseline, respectively (Criteria 1, 2). Complications, secondary interventions, and surgical risk factors were also analyzed.

Results: The mean (SD) IOP (mmHg) reduced from 21.58 ± 4.69 to 12.83 ± 3.01 at the end of 12 months in the GATT-Phaco group, with a corresponding reduction in AGM from 1.55 ± 0.75 to 0.15 ± 0.46 . Similarly, in the Phaco-KDB group (22.33 ± 2.69 mmHg to 14.51 ± 5.04 mmHg; 1.63 ± 0.75 to 0.08 ± 0.39 AGMs), iVent-Phaco group (20.85 ± 3.38 mmHg to 13.73 ± 2.88 mmHg; 1.75 ± 0.93 to 0.04 ± 0.19 AGMs), BANG-Phaco group (22.18 ± 2.46 mmHg to 15.42 ± 4.38 mmHg; 1.50 ± 0.71 to 0.29 ± 0.64), Tanito-Phaco group (22.48 ± 3.79 mmHg to 14.48 ± 4.13 mmHg; 1.43 ± 0.66 to 0.26 ± 0.63 AGMs). There was a significant reduction in IOP and AGM in each group at 12 months ($p < 0.001$). GATT-Phaco group had the maximum mean IOP percentage reduction of 38.7%, followed by KDB, TMH and iVent (34.1%, 34.5%, 33.1%) and the least with BANG (30.2%). Complete success by criteria 1 and 2 were more in GATT (89.1%, 79.3%) and KDB groups (86.3%, 82.4%), followed by iVent (76.9%, 69.2%), BANG (79.4, 79.4) and TMH (75%, 72.7%).

Conclusions: At the end of 12 months, GATT and KDB combined with phacoemulsification demonstrated similar and most favorable outcomes, followed by Tanito, iVent, and BANG in open-angle glaucoma. All approaches significantly lowered IOP and AGM.

Abstract No.: 203738

A Noninvasive Brimonidine-Loaded Conjunctival Insert to Sustainably Reduce Intraocular Pressure for Glaucoma Treatment

First Author: Zhutian **ZHANG**

Co-Author(s): Jianguo **SUN**, Xinghuai **SUN**

Purpose: Glaucoma is a leading cause of irreversible blindness worldwide. Reducing intraocular pressure (IOP) is the primary strategy to delay disease progression, and daily administration of eye drops is the common method. However, limited drug retention time and poor ocular bioavailability often compromise treatment efficacy and patient adherence. This study aimed to develop a sustained-release delivery system for brimonidine (BRI) to overcome these limitations.

Methods: A novel brimonidine-loaded silicone rubber insert (BRI@SR@PT) was prepared by incorporating BRI into a silicone rubber core, followed by sequential coatings of polydopamine and thermoplastic polyurethane. The physical properties, in vitro cytocompatibility, and drug release profile of the insert were evaluated. For in vivo assessment, the BRI@SR@PT was noninvasively placed into the conjunctival sac of rabbits. Subsequent analyses included in vivo drug release profiles, IOP-lowering efficacy, and biosafety evaluation.

Results: The BRI@SR@PT insert exhibited excellent thermal stability and mechanical elasticity. In vitro studies demonstrated continuous BRI release for up to 28 days with minimal cytotoxicity. In vivo, a single administration of the insert achieved significant IOP reduction for 21 days, far surpassing the short duration observed with conventional BRI eye drops. No signs of ocular toxicity or adverse reactions were observed throughout the experimental period.

Conclusions: The BRI@SR@PT conjunctival sac insert offers a promising noninvasive platform for long-term glaucoma treatment. Its ability to provide sustained IOP reduction effect may enhance treatment efficacy and patient compliance, representing a valuable alternative to traditional eye drops.

Abstract No.: 204214

A Novel Rabbit Model of Angle-Closure Glaucoma via Ciliary Block and Elevated Trans-Lens Pressure Difference

First Author: Xuanli **ZHENG**

Co-Author(s): Huan **CHEN**, Yuan-bo **LIANG**, Hai-shuang **LIN**, Fengping **ZHAO**

Purpose: While angle closure is a hallmark of primary angle-closure glaucoma (PACG), the upstream biomechanical drivers initiating this process remain poorly understood. It has been recently proposed that ciliary block elevates the trans-lens pressure difference, initiating anterior chamber shallowing. However, this mechanism lacks direct in vivo validation. To address

this gap, we established and characterized a novel rabbit model of angle-closure glaucoma induced by ciliary block-mediated trans-lens pressure difference.

Methods: Thirty rabbits were divided into three groups: intraocular lens with a capsular tension ring (IOL+CTR), IOL-only, and untreated control (n=10 each). Ciliary block was induced in the IOL+CTR group via extracapsular lens extraction and implantation of an oversized (13mm) CTR. Over 8 weeks, we monitored intraocular pressure (IOP), anterior chamber dynamics, and trans-lens pressure differences using tonometry and manometry, followed by histopathological evaluation.

Results: The IOL+CTR group developed sustained ocular hypertension with a significant trans-lens pressure gradient (8.5 ± 1.6 mmHg vs. 1.2 ± 1.6 mmHg in controls, $P < 0.001$). Quantitative analysis identified this gradient as the primary driver of anterior chamber shallowing (ACD: 4.06 ± 0.15 mm vs. 4.59 ± 0.11 mm in IOL group, $P < 0.001$) and complete angle closure—features absent in control groups. Mathematical modeling revealed a strong relationship between pressure gradient and ACD ($R^2 = 0.708$). Consequently, IOL+CTR animals exhibited classic glaucomatous optic neuropathy, characterized by 50% reduction in retinal thickness and marked optic nerve head excavation. Progressive exophthalmos occurred in 80% of these animals.

Conclusions: We successfully developed a reproducible rabbit model in which ciliary block-induced trans-lens pressure difference acts as a pivotal mechanistic link to anterior chamber shallowing, angle closure, and sustained IOP elevation, recapitulating key features of human angle-closure glaucoma.

Abstract No.: 206481

A Prospective Study on the Incidence of Normal Tension Glaucoma Among Chinese Patients With Treatment Naïve Obstructive Sleep Apnea Syndrome

First Author: Chi Him **TSANG**

Co-Author(s): Kendrick **SHIH**

Purpose: To investigate the incidence and risk factors for normal tension glaucoma (NTG) in Chinese patients with newly diagnosed and treatment naïve obstructive sleep apnea syndrome (OSAS).

Methods: This is a prospective cohort study conducted between 1st of July 2015 and 30th of June 2017. 220 consecutive subjects, who were referred to the respiratory clinic at Queen Mary Hospital for suspected OSAS, were recruited. Subjects with a pre-existing diagnosis of glaucoma or a history of OSAS treatment were excluded from analysis. Subjects underwent polysomnography (PSG), using Apnea-Hypopnea Index (AHI) as the diagnostic OSAS. The subjects further underwent a comprehensive glaucoma workup at

Grantham Hospital, including slit lamp examination, gonioscopy, intraocular pressure measurement, and at least two Humphrey Visual Field 24-2 and Optical Coherence Tomography (OCT) retinal nerve fiber layer assessments four months apart. Anderson's criteria were used for diagnosing glaucoma.

Results: A total of 195 Chinese patients consented to the study. On follow-up, 7 patients were excluded as they did not complete at least two ophthalmic assessments. The analyzed 188 patients had a mean age of 53.3 ± 9.9 , and 64.5% of them were male. The overall two-year incidence of normal tension glaucoma in this cohort was 6.34%. Subjects with more severe OSAS had a higher incidence of NTG. There were no significant correlations between AHI score and glaucoma parameters.

Conclusions: Patients with treatment naïve OSAS are at increased risk of NTG. Increased OSAS severity, as measured by AHI, is a marker for a higher risk of NTG. It is worthwhile to investigate the cost-effectiveness of glaucoma screening in this cohort.

Abstract No.: 203643

A Shark-Bioinspired Design of Aqueous Tesla Shunt: Bring Biomimeticism Into Minimally Invasive Glaucoma Surgery

First Author: Yingyan **MAO**

Co-Author(s): Luyi **HAN**, Qing **SANG**, Chu **WANG**, Ningli **WANG**

Purpose: To solve the critical gaps in glaucoma treatment—no approved external aqueous humor (AH) drainage devices and unaddressed reverse flow/infection risks—this study aimed to design, fabricate a shark-bioinspired aqueous Tesla shunt, and comprehensively verify its safety and efficacy as an innovative AH outflow pathway.

Methods: The design of the aqueous shunt was bioinspired by the spiral intestines of sharks. In vitro hydrodynamic experiments were subsequently conducted to validate the functional performance of the optimized shunt. For in vivo evaluations, normotensive rhesus macaques were used as animal models, with a follow-up period of 36 months. Additionally, preliminary clinical trials were carried out, with a 24-month follow-up duration, to assess the shunt's efficacy and safety in glaucoma patients.

Results: In the rhesus macaque models, the shunt exhibited efficacy in reducing IOP. Corneal endothelial density remained within normal ranges, showing no tissue damage. Anterior segment OCT confirmed stable device positioning without corneal remodeling or displacement. Clinically, 80% of patients maintained target IOP without hypotensive medications at 24 months, and no severe adverse events like infection or reverse flow occurred.

Conclusions: The shark-bioinspired Tesla shunt exhibits excellent biocompatibility and hydrodynamic efficacy. It enables an enhanced safety profile, reduced complications, increased efficacy of lowering IOP and reduced IOP fluctuations. It holds significant translational potential as a safe, long-lasting MIGS device for mild-to-severe glaucoma.

Abstract No.: 204885

A Study to Analyze the Cognitive Function in Normal Tension Glaucoma Patients

*First Author: Narayanan **BALAKRISHNAN***

Purpose: This study aims to analyze the cognitive function in Normal tension glaucoma (NTG) compared to High tension Glaucoma (HTG).

Methods: A case-control, cross-sectional analytical study involving 28 age and sex matched NTG participants and HTG controls was performed. Patients diagnosed with vision-related or neurological conditions were excluded. A detailed glaucoma evaluation was done, which included vision, IOP, Gonioscopy, CCT, HVF, and anterior and posterior segment examination. Both groups underwent a Montreal Cognitive Assessment Test (MoCA), and their cognition was documented. A cognitive function of <26/30 was considered significantly poor.

Results: All baseline characteristics were matched in both groups. The prevalence of cognitive impairment was high in the NTG group compared to the HTG group, and this value was statistically significant. A MoCA score of <26/30 was noted to a great extent amongst the NTG participants. Twenty-two NTG (78.6%) and twelve HTG participants (42.9%) had a mean MoCA score of <26/30 with a p value of 0.006. The mean deviation (MD) and pattern standard deviation (PSD) values were correlated with the cognitive impairment in the NTG group. However, Central corneal thickness (CCT) did not show any correlation. On calculating the odds ratio, the NTG group had 2.4 times greater risk of developing cognitive impairment compared to the HTG group (OR= 2.4, 95% CI: 1.148 to 4.904).

Conclusions: NTG patients have poorer cognition as compared to high tension glaucoma, and this may be associated with a risk of developing dementia in the future.

Abstract No.: 202350

A-Stream Glaucoma Shunt Versus Trabeculectomy: One-Year Results on Efficacy and Safety

*First Author: Hae Min **PARK***

*Co-Author(s): Jong Chul **HAN**, Eun Jung **LEE**, Do Young **PARK**, Seungsoo **RHO**, Jong Hoon **SHIN***

Purpose: To compare the effectiveness and safety of the A-stream Glaucoma Shunt (A-stream; MICROT Inc.,

Republic of Korea) to trabeculectomy in patients with primary open-angle glaucoma, pigmentary glaucoma, and pseudoexfoliative glaucoma. A-stream features a larger lumen compared to conventional MIGS devices, and promotes stable postoperative IOP control via preplaced ripcord; it is widely adopted in Korea.

Methods: Medical records of 30 eyes undergoing A-stream implantation and 38 eyes undergoing trabeculectomy were retrospectively reviewed. Primary outcomes were surgical success and intraocular pressure (IOP) reduction at 1 year, with success defined as IOP ≤ 21 mmHg and $\geq 20\%$ reduction without persistent hypotony (IOP < 6 mmHg > 1 month or with hypotony maculopathy). Success was classified as complete (without medications) or qualified (with/without medications). Ripcord removal, postoperative interventions, and complications were also assessed.

Results: A-stream and trabeculectomy demonstrated comparable efficacy, with qualified success rates of 90.0% and 84.2% and complete success rates of 60.0% and 50.0%, respectively. At 1 year, mean IOP significantly decreased from 24.5 to 12.4 mmHg in the A-stream group and 25.7 to 12.1 mmHg in the trabeculectomy group, with similar medication use. Ripcord removal was performed in most A-stream eyes at 2.5 months, yielding additional IOP reduction. Hypotony-related complications and postoperative interventions were more frequent after trabeculectomy, although no vision-threatening events were observed.

Conclusions: The A-stream Glaucoma Shunt demonstrated favorable one-year efficacy and safety compared to trabeculectomy. The ripcord enabled more controlled postoperative IOP management with a lower incidence of hypotony.

Abstract No.: 206352

Aberrantly Activated Unfolded Protein Response (UPR) in the Astrocytes of the Optic Nerve Head Accelerated Retinal Ganglion Cell Loss in Retinal Explants In Vitro

*First Author: Shaodan **ZHANG***

*Co-Author(s): Pin **WANG**, Jiayu **ZOU***

Purpose: To investigate the effect of UPR activation on the reactive state of optic nerve head astrocytes (ONHAs) and its impact on the survival of the co-cultured retinal explants.

Methods: Primary ONHAs isolated from adult wild-type mice were exposed to endoplasmic reticulum stress inducer tunicamycin (Tm, 0.5 and 2 mg/mL) for 48h. The expressions of UPR pathway-associated proteins were assessed by Western Blot. The neurotoxic phenotypic shift of ONHAs was evaluated by immunohistochemical staining and qPCR. Synthesis of astrocyte-derived neurotrophic factors by the ONHAs was quantified using qPCR and ELISA. A co-

culture system was established using ONHAs or ONHA-conditioned medium with the mouse neural retina explants. Retinal ganglion cell (RGC) survival was evaluated and compared between Tm-pretreated and control groups.

Results: Tm treatment induced a distinct UPR-reactivity profile in ONHAs. The PERK and XBP1 signaling pathway were significantly up-regulated in Tm-treated ONHAs at both the mRNA and protein levels. After 48 hours of Tm exposure, the pro-inflammatory A1 astrocyte markers were significantly up-regulated in ONHAs, while the expression of ciliary neurotrophic factor (CNTF) and brain-derived neurotrophic factor (BDNF) was markedly down-regulated in both ONHA and its supernatant. By day 4 and day 7, the number of RGCs in the retina explants co-cultured with both Tm-pretreated ONHA and ONHA-conditioned medium was significantly lower compared to their counterpart control groups.

Conclusions: Astrocytic UPR exerts an IOP-independent pathogenic role in the neurodegeneration of RGCs. It provides novel insights into the underlying mechanism of glaucomatous neuropathy and may be a potential therapeutic target for neuroprotective strategies.

Abstract No.: 204329

Accuracy of Intraocular Pressure Self-Measurement With Home-Tonometer

First Author: Kaichen **ZHUO**

Co-Author(s): Jingjing **HUANG**

Purpose: To assess the accuracy of the home-tonometer (iCute® Rebound Tonometer, iCute) against Goldmann Applanation Tonometry (GAT) for measuring intraocular pressure (IOP).

Methods: We recruited 45 patients from the outpatient clinic, including 33 glaucoma patients and 12 normal subjects. After training and passing a consistency assessment on the use of the iCute, participants performed IOP self-measured (iCute-pat). Afterwards, two ophthalmologists measured the IOP of each subject with iCute (iCute-doc) and GAT, respectively. The consistency of the measurements obtained by the doctor and patients using iCute was evaluated with paired t-test. The agreement and correlation between the measurements obtained with different tonometer were calculated using the Bland-Altman method and the Pearson correlation coefficient, respectively. Only the right eyes were used for statistical analysis to avoid statistical errors.

Results: There was no statistically significant difference between iCute-doc and iCute-pat. Mean differences (bias) between iCute-doc and iCute-pat, GAT and iCute-doc, and GAT and iCute-pat were -0.1087 mmHg, 0.6087 mmHg, and 0.5000 mmHg, demonstrating that the iCute tonometer tends to underestimate the IOP compared to GAT. The correlations of iCute-doc with both GAT ($r=0.8872$) and iCute-pat ($r=0.8024$) were

very strong, while the correlation between iCute-pat and GAT was strong ($r=0.7774$).

Conclusions: Self-measurement of IOP with the iCute® Rebound Tonometer shows acceptable accuracy compared to the Goldmann Applanation Tonometry.

Abstract No.: 206744

Additional Yield of a Neurophthalmological Evaluation in Patients Diagnosed With Glaucoma

First Author: Shantha **BALEKUDARU**

Purpose: To identify demographic and clinical markers for providing additional yield for neurological diagnosis in patients diagnosed with glaucoma.

Methods: Retrospective chart analysis of patients diagnosed with glaucoma, referred to the neurophthalmology department for further evaluation (January 2017 - December 2017). Demographic, clinical features, and investigation results were compared with those of consecutive patients identified with primary open-angle glaucoma as controls. Eyes with the worse visual acuity and/or visual field index was used as the unit of analysis.

Results: Cases (134) older than controls (100); 55.9 ± 15.5 years vs $63.8 \pm p < 0.001$. LogMAR visual acuity; cases 0.53 ± 0.75 vs 0.23 ± 0.53 controls ($p=0.02$). Cup: Disc ratio 0.6 ± 0.7 cases vs 0.8 ± 0.2 controls ($p=0.01$). Color vision abnormalities 29 (21.6%) cases vs 23 controls (23%) ($p=0.19$). Disc pallor; cases 60 (44.8%) vs controls 1 (1%), glaucomatous cupping cases 38 (28.4%), controls 92 (92%); pallor and cupping; 13 cases (9.7%) ($p < 0.001$). Visual field patterns were as follows; cases vs controls; neurological 34 (25.4%) vs 3 (3%), non-specific 13 (9.7%) vs 2 (2%), glaucomatous 60 (44.8%) vs 67 (67%) ($p=0.01$). Logistic regression identified the following factors for yielding a neurological diagnosis; Age; O.R 0.95 (0.93,0.97) $p < 0.001$, Logmar visual acuity: O.R 2.47 (1.39,4.34) $p=0.002$, Cup: disc ratio O.R 0.51 (0.3,0.87) $p=0.01$, Pallor O.R 7.2 (2.8,18.5) $p < 0.001$, neurological visual field pattern O.R 9 (2.22,36.89) $p=0.002$. Neurological diagnosis included space-occupying lesions; 7 (5%), intracranial aneurysm 1 (0.07%), Ischemic changes 16 (11.9%), miscellaneous, including toxic, nutritional, and traumatic optic neuropathy and optic neuritis, 20 (14.9%).

Conclusions: Clinical and visual field examination provided additional yield of important neurological diagnosis following neurological referral.

Abstract No.: 204782

Anterior Lens Capsule Proteomics Reveals Lysosomal Acidification Dysfunction and Pro-Fibrotic Remodeling in Primary Angle Closure Glaucoma

First Author: Jiamiao LIU

Co-Author(s): Rong RONG, Jing WANG, Xiaobo XIA

Purpose: To characterize proteomic differences in anterior lens capsules (ALCs) from patients having primary angle closure glaucoma (PACG) coexisting with age-related cataract (ARC) versus ARC alone, and to identify molecular clues to glaucoma pathophysiology.

Methods: This was a case-control study. ALCs were collected intraoperatively from 14 PACG patients with ARC and 15 age-matched ARC patients. Proteomic analyses were conducted using 4D-DIA mass spectrometry. Differentially expressed proteins (DEPs) were identified and subjected to pathway enrichment analysis, and protein-protein interaction networks were constructed to reveal key functional modules.

Results: A total of 1262 DEPs were identified. Enrichment analysis showed systemic disruption of protein homeostasis, marked by significant downregulation of protein NEDDylation/deNEDDylation and the TRiC/CCT chaperonin, including hub proteins such as COPS5, TCP1 and CCT2. Meanwhile, lysosomal acidification deficits were observed, evidenced by uniform downregulation of multiple vacuolar H⁺-ATPase subunits and Rag GTPases. These alterations were further associated with reduced activity of mechanistic target of rapamycin complex 1 (mTORC1), autophagy, and hypoxia-inducible factor-1 (HIF-1) signaling pathways. In contrast, Notch signaling and protein fucosylation pathways were significantly upregulated, suggesting activation of fibrotic remodeling programs.

Conclusions: The present work identified distinct proteomic profiles of ALCs in PACG and ARC patients. The systemic impairment of proteostasis and lysosomal dysfunction in PACG may cascade to suppress mTORC1 and autophagy signaling, thereby activating abnormal pro-fibrotic pathways. These findings highlight lysosomal acidification dysfunction and pro-fibrotic remodeling as central molecular features of PACG pathophysiology, providing novel insights for promising biomarkers and therapeutic intervention in glaucoma.

Abstract No.: 200420

Assessing the Efficacy of Vessel Density in Monitoring Visual Field Defects in Glaucomatous Eyes With Myopia: A Study in a Vietnamese Population

First Author: Truong Dang Minh PHAM

Co-Author(s): Kim Thanh DOAN, Ngoc Phuong Vy LY, Thao Huong NGUYEN, Thi Uyen Duyen NGUYEN, Anh Tuan TRAN

Purpose: Diagnosing and monitoring glaucoma in highly myopic eyes presents significant challenges. Vessel density (VD) measurements are less susceptible to the retinal and optic nerve head changes due to high myopia. This study evaluated the macular and peripapillary VDs, and their correlations with visual field mean sensitivities (VFMS) in patients with primary open-angle glaucoma and high myopia.

Methods: This observational cross-sectional study was performed on 40 primary open-angle glaucoma eyes with high myopia. Macular VDs, ganglion cell-inner plexiform layer thicknesses (GCIPLT); peripapillary VDs, and retinal nerve fiber layer thicknesses (RNFLT) were measured. These indices' global and sectoral correlations with the visual field mean sensitivities (VFMS) were assessed.

Results: The macular global, inner, and outer VDs were $34.38 \pm 8.15\%$, $35.00 \pm 8.79\%$, and $34.91 \pm 8.33\%$, respectively. The peripapillary global, superior, nasal, inferior, and temporal VDs were $35.44 \pm 4.55\%$, $34.96 \pm 4.51\%$, $34.91 \pm 4.22\%$, $35.29 \pm 4.85\%$, and $36.33 \pm 5.33\%$, respectively. The outer global VD correlated with the corresponding VFMS ($p = 0.026$). Macular inferior VFMS correlated with macular outer inferior VD ($p = 0.001$), more strongly than with corresponding GCIPLT. Peripapillary global VFMS and VFMSs of all sectors correlated with corresponding peripapillary VDs (all $p < 0.001$), more strongly than with corresponding RNFLT.

Conclusions: VD is a necessary adjunct to GCIPLT and RNFLT to monitor the progression of glaucomatous visual field defects in highly myopic eyes, especially in the outer inferior macula and the global, superior, nasal, inferior, and temporal peripapillary regions.

Abstract No.: 201818

Benefit of Omidenepag Isopropyl Ophthalmic Solution in Treatment Persistence in Japanese Patients With Glaucoma

First Author: Kenji KASHIWAGI

Co-Author(s): Masahiro FUWA, Reiko MIYAHARA, Tadashi NAKANO, Toru NAKAZAWA, Naomi OTSUKA

Purpose: To investigate the treatment persistence of antiglaucoma ophthalmic solution monotherapy, we conducted a retrospective observational cohort study in Japan.

Methods: Patients aged 18 years or older who were diagnosed with glaucoma between November 2018 and August 2020, and prescribed omdenepag isopropyl (OMDI), prostaglandin F receptor agonist (FP), or beta-blocker (BB) monotherapies were included. Data were obtained from the JMDC health insurance claims database (JMDC Inc., Tokyo, Japan).

Results: A total of 36,450 patients (5,865 patients prescribed OMDI, 20,715 patients prescribed FP, and 9,870 patients prescribed BB) were analyzed. The cumulative treatment persistence rate at three years was 27.0% (95% confidence interval [CI]: 25.9-28.1) in patients prescribed OMDI, which was significantly higher than 20.9% (95% CI: 20.4-21.5) in those prescribed FP; the hazard ratio was 0.835 (95% CI: 0.806-0.865, $p < 0.0001$), calculated with the multivariate Cox proportional hazards model. The median duration of treatment persistence, calculated with the Kaplan-Meier methods, was 281 days in those prescribed OMDI, 204 days in those prescribed FP, and 152 days in those prescribed BB; the treatment persistence of OMDI tended to be longer than FP or BB.

Conclusions: OMDI had a longer treatment persistence compared to other antiglaucoma ophthalmic solutions in the real-world setting, suggesting that OMDI would be a promising first-line treatment option in the long-term management of glaucoma.

Abstract No.: 200877

CIGAS: An Interpretable Deep Learning System for Glaucoma Screening

First Author: Ruyue **SHEN**

Co-Author(s): Jinyue **CAI**, Carol **CHEUNG**, Annie **LING**, Clement **THAM**

Purpose: To develop a clinically interpretable deep learning (DL) system for glaucoma screening—termed “CIGAS”—that leverages color fundus photographs (CFP) to detect glaucomatous optic neuropathy (GON) and visualize clinically relevant features, thereby enhancing diagnostic transparency and practical utility in clinical settings.

Methods: We developed a DL algorithm using a dataset of 109,899 CFP images, with labels of presence or absence of GON. The dataset was split into split into training, tuning, and test sets in a 7:1:2 ratio. The interpretable BagNet architecture was employed as the backbone to extract GON features from CFP. Text-based GON relevant features were identified using OpenAI-o3 and validated by glaucoma specialists. A heatmap-based visualization generated by Grad-CAM provided explainability, correlating identified features with expert annotations. Additionally, a lightweight large language model (LLM) was used to generate automated clinical reports based on the extracted features.

Results: The CIGAS system achieved an area under the receiver operating characteristic curve (AUROC) of 0.85 in external validation, with sensitivity and specificity exceeding 80%. Heatmap visualizations consistently highlighted clinically relevant regions, including optic disc and retinal nerve fiber layer defects, aligning well with expert assessments. The automated CFP reports showed that the heatmap-based features by the BagNet network and text-based features by LLM were similar to those highlighted by clinicians.

Conclusions: The CIGAS framework may assist glaucoma screening by combining interpretable feature identification with automated report generation. Additional external validation is warranted to confirm its generalizability and clinical applicability.

Abstract No.: 204357

CRISPR-Cas9-Mediated Deletion of Carbonic Anhydrase 2 in the Ciliary Body to Treat Glaucoma

First Author: Fei **LI**

Co-Author(s): Jiaxuan **JIANG**

Purpose: To investigate the therapeutic potential of CRISPR-Cas9-mediated deletion of carbonic anhydrase 2 (Car2) gene in the ciliary body as a novel gene therapy approach for treating glaucoma by sustainably reducing intraocular pressure (IOP).

Methods: We designed six sgRNA sequences targeting mouse Car2 gene and constructed a dual sgRNA-mediated CRISPR-Cas9 system delivered via ShH10 adeno-associated virus (AAV). Two mouse models were used: DBA/2J mice (genetic high-pressure glaucoma) and magnetic bead-induced chronic ocular hypertension (COH) model. Gene therapy was administered through single intravitreal injections, with IOP monitoring and comparison to brinzolamide. Safety was assessed using optical coherence tomography and electroretinography

Results: The dual-target CRISPR system achieved 97.3% gene editing efficiency ($p < 0.0001$) with low off-target rates (0.16–0.70%). Car2 knockout significantly reduced IOP in normal mice compared to controls ($p < 0.01$ to $p < 0.0001$), sustaining the effect for up to 2 months ($p < 0.05$ to $p < 0.0001$). In DBA/2J mice, IOP was lowered versus untreated groups ($p < 0.05$ to $p < 0.001$). In the COH model, Car2 disruption outperformed brinzolamide, with superior IOP reduction ($p < 0.05$ to $p < 0.0001$ between groups), preserved retinal thickness ($p < 0.05$ to $p < 0.0001$), higher Brn3a+ retinal ganglion cell counts ($p < 0.001$), and increased axon counts ($p < 0.01$ to $p < 0.001$), delaying optic nerve damage without systemic side effects.

Conclusions: CRISPR-Cas9-based Car2 disruption via intravitreal AAV delivery represents a promising, long-lasting gene therapy for glaucoma, offering superior IOP control and neuroprotection compared

to conventional treatments, with potential for clinical translation.

Abstract No.: 202030

Childhood Angle-Closure: Etiology and Treatment Outcomes from a Large Series Spanning Over 20 Years

First Author: Kasem **SERESIRIKACHORN**

Co-Author(s): Ta Chen Peter **CHANG**, Alejandro **PEREZ**

Purpose: To describe childhood angle-closure (CAC) causes and to compare the outcomes of glaucoma drainage devices (GDDs) and lens surgery in treating CAC glaucoma.

Methods: A retrospective, multicenter study of patients under 18 years of age diagnosed with CAC between 2003-2023. The study analyzed underlying causes, treatment patterns, and compared the outcomes of GDDs and lens surgery in CAC glaucoma.

Results: A total of 101 patients (159 eyes) were included, with a slight female predominance (51.49%) and a mean age at diagnosis of 10.34 ± 5.58 years. Acute CAC was observed in 5.7% of eyes, all secondary in nature. The remaining 94.3% had chronic CAC, most commonly associated with retinopathy of prematurity (ROP, 26.7%). Among chronic angle-closure glaucoma cases, ROP was the leading cause (21.85%), followed by glaucoma following cataract surgery (15.97%) and uveitis (7.56%). Surgical intervention was required in 63.3% of CAC glaucoma cases, with glaucoma drainage device (GDD) implantation being the most frequent (38.6%), followed by lens surgery (22.7%), peripheral iridotomy (15.9%), and trabeculectomy (7.9%). Lens surgery demonstrated a significantly higher complete success rate at 5 years compared to GDD ($p = 0.006$), while no significant differences were found in qualified success ($p = 0.20$) or serious surgical complications between the two groups.

Conclusions: CAC is primarily chronic and secondary, most often linked to ROP. Surgical intervention is frequently necessary in CAC glaucoma, with lens surgery demonstrating superior long-term complete success compared to GDDs and a comparable safety profile.

Abstract No.: 209610

Clinical Outcomes of Capsular Tension Ring Implantation During Combined Phacoemulsification and Trabeculectomy in Acute Primary Angle Closure

First Author: Yajie **SUN**

Purpose: To study the postoperative efficacy and safety of capsular tension ring (CTR) implantation during cataract surgery combined with trabeculectomy in patients with acute primary angle closure (APAC).

Methods: Prospective, Single-Center, controlled randomized clinical trial. Patients with APAC scheduled to undergo phacoemulsification with intraocular lens implantation and trabeculectomy (a triple procedure). This interventional study was conducted on consecutive patients with visually significant cataract and an acute attack of primary angle-closure glaucoma. Seventy patients were enrolled in the trial. Subjects were randomized 1:1 to receive or not receive CTR implantation during the triple procedure. All patients were evaluated at postoperative days 1 and 7, and at 1, 3, 6, 12, 18, and 24 months. Main Outcome Measures: Visual acuity and intraocular pressure (IOP) from postoperative day 1 to 24 months and at all follow-up visits, Intraocular Lens (IOL) tilt, refractive error, and anterior chamber depth (ACD) at 24 months. Safety measures included the frequency of complications and adverse events.

Results: There were 35 patients in each group. The baseline characteristics were similar between the two groups. At 12, 18, and 24 months postoperatively, the CTR group showed significantly better uncorrected distance visual acuity (UDVA) compared to the non-CTR group (median [interquartile range [IQR]], 0.22 [0.10-0.40] vs 0.40 [0.22-0.56], $P < 0.05$; 0.22 [0.10-0.40] vs 0.40 [0.22-0.56], $P < 0.01$; 0.22 [0.10-0.40] vs 0.40 [0.22-0.60], $P < 0.01$). No statistical differences in IOP were found between groups at any postoperative follow-up ($P > 0.05$). At 24 months, the CTR group exhibited significantly less IOL tilt and smaller refractive error compared to the non-CTR group (median [IQR], 0.16 [0.12-0.29°] vs 0.42 [0.31-0.61°], $P < 0.001$; mean [SD], 0.32 ± 0.73 D vs 0.77 ± 0.88 D, $P < 0.05$). The ACD measured 3554.68 ± 286.01 μ m in the CTR group and 3539.03 ± 258.86 μ m in the non-CTR group ($P = 0.826$). The CTR group had a lower rate of capsular contraction syndrome (CCS) (0% vs 20.6%, $P < 0.01$), but a higher rate of posterior capsule opacification (PCO) (58.1% vs 41.2%, $P < 0.05$) and IOL capture (19.4% vs 2.9%, $P < 0.05$) at 24 months. Postoperative antiglaucoma medication (AGM) was needed in one patient in each group. The CTR group experienced one case of IOL dislocation requiring surgical repositioning, while the non-CTR group had one case of medically refractory IOP elevation that required surgical intervention.

Conclusions: In patients with APAC, CTR implantation during the triple procedure significantly improved long-term UDVA, reduced IOL tilt and refractive error, and maintained stable IOP and ACD. However, this procedure was associated with a potential trade-off: a reduced incidence of CCS but an increased risk of PCO and IOL capture.

Abstract No.: 207008**Clinical Outcomes of XEN Gel Stent Implantation for Glaucoma: A Real-World Study***First Author: Qian TAN*

Purpose: To evaluate the clinical efficacy and safety of XEN Gel Stent implantation in patients with different types of glaucoma under real-world conditions.

Methods: A retrospective analysis was conducted on 39 patients (43 eyes) who underwent XEN Gel Stent implantation at Changsha Aier Eye Hospital between February 2020 and July 2023. The mean age was 47.2 ± 15.7 years. Diagnoses included primary open-angle glaucoma ($n=10$), primary chronic angle-closure glaucoma ($n=3$), and secondary glaucoma ($n=8$; due to ICE syndrome, uveitis, trauma, and post-congenital cataract surgery). Notably, 22 cases (51.2%) had prior failed glaucoma surgeries. Main outcome measures included postoperative intraocular pressure (IOP), use of antiglaucoma medications, and surgical complications.

Results: The mean IOP decreased significantly from 26.8 ± 8.6 mmHg preoperatively to 14.4 ± 6.1 mmHg postoperatively (46.3% reduction, $P<0.01$). The mean number of medications decreased from 2.9 ± 1.5 to 0.6 ± 1.3 , with 79.3% of patients requiring fewer medications. Complete surgical success was achieved in 58.1% of cases, with an overall success rate of 83.7%. The most common complication was shallow anterior chamber (18.6%), all of which resolved with conservative management.

Conclusions: XEN Gel Stent implantation effectively lowers IOP and reduces medication burden with an acceptable safety profile. It is particularly beneficial for refractory glaucoma patients with prior surgical failure, and represents a valuable option in the field of minimally invasive glaucoma surgery (MIGS).

Abstract No.: 202556**Clinical Trial on the Effects of French Maritime Pine Bark and Bilberry Fruit Extracts on Intraocular Pressure in Primary Open-Angle Glaucoma***First Author: Chisako IDA*

Co-Author(s): Akiko HARANO, Sho ICHIOKA, Mizuki IIDA, Kana MURAKAMI, Hinako OHTANI, Ayaka SHIMADA, Masaki TANITO, Yuto YOSHIDA

Purpose: To investigate the effects of a dietary supplement containing French maritime pine bark and bilberry fruit extracts on intraocular pressure (IOP) in primary open-angle glaucoma (POAG) patients.

Methods: In a randomized, placebo-controlled, two-period crossover study, 24 POAG patients (median age 60 years, range 27–68; 9 males, 15 females) treated with ≤ 3 medications and with at least one eye showing

IOP ≥ 15 mmHg by Goldmann applanation tonometry (GAT) were enrolled. Patients were randomized 1:1 to receive either supplement followed by placebo (GP group) or placebo followed by supplement (PG group), each for 8 weeks. The primary endpoint was GAT IOP; secondary endpoints included self-measured IOP with rebound tonometry (RBT), blood pressure, pulse rate, oxidative stress markers, carotenoids, advanced glycation end products (AGEs), autonomic balance, and adverse events.

Results: Twenty-two patients completed the supplement phase, and 23 the placebo phase. One mild, unrelated adverse event was observed. Mixed-effects analysis showed no significant effect on GAT IOP (estimate -0.38 mmHg; 95% CI -1.03 to 0.28). However, supplementation significantly reduced RBT IOP (-0.11 mmHg; 95% CI -0.18 to -0.04 ; $p = 0.0023$). No effects were observed on blood pressure, while pulse rate significantly decreased (-0.25 bpm; 95% CI -0.46 to -0.03 ; $p = 0.0251$). No significant changes were found in oxidative stress, carotenoids, AGEs, or autonomic balance.

Conclusions: Supplementation with French maritime pine bark and bilberry extracts significantly reduced self-measured IOP and pulse rate in POAG patients, though no significant effect on GAT IOP was detected.

Abstract No.: 206003**Combined Hydrus Microstent and Cataract Surgery in Normal Tension Glaucoma: 24-Month Real-World Outcomes***First Author: Nathan KERR**Co-Author(s): Keith BARTON*

Purpose: To evaluate the 24-month efficacy and safety of combined Hydrus Microstent implantation and cataract surgery in reducing anti-glaucoma medication burden in patients with normal tension glaucoma (NTG).

Methods: A registry-based ambispective cohort study utilising data from the International Glaucoma Surgery Registry (IGSR.org). We analysed 82 eyes of 59 patients with mild-to-moderate NTG (glaucomatous optic neuropathy with IOP ≤ 21 mmHg) who underwent combined Hydrus Microstent implantation and cataract surgery. The primary outcome was the change in anti-glaucoma medications from baseline to 24 months. Secondary outcomes included IOP reduction, percentage achieving IOP ≤ 15 mmHg, medication-free status, and safety parameters. Data was collected across centres in Australia, Canada, the United Kingdom, and the United States.

Results: At baseline ($n=82$), mean age was 74.2 ± 6.3 years with 72.0% female. Mean baseline IOP was 12.8 ± 3.6 mmHg on 1.6 ± 1.1 medications, with visual field mean deviation of -6.72 ± 5.84 dB. At 24 months ($n=45$), there was a 44% reduction in anti-

glaucoma medications, with mean medication count decreasing from 1.6 to 0.9 medications ($p < 0.001$). Fifty-one percent achieved medication-free status at 24 months. Mean IOP was maintained at 11.1 mmHg, with 91% achieving target IOP ≤ 15 mmHg. No post-operative complications were recorded and only 1.2% (1/82) required secondary surgical intervention (trabeculectomy).

Conclusions: Combined Hydrus Microstent implantation and cataract surgery demonstrated substantial and sustained medication reduction in NTG patients while maintaining excellent IOP control with outstanding safety. These findings support the Hydrus Microstent as an effective minimally invasive surgical option for medication reduction in NTG management, addressing an important unmet clinical need.

Abstract No.: 207068

Comparative Analysis of Ocular Biometric Parameters Between Primary Angle Closure Glaucoma Patients and Healthy Controls in the Indian Population

First Author: Rajat Mohan **SRIVASTAVA**

Co-Author(s): Siddharth **AGRAWAL**, Farheen **ANSARI**

Purpose: To compare ocular biometric parameters between Primary Angle Closure Glaucoma (PACG) patients and age- and gender-matched healthy controls.

Methods: Cross-sectional case-control study. Consecutive PACG patients and healthy controls were recruited. Ocular biometric parameters such as axial length (AL), anterior chamber depth (ACD), lens thickness (LT) were measured using A-scan ultrasound biometer and lens position (LP), relative lens position (RLP) and a novel biometric parameter (Lens-Anterior Segment Crowding Factor (LASC)) ($LT + ACD / LT$) were calculated and compared between the groups. The worse eye in the PACG and the right eye in the control group were considered for analysis. An independent t-test was used to compare the means between groups, and a p-value < 0.05 was considered statistically significant.

Results: A total of 100 eyes, each of PACG and healthy controls, were analyzed in the study. The ACD & LASC were significantly reduced among PACG patients compared to controls (2.40 ± 0.07 vs 2.58 ± 0.17 ; $p < 0.003$) & (1.520 ± 0.04 vs 1.63 ± 0.13 ; $p < 0.002$) respectively; whereas the LT was significantly increased among PACG patients. (4.64 ± 0.36 vs 4.20 ± 0.60 ; $p < 0.005$). There were no statistically significant differences between the LP & RLP between the groups.

Conclusions: PACG patients have reduced ACD and increased LT compared to healthy controls. LASC is a novel and reliable biometric indicator to suggest lens induced crowding of the anterior segment as observed in PACG compared to LP & RLP.

Abstract No.: 201632

Comparative Effectiveness of Minimally Invasive Glaucoma Surgeries In Indian Patients With Primary Open-Angle Glaucoma: The SKIBI Study

First Author: Prasanna Vekatesh **RAMESH**

Co-Author(s): M Nivean

Purpose: To evaluate and compare early outcomes of five minimally invasive glaucoma surgery (MIGS) techniques Suture-GATT, Kahook Dual Blade (KDB), iStent, Bent Ab Interno Needle Goniectomy (BANG), and iStent Inject in Indian patients with mild to moderate primary open-angle glaucoma (POAG) and cataract.

Methods: This prospective study included 113 eyes (Suture-GATT: 21, KDB: 28, iStent: 20, BANG: 31, iStent Inject: 13). Patients underwent phacoemulsification with one MIGS procedure. Intraocular pressure (IOP) reduction, antiglaucoma medication (AGM) use, and safety outcomes were assessed over 6 months. The procedure choice was influenced by patient preference and affordability.

Results: At 6 months, mean IOP reduction was Suture-GATT 6.41 ± 2.05 mmHg, KDB 5.88 ± 0.64 , iStent 2.81 ± 0.83 , BANG 5.27 ± 0.68 , and iStent Inject 6.14 ± 1.62 . AGM reduction was greatest with KDB (0.54 ± 0.15) and iStent Inject (0.64 ± 0.12), followed by Suture-GATT (1.05 ± 0.26), BANG (0.58 ± 0.11), and iStent (1.46 ± 0.38). Complications were least with iStent Inject and iStent. Complete success was highest with Suture-GATT (71%), contributing to 90% total success. Anterior segment imaging demonstrated characteristic outflow patterns for each procedure, which correlated with their relative efficacy and safety profiles.

Conclusions: All MIGS procedures effectively reduced IOP and AGM use. Suture-GATT and iStent Inject achieved the greatest IOP reduction, while KDB and iStent Inject offered superior safety. KDB may represent the most cost-effective option in Indian settings.

Abstract No.: 206799

Comparative Efficacy of Laser Trabeculoplasty Modalities and Antiglaucoma Medications for Open-Angle Glaucoma: A Network Meta-Analysis

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Purpose: To compare the effectiveness of various laser trabeculoplasty (LT) modalities and antiglaucoma medications in reducing intraocular pressure (IOP) and medication burden at 6 and 12 months in patients receiving LT (all laser-naïve) or medical therapy alone.

Methods: This systematic review was registered with PROSPERO (CRD420251071621). Five databases were searched through September 2025 for randomized and non-randomized studies evaluating LT techniques—argon (ALT), selective (SLT), micropulse (MLT), pattern scanning (PSLT), titanium-sapphire (TLT), and direct SLT (DSLT)—and antiglaucoma medications. Outcomes were the mean IOP reduction and the change in medication number at 6 and 12 months. Network meta-analyses using frequentist random-effects models were performed, and treatments were ranked by P-scores. Study quality was assessed using RoB-2 and ROBINS-I. Heterogeneity, inconsistency, sensitivity, and small-study effects were evaluated.

Results: Thirty-nine studies (4,614 eyes; 3,679 patients) were included. In the NMA, SLT 360° ranked highest for IOP reduction at 6 (P-score 77.2%) and 12 months (77.4%). Most comparisons were not statistically significant, except for SLT 360° versus SLT 180° at 6 months (MD −0.90 mmHg, 95% CI −1.56 to −0.23, $p = 0.008$). SLT 180°, SLT 360°, ALT 360°, and DSLT 360° significantly reduced medication burden compared with medical therapy (all $p < 0.0001$) at both time points. No severe adverse events were reported, and sensitivity analyses confirmed robust results with no single study influencing estimates.

Conclusions: In laser-naïve patients, SLT 360° ranked highest for IOP reduction and, along with several other LT modalities, significantly reduced medication burden with a favorable safety profile. These findings support laser trabeculoplasty as an effective and safe primary treatment option for open-angle glaucoma.

Abstract No.: 200592

Comparative Outcomes of Illuminated Microcatheter-Assisted Circumferential Trabeculotomy Versus Conventional Trabeculotomy in Congenital Glaucoma: A Systematic Review

First Author: Habiba **SULTANA**

Co-Author(s): Md Sajidul **HUQ**

Purpose: To systematically evaluate and compare the efficacy and safety of illuminated microcatheter-assisted circumferential trabeculotomy with conventional trabeculotomy in the surgical management of primary congenital glaucoma.

Methods: We systematically searched MEDLINE, Embase, Scopus, and the Cochrane Library for studies from 2000 to 2024. Eligible studies included 2 randomized controlled trials and 5 cohort studies comparing these surgical techniques in patients aged ≤ 18 years, and reporting outcomes such as IOP reduction, surgical success rates, complications, medication use, and reoperation rates at a minimum of 12 months follow-up. Risk of bias was assessed using Cochrane RoB 2 and Newcastle-Ottawa scales.

Results: Seven studies involving approximately 416 eyes with congenital glaucoma were included. Illuminated microcatheter-assisted trabeculotomy consistently resulted in greater mean IOP reductions (typically 45–52%) than conventional trabeculotomy (35–45%). At the latest follow-up (12–36 months), absolute surgical success (IOP control without medication) ranged from 64% to 90% with microcatheter-assisted surgery compared to 44% to 70% with conventional surgery. Both procedures were associated with self-resolving hyphema; rates of severe complications were low between groups. Microcatheter-assisted surgery led to less dependence on glaucoma medications and fewer reoperations. Quality assessment indicated overall moderate to low risk of bias among included studies.

Conclusions: Illuminated microcatheter-assisted circumferential trabeculotomy is superior to conventional partial trabeculotomy, providing enhanced IOP control, higher surgical success, reduced medication reliance, and fewer reoperations, without increased serious complications. Further multi-center RCTs with longer follow-up are warranted to confirm the durability of outcomes and clarify cost-effectiveness.

Abstract No.: 204394

Comparative Ultrastructural Analysis of the Trabecular Meshwork in Primary Open-Angle Glaucoma and Chronic Angle-Closure Glaucoma

First Author: Zhiqiao **LIANG**

Co-Author(s): Huijuan **WU**

Purpose: The trabecular meshwork (TM), the principal site of aqueous humor outflow resistance, plays a pivotal role in the regulation of intraocular pressure (IOP), the key modifiable risk factor for glaucoma. This study aimed to compare the ultrastructural characteristics of the TM in primary open-angle glaucoma (POAG) and chronic angle-closure glaucoma (CACG) using transmission electron microscopy (TEM).

Methods: TM specimens were obtained via Kahook Dual Blade goniotomy from 11 POAG and 9 CACG patients, immediately fixed, and processed for TEM analysis. The ultrastructural features examined included cellular morphology, extracellular matrix (ECM) organization, and collagen fibril architecture, with fibril diameters quantitatively measured using Feret's diameter.

Results: Both POAG and CACG samples exhibited a marked reduction in TM cell numbers accompanied by pronounced ultrastructural abnormalities, including plasma membrane rupture, mitochondrial swelling, chromatin aggregation, and dilated endoplasmic reticulum. ECM alterations in both groups included trabecular beam fusion and narrowed intertrabecular spaces, indicative of compromised tissue architecture and impaired aqueous humor outflow pathways.

Quantitative analysis revealed that collagen fibrils were significantly larger in CACG compared to POAG (60.27 ± 12.97 nm vs. 43.61 ± 8.62 nm, $p = 0.018$), with a larger cross-sectional area ($p = 0.027$).

Conclusions: These findings highlight distinct ultrastructural differences in the TM of POAG and CACG, with POAG characterized by thinner and CACG by larger fibrils, suggesting divergent ECM remodeling pathways that may contribute to subtype-specific outflow resistance and disease mechanisms.

Abstract No.: 201179

Comparing Outcomes Between Two Non-Valved Glaucoma Drainage Devices in a Tertiary Hospital

First Author: Jia Hui **LEONG**

Co-Author(s): Nor Idahriani **MUHD NOR**, Roslinah **MUJI**, Chew Ean **TAN**

Purpose: For the past decades, there have been no prior studies comparing Paul Glaucoma Implant (PGI) and Aurolab Aqueous Drainage Implant (AADI). We aim to compare the treatment outcome of PGI and AADI in medically uncontrolled glaucoma.

Methods: We retrospectively review 39 eyes that had undergone PGI ($n=19$) and AADI ($n=20$) implantation with a minimum of 12 months of follow-up. The primary outcome is defined as intraocular pressure (IOP) ≥ 6 and ≤ 18 mmHg and at least 20% IOP reduction from baseline (complete success: without medication; qualified success: with medications). Failure is defined as IOP < 6 mmHg and > 18 mmHg after 3 months, reoperation for IOP-related indication, explantation of the implant, and loss of light perception.

Results: There were no significant differences in baseline demographic and ocular characteristics between the groups, except for ethnicity. AADI has a higher complete success rate than PGI, 45% and 31.6% respectively ($p=0.44$). At 12 months, AADI scored a lower final mean IOP and greater IOP reduction (11.05 ± 3.35 mmHg, 68.5%) compared to PGI (13.74 ± 4.11 mmHg, 54%) ($p < 0.05$). Both groups achieved a reduction in the number of antiglaucoma medications from 3.84 ± 0.38 to 1.05 ± 1.27 in PGI versus 3.75 ± 0.44 to 0.70 ± 1.13 in AADI ($p=0.36$). There is no significant difference in mean visual acuity for both groups at baseline and final visits ($P=0.33$). There was a similar percentage of patients who experienced postoperative complications (31.6% PGI, 30% AADI, $P = 0.92$). Among these, PGI groups predominantly experience tube block ($n=3$) while hypotony is more commonly seen in AADI groups ($n=5$).

Conclusions: In summary, AADI showed a better outcome, whereby it achieves greater IOP reduction and significantly lower final mean IOP.

Abstract No.: 202277

Comparison of 24-2 Rapid Protocol of Melbourne Rapid Fields Online Perimetry With Humphrey Field Analyzer SITA-Standard and SITA-Faster

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Co-Author(s): Mitsuto **HOSOKAWA**, Yu Xiang George **KONG**, Toshio **OKANOUCHI**, Algis J. **VINGRYS**

Purpose: Melbourne Rapid Fields (MRF) web-browser perimetry software allows white-on-white increment threshold perimetry on any computer. This study evaluates the outcomes of MRF24-2 Rapid protocol (MRF24-2R), a new procedure that removes false negative trials, speeds fixation change, and adopts a neighborhood modified PDF, Bayes predictor.

Methods: This prospective, cross-sectional study included 223 eyes from 223 participants. The MRF24-2R results were compared to HFA24-2 SITA-Standard (HFA-SS) in 92 patients and to HFA24-2 SITA-Faster (HFA-SFR) in 131 patients. Mean Deviation (MD), Pattern Deviation (PD), and reliability indices were compared with Intraclass Correlation Coefficients (ICC) and Bland-Altman methods. Patients completed two MRF24-2R to define test-retest reliability.

Results: MRF24-2R returned high agreement with HFA-SS for MD (ICC = 0.96 {95% CI 0.94 to 0.98}) and PSD (ICC = 0.94 {95% CI 0.89 to 0.97}). Similar findings were found when MRF24-2R MD was compared to HFA-SFR (ICC = 0.95) and PSD (ICC = 0.90). Bland-Altman analysis for MRF24-2R and HFA-SS found a bias of -0.80 decibels (dB) (95% Limits of Agreement, LoA -5.48 dB, +3.87 dB) for MD and +0.95 dB (LoA -2.58 dB, +4.50 dB) for PSD. Reliability indices were similar for HFA-SS and MRF24-2R, but the mean false positive rate was lower than that of HFA-SFR [4.8 vs 7.1, $p=0.003$]. MRF24-2R (169 ± 45 seconds) was significantly faster than HFA-SS (346 ± 73 seconds) ($p < 0.001$) (approximately by 51%) and similar to HFA-SFR (192 ± 53 seconds) ($p=0.38$).

Conclusions: MRF24-2R provides fast, portable, reliable visual field tests for glaucoma screening and clinical management.

Abstract No.: 206509

Comparison of One-Year Surgical Outcomes of PreserFlo® MicroShunt, Trabeculectomy, and EX-PRESS® Glaucoma Filtration Surgery

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Purpose: To compare the one-year surgical outcomes of PreserFlo® MicroShunt (PFM), trabeculectomy (LEC), and EX-PRESS® glaucoma filtration surgery (EX).

Methods: We retrospectively reviewed consecutive cases undergoing PFM, LEC, or EX between September 2012 and March 2024 with one year of follow-up. A

total of 68 eyes (PFM), 75 eyes (LEC), and 49 eyes (EX) were included. Postoperative intraocular pressure (IOP), medication score (MS), best corrected visual acuity (BCVA), and surgical success were evaluated. Surgical success was defined as an IOP ≥ 14 mmHg and $\geq 20\%$ reduction from baseline at the one year, with or without medications.

Results: Mean IOP (mmHg) was decreased from 16.9 to 9.6 in PFM, 21.9 to 9.6 in LEC, and 20.5 to 14.3 in EX ($p < 0.05$ compared with baseline in all groups). Mean MS also decreased from 4.4 to 0.3 in PFM, 4.5 to 0.5 in LEC, and 3.6 to 1.7 in EX ($p < 0.05$ compared with baseline in all groups). BCVA significantly worsened postoperatively in all groups compared with baseline in all groups and did not recover until one year ($p < 0.05$). At one year, IOP and MS were lower in PFM and LEC than in EX, with no difference between PFM and LEC. Survival rates were 84.2%, 77.8%, and 69.4% in PFM, LEC, and EX groups, respectively ($p = 0.15$).

Conclusions: At one year postoperatively, PFM achieved IOP reduction comparable to LEC and superior to EX, with similar surgical success rates.

Abstract No.: 202068

Comparison of Outcomes of 180-Degree Tanito Microhook Trabeculotomy Versus 360-Degree Gonioscopy-Assisted Transluminal Trabeculotomy Combined With Phacoemulsification in Open-Angle Glaucoma

First Author: Madhavi **PILLAI**

Co-Author(s): Devendra **MAHESHWARI**, Nimrita **NAGDEV**

Purpose: To compare the surgical outcomes of Tanito microhook Trabeculotomy combined with phacoemulsification (Phaco-TMH) and 5-0 prolene gonioscopy-assisted transluminal trabeculotomy combined with phacoemulsification (Phaco-GATT) in mild-moderate Open-angle glaucoma.

Methods: This was a prospective, comparative, interventional study of 110 patients who underwent Phaco-TMH (Group 1, N=55) and Phaco-GATT (Group 2, N=55). The primary outcome measures included changes in intraocular pressure (IOP), antiglaucoma medications (AGM), and best-corrected visual acuity (BCVA). Success was defined as a combination of at least 20%, 25%, or 30% reduction in IOP and an absolute IOP of less than 21, 18, or 15 mm Hg, respectively (Criteria 1, 2, and 3). Additionally, interventions and complications were compared between the groups. A sample size of 50 eyes per group was required to detect a clinically significant difference in intraocular pressure (IOP) between Phaco-TMH and Phaco-GATT groups. The significance level was set at 0.05, and the desired power was 80%. All statistical analyses were performed using the statistical software STATA 14.0 (Texas, USA).

Results: In Group 1, mean IOP reduced significantly from 24.38 ± 6.29 mmHg to 14.60 ± 3.87 mmHg, and in Group 2 from 25.45 ± 5.65 mmHg to 12.80 ± 3.12 mmHg at 12 months ($p < 0.001$), with a significant reduction in Group 2 than in Group 1 ($p = 0.007$). The percentage reduction of IOP in Group 1 was 37.5% and in Group 2 was 47.7%. AGM significantly reduced from 1.53 ± 0.66 to 0.22 ± 0.57 and from 1.64 ± 0.73 to 0.09 ± 0.29 in Groups 1 and 2, respectively ($p < 0.001$), with no significant difference between the groups ($p = 0.137$). Complete success by criteria 1, 2, and 3 in Group 1 was 74.6%, 69.1% and 52.7%; and in Group 2 was 89.1%, 88.1% and 65.4% respectively. Higher baseline IOP and higher age were associated with a lower likelihood of surgical failure ($p = 0.002, p = 0.045$). Hyphema was seen in one patient in Group 1, 7 patients in Group 2, and two patients in Group 2 required an anterior chamber wash. IOP spikes were seen in one patient in Group 1 and three patients in Group 2.

Conclusions: The 180 Degree Tanito microhook trabeculotomy is safe, efficacious, and comparable to the 360-degree GATT combined with phacoemulsification. Phaco-GATT fared better in terms of IOP reduction. This study provides valuable comparative data on two cost-effective, minimally invasive glaucoma surgery (MIGS) techniques when combined with cataract surgery.

Abstract No.: 203405

Comparison of Surgical Outcomes of 360-Degree Circumferential Trabeculotomy Versus Excisional Goniotomy With Kahook Dual Blade at 12 Months

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Co-Author(s): Devendra **MAHESHWARI**, Madhavi **PILLAI**

Purpose: To compare the safety and efficacy of gonioscopy-assisted transluminal trabeculotomy (GATT) versus Kahook dual blade (KDB) with phacoemulsification in eyes with primary open-angle glaucoma.

Methods: A retrospective and comparative study included 122 eyes (61 GATT, group 1, and 61 KDB, group 2). Baseline characteristics like intraocular pressure (IOP), best corrected visual acuity (BCVA), and anti-glaucoma medications (AGMs) were compared at each postoperative visit. Data were collected at 2 weeks, 1 month, 3, 6, and 12 months. Surgical success was defined as IOP $\leq 21 / \leq 18 / \leq 15$ mmHg with $\geq 20\% / \geq 25\% / \geq 30\%$ reduction from baseline, respectively (Criteria 1, 2, and 3). Complications, secondary interventions, and surgical risk factors were also analyzed.

Results: The mean (SD) IOP decreased from 21.15 ± 3.76 to 13.20 ± 3.21 and from 22.90 ± 4.05 to 14.44 ± 5.01 in groups 1 and 2, respectively, at the end of 12 months ($p < 0.001$). AGM reduced from 1.64 ± 0.84 to 0.08 ± 0.28 and from 1.67 ± 0.77 to 0.08 ± 0.38 in groups 1 and 2,

respectively, at the end of 12 months ($p < 0.001$). The overall success was 85.3%, 78.7%, and 60.7% in group 1 by criteria 1, 2, and 3. In group 2, it was 86.9%, 83.6%, and 70.5%. Micro hyphemas were seen in 28 patients (20 (group 1), 8 (group 2)), and macro hyphemas were seen in 4 patients of group 1. 6 had IOP spikes (4 in group 1, 2 in group 2). AC wash was done in 2 patients.

Conclusions: Both GATT and KDB achieved significant reductions in intraocular pressure and anti-glaucoma medication use at 12 months, with KDB demonstrating safety and efficacy equivalent to 360° suture trabeculotomy.

Abstract No.: 201306

Comprehensive Genetic Landscapes and Clinical Heterogeneity in Nanophthalmos: New Insights From a Large Chinese Cohort

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Purpose: Nanophthalmos is a rare ocular condition characterized by a significantly short axial length (AL) and high hyperopia, often associated with various complications. This study aims to provide a comprehensive analysis of the clinical and genetic features of nanophthalmos in a large Chinese cohort.

Methods: A total of 105 patients from unrelated families diagnosed with nanophthalmos were included. Genetic testing was performed using whole-exome sequencing to identify variants in genes associated with the condition. Clinical features, including demographic data, the presence of accompanying clinical findings, and various ocular parameters, were compared across different genetic groups.

Results: Whole exome sequencing revealed variants in four key genes: PRSS56, MFRP, MYRF, and TMEM98, with a detection rate of 71.43%. Autosomal recessive genes (PRSS56 and MFRP) were associated with shorter AL, higher hyperopia, shallower vitreous chamber depth, and steeper corneal curvatures (larger K1 and K2). In contrast, autosomal dominant genes (MYRF and TMEM98) were linked to earlier onset of glaucoma and a higher incidence of multiple ciliary body cysts. In the patients carrying variants in PRSS56 and MFRP, biallelic variants were associated with more severe phenotypes, including more extreme ocular parameters and increased risks of specific complications, compared to monoallelic variants.

Conclusions: This study represents the largest cohort of nanophthalmos patients reported to date, expanding the genetic and clinical understanding of the condition. It identifies novel variants and provides valuable insights into genotype-phenotype correlations, highlighting the impact of genetic variation on the disease severity and associated complications of nanophthalmos.

Abstract No.: 204345

Corneal Biomechanics and Its Association With Visual Field Progression in Primary Open-Angle Glaucoma (Normal Tension or Hypertension): A Prospective Longitudinal Investigation

First Author: Yu **CAI**

Co-Author(s): Ya Hui **WEI**

Purpose: To analyze effects of dynamic corneal response parameters (DCRs) on visual field (VF) progression in normal-tension glaucoma (NTG) and hypertension glaucoma (HTG).

Methods: This was a prospective cohort study. This study included 57 subjects with NTG and 54 with HTG, followed up for 4 years. The subjects were divided into progressive and nonprogressive groups according to VF progression. DCRs were evaluated by corneal visualization Scheimpflug technology. General linear models (GLMs) were used to compare DCRs between two groups, adjusting for age, axial length (AL), mean deviation (MD), etc. VF progression risk factors were evaluated by logistic regression and receiver operating characteristic (ROC) curves.

Results: For NTG, first applanation deflection area (A1Area) was increased in progressive group and constituted an independent risk factor for VF progression. ROC curve of A1Area combined with other relevant factors (age, AL, MD, etc.) for NTG progression had an area under curve (AUC) of 0.813, similar to the ROC curve with A1area alone (AUC = 0.751, $p = 0.232$). ROC curve with MD had an AUC of 0.638, lower than A1Area-combined ROC curve ($p = 0.036$). There was no significant difference in DCRs between the two groups in HTG.

Conclusions: Corneas in the progressive NTG group were more deformable than those in the nonprogressive group. A1Area may be an independent risk factor for NTG progression. It suggested that the eyes with more deformable corneas may also be less tolerant to pressure and accelerate VF progression. VF progression in the HTG group was not related to DCRs. Its specific mechanism needs further study.

Abstract No.: 201268

Correlating Macular Optical Coherence Tomography Angiography and Visual Field Results in Glaucoma: A Systematic Review and Meta-Analysis

First Author: Yihao Eric **JIN**

Co-Author(s): Chin Hou Bryan **ANG**, Zhi Rui John **CHEW**

Purpose: To evaluate the relationship between macular vessel density (mVD) and visual field (VF) results in primary open-angle glaucoma (POAG).

Methods: Pubmed, Embase and Cochrane Library were searched to September 2024. Eligible studies

assessed mVD using OCT Angiography (OCT-A), and VF using 24-2 or 10-2 Humphrey Visual Field (HVF). The primary outcome was the pooled correlation between mVD and VF indices. Secondary outcomes included the association between baseline mVD and VF progression and the relationship between mVD decline and VF deterioration. Statistical analyses were performed using R, with significance at $p < 0.05$.

Results: 20 studies comprising 2,238 eyes were included. Superficial whole and parafoveal mVD showed moderate correlations with HVF 24-2 mean deviation (MD) (pooled $r = 0.319$ and 0.333 , respectively; all $p < 0.01$). Superficial whole mVD also correlated strongly with central mean sensitivity (MS) (pooled $r = 0.514$, $p < 0.001$), with associations across superficial and deep parafoveal, perifoveal, foveal regions (all $p < 0.05$). Baseline deep whole mVD was inversely correlated with risk and rate of VF progression ($p < 0.05$). Greater rates of reduction in superficial mVD in whole macula, parafoveal, perifoveal, and FAZ300 regions were significantly associated with rate of VF progression (all $p < 0.05$).

Conclusions: There is significant correlation between baseline superficial mVD and VF indices of severity, as well as between rate of reduction in superficial mVD and rate of VF progression. Superficial mVD may be a useful indicator of glaucoma severity and progression, while baseline deep mVD may help predict risk and rate of future VF progression.

Abstract No.: 206377

Correlation Between Corneal UBM Features and Genetic Variants in Early Childhood Glaucoma

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Co-Author(s): Vyshak A S, Sushmita **KAUSHIK**, Avilasha **MOHAPATRA**, Ashok **SINGH**

Purpose: To investigate whether specific corneal findings on ultrasound biomicroscopy (UBM) at presentation in early childhood glaucoma are associated with specific genetic variants.

Methods: This retrospective study included children under 3 years of age with glaucoma who underwent UBM imaging and genetic testing at presentation. Corneal changes on UBM were classified into six types: Type A (diffuse thickening), Type B (intracorneal hyper-reflectivity), Type C1/C2 (Descemet's membrane defects), Type D (intracorneal clefts), Type E (miscellaneous), and Type N (clinically clear cornea). All patients underwent whole-exome sequencing from blood samples. Only those with confirmed pathogenic variants were included. UBM patterns were correlated with genetic findings.

Results: A total of 221 eyes from 117 children were included. Type A (110 eyes) was associated with CYP1B1 variants (40%), TEK (11.1%), FOXC1 (6.8%), and others

(15.7%). Type B (45 eyes) showed CYP1B1 mutations in 77% of cases; 65% of these were Arg390His variant. Types C1/C2, with Peters Anomaly, showed 66% association with CYP1B1 Arg390His and 6.8% each with FOXC1 and PITX2. All three cases with Type D were CYP1B1 Arg390His and had the earliest onset and most severe glaucoma. Type N was associated with PAX6 mutations (70.5%), with other variants (FOXC1, LTBP2, NF1) present in 5.8% each, but no CYP1B1.

Conclusions: Specific UBM corneal patterns are strongly associated with distinct genetic variants. CYP1B1 variants affected the cornea the most, with Types B and D linked with CYP1B1 Arg390His mutation and poor outcomes. Type N is typically associated with PAX6 mutations and not CYP1B1. UBM imaging may aid early prediction of genetic aetiology and prognosis.

Abstract No.: 206677

Correlation Between Surgical Outcomes and Anterior Segment Optical Coherence Tomography-Derived Bleb Morphology Following XEN-45 Gel Stent Implantation

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Co-Author(s): Zhiqiao **LIANG**, Kuankuan **WU**

Purpose: To investigate the associations between anterior segment optical coherence tomography (AS-OCT)-derived bleb morphology and surgical outcomes following XEN-45 gel stent implantation.

Methods: This cross-sectional study consecutively included 80 eyes from 70 patients following XEN-45 gel stent implantation. Postoperative IOP and glaucoma medications were assessed at 1, 3, 6, 12, 18, and 24 months. AS-OCT imaging was performed to evaluate bleb characteristics in different postoperative stages. Spearman's correlation and binary logistic regression were employed to analyze relationships between bleb features and postoperative IOP and complete surgical success.

Results: XEN-45 gel stent implantation significantly reduced IOP from 27.1 ± 10.9 mmHg to 14.1 ± 1.3 mmHg ($p = 0.010$) and glaucoma medications from 3.1 ± 1.0 to 0.2 ± 0.6 ($p = 0.001$) at 2 years postoperatively. Significant reductions were observed at all follow-up time points from 1 day to 24 months compared to preoperative values. Early-stage blebs on AS-OCT exhibited subconjunctival spaces (88%), cavernous/hyporeflective Tenon's capsule patterns (48%/40%), absent episcleral lake (92%), and an intratenon ostium (96%) with absent/hyporeflective surroundings (48%/36%), with spaces significantly decreasing later ($p = 0.014$). Higher IOP was correlated with increased peri-ostial reflectivity ($p = 0.014$) and a greater iris-internal ostium distance ($r = 0.234$, $p = 0.045$). Complete surgical success was significantly associated with surgical procedure (OR = 14.119; 95% CI: 1.338–148.962; $p = 0.028$).

Conclusions: The XEN-45 gel stent was an effective treatment for reducing IOP and glaucoma medications. Parameters derived from AS-OCT, notably the iris-internal ostium distance and peri-ostial reflectivity, were strong predictors of IOP outcomes, offering valuable insights for clinical follow-up.

Abstract No.: 204568

Correlation Study Between Primary Glaucoma and Choroidal Thickness and Blood Flow

First Author: Ruixue ZHANG

Co-Author(s): Yuan HE

Purpose: This study aimed to compare and analyze the choroidal thickness (CT) and blood flow parameters at the macula and optic disc among patients with acute primary angle-closure glaucoma (APACG), chronic primary angle-closure glaucoma (CPACG), primary open-angle glaucoma (POAG), and a normal control group. Correlation analysis between choroidal thickness and blood flow was conducted to explore the relationship between choroidal parameters and different types of primary glaucoma.

Methods: A retrospective study was conducted involving 52 eyes with APACG, 27 eyes with CPACG, 57 eyes with PAC/PACS, 32 eyes with POAG, and 20 eyes in the normal control group. Swept-source optical coherence tomography angiography (SS-OCTA) was used to measure and compare macular foveal and optic disc choroidal thickness (CT) and choroidal vascular index (CVI). Statistical methods were applied for data analysis.

Results: Compared with the normal control group, the temporal macular choroidal thickness was significantly thicker in the APACG and PAC/PACS groups ($t = 2.275$, $P < 0.05$; $t = 2.716$, $P < 0.05$). In CPACG patients, the subfoveal, inferior, nasal, and temporal macular choroidal thicknesses were significantly thicker than those in the normal control group ($t = 2.362$, $P < 0.05$; $t = 3.138$, $P < 0.05$; $t = 2.129$, $P < 0.05$; $t = 2.259$, $P < 0.05$). In POAG patients, the subfoveal, superior, nasal, and temporal macular choroidal thicknesses were significantly thinner than those in the normal control group ($t = -2.811$, $P < 0.05$; $t = -2.352$, $P < 0.05$; $t = -2.450$, $P < 0.05$; $t = -2.038$, $P < 0.05$). Compared with the normal control group, the blood flow indices in the inferior, superior, and nasal macular regions were significantly lower in the APACG group ($t = -2.074$, $P < 0.05$; $t = -3.362$, $P < 0.05$; $t = -2.251$, $P < 0.05$). In the PAC/PACS group, the blood flow indices in the subfoveal, inferior, and nasal macular regions were significantly lower than those in the normal control group ($t = -2.635$, $P < 0.05$; $t = -2.020$, $P < 0.05$; $t = -2.057$, $P < 0.05$). In the POAG group, the temporal macular blood flow index was significantly lower than that in the normal control group ($t = 2.579$, $P < 0.05$). Compared with the normal control group, the blood flow indices in the inferior and temporal regions of

the optic disc were significantly lower in the APACG group ($t = -2.108$, $P < 0.05$; $t = -2.839$, $P < 0.05$). In the POAG group, the temporal optic disc blood flow index was significantly lower than that in the normal control group ($t = -2.225$, $P < 0.05$). In the APACG, CPACG, PAC/PACS, and POAG groups, the choroidal thickness in the inferior, superior, nasal, and temporal regions of the optic disc was positively correlated with the blood flow index ($r = 0.721$, $P < 0.01$; $r = 0.496$, $P < 0.01$; $r = 0.612$, $P < 0.01$; $r = 0.367$, $P < 0.05$).

Conclusions: Angle-closure glaucoma is associated with increased macular choroidal thickness, while open-angle glaucoma is associated with decreased macular choroidal thickness. The APACG, PAC/PACS, and POAG groups showed reduced peri-macular blood flow indices compared to the normal control group. The APACG and POAG groups exhibited reduced peri-optic disc blood flow indices compared to the normal control group. In the PAC/PACS group, subfoveal CT was positively correlated with CVI. In the APACG, CPACG, PAC/PACS, and POAG groups, sub-optic disc CT was positively correlated with CVI.

Abstract No.: 208368

Cost-Effectiveness Analysis of Population-Based Glaucoma Screening Using OCT-Based AI System in Vietnam

First Author: Jiaying ZHOU

Co-Author(s): Carol Y. CHEUNG, Truong X. NGUYEN, Anran RAN, Clement C. THAM, Shuyi ZHANG

Purpose: Glaucoma is frequently diagnosed at advanced stages and relies on opportunistic findings in clinical practice, given its asymptomatic nature in early stages, while the high diagnostic costs of conventional approaches have prevented the implementation of population-based screening for early glaucoma. We aim to evaluate the cost-effectiveness of population-based screening using an optical coherence tomography (OCT)-based AI system in Vietnam.

Methods: We developed a Markov model comparing OCT-based AI screening for primary angle-closure (PACG) and open-angle glaucoma (POAG) versus opportunistic findings from a societal perspective. A cohort of 100,000 individuals aged 50 through 35 1-year Markov cycles. Parameters were derived from literature, with costs from Vietnam Binh Dinh Eye Hospital converted to USD (2024 exchange rate: 25,400 HKD/USD). Primary outcomes were incremental cost-utility (ICURs) using quality-adjusted life years (QALYs) and incremental cost-effectiveness ratios (ICERs) using years of blindness avoided. To reflect the uncertainty around ICURs and ICERs, both one-way deterministic and simulated probabilistic sensitivity analyses were done. Willingness-to-pay (WTP) thresholds used three times the local per capita gross domestic product (GDP).

Results: Over 35 years, opportunistic finding cost US\$3,422.65 per person (16.60 QALYs), while OCT-

based AI screening cost US\$732.25 (17.79 QALYs). OCT-Based AI screening achieved 63,000 years of blindness avoided among 100,000 individuals, with ICUR of -US\$2,572 and ICER of -US\$4,271. One-way sensitivity analysis demonstrated AI performance as the most influential factor. Probabilistic sensitivity analysis confirmed robust ICURs and ICERs.

Conclusions: The OCT-based AI system for population-based glaucoma screening is highly cost-effective compared to opportunistic finding, offering evidence for implementing the AI system in real-world.

Abstract No.: 201911

Cost-Effectiveness Analysis of Population-Based Glaucoma Screening Using an OCT-Based AI System

First Author: Jiaying **ZHOU**

Co-Author(s): Carol Y. **CHEUNG**, Anran **RAN**, Clement C. **THAM**, Shuyi **ZHANG**

Purpose: Glaucoma is frequently diagnosed at advanced stages and relies on opportunistic findings in clinical practice, given its asymptomatic nature in early stages, while the high diagnostic costs of conventional approaches have prevented the implementation of population-based screening for early glaucoma. We aim to evaluate the cost-effectiveness of population-based screening using an optical coherence tomography (OCT)-based AI system in Hong Kong.

Methods: We developed a Markov model comparing OCT-based AI screening for primary angle-closure (PACG) and open-angle glaucoma (POAG) versus opportunistic findings from a societal perspective. A cohort of 100,000 individuals aged 50 through 35 1-year Markov cycles. Parameters were derived from literature, with costs from Hong Kong Hospital Authority converted to USD (2024 exchange rate: 7.81 HKD/USD). Primary outcomes were incremental cost-utility (ICURs) using quality-adjusted life years (QALYs) and incremental cost-effectiveness ratios (ICERs) using years of blindness avoided. Willingness-to-pay (WTP) thresholds used three times the local per capita gross domestic product (GDP).

Results: Over 35 years, opportunistic finding costs US\$17,413 per person (17.55 QALYs), while OCT-based AI screening costs US\$7,745 (19.14 QALYs). OCT-Based AI screening achieved 71,900 years of blindness avoided among 100,000 individuals, with ICUR of -US\$9,571 and ICER of -US\$14,281.

Conclusions: The OCT-based AI system for population-based glaucoma screening is highly cost-effective compared to opportunistic finding, offering evidence for implementing the AI system in real-world.

Abstract No.: 205573

Cost-Utility of Preservative-Free Latanoprost Eye Drop Cationic Emulsion Versus Preserved First-Line IOP-Lowering Therapies in Open-Angle Glaucoma or Ocular Hypertension Across Seven Asia-Pacific Countries

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Purpose: To assess the lifetime cost-utility and net monetary benefit (NMB) of preservative-free latanoprost eye drop cationic emulsion (PF-LAT E) compared to preserved first-line intraocular pressure (IOP)-lowering treatments in adults with open-angle glaucoma (OAG) or ocular hypertension (OHT) across seven Asian countries (Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam).

Methods: A hybrid decision-tree and Markov cohort model (30-day cycles) simulated disease progression and treatment pathways over a lifetime horizon (35-50 years). PF-LAT E was compared with country-specific preserved therapies, including betaxolol, bimatoprost, brimonidine, brinzolamide, carteolol, dorzolamide, latanoprost, tafluprost, timolol, travoprost. Patients with inadequate response escalated to second-line fixed-dose combinations and third-line surgeries. The analysis was conducted from a societal perspective, with costs in 2025 USD. Deterministic and probabilistic sensitivity analyses were performed to test model robustness.

Results: PF-LAT E consistently yielded QALY gains across all countries (0.03-0.41 per patient). Incremental costs ranged from cost-saving (-\$7,255) to modest increases (+\$473), depending on the comparator. Net monetary benefits were positive in all countries (except against preserved latanoprost in Thailand), ranging from -\$236 to \$15,633 based on local willingness-to-pay thresholds. Economic benefits were driven by fewer treatment escalations, improved treatment response, and lower adverse-event management costs. Results were robust in sensitivity analyses.

Conclusions: PF-LAT E offers enhanced clinical effectiveness and economic benefit versus preserved therapies, reinforcing that PF-LAT E is a cost-effective first-line option in routine glaucoma management.

Abstract No.: 200753

Cytomegalovirus US28 and CD8/CD69 Distribution in Human Eyes With Normal and Elevated Intraocular Pressure

First Author: Suqian **WU**

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Purpose: To characterize the distribution of cytomegalovirus (CMV) US28 and CD8/CD69, markers

of tissue-resident memory T (TRM) cells, in human eyes with normal and elevated intraocular pressure (IOP).

Methods: Three cadaveric eyes with no history of glaucoma or high IOP were collected. In addition, aqueous humor and tissues of iris and trabecular meshwork (TM) were collected from patients of Posner-Schlossman syndrome (PSS), primary open-angle glaucoma (POAG), primary angle-closure (PAC), primary angle-closure glaucoma (PACG) and secondary angle-closure (SAC). Ciliary processes were obtained from five of those patients. CMV DNA and anti-CMV Immunoglobulins in aqueous humor were tested, and all the solid tissues collected were immunostained.

Results: US28 was found in almost all regions, with high light intensities observed in retinal neuroepithelium, followed by ciliary bodies, and was observed in all the patient samples of iris and ciliary process. Tissues of TM from 23.1% of the PSS patients, 50% of the PAC patients and 100% of the PACG and SAC patients were found US28 positive. CD8/CD69 co-expression was detected in all samples of iris and none of the TM samples, and was expressed abundantly in ciliary processes obtained from patients with POAG and PACG, but minimally in those from patients with PSS.

Conclusions: CMV can reside in nearly all regions of the eye. Its critical reservoirs may include the retinal neuroepithelium and the ciliary body. Furthermore, we hypothesize that the substantial reduction in TRM cell number within the ciliary bodies is a key contributing factor to the relapse of PSS.

Abstract No.: 200351

Decoding Glaucoma Hemodynamics: Dual-Modality OCT-A and CDI Reveals Distinct Micro-Macro Vascular Signatures in Normal-Tension vs. High-Tension Subtypes

First Author: Wenbo HOU

Co-Author(s): Jun FENG, Xin LI

Purpose: To characterize optic nerve head (ONH) microcirculation via optical coherence tomography angiography (OCT-A) and upstream macrocirculation via color Doppler imaging (CDI) in patients with normal-tension glaucoma (NTG) and high-tension glaucoma (HTG).

Methods: This cross-sectional study included 67 HTG, 55 NTG, and 42 control eyes. Comprehensive exams comprised visual field, RNFL thickness via OCT, ONH vessel density (VD) by OCT-A, and CDI-measured hemodynamics [PSV, EDV, RI] of ICA, OA, CRA, SPCA. SPSS analyses used t-test, Mann-Whitney U, and Pearson correlation ($P < 0.05$).

Results: Glaucomatous eyes showed significantly reduced ONH VD and RNFL thickness versus controls (both $P < 0.001$) (Fig1, Table1, 2). The NTG group exhibited lower peripapillary VD than HTG ($P = 0.027$), particularly in nasal superior, inferior nasal, inferior tempo, and

tempo inferior sectors ($P < 0.05$) (Table2). Compared to controls, HTG showed decreased PSV (ICA: $P = 0.029$; CRA: $P = 0.023$) and EDV (ICA: $P = 0.023$; CRA: $P < 0.001$), and increased RI (ICA: $P = 0.019$; CRA: $P = 0.006$). NTG showed reduced PSV (OA: $P = 0.015$; CRA: $P < 0.001$) and EDV (OA: $P = 0.047$; CRA: $P = 0.001$) versus controls, with lower CRA PSV than HTG ($P = 0.034$). Peripapillary VD correlated with mean defect (MD, $P < 0.001$) and RNFL thickness ($P < 0.001$) but not with CDI parameters (all $P > 0.05$) (Fig2, Table3).

Conclusions: NTG and HTG exhibit distinct ONH microcirculatory and upstream macrocirculatory characteristics. OCT-A-derived VD correlates with glaucomatous structural-functional damage, whereas no correlation exists between micro- and macrovascular parameters, suggesting independent regulatory mechanisms in glaucoma subtypes.

Abstract No.: 204021

Decorin and Spironolactone Promote Retinal Ganglion Cell Survival in a Rat Retinal Explant Model Mimicking Glaucomatous Damage

First Author: Mariana BOTREL CUNHA

Co-Author(s): Francine BEHAR-COHEN, Emilie PICARD, Jenny YOUALE

Purpose: There is a critical need for neuroprotective therapies in glaucoma—particularly in normal-tension glaucoma (NTG), in which retinal ganglion cell (RGC) loss and optic nerve degeneration can progress independently of intraocular pressure. Mineralocorticoid receptor (MR) overactivation in ocular tissues contributes to neurovascular inflammation, neurotoxicity, oxidative stress, and glutamate-mediated excitotoxicity—mechanisms implicated in glaucoma pathogenesis, especially in NTG. Decorin (DCN) and spironolactone (SPR), both downregulated by MR activation, possess anti-inflammatory and neuroprotective properties. This study evaluated their neuroprotective effects in a rat retinal explant model of NMDA-induced excitotoxicity.

Methods: Twenty-four neuroretinas from two-month-old Wistar rats were assigned to four groups ($n = 6$ per group): (1) NMDA 680 μM (30 min); (2) NMDA + DCN 10 $\mu\text{g/mL}$ (pre- and post-treatment); (3) NMDA + SPR 4 $\mu\text{g/mL}$ (pre- and post-treatment); (4) Control. Explants were maintained in culture for 72 hours. NMDA was applied at 24 hours for 30 minutes and then washed out. DCN and SPR treatments were administered at 0 hours and again at 24.5 hours, immediately after NMDA removal. Cytotoxicity was quantified by LDH release, and RGC survival was assessed via RBPMs immunostaining. Automated cell counts using QuPath were verified manually. RGC counts were analyzed using Kruskal–Wallis and LDH kinetics with two-way ANOVA.

Results: Both DCN and SPR treatments reduced LDH release and cell mortality at 48 and 72 hours; however,

only SPR reached statistical significance ($p < 0.05$), indicating sustained cytoprotection. Furthermore, both SPR- and DCN-treated groups showed significantly higher RGC survival compared to NMDA-only explants (SPR: $p < 0.0001$; DCN: $p < 0.05$).

Conclusions: Decorin and spironolactone markedly attenuate NMDA-induced excitotoxicity in retinal explants at both molecular and cellular levels. These findings support their potential as neuroprotective candidates for glaucoma therapy, particularly in NTG.

Abstract No.: 208023

Development and Validation of a Multimodal Deep Learning Model for Latent Zonular Instability in Primary Angle Closure Disease

First Author: Ning **FAN**

Co-Author(s): Wei **CHI**, Sheng Li **MI**, Chun Yan **QIAO**

Purpose: This study aims to develop and validate a multimodal deep learning model for detecting latent zonular instability in patients with primary angle closure disease (PACD) and cataract.

Methods: This study included 102 patients with PACD who underwent cataract surgery at Shenzhen Eye Hospital from June 2022 to June 2024. The external validation set comprised data from 45 patients (59 eyes) with PACD at Beijing Tongren Hospital from May 2022 to May 2024. Intraoperative confirmation of zonular status served as the reference standard. A multimodal network, combining a ResNet-based convolutional neural network and a TabNet classifier, was developed and validated.

Results: The analysis included 102 eyes with PACD and cataract, with preoperative AS-OCT images and eight parameters. The parameters between latent zonular instability and zonular stability groups included anterior chamber depth, lens vault, angle opening distance at 750 μm , angle recess area at 750 μm , trabecular iris angle at 750 μm , anterior radius of the lens (F-R), anterior radius of the steep curvature of the lens (F-Rs), and lens thickness (all $P < 0.001$ except for F-R, $P = 0.017$). A multimodal model integrating AS-OCT images and clinical data achieved AUCs of 0.82 (95% CI: 0.75–0.88) and 0.78 (95% CI: 0.75–0.81), and accuracies of 79.55% and 75.20% in internal and external validations, respectively, outperforming doctors in diagnosis.

Conclusions: Combining clinical parameters and raw images, this multimodal artificial intelligence approach can effectively detect latent zonular instability in PACD, potentially enhancing early diagnosis.

Abstract No.: 206022

Diagnostic Accuracy of an AI-Based Fundus Camera for Glaucoma Detection: Comparison With Standard and Remidio-Based Grading System

First Author: Neha **YADAV**

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Purpose: To evaluate the diagnostic performance of an AI fundus camera for glaucoma detection compared with two glaucoma specialists applying different grading criteria under two definitions: (i) disc suspect or referable glaucoma as disease positive, and (ii) disc suspect or normal as disease negative.

Methods: Fundus images were independently graded by two glaucoma specialists: one using standard glaucoma grading criteria and the other using Remidio grading criteria. The performance of the AI fundus camera was compared against both specialists. Disease prevalence, sensitivity, specificity, and area under the ROC curve (AUC) were calculated.

Results: A total of 594 participants (mean age 46.8 years; SD 15.3; range 13–92 years) were included. Definition 1 (disc suspect or referable glaucoma as disease positive): Sensitivity was highest for the Remidio criteria for glaucoma detection (80.8%), compared with the standard clinical grading (63.0%). Specificity was high for both (93.8–95.1%). AUC values indicated strong performance, highest for the Remidio criteria (0.87) and slightly lower for the standard clinical grading (0.79). Definition 2 (disc suspect or normal as disease negative): Sensitivity ranged from 76.9% (standard clinical grading) to 80.0% (Remidio criteria), with specificity 96.1–97.1%. AUC values were 0.87–0.88. AI performance was comparable to both specialists across definitions.

Conclusions: The AI-based fundus camera achieved diagnostic accuracy comparable to that of glaucoma specialists. High sensitivity, specificity, and AUC support its potential for ruling out glaucoma in community screening, providing a feasible and scalable approach for early detection.

Abstract No.: 204164

Diagnostic Value of CASIA2 for Zonulopathy Detection in Primary Angle-Closure Glaucoma

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Co-Author(s): Yiyi **LI**, Mugen **LIU**, Arthur Labisi **SILOKA**

Purpose: To evaluate anterior segment characteristics of primary angle-closure glaucoma (PACG) using swept-source anterior segment optical coherence tomography (SS-OCT, CASIA2), and identify parameters that may improve clinical detection of zonulopathy.

Methods: This retrospective study included 122 eyes from 95 PACG patients who underwent combined cataract and glaucoma surgery. Eyes were classified into three groups: (1) Apparent zonulopathy, (2) occult zonulopathy (diagnosed intraoperatively), and (3) normal-zonule groups. Preoperative anterior segment parameters were obtained using CASIA2. Multivariate logistic regression was performed to identify independent risk factors associated with zonulopathy, and receiver operating characteristic (ROC) curves were used to evaluate diagnostic performance.

Results: Zonulopathy incidence was 47.5% (58/122). Of these, only 27.6% (16/58) were diagnosed preoperatively, while 72.4% (42/58) had occult zonulopathy. The occurrence was significantly higher in acute PACG eyes (64.8%, 35/54) than in chronic PACG eyes (33.8%, 23/68) ($P < 0.05$). Multivariate analysis indicated that greater lens thickness (LT) (OR=7.610, $P=0.009$) and greater lens vault (LV) (OR=0.237, $P=0.039$) were significant independent risk factors. ROC curve analysis revealed LT had moderate diagnostic value (AUC=0.703) for zonulopathy, with an optimal cutoff of 4.96 mm. A combined diagnostic model incorporating LT, LV, PACG subtype (acute vs. chronic), anterior chamber depth (ACD), and central ACD achieved the highest diagnostic efficacy (AUC=0.760).

Conclusions: Zonulopathy is commonly present in PACG eyes, particularly in acute cases. This study demonstrates that CASIA2-derived LT and LV are critical predictors for zonulopathy, and a multifactorial model enhances preoperative identification of occult Zonulopathy, providing clinical guidance for optimizing surgical strategy.

Abstract No.: 205439

Do Symptoms Match Signs? Agreement Between Questionnaires and Clinical Tests for Dry Eye Disease in Glaucoma and Normals

First Author: Amrita **PUGALENTHI**

Co-Author(s): Ronnie **GEORGE**, Baskaran **MANI**

Purpose: To evaluate the ocular surface and utility of symptom-based questionnaires in Dry Eye Disease (DED) in patients using anti-glaucoma medications (AGMs) and age-matched normals.

Methods: Prospective study of patients on >2 AGMs for ≥ 2 years and controls. Ocular surface disease index (OSDI), Standardized Patient Evaluation of Eye Dryness (SPEED), Dry Eye Questionnaires (DEQ-5), Schirmer's test (type I), and Tear film breakup time (TBUT) were graded as mild, moderate, severe and normal, and agreement was studied.

Results: Of 65 cases and 69 controls, age was similar, and gender was dissimilar ($p=0.009$). Mean AGMs were $2.88(\pm 1.02)$ in cases. TBUT ($6.72(\pm 2.07)$ vs $7.49(\pm 2.61)$; $p=0.062$) and Schirmer's ($14.4(\pm 5.88)$ vs $15.48(\pm 6.42)$; $p=0.313$) were reduced in cases. OSDI ($22.09(\pm$

$9.59)$ vs $10.83(\pm 9.06)$; $p=0.001$), SPEED ($8.25(\pm 3.46)$ vs $5.07(\pm 3.43)$; $p=0.001$), and DEQ-5 ($7.2(\pm 2.14)$ vs $4.07(\pm 3.09)$; $p=0.001$) were all worse in cases. Kappa (Schirmer's vs TBUT) was better in cases ($\kappa=0.285$, $p < 0.001$ vs $\kappa=0.113$, $p=0.06$). Agreement between Schirmer's and OSDI, SPEED and DEQ-5 for cases was best for OSDI ($\kappa=0.25$, 95% CI: 0.101-0.431) and <0.1 for the rest. For TBUT with questionnaires agreement was poor (<0.14 in all groups). Between OSDI and DEQ-5, kappa was (0.639, 95% CI: 0.474-0.804) for controls and (0.438, 95% CI: 0.269-0.607) for cases. Agreement between OSDI and SPEED was poor.

Conclusions: Given the ocular surface impact of long-term AGM use, patient-reported symptoms do not always reflect clinical signs of dry eye. Using validated questionnaires with objective testing is essential for accurate assessment of ocular surface dysfunction.

Abstract No.: 204187

Efficacy and Safety of Omidenepag Isopropyl vs Latanoprost for Glaucoma and Ocular Hypertension: A Meta-Analysis of Randomized Trials

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Purpose: To compare the effectiveness and safety of Omidenepag Isopropyl (OMDI) versus Latanoprost in patients with primary open-angle glaucoma or ocular hypertension, focusing on diurnal intraocular pressure (IOP) reduction and ocular adverse events.

Methods: This meta-analysis was registered in PROSPERO (CRD42024627603) and included randomized controlled trials comparing OMDI and latanoprost in patients with primary open-angle glaucoma or ocular hypertension. Systematic searches were conducted in PubMed, Embase, and Cochrane for English-language articles. Outcomes included diurnal IOP at 1 week, 2 weeks, 1 month, and final follow-up, as well as adverse events. Three reviewers independently screened and extracted data following PRISMA guidelines. Risk of bias was assessed using RoB 2.0, and evidence certainty was evaluated using GRADE. Pooled estimates were calculated using a random-effects model. Effect measures included mean differences (MDs) and risk ratios (RRs) with 95% confidence intervals (CIs).

Results: Four RCTs were included, comprising 817 patients. Follow-up ranged from one week to three months. There were no significant differences between groups in diurnal IOP reduction after one week (MD = -0.06 mmHg; 95% CI -0.61 to 0.50 ; $p = 0.84$). However, OMDI resulted in a slightly smaller IOP reduction compared to latanoprost up to 3 months (MD = 1.47 mmHg; 95% CI 0.82 to 2.11 ; $p < 0.00001$). Ocular adverse effects were more frequent in the OMDI group (RR = 1.42 ; 95% CI 1.16 to 1.75 ; $p = 0.004$). GRADE

assessment showed high certainty in diurnal IOP reduction at 2 weeks, 1 month, end of follow-up, and ocular adverse effects. Other outcomes were rated as moderate certainty.

Conclusions: OMDI offers a similar short-term IOP reduction to latanoprost but is slightly less effective over 3 months and has more ocular side effects. It may be an option for patients intolerant to prostaglandins, though its side-effect profile should be considered. The review is limited by a short follow-up time.

Abstract No.: 205917

Efficacy and Safety of Paul Implant in Refractive Glaucoma: A Long-Term Study

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Purpose: To determine the long-term efficacy and safety of the Paul tube implant in refractory glaucoma.

Methods: Surgical intervention included using ripcord (6-0 prolene) inserted inside the tube at the time of surgery. Surgical quadrant was left to the surgeon's preference: superior-temporal position was chosen in the majority of cases, 53 (80.3%), while it was inferior-temporal in 11 (16.7%) of the cases. A 0.2 Mitomycin was used in 61 (98.4%) of the cases. The patch graft type was Tutoplast in all (100%) of the cases. Both demographic and clinical glaucoma indices were collected pre- and post-operative, then followed up to a minimum of 12 months. Reduction in IOP, and success rates were calculated, and postoperative complications were assessed.

Results: The IOP was significantly reduced from a preoperative average of 28.7 (10.7) mmHg to 15.7 (8.1) mmHg postoperatively, $p < 0.0001$. At the last follow-up assessment visit, the IOP reached up to 13.7 (5.7) mmHg, $p = 0.005$. The average number of anti-glaucoma medications was significantly reduced from 3.3 (0.9) preoperatively, to 0.2 (0.6) postoperatively, $p < 0.0001$, while at the last follow-up assessment, it was stable at 0.2 (0.6). The complete success rate was 53 (81.5%), qualified success was 7 (10.8%), and overall success was 60 (92.3%). Main complications were AMD 3 (4.5%), Choroidal after suture removal: 1 (1.5), Conjunctival Dehiscence: 2 (3.0), and Hyphemia: 3 (4.5) with an overall complication rate of 9 (13.6%).

Conclusions: Paul tube has a comparable efficacy and safety profile to other equivalent glaucoma devices; the implant safety is quite valid for both adult and congenital refractive glaucoma cases.

Abstract No.: 206709

Etiology-Dependent Divergent Microvascular Patterns under Translaminar Pressure Difference Change

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Co-Author(s): Xiaowei **FAN**, Ningli **WANG**, Yanling **WANG**, Jingxue **ZHANG**

Purpose: To compare layer and bed-specific microvascular alterations induced by elevated translaminar cribriform pressure difference (TLCPD) from low intracranial pressure (LICP) versus intraocular pressure-driven ischemia-reperfusion (IR), and to relate these changes to multimodal structural and functional outcomes (OCT, ERG/PhNR, OKR), including retinal ganglion cell (RGC) injury.

Methods: Adult rats were assigned to: 1) LICP, via cerebrospinal fluid drainage, lowering intracranial pressure by ~ 8 mmHg; and 2) IR, via acute IOP elevation with two severities—mild ($+8$ – 10 mmHg) and high (~ 110 mmHg). High-resolution small-animal OCTA (axial < 5 μ m; 4×4 mm; depth 400 μ m) quantified choroid and retinal plexuses (SVP, IVP, DVP) at baseline, day 4, and day 7. OCT measured retinal/nerve-fiber layers. ERG/PhNR and OKR assessed function. Vascular metrics (diameter, skeleton density, tortuosity) and RGC apoptosis were analyzed region-wise. TLCPD was computed per eye; LICP and IR-mild produced an equivalent level of TLCPD disturbance.

Results: All groups showed early functional decline by day 4 (OKR and ERG/PhNR), concordant with OCT changes. LICP produced early, dominant compromise of the choroid and DVP (choroid -5.4% ; DVP -8.1% at day 4, nasal accentuation), with further DVP worsening by day 7 (diameter $\beta = -0.41$, $r^2 = 0.08$, $p < 0.0001$). Choroidal metrics correlated with optic-nerve damage (diameter $\beta = -0.25$, $r^2 = 0.02$, $p < 0.05$; tortuosity $\beta = -0.24$, $r^2 = 0.04$, $p < 0.01$; skeleton density $\beta = -0.23$, $r^2 = 0.06$, $p < 0.001$). Focal RGC loss predominated in the inferior region. IR showed a top-down pattern with primary SVP/IVP/DVP involvement. In IR-mild, SVP decreased by 12.1% with inferior–nasal emphasis at day 4, correlating with RGC apoptosis ($\beta = -0.24$, $r^2 = 0.15$, $p < 0.01$); DVP and choroid changes were smaller than in LICP. IR-high produced pan-plexus injury consistent with global ischemia. In the equivalent TLCPD comparison (LICP vs IR-mild), despite matched TLCPD disturbance, vascular alterations were larger with LICP—especially in the choroid—whereas IR-mild mainly affected SVP/IVP at day 4 and recovered quickly thereafter without significant regional RGC loss, and did not show inferior-predominant focal RGC loss. Enhanced OCTA depth penetration revealed previously undetectable deep vascular changes, demonstrating layer-, temporal-, regional-, and etiology-specific patterns of vascular injury.

Conclusions: TLCPD disturbance yields two macro injury phenotypes. Low ICP preferentially disrupts

the choroidal bed and deep retinal plexus, associates with inferior-predominant focal RGC loss, and exhibits a distinct multimodal pattern of change; IR mainly compromises SVP/IVP with secondary DVP involvement, and severe IR extends damage pan-plexus. Notably, at an equivalent level of TLCPD disturbance, LICP induces greater vascular change than acute mild IR. These patterns likely reflect differences between outer (choroidal) and inner-retinal circulations, informing etiology-tailored monitoring and intervention, and may help explain vascularly mediated mechanisms of neural injury in special glaucoma phenotypes such as normal-tension glaucoma.

Abstract No.: 207393

Evaluating the Outcomes of Kahook Dual Blade (KDB) in Primary Adult Glaucoma

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Purpose: To evaluate the outcomes of Kahook dual blade (KDB) in primary open-angle glaucoma (POAG) and primary angle closure glaucoma (PACG).

Methods: A total of 40 patients with POAG/PACG and cataract were included and underwent phacoemulsification with IOL insertion with KDB goniotomy. The patients were examined at baseline and at 1 week, 1 month, 3, 6, 12, and 18 months. The anterior chamber angle parameters on swept-source anterior segment OCT (SS-ASOCT) were noted at baseline, and at 3, 6, and 12-month follow-up. Main Outcome Measures: The primary outcome measure was reduction in intraocular pressure (IOP) and the number of anti-glaucoma medications. Secondary outcomes were changes in angle parameters and specular count

Results: The mean baseline IOP was 19.5 ± 7.2 mmHg. The mean IOP decreased to 13.9 ± 3.0 mmHg at 12 months. There was a significant reduction in the number of medications (4.1 ± 1.8 to 1.1 ± 0.8 mmHg; $p=0.02$ mmHg). Qualified success with IOP ≤ 12 mmHg was obtained in 80% of patients. No absolute failures were noted at 1-year follow-up. A significant widening of the angle parameters was noted postoperatively at 3, 6, and 12 months as compared to baseline in PACG patients. The other secondary outcome parameters, like BCVA, visual field changes, endothelial cell count, and complication rate, were also noted.

Conclusions: Phaco-KDB demonstrated significant reductions in both IOP and anti-glaucoma medications in both PACG and POAG patients.

Abstract No.: 208015

Evaluation of Results of Phacoemulsification-IOL Combined With Goniosynechialysis on Failed Trabeculectomy Eyes With Primary Angle-Closure Glaucoma

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Purpose: To assess the results of phacoemulsification IOL combined with goniosynechialysis for failed trabeculectomy in primary angle-closure glaucoma.

Methods: Clinical interventional study.

Results: Preoperative characteristics: females: males ratio was 13:3. The mean age was 61.15 ± 8.45 years old. The average time after Trabeculectomy was 41.47 ± 43.95 months. Visual acuity (VA) and IOP were improved remarkably after surgery. IOP was reduced significantly at all time points from 28.79 ± 5.61 mmHg at baseline to 15.15 ± 3.46 mmHg at 6 months after surgery. Preoperative Log MAR VA was 1.71 ± 0.87 , which has been improved to 0.77 ± 0.44 at 6 months with $p < 0.001$. The number of IOP-lowering medications was decreased from 2.56 ± 0.63 to 0.31 ± 0.87 , with $p < 0.001$. The complete success rate was 87.5 %. Preoperatively, the anterior chamber angle was almost completely closed. After surgery, angles were widened to grade 3-4 Shaffer in almost all cases except for one case where the angle closure had recurred. Hyphema is the most common complication, which occurred in 50% cases, and was, luckily, transient and responded well to treatment.

Conclusions: Phacoemulsification/ GSL proved to be safe and effective in PACG eyes with previously failed trabeculectomy.

Abstract No.: 200137

Evaluation of the Effects of Direct Selective Laser Trabeculoplasty After 2 Years of Treatment Both in Primary Open Angle Glaucoma Eyes and in Primary Angle Closure Glaucoma Ones

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Purpose: To evaluate the efficacy and safety of direct selective laser trabeculoplasty (DSLT) on eyes with primary open-angle glaucoma (POAG) and on primary angle closure glaucoma (PACG) eyes at 2-year follow-up.

Methods: In this study, 55 eyes of 30 patients affected by POAG and 23 eyes of 12 patients affected by PACG have been included. Before each treatment and at each follow-up, every subject underwent a complete eye visit, including data regarding the IOP-lowering drugs assumed. The patients treated underwent

30-2 standardized automated perimetries (SAP) prior to DSLT, at 6 months, 12, and 24 months after the procedure. Each patient was checked after 1 week and subsequently after 1, 3, 6, 12, and 24 months.

Results: At 1-month follow-up, both the eyes affected by POAG and those affected by PACG showed significantly ($p < 0.01$) lower IOP (-4.23 ± 2.11 mmHg and -3.64 ± 2.08 mmHg, respectively) and a lower number of IOP-lowering drugs taken (-0.81 ± 0.38 and -0.75 ± 0.66 , respectively) after DSLT. These reductions remained stable until the 2-year follow-up, both for IOP and for the drugs assumed. The SAP mean values showed perimetry stability in both POAG and PACG eyes at 2-year follow-up. No major complications were observed in the eyes included in this study.

Conclusions: Although these results need to be confirmed in further ones with larger population and longer follow up, they suggest that DSLT would be a useful tool for the management of glaucoma patients.

Abstract No.: 205027

Exosomal miR-450b-5p Secreted From Exendin-4 Stimulated Vascular Endothelial Cells Protected Retinal Ganglion Cells From Acute Ischemia Reperfusion Injury

First Author: Xiangmei **KONG**

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Purpose: Exendin-4 (Ex-4) has been reported to protect against ischemia-reperfusion (IR) injury in various vital organs. In this study, we aimed to investigate the potential neuroprotective effects of Exendin-4 (Ex-4) against retinal ischemia-reperfusion (RIR) injury and to elucidate the underlying mechanisms.

Methods: Immunofluorescence staining assay, hematoxylin and eosin (HE) staining were conducted to evaluate the neuroprotective role of Ex-4. A co-culture assay of human retinal vascular endothelial cells (HRVECs) and RGCs was established. Extracellular vesicles (EVs) were isolated from the culture supernatant of HRVECs with (E-EVs) or without Ex-4 treatment (O-EVs) under oxygen-glucose deprivation/reoxygenation (OGD/R) conditions. Transmission electron microscopy (TEM), Nanoparticle tracking analysis (NTA) and Nano-flow cytometry (NanoFCM) were used to detect the presence and purity of EVs. Cell activity, reactive oxygen species (ROS) level, and cell death rate of RGCs were evaluated. Further global miRNA sequencing was performed on E-EVs or O-EVs to explore potential mechanisms.

Results: Our findings revealed that Ex-4 had a GLP-1R-dependent neuroprotective effect on RGCs. Vascular endothelial cells (VECs) -derived EVs mediate the protective effect of Ex-4 on RGCs under acute RIR injury. We identified miR-450b-5p as a highly enriched miRNA in E-EVs. Treatment with either E-EVs or miR-450b-5p mimics significantly protected RGCs

against RIR-induced injury. Mechanistic investigations identified acyl-coenzyme A (CoA) synthetase long-chain family member 4 (ACSL4) as a direct target of miR-450b-5p.

Conclusions: Ex-4 exerts its neuroprotective effects under RIR injury by stimulating retinal VECs to secrete miR-450b-5p-enriched EVs, thereby revealing a novel endothelial-mediated neuroprotective pathway in ischemia diseases.

Abstract No.: 205473

Expert Annotations Enhance Ultra-Widefield Fundus Artificial Intelligence for Detecting Glaucoma and Myopia-Related Lesions

First Author: Lu **CHENG**

Co-Author(s): Jingjing **HUANG**, Lina **HUANG**, Weiguang **YU**, Qiting **YUAN**

Purpose: To develop and validate ultra-widefield (UWF) fundus-based artificial intelligence (AI) models for automated detection of primary open-angle glaucoma (POAG) in myopic eyes and automated segmentation of glaucomatous optic neuropathy, as well as simultaneous recognition of pathological myopia and other myopia-related lesions, and to evaluate the impact of expert-driven annotations.

Methods: A total of 6,096 UWF images were analyzed using InceptionV3-based deep learning models: an Annotation-Free UWF AI and an Annotated UWF AI trained with expert manual annotations. Tasks included binary classification (presence/absence of POAG, pathological myopia, and myopia-related lesions), ternary classification (glaucoma severity, tessellated fundus grading), four-class classification (mild myopia, mild myopia with POAG, high myopia, high myopia with POAG, according to clinical myopia and glaucoma diagnoses), and segmentation (vertical cup-to-disc ratio, cup-to-disc area ratio). Performance metrics included AUC, accuracy, and mean absolute error (MAE).

Results: The annotated AI model outperformed the annotation-free model across all tasks: binary AUCs 0.89–0.91 vs. 0.69–0.86; ternary macro-AUCs 0.94–0.95 vs. 0.90–0.91; four-class macro-AUC 0.84 with 66.0% accuracy vs. 0.47 and 34.4%. Segmentation achieved MAEs < 0.1 for both indices. Internal and external validation accuracies ranged from 72.5%–92.1% and 70.6%–93.0%, confirming robust generalizability.

Conclusions: Expert annotations significantly enhanced the diagnostic accuracy, interpretability, and generalizability of UWF AI models. Even in structurally complex myopic eyes, the annotated model reliably detected glaucoma and myopia-related lesions, demonstrating potential for large-scale screening, early diagnosis, and cost-effective clinical application.

Abstract No.: 202135

Factors Influencing Glaucoma Progression in Patients With Disc Hemorrhage

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Purpose: To determine clinical characteristics and glaucoma prognostic factors in patients presenting with disc hemorrhage (DH).

Methods: Fundus photographs taken between 2013-2018 were reviewed. DH was defined as bleeding within one disc diameter of the optic disc border, and types and locations were classified. Hemorrhages associated with other retinal hemorrhages were excluded. At least 12 months of follow-up, DH recurrence, intraocular pressure (IOP), and classes of anti-glaucoma medications at each visit were collected. Glaucoma progression was assessed by visual fields, optical coherence tomographs and fundus photographs.

Results: Of 5,319 eyes, DH was observed in 100 eyes of 91 subjects (1.9%, 95%CI 1.5-2.3%). The predominant types were peripapillary (49%) and rim type (34%). Glaucoma progression occurred in 58 eyes (58%) over a mean follow-up of 57.1 (15.6) months. The mean IOP during the follow-up was 12.9 (2.0) mmHg. Glaucoma progression was associated with DH recurrence (odds ratio [OR] 2.59, $p=0.012$) and beta-blocker use (OR 2.49, $p=0.049$). No significant associations were observed between glaucoma progression and IOP factors, DH type, or DH location. The mean time to progression was 27.4 (16.3) months. Recurrence of DH was detected in 33 eyes (33%, range 1-6 times). The observed minimum IOP (lowest IOP recorded during follow-up) was shown reversely associated with DH recurrence (OR 0.73, $p=0.023$).

Conclusions: More than half of the eyes with DH showed subsequent glaucoma progression. DH recurrence and beta-blocker use were associated with higher progression risk. While IOP factors was not significantly related to progression, a lower minimum IOP during follow-up protects against DH recurrence.

Abstract No.: 201454

Five-Year Safety and Efficacy Results of a Supraciliary Drainage Device in Open Angle Glaucoma Patients (STAR-GLOBAL)

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Purpose: The five-year safety and efficacy of a minimally invasive glaucoma surgery (MIGS) device, MINInject® (iSTAR Medical, Belgium), is described.

Methods: The device was implanted ab interno into the supraciliary space in a standalone procedure in four prospective trials (STAR-I,II,III,IV). Upon study completion at two years, subjects were invited to enrol into STAR-GLOBAL to continue follow-up annually until five years post-implantation. Outcome measures were intraocular pressure (IOP), IOP-lowering medications (meds), adverse events, and measurement of corneal endothelial cell density. Fifty-six subjects from the STAR-I, II, and III trials were enrolled in the STAR-GLOBAL trial, with 47 completing 5-year post-implantation follow-up (83.9%). These are preliminary, interim results of subjects who have completed the STAR-GLOBAL trial.

Results: In this STAR-GLOBAL population, the mean baseline diurnal IOP prior to implantation was 23.8 ± 3.5 mmHg with a mean of 2.4 ± 1.2 IOP-lowering meds ($n=56$). At 2 years post-implantation, mean diurnal IOP was 14.3 ± 4.2 mmHg (-9.6 mmHg, -39.5% ; $p<0.0001$) on 1.4 ± 1.4 meds ($n=55$). At 5-year post-implantation follow-up ($n=47$), mean diurnal IOP was 14.8 ± 5.6 mmHg (-9.1 mmHg, -38.4% ; $p<0.0001$) on 1.5 ± 1.4 meds ($p<0.0001$). Further, 83.0% of subjects achieved a $\geq 20\%$ IOP reduction, 78.7% of subjects achieved an IOP ≤ 18 mmHg, and 31.9% of subjects were med-free at 5 years.

Conclusions: This supraciliary MIGS device offers an effective, bleb-free treatment option for patients with medically uncontrolled primary open angle glaucoma.

Abstract No.: 202827

From Metallogenomics to Ferroptosis: Multi-Omics Evidence Chain Unraveling Digoxin-Regulated Iron Homeostasis in Glaucomatous Trabecular Meshwork

*First Author: Xiaoyu ZHOU
Co-Author(s): Xuanchu DUAN*

Purpose: Recent studies have found that ferroptosis may be involved in the process of trabecular meshwork injury in glaucoma. This study aims to reveal the ferroptosis-related gene signature in primary open-angle glaucoma (POAG) and identify small-molecule drugs as a new direction of therapy.

Methods: Mendelian randomization (MR) analysis of East Asian GWAS data to assess causal relationships between blood metals and POAG. Ferroptosis-related indicators in POAG patients and chronic ocular hypertension (COH) rats were detected by ELISA kits. Integration of trabecular meshwork (TM) transcriptomes from POAG patients and ferroptosis-related gene sets (FerrDb) to identify core regulatory genes. CMap database screening and molecular docking to predict therapeutic compounds, followed by in vitro validation using hydrogen peroxide-induced TM ferroptosis models. Digoxin was formulated as ophthalmic drops and administered topically twice

daily to the eyes of COH rats to verify its intraocular pressure (IOP) lowering effect in vivo.

Results: MR results demonstrated that elevated serum iron levels causally increased POAG risk. Ferroptosis levels were enhanced in POAG patients and COH eyes of rats. A total of 14 ferroptosis-related differentially expressed genes were identified. PPI analysis identified SLC2A3, SCD and HBA1 as ferroptosis-TM injury hub genes, whose dysregulation amplified lipid peroxidation. CMap and molecular docking indicated that ATPase inhibitors digoxin might be considered as potential therapeutic drugs for POAG. Digoxin administration alleviated H₂O₂-induced HTMCs ferroptosis and lowered IOP of COH eyes.

Conclusions: This study identifies digoxin as a promising agent targeting the SLC2A3/SCD/HBA1 pathway to suppress ferroptosis and lower IOP, offering a transformative strategy for POAG therapeutics.

Abstract No.: 204290

Genetic Spectrum and Genotype-Phenotype Correlations in a Chinese Cohort With Nanophthalmos With Secondary Angle-Closure Glaucoma

First Author: Hanxue ZHAO

Purpose: This study aimed to characterize the genetic spectrum and clinical features of nanophthalmos with secondary angle-closure glaucoma (NSACG) in a large Chinese cohort, with emphasis on novel developmental and pathogenic mechanisms.

Methods: The participants underwent ocular and systemic examinations and whole-exome sequencing. The main outcome measures were pathogenic genetic variants, axial length (AL), refractive spherical equivalent (SE), vitreous chamber depth (VCD), white-to-white (WTW), radius of corneal curvature (flat and steep K: K1 and K2), anterior chamber depth (ACD), lens vault (LV), lens thickness (LT), extent of angle closure, anterior segment crowding value, retinal nerve fiber layer (RNFL) thickness, central subfield thickness (CST) in macular, cup-to-disc ratio (C/D), mean defect in visual field, and onset age of angle-closure glaucoma (ACG).

Results: Pathogenic variants were identified in 51.1% of patients. PRSS56 and MFRP were the predominant AR variants, whereas MYRF and TMEM98 were the main AD variants. Genetically diagnosed patients exhibited disproportionate reduction in VCD relative to AL, challenging the conventional view of nanophthalmos as a proportionally small eye. AR variants were associated with more extreme anterior segment crowding and limited corneal expansion, whereas AD variants were linked to earlier glaucoma onset and more severe visual field defects. Furthermore, retinal detachment and ciliochoroidal detachment occurred more frequently in genetically diagnosed patients, even after adjusting for

AL and age, implicating impaired vitreous development and altered intraocular fluid dynamics.

Conclusions: This is the first large-scale genotype-phenotype study of NSACG in a Chinese population. Our findings expand the mutational spectrum and may reveal novel mechanisms involving vitreous underdevelopment. The faster glaucoma progression in AD cases highlights the need for early intervention.

Abstract No.: 202834

Glaucoma Burden Among First-Degree Relatives: Insights From a National Referral Hospital in Indonesia

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Purpose: Glaucoma remains a major cause of irreversible blindness worldwide. Identifying high-risk groups, particularly first-degree relatives of primary open-angle glaucoma (POAG) patients, is essential for cost-effective early detection strategies. This study aimed to determine the glaucoma prevalence and risk factors among first-degree relatives of POAG patients in Indonesia.

Methods: A cross-sectional study was conducted at a national referral hospital in Indonesia involving first-degree relatives (parents, siblings, and offspring) of POAG patients aged ≥ 40 years. Participants underwent standardized ophthalmic assessment, including visual acuity, refraction, Goldmann applanation tonometry, gonioscopy, optic disc evaluation, perimetry, and central corneal thickness measurement, along with systemic evaluation for diabetes and hypertension. Glaucoma diagnosis followed the International Society of Geographical and Epidemiological Ophthalmology (ISGEO) criteria.

Results: A total of 359 relatives from 198 POAG patients were examined. Median age was 47 years, with 60.4% identifying as female. The overall glaucoma prevalence was 16.2%. On bivariate analysis, elevated intraocular pressure (IOP) ($p=0.002$), reduced ocular perfusion pressure (OPP) ($p=0.015$), and sibling status ($p=0.031$) were significantly associated with glaucoma. Siblings had nearly twice the prevalence compared with offspring. Higher prevalence was also observed among participants with moderate-to-high myopia, age ≥ 60 years, and diabetes mellitus, although not statistically significant. Multivariate logistic regression identified IOP ($\beta=0.090/\text{mmHg}$, $p=0.019$) and sibling relationship (aOR 2.59; 95% CI 1.32–5.09; $p=0.006$) as independent predictors.

Conclusions: The prevalence of glaucoma among first-degree relatives was higher than in the general population, with elevated IOP, reduced OPP, and sibling relationship contributing to risk. Targeted screening of

high-risk families could facilitate earlier detection and prevention of blindness.

Abstract No.: 201289

Glaucoma and Risk of Dementia: The UK Biobank Study

First Author: Vincent **YUEN**

Co-Author(s): Clement **THAM**, Jason **YAM**, Yuzhou **ZHANG**

Purpose: To evaluate the association between glaucoma and the risk of developing dementia, and to identify optical coherence tomography (OCT) biomarkers predictive of dementia using data from the UK Biobank.

Methods: Participants from the UK Biobank were included if they had no prior diagnosis of dementia and either no glaucoma or glaucoma diagnosed before recruitment. Diagnoses of glaucoma and dementia were obtained from linked hospital inpatient and death records. OCT parameters were analysed in a subset of participants with available imaging data.

Results: A total of 488,085 participants were included, of whom 7,671 had glaucoma at baseline. The mean follow-up duration was 16.5 years. After adjusting for age, sex, hypertension, diabetes, hyperlipidaemia, cardiovascular disease, and education level, glaucoma was significantly associated with increased risk of all-cause dementia (hazard ratio [HR]=1.354, $P<0.001$), dementia in Alzheimer's disease (HR=1.314, $P=0.023$), and vascular dementia (HR=1.402, $P=0.010$). OCT analysis revealed that individuals who developed dementia had significantly larger vertical cup-to-disc ratio (mean difference [MD]=0.082, $P=0.036$) and larger optic disc diameter (MD=0.114 mm, $P=0.003$).

Conclusions: Glaucoma is associated with a heightened risk of developing dementia, including Alzheimer's and vascular subtypes. Structural changes in the optic nerve head, as captured by OCT, may serve as indicators of neurodegeneration and cognitive decline.

Abstract No.: 208016

Goniotomy for Adult Refractory Glaucoma: A 24-Month Prospective Observation Study

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Purpose: To evaluate the surgical outcomes of goniotomy in refractory glaucoma.

Methods: A prospective study was conducted on refractory glaucoma patients who underwent goniotomy. Study outcomes included changes in intraocular pressure (IOP), anti-glaucoma medication (AGM) usage, and complications over a 24-month period. Postoperative IOP > 21 mmHg at two consecutive follow-up visits or reduced $< 20\%$ from baseline, IOP ≤ 5 mmHg, re-operated for glaucoma,

and required more AGM than baseline was regarded as failure. Logistic regression analysis was used to investigate the potential factors for surgical failure.

Results: A total of 81 eyes from 72 patients were included. All participants had undergone at least one prior incision surgery: 66 eyes (81.48%) had undergone one prior surgery, 11 eyes (13.58%) had two, 4 eyes (4.94%) had three or more surgeries. Following goniotomy, IOP significantly decreased from 23.27 ± 11.12 mmHg preoperatively to 15.70 ± 2.78 mmHg at 24 months ($P<0.001$), along with a significant reduction in AGM use (from 2.79 ± 1.02 preoperatively to 1.43 ± 1.37 at 24 months, $P<0.001$). 27 eyes (33.33%) reached the criteria of complete success and 66 eyes (81.48%) met the qualified success at 24 months. 15 eyes (18.52%) were regarded as surgical failure and 3 of them underwent re-operation. Higher preoperative IOP was identified as a risk factor of surgical failure ($P<0.05$). 18 eyes (22.22%) developed hyphema and 8 eyes (9.88%) complicated with transient IOP spike.

Conclusions: Goniotomy effectively reduced IOP and AGM use in refractory glaucoma at 24 months, and may serve as a low-risk therapeutic option.

Abstract No.: 204496

High Polygenic Risk Predicts Future Need for Surgery in Suspect and Early Glaucoma

First Author: Victoria **TANG**

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Purpose: To examine the utility of a polygenic risk score (PRS) for predicting progression to surgical intervention in individuals with suspect or early glaucoma.

Methods: Longitudinal, prospective observational cohort study (PROGRESSA). Incisional surgery, defined as trabeculectomy, tube or drainage device insertion, was the outcome of interest. All participants had a PRS expressed as a percentile. Relative risks were estimated, Kaplan-Meier analysis was used to assess the cumulative incidence of surgery, and logistic regression evaluated the association between PRS and surgery.

Results: We included 2,486 eyes with suspect and early manifest glaucoma (mean age 64.0 ± 10.1 years; 42% male) with an average follow-up time of 8.6 ± 2.1 years. Overall, 4.8% ($n=119/2486$) underwent incisional surgery. Median PRS was higher in eyes requiring surgery (84.7 vs 76.1, $p = 0.016$). No eyes in the bottom PRS decile required surgery within 5 years (0/24; 0%). At 5 years, eyes within the top 10% of PRS had nearly twice the risk of surgery compared with the bottom 90% (2.6% vs 1.3%, RR1.97, 95% CI 1.07–3.65, $p = 0.03$). Across their entire follow-up, the top decile had a 1.74-fold higher risk of surgery compared with the rest (6.7% vs 3.8%, 95% CI 1.20–2.51, $p = 0.004$). Within the top PRS decile, there was a higher cumulative incidence of surgery (log-rank $p = 0.001$), and logistic regression

also demonstrated higher odds of surgery (OR 1.70; $p = 0.004$).

Conclusions: A high PRS is associated with a greater likelihood of surgery amongst glaucoma suspects, supporting its use in assisting surgeons in identifying high-risk individuals earlier and prioritising them for closer monitoring.

Abstract No.: 200273

Hypothalamic Atrophy in Glaucoma Is Linked to IGF-1 Dysregulation and Glial Inflammation

First Author: Ji Won **BANG**

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Purpose: Glaucoma involves degeneration of retinal ganglion cells, including intrinsically photosensitive subtypes that project to the hypothalamus. The hypothalamus regulates systemic inflammation through hormonal release and autonomic pathways. However, it remains unclear if such pathways are impaired in glaucoma. Here, we investigated whether glaucoma-related hypothalamic atrophy is linked to hormonal dysregulation and glial inflammation.

Methods: Data from UK Biobank (healthy: $N=480$, 62.42 ± 0.22 [SE] yrs, glaucoma: $N=480$, 62.44 ± 0.22 yrs) and an independent prospective cohort (healthy: $N=27$, 63.93 ± 1.47 yrs, glaucoma: $N=52$, 65.71 ± 1.02 yrs) were used. Structural MRI provided hypothalamic volumes, ophthalmic measures assessed vision and retinal structure, and blood proteomics quantified activation markers for astrocyte (CHI3L1, LCN2, C3) and microglia (TREM2, MSR1, HAVCR2). Structural equation modeling (SEM) tested mediation pathways linking glaucoma, hypothalamic volume, insulin growth factor-1 (IGF-1), and glial activation, adjusting for age and sex. SHapley Additive exPlanations (SHAP) identified top proteomic features associated with glaucoma classification.

Results: Glaucoma patients had smaller hypothalamic volume than controls ($P < 0.001$), which correlated with visual field loss and retinal thinning (all P s < 0.05). SEM revealed that hypothalamic shrinkage predicted both greater astrocytic activation ($P = 0.008$) and reduced IGF-1 ($P = 0.013$), which in turn was associated with higher microglial activation ($P = 0.014$). SHAP identified 8 of the top 10 features linked to glaucoma classification as inflammation-related.

Conclusions: Our findings suggest a feed-forward pathway linking glaucoma, hypothalamic atrophy, hormonal dysregulation, and heightened glial inflammation. These results highlight the systemic hypothalamic-inflammatory involvement in the pathophysiology of glaucoma.

Abstract No.: 205342

Identification of Glaucoma Endotypes From Aqueous Humor Analysis: A Novel Framework for Patient Stratification and Targeted Therapy

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Co-Author(s): Kevin **CHAN**, Rima **DADA**, Tanuj **DADA**, Daman **SALUJA**, Himanshu **SINGH**

Purpose: To identify molecular endotypes of primary open-angle glaucoma (POAG) from aqueous humor (AH) proteo-metabolomics and map them to targetable biological pathways.

Methods: AH (0.5 mL) from cataract controls ($n=30$), early POAG (MD -6 to -12 dB; $n=30$), and advanced POAG (MD < -20 dB; $n=30$) underwent LC-MS proteomics/metabolomics. A 46-protein/50-metabolite panel was analyzed by consensus k-means (1,000 resamples) to define clusters ("endotypes"), with stability assessed by PAC and silhouette indices. Pathway scores (insulin/GLP-1, mitochondrial/TCA, inflammatory eicosanoids, kynurenine, neurotrophic/stress) were computed from z-scored composites. Associations with MD used ANCOVA adjusting for IOP, age, and sex.

Results: Three robust endotypes emerged (consensus PAC < 0.05): (E1) Insulin-deficient, characterized by low INSR/PI3K/AKT/mTOR and low GLP-1/IGF-1; (E2) Mito-inflammatory, with TCA depletion (citrate, α -ketoglutarate, cardiolipin) plus high TNF α /IL-6/PGE2; and (E3) Stress-dominant, marked by high cortisol/kynurenine/quinolinic acid and reduced BDNF/ β -endorphin. Endotypes differed in MD ($p < 0.001$): E1/E2 worse than E3, and E2 worst after IOP adjustment ($p < 0.01$). AQP4 expression was highest in E2 ($p < 0.01$), linking fluid-transport disturbance with mito-inflammation. Stability analyses confirmed cluster reproducibility.

Conclusions: AH proteo-metabolomics resolves clinically relevant endotypes of POAG with distinct, targetable biology—insulin/GLP-1 augmentation (E1), mitochondrial stabilization/anti-inflammatory therapy (E2), and HPA/kynurenine modulation with neurotrophic support (E3). Endotyping may enable precision stratification and tailored interventions.

Abstract No.: 206480

Impact of Expanding Antiglaucoma Medication Use on Trabeculectomy Outcomes: A Four-Decade Analysis

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Purpose: To evaluate whether the expanding availability and use of antiglaucoma medications (AGMs) over four decades has influenced trabeculectomy outcomes.

Methods: A retrospective comparative analysis was conducted on patients with primary open-angle and angle-closure glaucoma who underwent trabeculectomy between 1985 and 2024. Cases were grouped by decade, with a minimum follow-up of 1 year. Demographic and clinical parameters, survival outcomes were compared.

Results: A total of 397 eyes of 289 patients were assessed: 1985–1994 (n=99 eyes), 1995–2004 (n=98), 2005–2014 (n=100), and 2015–2024 (n=100). Significant differences were observed in sex (p=0.002), number of preoperative AGMs (p<0.001), and duration of use (p=0.048). Use of antimetabolites increased markedly over time (from 6% in decade 1 to 58% 5-fluorouracil use +17 % Mitomycin-C(MMC) use in decade 2, 100 % MMC in later decades). At 1-year follow-up, failure rates showed a decade-wise increase (8%, 8.1%, 15%, 14%). Kaplan–Meier survival analysis showed cumulative success rates 95%, 92%, 94%, 96% at 2 years, 91%, 90%, 89%, 83% at 5 years, 82%, 76%, 75%, 69% at 10 years, with a trend towards declining success over time but statistically insignificant. However, an earlier re-initiation of AGMs (p=0.011) after trabeculectomy was needed over the decades. There was an increase in need for bleb needling (0%, 3.5, 1.6%), but it was statistically insignificant.

Conclusions: Over four decades, the growing availability of AGMs and longer exposure to multiple AGMs prior to surgery have altered the postoperative outcomes even with Mitomycin-c use. The survival rates decrease over a longer period of time, and the need for postoperative AGMs has increased.

Abstract No.: 202215

Impact of Skin Fibrosis on Risk of Primary Open-Angle Glaucoma and Surgical Outcomes

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Co-Author(s): Chien-chih **CHOU**

Purpose: To investigate whether skin fibrosis is associated with an increased risk of developing primary open-angle glaucoma (POAG) and requiring revision glaucoma surgeries.

Methods: This retrospective cohort study used the TriNetX database to analyze two cohorts of patients aged ≥18 years: one without prior glaucoma (skin fibrosis vs. non-fibrosis) and one with glaucoma who underwent their first surgery (trabeculectomy or glaucoma drainage device), also categorized by skin fibrosis. The study aimed to evaluate the risk of POAG in patients without a glaucoma history and the risk of revision glaucoma surgeries in those with a glaucoma history. Hazard ratios and 95% confidence intervals were calculated, with cumulative incidence assessed using Kaplan-Meier analyses.

Results: Among 100,383 matched pairs without prior glaucoma, those with skin fibrosis had a significantly elevated risk of POAG (HR, 2.10; 95% CI, 1.70–2.58). Among 368 matched pairs with a history of glaucoma surgery, skin fibrosis was associated with a higher likelihood of undergoing revision procedures (HR, 1.56; 95% CI, 1.05–2.32). Kaplan-Meier curves demonstrated significantly greater cumulative incidences of both POAG and revision surgeries in the skin fibrosis group compared to the non-skin fibrosis group.

Conclusions: Skin fibrosis is associated with an increased risk of POAG and a higher likelihood of requiring revision surgery, suggesting that it may serve as a clinically observable marker for glaucoma risk and suboptimal surgical outcomes.

Abstract No.: 204240

Impact of Switching From Prostaglandin Analogues to Omidenepag Isopropyl on Signs of Prostaglandin-Associated Periorbitopathy

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Co-Author(s): Jong Jin **JUNG**, Chan Yun **KIM**, Joon Mo **KIM**, Michael S **KOOK**, Hye-young **Iopilly PARK**, Chungkwon **YOO**

Purpose: To assess changes in signs of prostaglandin-associated periorbitopathy (PAPS) after switching from prostaglandin analogues (PGAs) to omidenepag isopropyl ophthalmic solution 0.002% (OMDI) in patients with glaucoma or ocular hypertension (OHT). The primary outcome was improvement in deepening of the upper eyelid sulcus (DUES); secondary outcomes included changes in other PAPS features and intraocular pressure (IOP).

Methods: This multicenter study enrolled 96 patients with PAPS previously treated with PGAs for over three months; one eye per patient was selected. All patients were switched to OMDI and followed for 24 weeks. Outcome measures included intraocular pressure (IOP) and PAPS features: DUES, flattening of the lower eyelid bag (FLEB), upper eyelid blepharoptosis, hyperpigmentation, and ciliary hypertrichosis. PAPS signs were graded using standardized photographs by masked observers, with improvement defined as any positive change in these features.

Results: DUES improved in 70.8% of patients at 24 weeks compared to baseline (p<0.001), which was statistically significant. Improvements were also observed in hyperpigmentation (72.9%), ciliary hypertrichosis (37.5%), upper eyelid ptosis (26.0%), and FLEB (17.7%). Overall PAPS improvement, as assessed independently by third-party evaluators, was reported in 61.5% patients. After switching, mean IOP decreased from 16.7 to 14.6 mmHg (p<0.001), showing statistical significance; 42.7% of eyes achieved >15% reduction and 27.1% achieved >20% reduction. No adverse events were recorded.

Conclusions: Switching to OMDI significantly improved PAPS signs and reduced IOP, supporting its potential as a safe therapeutic option for patients with PAPS.

Abstract No.: 201582

In Silico Enabled Discovery of Novel ROCK Inhibitors With IOP-Lowering Effect for Glaucoma

First Author: Jiakai PI

Co-Author(s): Rongbiao PI, Zhixian ZHANG

Purpose: To discover a novel Rho-associated coiled-coil kinase (ROCK) inhibitor with intraocular pressure (IOP) lowering effect and minimum side effects for Glaucoma in silico.

Methods: A series of novel phenylamides was designed and followed by virtual screening using molecular docking to identify candidates with high binding affinity to ROCK. Eight phenylamides were synthesized, and their inhibitory activity against ROCK1 and ROCK2 was assayed in a tube and at the cellular level. In addition, effects on conjunctival cells and neural cells were evaluated. Moreover, conjunctival congestion and IOP-lowering efficacy were assessed in rabbit, rat, and mouse glaucoma models.

Results: Compound 5 emerged as the most promising candidate, demonstrating potent ROCK1 and ROCK2 inhibition, with IC₅₀ values of 41.81 nM and 14.26 nM, respectively. Compared with marketed drugs, Compound 5 exhibited comparable cellular-level effects on corneal recovery and has superior efficacy in neuroprotection against H₂O₂ toxicity. Further conjunctival congestion evaluation in a rabbit revealed that Compound 5 exhibited only mild conjunctival congestion, suggesting favorable ocular tolerance. In glaucoma mice and normal rats, Compound 5 significantly reduced IOP in 12 h, which is similar to that of Netarsudil.

Conclusions: Our findings demonstrated that Compound 5 represents a potent ROCK inhibitor and significant potential for Glaucoma with reducing IOP and minimal ocular side effects, suggesting that Compound 5 is a promising lead compound for the development of novel ROCK inhibitors for the treatment of Glaucoma.

Abstract No.: 204118

In Vivo Neuronal Visualization Using a Novel NIR-II Neurotracer: Evaluation in Ocular Disease Models

First Author: Wenhan LU

Co-Author(s): Xinghuai SUN

Purpose: Real-time in vivo visualization of the optic pathway under pathological conditions remains challenging due to limitations in deep-tissue penetration and spatiotemporal resolution of

conventional neural tracers. The utilization of NIR-II regions in optical imaging offers enhanced resolution and heightened imaging contrast, owing to minimal background interference, as well as increased tissue penetration depth for longer wavelengths. This study aimed to realize in vivo observation and analysis of RGC central projection damage under different ocular disease models.

Methods: Here, we developed a novel NIR-II neurotracing probe for anterograde labeling of retinal ganglion cells (RGCs) via intravitreal injection. Comprehensive evaluations were performed to assess the probe's physicochemical characterization, biosafety profile, and functional efficacy. This probe enabled longitudinal monitoring of axonal dynamics in: (1) mice acute ocular hypertension (AOH) models, (2) rat optic nerve crush (ONC) injuries, and (3) visual pathway compression (VPC) model using real-time NIR-II fluorescence microscopy.

Results: The probe achieved effective labeling and real-time imaging of the soma and axons of RGCs via NIR-II imaging with signal persistence >1 week. In the AOH and ONC models, the gradual RGC degeneration was detected with time. In models with visual pathway compression by B16-derived tumor, aberrant visual behaviors together with reduced NIR-II signal in the visual pathway and contralateral eyes were detected. Biosafety assessments confirmed the probe's safety on critical physiological parameters of major organ systems.

Conclusions: This NIR-II probe facilitates high-fidelity in vivo mapping of pathological axonal alterations across glaucomatous and neoplastic contexts, providing a critical tool for evaluating therapeutic interventions targeting optic neuropathies.

Abstract No.: 206443

Integrative Genetic Analyses of Metabolomics in Primary Open-Angle Glaucoma Indicate an IOP-Mediated Sphingomyelin Link

First Author: Hengtong LI

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Purpose: Primary open-angle glaucoma (POAG) is a major cause of irreversible blindness. Although many genetic loci and metabolic biomarkers have been linked to POAG, causal metabolic pathways remain unclear due to confounding and intercorrelations between metabolites.

Methods: We screened candidate metabolites using four complementary approaches: prospective-cohort, genetic correlation, two-sample MR, and latent causal variable (LCV) analysis. To address correlations among metabolites, we controlled for multicollinearity and instrument strength, then performed multivariable MR to estimate independent metabolic effects on POAG.

Additionally, we applied genomic structural equation modeling (GSEM) for glaucoma endophenotypes mediation, drug-target MR and colocalization for mechanistic insights. We also constructed a direct-effect network among metabolites and mapped their connections to POAG risk.

Results: We found that higher levels of sphingomyelin were associated with increased POAG risk (OR = 1.58, 95% CI: 1.04 - 2.40, P = 0.03) in multivariable MR. GSEM showed that this effect was mediated by IOP (indirect effect β = 0.049; 95% CI: 0.007 - 0.091; P = 0.023). The association between sphingomyelin and IOP was observed in both European (β = 2.67; 95% CI: 2.30 - 3.05; P = 4.07E-10) and Asian (β = 2.56; 95% CI: 1.71 - 3.40; P = 3.21E-10) cohorts. Drug-target MR identified three proteins in the sphingomyelin pathway as potential therapeutic targets, although these results are exploratory and require further validation. Network deconvolution analysis revealed that metabolites influence POAG through interconnected direct-effect pathways.

Conclusions: These results highlight the value of multivariable approaches in metabolomic studies, clarify the role of sphingomyelin in POAG, and may help guide future research on metabolic biomarkers and new therapies for POAG.

Abstract No.: 204144

Interaction of CYP39A1 and LOXL1 Genetic Variants in the Pathogenesis of Exfoliation Glaucoma

First Author: Mineo **OZAKI**

Co-Author(s): Tin **AUNG**, Ying Swan **HO**, Chiea Chuen **KHOR**, Zhenxun **WANG**

Purpose: Exfoliation syndrome (XFS) is an age-related disorder, with 15–40% progressing to exfoliation glaucoma (XFG) or ocular hypertension. Recent exome sequencing identified rare CYP39A1 variants affecting cholesterol metabolism. We investigated the relationship between cholesterol abnormalities, LOXL1 release, and exfoliation material (XFM) formation in XFS/XFG.

Methods: Aqueous humor samples from XFS/XFG patients were analyzed. To investigate the connection between the CYP46A1/CYP39A1 pathway and LOXL1, we chose human fetal retinal pigment epithelium cells as a substitute for pigmented ciliary cells, where CYP39A1 is highly expressed. We investigated how genetic abnormalities contribute to the pathological mechanism of XFG by employing specific inhibitors.

Results: We demonstrate that reduction of CYP39A1 activity, either by mutation or decreased expression, leads to 24(S)-hydroxycholesterol (24-OHC) accumulation in hFRPE cells, activating the nuclear receptor LXR and driving cholesterol efflux pathways. Elevated esterified cholesterol and higher LOXL1

protein were observed in aqueous humor from XFS/XFG patients. Our findings indicate that XFS may be triggered by lipid metabolic dysfunction, where excess 24-OHC promotes LOXL1 release and misfolding, highlighting LOXL1 as a key mediator of XFM formation.

Conclusions: The cellular assays we established provide a representative model of XFM deposit formation, which has been confirmed through validation in aqueous humor from patients as well as unaffected controls. Collectively, the data suggest that strategies aimed at lowering 24-OHC abundance or facilitating the correct folding of LOXL1 may constitute feasible therapeutic avenues for controlling XFM deposition in XFS.

Abstract No.: 203152

Investigating the Link Between Neuroticism and Glaucoma: Insights From a Mendelian Randomization Study

First Author: Gehan **AI**

Co-Author(s): Hongxi **WANG**

Purpose: Emotional instability is often suspected to elevate glaucoma risk, yet causality remains unclear. We explored whether neuroticism—a stable, heritable personality trait—has a causal relationship with glaucoma using a bidirectional Mendelian Randomization (MR) approach.

Methods: Genetic instruments for overall neuroticism and its 12 subclusters were derived from UK Biobank GWAS data (N = 380,506). Glaucoma outcome data, including primary open-angle glaucoma (POAG), normal-tension glaucoma (NTG), and primary angle-closure glaucoma (PACG), came from FinnGen R11. Bidirectional two-sample MR was performed, using inverse variance weighted (IVW) as the main method. Significant associations were further tested using multivariable MR (MVMR) to account for subcluster intercorrelations. Multiple testing was controlled via Benjamini-Hochberg correction.

Results: Forward MR suggested potential protective effects of specific subclusters: ‘worry too long after an embarrassing experience’ was inversely associated with POAG (OR = 0.46, P = 0.005), and ‘mood often goes up and down’ with NTG (OR = 0.35, P = 0.002). However, these associations lost significance after MVMR and correction for multiple testing. No reverse causal effects of glaucoma on neuroticism were observed. Sensitivity analyses revealed no pleiotropy or weak instrument bias.

Conclusions: To our knowledge, this is the first MR study evaluating personality traits in glaucoma. While initial findings hinted at protective associations, neuroticism likely does not causally influence glaucoma risk. Our results challenge clinical assumptions linking emotional instability to glaucoma and highlight the

importance of integrating psychological and genetic perspectives in ophthalmic research.

Abstract No.: 202856

Kurarinone Attenuates Inflammation Stress and Neuronal Damage After Acute Glaucoma by Suppressing Lipocalin-2 and Ferroptosis

First Author: Yunhong SHI

Co-Author(s): Honghua YU, Naiyuan ZHANG

Purpose: Glaucoma is the leading cause of irreversible blindness worldwide, with neuroinflammation playing a key role in its pathological progression. Targeting neuroprotection remains a critical therapeutic challenge. Here, we report a promising strategy using Kurarinone—a natural compound derived from the roots of the traditional Chinese medicine *Sophora flavescens*—to protect retinal ganglion cells (RGCs) by suppressing neuroinflammation.

Methods: In vivo, retinal structure and RGC density were assessed using immunohistochemistry, H&E staining, and retinal flat-mount imaging. Mitochondrial morphology and ferroptosis were evaluated via transmission electron microscopy. In vitro, microglial cell viability and Kurarinone toxicity were determined using CCK-8 assays. Ferroptosis levels were measured with reactive oxygen species (ROS) assay kits, FerroOrange staining, and Western blot. Fresh retinas were prepared for 10x Genomics single-cell RNA sequencing to investigate the underlying mechanisms.

Results: Kurarinone treatment significantly reduced RGC loss after AOH injury, largely preserved the normal thickness of the ganglion cell layer (GCL), downregulated lipocalin-2(Lcn2), decreased the p-STING/STING ratio, and reduced expression of TFR and FTH1 in vivo. It also ameliorated mitochondrial structure and prevented excessive ROS production. The neuroprotective effects were attributed to inhibition of the cGAS–STING pathway. Single-cell sequencing identified Lcn2 as a core functional molecule affected by Kurarinone. While DIABZI (a STING agonist) suppressed OGD/R-induced oxidative stress and ferroptosis, the anti-inflammatory effect of Kurarinone was retained upon treatment with ZINC00640089 (a Lcn2 inhibitor).

Conclusions: Our findings identify Kurarinone as a promising therapeutic candidate for acute glaucoma-related ischemia–reperfusion injury. It exerts its effects by inhibiting the cGAS–STING pathway and Lcn2 secretion, thereby suppressing microglial ferroptosis.

Abstract No.: 205117

Label-Free Structural and Functional Evaluation of Mice Retina by Dual-Mode Full-Field Optical Coherence Tomography

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Co-Author(s): Yiqing LI, Zhongzhou LUO, Jiahui TANG, Peng XIAO

Purpose: This study aims to establish a novel structural-functional evaluation system for retina (especially retinal ganglion cells (RGCs)) based on dual-mode Full-Field Optical Coherence Tomography (FFOCT).

Methods: Thirty C57BL/6J mice were randomly assigned to two groups: control (CTRL) and optic nerve crush (ONC). Mice were euthanized at 1, 3, 5 or 7 days post-injury. Following enucleation, fresh retinal tissues were carefully dissected. Their Dual-mode FFOCT imaging was performed using a customized setup.

Results: Dual-mode FFOCT images reveal well-organized retinal layers in control specimens, with consistently strong structural contrast across different layers of retina. In contrast, retinal tissues from ONC mice exhibit progressive structural disorganization in both static and dynamic images. The dynamic FFOCT signal notably declines with time after injury, reflecting impaired cellular motility and viability. Quantitative analysis revealed a significant and progressive reduction in mean signal intensity in all ONC groups compared to control. The degree of functional damage and cell size varies in different cells, which can correspond to the immunostaining results, reflecting different cell types and even subtypes.

Conclusions: These findings demonstrate that dual-mode FFOCT offers a sensitive and label-free approach for detecting both structural and functional deterioration in the retina following optic nerve injury. By enabling real-time assessment of retina structure-function dynamics, this method may facilitate the development of targeted therapeutic strategies aimed at promoting RGC survival and optic nerve regeneration. Nonetheless, the cellular and molecular mechanisms underlying the observed dynamic signal changes need further investigation to explain the correlated biological processes.

Abstract No.: 205618

Long-Term Comparative Outcomes of Hydrus vs iStent Inject Microinvasive Glaucoma Surgery Implants Combined With Cataract Surgery

First Author: Jeremy TAN

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Purpose: To compare the long-term effectiveness of combined phacoemulsification and Hydrus microstent (phaco-Hydrus) vs iStent inject (phaco-iStent) using

MIGS-specific surgical success definitions in a large observational cohort.

Methods: Retrospective study of eyes in the Fight Glaucoma Blindness registry that underwent phaco-Hydrus or phaco-iStent with a minimum of 48-month follow-up. The prespecified primary endpoint was $\geq 20\%$ IOP decrease and IOP ≤ 21 mmHg, or ≥ 1 medication reduction vs baseline at 48 months with no pre-operative washout. Propensity score matching of baseline covariates was used to examine outcomes in a subcohort (matched cohort).

Results: 431 eyes (98 phaco-Hydrus: 331 phaco-iStent) were included in the overall cohort and 177 eyes (59 phaco-Hydrus: 118 phaco-iStent) in the matched cohort. There was no significant difference in the rate of surgical success between each group in achieving the primary endpoint at 48 months (adjusted overall cohort, 41.2% vs 43.0% in phaco-Hydrus vs phaco-iStent respectively, $p = 0.44$; matched cohort, 44.1% vs 43.2%, $p = 0.99$). There was no significant difference in degree of IOP reduction, medication reduction and adjusted secondary outcomes between the phaco-Hydrus vs phaco-iStent groups in both overall and matched cohorts. The incidence of adverse events and secondary procedures was similar between both groups.

Conclusions: There was no significant difference in surgical success between phaco-Hydrus and phaco-iStent groups at 48 months. Over 40% of eyes maintained the primary success endpoint of $\geq 20\%$ IOP decrease and IOP ≤ 21 mmHg or ≥ 1 medication reduction vs baseline without the need for secondary glaucoma surgery.

Abstract No.: 208466

Long-Term Corneal Biomechanical Changes Following Intraocular Pressure Reduction in Primary Open-Angle Glaucoma: A 12-Week Prospective Analysis

First Author: Yunzhi XU

Co-Author(s): Wei CHI, David C.C. LAM, Minbin YU

Purpose: Corneal biomechanical parameters are strongly influenced by intraocular pressure (IOP), complicating the interpretation of longitudinal changes. This study aimed to investigate corneal stiffness and modulus alterations over 12 weeks following IOP-lowering therapy in primary open-angle glaucoma (POAG).

Methods: A prospective cohort of 31 treatment-naïve POAG patients underwent corneal stiffness and modulus assessment via a corneal indentation device at weeks 1 and 12 after treatment. IOP was measured by Goldmann applanation tonometry. Paired t-tests evaluated changes, with significance set at $\alpha=0.05$. Correlation coefficients quantified within-eye parameter stability.

Results: Corneal stiffness increased significantly from 67.76 ± 9.94 N/m to 71.91 ± 8.81 N/m (mean difference 4.15 N/m, 95% CI 0.79–7.51; $t=-2.520$; $p=0.017$). Corneal modulus also increased from 0.559 ± 0.097 MPa to 0.592 ± 0.084 MPa (mean difference 0.033 MPa, 95% CI 0.005–0.061; $t=-2.396$; $p=0.023$). IOP remained clinically stable (14.28 ± 2.79 vs 14.68 ± 3.24 mmHg; $p=0.394$).

Conclusions: The cornea becomes significantly stiffer at 12 weeks compared to 1 week after IOP reduction, despite stable IOP. This biomechanical stiffening may reflect time-dependent corneal tissue remodeling that may impact IOP measurement accuracy and long-term glaucoma management.

Abstract No.: 205818

Long-Term Outcomes of Early Versus Late Phacoemulsification in Acute Primary Angle Closure (APAC): A Multicentre Retrospective Study

First Author: Thomas Chi-ho LAM

Co-Author(s): Poemen CHAN, Man Hin LUI, Vikki NG, Jolly TSUI

Purpose: This multicenter retrospective study compared long-term outcomes of phacoemulsification for acute primary angle closure (APAC) across different surgical intervals, evaluating intraocular pressure (IOP) control, medication requirements, and treatment success rates using rigorous statistical methods.

Methods: We analyzed 89 consecutive APAC patients treated at four tertiary referral centers using a standardized protocol. Participants were stratified into three surgical timing groups: early (<90 days post-APAC, $n=27$), intermediate (90–360 days, $n=32$), and delayed phacoemulsification (>360 days, $n=29$) through comprehensive chart review. Complete success was defined as maintained IOP ≤ 21 mmHg without any glaucoma medications throughout follow-up.

Results: At a mean follow-up of 3.25 years, the cohort demonstrated good intraocular pressure control with a mean IOP of 14.44 mmHg on 1.8 medications. Primary IOL implantation was successfully performed in 87 cases (97.8%). Surgical complications included two cases requiring anterior vitrectomy (1 posterior capsule rupture, 1 zonulysis). Three patients (3.4%) required subsequent trabeculectomy, and two (2.2%) required micropulse cyclophotocoagulation. Initial unadjusted analysis revealed statistically significant early disparities: the early intervention group showed substantially higher 1-month IOP (20.59 mmHg vs 16.94 mmHg, $p=0.009$) and required significantly more glaucoma medications (2.37 vs 1.14 , $p<0.001$) compared to the delayed group. These initial differences completely normalized long-term, with no significant intergroup variation in final IOP ($p=0.130$) or medication burden ($p=0.227$). Survival analysis initially appeared to favor delayed surgery for complete

success ($p < 0.05$). However, multivariate Cox regression adjusting for confounding factors that reflected disease severity demonstrated that surgical timing itself was not an independent predictor of outcome ($p = 0.95$). Elevated average IOP during the critical first week after initial presentation emerged as the strongest predictor of treatment failure (Hazard Ratio: 1.062 per mmHg increase, $p = 0.067$).

Conclusions: Phacoemulsification demonstrates consistent safety and efficacy across all surgical timepoints. The observed superiority of delayed surgery reflects case selection bias rather than therapeutic timing advantages. Initial disease severity, particularly early IOP control characteristics, represents the primary determinant of long-term treatment outcomes in APAC management.

Abstract No.: 202819

Mechanobiology Dysregulation in Glaucomatous Target Tissues Under Chronic Ocular Hypertension

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Co-Author(s): Huan **DU**

Purpose: This study systematically explores mechanobiological alterations in glaucomatous target tissues, including retina, optic nerve, lamina cribrosa, and sclera, during glaucoma pathogenesis. It elucidates the biological responses of these tissues to mechanical microenvironmental changes induced by chronic ocular hypertension (COH), clarifies cross-tissue mechanobiological response pathways, refines the pathogenic mechanisms of glaucoma, and provides a basis for interventions.

Methods: Chronic ocular hypertension-induced glaucoma models were established. At the early, middle, and late disease stages, the eyeballs were enucleated and processed into frozen sections. Atomic force microscopy (AFM) was used to quantify the tissue elastic modulus; Masson's trichrome staining was performed to observe collagen deposition; and immunofluorescence, Western blotting, and RT-PCR were employed to detect the expression of mechanosensitive channels, including Piezo1/2 and TRPV1/4.

Results: COH exerts the following effects on rats: (1) upregulating Piezo1 expression in the retina and optic nerve, accompanied by increased collagen deposition and elevated elastic modulus; (2) inducing collagen deposition at the lamina cribrosa; and (3) upregulating Piezo1, Piezo2, and Trpv1 expression in the sclera, along with increased collagen deposition and a higher elastic modulus.

Conclusions: COH triggers dysregulated mechanosensitive channel expression in target tissues, modulating collagen metabolism to cause lamina cribrosa collagen deposition and scleral fiber

remodeling. This leads to mechanical abnormalities, disrupting retinal ganglion cell mechanosensation and optic nerve axonal transport, forming a persistent «elevated IOP-abnormal channels-structural remodeling-mechanical dysfunction» loop in glaucoma progression.

Abstract No.: 204220

Metabolomic Profiling of Retinal Ischemia-Reperfusion Injury in Mice: An Untargeted Approach

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Purpose: Retinal ischemia-reperfusion (I/R) injury is a critical pathological process leading to irreversible retinal ganglion cell (RGC) degeneration and visual dysfunction, with implications for glaucoma, retinal artery occlusion, and other neurodegenerative disorders. Despite its clinical significance, the metabolic perturbations underlying retinal I/R remain not fully understood. This study employs an untargeted metabolomics approach to uncover key metabolites alterations and dysregulated pathways involved in retinal I/R, providing novel insights into potential therapeutic targets for neuroprotection.

Methods: Retinal I/R was induced in the C57BL/6J mice ($n = 6/\text{group}$), with RGC survival quantified via RBPMs+ immunohistochemistry and retinal function assessed by electroretinography (ERG) at 7 days post-injury. To investigate alterations in the global metabolite profile during retinal I/R, we isolated retinal tissues from mice in both sham surgery and I/R groups. Untargeted metabolomics analysis was performed via ultra-performance liquid-chromatography tandem mass spectrometry (UPLC-MS/MS) to profile the metabolites in retinal tissues. Bioinformatics analysis was then conducted to identify dysregulated metabolic networks associated with the altered metabolite profiles.

Results: Phenotypic validation confirmed significant RGC loss ($P < 0.001$) and ERG amplitude reduction (scotopic a- and b- wave, $P < 0.001$) in I/R retinas. Comparative metabolomics revealed 135 significantly dysregulated metabolites (96 in positive-ion mode, 39 in negative-ion mode, $VIP > 1.0$, $P < 0.05$) in I/R retinas, compared to the control group. Key findings included perturbations in amino acid metabolism (such as L-lysine, arginine, proline), fatty acids and lipids homeostasis, and energy metabolism-related metabolites (such as carnitine, and succinic acid). Pathway analysis highlighted disruptions in amino acid biosynthesis, mitochondrial metabolism (e.g., «central carbon metabolism in cancer»), and neurotransmitter-related pathways («ABC transporters»), suggesting metabolic reprogramming as a compensatory response to I/R stress.

Conclusions: This study provides the first comprehensive metabolomic signature of retinal I/R injury, identifying critical disruptions in amino acid and lipid metabolism that may drive RGC degeneration. The convergence of these metabolic pathways suggests synergistic roles in neuroprotection and energy crisis resolution, offering a foundation for future therapeutic strategies targeting metabolic reprogramming to mitigate retinal I/R injury.

Abstract No.: 201938

Microcirculation Disorders and Inflammation Caused by Abnormal Lipid Metabolism Impair the Structure and Function of the Retina

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Purpose: To investigate whether lipid metabolism abnormalities induced by high-feed diet (HFD) of ApoE^{-/-} mice of different weeks of age cause damage to retinal structure and function.

Methods: A mouse model of atherosclerosis induced by abnormal lipid metabolism was established by feeding HFD and ApoE^{-/-} in C57BL/6 mice. Blood lipid levels and plaque formation in mouse models were investigated by hematoxylin-eosin staining and oil red staining. Fundus fluorescein angiography was performed to investigate the microcirculation of retinal vessels. Quantitative real-time PCR and western blot were used to evaluate inflammatory factors and key proteins. Retinal ganglion cells were detected by β III-tubulin immunofluorescence staining. The structure and function of the retina were evaluated using optical coherence tomography, HE staining, and electroretinogram.

Results: C57BL/6 mice with ApoE^{-/-} were fed HFD to 42 weeks of age, and total cholesterol and low-density lipoprotein cholesterol increased, plaque area increased, and a model of atherosclerosis caused by abnormal lipid metabolism was established. Retinal blood perfusion decreased significantly in atherosclerotic mice, and microcirculation disorders appeared. The increased expression of $\text{Tnf-}\alpha$ indicates retinal inflammation. The thickness of the nerve fiber layer was reduced, and the number of RGCs decreased. The amplitudes of a-wave, b-wave, and Photopic Negative Response were reduced, and the latency was prolonged, suggesting that the structure and function of the retina were seriously damaged.

Conclusions: Atherosclerosis caused by abnormal lipid metabolism can aggravate the abnormal microcirculation and microenvironment inflammation in the eye, causing retinal structural and functional damage in the later stage.

Abstract No.: 205757

Microglial TIGAR Preserves Retinal Ganglion Cells by Shifting Microglial Glycolysis and Attenuating Neuroinflammation in Glaucoma

First Author: Yuxun SHI

Co-Author(s): Jingjing HUANG

Purpose: Microglial activation drives neuroinflammation and retinal ganglion cell (RGC) loss in glaucoma. While metabolic reprogramming to glycolysis is a pivotal trigger for pro-inflammatory microglial activation, its regulatory mechanisms in glaucoma remain elusive. This study investigates the role of TIGAR, a glycolytic regulator, in microglial function and glaucomatous RGC degeneration.

Methods: An acute ocular hypertension (AOH) model was induced in mice. TIGAR was knocked down via intravitreal injection of AAV-shTIGAR. RGC survival and function were assessed by retinal wholemounts and pattern electroretinogram (PERG), respectively. Inflammatory factors were evaluated by qPCR. In primary microglia under oxygen-glucose deprivation/reoxygenation (OGD/R), the effects of TIGAR on glycolysis were determined.

Results: Following AOH, TIGAR was upregulated in retinal microglia. TIGAR knockdown exacerbated RGC loss and functional decline, which was associated with increased retinal levels of IL-1 β and IL-18. In primary microglia under OGD/R, TIGAR knockdown enhanced glycolysis and promoted inflammation in microglia after OGD/R. Conversely, TIGAR overexpression suppressed glycolysis and attenuated inflammation.

Conclusions: Our findings identify microglial TIGAR as a critical protector in glaucoma, safeguarding RGCs by constraining glycolytic metabolism and inhibiting the subsequent neuroinflammatory response.

Abstract No.: 204988

Nervonic Acid Provides Neuroprotection Against Experimental Glaucoma

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Purpose: This study aimed to investigate the potential neuroprotective effects of Nervonic Acid (NA) against N-methyl-D-aspartate (NMDA)-induced experimental glaucoma models both in mice and R28 cells.

Methods: NMDA was intravitreally injected in mice, accompanied by administration of NA eye drops (0.1 or 0.5 mg/kg) for continuous 14 days. Retinal ganglion cell (RGC) survival was quantified using Tuj1 immunofluorescence on flat-mounted retinas. Retinal structural integrity was assessed by hematoxylin and eosin staining and measurement of layer thickness. Retinal function was evaluated using electroretinography (ERG). Apoptosis proteins,

including Bcl-2, Bax, and cleaved Caspase-3, were analyzed by Western blotting. Rat R28 cells were subjected to glutamate-induced excitotoxicity, and the effects of NA on cell viability (CCK-8), apoptosis (TUNEL), and oxidative stress (DCFH-DA staining) were assessed.

Results: NA treatment significantly attenuated NMDA-induced RGC loss and mitigated inner plexiform layer (IPL) thinning in mice in a concentration-dependent manner. ERG recordings demonstrated that NA restored the amplitudes of the b-wave and oscillatory potentials, indicating functional recovery. In R28 cells, NA alleviated glutamate-induced damage by enhancing cell viability, reducing apoptosis, and decreasing intracellular ROS levels. Mechanistically, NA alleviated excitotoxicity-induced retinal apoptosis as revealed by reversed Bcl-2/Bax ratio and Caspase-3 activation.

Conclusions: Nervonic acid confers significant protection against NMDA-induced excitotoxic damage by preserving retinal structure and function by inhibiting apoptosis and oxidative stress in retinal cells. These findings suggest NA has promising therapy for excitotoxicity-related retinal pathologies like glaucoma.

Abstract No.: 201251

Neuroprotective Effects of BMSC-Apoptotic Vesicles on Retinal Ganglion Cells: Therapeutic Potential for Glaucomatous Injury

First Author: Si **CHEN**

Co-Author(s): Xiaobo **XIA**, Mengling **YOU**

Purpose: Glaucoma is the leading cause of irreversible blindness worldwide, characterized by progressive degeneration of retinal ganglion cells (RGCs). Retinal ischemia/reperfusion (I/R) injury induced by elevated intraocular pressure (IOP) is a major contributor to RGC loss. Bone marrow mesenchymal stem cell (BMSC)-derived extracellular vesicles (EVs), especially apoptotic EVs (ApoEVs), have shown regenerative and immunomodulatory properties in various tissues. However, their neuroprotective potential in glaucoma remains largely unexplored.

Methods: Bone marrow-derived MSCs (BMSCs) were induced to undergo apoptosis using STS. ApoEVs were isolated via differential centrifugation. For enhanced therapeutic efficacy, ApoEVs were co-incubated with berberine (BBR) at a mass ratio of 1:1.5 (ApoEV protein:BBR) under gentle agitation overnight. A mouse model of retinal I/R injury was established by transient elevation of IOP. ApoEVs or ApoEV-BBR complexes were intravitreally injected 24 hours before I/R induction. RGC survival was assessed via immunohistochemistry and retinal flat-mount staining. Retinal function was evaluated using ERG and VEP. Transcriptomic analyses were conducted to identify differentially expressed genes and underlying mechanisms which were later verified with molecular biology experiments.

Results: Intravitreal ApoEVs penetrated the retina, preserved RGC survival, and maintained function after I/R injury. Transcriptomics revealed Irgm1 downregulation with ApoEVs. Berberine alone was protective, while ApoEVs plus Berberine produced a synergistic effect via MAPK modulation and inflammation suppression.

Conclusions: BMSC-derived ApoEVs confer neuroprotection in an acute glaucoma model. Co-delivery with BBR enhances this benefit, highlighting a promising synergistic therapeutic strategy for glaucoma and retinal neurodegeneration.

Abstract No.: 200640

Neuroprotective Effects of the Umbelopsis-Derived Small Molecule Compound U-7 on RGCs in Glaucoma via Inhibition of the cGAS-STING-PERK Pathway

First Author: Xingyi **CHEN**

Co-Author(s): Xiaobo **XIA**

Purpose: Glaucoma is a leading cause of irreversible blindness, characterized by progressive retinal ganglion cell (RGCs) loss. Current therapies mainly focus on lowering intraocular pressure, with limited effect on neuroprotection. This study aimed to investigate the role of the cGAS-STING pathway and endoplasmic reticulum (ER) stress in RGCs damage under glutamate excitotoxicity, and to evaluate the neuroprotective potential of a novel compound, U-7.

Methods: Glutamate-induced R28 cell and NMDA-induced mouse models were used. Proteomic analysis and western blotting assessed cGAS-STING and PERK-ATF4-CHOP pathway activation. U-7, isolated from *Umbelopsis* sp. DWS 372, was screened for neuroprotective activity. RGCs survival was evaluated using CCK8, Hoechst/PI staining, retinal flatmounts, and immunofluorescence. Visual function was tested via f-VEP, f-ERG, and the Optodrum system. ROS levels, inflammation, and ER stress markers were assessed by flow cytometry, qRT-PCR, and microscopy.

Results: cGAS-STING and downstream ER stress pathways were significantly activated in both models. STING inhibition reduced PERK pathway activity and RGCs loss. U-7 improved RGCs survival and reduced PI-positive cells. Functional tests confirmed that U-7 alleviated visual dysfunction and preserved optic nerve integrity. U-7 also decreased ROS levels, ER stress markers, and inflammatory responses, leading to reduced RGCs apoptosis.

Conclusions: U-7 protects RGCs by inhibiting cGAS-STING-mediated ER stress and oxidative and inflammatory damage, offering a promising neuroprotective approach for glaucoma treatment.

Abstract No.: 204857

New Findings on Mechanism of Primary-Angle Closure: Trans-Lens Pressure Difference

First Author: Yuanbo **LIANG**

Purpose: To propose and systematically validate a new hypothesis for the mechanism of primary angle-closure glaucoma (PACG)—the «trans-lens pressure difference» (TLPD) theory. This hypothesis posits that resistance to aqueous humor flow caused by a narrowed space between the ciliary body and the lens (cilio-lenticular block) is the core driver of anterior lens displacement and anterior chamber shallowing.

Methods: The study was conducted in three parts: 1) Clinical Imaging Study: A case-control study using 3.0T magnetic resonance imaging (MRI) was performed to precisely measure and compare the cilio-lenticular distance between 25 PACG patients and 19 age- and gender-matched normal controls. 2) Animal Model Study: An animal model was established in New Zealand white rabbits by artificially inducing a cilio-lenticular block with a capsular tension ring (CTR). The TLPD was directly measured by cannulating the anterior and vitreous chambers, while intraocular pressure (IOP) and anterior chamber depth (ACD) were monitored. 3) Interventional Study: A novel fenestrated intraocular lens (IOL) was designed and tested in the animal model to verify if physically relieving the pressure difference could effectively lower IOP and deepen the ACD.

Results: 1) The MRI study revealed that the cilio-lenticular distance in PACG patients (0.53 ± 0.10 mm) was significantly smaller than in controls (0.83 ± 0.18 mm, $P < 0.001$), serving as a strong independent predictor for PACG. 2) The animal model successfully induced a significant TLPD (8.50 ± 1.60 mmHg), leading to sustained ocular hypertension and a shallower ACD. 3) Implantation of the fenestrated IOL, followed by a YAG posterior capsulotomy, significantly reduced the TLPD (from 8.67 mmHg to 2.67 mmHg), normalized IOP, and increased ACD, while the standard IOL group showed no significant changes.

Conclusions: The collective clinical and experimental evidence consistently demonstrates that cilio-lenticular block is a key anatomical feature in PACG. It generates a significant trans-lens pressure difference that drives the lens forward, ultimately leading to angle closure. Alleviating this pressure difference can effectively reverse this pathological process.

Abstract No.: 207004

OCT-Angiography-Based Analysis of Macular Vascular Density and Peripapillary Perfusion in a Patient of Primary Open Angle Glaucoma (POAG)

First Author: Medha **RAI**

Purpose: 1. Measurement of macular vascular density and peripapillary perfusion on OCT-Angiography in

POAG patients 2. To correlate these changes with the severity of glaucoma

Methods: An analytical cross-sectional study was conducted at King George's Medical University, Lucknow, from February 2024 to February 2025, including 130 subjects (65 POAG and 65 non-glaucomatous controls). All participants underwent detailed ophthalmic evaluation, including best corrected visual acuity, slit-lamp examination, gonioscopy, fundus examination, and visual field analysis. Retinal nerve fiber layer (RNFL) thickness and macular parameters were assessed using Cirrus HD-OCT, while peripapillary and macular perfusion densities were measured with OCTA. Exclusion criteria included systemic vascular diseases, previous ocular trauma/surgery (except cataract/glaucoma), and retinal vasculopathies. Statistical analysis was performed using SPSS v23, with ANOVA, t-tests, and correlation analysis applied.

Results: POAG patients demonstrated significantly reduced central corneal thickness and corneal hysteresis compared to controls ($p < 0.01$). Cup-to-disc ratio was significantly higher in POAG eyes (0.7 ± 0.1 vs. 0.4 ± 0.1 , $p < 0.01$). Vessel density and perfusion indices on OCTA were markedly decreased with advancing glaucoma severity ($p < 0.01$). Central and perifoveal perfusion showed a strong correlation with RNFL thinning and visual field loss.

Conclusions: OCTA-derived parameters, including vessel density and perfusion indices, significantly reflect glaucomatous damage and correlate with disease severity. These findings suggest OCTA as a valuable non-invasive tool for early detection, monitoring, and prognostication of POAG beyond IOP measurement.

Abstract No.: 207411

OCTA-Based Peripapillary Perfusion and Macular Microvasculature As Early Markers of Pre-Perimetric Glaucoma

First Author: Harshitha C

Co-Author(s): Sasankadhar Reddy **MUDUMALA**, Nishitha **NARUKULLA**

Purpose: To evaluate whether OCTA-derived peripapillary perfusion and macular microvasculature parameters can detect pre-perimetric primary open-angle glaucoma (POAG) earlier and more accurately than RNFL thickness alone.

Methods: This prospective case-control study included 60 eyes of POAG suspects with normal visual fields and disc changes suggestive of glaucoma, and 60 age-matched healthy controls. All eyes underwent Cirrus AngioPlex OCTA with 4.5×4.5 mm ONH (RPC) and 6×6 mm macular scans. Global and sectoral radial peripapillary capillary (RPC) vessel density, macular superficial capillary plexus (SCP) density, ganglion cell

complex (GCC), and RNFL thickness were analyzed. Receiver operating characteristic (ROC) curves were used to compare diagnostic accuracy. Superior–inferior perfusion asymmetry and correlations with mean deviation (MD) and pattern standard deviation (PSD) were assessed.

Results: POAG suspect eyes showed significant reduction in global and inferotemporal RPC perfusion and macular SCP density, with increased superior–inferior asymmetry (all $p < 0.01$). ROC analysis demonstrated higher diagnostic accuracy for RPC global perfusion (AUC 0.91) compared with RNFL (0.86) and GCC (0.88). A composite index combining RPC IT sector, S–I asymmetry, and GCC achieved the highest AUC (0.94), reclassifying 23% of suspects with normal RNFL as glaucomatous. Perfusion metrics showed moderate correlation with MD and PSD ($r = 0.42–0.55$, $p < 0.01$).

Conclusions: OCTA-based peripapillary perfusion and macular microvasculature analysis provide highly sensitive, objective biomarkers for early glaucomatous damage, outperforming RNFL thickness alone. Incorporation of these parameters into clinical screening protocols may enable earlier diagnosis, risk stratification, and timely intervention to prevent vision loss.

Abstract No.: 207003

One Decade Glaucoma Trend in Indonesia: Retrospective Analysis of Big Data National Health Insurance 2015–2024

First Author: Krisna **JATI**

Co-Author(s): Muhammad **BAYU SASONGKO**, Yessi **PRIMANDA SARI**, Indra **TRI MAHAYANA**

Purpose: Glaucoma is a leading cause of irreversible blindness, with prevalence rising alongside population aging. This study aimed to assess national trends in glaucoma cases and healthcare expenditures in Indonesia from 2015 to 2023 using claims data from the National Health Insurance program (Jaminan Kesehatan Nasional/JKN).

Methods: A secondary data analysis was conducted using a random 1% sample of JKN health claims, representing 2.4 million beneficiaries. Glaucoma cases were identified with ICD-10 codes H40, H44.51, and Q15 from primary or secondary diagnoses at advanced-level facilities. Demographic, clinical, and healthcare utilization data were analysed using STATA IC version 14.0. Case numbers and costs were extrapolated to national estimates and stratified by intervention category.

Results: From 2015 to 2023, glaucoma cases increased by 75.9%, with prevalence rising from 0.2 to 2.6 per 1,000 population. Female patients represented a slightly higher proportion, and the mean age was 54.76 years ($SD = 17.47$). Glaucoma-related claims increased by 68%, from IDR 135 billion in 2015 to IDR 419 billion

in 2023, with declines in 2016 and 2020 reflecting service disruptions and COVID-19 restrictions. Surgical claims rose 7.5-fold, with cataract extraction most frequent. A total of 12,650 unique patients were identified, with 1–47 visits annually and expenditures ranging from IDR 140,700 to IDR 34,122,000.

Conclusions: This first nationwide analysis highlights the increasing prevalence and economic burden of glaucoma under JKN. Future studies should incorporate disease severity and hospital-level factors to inform efficient, evidence-based glaucoma care.

Abstract No.: 206920

Optical Coherence Tomography Assessment of Retinal Nerve Fibre Layer Changes in Chronic Kidney Disease Patients

First Author: Subhangi **SAHU**

Co-Author(s): Saswati **SEN**

Purpose: To analyze the retinal nerve fiber layer (RNFL) and ganglion cell complex (GCC) thickness in patients with chronic kidney disease (CKD) compared with age and sex matched healthy controls, and to correlate retinal changes with disease duration and renal function.

Methods: This was a prospective case control study which included 100 patients with CKD (duration ≥ 3 months, aged 30–70 years) and 100 age- and sex matched controls. A detailed ophthalmic examination, including visual acuity, slit-lamp biomicroscopy, intraocular pressure measurement, fundoscopy, and spectral-domain optical coherence tomography (OCT), was done. Parameters analyzed included peripapillary RNFL thickness, GCC thickness, and optic nerve head morphology. Exclusion criteria were glaucoma, diabetic or hypertensive retinopathy, macular pathology, high refractive errors, and media opacities. Clinical data such as estimated glomerular filtration rate (eGFR) and duration of CKD were also recorded.

Results: The mean retinal nerve fiber layer (RNFL) thickness was significantly reduced in the case group compared to controls ($72.0 \pm 7.0 \mu\text{m}$ vs. $95 \pm 8.0 \mu\text{m}$; $p < 0.001$). Similarly, ganglion cell complex (GCC) thickness was markedly lower in cases than in controls ($85.0 \pm 8.0 \mu\text{m}$ vs. $95.5 \pm 7.5 \mu\text{m}$; $p < 0.001$). Quadrant-wise analysis demonstrated significant RNFL thinning in the inferior ($120.0 \pm 10.0 \mu\text{m}$ vs. $130.0 \pm 15.0 \mu\text{m}$; $p = 0.002$), superior ($115.0 \pm 10.0 \mu\text{m}$ vs. $125.0 \pm 12.0 \mu\text{m}$; $p = 0.004$), and nasal quadrants ($105.0 \pm 10 \mu\text{m}$ vs. $115.0 \pm 10.0 \mu\text{m}$; $p = 0.001$). There was a relatively insignificant difference in the temporal quadrant ($70.00 \pm 8.0 \mu\text{m}$ vs. $73.0 \pm 7.00 \mu\text{m}$; $p = 0.28$). Importantly, patients with advanced stages of CKD, as well as those with a duration of CKD exceeding 10 years, exhibited significantly greater RNFL and GCC thinning compared to those in early stages and those with disease duration under 10 years, indicating progressive retinal

neurodegeneration correlating with prolonged CKD exposure.

Conclusions: OCT-based RNFL and GCC measurements provide a reliable, non-invasive means to detect early retinal neurodegeneration in CKD. These findings underscore the role of ophthalmic screening as an adjunct to systemic evaluation, potentially aiding in early intervention and better patient outcomes.

Abstract No.: 202369

Outcome of Goniotomy Over 120°, 240°, and 360° in Juvenile Open-Angle Glaucoma: A Multicenter Study

First Author: Zhixuan **WANG**

Co-Author(s): Fengbin **LIN**, Yunhe **SONG**, Zefeng **YANG**, Xiulan **ZHANG**

Purpose: To compare the surgical efficacy and safety of 120-, 240-, and 360-degree goniotomy (GT) for patients with juvenile open-angle glaucoma (JOAG).

Methods: This multicenter retrospective study included 102 eyes of 102 JOAG patients, who underwent GT with a follow-up of at least 6 months. Patients were categorized into three groups: (1) 120°GT, (2) 240°GT, and (3) 360°GT. Intraocular pressure (IOP), glaucoma medications, and complications were recorded at baseline and the final visit. Complete success and qualified success were defined as a postoperative IOP ≤ 21 mmHg without and with medications, respectively.

Results: The mean age of the participants was 24.4 ± 7.9 years. After a mean follow-up of 8.1 ± 2.7 months, complete success rates were similar between the 240°GT (45.2%) and the 360°GT (63.2%) ($P = 0.135$), and both were superior to 120°GT (18.2%) ($P < 0.05$). Qualified success rates among patients in the 120°, 240°, and 360° GT groups were 93.9%, 96.8% and 100%, respectively, and showed no statistically significant difference ($P = 0.292$). 360°GT required fewer medications than 240°GT and 120°GT ($P < 0.05$), with no significant difference in medications between 120°GT and 240°GT ($P > 0.05$). Hyphema was the most common postoperative complication, with a significantly higher incidence in the 360°GT (68.4%) compared to the 240°GT (41.9%) and 120°GT (33.3%) ($P < 0.05$).

Conclusions: 240° and 360°GT showed similar efficacy in IOP reduction, and were superior to 120°GT. More extensive GT may provide better outcomes in JOAG.

Abstract No.: 204288

Outcomes of Combined Phaco, Irido-Zonulo-Hyaloid-Vitrectomy, Ahmed Valve and Scleral Windows for Angle-Closure Glaucoma Secondary to Nanophthalmos

First Author: Zhigang **FAN**

Co-Author(s): Yan **GAO**

Purpose: To summarize outcomes of a modular surgical approach with phacoemulsification, irido-zonulo-hyaloid-vitrectomy (IZHV), Ahmed glaucoma valve (AGV) and scleral windows for angle-closure glaucoma (ACG) secondary to nanophthalmos.

Methods: This was a retrospective and interventional case series including 92 eyes in 62 consecutive cases of nanophthalmos with ACG. All patients underwent a modular surgical approach tailored to their clinical characteristics: Procedure I, phaco + GSL; Procedure II: Procedure I + IZHV; Procedure III, phaco + IZHV + AGV; Procedure IV: Procedure III + scleral windows.

Results: Ninety-two eyes from 62 patients, with a mean age of 50.52 ± 14.03 years and a median axial length of 19.89 (range: 14.84 - 20.99) mm, were included. Depending on different clinical characteristics, 14, 26, 22, and 30 eyes underwent surgical procedures I, II, III and IV, respectively. The median follow-up was 13 (range: 12-36) months. At the last visit, intraocular pressures in all patients were maintained below 21 mmHg with no anti-glaucoma medications. Complications included malignant glaucoma (MG, 9 eyes), uveal effusion (UE, 5 eyes), suprachoroidal hemorrhage (1 eye), fibrin membrane formation (4 eyes), uveitis (1 eye), macular edema (1 eye), and compromised corrected distance visual acuity (CDVA, 6 eyes). Younger age was associated with a higher risk of MG (OR: 1.06, $P = 0.04$), UE (OR: 1.07, $P = 0.046$) and compromised CDVA (OR: 1.11, $P = 0.02$).

Conclusions: The modular surgical approach achieves consistency in a relatively great prognosis and reducing complications in these challenging cases of ACG secondary to nanophthalmos.

Abstract No.: 202048

Outcomes of Low-Energy Selective Laser Trabeculoplasty

First Author: Hinako **OHTANI**

Co-Author(s): Yuri **FUJINO**, Chisako **IDA**, Mizuki **IIDA**, Sayaka **KAWAMOTO**, Kana **MURAKAMI**, Masaki **TANITO**

Purpose: To evaluate the mid- to long-term outcomes of selective laser trabeculoplasty (SLT) performed with lower energy (≤ 0.5 mJ) than conventional settings (0.6–1.2 mJ).

Methods: This retrospective study included 100 eyes of 55 patients (mean age 55.5 years, 49% male) who underwent SLT at a mean energy of 0.34 mJ and were

followed for ≥ 36 months. Treatment failure was defined as either an increase in medication score or need for additional glaucoma surgery (Definition 1), or the need for glaucoma surgery (Definition 2). Cox proportional hazards models were applied.

Results: During follow-up, 37 eyes required one repeat SLT and 8 eyes required two. Mean intraocular pressure (IOP) decreased from 16.7 mmHg preoperatively to 15.1, 14.5, and 13.9 mmHg at 12, 36, and 60 months, respectively ($p < 0.0001$, mixed-effects model). Medication scores were 2.2, 2.4, 2.1, and 2.8, respectively ($p = 0.0003$). Success rates at 12, 36, and 60 months were 71%, 37%, and 26% by Definition 1, and 90%, 68%, and 61% by Definition 2. At 36 months, success rates by preoperative medication score (0, 1–2, ≥ 3) were 11%, 49%, and 38% for Definition 1 ($p = 0.0003$), and 83%, 73%, and 58% for Definition 2 ($p = 0.02$). By Definition 2, younger age, lower preoperative IOP, and lower baseline medication score were significantly associated with success (HR = 0.1 for 0 vs ≥ 3 , $p = 0.0006$; HR = 0.4 for 1–2 vs ≥ 3 , $p = 0.03$).

Conclusions: Performing low-energy SLT using approximately one medication can delay the need for additional therapy or surgery.

Abstract No.: 202897

Outcomes of Phacogoniotomy for Medically Controlled and Uncontrolled Primary Open Angle Glaucoma With Cataract: A Multicenter Study

First Author: Guihua XU

Co-Author(s): Yunhe SONG

Purpose: To evaluate the efficacy and safety of PEI combined with 120-degree GT in the treatment of medically controlled or uncontrolled POAG with cataract.

Methods: Multicenter observational study conducted in 9 ophthalmic institutes/general hospitals in China. Patients with medically controlled [baseline intraocular pressure (IOP) ≤ 21 mmHg] or uncontrolled (baseline IOP > 21 mmHg) POAG with clinically significant cataract were included, who were followed up with at least 12 months. The IOP, topical hypotensive medication, surgery complications, and visual acuity surgery success were recorded and compared between groups at baseline and the final visit. Complete surgical success was defined as postoperative IOP of 5–18 mmHg without additional topical medications, vision-threatening complications, or reoperation for glaucoma. Qualified success is the same as complete success except allowing the use of ocular hypotensive medications.

Results: One hundred participants with 132 eyes were included with a mean follow-up time of 17.5 ± 5.2 months (range: 12–32) postoperatively. In general, the mean IOP reduced from 21.2 ± 7.4 mmHg at baseline

to 14.7 ± 2.9 mmHg postoperatively ($P < 0.05$), with an average reduction of 6.4 ± 7.9 mmHg ($23.5 \pm 25.6\%$). The mean number of hypotensive medications declined from 1.6 ± 1.2 to 0.3 ± 0.6 , with a mean reduction of 1.4 ± 1.2 . One hundred and eight out of 132 (81.8%) eyes achieved complete success and 118 (89.4%) achieved qualified success of surgery, respectively. The chief complications involved hyphema (15.2%), corneal edema (19.7%), IOP spike (8.3%), or hypotony (1.5%). In subgroup analysis of medically controlled versus medically uncontrolled participants, difference was found neither in IOP at final visit (14.5 ± 0.3 vs 15.1 ± 0.4 mmHg; $P = 0.28$), medication (1.8 ± 1.1 vs 1.4 ± 1.3 ; $P = 0.54$), and complete (85.3% vs 77.2%; $P = 0.23$) or qualified success rate (95.0% vs 86.0%; $P = 0.27$), nor in any kind of surgery complications (all P s > 0.05), respectively.

Conclusions: POAG with cataract could be effectively treated by phacogoniotomy, regardless of medically controlled or medically uncontrolled status at baseline.

Abstract No.: 207092

Peripapillary Microvascular Density and Visual Field Damage in Moderate and Severe Primary Open-Angle Glaucoma

First Author: Khoa NGUYEN

Co-Author(s): Thanh DOAN, Quyen HUYNH, Nghiep TRANG

Purpose: To assess the correlation between peripapillary vessel density (VD) parameters and 24-2 visual field (VF) outcomes in eyes with moderate and advanced primary open-angle glaucoma (POAG).

Methods: This observational, cross-sectional study included 74 eyes of 56 POAG patients. Based on the Hodapp–Parrish–Anderson VF grading scale, eyes were classified as having moderate POAG (37 eyes) or severe POAG (37 eyes), and all underwent optical coherence tomography angiography (OCTA) and optical coherence tomography (OCT) testing. Mean deviation (MD), mean sensitivity (MS), VD, and retinal nerve fiber layer (RNFL) thickness were analyzed globally and by sector according to the modified Garway–Heath mapping. Correlations between structural indices and VF parameters were evaluated using Pearson regression.

Results: The mean patient age was 54.88 ± 15.32 years, with an MD of -16.32 ± 8.57 dB and a mean VD of $40.93 \pm 3.70\%$. Statistically significant differences in all vascular indices were found between the moderate and severe POAG groups ($p < 0.05$). Among all vascular and structural parameters, superior VD and peripapillary VD showed the strongest correlations with MD ($r = 0.728$ and 0.669 , respectively; $p < 0.001$). In addition, superior VD demonstrated the highest correlation with the MS of the corresponding VF sector ($r = 0.781$, $p < 0.001$).

Conclusions: In moderate and severe POAG, there was a strong correlation between peripapillary VD (both total and regional) and VF deficits, particularly in the superior quadrant.

Abstract No.: 205678

Peripapillary Staphyloma and Asymmetric Fundus Unevenness As Risk Factors for Open-Angle Glaucoma in Eyes With Myopia

First Author: Nan LUO

Co-Author(s): Ying HAN, Jingjing HUANG, Yuzhou XIANG

Purpose: To investigate the association between posterior staphyloma, fundus curvature, and open-angle glaucoma (OAG) in myopic eyes.

Methods: Myopic eyes were collected from a cohort at the Zhongshan Ophthalmic Center and grouped based on the diagnosis of OAG, with a 1:1 ratio of case-control matching for age and sex. OAG was subclassified into normal-tension and high-tension, juvenile-onset and adult-onset. Pathologic myopia was defined as the presence of posterior staphyloma and/or myopic maculopathy equal to or more severe than diffuse chorioretinal atrophy. Posterior staphyloma was categorized by its location and extent. Fundus steepness, unevenness, and asymmetry were quantitatively assessed using Gaussian curvature in the macular, superior, temporal, inferior, and nasal regions. The association between fundus morphology and OAG was evaluated using logistics regression adjusted for confounding covariates.

Results: A total of 334 myopic eyes (164 males and 170 females) were analyzed, of which 167 had OAG and 91 had pathologic myopia. Peripapillary staphyloma was more prevalent in myopic eyes with OAG than in those without OAG (6.6% versus 2.4%; $P=.04$). Peripapillary staphyloma was identified as a risk factor for OAG in eyes with pathologic myopia (odds ratio=67.239, $P=.02$). Myopic eyes with OAG showed lower macular steepness, higher temporal unevenness, lower superior-inferior asymmetry in steepness, and higher nasal-temporal asymmetry in unevenness (all $P<.05$). In myopic eyes, nasal-temporal asymmetry in fundus unevenness was associated with a higher risk of OAG (odds ratio=3.082 for every 100% increase, $P=.004$).

Conclusions: Region-specific fundus curvature alterations and peripapillary staphyloma are associated with OAG in myopia.

Abstract No.: 207067

Peripapillary Vessel Density as an Emerging Biomarker for Postoperative Monitoring Beyond the Structural Floor in Advanced Primary Open-Angle Glaucoma

First Author: Duyen PHAM

Co-Author(s): Yen DINH, Thanh DOAN, Quyen HUYNH

Purpose: To evaluate longitudinal changes in peripapillary vessel density (pVD) after trabeculectomy and explore its potential role as an adjunctive biomarker for disease monitoring in primary open-angle glaucoma (POAG).

Methods: This prospective longitudinal study included 36 eyes of 36 POAG patients undergoing trabeculectomy. Peripapillary vessel density was quantified by optical coherence tomography angiography (OCT-A), structural parameters were measured using OCT, and visual field function was assessed using Mean Deviation (MD). Measurements were obtained preoperatively and at 1, 3, and 6 months postoperatively.

Results: Mean intraocular pressure significantly decreased from 31.33 ± 7.08 mmHg to 12.12 ± 3.20 mmHg at 6 months. Despite effective pressure reduction, both pVD (from 38.79% to 38.23%; $p < 0.05$) and MD (from -19.81 dB to -20.35 dB; $p < 0.05$) exhibited significant declines over the follow-up period. Although both parameters decreased in parallel, no statistically significant correlation was found between the magnitude of pVD and MD change, suggesting that vascular and functional deterioration may occur through partially independent pathways. Retinal nerve fiber layer and ganglion cell complex thickness remained stable, indicating a structural floor effect in conventional OCT measurements.

Conclusions: Even with well-controlled intraocular pressure, disease progression may persist after trabeculectomy. The parallel decline in vascular and functional parameters, despite stable neural structural metrics, highlights pVD as an emerging objective biomarker for postoperative monitoring when conventional OCT parameters reach their structural floor. Integrating pVD with visual field testing may improve detection of progression and guide timely therapeutic decisions in advanced glaucoma.

Abstract No.: 202504

Peripheral Iridectomy With Goniosynechialysis and Goniotomy vs Trabeculectomy for Advanced PACG: A Randomized Clinical Trial

First Author: Fengbin LIN

Co-Author(s): Xiulan ZHANG

Purpose: To investigate the safety and effectiveness at 1 year of combining surgical peripheral iridectomy

(SPI) with goniosynechialysis (GSL) and goniotomy (GT) vs trabeculectomy in advanced primary angle-closure glaucoma (PACG) without cataract.

Methods: A total of 88 Chinese patients (88 eyes) with advanced PACG (no cataract) were enrolled. Mean (SD) age: 60.3 (7.3) years; 52 (59.1%) female. 43 randomized to SPI+GSL+GT, 45 to trabeculectomy; 86 (97.7%) completed 12-month follow-up. Primary outcome: 12-month IOP (noninferior margin: 4mmHg). Secondary outcomes: surgical success (IOP 5-18mmHg, $\geq 20\%$ baseline reduction, with/without antiglaucoma meds); postoperative complications/interventions, and antiglaucoma med count.

Results: At 12 months: SPI+GSL+GT mean (SD) IOP: 15.6 (4.0) mmHg vs trabeculectomy's 14.9 (4.2) mmHg ($P=.55$). Qualified success: 38/43 (88.4%) vs 42/45 (93.3%) ($P=.48$). However, complete success lower: SPI+GSL+GT 26 (60.5%) vs trabeculectomy 37 (82.2%) ($P=.03$). Postoperative complications: 8 (18.6%) vs 9 (20.0%) ($P=.71$). Postoperative interventions lower: 3 (7.0%) vs 25 (55.6%) ($P<.001$). Median (IQR) meds: SPI+GSL+GT 2(0-3) $\rightarrow$ 0(0-1); trabeculectomy 2(2-3) $\rightarrow$ 0(0-0) ($P=.004$).

Conclusions: SPI+GSL+GT was noninferior to trabeculectomy for IOP control in patients with PACG without cataract at 12 months postoperatively, with fewer postoperative interventions.

Abstract No.: 206997

Phacoemulsification Combined With Trabeculectomy for Secondary Glaucoma Associated With Pediatric Uveitic Cataract

First Author: Weiwei **WANG**

Purpose: To explore the effectiveness and safety of phacoemulsification combined with trabeculectomy for secondary glaucoma associated with pediatric uveitic cataract.

Methods: Retrospective analysis of preoperative and postoperative data in two pediatric patients with uveitis-associated cataracts and secondary Glaucoma.

Results: Child 1 had a 3-year history of bilateral uveitis, underwent bilateral LPI 2 years earlier, and left-eye cataract surgery 1 year earlier. Preoperatively, the right eye had a visual acuity of 0.2 and an IOP of 31.2 mmHg. Examination revealed peripheral band-shaped keratopathy, complete posterior synechiae of the iris, a laser iridotomy at the 6 o'clock position, and cortical lens opacity. Postoperatively, the visual acuity improved to 0.5, IOP decreased to 12.9 mmHg with no synechiae of the iris and a clear, well-positioned IOL. Child 2 had a 4-year history of bilateral uveitis and had undergone left-eye cataract surgery 2 years earlier. Preoperatively, the right eye had a visual acuity of 0.1 and an IOP of 49.4 mmHg, with no marked corneal edema, nearly complete posterior synechiae of the iris, and opacification of the lens. Postoperative

visual acuity improved to 0.5, IOP decreased to 13.0 mmHg with no synechiae of the iris and a clear, well-positioned IOL. Child 1 was followed for 1 year and Child 2 for 6 months; in both cases, postoperative IOP remained normal without any glaucoma medications, and no disease progression was observed.

Conclusions: Phacoemulsification combined with trabeculectomy is effective and safe for secondary glaucoma associated with pediatric uveitic cataract, but larger sample sizes and longer follow-up are needed.

Abstract No.: 200924

Postoperative Risks and Climate Exposure: A 10-Year Cohort Study of Incisional Glaucoma Surgery Outcomes

First Author: Tianhao **CHEN**

Co-Author(s): Yuan **LEI**, Xinghuai **SUN**, Yi **TIAN**, Yuyan **ZHANG**

Purpose: Incisional glaucoma surgery is an effective strategy for lowering intraocular pressure, yet postoperative fibrotic scarring frequently undermines long-term success. This study aims to characterize climatic determinants of surgical failure.

Methods: A total of 5,193 patients who underwent incisional glaucoma surgeries from January 2015 to July 2024 were included in this study. Individual-level clinical data were obtained from electronic medical records. Ambient temperatures were estimated using spatiotemporal bilinear interpolation. Multivariable-adjusted random-effects Cox proportional hazards models with restricted cubic splines and segmented regression were used to assess the temperature-outcome relation. To identify potential susceptible populations, stratified analyses were conducted. Multiple sensitivity analyses were performed to confirm robustness.

Results: Non-optimal temperature augmented the incidence of suboptimal surgical outcomes. A U-shaped, nonlinear association was observed between ambient temperature and risk of suboptimal outcomes (P for nonlinearity < 0.0001) within prolonged exposure windows (120 and 180 days), with the lowest risk at 3–26°C. The risk increased by 14.5% (95% CI: 11.5%–17.4%) for each 1°C decrease below this range, while each 1°C increase above the range was associated with a 31.9% (95% CI: 25.1%–39.0%) higher risk. Effects were more pronounced among older individuals and cases with primary open-angle glaucoma.

Conclusions: Ambient temperature significantly influences surgical outcomes following conjunctival incision glaucoma procedures. As climate change accelerates the frequency of heat and cold spells, integrating meteorological data into surgical planning and perioperative management may reduce risk, particularly in vulnerable populations.

Abstract No.: 206678

Predictive Factors for Ciliary Block After Cataract and Goniosynechialysis Surgery in Primary Angle-Closure and Primary Angle-Closure Glaucoma: A Multicenter Retrospective Study

First Author: Huijuan **WU**

Co-Author(s): Chao **DAI**, Sujie **FAN**, Shuning **LI**, Yao **MA**, Li **QIN**, Dajiang **WANG**

Purpose: To identify predictive factors for ciliary block (CB) following combined phacoemulsification, intraocular lens implantation, and goniosynechialysis (P+I+GSL) in patients with primary angle-closure (PAC) and primary angle-closure glaucoma (PACG).

Methods: This multicenter retrospective study analyzed 66 eyes from 66 patients who underwent P+I+GSL between February 2022 and December 2024. Patients were categorized into two groups: those who developed CB (n=33) and those who did not (n=33). Preoperative biometric parameters obtained from ultrasound biomicroscopy (UBM) and IOLMaster, along with intraoperative data, were analyzed. Univariable and multivariable logistic regression analyses were conducted to identify risk factors for CB.

Results: Compared to the non-CB group, patients who developed CB had shorter axial length, narrower anterior chamber width (ACW), and thinner lenses (LT) ($P < 0.05$) preoperatively. Multivariable analysis identified reduced ACW ($OR = 0.049$, $P < 0.05$), decreased LT ($OR = 0.007$, $P < 0.05$), and lack of preoperative mannitol administration ($OR = 0.025$, $P < 0.05$) as significant predictors of CB. The optimal cut-off values for predicting CB were 11.72 mm for ACW and 4.84 mm for LT, with area under the curve values of 0.861 and 0.863, respectively.

Conclusions: Shorter AL, narrow ACW, thin lenses, and lack of preoperative mannitol administration are significant risk factors for CB following P+I+GSL in PAC and PACG patients. These findings highlight the importance of preoperative assessment of ACW and LT, along with the use of mannitol, may help reduce the incidence of CB in high-risk patients.

Abstract No.: 208393

Preoperative and Intraoperative Characteristics of Zonulopathy in Patients With Acute Angle-Closure Glaucoma in Cataract Surgery: A Cross-Sectional Study

First Author: Rui **QIN**

Co-Author(s): Jiawei **CHEN**, Yiyun **LIU**, Hong **QI**, Xiaoyu **WANG**

Purpose: This study aimed to identify the zonulopathy in patients with acute angle-closure glaucoma (AACG) during cataract surgery and the preoperative biometric parameters related to zonulopathy.

Methods: A cross-sectional study of 80 eyes of 40 patients with one-eye AACG.

Results: All patients were one-eye AACG and 42.5 % of fellow eyes were diagnosed with primary angle-closure glaucoma (PACG), anterior capsule wrinkling demonstrated 70% sensitivity and 93% specificity for zonulopathy. Zonulopathy was diagnosed in 60% of AACG eyes. Zonulopathy eyes exhibited smaller ACD (2.01 ± 0.28 mm, $p = 0.025$), higher lens vault (1.25 ± 0.28 mm, $p = 0.007$), larger pupil diameter (4.33 ± 1.25 mm, $p = 0.048$), higher incidence of iris dechromation (50%, $p = 0.001$), greater cup-to-disc ratio (0.67 ± 0.15 , $p = 0.024$), and lower visual field index $66.35 \pm 33.95\%$, $p = 0.05$). Multivariate logistics analysis confirmed AACG as the sole independent risk factor ($OR = 3.733$, $P < 0.001$).

Conclusions: Intraoperative adverse events, particularly anterior capsule wrinkling, can help assess the severity of zonulopathy in AACG eyes. Zonulopathy was present in 60% of AACG eyes. The shallow ACD, dechromation of the iris, and increased C/D caused by AACG were associated with zonulopathy.

Abstract No.: 202112

Prognostic Factors Influencing the Outcomes of PEI Combined With Goniosynechialysis and Goniotomy in the Treatment of Primary Angle-Closure Glaucoma

First Author: Chukai **HUANG**

Purpose: To evaluate the effectiveness and safety of PEI plus GSL and GT for advanced PACG.

Methods: This was a cross-sectional study. IOP, BCVA, and the number of anti-glaucoma medications used in patients before surgery and at 1 day, 1 week, 1 month, and 3 months postoperatively were analysed. Quantitative assessment of changes in angle parameters was conducted using AS-OCT. Logistic regression analysis was employed to analyze the impact of multiple factors on the surgical outcomes.

Results: A total of 59 eyes of 59 patients were included. The mean preoperative IOP was 23.54 ± 11.14 mmHg, and the IOP at the end of follow-up was 14.00 ± 4.51 mmHg ($P = 0.001$), a decrease of 9.54 ± 10.72 mmHg (40.53%). The mean preoperative and the postoperative BCVA was 0.74 ± 0.85 and 0.53 ± 0.83 ($P = 0.007$). The number of anti-glaucoma medications was reduced from 3.12 ± 0.72 to 0.26 ± 0.74 . The complete success rate was 78.0%, and the qualified success rate 94.9%. At the 3-month postoperative follow-up, quantitative assessment of angle parameters showed significant increases compared to preoperative measurements ($p < 0.001$). Multivariate analysis revealed that a family history of glaucoma ($OR = 1.143$, 95%CI $2.295 - 135.075$, $P < 0.006$) and preoperative high intraocular pressure ($OR = 17.780$, 95%CI $1.040 - 1.241$, $P < 0.005$) were independent risk factors for prognosis.

Conclusions: PEI+GSL+GT is preliminarily effective and safe for advanced PACG. A family history of glaucoma and preoperative high IOP are independent risk of prognosis.

Abstract No.: 204749

Prospective Multi-Centre Evaluation of iStent Infinite as a Stand-Alone Procedure for Open-Angle Glaucoma With Up to 24-Months Follow-Up

First Author: Colin **CLEMENT**

Co-Author(s): Geoff **CHAN**, Hamish **DUNN**, Todd **GOODWIN**, Frank **HOWES**, Judy **KU**, Ridia **LIM**, David **MANNING**, Michael **SHIU**

Purpose: To evaluate the safety and efficacy of the iStent infinite trabecular micro-bypass system as a stand-alone procedure in eyes with open-angle glaucoma (OAG).

Methods: This prospective study included 78 eyes from 61 patients with OAG undergoing implantation of three iStent infinite devices as a stand-alone procedure. Patients were followed up to 24 months. Outcomes included intraocular pressure (IOP), glaucoma medication use, visual field mean deviation (MD), cup-to-disc ratio, retinal nerve fibre layer thickness (RNFL), and central corneal thickness. Multilevel mixed-effects linear regression was used to model IOP change, and Poisson regression for medication use, accounting for repeated measures nested within eye, patient, and surgeon. Surgical success was defined according to American Academy of Ophthalmology (AAO) criteria.

Results: Mean baseline IOP was 18.54 ± 6.24 mmHg on 2.5 ± 1.2 medications. At 12 months, mean IOP reduced to 13.72 ± 3.64 mmHg ($p < 0.001$), and to 14.68 ± 4.41 mmHg at 24 months, representing a ~21% reduction. Medication use decreased to 1.56 ± 1.55 at 12 months and 1.68 ± 1.55 at 24 months ($p < 0.001$). By 24 months, 39.4% of eyes achieved AAO-defined success (IOP < 21 mmHg and $> 20\%$ IOP reduction from baseline). Visual field MD, RNFL thickness, and cup-to-disc ratio remained stable, with no cases of hypotony or loss of light perception vision.

Conclusions: Standalone iStent infinite implantation produced significant and durable reductions in IOP and medication burden over 24 months in eyes with OAG, with stable visual function and a favourable safety profile. These findings support its role as an effective minimally invasive option for long-term glaucoma management independent of cataract surgery.

Abstract No.: 201936

Protective Role of Metformin in Glaucoma: Prospective Cohort Study, Meta-Analysis, and Drug-Target Mendelian Randomization

First Author: Can Can **XUE**

Co-Author(s): Miao Li **CHEE**, Ching-yu **CHENG**, Rachel **CHONG**, Raghavan **LAVANYA**, Hengtong **LI**, Zhi Da **SOH**, Nicholas **TAN**, Yih-chung **THAM**, Marco **YU**

Purpose: Metformin use may protect against glaucoma through multiple mechanisms, while previous studies reported mixed results. To clarify this association, we conducted a prospective cohort study, a meta-analysis, and a drug-target Mendelian randomization (MR) analysis.

Methods: In the UK Biobank, we examined the association between metformin use and incident glaucoma among 24,206 patients with diabetes using multivariable Cox regression. A random-effect meta-analysis was performed to synthesize existing human studies on the association between metformin and glaucoma. Biomarker (Hemoglobin A1c)-weighted drug-target MR was conducted using multiple MR models to estimate metformin's causal effect on primary open-angle glaucoma (POAG) and intraocular pressure (IOP), leveraging genetic variants near five metformin target genes as instrumental variables.

Results: A total of 841 patients developed glaucoma during a mean follow-up of 12.1 ± 2.8 years. Metformin use was associated with a 19% lower glaucoma risk (HR, 0.81; 95% CI, 0.69–0.97; $P = 0.018$), independent of glycemic control, IOP, diabetes duration, and other confounders. Random-effect meta-analysis of cohort studies showed a consistent protective effect (pooled RR, 0.81; 95% CI, 0.72–0.93; $P = 0.002$) of metformin on glaucoma incidence among subjects with diabetes. Drug-target MR indicated each standard deviation decrease in hemoglobin A1c via five metformin targets was causally associated with 33% lower glaucoma risk (OR, 0.67; 95% CI, 0.46–0.98; $P = 0.039$).

Conclusions: Our findings suggest metformin may reduce glaucoma risk in the diabetic population, supporting the need for randomized clinical trials to evaluate metformin's potential as a preventive glaucoma therapy.

Abstract No.: 200848

Quantitative Changes of the Ciliary Body and Their Association With Refractive Error After Phacoemulsification in Phakic Eyes With Malignant Glaucoma

First Author: Yu **YANG**

Co-Author(s): Jingjing **HUANG**

Purpose: To investigate ciliary body changes after phacoemulsification and their association with postoperative refractive errors in eyes with malignant glaucoma.

Methods: This retrospective study analyzed data of phakic eyes which underwent phacoemulsification combined with goniosynechialysis at Zhongshan Ophthalmic Center after failed trabeculectomy or laser peripheral iridotomy for primary angle-closure glaucoma between June 2022 and June 2024. Eyes were grouped by the diagnosis of malignant glaucoma, with additional anterior vitrectomy performed in the malignant glaucoma group. Ciliary body parameters were measured using ultrasound biomicroscopy, and pre- and postoperative values were compared between groups. Multivariate regression identified factors associated with postoperative refractive errors.

Results: Sixteen eyes with malignant glaucoma and 62 control eyes without malignant glaucoma were included. Preoperatively, eyes with malignant glaucoma showed thinner and more anteriorly rotated ciliary bodies ($P < 0.05$). Postoperatively, eyes with malignant glaucoma showed larger increases in ciliary body thickness ($P < 0.05$) and greater decreases in anterior rotation ($P < 0.05$), although their ciliary body thickness remained lower than that of controls. Greater myopic shifts were found in eyes with malignant glaucoma compared to controls (median: -1.19 versus -0.10 diopter; $P < 0.001$). Multivariate regression identified thinner preoperative lens thickness ($P = 0.028$), thinner baseline ciliary body thickness at the scleral spur ($P = 0.018$), and smaller trabecular-ciliary angle ($P = 0.003$) as being associated with greater myopic shifts.

Conclusions: In eyes with malignant glaucoma, although phacoemulsification combined with anterior vitrectomy partially restored ciliary body morphology, greater postoperative myopic shifts were found. Preoperative ciliary body assessment may help predict refractive errors in malignant glaucoma patients.

Abstract No.: 205996

Real-World Long-Term Efficacy of the Hydrus Microstent in Medication Reduction for Glaucoma Management: International Glaucoma Surgery Registry Analysis

First Author: Nathan **KERR**

Co-Author(s): Keith **BARTON**, Gok **RATNARAJAN**, Jing **WANG**

Purpose: To evaluate the real-world efficacy of the Hydrus Microstent combined with cataract surgery in reducing medication burden and maintaining intraocular pressure (IOP) control in patients with mild-to-moderate primary open-angle glaucoma (POAG), pseudoexfoliative glaucoma (PXFG), and pigment dispersion glaucoma (PDG).

Methods: An international, multicentre, registry-based study analysed 484 eyes from 361 patients who underwent Hydrus Microstent implantation with cataract surgery. Primary outcomes were changes in topical medication burden and IOP from baseline to

24 months. Secondary outcomes included medication-free status, complications, and secondary surgical interventions (SSI). Data were collected through the International Glaucoma Surgery Registry (IGSR.org) across centres in Australia, Canada, the United Kingdom, and the United States.

Results: At baseline, mean medications were 1.8 ± 1.4 , and mean IOP was 16.7 ± 5.4 mmHg. Visual field mean deviation was -5.83 ± 5.93 dB. At 12 months ($n = 205$), medications were reduced by 44% (1.8 to 1.0), IOP by 17% (to 13.8 mmHg), and 43% achieved medication-free status. At 24 months ($n = 187$), reductions were maintained: medications decreased 44% (1.0), 47% were medication-free, and IOP reduced by 20% to 13.3 mmHg (all $p < 0.001$). Complications were rare, with only 2 cases (0.4%) of hyphaema (>10% anterior chamber in 1 case). SSI occurred in 2.7%, mainly in filtration procedures. Outcomes compared favourably with the HORIZON trial.

Conclusions: In real-world practice, Hydrus Microstent with cataract surgery achieved sustained medication and IOP reduction with excellent safety, supporting its role as an effective minimally invasive glaucoma option.

Abstract No.: 203642

Relationship Between Long-Term Blood Pressure Fluctuations and Visual Field Progression in Primary Open-Angle Glaucoma

First Author: De-fu **CHEN**

Co-Author(s): Yuanbo **LIANG**

Purpose: This study aims to evaluate the association between long-term blood pressure (BP) fluctuations and visual field (VF) progression in patients with primary open-angle glaucoma (POAG).

Methods: Linear mixed models were used to assess associations between BP metrics and VF progression rates. BP variability (BPVR) and intraocular pressure (IOP) variability during the follow-up period were calculated as the standard deviation (SD) divided by the mean value. Correlated non-fluctuating BP metrics (baseline, mean, maximum, and minimum BP) were combined using principal component analysis (PCA) for systolic BP (SBP) and diastolic BP (DBP), respectively. Principal component 1 (PC1) was included as a covariate. The interactions between covariates and time from baseline were modeled to determine their effects on VF progression rates.

Results: A total of 157 eyes from 157 POAG patients were included, with a mean age of 56.9 ± 13.4 years at baseline. VF progression was observed in 74 eyes (44%). These eyes exhibited significantly higher DBPVR (0.10 ± 0.02 vs. 0.09 ± 0.03 mmHg, $P = 0.009$) and slightly higher SBPVR (0.08 ± 0.02 vs. 0.07 ± 0.02 mmHg, $P = 0.077$), though the latter was not statistically

significant. Notably, only SBPVR was significantly associated with VF progression rates (estimate: -12.57 dB/year [SE: 5.20 dB/year], $P = 0.0166$), while IOP and non-fluctuating BP metrics were not.

Conclusions: Blood pressure variability, particularly SBP variability, may be an independent risk factor for accelerated VF progression in POAG. Clinicians should carefully monitor BP variability in POAG patients to mitigate potential disease progression.

Abstract No.: 201492

Results of iTrack Global Data Registry to Support the Role of Canaloplasty for Treatment of Glaucoma

First Author: David **LUBECK**

Co-Author(s): Keith **BARTON**, Nathan **KERR**

Purpose: The iTrack Global Data Registry (iTGDR) was established to collect comprehensive real-world data on the efficacy and safety of canaloplasty. Key outcomes include intraocular pressure (IOP) reduction, medication use, endothelial cell count, adverse events, and procedure-specific parameters.

Methods: This is a prospective, multicenter, real-world study conducted in the USA, Canada, Europe, Asia, and Australia. Data were collected in a cloud-based registry and included patients with primary and secondary open-angle glaucoma undergoing canaloplasty. Only eyes with at least 12 months of follow-up and combined with phacoemulsification were included. Outcomes were assessed at baseline and post-op (last available follow-up). Success was defined as achieving criteria set by the American Academy of Ophthalmology.

Results: This study included 318 eyes of 237 patients up to May 2025. Mean baseline IOP and medication use were 17.2 ± 5.3 mmHg and 2.1 ± 1.1 , respectively, and were significantly reduced to 14.1 ± 3.9 mmHg and 1.3 ± 1.4 medications ($p < 0.001$) at the last available follow-up (mean: 20.4 ± 7.9 months). Medication-free eyes increased from 7.0% ($n=22$) at baseline to 42.8% ($n=134$) postoperatively. Success was achieved in 61.9% of eyes ($n=197$) at postop. Intraoperative complications occurred in 0.3% of cases ($n=1$), and postoperative complications in 2.2% of cases ($n=7$).

Conclusions: Canaloplasty performed via an ab-interno approach reduced IOP and medications in patients with primary and secondary open-angle glaucoma.

Abstract No.: 208341

Risk Factors for Visual Field Progression in Primary Angle Closure Disease Over 10 Years: The CUPAL Study

First Author: Ruyue **SHEN**

Co-Author(s): Poemen **CHAN**, Carol **CHEUNG**, Annie **LING**, Clement **THAM**

Purpose: To identify associated long-term risk factors of visual field (VF) progression among eyes of primary angle closure disease (PACD), including primary angle closure suspect (PACS), primary angle closure (PAC), and primary angle closure glaucoma (PACG).

Methods: PACD eyes with at least a ten-year follow-up duration were included. VF was tested every 6 months using a 24-2 pattern standard on the Humphrey Field Analyzer. The initial intraocular pressure (IOP) fluctuation and initial visual field index (VFI) slope were calculated based on the first-year follow-up data. Univariable and multivariable Cox proportional hazards regression models were calculated to determine potential risk factors associated with VF progression.

Results: Forty out of 129 (31.0%) eyes with PACD developed VF progression, including 2 out of 11 (18.2%) PACS eyes, 9 out of 52 (17.3%) PAC eyes, and 29 out of 66 (43.9%) PACG eyes. In multivariable Cox models, longer axial length (AL) at baseline, more advanced disease at baseline, higher initial IOP fluctuation, and steeper initial VFI slope were associated with VF progression in PACD eyes (all $P \leq 0.031$). Among PACG eyes, higher IOP fluctuation and steeper initial VFI slope were associated with glaucoma progression. Among PACS/PAC eyes, a steeper initial VFI slope was associated with VF progression ($P \leq 0.008$).

Conclusions: Larger initial IOP fluctuation, steeper initial VFI slope, longer baseline AL, and more advanced disease at baseline were associated with a higher risk of VF progression among PACD, highlighting the importance of tailored management strategies for patients with different severity and refraction.

Abstract No.: 201455

Serum Proteomic Profiles Associated With Inner Retinal Biomarkers and Intraocular Pressure: A Preliminary Proteomics Analysis From the UK Biobank

First Author: Ya Yuan Rachel **LEUNG**

Co-Author(s): Yonglin William **WU**

Purpose: Glaucoma is associated with intraocular pressure (IOP), which relates to inner retinal changes. We used an agnostic approach to identify proteins associated with IOP and inner retinal structural biomarkers associated with glaucoma.

Methods: We analyzed proteomic profiles linked to IOP (corneal compensated, $n=12,826$) and inner retinal biomarker (macular retinal nerve fiber layer

thickness (mRNFL, $n=5,263$), and macular ganglion cell inner plexiform layer thickness (mGCIPL, $n=5,263$), in the UK Biobank. Serum proteomic data ($n=2,923$ proteins), obtained using Olink technology and expressed as normalized protein expression units, were evaluated via multivariable-adjusted linear regression. Multivariable models were adjusted for demographic, biochemical, and clinical covariates. We used the linear mixed model testing method to adjust for multiple protein comparisons.

Results: Of ten proteins associated with IOP, five were related to extracellular matrix remodeling: opticin ($\beta=0.37$; CI: 0.22, 0.52), MMP12 ($\beta=-0.13$; CI: -0.45, -0.17), alpha-L-fucosidase1 ($\beta=0.19$; CI: 0.11, 0.27), stanniocalcin-2 ($\beta=0.67$; CI: 0.40-0.93), endothelin-converting enzyme1 ($\beta=0.48$; CI: 0.29, 0.68), and three were related to immune modulation: lymphotactin ($\beta=-0.27$; CI: -0.40, -0.15), KIR2DL3 (NK cell inhibitor; $\beta=-0.22$; CI: -0.32, -0.13), LILRB4 (inhibitory immune receptor; $\beta=-0.38$; CI: -0.54, -0.21). Of six proteins associated with mGCIPL and ten proteins associated with mRNFL, two shared proteins were related to immune regulation (SIGLEC9 (immunoregulatory receptor; mGCIPL $\beta=1.51$; CI: 0.87, 2.15; mRNFL $\beta=1.11$; CI: 0.63, 1.57)) and proteostasis (CREBZF (transcriptional regulator; mGCIPL $\beta=2.14$; CI: 1.16, 3.05; mRNFL $\beta=1.91$; CI: 1.21, 2.61)). Additionally, four other proteins were associated with immune regulation (TIMD4, BLNK, C1RL, and FGL1), and proteostasis (SUMF2, CSTB, CTSL, and PDIA3) respectively.

Conclusions: This study highlights proteins linked to IOP and inner retinal homeostatic mechanisms, which have the potential to serve as biomarkers that modulate genetic predispositions to glaucoma. Future protein set enrichment analysis could shed light on pathways associated with the identified proteins.

Abstract No.: 206715

Sleep Apnoea in Normal Tension Glaucoma Chinese Patients That Progressed Despite Achievements of Treatment Target Eye Pressure: A Case Series

First Author: Nancy Shi Yin **YUEN**

Purpose: To evaluate sleep apnoea in normal tension glaucoma patients with achieved target intraocular pressure reduction.

Methods: This study included normal tension glaucoma patients who showed visual field progression despite achieving a 25–30% target eye pressure with treatment. All patients were followed by the author, and detailed histories for systemic cardiovascular and other NTG risk factors revealed none. Full polysomnography was performed and reported by respiratory physicians or ENT specialists.

Results: Over 75% (25/33) of patients were diagnosed with moderate to severe obstructive sleep apnoea.

Most were non-obese, without daytime somnolence; only three reported snoring. A high proportion also had high myopia (23/33), suggesting increased optic nerve vulnerability in myopic patients.

Conclusions: Prevalence of moderate to severe obstructive sleep apnoea is noted to be very high in our series of Chinese Normal tension glaucoma patients with well-lowered intra-ocular pressure. Patients' history, symptoms, body build, and snoring history do not point to sleep apnoea. It is advisable to advise patients for a polysomnography in treating those NTG Chinese patients with progression before embarking on further invasive procedures to lower an already well lowered intra-ocular pressure. Besides, it is beneficial for these moderate or severe sleep apnoea patients too to lower their other cardiovascular disease risk with our help in picking them up and receiving OSA treatment which is well documented in medical literature.

Abstract No.: 205751

Sleep Pattern, Visual Field Loss, and Structural Damage in Older Adults With Glaucoma: Insights From EGSS China and NHANES 2005–2008

First Author: Jingjing **HUANG**

Co-Author(s): Zhonghua **LUO**

Purpose: To investigate sleep patterns in older adults with glaucoma and evaluate their associations with structural and functional glaucomatous damage.

Methods: We analyzed data from the Elderly Glaucoma and Sleep Study (EGSS) in China ($n = 200$) and the 2005–2008 National Health and Nutrition Examination Survey (NHANES) in the United States ($n = 3317$). All participants were aged 60 years or older and underwent ophthalmic and systemic assessments. Sleep patterns were evaluated using standardized questionnaires and wearable devices, and multivariable regression models were applied to examine associations between sleep disturbances and demographic, clinical, and ocular factors.

Results: In NHANES, older adults with glaucoma reported more frequent sleep disturbances than controls, including higher rates of sleep trouble (36.2% vs. 28.5%, $P = 0.014$), difficulty falling asleep (47.5% vs. 38.1%, $P = 0.003$), and difficulty maintaining sleep (51.1% vs. 46.9%, $P = 0.023$). In EGSS, patients with primary open-angle glaucoma (POAG) showed poorer sleep quality, longer and higher proportions of light sleep, and a lower 6-sulfatoxymelatonin/creatinine ratio than controls (all $P < 0.05$), while no significant differences were found for primary angle-closure glaucoma. In multivariable analyses, depressive symptoms, thinner peripapillary retinal nerve fiber layer, and reduced optic nerve head vessel density were independently associated with worse sleep outcomes in POAG.

Conclusions: Older adults with glaucoma, particularly those with POAG, exhibit a higher prevalence of sleep disturbances, including increased light sleep duration and altered melatonin metabolism. In POAG, poor sleep quality was closely associated with glaucomatous structural damage and visual field loss.

Abstract No.: 204559

Stereophotographic Assessment of Intraocular Pressure Reduction in Myopic Eyes With Glaucoma-Compatible Optic Neuropathy

First Author: Yang **ZHANG**

Co-Author(s): Ailing **BIAN**, Gangwei **CHENG**, Lue **LI**, Qi **ZHOU**

Purpose: To evaluate the clinical significance of intraocular pressure (IOP) reduction in patients with glaucoma-compatible optic neuropathy in myopia (GCON-M) and to determine whether optic disc and functional changes represent true glaucomatous damage or benign anatomic variants.

Methods: The eye with the worse baseline VF mean deviation received IOP-lowering treatment targeting a 30% reduction, while the fellow eye served as an untreated control. Participants underwent serial VF testing and stereophotographic imaging of the optic nerve head over a median follow-up of 48 months. Structural and functional progression was compared between the treated and control eyes.

Results: Among 82 eyes analyzed, 4 treated eyes (9.7%) and 5 control eyes (12.5%) showed progression. Although treated eyes achieved a mean IOP reduction of 31.1%, no significant differences in VF outcomes or optic disc morphology were observed between groups. IOP-lowering treatment was not associated with a significant reduction in the risk of visual field progression (HR = 1.04; 95% CI, 0.68–1.37; P = 0.88). Kaplan-Meier survival analysis indicated no significant difference in progression-free survival (P = 0.758), neither structural change (P = 0.496) nor disc hemorrhage (P = 0.524) significantly influenced progression-free survival.

Conclusions: In this cohort of young patients with GCON-M, no statistically significant differences were observed between treated and untreated eyes despite a substantial IOP reduction. These results should not be interpreted as evidence that IOP reduction is ineffective, but rather highlight the need for larger, prospective studies. The findings suggest that the natural history of GCON-M may differ from classical glaucoma and warrant cautious monitoring and individualized management.

Abstract No.: 206020

Subconjunctival Injection of Mitomycin C for Mitigating the Hypertensive Phase in Ahmed Glaucoma Valve Implantation

First Author: Shivam **GUPTA**

Co-Author(s): Devendra **MAHESHWARI**, Nimrita **NAGDEV**, Madhavi **PILLAI**

Purpose: To assess the safety and efficacy of postoperative subconjunctival injection of Mitomycin C for the hypertensive phase in Ahmed glaucoma valve implantation.

Methods: Sixty-three refractory glaucoma patients underwent Ahmed Glaucoma Valve (AGV) implantation. Thirty-two consecutive patients received subconjunctival 0.2 µg/mL Mitomycin C (MMC) injections at weeks 1 and 4 postoperatively (MMC group), compared to thirty consecutive patients undergoing standalone AGV (No MMC group). The primary outcome was the incidence of HP, defined as intraocular pressure (IOP) > 21 mmHg within 6 months postoperatively. Secondary outcomes included intraocular pressure (IOP), best-corrected visual acuity (BCVA), number of antiglaucoma medications (AGMs), complications, secondary interventions, and surgical success. All patients were evaluated on postoperative days 1, 7, and 1, 2, 3, 6 months.

Results: In this study, 37.5% in the MMC group and 53.3% in the No MMC group exhibited HP (p=0.21). In the MMC and No MMC groups, mean (SD) IOP reduced from 38.84 ± 11.12mmHg and 35.17 ± 12.56mmHg to 15.38 ± 3.25mmHg and 17.63 ± 5.53mmHg, respectively, by 6 months (p=0.256). AGM decreased from 2.97 ± 0.93 to 0.72 ± 0.68 and 2.83 ± 0.91 to 1.50 ± 0.94 in the MMC and No MMC groups, respectively, by 6 months (p<0.001). By criteria 1 (IOP reduction >20% from baseline and between 6 to 21 mmHg) and criteria 2 (IOP reduction >25% and between 6 to 18 mmHg), the success rate was 87.5 % and 75.0% in the MMC group and in the No MMC group, 70.0% and 60% respectively.

Conclusions: Post-operative subconjunctival MMC injection is associated with a lower incidence of hypertensive phase following AGV and decreases the need for antiglaucoma medications.

Abstract No.: 205937

Surgical Outcomes of Gonioscopy-Assisted Transluminal Trabeculotomy in High Myopia Versus Non-High Myopia With Open-Angle Glaucoma

First Author: Nimrita **NAGDEV**

Co-Author(s): Devendra **MAHESHWARI**, Madhavi **PILLAI**

Purpose: To compare the safety and efficacy of gonioscopy-assisted transluminal trabeculotomy in open-angle glaucoma associated with high myopia.

Methods: A prospective, interventional and comparative study included 36 high myopia (group 1) and 40 non-high myopia (group 2) patients with open-angle glaucoma. Combined gonioscopy-assisted transluminal trabeculotomy with phacoemulsification was performed in both groups. Baseline characteristics like Intraocular pressure (IOP), best corrected visual acuity (BCVA) and anti-glaucoma medications (AGMs) were compared. Data were collected at 2 weeks, 1 month, 3, 6 and 12 months. Surgical success was defined as IOP ≤ 21 / ≤ 18 / ≤ 15 mmHg with > 20%/25%/30% reduction from baseline, respectively (Criteria 1, 2 and 3). Complications, secondary interventions and surgical risk factors were also analyzed.

Results: The mean (SD) IOP (mmHg) decreased from 20.56 ± 4.71 to 13.32 ± 5.02 and from 19.33 ± 4.15 to 12.94 ± 3.48 in groups 1 and 2 respectively at the end of 12 months ($p < 0.001$). AGM reduced from 2.11 ± 0.89 to 0.36 ± 0.95 and 1.63 ± 0.87 to 0.06 ± 0.24 in group 1 and 2 respectively at 12 months ($p < 0.001$). Success rate was 84.0%, 69.3% and 43.5% by criteria 1, 2, and 3, respectively, in group 1. In group 2, it was 87.5%, 74.3% and 61.3%. Micro hyphemas were seen in 18 patients (8 in group 1, 10 in group 2), and macro hyphemas were seen in 7 patients (3 in group 1, 4 in group 2). 11 had IOP spikes (6 group 1, 5 group 2). AC was done in 4 patients (2 in each group).

Conclusions: Combined Gonioscopy-assisted transluminal trabeculotomy with phacoemulsification is a safe and effective procedure in open-angle glaucoma associated with high myopia. It showed similar outcomes in terms of IOP and AGM reduction to the control group at 12 months.

Abstract No.: 204604

Surgical Outcomes of Phacoemulsification Followed by KDB Goniotomy or Trabeculectomy in Patients With Moderate to Severe Primary Angle Closure Glaucoma

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Co-Author(s): Dan **HU**, Jing **WU**, Xiaxia **YANG**, Jian **ZHOU**

Purpose: This research was designed to compare the efficacy and safety of phacotrabeculectomy (phaco-trab) versus phacoemulsification combined with Kahook Dual Blade goniotomy (phaco-KDB) in patients with moderate to severe primary angle-closure glaucoma (PACG).

Methods: This single-center, non-randomized retrospective cohort study included 77 eyes from 74 PACG patients with concurrent cataract, who underwent either phaco-trab (40 eyes, 39 patients) or phaco-KDB (37 eyes, 35 patients). All patients had moderate-to-severe visual field (VF) defects and were using ≥ 2 topical intraocular pressure (IOP)-lowering medications preoperatively. Changes in best-corrected

visual acuity (BCVA), IOP, medication use, mean deviation (MD), progression of VF, and complications were compared between the two groups.

Results: The mean follow-up duration was 13.5 ± 4.1 months (phaco-trab) and 12.9 ± 3.9 months (phaco-KDB). Postoperative BCVA improved in both groups, with no significant intergroup difference. The baseline IOP was 30.29 ± 7.69 mmHg in the phaco-trab group, and 28.20 ± 4.70 mmHg in the phaco-KDB group, which decreased to 15.64 ± 3.22 mmHg and 17.55 ± 3.34 mmHg, respectively ($P = 0.041$), and the phaco-KDB group required more medications ($P = 0.027$) at the last follow-up. The qualified success rates were 87.5% (phaco-trab) versus 83.8% (phaco-KDB) ($P = 0.604$). No statistically significant progression of VF defects and no serious intraoperative or postoperative complications were noted.

Conclusions: Both KDB goniotomy and trabeculectomy, when combined with phacoemulsification, effectively improve visual acuity, reduce IOP, and stabilize VF. Phaco-KDB is an effective ab interno procedure that achieves a comparable success rate to phaco-trab. Its minimally invasive nature may delay or obviate filtration surgery, simplify the procedure, and offer faster visual rehabilitation.

Abstract No.: 201787

Surgical Outcomes of Trabecular Micro-Bypass Minimally Invasive Glaucoma Surgery in Eyes With High Myopia: A Multi-Centre Study.

First Author: Shi Qi, Natalie **WONG**

Co-Author(s): Bryan Chin Hou **ANG**, Rachel S **CHONG**, Hla Myint **HTOON**, Mitchell **LAWLOR**, Prasanna Venkatesh **RAMESH**

Purpose: To explore the outcomes of trabecular bypass minimally invasive glaucoma surgery in highly myopic (HM) patients.

Methods: A retrospective, observational multicentre study of HM eyes (phakic refractive spherical equivalent $\leq -6D$ or axial length $\geq 26mm$) with mild-moderate primary open-angle glaucoma or ocular hypertension that received iStent injects, or Hydrus Microstents was performed between January 2019 and December 2023.

Results: 252 eyes (207 subjects) across three tertiary ophthalmology centres were enrolled. At 24 months post-surgery, $\geq 20\%$ intraocular pressure (IOP) reduction from baseline with and without glaucoma medications was achieved in 35.8% and 13.4% of eyes in the Hydrus group, and 30.0% and 6.67% of eyes in the iStent group respectively ($p = 0.502$; $p = 0.223$); drop-freedom was achieved in 48.7% and 38.5% of eyes in the Hydrus and iStent groups respectively ($p = 0.248$). IOP $\leq 15mmHg$ with and without glaucoma medications was achieved in 55.2% and 28.4% of eyes

in the Hydrus group, and 63.3% and 21.7% of eyes in the iStent group, respectively ($p=0.391$; $p=0.408$). Kaplan-Meier analysis showed no significant difference between groups for time to failure of maintaining $\geq 20\%$ IOP reduction with (12-month cumulative risk: iStent=89.8%, Hydrus=83.1%, $p=0.0724$) and without glaucoma medications (iStent=92.2%, Hydrus=86.3%, $p=0.0998$). Surgical success, per American Academy of Ophthalmology criteria, was achieved in 61.2% of Hydrus eyes and 53.3% of iStent eyes.

Conclusions: The iStent inject and Hydrus Microstent may achieve lower IOP reduction in HM eyes with comparable complication rates to non-HM eyes. Outcomes appear similar between both implants.

Abstract No.: 206892

Surgical Outcomes of a Non-Valved Glaucoma Drainage Device Compared With Ahmed Glaucoma Valve in Malaysia

First Author: Suyi **SIOW**

Co-Author(s): Roslinah **MUJI**

Purpose: Aurolab Aqueous Drainage Implant (AADI), a prototype based on the Baerveldt Glaucoma Device (BGD), was introduced to Malaysia around 2018. The study aims to examine the efficacy and safety of AADI against Ahmed Glaucoma Valve (AGV) in the management of refractory glaucoma at one year.

Methods: Retrospective analysis of glaucoma patients who either underwent AADI or AGV from January 2021 to December 2022 in Hospital Kuala Lumpur and Hospital Selayang. Primary outcome measures were success rates (intraocular pressure; IOP 6 to 18mmHg) and numbers of post-operative antiglaucoma medications (AGM). Secondary outcome measures include early and late post-operative complications.

Results: Thirty-one patients underwent AADI, while 23 patients underwent AGV implantation. AADI patients were observed to have a significantly lower IOP at 3 and 6 months ($p<0.001$ and $p<0.003$). At 12 months, overall success was 90.3% in the AADI and 65.2% in the AGV group, respectively ($p=0.093$). The AADI group had a significantly lower number of AGMs at 12 months post-operation ($p=0.028$). There were no significant differences in early and late post-operative complications.

Conclusions: AADI is shown to have higher overall success rates while requiring a smaller number of AGMs as compared to AGV. They also have a similar safety profile.

Abstract No.: 205235

Sustained Intraocular Pressure Lowering With a Suprachoroidal Injection of Nanoliposomal Latanoprost in the Rabbit

First Author: Phey Feng **LO**

Co-Author(s): Joanna **BUSOY**, Shamira **PERERA**, Sai Bo **TUN**, Amutha Barathi **VELUCHAMY**, Tina **WONG**

Purpose: Sustained drug delivery allows for maintenance of optimal therapeutic concentrations, increasing bioavailability to targeted tissues, and addressing patient compliance. In glaucoma, the suprachoroidal space is an established anatomical space that can be utilised to lower IOP. Our study investigated the safety and efficacy of a latanoprost-loaded lipid nanoparticle system injected into the suprachoroidal space of a rabbit to lower IOP.

Methods: Dutch-Belt rabbits were randomised to receive a suprachoroidal injection of either a nanoliposomal latanoprost (150 μ l of 2mg/ml) or a blank liposomal nanocarrier. Baseline IOP was recorded before treatment and subsequently measured at set intervals until IOP returned to baseline. Anterior segment photographs, anterior segment optical coherence tomography (AS-OCT), OCT of the macula, and pattern electroretinography (pERG) were all done for monitoring.

Results: There was a 28.3% (5.1 ± 2.12 mmHg) decrease in IOP from baseline at 8 hours post nanoliposomal latanoprost injection, reaching a maximum of 40% (7.7 ± 2.3 mmHg) decrease on Day 5. Significant IOP lowering of at least 20% reduction ($p<0.01$) was sustained until Day 56 before gradually returning to baseline at Day 90. In comparison, eyes that received the blank liposome recorded a maximum IOP lowering of 7.7% (0.9 ± 0.9 mmHg) at Day 7 before returning to baseline by Day 28. Clinical monitoring did not show any adverse events in either group.

Conclusions: The suprachoroidal space is a feasible space that can be explored as an alternative anatomical placement for sustained drug delivery in the treatment of glaucoma.

Abstract No.: 204352

The Analysis of Angle Dysgenesis in Juvenile-Onset Open-Angle Glaucoma

First Author: Huaizhou **WANG**

Co-Author(s): Jinghong **SANG**, Weijia **ZHANG**

Purpose: The purpose of this study was to evaluate different types of angle dysgenesis and clinical features in juvenile-onset open-angle glaucoma patients in China.

Methods: This prospective study recruited consecutive patients diagnosed with JOAG. Patients were classified based on their iris and angle morphology. Age, age of onset, sex, IOP, visual field defect (MD), and vertical C/

D were analyzed and correlated with the gonioscopic features among JOAG patients. All statistical tests were performed using the software SPSS 20.0.

Results: Out of the 202 unrelated patients with JOAG, the study included 139 JOAG patients who had all the phenotypic characteristics required for the study. Only the right eye was included in the analysis. 68% patients had normal angles, while 21% patients had angle dysgenesis high iris insertion (HII), 11% patients had prominent iris processes (PIP). 50% patients had normal iris crypt (NIC), while prominent iris crypt (PIC) was seen among 32% patients, and absence of iris crypt (AIC) among 18% patients. Distribution proportions of the four JOAG clusters: Each cluster accounted for 14.4% to 45.3% of the cohort. Predictor importance analysis of the 4 variables revealed that iris features contributed more significantly to classification than gonioscopic patterns.

Conclusions: Some of the JOAG patients in China have angle dysgenesis and / or abnormal iris features. Cluster analysis extracted four subgroups of the JOAG phenotype that has clinical and prognostic significance and may potentially be helpful in treating JOAG patients in the clinics.

Abstract No.: 202712

The Effect of Epigallocatechin-3-Gallate (EGCG) on Matrix Metalloproteinase-3 (MMP-3) Expression and Fibroblast Migration in Human Tenon Fibroblasts as a Model of Post-Trabeculectomy Wound Healing In Vitro

First Author: Ruth **ANASTASIA**

Co-Author(s): Evelyn **KOMARATIH**, Yulia **PRIMITASARI**

Purpose: This study aimed to evaluate the effects of Epigallocatechin-3-Gallate (EGCG) on Matrix Metalloproteinase-3 (MMP-3) expression and fibroblast migration in human tenon fibroblasts (HTFs) as a model for post-trabeculectomy wound healing in vitro.

Methods: This in vitro true experimental study involved HTF cell cultures divided into four groups: a negative control group (untreated HTFs), a positive control group (treated with MMC 0.4 mg/mL), an EGCG group (treated with 50 μ M EGCG), and a combination group (treated with 50 μ M EGCG and 0.3 mg/mL MMC). Antifibrotic effects were assessed by measuring MMP-3 expression through immunofluorescence and analyzing cell migration rates using a scratch wound assay at 24, 48, and 72 hours.

Results: A significant difference in MMP-3 expression was observed among the four groups ($p < 0.001$). The combination group (50 μ M EGCG and 0.3 mg/mL MMC) showed the lowest MMP-3 expression (19305.54 ± 1630.63), followed by the MMC 0.4 mg/mL group (22876.45 ± 1263.72), the EGCG 50 μ M group (40182.18 ± 2498.39), and the control group (74654.72 ± 3269.02). There was a significant difference among

the four groups at 24, 48, and 72 hours of observation ($p < 0.001$). Migration analysis showed that the combination group had the largest remaining wound area (78.72%) at 72 hours, indicating the lowest fibroblast migration rate, followed by the MMC, EGCG, and control groups.

Conclusions: The findings suggest that both EGCG and MMC, individually and in combination, significantly reduce MMP-3 expression and inhibit fibroblast migration. The combination of EGCG and MMC demonstrated the greatest antifibrotic effect, supporting its potential as a safer alternative adjuvant therapy for reducing post-trabeculectomy fibrosis with minimized side effects.

Abstract No.: 200447

The Effectiveness and Safety of Kahook Dual Blade Assisted Ab Interno Trabeculectomy in Secondary Open-Angle Glaucoma

First Author: Xiang **FAN**

Co-Author(s): Lingling **WU**

Purpose: To explore the effectiveness and safety of Kahook Dual Blade (KDB) assisted Ab interno Trabeculectomy (ABiT) in secondary open-angle glaucoma (SOAG).

Methods: Uncontrolled SOAG patients were consecutively enrolled. KDB-assisted ABiT was performed, and phacoemulsification and intraocular lens implantation (Phaco+IOL) were combined for patients with cataract. Intraocular pressure (IOP) and types of anti-glaucoma medications at different times were compared by the Wilcoxon signed-rank test. Relative success rate was defined as IOP-reduction $\geq 30\%$ or type of anti-glaucoma medication's reduction ≥ 1 at 12 months postoperatively. Safety assessments included anterior chamber hemorrhage within 1 week, IOP Spike within 1 month, and other adverse events within 12 months postoperatively.

Results: 13 patients consisted of 3 pseudoexfoliation syndrome, 3 steroid-induced glaucoma, 3 herpes-zoster-induced SOAG, 2 Posner-Schlossman syndrome, 1 SOAG after silicone-oil-removal and 1 uveitic glaucoma had one-year-follow-up with 3.3 ± 0.2 type of medications and 33.3 ± 4.0 mmHg in IOP preoperatively. 9 patients underwent ABiT, 4 patients combined with Phaco+IOL. Average IOPs on postoperative day 1, week 1, month 1, month 6, and month 12 were 23.9 ± 3.8 mmHg, 17.4 ± 3.4 mmHg, 15.0 ± 1.7 mmHg, 17.8 ± 0.9 mmHg, and 14.4 ± 0.9 mmHg while average types of medications were 1.3 ± 0.1 , 2.3 ± 0.2 , 2.1 ± 0.3 , 1.6 ± 0.3 , and 1.7 ± 0.4 respectively, both significantly lower than preoperative ($p < 0.05$). With 100% relative success rates, there were not any complications except for 4 IOP spikes.

Conclusions: KDB assisted ABiT demonstrated well IOP reduction and could reduce the use of anti-glaucoma medication significantly in SOAG.

Abstract No.: 208346

The Efficacy and Safety of Ultrasound Cyclo Plasty in the Treatment of Secondary Glaucoma in Nanophthalmos

First Author: Yuxia YANG

Co-Author(s): Ming-ming YANG

Purpose: To investigate the efficacy and safety of Ultrasound Cyclo Plasty (UCP) in the treatment of secondary glaucoma in nanophthalmos that is uncontrolled by medication.

Methods: All eyes underwent UCP treatment (10 sectors). The mean preoperative intraocular pressure (IOP) was 45.7 ± 5.2 mmHg, with a mean of 5 types of IOP-lowering medications used. All patients subsequently underwent sequential secondary surgery, comprising phacoemulsification, intraocular lens (IOL) implantation, and goniosynechialysis, within 1-2 months after the UCP procedure. Patients were followed up for 6-24 months, with monitoring of visual acuity, IOP, anterior segment OCT findings, complications, and medication use.

Results: IOP: IOP dropped markedly on day 1 post-op, with a 100% control rate. Visual Acuity: Mean vision improved from the first day. Anterior Segment OCT: Showed clear chamber deepening and partial angle opening. Complications: Three transient choroidal detachments resolved spontaneously; two mild inflammations subsided within a week; three cases of pupil deformation occurred without lasting effects. Medication: Only one eye required one extra drug at six months; all others maintained normal IOP drug-free.

Conclusions: In nanophthalmic glaucoma, single UCP achieved complete IOP control without serious complications. Its non-invasive nature avoids the high risks of conventional surgery, making it ideal for these cases. Subsequent cataract surgery (phaco + IOL + GSL) provided markedly better outcomes than traditional methods.

Abstract No.: 201309

The Mechanism of Elevated Intraocular Pressure-Induced Retinal Ganglion Cell Necroptosis in Glaucoma via TRPV1-Mediated Regulation of RIPK1 Phosphorylation

First Author: Xiaoyu ZHUANG

Co-Author(s): Chenyu FU, Lin FU, Shumeng YAO, Qiaoping YOU, Yuanbo LIANG

Purpose: This study aimed to investigate the hypothesis that elevated intraocular pressure (IOP) induces

retinal ganglion cell (RGC) necroptosis through TRPV1-mediated, calcium-dependent RIPK1 phosphorylation.

Methods: Aimed to investigate the role of TRPV1 and downstream signaling pathways in glaucomatous neural injury by establishing both acute and chronic ocular hypertension animal models. IOP changes were monitored and compared between models. Parallel in vitro experiments involved an R28 retinal cell model subjected to high-pressure insult. Multiple techniques were employed, including immunofluorescence, Western Blot, qPCR, OCT, and ERG, to assess the expression and phosphorylation levels of key molecules such as TRPV1, CaMKII δ , and components of the necroptotic pathway (RIPK1, RIPK3, and MLKL).

Results: One week after induction of acute ocular AOH, a significant reduction in RGC density was observed in the AOH group compared to controls ($P < 0.05$), accompanied by significant microglial activation and proliferation ($P < 0.05$). Molecular analysis revealed a marked upregulation in the expression of TRPV1, CaMKII δ , and key necroptosis pathway proteins (RIPK1, RIPK3, and MLKL) in the AOH group ($P < 0.01$). Notably, treatment with TRPV1 and CaMKII δ inhibitors significantly downregulated the expression of necroptosis-related proteins and attenuated RGC loss. OCT imaging showed a reduction in the thickness of the INL and GCL in AOH retinas, which was significantly ameliorated by inhibitor treatment. Furthermore, ERG recordings indicated a pronounced decrease in response amplitude in the AOH group, with partial functional recovery following inhibitor administration.

Conclusions: We conclude that TRPV1-mediated RIPK1 phosphorylation is a key mechanism in pressure-induced RGC necroptosis, offering a promising new strategy for glaucoma neuroprotection.

Abstract No.: 202325

The Role of Scleral Structural Remodeling in Reducing Optic Disc Stress and Deformation Under High Intraocular Pressure and Its Optic Neuroprotective Mechanism

First Author: Liao LI

Co-Author(s): Duan XUANCHU

Purpose: To develop a rabbit eye finite element model for optimizing scleral excision-thinning parameters, establish hypertensive and scleral excision-thinning models to validate reduced optic disc stress and deformation, and analyze molecular mechanisms underlying scleral remodeling-mediated optic nerve protection, thereby proposing a novel glaucoma therapy.

Methods: A finite element model of the rabbit eye was developed using FEBio to simulate the biomechanical effects of various excision patterns. Chronic ocular hypertension was induced in New Zealand rabbits by anterior chamber injection of photocurable silk

fibroin hydrogel, with subsequent surgical excision-thinning of the scleral tissue. Intraocular pressure, lamina cribrosa depth, and photopic negative response (PhNR) were systematically measured and compared across experimental groups. Histological evaluation included TUNEL staining for apoptosis assessment, electron microscopy for ultrastructural analysis, and immunohistochemistry for detecting expression levels of FGF-2, MMP-2, TIMP-1, and TGF- β .

Results: Scleral excision-thinning significantly reduced IOP from 22.42 ± 5.62 mmHg to 15.42 ± 3.78 mmHg ($P < 0.05$), decreased lamina cribrosa depth, improved PhNR amplitude, and lowered scleral stiffness compared to the hypertension group. Structural improvements included more regular retinal cell arrangement, reduced axonal swelling, diminished myelin damage, and partial reorganization of scleral collagen fibers. Molecular analysis revealed significant downregulation of FGF-2 expression following excision-thinning, while MMP-2, TIMP-1, and TGF- β levels showed no statistically significant alterations.

Conclusions: Scleral excision-thinning effectively attenuates glaucomatous damage by reducing biomechanical strain on the optic disc and modulating extracellular matrix remodeling, representing a promising biomechanical intervention strategy for glaucoma management.

Abstract No.: 203171

The Role of eEF2 in Retinal Ganglion Cell Loss in a Glaucoma Model

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Co-Author(s): Chenyu **FU**, Lin **FU**, Yuanbo **LIANG**, Yijing **PING**, Sen **WANG**, Shumeng **YAO**, Haiyang **ZHANG**, Xiaoyu **ZHUANG**

Purpose: This study aims to investigate the role of eukaryotic elongation factor 2 (eEF2) in retinal ganglion cell (RGC) loss under elevated intraocular pressure (IOP) in a glaucoma model. We hypothesize that eEF2 signaling pathway activation contributes to RGC degeneration.

Methods: Public single-cell RNA sequencing data of adult mouse RGC (GSM3177678, GSM3177677) were analyzed for eEF2 expression. An acute glaucoma model was established in mice by anterior chamber perfusion, achieving IOP >40 mmHg. Retinal function and visual behavior were assessed, along with eEF2 pathway protein and mRNA expression. RGC loss was evaluated via immunofluorescence staining and cell counting in retinal sections. The pathway was validated in in vivo models. Through the ocular hypertension model, RGC loss and activation of the eEF2-related pathway were observed.

Results: Single-cell RNA-seq analysis revealed various RGC subpopulations, all exhibiting strong eEF2 expression, with RGC subtypes displaying elevated

levels. Transcriptome sequencing results showed that compared to the control group, the eEF2 expression was up-regulated in the high-IOP model group, with a statistically significant difference. These findings are in agreement with immunofluorescence staining data. In the glaucoma model, RGC density was significantly reduced in the mid-peripheral and peripheral retina. qPCR and WB indicated elevated eEF2 mRNA and protein levels in the high-IOP group compared to controls.

Conclusions: eEF2 is consistently expressed in RGCs and is upregulated under high-IOP. In vivo models support the involvement of the eEF2 pathway in glaucoma-related RGCs loss. Targeting eEF2 signaling may represent a potential therapeutic strategy for neuroprotection in glaucoma.

Abstract No.: 202728

The Stiffness Changes of Optic Nerve, Retina and Peripapillary Sclera in Chronic Glaucoma Model Rats Were Observed by Atomic Force Microscopy

First Author: Xu **LIU**

Co-Author(s): Huan **DU**, Yuan **HE**

Purpose: Glaucoma is a chronic, irreversible, blinding eye disease. The change of biomechanical properties of intraocular tissues in glaucoma may cause optic nerve injury. The stiffness changes of optic nerve heads (ONH), retina and peripapillary sclera (PPS) in chronic glaucoma model rats were analyzed by atomic force microscopy (AFM) nanoindentation.

Methods: Glaucoma is a chronic, irreversible, blinding eye disease. The change of biomechanical properties of intraocular tissues in glaucoma may cause optic nerve injury. In this preliminary study, the stiffness changes of ONH, retina, and PPS in chronic glaucoma model rats were analyzed by AFM nanoindentation.

Results: The corresponding YME value of ONH showed that the average elastic modulus of the control sample was 140.5Pa, and that of the 2-week high IOP model eye was 226.2Pa, indicating that the elastic modulus of the optic nerve of the 2-week high IOP rats was increased ($P < 0.01$). The corresponding YME value of retina showed that the average value of the control sample was 53.1Pa, that of the 2-week high IOP model was 42.82Pa, that of the 4-week high IOP model was 22.4Pa, and that of the 6-week high IOP model was 33.76Pa. The elastic modulus of retina of rats with high IOP at 2, 4 and 6 weeks decreased significantly ($P < 0.01$). The corresponding YME value of PPS is displayed: The average elastic modulus of the control samples was 3.98kPa, the average elastic modulus of PPS for 4 weeks of IOP was 2.44kPa, and the average elastic modulus of PPS for 6 weeks of IOP was 7.50kPa. The elastic modulus of PPS in rats with IOP was decreased ($P < 0.01$), and the elastic modulus of PPS in rats with IOP was significantly increased ($P < 0.01$).

Conclusions: AFM can be used to characterize the stiffness of intraocular tissue, but further large-scale analysis is needed. Increased YME in ONH early in glaucoma implies increased resistance to deformability of ONH and decreased YME in retina, which may reflect its inherent tissue weakness, making the retina more vulnerable to damage from high intraocular pressure. The YME of PPS decreases in the early and middle stages and increases in the late stages, which may suggest that PPs exerts a protective effect on the optic nerve by adjusting its stiffness. This study may provide a new idea for the neuroprotection of glaucoma from the aspect of biomechanics.

Abstract No.: 205188

The Threshold Value for Predicting Diurnal Intraocular Pressure Variation in Patients With Suspected Normal-Tension Glaucoma

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Purpose: To determine a threshold intraocular pressure (IOP) value that can predict diurnal IOP levels in patients suspected of normal tension glaucoma (NTG), with the goal of improving screening in resource-limited settings.

Methods: This retrospective study reviewed outpatient clinic (OPD) records and diurnal tension clinic (DTC) data collected between 2017 and 2025. Patients older than 40 years with suspected NTG were included if they had baseline IOP measured with a Goldmann applanation tonometer at the OPD and complete IOP data from a rebound tonometer (iCare®) recorded at five DTC time points. Exclusion criteria included previous glaucoma diagnosis, current glaucoma medication use or a washout period < 6 weeks, and previous glaucoma surgery or laser treatment. The optimal Goldmann applanation IOP threshold was identified using receiver operating characteristic (ROC) curve analysis with Youden's index. Logistic regression was performed to assess the association between IOP fluctuation and NTG diagnosis.

Results: A total of 125 eyes from 123 patients were analyzed. Based on diurnal IOP measurements, 109 eyes were diagnosed with NTG and 16 with primary open-angle glaucoma. ROC analysis identified a Goldmann applanation IOP cutoff of 17.0 mmHg for predicting diurnal IOP values ≤ 21 mmHg (sensitivity 77%, specificity 63%, area under the curve 0.70). Lower IOP fluctuation was significantly associated with an increased likelihood of NTG diagnosis (odds ratio 0.514, 95%CI 0.376-0.701; $P < .001$).

Conclusions: A Goldmann applanation IOP threshold of 17 mmHg may serve as a practical screening tool for predicting diurnal IOP values not exceeding 21 mmHg

in settings without access to DTCs, facilitating earlier NTG diagnosis and timely treatment.

Abstract No.: 202340

Time-Series Analysis of the Impact of Air Pollutants on Posner-Schlossman Syndrome Attacks in Hangzhou

First Author: Chenyu **FU**

Co-Author(s): Yuanbo **LIANG**, Zuowei **XIE**, Lin **FU**

Purpose: To investigate the potential association between air pollutants and the attack of Posner-Schlossman Syndrome (PSS) in Hangzhou.

Methods: Outpatient records of PSS patients from Zhejiang Eye Hospital (October 2018–October 2024) and concurrent air pollutant and meteorological data were collected. Generalized Additive Models (GAM) were employed to examine the relationship between pollutant concentrations and PSS attack counts, as well as pollutant lag effects; stratified analyses by season and gender were further performed.

Results: A total of 3,564 PSS-related outpatient visits were recorded, with 660 eligible cases (long-term Hangzhou residents with confirmed PSS onset and elevated intraocular pressure). The attack peak occurred from April to June (221 cases). The single-pollutant model showed: NO_2 had the highest risk, with significant positive correlations with PSS attack at single lags (lag0–5) and cumulative lags (lag01–07) (all $P < 0.05$), peaking at lag05 (RR=1.139, 95% CI: 1.048–1.238); O_3 was positively correlated at single lags (lag0–2) and cumulative lags (lag01–07) (all $P < 0.05$), peaking at lag04 (RR=1.065, 95% CI: 1.022–1.110); $\text{PM}_{2.5}$ and PM_{10} were positively correlated at lag2 (RR=1.074 and 1.040, respectively). For cumulative lags, $\text{PM}_{2.5}$ correlated at lag02–04, and PM_{10} at lag03. Stratified analysis revealed stronger impacts of NO_2 , $\text{PM}_{2.5}$, and PM_{10} on males, and a more pronounced effect of NO_2 in winter.

Conclusions: PSS has two annual attack peaks (April–June and October). Elevated NO_2 , O_3 , $\text{PM}_{2.5}$, and PM_{10} may be positively associated with PSS attack (with evident lag effects), among which NO_2 and O_3 show more prominent associations.

Abstract No.: 205449

To Determine the Target Intraocular Pressure That Needs to Be Achieved to Halt Disease Progression in Primary Angle Closure Glaucoma: The CUPAL Study

First Author: Alicia Hoi Ying **LIU**

Co-Author(s): Annie **LING**, Clement C. **THAM**

Purpose: To determine the target intraocular pressure (IOP) that needs to be achieved to halt disease progression in primary angle closure glaucoma (PACG).

Methods: PACG patients enrolled in the CUHK PACG Longitudinal (CUPAL) study with more than 8 years of follow-up were included in this analysis. IOP was documented every 6 months, and visual field (VF) was assessed with automated perimetry. As in the AGIS study for POAG patients, PACG subjects were categorised by the proportion of visits with IOP >18 mmHg: Group A (<20%, n=293 eyes), B (20-50%, n=86), C (50%-75%, n=24), and D (>75%, n=7). The primary VF outcome was mean deviation (MD), analysed as change from baseline. Independent-sample t-tests were used to compare VF progression between groups.

Results: A total 410 eyes from 205 PACG patients were analysed. Baseline mean age (65.25 years, p=0.247) and gender (male=29.3%, p=0.14) between < and ≥ 18 mmHg groups were insignificantly different. Over follow-up, VF stability of mean MD was observed in Groups A and B (p<0.001), while Groups C and D demonstrated progressive deterioration (Group B vs C, p=0.92; Group C vs D, p=0.06). Group-level mean IOP were 13.94, 17.05, 18.82, and 20.61 mmHg across Groups A to D, respectively. When IOP >18 mmHg in <50% of visits, VF in PACG is stabilised.

Conclusions: These findings may provide clinical guidance for long-term IOP targets in PACG.

Abstract No.: 206764

To Evaluate the Performance of a Bimodal Machine Learning Algorithm That Integrates Handheld Chromatic Pupillometry (HCP) Features With Standard Structural and Functional Clinical Metrics for the Detection of Early-Stage Glaucoma

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Co-Author(s): Eray **ATALAY**, Raymond **NAJJAR**, Mert Egemen **ÇALIŞKAN**

Purpose: To evaluate the performance of a bimodal machine learning algorithm that integrates handheld chromatic pupillometry (HCP) features with standard structural and functional clinical metrics for the detection of early-stage glaucoma.

Methods: Glaucoma patients (n=51, Age ± SD: 66.1 ± 5.9 years, 45% male) and age-matched controls (n=60, 66.4 ± 11.9 years, 55% male) were recruited for this cross-sectional study. In addition to a thorough clinical examination, participants underwent assessment with the Humphrey Field Analyzer (HFA), Optical Coherence Tomography (OCT), and HCP. Device-specific outcomes were extracted, feature importance evaluated with gradient-boosted trees, and logistic regression classifiers trained to construct single-modality (one device) and bimodal (two devices) models. Performance was assessed using the area under the receiver operating characteristic curve (AUROC), sensitivity, specificity, Akaike Information Criterion (AIC), and odds ratios (OR).

Results: Bimodal models outperformed single-modality classifiers. OCT+HCP achieved the highest performance (AUROC= 0.97, 95%CI: 0.95–1.00; sensitivity= 0.90, specificity= 0.93; AIC = 54.9). OCT+HFA yielded an AUROC of 0.93 (0.89–0.98), while HFA+HCP showed an AUROC of 0.87 (0.80–0.94). Key predictors in the OCT+HCP model were retinal nerve fibre layer thickness (OR: 0.66 (0.37–0.94)), vertical cup-to-disc ratio (OR: 6.2 (0.66–19.9)), and area under the post-illumination pupillary response ratio (OR: 0.76 (0.66–0.87)). Negative predictive values exceeded 0.99 across models, whereas positive predictive values, albeit low (0.33) due to disease prevalence, were highest in the OCT+HCP model.

Conclusions: Integrating HCP with conventional clinical modalities can improve the detection of early glaucoma. These findings underscore the potential of bimodal approaches as objective, non-invasive tools for early glaucoma stratification.

Abstract No.: 202136

Translating Neuroretinal Rim Width Into Progression Risk: A Deep Learning Framework for Normal-Tension Glaucoma

First Author: Tao **WANG**

Co-Author(s): Defu **CHEN**, Yuanbo **LIANG**

Purpose: To develop a high-precision automated model for optic disc and optic cup segmentation, establish a standardized neuroretinal rim width-based analysis system, and evaluate its value in tracking normal-tension glaucoma progression.

Methods: The TransUNet model segmented the optic disc and cup from 3,300 fundus images. Algorithm robustness was tested using coordinate transformation, rim width standard deviation, and test-retest reliability. Patients with visual field progression were classified by baseline mean deviation (MD) into early (MD>-6 dB) or moderate-to-advanced stages (MD ≤ -6 dB). Longitudinal rim width changes were quantified across eight quadrants.

Results: The model achieved cup segmentation sensitivity of 94.7% (Intersection over Union [IoU] 89.0%) and disc segmentation sensitivity of 94.2% (IoU 95.5%). Robustness testing showed a mean standard deviation of 2.64% after coordinate transformation and 1.20% on test-retest. Rim width reduction in early-stage disease was greatest in the temporal-inferior quadrant, while moderate-to-advanced disease showed significant reduction in nasal-inferior and temporal-inferior quadrants. Early-stage progression localized mainly to the temporal-superior and temporal-inferior quadrants, whereas later stages exhibited diffuse involvement. Among eyes with early visual field damage, 68.2% showed rim progression preceding functional loss, compared with 44.0% in moderate-to-advanced disease.

Conclusions: This TransUNet-based rim width analysis method for dynamic quantification of glaucomatous damage reveals distinct rim loss patterns in normal-tension glaucoma. Also, it shows structural changes often precede functional defects in early stages, offering a tool for precise diagnosis and early detection.

Abstract No.: 207272

Treatment Outcomes of Slow Coagulation Trans-Scleral Cyclophotocoagulation for Refractory Glaucoma

First Author: Shalini SHALINI

Co-Author(s): Salwa KAIDAKATH, Meena MENON

Purpose: To Evaluate the outcome and safety of slow coagulation transscleral photocoagulation (TSCPC) in patients with uncontrolled glaucoma.

Methods: Retrospective study of 58 eyes who underwent TSCPC using slow coagulation settings (power settings of 1300-1500 mW and a duration of 3500-4000 ms).

Results: The mean age was 53.86 years, and 62.1% were males. The indications for the laser included Neovascular glaucoma (34.5%), advanced. Primary open/angle closure glaucoma (19%), glaucoma secondary to vitreo-retina surgery (23.8%) or penetrating keratoplasty (23.8%). A statistically significant reduction in intraocular pressure (IOP) from 40.19 to 15.33 mmHg was noted at 6 months. Surgical success was achieved in 82.5 % at 6 months, and 75% in 26 patients followed up to 1 year. The mean antiglaucoma medications (AGM) reduced from 3.72 to 2.35 ($p < .001$). No drop in visual acuity seen in any patient. Some of the few post-procedural complications included sub-conjunctival hemorrhage, hyphema, scleritis which resolved with treatment. Hypotony was recorded in 1 patient and repeat laser was advised in 5 patients

Conclusions: Encouraging safety and efficacy were demonstrated by our study with a noteworthy decrease in IOP and AGM, with insignificant serious complications.

Abstract No.: 204575

Two-Year Outcome of Phacogoniectomy Versus Phacotrabeculectomy for Advanced Primary Angle-Closure Glaucoma With Cataract: A Randomized Controlled Trial

First Author: Yunhe SONG

Purpose: To investigate the two-year effectiveness and safety of phacogoniectomy versus phacotrabeculectomy among patients with advanced primary angle-closure glaucoma (PACG) and cataracts.

Methods: Multicenter, randomized controlled, non-inferiority trial. A total of 124 patients (124 eyes) with advanced PACG and cataracts were enrolled.

One hundred and twelve participants with 112 eyes completed the 2-year follow-up. Participants were randomly assigned in a 1:1 ratio to receive either phacogoniectomy or phacotrabeculectomy. The primary outcome was the reduction in intraocular pressure (IOP) from baseline to final visit postoperatively, for which a non-inferiority margin of 4 mmHg was evaluated. Complete success was defined as a postoperative IOP > 5 and ≤ 18 mmHg and a 20% reduction from baseline without the use of topical medications. Qualified success was similar to that of complete success, allowing the utilization of ocular hypotensive medications.

Results: After 2 years, phacogoniectomy demonstrated non-inferiority to phacotrabeculectomy in terms of IOP reduction, with mean IOP reductions of -24.9 mmHg and -24.8 mmHg ($P = 0.463$), respectively. Both groups experienced a significant reduction in the mean number of medications used postoperatively ($P < 0.001$). For surgery success, 81.4% and 84.6% patients achieved complete success in the phacogoniectomy and phacotrabeculectomy groups at 2 years, respectively ($P = 0.802$). The phacogoniectomy group had a qualified success rate of 94.9% (56 of 59 patients), whereas the phacotrabeculectomy group had a qualified success rate of 88.5% (46 of 52 patients) ($P = 0.301$). No additional adverse events or postoperative complications were observed in both groups.

Conclusions: Phacogoniectomy was non-inferior to phacotrabeculectomy in terms of IOP reduction for advanced PACG and cataracts in a two-year follow-up period. The extended 2-year follow-up results suggested that phacogoniectomy could be considered as a first-line treatment in these patients.

Abstract No.: 202491

Two-Year Outcomes of Gonioscopy-Assisted Transluminal Trabeculotomy (GATT) in Early Childhood Glaucoma in India

First Author: Anchal GERA

Co-Author(s): Sushmita KAUSHIK, Surinder PANDAV, Manik SARDANA, Vyshak SURESH

Purpose: To evaluate the safety and efficacy of Gonioscopy-Assisted Transluminal Trabeculotomy (GATT) in childhood glaucoma and compare outcomes between primary congenital glaucoma (PCG) and non-PCG eyes.

Methods: A prospective cohort study included 40 eyes of 32 patients (< 2 years) with glaucoma treated between January 2021–December 2023 at a tertiary centre in North India, with ≥ 24 months follow-up. Of these, 32 eyes had PCG and 8 had glaucoma associated with non-acquired anomalies. All underwent GATT with 5-0 polypropylene suture cannulation of Schlemm's canal. Surgical success was defined as IOP ≤ 21 mmHg (criterion A) or ≤ 18 mmHg (criterion B) with $\geq 20\%$ reduction from baseline, without additional surgery or

increased medications. Secondary outcomes included the extent of angle treated and complications.

Results: Mean age at surgery was 12.13 ± 14.04 months. Mean IOP reduced from 24.07 ± 9.8 to 15.96 ± 5.4 mmHg at 2 years (33.7% reduction), with medication use declining from 1.78 ± 0.8 to 0.92 ± 1.1 (45% reduction). In PCG eyes, cumulative success rates were 93.75%/87.5% at 1 year and 80.7%/76.9% at 2 years (criteria A/B). Complete 360° GATT achieved 100% and 95% success at 1 year. Non-PCG eyes showed significantly lower success (62.5% at 2 years); none achieved complete 360° treatment. Hyphema occurred in 52.5% and resolved spontaneously in 90.4%. No sight-threatening complications occurred.

Conclusions: GATT demonstrated high safety and efficacy, particularly in PCG. Outcomes correlated with angle extent, highlighting advantages over filtering surgery by preserving conjunctiva for future interventions.

Abstract No.: 203437

Two-Year Outcomes of Goniotomy Following Failed Surgery for Glaucoma: A Multicenter Study

First Author: Dilimulati **XIAOKAITI**

Co-Author(s): Zige **FANG**, Xiulan **ZHANG**

Purpose: To evaluate the two-year outcomes of goniotomy (GT) in patients with prior failed surgery for glaucoma.

Methods: This prospective multicenter study enrolled patients undergoing GT after previous failed glaucoma surgery. Outcome measures included intraocular pressure (IOP) change, medication use, treatment success rate, and postoperative complications over 24 months. Complete success was defined as an IOP of 6-18 mmHg with $\geq 20\%$ reduction from baseline, without medication. Qualified success required similar IOP control with medication. Logistic regression models identified factors affecting surgical success.

Results: A total of 61 eyes of 51 patients were included, with 20 eyes (17 patients) diagnosed with primary open-angle glaucoma and 41 (34 patients) with primary angle-closure glaucoma as their primary condition. The mean age was 60.6 ± 10.6 years, with 30 (58.7%) females. Among these, 26 (42.6%) achieved complete success, and 52 (85.2%) achieved qualified success. The mean IOPs dropped from 26.4 ± 6.2 mmHg preoperatively to 16.3 ± 4.8 mmHg at 24 months (35.8% reduction; $P < 0.001$). Anti-glaucoma medications decreased from 2.6 ± 1.2 to 1.4 ± 1.4 over 24 months ($P < 0.001$). The overall best-corrected visual acuity was stable during the follow-up period ($P = 0.987$). The primary complications observed included hyphema ($n=7$), IOP spikes ($n=6$), mild corneal edema ($n=3$), and shallow anterior chamber ($n=2$), all within the first postoperative month. Regression analysis

revealed that older age was positively correlated with both complete success (OR = 1.06; 95% CI, 1.00-1.12; $P = 0.044$) and qualified success (OR = 1.16; 95% CI, 1.05-1.28; $P = 0.004$). Conversely, the presence of POAG was negatively associated with qualified success rates (OR = 0.18; 95% CI, 0.04-0.84; $P = 0.029$).

Conclusions: GT proves to be a safe and effective procedure for patients with previous failed glaucoma surgery over the 24-month study period.

Abstract No.: 206182

Two-Year Results of the Paul Glaucoma Implant for Patients With Uncontrolled Glaucoma

First Author: Jyri-pekka **KOSKINEN**

Co-Author(s): Mohamed **GENEID**, Mika **HARJU**, Juha **VÄLIMÄKI**

Purpose: To evaluate the 1- and 2-year outcomes of the Paul glaucoma implant (PGI) as primary surgery in patients with uncontrolled glaucoma.

Methods: This prospective single-center study included 80 patients operated on by a single surgeon between January 2022 and September 2023. All cases used a tube ligature technique without intraluminal stenting or antimetabolites. Intraocular pressure (IOP), medications, visual acuity, and surgical success were assessed at 12 and 24 months. Complete success was IOP < 21 , < 18 , or < 15 mmHg with $\geq 20\%$ reduction from baseline without medications or further surgery; qualified success allowed medications.

Results: Baseline mean IOP was 33.4 ± 8.3 mmHg on 4.1 ± 0.9 medications. At 12 and 24 months, IOP was 12.8 ± 4.1 and 11.7 ± 4.4 mmHg with 0.8 ± 1.3 and 0.9 ± 1.1 medications (62% and 65% reduction, $p < 0.001$). Success rates at 12/24 months were 61%/52% (< 21 mmHg), 59%/48% (< 18 mmHg), and 43%/47% (< 15 mmHg) for complete success, and 94%/89%, 90%/82%, and 68%/72% for qualified success. Visual acuity remained stable (LogMAR 0.20 baseline, 0.46 at 12 months, 0.44 at 24 months). Complications occurred in 21 eyes (26%), most commonly choroidal effusion in 16 eyes (20%), of which 2 required drainage; tube erosion (2), tube occlusion by iris (2), and corneal decompensation (1) were rare.

Conclusions: In glaucoma eyes with useful vision, PGI with tube ligature without an intraluminal stent seems to provide significant and sustained IOP lowering with minimal vision-threatening complications through 2 years.

Abstract No.: 204480

Unconventional Inflammatory Markers (Serum Homocysteine, Vitamins B-6, B-12 and Folic Acid) in Prognostication of Primary Open Angle Glaucoma

First Author: Sangeeta **ABROL**

Co-Author(s): Nishi **SATISH**

Purpose: The purpose of this study is to determine if serum Homocysteine, vitamins B6, B12, and folic acid values are affected in primary open-angle glaucoma, to follow up and analyse if these values change according to the progression of POAG.

Methods: This is a prospective analytical study, done in two steps. The sample size statistically calculated was 200 patients with either or both eyes diagnosed as POAG. The duration of the study was 10 months, with the patient being diagnosed as POAG on the first visit. Once the patient was successfully diagnosed, a baseline value of all inflammatory markers was immediately evaluated. All patients were started on therapy and monitored on months 1, 3 and 6. Serum levels of inflammatory markers were taken on each visit and compared for patients who progressed vs patients who did not.

Results: Patients of all three grades were included in this study; the results were stratified according to severity. Patients who progressed according to visual field analysis or RNFL changes showed statistically lower levels of vitamin B12, B6 and folate. Serum Homocysteine levels were statistically higher, however not clinically higher.

Conclusions: With statistically higher levels of serum homocysteine levels and statistically lower levels of vitamin B6, B12 and Folic Acid at 6 months, these simple tests may prove useful for analysis and prevention of glaucoma progression. Awareness has to be created about these markers as they were not clinically significant levels and may be missed easily.

Abstract No.: 205080

Use of an Endoscope-Holding Robot (OQrimo) to Maintain Safe Tube-Endothelial Distance During Preserflo MicroShunt Insertion in Eyes With Opaque Anterior Chambers

First Author: Keisuke **ADACHI**

Co-Author(s): Kenta **ASHIKAGA**, Toshinari **FUNAKI**, Shintaro **NAKAO**

Purpose: Shorter tube-endothelial distance (TED) after Preserflo MicroShunt (PFM) implantation has been associated with decreased corneal endothelial cell density (Ibarz-Barbera et al., Ophthalmology and Therapy, 2022). In this study, we investigated whether using a robotically stabilized intraocular endoscope (OQrimo) enables safe PFM insertion while maintaining

a sufficient TED, even in porcine eyes with artificially induced anterior chamber opacity.

Methods: An experienced surgeon performed all procedures. PFM was inserted into both normal porcine eyes and porcine eyes with opaque anterior chambers using either the conventional blind technique or under visualization with a 25G intraocular endoscope (Machida Endoscope Co., Ltd.). In the endoscopic group, the endoscope was inserted at the 5 o'clock position and secured to visualize the trabecular meshwork. The insertion site and angle of the PFM were adjusted under direct endoscopic visualization. Opaque anterior chamber models were created by placing black-painted soft contact lenses on the cornea. Postoperative TED was measured using anterior segment optical coherence tomography (AS-OCT).

Results: The mean TED was significantly greater in the endoscope-assisted group compared to the non-endoscope-assisted group, both in normal eyes (1.96 ± 0.27 mm vs. 1.13 ± 0.40 mm, $P = 0.009$) and in opaque eyes (1.85 ± 0.32 mm vs. 1.12 ± 0.28 mm, $P = 0.015$).

Conclusions: OQrimo-assisted endoscopic visualization significantly increased TED during PFM insertion, even in eyes with opaque anterior chambers. This technique may contribute to reducing postoperative corneal endothelial cell loss.

Abstract No.: 204099

VEGFC-Mediated Neuroprotection Through Augmented Ocular Lymphatic Transport

First Author: Siting **WU**

Co-Author(s): Yiqing **LI**

Purpose: Recent studies have confirmed the existence of the ocular lymphatic system, but the relationship between glaucoma progression and ocular lymphatic drainage function remains to be characterized.

Methods: COH was induced in 6-8-week-old C57BL/6J mice via anterior chamber injection of in situ-crosslinking hydrogel. Two days prior to COH induction, mice received intravitreal administration of either sterile water or VEGFC (2 μ g). Time-course lymphatic drainage analysis using Evans Blue tracer (10-60 min pre-sacrifice) with subsequent sectioned or 3D optical clearing of ocular tissues and cervical lymph nodes. At 8 weeks after COH, the numbers of survival retinal ganglion cells (RGCs) were counted and stained by RBPMS. Concurrently, immunofluorescence staining was performed to evaluate the expression of GFAP, AQP4 and A β in the retina and optic nerve.

Results: In mice subjected to intracameral hydrogel injection, IOP was significantly elevated one week post-surgery and remained elevated for up to eight weeks. At 8 weeks post COH, VEGFC treatment markedly reduced Evans Blue accumulation in both the retina and optic nerve and enhanced its drainage to the

cervical lymph nodes compared to the injured group. VEGFC administration also significantly promoted RGCs survival. Immunofluorescence analysis revealed increased expression of GFAP and AQP4 in the retina and optic nerve of the injured group. Furthermore, VEGFC treatment partially preserved visual function in mice with chronic ocular hypertension.

Conclusions: Ocular lymphatic drainage was impaired in the mouse model of chronic ocular hypertension. VEGFC treatment enhanced Evans Blue clearance to the cervical lymph nodes, and significantly promoted RGC survival and preserved visual function.

Abstract No.: 204514

Validation of Smartphone-Based Gonioimaging Technique: Direct Imaging of Goniomirror by Smartphone (DIGS Pro)

First Author: Nilesh KUMAR

Purpose: Direct Imaging of Goniomirror by Smartphone (DIGS Pro) is a frugal, innovative slit-lamp device to obtain gonio-images. It utilises a gonio-mirror and a smartphone for the imaging. To validate the anterior chamber grading done on the images obtained with a 4-mirror gonio-lens using DIGS by comparing with the gold standard gonioscopy by Slit-lamp examination and imaging.

Methods: Gonioscopy was performed by a single masked physician. A sequential imaging of 70 eyes was done by the same physician for both DIGS Pro and Slit-Lamp Imaging in a masked fashion. The images were then compared to the gold standard slit-lamp gonioscopy by the same physician and graded in masked fashion by two physicians.

Results: Out of 280 images obtained, 250 were found to be of gradable quality. The intra-observer agreement (between DIGS Pro and Slit-Lamp Gonio-imaging) was 84.0% with Cohen's kappa 0.65, which signified substantial agreement. The interobserver agreement between two physicians for the grading of gonio-imaging using DIGS Pro was 92.4% with Cohen's Kappa 0.71, which signified substantial agreement.

Conclusions: The DIGS Pro technique provides a reliable, low-cost alternative for gonio-imaging without a slit-lamp. Substantial intra-observer and inter-observer agreement with conventional gonioscopy underscores its validity for anterior chamber angle assessment. Given its portability, affordability, and ease of use, DIGS Pro has the potential to enhance glaucoma screening and monitoring, especially in resource-constrained or outreach settings.

Abstract No.: 205779

Visual Impairment and Mortality in Older U.S. Adults: Roles of Physical Activity and Depression

First Author: Jingjing HUANG

Co-Author(s): Zhonghua LUO

Purpose: To examine the association between visual impairment (VI) and all-cause mortality in older U.S. adults and assess potential mediation by physical activity (PA) and mental health.

Methods: A prospective cohort of 2,154 adults aged ≥ 60 from NHANES 2007-2008 was analyzed. Participants were included and categorized by VI status based on self-reported visual function and objective visual acuity examination. Cox regression (adjusted for demographic, anthropometric, socioeconomic, and clinical factors), propensity score matching, and subgroup analyses assessed the association between VI and all-cause mortality. Mediation analyses evaluated direct and indirect effects via PA and mental health.

Results: The 2154 included participants represent a survey-weighted 51 million older U.S. adults. Over a median follow-up of 145.0 months, 399 (57.8%) deaths occurred in the VI group and 535 (34.6%) in the non-VI group. VI was associated with an increased risk of all-cause mortality after propensity score matching and adjusting for sociodemographic, clinical, and lifestyle factors (fully adjusted HR, 1.21; 95% CI, 1.04-1.41; $P = 0.012$). In subgroup analyses, subjective VI was significantly associated with mortality (fully adjusted HR, 1.33; 95% CI, 1.13-1.57; $P < 0.001$), whereas objective VI alone was not. Mediation analyses indicated that PA accounted for 9.4% of the association between VI and all-cause mortality, but depressive symptoms were not a significant mediator.

Conclusions: In this nationally representative cohort, VI was independently associated with higher all-cause mortality in older U.S. adults. Subjective VI appeared more predictive of survival than objective acuity loss. Reduced PA partially mediated this association.

Abstract No.: 201320

Visual and Surgical Outcomes of Mitomycin-C Augmented Combined Non-Penetrating Deep Sclerectomy and Phacoemulsification in Eyes With End-Stage Glaucoma

First Author: Jyotish Kumar KHILAR

Co-Author(s): Sharmila REDDY

Purpose: To report the surgical outcomes of MMC augmented NPDS and phacoemulsification in patients with co-existing cataract & end-stage glaucoma.

Methods: Retrospective analysis of 349 eyes of 320 patients who underwent combined NPDS+phaco surgery was included. Outcome measures BCVA, IOP, AGM (anti-glaucoma medication), and compared intra-

and post-operative complications and interventions were noted. Cumulative failure rate was defined as IOP >21 mmHg or not reduced by at least 20% below baseline; or IOP < 6mmHg on 2 consecutive follow-up visits, re-surgery for high IOP or a surgical complication, or loss of PL.

Results: Significant post-op reduction in mean IOP was noted from baseline of 17.54(5.43) to 15.10(5.34) & 16.23(6.87) mmHg at 6 months & 1 year, respectively. Number of AGM reduced significantly from 2.95(1.01) to 1.99(0.98) & 2.16(1.00) at 6 & 12 months respectively. Complications were seen in 17.8% patients, and most were related to poor IOP control (8.3%). 2(0.6%) patients underwent tube surgery & 3 (0.9%) underwent diode CPC for refractory high IOP. Cumulative surgical success was 91% and 84% at 1& 2 years, respectively.

Conclusions: This method is a safe & viable option for eyes with advanced glaucoma.

Abstract No.: 203301

$\gamma\delta$ T Cell-Mediated Neuroimmune Dysregulation in Glaucomatous Optic Nerve Injury

First Author: Jiahao XU

Co-Author(s): Xuanchu DUAN, Xiaoyu ZHOU

Purpose: Elucidating the intraocular pressure-independent neurodegenerative mechanisms is a key issue in glaucoma treatment. As an important subset bridging innate and adaptive immunity, the role of $\gamma\delta$ T cells in glaucoma remains unclear. This study aims to uncover the mechanism by which $\gamma\delta$ T cells mediate immune-neural interactions in primary open-angle glaucoma (POAG) and evaluate their potential as a therapeutic target.

Methods: A two-sample Mendelian randomization analysis was employed to assess the genetic associations between immune cells and POAG. Peripheral blood mononuclear cells (PBMCs) were isolated from three POAG patients and three age- and gender-matched healthy controls using Ficoll density gradient centrifugation, followed by high-throughput single-cell transcriptome sequencing on the SeekOne® microfluidic platform. Additionally, retinal tissues were collected from the DBA/2J spontaneous glaucoma mouse model during the normal intraocular pressure phase (4 months old) and the optic nerve degeneration phase (14 months old) for single-cell transcriptome sequencing.

Results: A total of 39 immune cell phenotypes associated with POAG pathogenesis were identified ($P < 0.05$), with T cell-related phenotypes being the most prevalent. Among these, $\gamma\delta$ T cells were identified as the most significant risk factor for POAG (OR = 1.089, $P = 6.78 \times 10^{-4}$). Single-cell transcriptome analysis revealed significant upregulation of GZMK expression in

peripheral blood $\gamma\delta$ T cells of POAG patients. This gene encodes granzyme K, which may be involved in vascular injury processes. In the animal model, 14-month-old DBA/2J mice exhibited significant disorganization of optic nerve axon structures and a reduction in retinal ganglion cell numbers compared to age-matched C57 mice and 4-month-old DBA/2J mice, along with increased $\gamma\delta$ T cell infiltration in the retina. CellChat cell communication analysis further demonstrated that both the number and intensity of signal interactions between $\gamma\delta$ T cells and microglia were significantly enhanced in the retinas of 14-month-old DBA/2J mice, with notable enrichment of the SEMA3 signaling pathway.

Conclusions: $\gamma\delta$ T cells may drive glaucomatous optic nerve injury through dual mechanisms: peripheral (GZMK-mediated blood-retinal barrier disruption) and central (SEMA3 signaling-triggered neuroinflammation). Targeting this signaling axis could provide a novel neuroprotective therapeutic strategy for glaucoma.

Intraocular Inflammation, Uveitis and Scleritis

Abstract No.: 207654

18 β -Glycyrrhetic Acid Reshapes Ocular Immunity and Attenuates Autoimmune Uveitis by Restraining Th1/Th17 Responses

First Author: Lin DU

Co-Author(s): Wai Kit CHU, Bo Man HO, Chi Pui PANG

Purpose: To test whether 18 β -Glycyrrhetic acid (GA) mitigates experimental autoimmune uveitis (EAU) by reducing pathogenic T-cell activity and remodeling ocular immune infiltration.

Methods: EAU was induced in C57BL/6 mice by immunization with hIRBP650-671 in CFA. Mice received oral GA (100 mg kg⁻¹, every other day, days 1–20) or vehicle. Longitudinal disease assessment included fundus/cSLO, OCT, and ERG. At days 11, 14, 17, and 20 post-immunization, ocular leukocytes were profiled by flow cytometry to quantify total CD45+ cells, retinal microglia (CD45intP2RY12+), and infiltrating immune subsets. CD4+ T-cell phenotypes and effector function were evaluated by intracellular staining for IFN γ and IL-17A. Absolute counts and proportional compositions were analyzed across timepoints.

Results: GA delayed clinical onset and reduced peak disease severity, with preservation of retinal function on ERG. GA lowered total intraocular CD45+ leukocyte burden from mid to late disease and blunted the expansion of CD4+ T cells that typically predominates after day 14. While microglial absolute numbers were largely unchanged, their relative proportion increased,

consistent with reduced recruitment of peripheral leukocytes. Frequencies of IFN γ + and IL-17A+ CD4+ T cells were decreased in GA-treated eyes, indicating suppression of canonical Th1/Th17 effector programs. Early myeloid dominance of the infiltrate was preserved, whereas GA tempered subsequent T-cell-driven amplification of inflammation.

Conclusions: GA ameliorates autoimmune ocular inflammation by restraining intraocular Th1/Th17 responses and reshaping the immune ecosystem, leading to reduced leukocyte burden and preserved retinal function. These findings support GA as a potential steroid-sparing immunomodulator; its activity is consistent with redox-linked, NF- κ B-modulating control of T-cell pathogenicity.

Abstract No.: 204286

A Case of *Pantoea ananatis* Endophthalmitis by Metagenomic Next-Generation Sequencing and 4-Year Follow-Up

First Author: Yuting **CAI**

Co-Author(s): Yun **LI**, Ziyang **LI**, Yingqian **PENG**

Purpose: To report the first documented case of *Pantoea ananatis*-induced endophthalmitis in a pediatric patient and highlight the role of metagenomic next-generation sequencing (mNGS) in pathogen identification, antibiotic sensitivity prediction, and clinical decision-making.

Methods: Case report of a 13-year-old girl initially managed as uveitis, diagnosed by aqueous humor mNGS analysis and confirmatory PCR and Sanger sequencing, cured by vitrectomy and antibiotics application.

Results: mNGS detected *Pantoea ananatis* (17,053 reads) in aqueous humor, revising the diagnosis to infective endophthalmitis. Targeted PCR (acxB, tssI, tssH) and sequencing confirmed pathogen identity. Despite its low virulence, the infection progressed insidiously following steroid therapy. Timely diagnosis and tailored treatment stabilized best-corrected visual acuity (BCVA) over a 4-year follow-up.

Conclusions: This represents the first report of *Pantoea ananatis* as an endophthalmitis pathogen. The case underscores diagnostic challenges in distinguishing inflammation from infection in an atypical, incooperative pediatric population. mNGS provides critical and rapid pathogen identification, guiding antibiotic strategies, and optimizing outcomes in complex ocular infections.

Abstract No.: 204074

A Computable Phenotype for HSV Anterior Uveitis: Operationalizing the SUN Classification Criteria Employing the OMOP Common Data Model

First Author: Brian **TOY**

Purpose: Uveitis Classification Criteria were developed in 2021 by the Standardization of Uveitis Nomenclature (SUN) Working Group. These criteria have the potential to be useful in the identification of patients for observational research. Real-life applications can be labor-intensive, and there is a current unmet need for efficient application of computable phenotypes for uveitis in real-world data. To streamline data integration and analysis across multiple databases, this study operationalized a computable phenotype for the SUN classification criteria for herpes simplex virus (HSV) anterior uveitis within the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) and applied it to two electronic health records (EHR) systems and one claims database.

Methods: Using the Observational Health Data Sciences and Informatics (OHDSI) ATLAS tool, we constructed a computable phenotype for HSV anterior uveitis, applied it to two electronic health records (EHR) systems for internal validation, and to Optum's Clinformatics® claims database for external validation.

Results: In EHR manual chart reviews, we identified 5,404 and 38 patients at two sites, achieving 70% and 90% accuracy, respectively, in a randomized validation sample. From the claims database, 10,858 (2.7%) patients met all criteria, consistent with previous literature. The most discriminatory inclusion criterion was a history of HSV keratitis.

Conclusions: Our results indicate that OMOP can accurately represent the SUN classification criteria for HSV anterior uveitis across disparate databases, suggesting potential utility for operationalizing other uveitis subtypes in observational research.

Abstract No.: 205514

Apolipoprotein A1 Modulates Teff/Treg Balance Through Scavenger Receptor Class B Type I-Dependent Mechanisms in Experimental Autoimmune Uveitis

First Author: Haixiang **HUANG**

Purpose: Experimental autoimmune uveitis (EAU) is a representative animal model of human uveitis. In this study, we investigated whether apolipoprotein A1 (APOA1) can alleviate EAU and explored its underlying mechanism.

Methods: Mice were immunized with interphotoreceptor retinoid-binding protein 1-20 and treated with APOA1 or vehicle. The retinas, draining lymph nodes (DLNs), and spleens were

analyzed. Isolated T cells were used for proliferation, differentiation, and function assays in vitro. Selective inhibitors and pathway agonists were used to study signaling pathways. The effect of APOA1 on peripheral blood mononuclear cells (PBMCs) from uveitis patients was also examined.

Results: Administration of APOA1 ameliorated EAU. APOA1 suppressed pathogenic CD4+ T cell expansion in DLNs and spleen, and decreased the infiltration of effector T (Teff) cells into the retina. APOA1 also inhibited T cell proliferation and T helper 1 cell differentiation in vitro and promoted regulatory T (Treg) cell differentiation. APOA1 restricted inflammatory cytokine production from lipopolysaccharide-stimulated PBMCs. Mechanistic studies revealed that the effect of APOA1 was mediated by scavenger receptor class B type I (SR-BI) and downstream signals including phosphatidylinositol 3-kinase/Protein kinase B (PKB, or Akt), p38 mitogen-activated protein kinase, and nuclear factor- κ B.

Conclusions: APOA1 ameliorates EAU by regulating the Teff/Treg partially through SR-BI. Our results suggest that APOA1 can be a therapeutic alternative for autoimmune uveitis.

Abstract No.: 206417

Association Between Glucose-6-Phosphate Dehydrogenase (G6PD) Deficiency and Systemic Autoimmune Diseases With Immunopathological Ocular Manifestations

First Author: Kit Fai **LAU**

Co-Author(s): Kam Lung, Kelvin **CHONG**, Ka Hei, Kenneth **LAI**, Chi Pui, Calvin **PANG**, Yi Ching **PO**, Chee Yung, Clement **THAM**

Purpose: To systematically review the potential association between glucose-6-phosphate dehydrogenase (G6PD) deficiency and systemic autoimmune diseases presenting immunopathological ocular manifestations. We aim to integrate the latest findings and bridge the knowledge gap between G6PD deficiency and eye-specific autoimmune complications.

Methods: Between June 2 and June 19, 2025, a literature search was conducted across four electronic databases: PubMed, Medline, Google Scholar, and Web of Science. Without restriction on the date of publication, only articles published in English were screened. In compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, articles from all four databases were screened, retrieved, and assessed for eligibility. Articles were first screened independently by the two investigators, followed by a cross-checking process. Ultimately, this systematic review included only articles that were useful and relevant. An officially published record of this systematic review is available on Prospero (CRD420251073065).

Results: Among the 142 articles initially screened, 11 relevant articles documenting the relationship between G6PD deficiency and systemic autoimmune diseases that induce ocular manifestations were eventually included. There are two cohort studies, three case-control studies, two retrospective data analyses, one narrative review, one retrospective chart review, and two case reports.

Conclusions: It is reported that a positive correlation exists between G6PD deficiency and an individual's susceptibility to various systemic autoimmune diseases, which frequently manifest with secondary ocular complications due to dysregulated inflammatory responses that attack the eyes and ocular adnexa. However, there is currently no clear association between G6PD deficiency and primary idiopathic autoimmune ocular diseases.

Abstract No.: 205396

Bilateral Acute Panuveitis From Presumptive Ocular Tuberculosis in a Young Adult Woman With Antecedent Tuberculous Meningitis

First Author: Bryan Vincent **MESINA**

Co-Author(s): Josept Mari **POBLETE**

Purpose: Tuberculous uveitis is an uncommon manifestation of systemic tuberculous infection. Ocular involvement may occur through direct infiltration, hematogenous spread, or immune-mediated mechanisms.

Methods: We report a case of bilateral acute panuveitis in a young Filipino woman with antecedent tuberculous meningitis.

Results: A 32-year-old woman presented with a two-week history of headache, fever, dizziness, malaise, and vomiting. One week later, she developed sudden bilateral blurred vision with eye redness and floaters. Neuroimaging and cerebrospinal fluid analysis were performed, confirming tuberculous meningitis. Ocular examination revealed visual acuity of hand motions in both eyes, mild anterior chamber reaction, keratic precipitates, moderate vitritis, optic disc edema, and severe retinal vasculitis involving all retinal vessels. Extensive infectious and immunologic work-up supported a diagnosis of bilateral acute panuveitis from presumptive ocular tuberculosis. The patient was started on anti-tuberculous therapy with adjunctive systemic and topical corticosteroids. After four months of treatment, visual acuity improved to 6/12 in both eyes.

Conclusions: Definitive diagnosis of ocular tuberculosis remains challenging, particularly in resource-limited settings where specific testing is not readily available. This case highlights the importance of maintaining a high index of suspicion and performing comprehensive clinical and diagnostic evaluation to enable prompt

recognition and management of presumptive tuberculous uveitis.

Abstract No.: 205367

Bilateral Anterior Uveitis After Anti-Adhesion Agent Use in Obstetric and Gynecologic Surgery: A Case Series

First Author: Ivone **CAROLINE**

Purpose: We report a rare case series of bilateral anterior uveitis associated with Mediclore use, a thermo-sensitive anti-adhesion agent composed of poloxamer, gelatin, and chitosan, in Obstetric and Gynecologic Surgery.

Methods: Retrospective case series of patients from the Obstetrics and Gynecology service who developed acute anterior uveitis after intraoperative Mediclore use (April 2023–March 2024). Clinical data included demographics, surgery type, time to symptom onset, ocular findings, treatment, laboratory work-up, and one-week outcomes.

Results: Nine female patients (mean age 39.2 years; range 30–51) were included; five underwent Caesarean section and four underwent TAH/BSO (one with appendectomy). Ocular symptoms began on postoperative day 1–2 in all cases. Intraocular pressure was normal; inflammation was mild and anterior, often bilateral; initial visual acuity ranged 0.5–1.0. Management consisted of topical corticosteroids (dexamethasone, prednisolone acetate, or fluorometholone) with mydriatics when indicated; no systemic immunosuppression was used. Serologic screening excluded active infections (e.g., syphilis, toxoplasma, rubella, HIV, HBV/HCV, CMV). At one week, all patients showed resolution with visual acuity of 1.0 and no persistent inflammation. Causality assessment using the Naranjo Adverse Drug Reaction Probability Scale classified the association as probable (score = 6).

Conclusions: Postoperative, mild anterior uveitis with rapid, complete recovery was observed after Mediclore use, yielding a probable drug induced uveitis signal on standardized causality assessment. While outcomes were favorable with topical therapy, clinicians should recognize this potential association, ensure appropriate screening to exclude mimickers, and counsel patients accordingly.

Abstract No.: 204849

Characterization of Intraocular Microbiome-Immune Microenvironment in Age-Related Macular Degeneration

First Author: Yinhan **WANG**

Co-Author(s): Youxin **CHEN**, Qianyi **YU**, Xinyu **ZHAO**

Purpose: Emerging evidence supports the presence of an intraocular microbiome with disease-specific patterns, yet its contribution to age-related macular

degeneration (AMD) remains unclear. This study was designed to characterize the intraocular microbiome in AMD and elucidate its association with the local inflammatory microenvironment and clinical features.

Methods: A total of 41 treatment-naïve wet AMD (wAMD) patients and 33 cataract controls were enrolled. Aqueous humor samples underwent 5R 16s rDNA sequencing to profile the intraocular microbiome and identify differentially abundant microbial genera, which were correlated with clinical characteristics. Co-occurrence networks of high-abundance microbiota were constructed to investigate microbial interactions, while paired cytokine profiling assessed links to the inflammatory microenvironment.

Results: Both groups were dominated by Proteobacteria, Actinobacteria, Firmicutes, and Bacteroidetes, but exhibited distinct β -diversity and genus-level composition. wAMD was enriched in Bacteroides, Alistipes, Bilophila, Enterococcus, and Allobaculum, with Bilophila, Alistipes, and Allobaculum serving as key nodes in the microbial network. Bilophila abundance correlated negatively with IL-1ra (Spearman $r=-0.315$, $P=0.045$) and pigment epithelium detachment maximum diameter (Spearman $r=-0.620$, $P=0.010$), Enterococcus with MIP-1 α (Spearman $r=-0.359$, $P=0.021$), and Alistipes with central retinal thickness (Spearman $r=-0.700$, $P=0.004$). Both Bilophila and Bacteroides were enriched in type 2 macular neovascularization ($P=0.045/P=0.004$) and anti-VEGF treatment good responders ($P=0.041/P=0.030$).

Conclusions: wAMD is featured with a distinct intraocular microbiome linked to local inflammation and clinical phenotypes. Specific microbial genus, particularly Bilophila and Bacteroides, may represent candidate biomarkers for disease subtyping and treatment response. The relationship between Bilophila enrichment and reduced IL-1ra suggests a potential proinflammatory role, while further studies should be conducted to elucidate the mechanism.

Abstract No.: 205245

Clinical Efficacy of the 0.18 mg Fluocinolone Acetonide Intravitreal Implant for Non-Infectious Uveitis-Associated Macular Edema: A Real-World Study

First Author: Cong **CHEN**

Co-Author(s): Yanpng **SONG**, Ming **YAN**, Wenjing **ZHANG**

Purpose: To evaluate the clinical efficacy and safety of the 0.18 mg fluocinolone acetonide intravitreal implant (FAi) in Chinese patients with macular edema (ME) secondary to non-infectious uveitis (NIU).

Methods: This single-center, retrospective case series study included patients diagnosed with NIU-associated ME who received an intravitreal injection of the 0.18 mg FAi at our ophthalmology department between

January 2024 and September 2024. All patients were followed for at least 12 months. The main outcome measures included changes in best-corrected visual acuity (BCVA, converted to logMAR values), intraocular pressure (IOP), central macular thickness (CMT), and subfoveal choroidal thickness (SFCT) from baseline to 1, 3, 6, and 12 months post-injection. Rates of inflammatory recurrence and treatment-related adverse events were also recorded. Statistical comparisons were performed using repeated-measures analysis of variance.

Results: A total of 39 patients (50 eyes) with a mean age of 54.6 ± 14.8 years were enrolled. The mean baseline BCVA (logMAR) was 0.65 ± 0.33 , and the mean baseline CMT was 333.4 ± 108.6 μm . BCVA showed significant improvement from baseline at all postoperative time points ($P < 0.01$), decreasing to 0.48 ± 0.31 at 12 months. CMT demonstrated a continuous and significant decreasing trend post-injection ($P < 0.01$), reducing to 239.7 ± 54.4 μm at month 12. SFCT also decreased significantly compared to baseline ($P < 0.01$). A statistically significant increase in IOP from baseline was observed ($P < 0.01$); however, elevated IOP was effectively controlled with medication or laser/surgical intervention in the vast majority of cases (36%). The inflammatory recurrence rate within the 12-month follow-up period was 14% (7/50 eyes). Migration of the FAi into the anterior chamber occurred in one eye. No other serious ocular complications or systemic adverse events were observed.

Conclusions: In this real-world study, the 0.18 mg fluocinolone acetonide intravitreal implant effectively improved visual acuity, reduced macular edema, and attenuated choroidal inflammation in patients with NIU-associated ME. The primary risk was manageable IOP elevation, with an overall favorable safety profile. It represents an effective long-term treatment option for Chinese patients with this condition.

Abstract No.: 202940

Clinical Profile and OCT Characteristics of Optic Disc Toxoplasmosis

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Purpose: To characterize the clinical and OCT features of optic disc toxoplasmosis at presentation and study the associated pattern-based visual prognosis.

Methods: A retrospective, observational, cross-sectional single-center study at a tertiary eye center (September 2015- November 2024) included patients with clinically diagnosed ODT having baseline optic nerve head (ONH) OCT. The data included demographics, clinical findings, and OCT features at presentation.

Results: Thirty-two patients (mean age 31.87 ± 10.94 years; 17–62 years) were included: 21 primary, four recurrences, and seven reactivations; two were HIVpositive. Over 40% had anterior uveitis. Lesions were predominantly juxtapapillary (75%), unifocal (84%), and superotemporal (60%), with bright yellow coloration (34%) and illdefined margins (46%). Disc edema (71%) and skip vasculitis (68%) were frequent. OCT (30 patients) revealed fullthickness retinitis (96%), hyperreflective dots (83%), vitreous adhesions (86%), and neurosensory detachment (63%).

Conclusions: ODT resembles classic OT but shows characteristic changes at the vitreoretinal interface and macula on OCT at baseline. Recognizing these patterns helps in the diagnosis and management of ODT.

Abstract No.: 204263

Corticosteroid-First Versus QuantiFERON-Guided Upfront Anti-Tuberculosis Therapy in Presumed Ocular Tuberculosis: A Retrospective Cohort Pilot Study in BCG-Vaccinated, TB-Endemic Low-Resource Settings

First Author: Mayjane Joan **TUMULAK**

Purpose: To compare outcomes of QFT-guided upfront ATT versus corticosteroid-first followed by ATT in OTB, and to assess the impact of TST-QFT discordance in a BCG-vaccinated, TB-endemic, low-resource population.

Methods: We retrospectively reviewed 28 eyes from 21 QFT-positive OTB patients in a uveitis clinic. Eyes were grouped as upfront ATT ($n=16$) and Steroid-first $\rightarrow$ ATT ($n=12$). Outcomes included ≥ 2 line BCVA improvement, inflammation resolution, overall treatment response, and change in logMAR BCVA. TST-QFT discordance was defined as TST-negative but QFT-positive. Fisher's exact test, risk ratios with 95%CI, Mann-Whitney U, and Spearman's correlation were applied.

Results: Upfront ATT eyes showed higher ≥ 2 -line BCVA improvement (56% vs 33%) and universal inflammation resolution (100% vs 83%), though differences were not statistically significant. In the steroid-first eyes, referral delay (median 4.5 months) negatively correlated with visual improvement ($p=-0.59$, $p=0.044$). TST-QFT discordance was prevalent (82%). Discordant (TST-/QFT+) eyes responded robustly to ATT, with 100% inflammation resolution versus 60% in concordant eyes ($p=0.018$; RR 1.67; 95% CI 1.10-2.53).

Conclusions: In a BCG-vaccinated, TB-endemic, low-resource setting, TST frequently fails to detect OTB while QFT identifies cases that respond to ATT. Upfront QFT-guided ATT avoids harmful steroid delays and supports prioritising QFT access in diagnostic protocols.

Abstract No.: 204442

Costunolide Ameliorates Autoimmune Uveitis Through Inhibition of TRAF1 Deubiquitination and TNF- α -Induced Retinal Endothelial Inflammation by Targeting USP15

First Author: Yu **GAO**

Co-Author(s): Peizeng **YANG**

Purpose: The study aims to characterize the role of tumor necrosis factor- α (TNF- α) in inducing retinal endothelial inflammation and to identify an effective agent that can alleviate retinal endothelial dysfunction through screening of terpene compounds and to explore the specific mechanisms, providing new targets for the treatment of autoimmune uveitis.

Methods: Firstly, we used proteomics to profile the inflammatory response of human retinal microvascular endothelial cells (HRMECs) to TNF- α . A library of 336 terpenoids was screened to explore an effective compound alleviating retinal endothelial inflammation by immunofluorescence. Experimental autoimmune uveitis (EAU) was induced in mice to validate the therapeutic effect of the lead compound. Further, we used a 20K microarray to screen for a direct target of the lead compound. Finally, molecular docking, molecular dynamics, and lentivirus infection were performed to investigate the specific mechanism how the compound exerts its effects.

Results: TNF- α strongly triggers cellular inflammation in retinal endothelial cells. Costunolide (COS) is a potent suppressor of TNF- α -induced endothelial inflammation. In EAU mice, COS treatment improved clinical and histological scores, accompanied by reduced endothelial adhesion molecule expression and decreased T-cell infiltration. Mechanistically, directly targeting USP15, COS inhibited USP15-dependent deubiquitination of TRAF1 and TNF signaling in retinal endothelial cells.

Conclusions: COS plays a vital role in alleviating TNF- α -induced endothelial inflammation and autoimmune uveitis by suppressing USP15-dependent deubiquitination of TRAF1 and blocking T cell infiltration.

Abstract No.: 205881

Current Update on Clinical Spectrum, Diagnostic Challenges, and Management of Tuberculosis-Associated Ocular Surface Inflammation: A Systematic Review

First Author: Erica **WIDODO**

Co-Author(s): Tifanni **EXCELINDA**, Rina **LA DISTIA**, Ikhwanuliman **PUTERA**

Purpose: To systematically review the clinical spectrum, diagnostic challenges, and treatment outcomes of ocular surface inflammation associated with Mycobacterium tuberculosis (Mtb).

Methods: We searched PubMed/MEDLINE, Google Scholar, Epistemonikos, Cochrane Library, and ScienceDirect through February 22, 2025. Eligible studies reporting ocular surface inflammation in tuberculosis (TB) were included. Data on clinical presentation, systemic associations, diagnostic modalities, treatments, and outcomes were extracted and comprehensively analyzed.

Results: Thirty-four studies with 293 patients were analyzed. Ocular surface manifestations included keratitis/keratouveitis, keratoconjunctivitis, sclerokeratitis, scleritis/episcleritis, conjunctivitis, and sclerokeratoconjunctivitis. Diagnosis was primarily presumptive via tuberculin skin test or interferon-gamma release assay. However, a subset of patients at each anatomical site of involvement may have confirmed systemic TB or Mtb isolation from ocular specimens. Corneal involvement was aggressive and ulcerative during active TB, whereas immune-mediated keratitis was milder. Scleral disease had the highest microbiological confirmation rate, with necrotizing variants strongly linked to systemic infection. A full course of anti-tuberculous therapy (ATT) is fundamental, supplemented with topical and/or systemic corticosteroids based on disease severity and location. Recurrence of inflammation may occur in inadequately treated cases.

Conclusions: The clinical spectrum of TB-associated ocular surface inflammation is highly heterogeneous. Certain clinical features may increase the likelihood of active TB infection. A cautious and systematic workup is essential to detect active TB, and analysis of local ocular specimens should not be overlooked. Regarding treatment, ATT remains the cornerstone, with corticosteroids (local and systemic) tailored to disease severity and anatomical involvement.

Abstract No.: 201139

Demography, Risk Factors and Clinical Outcomes for Uveitic Glaucoma in a Multiethnic Malaysian Cohort – a Multicentric Study

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Purpose: To study the prevalence, demographic characteristics, risk factors, and clinical outcomes of uveitic glaucoma in a multiethnic Malaysian cohort.

Methods: A retrospective, cohort study was conducted in tertiary hospitals in Kuala Lumpur and Sarawak, Malaysia. Clinical records were reviewed, and the cases were chosen based on the inclusion criteria.

Results: A total of 257 eyes (163 patients) were included. Mean age of uveitis onset was 37.3 $\pm$ 16.2 years with a slight female predominance. The

prevalence of hypertensive uveitis and uveitic glaucoma was 26.1% and 30.0% respectively. Multivariate analysis identified age of onset (Odds ratio [OR] 1.024; 95% confidence interval [CI] 1.003–1.044, $p = 0.023$), male gender (OR 1.970; 95% CI 1.046–3.709, $p = 0.036$), presence of posterior synechiae (PS) (OR 3.326; 95% CI 1.092–10.133, $p = 0.034$) or peripheral anterior synechiae (PAS) (OR 4.606; 95% CI 2.065–10.272, $p < 0.001$), and intraocular pressure (IOP) >21 mmHg at presentation (OR 1.077; 95% CI 1.039–1.117, $p < 0.001$) as risk factors of uveitic glaucoma. Steroid responsiveness occurred in 74/253 (29.2%) of corticosteroid-treated eyes. More than one-third (53/144, 36.80%) of eyes required at least one glaucoma incisional surgery, and chronic uveitis ($p = 0.004$) and presence of PAS ($p < 0.001$) were factors associated with a higher need for glaucoma surgery. Uveitic glaucoma, as the primary cause of visual impairment or blindness, occurred in 39/112 (34.8%) affected eyes.

Conclusions: Uveitic glaucoma is a potentially irreversible blinding complication. By understanding the risk factors, uveitic glaucoma can be prevented with targeted screening and timely intervention.

Abstract No.: 203523

Diagnostic Serum Biomarkers Associated With Acute Anterior Uveitis

First Author: Bo **GONG**

Co-Author(s): Huan **LI**

Purpose: Acute anterior uveitis (AAU) is the most common subtype of non-infectious uveitis and an important cause of vision-threatening ocular inflammation. However, its metabolic characteristics and potential diagnostic biomarkers remain largely unexplored.

Methods: Plasma samples from 21 AAU patients and 21 age- and sex-matched healthy controls (HCs) were analyzed using untargeted metabolomics based on ultra-performance liquid chromatography tandem mass spectrometry (UPLC–MS/MS). Differential metabolites were identified by univariate and multivariate analyses. Pathway enrichment and clustering analyses were performed to explore biological relevance. Predictive diagnostic models were constructed using random forest (RF) and least absolute shrinkage and selection operator (LASSO) regression.

Results: Among 995 detected metabolites, 76 showed significant differences between AAU and HCs (27 increased and 49 decreased; VIP > 1 , FDR < 0.05). Pathway enrichment highlighted perturbations in purine and pyrimidine metabolism, amino acid metabolism, and lipid metabolism. RF analysis achieved 95% predictive accuracy with an area under the curve (AUC) of 1.0. LASSO regression further retained 12 key metabolites, including phytanate, ursodeoxycholate, glycylvaline, p-cresol sulfate,

hexadecanedioate (C16DC), pyrrolidine, bilirubin (E,E), guaiacol sulfate, oleoylcholine, eicosenoylcarnitine (C20:1), oxindolylalanine, and fibrinopeptide A. These metabolites collectively provided excellent discriminative power, yielding an AUC of 0.990.

Conclusions: This study provides the first comprehensive plasma metabolomic characterization of AAU, identifying specific metabolic disturbances linked to systemic inflammation and immune regulation. The 12 metabolite panel demonstrates strong diagnostic potential and offers novel insights into the pathogenesis of AAU.

Abstract No.: 210363

Differentiating Vogt-Koyanagi-Harada Syndrome From Paraneoplastic VKH-Like Retinopathy: A Report of Two Cases

First Author: Jiabei **XIONG**

Co-Author(s): Jiayin **CAI**, Yongping **HU**, Jian **LI**, Yijia **ZHANG**

Purpose: To highlight the diagnostic challenge in distinguishing Vogt-Koyanagi-Harada (VKH) syndrome from paraneoplastic autoimmune retinopathy (p-AIR), which can present with nearly identical fundus features.

Methods: We report two patients with bilateral vision loss, macular edema, and serous retinal detachment. Case 1 was a 30-year-old male with a viral prodrome and fluorescein angiography (FFA) findings typical of VKH. Case 2 was a 65-year-old male with small-cell lung cancer and FFA characteristics indicative of p-AIR.

Results: Management diverged significantly. The VKH patient (Case 1) required systemic immunosuppression. The p-AIR patient (Case 2) improved with local retrobulbar steroids, avoiding systemic therapy that could interfere with his cancer treatment.

Conclusions: VKH and p-AIR are critical masqueraders in many cases. Accurate differentiation based on medical history and FFA is essential, as it dictates fundamentally different treatment strategies — systemic immunosuppression versus localized therapy — and directly impacts patient outcomes and oncological safety.

Abstract No.: 205379

Early Recurrence and Vision Outcomes in HLA-B27-Associated Uveitis: A Multicentre Asian Cohort with 12-Month Follow-Up

First Author: Gladys Sze Yee **LING**

Co-Author(s): Rupesh **AGRAWAL**, Carlos **CIFUENTES GONZÁLEZ**, Bernett **LEE**, William **ROJAS-CARABALI**

Purpose: HLA-B27-associated uveitis is common, yet early (12-month) predictors of recurrence and vision loss in Asian cohorts remain unclear, and published definitions of “recurrence” vary. The objective of our

study was to estimate 12-month recurrence and vision outcomes in HLA-B27-associated uveitis and explore baseline factors associated with early recurrence.

Methods: Multicentre cohort across Asia, including retrospective and prospective cases. Clinical charts of 172 HLA-B27-associated uveitis patients were reviewed. After exclusions, 94 participants were analysed. Exposures included baseline demographics, systemic disease, and anatomical diagnosis (predominantly anterior uveitis). Sixteen participants had a concurrent systemic disease; 88/94 (93.6%) had anterior uveitis, 1 had intermediate uveitis, and 5 had panuveitis.

Results: Across the first 12 months, 30/94 (31.9%) participants experienced ≥ 1 recurrence. Baseline age, sex, systemic disease, and anatomic class did not differ meaningfully between those with and without recurrence (all $p > 0.20$). 10/94 (10.6%) developed moderate-to-severe vision loss at 12 months. Vision loss occurred more often in participants with intermediate uveitis (1/10) or panuveitis (2/10) than among those without vision loss (0 and 3 cases, respectively); numbers were small and estimates imprecise.

Conclusions: In this Asian multicentre HLA-B27 cohort, about one-third recurred within 12 months, and one-tenth had moderate-to-severe vision loss. We did not identify baseline predictors of early recurrence. These findings support close early follow-up for newly diagnosed HLA-B27 uveitis and motivate prospective, time-to-event analyses to refine risk stratification.

Abstract No.: 207200

Efficacy and Safety of Topical Interferon Therapy in Inflammatory Macular Edema: A Large Retrospective Study

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Co-Author(s): Ankush KAWALI, Padmamalini MAHENDRADAS, Sai Bhakti MISHRA

Purpose: To evaluate the efficacy and safety of topical interferon (IFN) therapy in inflammatory macular edema (IME).

Methods: This is a retrospective study of patients with IME treated with topical IFN therapy. Case records of patients were evaluated for central macular thickness (CMT) on OCT scan at commencement of IFN therapy and its changes during the follow-up. The time taken for the complete resolution of IME was noted. IFN eye drops were administered in QID dose and tapered by 1 drop/month after resolution of IME.

Results: Eighty-five eyes of eighty patients with IME were studied. The leading cause of IME was post-operative inflammation (30), followed by uveitic cystoid macular edema (CME). Mean CMT at commencement of IFN was 486.2 μm (range: 277-762 μm , SD: 108 μm), and at 1 month was 381.7 μm (range: 222-769 μm , SD: 103.6 μm). The mean duration

for first complete resolution ($n=44$) was 13.4 weeks (range: 1.5 weeks- 90 weeks, SD: 16.5 weeks). Twenty-seven patients (29%) had relapse. Most common side effects seen were papillary conjunctivitis ($n=6$) and 1 patient with pre-existing endothelial decompensation showed worsening. No systemic side effects were noted clinically. Subgroup analysis was done for patients treated with only IFN ($n=19$) - mean CMT at commencement was 482.6 μm (range: 345-713 μm , SD: 93.7 μm), and at 1 month was 386.2 μm (range: 230-480 μm , SD: 61 μm).

Conclusions: This largest study on topical IFN therapy demonstrates that IFN can be a noninvasive, and safe therapeutic option in the treatment of IME.

Abstract No.: 205220

Flavoprotein Fluorescence as a Potential Biomarker of Mitochondrial Stress in Retinal Vasculitis

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Purpose: To evaluate flavoprotein fluorescence (FPF) patterns in patients with retinal vasculitis compared to healthy controls, and to explore the potential of FPF imaging as a non-invasive biomarker of mitochondrial stress in retinal vasculitis.

Methods: This cross-sectional case-control study included 66 eyes from patients with retinal vasculitis and 20 eyes from age- and sex-matched healthy controls. Flavoprotein fluorescence (FPF) imaging, which detects mitochondrial oxidative stress by capturing the autofluorescence of oxidised mitochondrial flavoproteins, was performed using the OCUMET® Beacon. OcuMet® imaging was performed at the macula, fovea, and optic nerve head. Proprietary software provided quantitative FPF parameters: mean signal intensity and signal heterogeneity. Images with suboptimal quality scores or incomplete outputs were excluded. Between-group comparisons were performed using non-parametric statistical tests.

Results: Cases demonstrated significantly higher mean FPF intensity in the macula and optic nerve head compared to controls ($p < 0.05$), indicating increased oxidative stress and mitochondrial dysfunction in retinal vasculitis. Macular signal heterogeneity was significantly lower in cases, suggesting a more uniform stress distribution, potentially due to anatomical buffering by the dual retinal and choroidal circulation. Optic nerve head heterogeneity was elevated in cases, reflecting localised stress near inflamed retinal vessels. Foveal signal heterogeneity did not differ significantly between groups, consistent with the avascular nature of the foveal region.

Conclusions: FPF imaging reveals region-specific increases in mitochondrial stress in retinal vasculitis,

particularly in the macula and optic nerve head. These findings support FPF as a sensitive, non-invasive biomarker of retinal vascular inflammation and highlight differences in vulnerability across retinal subregions, offering potential for more objective disease monitoring.

Abstract No.: 205417

From Atypical Optic Neuritis to Acute Zonal Occult Outer Retinopathy: A Longitudinal Diagnostic Challenge in a Young Adult Woman

First Author: Gabriel Angelo **MONTEMAYOR**

Co-Author(s): Bryan Vincent **MESINA**

Purpose: Acute zonal occult outer retinopathy (AZOOR) is rare condition affecting the photoreceptors and retinal pigment epithelium. Its mechanism remains unclear but is hypothesized to be autoimmune. It typically presents with photopsias or scotomas in the setting of a normal fundus, later progressing to retinal atrophy and mottling.

Methods: We describe a case of bilateral AZOOR initially misdiagnosed as atypical bilateral optic neuritis and treated with systemic corticosteroids eight years earlier.

Results: A 39-year-old woman initially presented with bilateral paracentral scotomas and blurred vision. Examination showed peripapillary atrophy in the right eye and grade 2 optic disc edema with peripapillary halo in the left. Fluorescein angiography demonstrated transmission defects in both eyes resembling chorioretinal atrophy, with peripapillary leakage on the left. She was treated with oral prednisone (1 mg/kg/day), resulting in partial symptomatic improvement and no recurrence for several years. At present, she reported enlarging scotomas despite visual acuity of 6/6 in both eyes. Fundus examination showed bilateral extensive peripapillary chorioretinal atrophy, while perimetry confirmed enlarged blind spots. Optical coherence tomography revealed outer retinal disorganization, while fundus autofluorescence demonstrated a trizonal pattern of hyper-, hypo- and normal autofluorescence, consistent with AZOOR. The patient opted for close observation rather than further corticosteroid therapy.

Conclusions: AZOOR remains an elusive diagnosis without established treatment guidelines. This case emphasizes the need for early recognition and comprehensive multimodal imaging to guide management and monitor progression in patients initially presenting with atypical optic neuritis that later evolves into AZOOR.

Abstract No.: 203332

Glymphatic System Dysfunction in Thyroid Eye Disease Associated With Disease Activity and Duration

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Purpose: To investigate the alterations in the lymphatic system in patients with thyroid eye disease (TED) using diffusion tensor imaging (DTI) analysis along the perivascular space (ALPS) and to explore the correlation between the lymphatic system and clinical features of TED.

Methods: The study included 47 patients with TED, including 20 active TED patients (AP) and 27 inactive TED patients (IP), along with 24 healthy controls (HC). Imaging data, including DTI sequences, were acquired using a 3.0 Tesla scanner. ALPS values were calculated based on the diffusivity of the bilateral superior corona radiata and superior longitudinal fasciculus. Correlation analyses were thus performed between ALPS values and clinical characteristics.

Results: The DTI-ALPS analysis in the TED patient group collectively showed lower mean and left ALPS values compared to the HC, with statistically significant differences observed (mean ALPS: $P=0.0308$, left ALPS: $P=0.0032$). Among the TED subgroups, the IP had significantly lower left ALPS values than HC ($P=0.006$). Correlation analysis within the IP subgroup indicated that lower ALPS values were significantly associated with longer disease duration ($P=0.015$) and greater palpebral fissure height ($P=0.028$).

Conclusions: Glymphatic system dysfunction is evident in TED patients, with its extent influenced by disease activity and duration.

Abstract No.: 204409

High Serum Soluble Interleukin-2 Receptor Levels in Tubercular Uveitis

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Co-Author(s): Willem **DIK**, *Rina* **LA DISTIA NORA**, *Nicole* **NAGTZAAM**, *Saskia* **ROMBACH**, *P.Martin* **VAN HAGEN**

Purpose: To investigate whether serum soluble interleukin-2 receptor (sIL2R), a known biomarker for sarcoidosis, is elevated in tubercular uveitis (TBU) within a tuberculosis (TB)-endemic population, and to evaluate its diagnostic performance compared with other biomarkers.

Methods: Serum samples from 14 TB patients (2 with pulmonary TB [PTB] only, 4 with PTB and uveitis, and 8 with uveitis and positive QuantiFERON-TB Gold [QFT]) were analysed. Six of the latter fulfilled Standardization of Uveitis Nomenclature (SUN) criteria for TBU, and two were PCR-positive for Mycobacterium tuberculosis in ocular fluid. Comparisons were made with 76

patients with other infectious or non-infectious uveitis and 9 healthy controls. Serum sIL2R was measured, and diagnostic performance was assessed using receiver operating characteristic (ROC) analysis and Youden's index. A comparison of several biomarker combinations (sIL2R, CXCL9, BAFF, and QFT) was also evaluated.

Results: Median serum sIL2R was significantly higher in PTB patients than controls (449.5 vs 199.0 U/mL, $p=0.0004$). Among uveitis patients, TBU cases had higher sIL2R levels (359.0 vs 244.0 U/mL, $p=0.0341$). A cut-off of 310 U/mL yielded 75% sensitivity and 66% specificity for TBU (AUC=0.693, 95% CI: 0.526–0.860). sIL2R correlated positively with CXCL9, but adding sIL2R to CXCL9 and BAFF did not enhance diagnostic performance beyond the previously reported CXCL9–BAFF–QFT combination.

Conclusions: Serum sIL2R is elevated in TB and TBU, supporting its role as a general marker of granulomatous inflammation. However, its diagnostic utility in TBU is limited, and interpretation should be cautious, particularly in TB-endemic settings.

Abstract No.: 206628

Inter-Eye Correlation of Visual Acuity and Inflammatory Biomarkers in Bilateral Uveitis: Considerations for Statistical Modelling

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Purpose: To evaluate inter-eye correlation of visual acuity (VA) and inflammatory biomarkers in patients with bilateral uveitis, to inform clinical assessments and statistical modelling in research and practice.

Methods: This retrospective observational study analysed standardized VA measurements (LogMAR and ETDRS) and inflammatory markers (anterior chamber cells, flare, and vitreous haze) from the Ocular Autoimmune Inflammatory and Infectious Disease (OASIS) registry, which includes data from tertiary uveitis centres. Only patients with bilateral uveitis and complete VA data for both eyes at the same visit were included. Spearman's rank correlation coefficients were used to assess inter-eye associations across different aetiologies and time points. Distribution patterns were examined using histograms and scatterplots with LOESS smoothing.

Results: At baseline, VA showed moderate inter-eye correlation ($\rho=0.53$), with stronger correlations in non-infectious ($\rho=0.60$) and idiopathic ($\rho=0.57$) uveitis compared to infectious cases ($\rho=0.45$). Inflammatory biomarkers demonstrated strong baseline inter-eye correlations, particularly for vitreous haze ($\rho=0.79$), which increased to nearly perfect levels at five years ($\rho=0.97$). Anterior chamber flare and cells showed moderate-to-strong correlations initially

but declined over time, indicating greater variability in anterior segment inflammation. Distributions of VA were skewed or bimodal, indicating heterogeneous disease severity.

Conclusions: Between-eye correlation in bilateral cases of uveitis for visual acuity and inflammatory biomarker varies by aetiology and inflammation site. Posterior segment markers exhibit greater symmetry over time, while anterior markers show declining concordance. These findings support the need for sophisticated, eye-paired statistical models in research and personalized assessment strategies in clinical settings.

Abstract No.: 204128

Interleukin-6 Inhibition With Vamikibart in Patients With Uveitic Macular Edema: Data From Phase-3 MEERKAT and SANDCAT Trials

First Author: Yih-shiou **HWANG**

Co-Author(s): Deanna **GALLOWAY**, Lyndell **LIM**, Lachlan **MACGREGOR**, Laura **STEEPLES**, Robyn **TROUTBECK**

Purpose: Vamikibart is a recombinant monoclonal anti-IL-6 (interleukin-6) antibody engineered for IVT (intravitreal) delivery. Two global, randomized, double-masked, sham comparator-controlled phase-3 trials, MEERKAT (study GR44277, NCT05642312) and SANDCAT (study GR44278, NCT05642325), are currently investigating the efficacy, safety, and pharmacokinetics/pharmacodynamics of IVT vamikibart in UME (uveitic macular edema) secondary to NIU (non-infectious uveitis).

Methods: Patients ($n=225$ per study) with UME and BCVA (best-corrected visual acuity) scores of 73–19 ETDRS (Early Treatment Diabetic Retinopathy Study) letters with active/inactive, acute/chronic NIU are randomized into three arms: vamikibart 0.25mg, vamikibart 1mg, and sham. Study treatment is administered 4 times every 4 weeks through Week 12, followed by as-needed dosing during Weeks 20–48. Predefined rescue criteria allow standard-of-care treatment for worsening BCVA, UME, or inflammation. The primary endpoint is the proportion of patients with ≥ 15 -letter BCVA improvement from baseline at Week 16. Secondary endpoints include changes in BCVA and central subfield thickness, rescue medication requirements, adverse events, and IL-6 and vamikibart concentrations in aqueous humor and serum.

Results: The trials are ongoing at the time of abstract submission. By the time of the proposed APAO presentation, primary endpoint data at Week-16, along with key secondary endpoints, will be available and presented.

Conclusions: MEERKAT and SANDCAT will evaluate Vamikibart's potential to address the unmet need for effective non-corticosteroid treatments in UME. Primary efficacy and safety data obtained from these

trials are expected to provide insights into vamikibart's potential role in UME treatment.

Abstract No.: 206589

Intracameral Bacteriophage As Prophylaxis of Staphylococcus aureus-Induced Endophthalmitis Following Lens Extraction Surgery in Rabbits

First Author: Herdina **RAMADHANI**

Co-Author(s): Muhammad Indra Mahardika Iridika **HUMERI**, Djoko **LEGOWO**, Annise **PROBONINGRAT**, Indri **WAHYUNI**, Ismi **ZUHRIA**

Purpose: Postoperative endophthalmitis is a severe complication following cataract surgery. The most common organism cause endophthalmitis is gram-positive bacteria, Staphylococcus aureus. This study aimed to demonstrate the prophylactic effect of intracameral bacteriophage administration in Staphylococcus aureus-induced endophthalmitis after lens extraction surgery in rabbits.

Methods: A total of 10 New Zealand rabbits were divided into 2 groups, consisting of 5 rabbits each. Postoperative endophthalmitis was induced by injecting intracameral S. aureus bacteria just after lens extraction surgery. The control group was rabbits that underwent extracapsular lens extraction surgery and were injected with S. aureus. The treatment groups as above, followed by simultaneously administering 2×10^9 intracameral Staphylococcal bacteriophage injection in 25 μ L of physiological saline. The expression of IL-1b, IFN-g, MPO, and ICAM-1 was evaluated using the ELISA method at 48 hours after surgery. Pathological changes in retinal tissues were observed using HE staining.

Results: IL-1b, IFN-g, and ICAM-1 levels in the treatment group ($8,4702 \pm 2,625$ ng/L; 16.086 ± 1.578 , 4 ng/L; and 9.0104 ± 1.4753 ng/L) were lower than the control group ($11,9021 \pm 3,508$ ng/L; 18.722 ± 1.113 , 1 ng/L; and 15.4895 ± 0.9845 ng/L) with $p=0.023$; $p=0.016$; and $p<0.001$. There was no difference in MPO levels between the treatment group and the control group ($p=0.521$). Histopathologic examinations showed disruption of the retinal layers and the presence of numerous S. aureus in the globe in control groups. In contrast, retinal structures are intact, and no S. aureus staining is found in bacteriophage-treated eyes.

Conclusions: Administration of intracameral bacteriophages into the rabbit after lens extraction surgery affect the levels of IL-1b, IFN-g, ICAM-1, however without any impact on MPO levels. These findings demonstrate the potential of bacteriophage therapy as an emerging treatment modality, offering a sustainable prophylactic alternative for endophthalmitis.

Abstract No.: 204167

Intraretinal and Subretinal Fluid Resolution With Vamikibart in Uveitic Macular Edema: Phase-1 DOVETAIL Exploratory Results

First Author: Iksoo **BYON**

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Purpose: To investigate the efficacy of intravitreal vamikibart on IRF (intraretinal fluid) and SRF (subretinal fluid) resolution in UME (uveitic macular edema) patients in DOVETAIL study.

Methods: DOVETAIL (NCT06771271) was a phase-1, open-label, multiple-ascending-dose trial of vamikibart in diabetic macular edema and UME (secondary to all noninfectious uveitis types). UME patients ($n=37$) were enrolled into three dose-groups (0.25-mg: $n=12$; 1-mg: $n=12$; 2.5-mg: $n=13$) and received vamikibart at W0 (Week), W4, W8, followed by off-treatment observation until W20 (2.5-mg) or W36 (0.25-mg, 1-mg). The primary endpoint was safety. In this exploratory analysis on retinal optical coherence tomography, IRF and SRF presence were evaluated by masked graders (central-reading center), and volumes were quantified via an automated deep-learning model.

Results: Across all doses, the proportion of patients with foveal IRF absence increased from baseline (40.5%) to W4 (74.3%), W8 (80.6%), and W12 (85.7%). Median IRF volume decreased from 129.0-nL at baseline to 5.2, 3.3, 3.8-nL at W4, W8, W12, respectively, in the Early Treatment Diabetic Retinopathy Study central 1-mm ring, and from 375.7-nL at baseline to 13.9, 7.4, 6.5-nL at W4, W8, W12, respectively, in the central 3-mm ring. Proportions of patients with foveal SRF absence increased from baseline (51.4%) to W4 (91.7%), W8 (97.2%), W12 (100%). For patients with baseline SRF >0 -nL in the central 3-mm ring ($n=20$), median SRF volume reduced from 12.4-nL at baseline to 0-nL at W4/W8/W12. IRF/SRF improvements were maintained during the off-treatment period.

Conclusions: Vamikibart led to rapid fluid resolution, with $>85\%$ patients achieving complete IRF resolution and 100% achieving SRF resolution by W12, highlighting Vamikibart's potential benefit as an effective treatment for UME.

Abstract No.: 203983

Iris Vascular Characteristics Changes in Non-Infectious Uveitis: A Wide-Field Swept-Source Anterior Segment Optical Coherence Tomography Angiography Study

First Author: Zihui **WU**

Co-Author(s): Liu **YANG**

Purpose: To quantitatively assess differences in iris vascular characteristics among patients with active non-infectious uveitis (NIU), inactive NIU, and healthy

controls using wide-field swept-source anterior segment optical coherence tomography angiography (SS-AS-OCTA), and to identify reliable imaging biomarkers for monitoring NIU.

Methods: This cross-sectional observational study involved 87 eyes from 48 participants, categorized into active NIU (28 eyes), inactive NIU (29 eyes), and healthy control (30 eyes) groups. Iris Vascular Characteristics were analyzed using wide-field SS-AS-OCTA. Iris vessel area density (VAD) and vessel length density (VLD) were measured in six regions of the iris: the inner one-third, outer two-thirds, and full range of both the nasal and temporal sides.

Results: The active NIU group showed significantly higher VAD values than the inactive NIU group in five iris regions (all $p < 0.001$), except for the nasal outer two-thirds ($p = 0.002$). Compared to the healthy controls, the active NIU group had significantly higher VAD ($p < 0.001$) and VLD ($p < 0.001$) across all six iris regions. Similarly, VLD was significantly higher in the active NIU group than in both the inactive NIU group and the healthy controls across all six iris regions (all $p < 0.001$).

Conclusions: Wide-field SS-AS-OCTA effectively detects iris vascular changes in active NIU. The VAD and VLD of the iris serve as sensitive, non-invasive imaging biomarkers, providing a quantitative method to monitor disease progression and evaluate treatment response, which enhances the clinical management of uveitis.

Abstract No.: 205965

Long-Term Visual Outcomes of Uveitis: A Real-World Study in China

First Author: Lingyu DAI

Co-Author(s): Guannan SU, Peizeng YANG

Purpose: To assess the long-term visual outcomes of uveitis in China, and to investigate demographic characteristics and diagnosis of this disease.

Methods: A retrospective review of clinical data from uveitis patients who were referred to the Uveitis Center of Chongqing Medical University First Affiliated Hospital between 2008 and 2022.

Results: A total of 1,380 subjects with third-year follow-up data were enrolled. The mean age at the first visit was 33 ± 15 years, with 46.3% females. The median duration of uveitis was 12.0 (3.0-35.0) months. There were 1,344 non-infectious uveitis patients (97.4%), with undifferentiated uveitis accounting for the largest proportion (33.0%). Furthermore, the most common specific types were Vogt-Koyanagi-Harada (VKH) disease (22.7%) and Behçet's disease (BD) (21.8%). Compared to baseline, significant improvements in visual acuity (VA) were observed in both male and female uveitis patients at 1, 2, 3, and 5 years after treatment (all $p < 0.001$). The overall percentage of eyes

with visual acuity (VA) $< 20/400$ was 17.5% at baseline and decreased to 13.9% at the third year. Notably, the proportion of eyes with VA $< 20/400$ in males was significantly higher than that in females (male: 20.3% at baseline and 18.5% at year 3; female: 14.3% at baseline and 8.7% at year 3). Among patients with VA $< 20/400$ in at least one eye at the third year, BD accounts for the largest proportion (37.0%), with 94.4% of BD cases being male.

Conclusions: Our study demonstrated that the most common specific uveitis subtypes were VKH disease and BD in China. The overall visual outcomes were improved after treatment. However, female patients had a superior long-term visual prognosis compared to male patients, possibly due to the refractory nature and poorer visual prognosis of BD and its higher prevalence in males.

Abstract No.: 204407

Metformin Reduces Intracellular M. tuberculosis Replication and Inflammation In Vitro: A Potential Host-Directed Therapy for Ocular Tuberculosis?

First Author: Ikhwanuliman PUTERA

Co-Author(s): Willem DIK, Rina LA DISTIA NORA, P.Martin VAN HAGEN

Purpose: To identify potential host-directed therapy (HDT) compounds for ocular tuberculosis (TB).

Methods: In silico drug discovery was conducted based on "anti-match" characteristics using a bioinformatics platform. In vitro assays to test HDT compound (metformin) efficacy were conducted with retinal pigment epithelial (RPE) cells and human retinal endothelial cells (RECs) that were infected with two different Mycobacterium tuberculosis (Mtb) strains (H37Rv and a hypervirulent clinical Beijing strain). Colony-forming unit (CFU) assays were conducted and cytokine levels were determined in culture supernatants.

Results: In silico analysis identified metformin as a potential HDT for ocular TB. Metformin (4 mM) treatment reduced intracellular Mtb replication in RPE cells 48 hours after Mtb-infection (median CFU: 2.4×10^5 CFU/mL in treated cells vs. 3.9×10^5 CFU/mL in untreated cells; $p = 0.019$). Metformin also significantly decreased the production of CCL2/MCP-1 and IL-6 in both Mtb-infected RPE cells and RECs and that of CXCL10/IP-10, CCL5/RANTES, and IL-8 in Mtb-infected RECs.

Conclusions: Metformin suppresses intracellular replication of Mtb in RPE cells alongside the proinflammatory cytokine production by RPE cells and RECs. This study provides the first evidence for metformin as a potential HDT for ocular TB.

Abstract No.: 205378

MicroRNA-Loaded Antioxidant Nanoplatfoms for Prevention and Treatment of Experimental Acute and Chronic Uveitis

*First Author: Siting SHENG**Co-Author(s): Haijie HAN, Jian JI, Wen XU, Huiling ZHAO*

Purpose: To address limitations of current uveitis treatments, this study developed a microRNA (miRNA)-loaded antioxidant nanoplatfom, polyethyleneimine (PEI)-modified polydopamine (PDA) carrying miR-132-3p (PEI/PDA@miR-132), for the prevention and treatment of experimental acute and chronic uveitis.

Methods: PEI/PDA was synthesized to load miR-132 via electrostatic interactions. Its characterization, in vitro anti-oxidative/anti-inflammatory activities, and in vivo therapeutic effects were evaluated using lipopolysaccharide (LPS)-induced acute uveitis rat models and inter-photoreceptor retinoid-binding protein 1-20 (IRBP 1-20)-induced chronic uveitis mouse models, with dexamethasone (DXM) as control. Safety was assessed via cytotoxicity, histology, and blood tests.

Results: PEI/PDA@miR-132 showed good stability, high miR-132 transfection efficiency, and concentration-dependent antioxidant activity. It scavenged reactive oxygen species (ROS), inhibited M1 macrophage polarization, downregulated nuclear factor-kappa B (NF- κ B) signaling, reduced pro-inflammatory cytokines (tumor necrosis factor- α (TNF- α), interleukin-1 β (IL-1 β)), alleviated uveitis symptoms better than controls, and exhibited superior retinal safety and excellent biocompatibility.

Conclusions: PEI/PDA@miR-132 effectively treats acute and chronic uveitis by targeting oxidative stress, inflammation, and apoptosis, promising a safe therapeutic strategy for such diseases.

Abstract No.: 206181

Multimodal Imaging of Uveal Effusion Syndrome Type 3 in Eyes in the Pachychoroid Spectrum

*First Author: Amala Elizabeth GEORGE**Co-Author(s): Muna BHENDE, Parthopratim Dutta MAJUMDER, Sudharshan SRIDHARAN*

Purpose: To report findings on multimodal imaging in eyes with uveal effusion syndrome Type 3 and pachychoroid.

Methods: Patients with Uveal effusion syndrome type 3 with normal axial length and scleral thickness, and pachychoroid were included. The diagnosis of pachychoroid was based on Optical Coherence tomography (OCT) and Fundus fluorescein angiography (FFA) in all patients. Details of Indocyanine green

angiography (ICGA) and OCT angiography (OCTA) were also reviewed when available.

Results: We included 21 eyes of 14 patients (1 female, 13 males); mean age was 45.2 (SD: 11.3) yrs. Bilateral disease was seen in 8 patients (57%) and unilateral in 5. Mean axial length was 22 mm (SD: 0.9). 5/21 eyes (24%) had best corrected visual acuity less than or equal to 6/60 at presentation. Mean sub-foveal choroidal thickness (SFCT) on OCT was 473(SD: 194) microns (Range: 260 to 793). OCTA showed dilated choroidal vessels in 3 patients. FFA did not detect any leaks in 8 patients. 4 eyes had leaks suggestive of central serous chorioretinopathy (CSCR) and 3 had pinpoint leaks during the course of their disease. Leopard spot patterns were noted in 11/21 eyes (51%) additionally. On ICGA (n=14) choroidal hyperpermeability was seen in 9 eyes.

Conclusions: In this largest series of eyes with Type 3 uveal effusion syndrome associated with pachychoroid spectrum, the most common finding was thickened choroid, leopard spot patterns, and choroidal hyperpermeability on ICG. 4 eyes had associated CSCR during the disease course. There was a strong male preponderance.

Abstract No.: 203499

NETs-CD44-IL-17A Feedback Loop Drives Th17-Mediated Inflammation in Behçet's Uveitis

First Author: Yi WU

Purpose: Behçet's uveitis (BU) is a severe ocular manifestation of Behçet's disease, a systemic immune disorder typically accompanied by abnormal neutrophil infiltration and hyperactivation. We aimed to investigate the underlying causes of excessive neutrophil extracellular traps (NETs) production in BU and to elucidate the mechanisms by which NETs contribute to the pathogenesis of BU.

Methods: Single-cell RNA sequencing (scRNA-seq) is used to investigate the heterogeneity of neutrophils in BU and to map the immune profile of experimental autoimmune uveitis (EAU) following NETs inhibition. The role of NETs in EAU was validated in vitro and vivo experiments.

Results: Circulating neutrophils from BU patients exhibited a higher propensity for NETs release compared to healthy controls. In EAU, neutrophils were observed to exert pro-inflammatory effects through NETs. Clearing NETs could inhibit T helper 17 (Th17) cells differentiation and significantly alleviate EAU symptoms. Both in vivo and in vitro experiments demonstrated neutralizing interleukin-17A (IL-17A), IL-17A secreted by Th17 cells markedly reduced neutrophil infiltration and NETs formation in EAU. ScRNA-seq confirmed CD44 plays a key role in mediating interactions between NETs and Th17

cells. Antagonizing CD44 significantly decreased the proportion of Th17 cells and NETs formation in both in vivo and in vitro experiments. Multiplex immunofluorescence and cell communication analysis demonstrated the interactions and colocalization between NETs and CD44highCD4+T cells in EAU.

Conclusions: NETs induce Th17 differentiation via upregulating CD44, and in turn Th17 cells secrete IL-17A to recruit neutrophils and promote NETs formation. Interrupting NETs-CD44-IL-17A feedback loop might be a potential therapeutic target for BU.

Abstract No.: 203264

Ocular Tuberculosis in Pediatric Population Visiting a Tertiary Eye Care Hospital: A Two-Year Retrospective Observational Study

First Author: Radhika **THUNDIKANDY**

Co-Author(s): Lisa **SUNNY**

Purpose: To report the clinical profile with radiological and immunological evidence of ocular tuberculosis in children.

Methods: Methods: Medical records of all pediatric patients diagnosed with ocular Tuberculosis from January 2023 to December 2024 were studied for ocular clinical features, Tuberculosis contact, Tuberculin skin test, radiological evidence of Tuberculosis, and history of previous systemic Tuberculosis.

Results: A total of 21 children were in the study. Mean age was 14 years (range 8-16). Posterior uveitis was most common which included choroiditis (4), retinal vasculitis (3), Tuberculous optic neuritis (1). Intermediate uveitis (4), phlycten (4), sclero keratitis (3), anterior uveitis (2). Only 5 patients had a history of tuberculosis contact. 18 out 21 patients had positive tuberculin skin test and 19 out of 21 children had radiological evidence of old Tuberculosis. No child gave a history of active systemic Tuberculosis in the past

Conclusions: Ocular Tuberculosis is an important cause for pediatric uveitis in an endemic country like India. It presents in a myriad ways and can cause morbidity if not recognized early and appropriately treated .As previous history of systemic tuberculosis was absent in all our patients the Tuberculin skin test and radiological evidence of old healed Tuberculosis are crucial adjuvants in the diagnosis of presumed ocular Tuberculosis.

Abstract No.: 202530

Optical Coherence Tomography (OCT) Biomarkers in Vogt Koyanagi Harada (VKH) Syndrome

First Author: Parima **JARENSIRIPORNKUL**

Co-Author(s): Wipada **LAOVIROJJANAKUL**, Kanpirom **TANGPONTIRAK**

Purpose: To evaluate associations between OCT features observed during the acute, active phase of VKH and late-stage best-corrected visual acuity (BCVA, logMAR) after inflammation is controlled.

Methods: Cross-sectional analysis of OCT images from patients with acute, active VKH. OCT features were graded for the presence/absence of subretinal septa (bacillary layer detachment), retinal pigment epithelium (RPE) folds, RPE clumping (subretinal drusen-like deposits), and hyperreflective foci (HRF), and for subretinal fluid (SRF) thickness and central subfield thickness (CST). Associations with late-stage BCVA were examined using generalized linear models.

Results: Ninety-five eyes from 95 patients were included (mean age 43.1 years). Median initial and late-stage BCVA were 1.00 and 0.18 logMAR, respectively. Median SRF and CST were 339.0 μ m and 578.5 μ m. HRF were present in 76 eyes (80.0%), RPE folds in 54 (57.4%), subretinal septa in 36 (37.9%), and RPE clumping in 26 (27.7%). In univariable models, RPE clumping showed a trend toward worse late-stage VA ($\beta=0.121$ logMAR; 95% CI -0.0046 to 0.2468 ; $p=0.059$), while subretinal septa showed a non-significant trend toward better VA ($\beta=-0.0758$; 95% CI -0.168 to 0.016 ; $p=0.107$). In a stepwise multivariable model, subretinal septa were independently associated with better VA ($\beta=-0.134$; 95% CI -0.265 to -0.003 ; $p=0.045$), whereas RPE clumping was associated with worse VA ($\beta=0.118-0.125$; $p=0.039-0.027$).

Conclusions: The presence of subretinal septa on OCT in active acute VKH was associated with better VA, while the presence of RPE clumping would predict the worse VA in the late stage of disease. These results identify OCT biomarkers that may aid prognostication and treatment plans.

Abstract No.: 206143

Rate of Intraocular Inflammation (IOI) Post-Intravitreal Brolucizumab: A 5-Year Clinical Audit at a Malaysian Tertiary Center

First Author: Xin Yee **CHONG**

Co-Author(s): Rajasudha **SAWRI RAJAN**

Purpose: To evaluate the rate of intraocular inflammation (IOI) following intravitreal Brolucizumab at a tertiary centre, compare with landmark studies, characterise affected cases, identify risk factors, and explore strategies to reduce inflammation.

Methods: This retrospective audit included patients who received at least one intravitreal Brolucizumab injection at HSAS, the main medical retina centre in Malaysia, between January 2021 and August 2025. Data from electronic records included demographics, ocular diagnosis, number of injections, IOI occurrence, clinical presentation, treatment, visual acuity changes, lens status, and history of IOI, uveitis, or allergy.

Results: Ninety patients were reviewed; 20 (22.22%) developed IOI, a higher rate than the 4.6% reported in the HAWK and HARRIER trials. The mean age of affected patients was 68 years, with equal gender distribution. Most were Malay and phakic, with polypoidal choroidal vasculopathy the most common diagnosis. IOI developed mostly after the second injection, with symptoms appearing on average 10.75 days after the last intravitreal Brolucizumab. Clinical presentations included anterior, intermediate, and pan-uveitis; 15% showed vasculitis on fluorescein angiography. Visual acuity worsened in 70% of IOI cases. Brolucizumab was discontinued in all affected patients and treated with topical steroids, where 65% also received oral steroids. No patients required intravenous steroids. IOI was more common among the Malay ethnicity, phakic eyes, and patients aged 60–70 years. No significant associations were found with gender, uveitis history, or systemic comorbidities.

Conclusions: The IOI rate in our study was higher than in clinical trials, highlighting the importance of careful monitoring and patient selection to enhance safety in real-world Brolucizumab use.

Abstract No.: 206813

Resurgence of Acquired Syphilitic Uveitis: Characteristics, Challenges and Outcomes

First Author: Devesh KUMAWAT

Co-Author(s): Shakha ., Shoryavardhan AZAD, Vinod KUMAR, Pradeep VENKATESH

Purpose: Syphilitic uveitis (SU) is a re-emerging cause of intraocular inflammation. This study aimed to characterize the clinical, imaging features, treatment modalities, and outcomes of SU at a tertiary-care center in North India over the last decade.

Methods: An ambispective observational study included SU patients between January 2016 and April 2025. Diagnosis was based on compatible clinical features, positive syphilis serology, and response to antibiotic therapy. Data on demographics, HIV status, ocular findings, imaging, treatment regimens, and outcomes were retrieved. Best-corrected visual acuity (BCVA) was assessed, with a favorable outcome defined as $BCVA \geq 20/30$. Statistical analysis identified factors associated with a favorable outcome.

Results: Twenty-six patients (44 eyes) were included, predominantly male (92.3%) with a mean age of 37.9 ± 12.1 years. Five patients presented before and

21 presented after the Coronavirus disease (COVID-19) pandemic. HIV co-infection was present in 50% of patients. Posterior uveitis (61.4%) and panuveitis (36.4%) were common forms. Characteristic placoid or confluent chorioretinitis patterns were noted, with punctate white dots in nearly one-third of eyes. 38.5% cases were misdiagnosed initially and empirically treated with corticosteroids. Definitive treatment included intravenous ceftriaxone/ aqueous penicillin with adjunctive corticosteroids in few cases. At median follow-up of 9 months, 93.2% eyes showed resolution, and 54.5% achieved $BCVA \geq 20/30$. Better initial vision, posterior uveitis (versus panuveitis), and treatment with aqueous penicillin were associated with a favorable outcome.

Conclusions: Syphilitic uveitis has resurged, particularly in the post-COVID era. Heightened awareness, due suspicion, and early recognition using multimodal imaging are vital for favorable outcomes. Aqueous penicillin may yield superior outcomes and merits further evaluation.

Abstract No.: 205328

Reticular Iris Pattern as a Potential Clinical Marker for Cytomegalovirus-Associated Posner-Schlossman Syndrome

First Author: Ba Dong Nhat HUYNH

Co-Author(s): Thi Uyen Duyen NGUYEN

Purpose: To evaluate reticular iris pattern as a clinical marker for cytomegalovirus infection in Posner-Schlossman syndrome through aqueous humor polymerase chain reaction analysis and correlation with clinical findings.

Methods: This cross-sectional study included 30 patients with active Posner-Schlossman syndrome. All underwent ophthalmologic examination and aqueous humor PCR for CMV, HSV, VZV, and EBV DNA. Clinical parameters, including iris morphology patterns, keratic precipitate morphology, intraocular pressure measurements, corneal endothelial cell density, and glaucomatous damage, were systematically correlated with PCR results.

Results: CMV DNA was detected in 14/30 (46.7%) patients, with EBV co-infection in 2 cases. Reticular iris pattern was strongly associated with CMV infection, occurring in 64.3% of CMV-positive versus 6.3% of CMV-negative eyes ($p=0.002$; $OR=58.5$). Additional CMV correlates included stellate keratic precipitates (85.7% vs 25.0%, $p=0.002$) and reduced endothelial cell density (1913 ± 629 vs 2357 ± 555 cells/ mm^2 , $p=0.049$). CMV-positive patients exhibited more frequent recurrent episodes and advanced glaucomatous damage ($p<0.05$). HSV and VZV were not detected.

Conclusions: Cytomegalovirus was the predominant viral pathogen detected in Posner-Schlossman syndrome, identified in nearly half of cases. Reticular

iris pattern appears to be a potential clinical indicator for CMV-associated disease. Clinical differences may exist between CMV-positive and negative cases, potentially helping clinicians identify patients who may benefit from aqueous PCR testing and targeted antiviral therapy. Further longitudinal studies are warranted to confirm these findings and establish their prognostic value.

Abstract No.: 205643

Retinal Pigment Epithelium Stress Following Intravitreal Ganciclovir: A Novel Insight From Clinical Spectrum

First Author: Kuifang DU

Purpose: The retinal toxicity of intravitreal ganciclovir (GCV) is contentious. Our study aims to describe new clinical findings following intravitreal GCV and propose a mechanism for the pathogenesis of those post-injection retinal changes.

Methods: A retrospective case series included 114 patients with cytomegalovirus retinitis (CMVR) receiving intravitreal GCV (2.5 mg/0.05 mL) combined with systemic therapy. Patients with presumed retinal toxicity following intravitreal GCV injection were enrolled. Clinical data, laboratory tests, ocular examination, and multimodal images of the retina were collected. Serial optical coherence tomography (OCT) was performed to monitor pre- and post-retinal changes.

Results: Five patients (7 eyes) ($4.4\% \pm 2.6\%$) with macular spared from CMVR lesions experienced acute vision loss and transient macular edema after the GCV injection; 1 patient ($0.9\% \pm 2.6\%$) with bilateral CMVR developed chronic and progressive retinal pigment epithelium (RPE) atrophy in the CMVR-spared areas of the eye receiving repeated GCV injections, contrasting with untreated contralateral eyes. Three of them were additionally diagnosed as cytomegalovirus-immune recovery retinitis. With OCT, all eyes showed intact Bruch's membrane and normal thickness of inner retinal layers. Seven eyes with acute vision loss showed outer retinal changes within 24 hours post-injection, including macular SRF (7 eyes), macular vertical hyperreflective foci (5 eyes), and ONL edema (4 eyes), and resolving spontaneously weeks later.

Conclusions: Intravitreal GCV treatment may trigger acute macular edema and chronic RPE degeneration in CMVR patients. We hypothesize that RPE dysfunction is the pivotal pathogenic mechanism orchestrating these clinical spectrums, potentially induced by multifactorial interplay, including chemical irritation, cumulative toxicity, systemic comorbidities, and CMVR-related inflammatory cascades.

Abstract No.: 204265

Role of Adjunctive Intravitreal Therapy in Intraocular Tubercular Granuloma – a Retrospective Case Series

First Author: Sudha GANESH

Purpose: To evaluate the role of intravitreal anti-VEGF with moxifloxacin in intraocular tubercular granuloma.

Methods: This retrospective study was conducted at a referral uveitis clinic between January 2022 and 2025. All patients who had received intravitreal anti-VEGF with moxifloxacin along with systemic anti-tubercular therapy (ATT) for intraocular tubercular (TB) granuloma were included.

Results: Eight eyes of eight consecutive patients with tubercular granulomas treated at our institution were analyzed. The median age of presentation was 33 years (range 18-44 years). The median duration of follow-up was 5 months (range 2 to 34 months). Five cases had TB choroidal granuloma, two had ciliary body granuloma, and one had both choroidal and ciliary body granulomas. All patients received intravitreal anti-VEGF and moxifloxacin along with systemic ATT therapy and oral steroids. Seven eyes had resolved granuloma at the last follow-up. One patient had persistent inflammation despite three intravitreal anti-VEGF injections along with moxifloxacin. The visual acuity improved in six patients.

Conclusions: Adjunctive intravitreal therapy with anti-VEGF with moxifloxacin, along with ATT, aided in the resolution of intraocular TB granuloma.

Abstract No.: 203712

Scleral Abscess- Review of Risk Factors, Clinical Features, Causative Organism, Management and Outcome in a Tertiary Eye Care Hospital

First Author: Radhika THUNDIKANDY

Co-Author(s): Lisa SUNNY

Purpose: To analyze the demographics, risk factors, causative organism, management, clinical features, and outcome of patients with exogenous infectious scleral abscess.

Methods: Retrospective observational study. The medical records of all patients diagnosed with scleral abscess from January to December 2024 were reviewed. 30 eyes of 30 patients were included in the study. The Ultrasound bio microscopy (UBM) findings were noted.

Results: Median age was 65 years. Males were more than females, 21:9. Trauma was the most common risk factor. Trauma with stick /stone 11, fall of insect 2, uncontrolled diabetes 6, fall of chemical 1, post-ocular surgery 5, immunosuppressed state 3, old age 8. Corneal involvement seen in 6 patients, hypopyon/ac reaction 3. Commonest site of abscess was temporal

10, followed by nasal 8. *Pseudomonas* was the commonest organism, followed by fungus. no growth by culture was seen in 19. All underwent incision and drainage except 1 patient due to scleral breach by UBM. Appropriate antimicrobials were given according to culture and sensitivity report when available. Pain was more than the clinical signs. Use of topical or oral steroids gave only temporary relief and there was delay in time to healing. Healing was faster following early debridement. All cases resolved with underlying scleral necrosis 1 eye went into endophthalmitis.

Conclusions: Careful history, clinical examination and UBM helped in early diagnosis of exogenous scleral abscess. Early debridement helped in faster resolution compared to medical management alone. Use of corticosteroids delayed healing and worsened the scleral abscess.

Abstract No.: 208059

Serum Metabolic Analysis Identifies Novel Biomarkers for Distinction Between Corticosteroids and Cyclosporin A Resistant and Sensitive Pediatric Idiopathic Uveitis Patients

First Author: Rui **CHANG**

Co-Author(s): Peizeng **YANG**

Purpose: To identify serum metabolic biomarkers capable of distinguishing corticosteroids and cyclosporin A (CS & CsA) resistant from sensitive pediatric idiopathic uveitis (PIU) patients.

Methods: Serum samples from 32 CS & CsA-sensitive and 24 CS & CsA-resistant PIU patients were analyzed for metabolic profiles using Ultra High Performance Liquid Chromatography-Orbitrap Exploris Mass Spectrometry (UHPLC-OE-MS). Bioinformatic analyses were performed to identify differential metabolites between the two groups, and machine learning (ML) algorithms were employed to develop a diagnostic model based on these metabolites. To assess the model's stability and generalizability, all serum samples were randomly split into a training set and a test set using ML-based random sampling.

Results: The metabolic phenotype of CS & CsA-resistant PIU patients showed significant remodeled compared with sensitive patients. Among the differential metabolites between the two groups, lipids were markedly dysregulated (72.47%). The ML-based multivariate selection approach, including Neural Network (NNET), Least Absolute Shrinkage and Selection Operator (LASSO), and eXtreme Gradient Boosting (XGBoost), identified 4 candidate metabolite biomarkers. Receiver operating characteristic (ROC) analysis revealed that MG 15:0, PI-Cer 28:0;3O, and SPB 20:0;2O yielded area under the curve (AUC) values of 0.934, 0.953, and 0.904, respectively, all of which were upregulated in resistant patients. In contrast, N-acetylaspatic acid, with an AUC of 0.934, was

downregulated in resistant patients. The combined diagnosis model of these 4 metabolites achieved an improvement in AUC values (AUC=1). Validation of the combined diagnosis model showed excellent efficiency with AUC=0.971 of NNET, 0.971 of LASSO, and 0.957 of XGBoost, respectively, in test sets.

Conclusions: We identified 4 previously unexplored but potentially valuable metabolic biomarkers that can effectively discriminate between CS & CsA-resistant and -sensitive PIU patients. These findings may provide critical guidance for the early stage of clinical medication decisions in order to avoid visual impairment of resistant PIU patients.

Abstract No.: 203092

Sestrin2 Exerts a Novel Protective Effect Against LPS-Induced Ferroptosis via the Nrf2-SLC7A11-GPX4 Signaling Axis

First Author: Jiawei **YIN**

Co-Author(s): Peiquan **ZHAO**

Purpose: Uveitis is a leading cause of visual impairment linked to systemic inflammatory diseases. Current corticosteroid treatments are limited by significant long-term side effects. Sestrin 2 (SESN2), a stress-responsive antioxidant protein, is implicated in the regulation of ferroptosis and inflammation. This study investigates SESN2's role in modulating inflammation and ferroptosis in endotoxin-induced uveitis (EIU) models, aiming to develop safer therapeutic alternatives for uveitis management.

Methods: C57BL/6 mice were subjected to EIU via intravitreal injection of lipopolysaccharide (LPS) with or without SESN2-overexpressing adeno-associated virus (AAV). Clinical evaluations, cytokine profiling, and ferroptosis marker assessments were conducted. Additionally, BV2 microglial cells were genetically modified to overexpress or silence SESN2, followed by analyses of inflammatory cytokine production, oxidative stress, ferroptosis-related pathways, mitochondrial function, and involvement of the Nrf2 signaling pathway.

Results: SESN2 expression was significantly reduced in vivo and in vitro following LPS treatment. AAV-mediated SESN2 overexpression suppressed inflammatory responses. Mechanistically, SESN2 inhibited ferroptosis by upregulating ferroptosis-resistant proteins (SLC7A11, GPX4) and reducing lipid peroxidation markers (4-HNE). In vitro, SESN2 overexpression reduced oxidative stress and ferroptosis, while SESN2 knockdown exacerbated these effects. SESN2's protective role was mediated by Nrf2 activation, enhancing antioxidant defenses and ferroptosis inhibition. Inhibition of Nrf2 reversed SESN2's protective effects, underscoring the importance of the p62/Nrf2/GPX4 axis in SESN2-mediated ferroptosis protection.

Conclusions: SESN2 plays a crucial role in protecting against inflammation and ferroptosis via the Nrf2 pathway, presenting a promising therapeutic target for uveitis management.

Abstract No.: 202548

Single-Cell Transcriptome Analysis Reveals Immune Cell Heterogeneity of Vogt-Koyanagi-Harada (VKH) Disease

First Author: Jingwen WANG

Co-Author(s): Ying LI, Shuai OUYANG, Jia QU

Purpose: This study aimed to reveal immune cell heterogeneity and cell-cell interaction signals in the immune microenvironment in the pathogenesis of VKH patients.

Methods: We utilized single-cell transcriptomics methods to explore immune cell heterogeneity of VKH.

Results: We revealed that major antigen-presenting cells CD14⁺ Monocytes and mDC cells function enriched in antigen-presenting, T, NK and NKT cells mainly involved in acute immune responses and immune activation functions, upregulated function of plasma cells and mast cell related to increased protein translation, synthesis and processing in VKH. Moreover, we uncovered VKH involves multiple immune cell-cell interactions increased and cell communication signals were dysfunction in VKH. In addition, we revealed that pro-immunity and inflammation transcription factors like USF2, IRF8, POU2F2 and JUN were activated while anti-immunity and inflammation transcription factors such as ETS2 and MXD4 were suppressed in the majority of cell types of VKH.

Conclusions: These findings provided a potential target cell population or target genes for immunotherapy and anti-inflammation treatments.

Abstract No.: 206380

Six-Month Versus Nine-Month Anti-Tubercular Therapy for Tubercular Posterior Uveitis: A Multicentric, Prospective, Randomised Controlled Study

First Author: Ronnie Abhishek TALLURI

Co-Author(s): Soumyava BASU, Anup KELGAONKAR, May Zun Aung Win, Somsiri Sukavatcharin

Purpose: The role of anti-tubercular therapy (ATT) in prevention of recurrent inflammation in ocular tuberculosis (TB) is well established. However, the optimal duration of ATT in ocular TB remains unclear. Here, we report a prospective, randomized, study, to compare the efficacy of 6-month versus 9-month ATT, for the treatment of clinically diagnosed tubercular posterior uveitis (TPU).

Methods: We conducted a multi-center, prospective, randomized, observer masked-study across three different centers in India, Myanmar and Thailand

respectively. We included patients with clinically diagnosed TB retinal vasculitis, serpiginous-like choroiditis (SLC) or multifocal choroiditis (MFC), based on SUN-diagnostic criteria, and no active pulmonary or extra-pulmonary TB. The primary efficacy outcome was persistent or recurrent inflammation, from the completion of ATT till one year follow up

Results: Sixty-four patients were randomized into the study, of which 14 were excluded due to incomplete follow up. Of the remaining 50 patients, 36% (n=18) were bilateral, 60% (n=30) male, with mean age of 38.4±12.1 years. The patients were equally divided (n=25 each) between six- and nine-month groups. Clinical phenotypes at presentation were retinal vasculitis (n=28, 56%), MFC (n=12, 24%), and SLC (n=10, 20%). Four patients (16%) from the six-month group, and none from the nine-month group had persistent (n=1, SLC) or recurrent (n=3, one each of SLC, MFC and retinal vasculitis) inflammation following completion of ATT. However, logistic regression analysis did not reveal any difference between the six-month and nine-month groups (p=0.91).

Conclusions: Six-months ATT was as effective as nine-months in the treatment of TB posterior uveitis.

Abstract No.: 202707

Studies on the Mechanism by Which Magnesium Regulates Mitochondrial Function Through NPTX1 in CD4⁺ T Cells of Vogt-Koyanagi-Harada Syndrome

First Author: Jing XU

Purpose: To clarify the role of magnesium in regulating mitochondrial function in CD4⁺ T cell of Vogt-Koyanagi-Harada syndrome (VKH).

Methods: Inductively coupled plasma mass spectrometry was conducted to evaluate trace element levels. Then we performed a magnesium supplement experiment in human peripheral blood CD4⁺ T cells and the EAU mouse model. Flow cytometry was used to measure the frequency of Th1, Th17, and Treg cells. Immunofluorescence and quantitative real-time polymerase chain reaction (RT-qPCR) were subjected to detect mitochondrial function. Then RNA sequencing-based transcriptomics was performed in vitro to screen potential molecules regulated by magnesium.

Results: We found the lower magnesium level in both serum and CD4⁺ T cell extracted from VKH syndrome patients compared with that from healthy controls. In vitro results showed that magnesium supplement could decrease the frequency of Th1 and Th17 cells, and improve the frequency of Treg cells. Furthermore, magnesium supplement could down-regulate ROS levels and mitochondrial DNA copy number. In vivo experiments demonstrate that magnesium supplement could alleviate the inflammation of the experimental autoimmune uveitis model mouse. Transcriptomics

analysis found that magnesium could influence mitochondrial function through NPTX1. RT-qPCR verified higher NPTX1 levels in healthy control and magnesium supplement subjects. And NPTX1 silencing could not invert the imbalance of Th1, Th17/Treg cells.

Conclusions: Magnesium could regulate mitochondrial function in CD4+ T cell through the activation of NPTX1 to alleviate disease progression. The study indicates that magnesium would be a novel insight and potential applications for the prevention and treatment of VKH syndrome.

Abstract No.: 205949

Suprachoroidal Proliferative Membrane in Uveal Effusion Syndrome With Nanophthalmos: Incidental Finding During Sclerectomy

First Author: Jingyi **SHI**

Co-Author(s): Yong **TAO**, Ying **TIAN**

Purpose: To report the identification and histopathological analysis of a suprachoroidal proliferative membrane in a patient with uveal effusion syndrome (UES) and nanophthalmos, highlighting its potential role in the pathophysiology of the condition.

Methods: A comprehensive ophthalmological examination, including fundus examination, IOL-Master biometry, and B-scan ultrasound, was performed on a 52-year-old female patient presenting with blurred vision. Sclerectomy was conducted, during which a white strand-like substance was extracted from the suprachoroidal space. Histopathological and immunohistochemical analyses were carried out to characterize the substance.

Results: The patient presented with hand motion visual acuity in the right eye and a best-corrected visual acuity of 0.4 in the left eye. Fundus examination revealed a spherical bulge of the retina in the right eye, and IOL-Master confirmed nanophthalmos with axial lengths of 18.2 mm (right) and 18.5 mm (left). B-scan ultrasound showed a retinal and choroidal detachment in the right eye. During sclerectomy, a 3 cm white strand-like substance was extracted from the suprachoroidal space of the right eye. Histopathological analysis identified it as a collagen-rich proliferative membrane, with immunohistochemical staining showing strong positivity for collagen type I and moderate positivity for CD68. Post-surgery, with topical corticosteroids, the uveal effusion resolved, the retina flattened, and visual acuity improved to 0.02 in the right eye.

Conclusions: The discovery of a suprachoroidal proliferative membrane rich in fibroblasts and macrophages in a patient with UES and nanophthalmos suggests an inflammatory component in the pathophysiology of nanophthalmic UES, providing new insights into its mechanism and potential therapeutic targets.

Abstract No.: 203806

Taming the Acute Storm: The Prognostic Influence of Early Systemic Immunosuppressive Therapy in Acute Uveitic Phase of Vogt-Koyanagi-Harada Syndrome

First Author: Asifa Tasnim **MOUTUBA**

Co-Author(s): Md.Dedarul **HASSAN**, Md.Zaman **SAKIB**

Purpose: Vogt-Koyanagi-Harada (VKH) disease is a bilateral, diffuse, idiopathic autoimmune condition and a major cause of severe vision loss. This study aims to assess the prognostic significance of initiating systemic immunosuppressive therapy early during the acute uveitic phase of the disease.

Methods: A prospective interventional study was conducted at Ispahani Islamia Eye Institute, Bangladesh (Aug 2024–Aug 2025). 80 eyes from 40 VKH patients were divided into two groups: early treatment (within 2 weeks of symptom onset) and delayed treatment (after 1 month). Treatment included intravenous methylprednisolone followed by oral prednisolone and immunomodulatory therapy. Outcomes measured over 3 months included best-corrected visual acuity (BCVA), intraocular pressure, central macular thickness, recurrence, and chronic disease development.

Results: A total of 80 eyes from 40 patients were analyzed. The mean age of the study population was 40 ± 11 years, with a male-to-female ratio of 1:2. Complete resolution of uveitis was observed in 23 patients (57.5%), while 12 patients (30%) developed a chronic course, and 4 patients (10%) progressed to chronic recurrent uveitis. Those who began immunosuppressive therapy within two weeks of symptom onset demonstrated significantly better visual outcomes, a notable reduction in central macular thickness, quicker resolution of exudative retinal detachment, and fewer instances of chronic recurrent disease and late complications such as sunset glow fundus.

Conclusions: Early immunosuppressive therapy during the acute phase of VKH improves long-term visual outcomes and lowers risk of chronic progression underscoring the need for prompt diagnosis and aggressive management.

Abstract No.: 202388

Targeted Delivery of Avacopan via Sortase A-Modified Extracellular Vesicles Attenuates Endotoxin-Induced Retinal Inflammation

First Author: Deixn **MENG**

Co-Author(s): Yidan **CHEN**, Cong **CUI**, Dawei **SUN**

Purpose: Uveitis is a prevalent ocular inflammatory condition and a major contributor to global vision impairment, impacting persons of all ages and genders. The inflammatory cascade activates the complement system, resulting in the production of C5a, promoting excessive neutrophil recruitment and reactive oxygen

species (ROS) bursts, thus intensifying tissue damage. In this study, we developed a targeted drug delivery system by conjugating small extracellular vesicles with the microglia-binding peptide MG1 using Sortase A. The C5aR1 antagonist CCX168 (Avacopan™) was loaded into the modified EVs via extrusion, resulting in the successful construction of a microglia-targeted therapeutic platform.

Methods: Using a lipopolysaccharide (LPS)-induced endotoxin-induced uveitis (EIU) model, we evaluated the effects of MG1-EVs/Ava on ocular inflammatory pathology, microglial migration, and retinal cytokine expression. In vitro assays were performed to assess the cytotoxicity of Avacopan as well as its impact on ROS generation and pro-inflammatory cytokine production. In addition, data-independent acquisition (DIA) proteomics analysis was conducted to explore the downstream signaling pathways involved in MG1-EVs/Ava-mediated therapeutic effects.

Results: Both in vitro and in vivo investigations indicated that MG1-EVs/Ava showed markedly improved transport efficiency relative to EVs/Ava and greater anti-inflammatory effects compared to Avacopan alone. In rescue experiments, siRNA-mediated knockdown of MAPK9 reversed the upregulation of C5aR1 and pro-inflammatory cytokines, further supporting its role in mediating the therapeutic effects of MG1-EVs/Ava.

Conclusions: The findings of this study demonstrate both the therapeutic efficacy and mechanistic basis of MG1-EVs/Ava, highlighting its potential as a promising treatment strategy for infectious uveitis.

Abstract No.: 207095

Tattoo-Associated Uveitis

First Author: Xuchuan WANG

Purpose: This paper elaborates on the clinical features of tattoo-related uveitis by presenting a well-documented case, analyzes the pathogenesis of this disease based on the tattoo history, and describes the treatment process.

Methods: Multiple tattoos were noted on the patient's body, with discoloration, stiffness, redness, unevenness, and slight skin damage on the left upper arm where a tattoo had been removed by laser six months prior. Five days after the laser removal, the patient developed decreased vision, eye redness, and photophobia in both eyes.

Results: In this case, the patient developed eye symptoms two weeks after laser tattoo removal. When laser is used to remove tattoos, it can break down pigment particles into smaller sizes, making them more easily captured by lymphocytes and triggering an immune response. At the same time, laser can also cause damage to normal skin tissue, leading to an inflammatory response and activating the immune

function. Generally speaking, local and systemic use of corticosteroids or immunosuppressants can treat patients of this kind. During the treatment, the ocular and skin symptoms often improve simultaneously. The patient in this case conforms to this situation.

Conclusions: Both tattooing and laser tattoo removal can cause panuveitis, but the mechanism remains to be further studied. With the popularity of tattoo culture, more cases of tattoo-related uveitis will emerge. All cases of uveitis with unknown causes should undergo inquiries and examinations regarding tattoos.

Abstract No.: 203237

The Risk Assessment of Uveitis After Monkeypox Diagnosis: A Multicenter Population-Based Study

First Author: Chun-ju LIN

Co-Author(s): Ning-yi HSIA, Alan Y. HSU, Hou-ting KUO, Bing-qi WU

Purpose: Human monkeypox (MPOX) infection is attributed to the MPOX virus. While details on ophthalmologic manifestations have been limited, some case reports of uveitis have also been documented. However, uveitis has not been extensively documented among MPOX patients. Therefore, we conducted a population-based study utilizing the TriNetX electronic health registry database.

Methods: This retrospective cohort study used the TriNetX database and recruited those with and without MPOX diagnosis from January 1, 2016, to December 31, 2023. The non-MPOX cohort consisted of randomly selected control patients, including age, gender, ethnicity, race, relevant comorbidities, previous medications, and the inflammatory marker C-reactive protein. Statistical analysis on uveitis risk included hazard ratios (HRs) and 95% confidence intervals (CIs) were calculated over 8 years (2016–2023). A separate analysis of the risk of uveitis among MPOX patients aged 20 years and older was also conducted.

Results: A total of 5449 MPOX patients of all ages (25.45% female; mean age 35.17 ± 15.70 years) and 5449 propensity-matched non-MPOX comparators (23.97% female; mean age 35.30 ± 15.91 years) were recruited. For both the overall MPOX patient population and the adult MPOX patients, the risk of uveitis was significantly higher. This increased risk mainly happened in patients with anterior uveitis. Specifically, the HR for uveitis in all MPOX patients was 2.59. Among MPOX patients aged 20 years or older, the HR for uveitis was 2.14.

Conclusions: There is a notable association between new-onset uveitis and patients with MPOX. Our real-world findings underscore the importance of being aware of the potential risk of anterior uveitis.

Abstract No.: 206625**Topical JAK-Inhibitor: A Possible Therapeutic Option for Ocular Inflammatory Diseases***First Author: Ngoc THAN**Co-Author(s): Amir AKHAVANREZAYAT, Jia-horung HUNG, Hareem KHAN, Caroline LU, Quan Dong NGUYEN, Wang SHEN, Albert TSAI*

Purpose: To investigate the potential of a selective topical JAK1/TYK2 inhibitor as a corticosteroid-sparing therapy in ocular inflammatory diseases, including postoperative inflammation and noninfectious anterior uveitis (NIAU). By targeting IL-12/IL-23 signaling, JAK1/TYK2 inhibitors suppress pro-inflammatory Th1 and Th17 responses, which play central roles in autoimmune and anti-inflammatory in uveitis.

Methods: Preclinical findings and early clinical experience with selective JAK1/TYK2 inhibitors were evaluated, with emphasis on anterior uveitis, postoperative inflammation, and ocular surface disease. Particular attention was given to cytokine modulation involving IL-12/IL-23 and Th1/Th17 responses, as well as the pharmacologic attributes of topical formulations engineered for ocular penetration.

Results: Topical JAK1/TYK2 inhibition demonstrated rapid and robust anti-inflammatory activity. In NIAU Phase 2 trials, both concentrations of topical JAK1/TYK2 inhibitor achieved a ≥ 2 -grade reduction in ACC in $>92\%$ of subjects by day 14, compared with 77.80% for prednisolone acetate ($p=0.048$). Rates of complete ACC resolution at Day 28 reached 85.71% with high-dose group versus 77.78% with prednisolone acetate. In postoperative inflammation, a significantly greater proportion of patients achieved complete resolution of anterior chamber cells (ACC=0) at day 15 compared to approved corticosteroids ($p<0.01$), accompanied by superior pain relief. Importantly, ocular adverse events were comparable to vehicle, with no evidence of steroid-related intraocular pressure elevation.

Conclusions: Topical JAK1/TYK2 inhibition represents a promising new therapeutic class for ocular inflammatory disease, combining efficacy comparable or superior to corticosteroids with a favorable safety profile. Its mechanism of targeting IL-12/IL-23-driven inflammation supports broad application across uveitis, postoperative inflammation, and ocular surface disease. This approach may redefine management of ocular inflammation while reducing reliance on corticosteroids.

Abstract No.: 204567**UveAltis: Development, Performance Evaluation, and Benchmarking of a Novel Uveitis Retrieval-Augmented Chatbot for Patients and Physicians***First Author: Elaine Marie TAN**Co-Author(s): Rupesh AGRAWAL, Carlos CIFUENTES-GONZÁLEZ, Alejandra DE-LA-TORRE, William ROJAS-CARABALI, Maxwell SINGER*

Purpose: Uveitis, a complex group of inflammatory eye conditions, poses significant diagnostic challenges that can lead to impaired visual outcomes. Accurate diagnosis and effective patient education are crucial for improving care. This study introduces UveAltis, an AI-based chatbot utilizing Retrieval-Augmented Generation (RAG) and GPT-4o, designed to enhance diagnostic accuracy and provide high-quality patient education for uveitis. This study assesses the diagnostic accuracy and patient education capabilities of UveAltis compared to traditional diagnostic criteria and other language models.

Methods: A validation study was conducted using simulated clinical scenarios to evaluate UveAltis's diagnostic performance. Comparisons were made with five large language models (ChatGPT4o mini, ChatGPT4o, Gemini 1.5 Flash, Meta Llama3.1, Claude Sonnet-3.5) and the Standardization of Uveitis Nomenclature (SUN) criteria. Patient-related queries were assessed using Likert scales for correctness, completeness, readability, helpfulness, and safety. Data analysis was based on a peer-reviewed literature dataset of 1,421 relevant uveitis articles. Independent ophthalmologists reviewed all cases and educational outputs.

Results: UveAltis achieved a diagnostic accuracy of 92% (23/25 cases), outperforming other models (range: 44%–88%). It demonstrated superior patient education capabilities, scoring higher in correctness, completeness, readability, and safety compared to online resources. Diagnostic task completion was 80% (20/25) for task 1 and 92% (23/25) for task 2. Statistically significant differences ($P < .05$) were observed in educational quality across multiple dimensions.

Conclusions: UveAltis, leveraging GPT-4o and RAG, serves as a translational bridge between AI innovation and clinical ophthalmology, significantly improving diagnostic support and patient education in uveitis. It represents a promising digital health tool for improving outcomes in complex ocular diseases, especially in settings with limited specialist access.

Myopia

Abstract No.: 203784

A New Perspective on Myopia Control: The Causal Role of Depression and Anxiety

First Author: Xiao WANG

Co-Author(s): Zhipeng LAI, Zhouyue LI, Jinyi XU, Shengsong XU, Xiao YANG

Purpose: To investigate the bidirectional causal relationship between depression, anxiety, and myopia using a robust genetic approach.

Methods: We employed a bidirectional two-sample Mendelian randomization to examine the causal relationship between depression, anxiety and myopia, while accounting for potential confounding factors. Summary statistics from large-scale genome-wide association studies (GWAS) were utilized. Genetic variants (single-nucleotide polymorphisms, or SNPs) associated with depression were sourced from the FinnGen consortium, and those for anxiety were obtained from the Psychiatric Genomics consortium. The inverse-variance weighted (IVW) method served as our primary analytical tool, complemented by comprehensive sensitivity analyses, including MR-Egger regression and leave-one-out analysis, to ensure the robustness of our findings and detect potential pleiotropy.

Results: A total of 21, 10 SNPs were selected as instrumental variables for depression and anxiety, respectively. Based on the IVW analysis, both depression (OR = 1.010, 95% CI = 1.002-1.018, P = 0.016) and anxiety (OR = 1.083, 95%CI = 1.022-1.149, P = 0.008) increased the risk of myopia. After adjusting in the multivariable MR, the IVW and Egger methods indicated that depression (OR = 1.004, 95%CI = 1.000-1.008, P = 0.030) or anxiety (OR = 1.004, 95%CI = 1.001-1.008, P = 0.026) was still associated with elevated risks of myopia.

Conclusions: This study provides compelling genetic evidence of a direct causal link between mental health disorders, specifically depression and anxiety, and an increased risk of myopia. These findings highlight the importance of integrating mental health screening and support into strategies for myopia prevention and control. Future research should focus on the underlying biological mechanisms to inform more targeted clinical interventions.

Abstract No.: 206943

AI-Based Non-Cycloplegic Refraction Diagnosis and Multimodal Temporal Prediction of Myopia Risk

First Author: Yunyun SUN

Co-Author(s): Mengxian HE

Purpose: To develop and validate two artificial intelligence (AI) models: (1) a diagnostic model for accurate refraction assessment under non-cycloplegic conditions, and (2) a multimodal temporal model for individualized prediction of myopia onset and progression.

Methods: Subjects were recruited from the Beijing, Lhasa and Anyang Eye Study. Cycloplegia was achieved with two drops of 1% cyclopentolate and 1 drop of Mydrin P (Tropicamide 0.5%, phenylephrine HCl 0.5%). For the diagnostic model, data from over 30,000 individuals were used. Demographic, non-cycloplegic refraction, and ocular biometric parameters were integrated. Missing values were imputed with Hyperband-optimized learners, followed by ensemble learning to predict cycloplegic refraction and myopia classification, with a final neural network aggregator. For the temporal prediction model, longitudinal data with 6 years of follow-up) were analyzed, integrating refraction, axial length, corneal curvature, fundus imaging, genetic, and environmental factors. Multimodal and multi-time-scale modeling was performed, incorporating temporal variables. Model interpretability was assessed with SHAP analysis.

Results: The diagnostic model reduced unnecessary cycloplegia by 35% while maintaining 95% sensitivity, supporting reliable and cost-effective screening. The temporal model achieved high accuracy, with a one-year prediction error of 0.16D, clinically negligible. SHAP analysis identified temporal intervals as the most influential predictor, surpassing ocular biometry. Regional comparisons (plateau vs. plain populations) revealed limited cross-applicability, highlighting environmental and lifestyle effects.

Conclusions: AI-driven approaches enable accurate refraction diagnosis without routine cycloplegia and provide dynamic, multimodal prediction of myopia risk. These models improve screening efficiency, support personalized management, and emphasize the need for region-specific adaptation in global applications.

Abstract No.: 205112

Adjunctive Use of Eyelid Wipes Improves Ocular Surface Condition in Children Initiating Orthokeratology

First Author: Xiaoxiao ZHANG

Co-Author(s): Mansha HE

Purpose: To evaluate whether eyelid wipes improve ocular surface health and meibomian gland function

in children newly fitted with orthokeratology (Ortho-K) lenses.

Methods: Fifty-eight myopic children (mean age 10.2 ± 1.3 years) initiating Ortho-K were randomized to an eyelid-wipe group ($n = 31$, daily wipes for 1 month) or a control group ($n = 27$, no lid hygiene). Baseline and 1-month follow-up assessments included noninvasive tear breakup time (NITBUT), lipid layer thickness (LLT), tear meniscus height (TMH), meibomian gland expressibility (MGE), corneal fluorescein staining (CFS), Ocular Surface Disease Index (OSDI), and overnight lens-wear comfort.

Results: All participants completed follow-up with comparable baseline characteristics. After 1 month, NITBUT showed modest improvement in the eyelid-wipe group (6.8 ± 2.5 s to 7.4 ± 2.6 s) versus minimal change in controls ($P = 0.12$). LLT tended to increase with wipes while remaining stable in controls ($P = 0.07$). MGE improved significantly in the eyelid-wipe group (2.5 ± 0.9 to 1.9 ± 0.8) compared with controls ($P = 0.002$). CFS rose in both groups but was significantly lower with eyelid wipes ($P = 0.03$). TMH showed no significant change. Subjective outcomes favored eyelid wipes, with greater OSDI reduction ($P = 0.02$), better overnight comfort ($P = 0.04$), and reduced morning crusting/itching (48% vs. 19%, $P = 0.01$). No adverse events were observed.

Conclusions: Adjunctive eyelid wipes improved meibomian gland function, ocular comfort, and corneal staining outcomes in children beginning Ortho-K wear. Incorporating lid hygiene may enhance safety and tolerability in pediatric Ortho-K management.

Abstract No.: 206834

Advancing Myopia Care Through Generative AI-Enabled Non-Invasive Choroidal Vascular Fingerprinting

First Author: Danli **SHI**

Co-Author(s): Mingguang **HE**

Purpose: To non-invasively generate indocyanine green angiography (ICGA)-like choroidal vasculature from color fundus photography (CFP), establish a comprehensive vascular analysis system, and evaluate their clinical utility as biomarkers for myopia progression.

Methods: A generative adversarial network (GAN) was trained on paired CFP-ICGA images to synthesize ICGA-like choroidal vessels. Segmented ICGA vasculature served as ground truth. Segmentation performance was evaluated using the area under the receiver operating characteristic curve (AUC). From simulated images, five categories of choroidal metrics—caliber, density, complexity, branching angle, and tortuosity—were extracted. Associations with myopia were tested in 34,623 UK Biobank participants, while predictive value for progression was evaluated in 542 adolescents

from the Guangzhou Twin Eye Study over a median 4-year follow-up, using regression models adjusted for conventional risk factors with FDR correction.

Results: The GAN generated detailed choroidal vessel segmentations, achieving an AUC of 0.746 (95% CI: 0.704–0.787) from CFP input and 0.940 (95% CI: 0.929–0.950) from ICGA input. In UK Biobank, 84 and 85 of 102 choroidal parameters were significantly associated with spherical equivalent and prevalent myopia, respectively. In adolescents, models incorporating age, gender, and choroidal vessel metrics predicted axial length progression with an AUC of 0.888, compared to 0.852 for risk factors alone; for spherical equivalent progression, the corresponding AUCs were 0.844 vs. 0.805, with significant improvements when choroidal features were added.

Conclusions: Generative AI enables non-invasive reconstruction of ICGA-level choroidal vasculature from CFP. Quantitative choroidal vascular fingerprints significantly enhance the prediction of myopia progression, representing novel biomarkers with strong potential for personalized myopia management.

Abstract No.: 206871

Age Alone Predicts Myopia Progression From School Age to Early Adulthood

First Author: Yin **HU**

Co-Author(s): Xiaohu **DING**

Purpose: Each additional diopter of myopia confers a 20%-60% increase in the risk of varying sight-threatening complications. It is imperative to establish prediction models to identify children at risk of experiencing excessive cumulative myopia progression spanning the critical progression period and, accordingly, administer proactive intervention. This study aimed to develop and validate prediction models for cumulative myopia progression by early adulthood.

Methods: Prediction models were derived using data of a prospective, 12-year twin cohort in Guangzhou, China. Cumulative axial elongation by adulthood was defined as the change in axial length from the current visit to the last follow-up visit as an adult (≥ 18 years). Multilevel logistic regression models were built and validated to predict cumulative axial elongation of 0.4 mm or more. Age was used to develop a univariate model. Prior defined candidate predictors were selected to develop a multivariate prediction model. Discrimination and calibration were evaluated based on five-fold cross-validation.

Results: A total of 9782 visits from 1203 eligible participants (526 [43.72%] males; mean [SD] age and SE refraction at first recorded visit after myopia onset, 12.81 [2.23] years and -1.93 [1.60] D, respectively) were analyzed. An age-only-based model demonstrated excellent predictive discrimination (AUC [95%CI] of five-fold cross-validation, 0.96 [0.96, 0.97])

and calibration (Brier score [95%CI], 0.08 [0.08, 0.08]). Inclusion of other predictive variables did not improve model performance.

Conclusions: An age-only-based model demonstrated good predictive accuracy for cumulative myopia progression that needs proactive intervention. Future studies are needed to validate its clinical utility.

Abstract No.: 201308

Analysis of Gene Mutation Spectrum for Early-Onset High Myopia Based on Whole Exome Sequencing

First Author: Liyin **WANG**

Co-Author(s): Xingtao **ZHOU**

Purpose: This study aimed to identify the loci of gene mutations associated with high myopia (HM), analyse the genetic mutation spectrum characteristics for early-onset HM (eo-HM), and explore the application of polygenic risk scores (PRS) in predicting eo-HM.

Methods: Whole-exome sequencing (WES) and ophthalmic measurements were performed on participants with HM, and the mutation results were further verified by copy number variation sequencing, long-range PCR, and Sanger sequencing. Participants were classified into eo-HM (onset age <7 years, binocular spherical equivalent refraction <-6.0 dioptres [D]) and late-onset HM (lo-HM). PRS was calculated and assessed for eo-HM prediction accuracy through receiver operating characteristic (ROC) curve metrics.

Results: The participants comprised 100 patients with HM. WES identified 36 variants across 35 of 100 patients (35.00%), with the eo-HM group exhibiting a significantly higher detection rate (56.52%) than the lo-HM group (16.67%) ($p < 0.001$). COL2A1 c.1221+1G>A, ARR3 c.41T>C, GLRA2 c.1006G>A, ZEB1 c.1672C>T, and HDAC8 c.466A>G were recognized as denovo mutation loci in eo-HM. TCF7L2, AIPL1, INPP5E and promoter mutation of SALL4 were identified as novel potential pathogenic mutations for HM. Genetic mutations related to retinal diseases were more frequently observed in eo-HM group than in the lo-HM group ($p < 0.01$). ROC curve analysis signified that PRS could serve as a potential predictor for eo-HM, (area under the curve 0.70).

Conclusions: This study expands the eo-HM mutational spectrum and proposes novel HM pathogenic genes, while demonstrating PRS's potential as a predictive model for eo-HM.

Abstract No.: 200578

Association Between Relative Peripheral Refractive Error and Myopia Progression: A Preliminary Study Using Optical Path Difference Scans

First Author: Kai En **CHAN**

Co-Author(s): Marcus **ANG**, Joey Zi Ying **CHUNG**

Purpose: Myopia is one of the leading causes of irreversible visual impairment globally. The role of relative peripheral hyperopia in myopia onset and progression remains debated. This study evaluates the relationship between relative peripheral refraction (RPR) and myopic status using Optical Path Difference (OPD) scan data.

Methods: This cohort study included 660 patients (1320 eyes) from the AIM cohort who underwent cycloplegic OPD scans at follow-up. RPR was calculated as the difference between peripheral (6-8 mm optical zone diameter) and central (2-4 mm zone) refraction derived from OPD scan. Linear regression was used to assess associations between RPR and myopic status, while generalised estimating equations evaluated the association between RPR and myopic progression. Models were adjusted for age, pupil size, astigmatism and inter-eye correlation.

Results: Myopic eyes had significantly more hyperopic RPR compared to non-myopic (β : +0.16D, 95%CI: 0.07-0.25 D, $p = 0.001$) eyes. However, no significant difference was observed between low and moderate-high myopia. Eyes with relative peripheral hyperopia at follow-up were more likely to have shown myopic progression (RR: 1.13, 95%CI: 1.02-1.25, $p = 0.020$) from baseline.

Conclusions: Although RPR was measured at follow-up, eyes with relative peripheral hyperopia were more likely to have exhibited myopic progression from baseline. This association supports the relevance of RPR in myopia and highlights the potential of OPD-based measurements as an adjunctive tool in identifying eyes at risk of progression. Further prospective studies are warranted to validate its predictive utility.

Abstract No.: 202403

Association of Attention-Deficit Hyperactivity Disorder With Myopia Among School Children

First Author: Xiu Nian **CHEN**

Co-Author(s): Jason **YAM**

Purpose: To determine the relationship of attention-deficit hyperactivity disorder (ADHD) with myopia among school children.

Methods: Children aged six to eight years in Hong Kong were recruited through a stratified, clustered randomized sampling frame and subsequently invited to undergo cycloplegic autorefractometry and axial length

measurements between 2016 and 2021. ADHD diagnoses were made by qualified physicians according to ICD-10 criteria. ADHD symptoms were assessed using the SWAN Questionnaire.

Results: Totally 474 children with ADHD and 9950 control children were included. The age- and sex-adjusted myopia prevalence was lower in ADHD group (21%) versus controls (26%; $P = 0.02$). Multivariable regression analysis showed less myopia ($OR = 0.75$; $P = 0.03$), higher spherical equivalent refraction (SER) ($\beta = 0.13$; $P = 0.04$), and shorter axial length (AL) ($\beta = -0.07$; $P = 0.03$) in children with ADHD. Specifically, ADHD with oral MPH treatment had less myopia ($OR = 0.61$, $P = 0.04$), higher SER ($\beta = 0.36$; $P < 0.001$) and shorter AL ($\beta = -0.25$; $P < 0.001$) compared to controls. Each additional month of MPH treatment was associated with a higher SER ($\beta = 0.02$; $P = 0.01$) and shorter AL ($\beta = -0.01$; $P = 0.01$). For each one-point increase in attention-deficit scores, children were found to be less myopic ($OR = 0.88$, $P = 0.01$), having higher SER ($\beta = 0.07$; $P = 0.003$) and shorter AL ($\beta = -0.04$; $P = 0.001$). The prevalence of myopia among ADHD increased to 32% during COVID-19 pandemic compared with 23% before COVID-19 pandemic ($P = 0.04$).

Conclusions: This cross-sectional study found that ADHD is associated with reduced myopia prevalence, more hyperopic SER, and shorter AL.

Abstract No.: 200973

Association of Optic Nerve Head Metrics and Parapapillary Gamma Zone With Myopia Onset and Progression in Children: The Hong Kong Children Eye Study

First Author: Yi LI

Co-Author(s): Jason C. YAM, Xiu Juan ZHANG

Purpose: The purpose of this study was to evaluate the associations of optic nerve head (ONH) metrics and parapapillary gamma zone with myopia onset and progression in school children aged 6 to 8 years over 3 years.

Methods: The ONH was imaged by spectral domain-optical coherence tomography (SD-OCT) using an adopted scan protocol comprising 24 equally spaced radial B-scans.

Results: The study included 765 children (mean age: 7.69 ± 1.01 years). Significant differences were found in disc ovality index, gamma zone area, Bruch's membrane opening distance (BMOD), temporal border tissue angle (BTA), and optic disc-fovea distance (DFD) across different refractive status groups (all $P < 0.001$). Multivariable logistic regression analysis indicated that female sex ($OR = 1.74$; $P = 0.006$), longer axial length ($OR = 1.81$; $P < 0.001$), larger nasal BTA ($OR = 1.01$; $P = 0.005$), larger temporal BTA ($OR = 1.01$; $P = 0.019$), optic disc torsion ($OR = 2.12$; $P = 0.007$), and longer DFD at baseline ($OR = 3.39$; $P < 0.001$) were risk factors

of myopia onset, while presence of gamma zone at baseline was not. In multivariable linear regression analysis, baseline disc ovality index, BMOD, nasal BTA, temporal BTA, and DFD, as well as changes in BMOD, nasal BTA, temporal BTA, gamma zone area, and DFD were significantly associated with spherical equivalent (SE) progression over 3 years.

Conclusions: ONH parameters like nasal BTA, temporal BTA, disc torsion, and DFD may have predictive value for myopia onset and progression. As the myopic SE progresses, gamma zone enlargement coincides with the elongation of BMOD and DFD.

Abstract No.: 205013

Behavioral and Familial Risk Factors for Myopia Prevalence in Chinese Schoolchildren: A Latent Class Analysis

First Author: Hongmei ZHANG

Co-Author(s): Ruihua

Purpose: To identify high-risk behavioral patterns and family factors contributing to myopia prevalence among primary and secondary school students in China using latent class analysis (LCA).

Methods: This cross-sectional study analyzed data from 2,755 students aged 6-16 years, enrolled in the Tianjin Child and Adolescent Research of Eye (TCARE). Participants completed eye examinations and questionnaires assessing lifestyle factors such as physical activity, diet, near work, and screen time. LCA was used to classify students into distinct behavioral phenotypes. Multivariable logistic regression analyzed associations between these phenotypes and myopia risk, adjusting for parental myopia and education level.

Results: Three behavioral categories were identified: Healthy Behavior (44.6%), Eye Strain (24.6%), and Eye Strain with Unhealthy Diet (30.8%). Students in the Eye Strain and Unhealthy Diet category exhibited a 1.61-fold increased risk of myopia, while the Eye Strain category had a 1.89-fold increased risk compared to the Healthy Behavior category. Parental myopia and maternal education were also significant predictors of myopia risk.

Conclusions: Behavioral patterns, particularly those involving excessive screen time and insufficient physical activity, contribute significantly to myopia prevalence in Chinese schoolchildren. Our findings suggest that lifestyle modifications, including increased physical activity and reduced screen exposure, could be effective strategies for myopia prevention. The role of parental education highlights the importance of family-level interventions in mitigating myopia risk.

Abstract No.: 200768

Better Myopia Control of Orthokeratology Than Defocus Incorporated Soft Contact Lenses by Including the Modulation of Retinal Blood Flow

First Author: Yunjie ZHANG

Co-Author(s): Lin FU, Yijing PING, Shumeng YAO, Xiaoyu ZHUANG

Purpose: This study compares the effects of orthokeratology (OK) lenses and Defocus Incorporated Soft Contact (DISC) on retinal vessel density (RVD) and investigates the role of retinal microcirculation in myopia control.

Methods: A self-controlled clinical trial included 35 subjects (8-12 years) with myopia (-1.00D to -5.00D). Participants wore OK lenses or DISC in one eye, with the contralateral eye serving as the control. RVD was assessed using optical coherence tomography angiography, and axial length (AL) elongation was tracked. The 9 grids with the macula as the center and the 4-quadrant dividing method were utilized.

Results: After 12-month treatment, the AL elongation was significantly shorter in the OK group (0.17 ± 0.17 mm) compared to the DISC group (0.26 ± 0.15 mm, $P < 0.05$). RVD in the OK group initially decreased but rebounded to baseline values after 4 weeks off wearing, while the DISC group showed no significant changes. Baseline RVD parameters divided by the 9 grids method predicted AL elongation (AUC: 0.768-0.824, $P < 0.05$) in the OK group, whereas the RVD parameters from the 4 quadrants dividing method showed no correlation with the AL elongation.

Conclusions: The OK lenses showed better myopia control than the DISC lenses in this study, and this may be potentially mediated through retinal microcirculation modulation. This study further identifies RVD biomarkers from the 9-grid dividing method, predicting the myopia control effect of OK lenses. Therefore, more attention should be paid to the RVD changes by the 9-grid dividing method.

Abstract No.: 203496

Blue Light Suppresses Form-Deprivation Myopia in Mice via an Opn4-Mediated Pathway

First Author: Congying LI

Co-Author(s): Ying HUANG, Yuting KANG, Shi-ming LI, Xinyu LI, Tianli PENG, Meijun WANG, Ningli WANG

Purpose: The role of blue light in myopia development remains controversial. This study aimed to determine whether 480 nm blue light influences form-deprivation myopia (FDM) via intrinsically photosensitive retinal ganglion cells (ipRGCs) that express Opn4.

Methods: Monocular FDM was induced in C57BL/6J mice from postnatal days 21 to 63 (P21-P63),

maintained under a 12-hour light/12-hour dark cycle. Control mice were exposed solely to white light, while experimental groups received additional 480 nm blue light during one of the following intervals: 05:00-08:00, 17:00-20:00, 20:00-23:00, 08:00-20:00, or continuously ($n=10$ per group). The most effective interval for suppressing FDM was further tested in Opn4^{-/-} mice ($n=10$). Refractive error, axial length, and retinal Opn4 expression were evaluated at P63.

Results: Blue light exposure from 20:00-23:00 significantly suppressed FDM in C57BL/6J mice, resulting in reduced myopic shifts (-6.42 ± 4.08 D vs. -18.87 ± 9.66 D, $P = 0.007$), less axial elongation (0.014 ± 0.032 mm vs. 0.071 ± 0.017 mm, $P = 0.003$), and elevated Opn4 expression (0.79 ± 0.25 vs. 0.56 ± 0.10 , $P = 0.010$) compared with white-light controls. Other intervals did not yield significant protective effects. In Opn4^{-/-} mice, blue light exposure during this interval failed to suppress FDM, with refractive errors and axial elongation similar to those of wild-type controls under white light (-13.36 ± 3.62 D vs. -17.35 ± 4.31 D, 0.037 ± 0.014 mm vs. 0.030 ± 0.012 mm, all $P > 0.05$).

Conclusions: These findings identify Opn4 as an essential mediator in the suppression of myopia by blue light, highlighting its potential role in developing innovative light-based therapeutic strategies.

Abstract No.: 201033

CPNE1: A Novel Therapeutic Target for Myopia Progression – From Genetic GWAS Discovery to Functional Validation In Vivo

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Co-Author(s): Shan GAO, Guoge HAN, Yan WANG, Yining WANG, Pinghui WEI, Zitian XIA

Purpose: To identify novel regulatory genes associated with myopia and validate their functional roles in vivo using animal models.

Methods: We performed a fixed-effect meta-analysis of two large-scale genome-wide association studies (GWAS) comprising 41,468 cases and 817,202 controls to identify genome-wide significant loci associated with myopia. Potential functional myopia-associated genes were prioritized using summary data-based Mendelian randomization (SMR). Bayesian colocalization analysis, Mendelian randomization (MR) analysis, and validation in an independent cohort were used to verify the causal roles of the candidate genetic loci. DEGseq2 differential expression and machine learning-based LASSO feature selection, scleral transcriptomic analyses were investigated to strengthen the CPNE1 myopic prevention role. Single-cell RNA sequencing (scRNA-seq) and immunohistochemistry (IHC) were used to localize CPNE1 expression within ocular tissues. CPNE1 was overexpressed by adeno-associated virus (AAV) from the sclera in the lens-induced myopic (LIM) model, and its potential inhibiting eye axial progression role in scleral fibroblast was explored.

Results: The GWAS meta-analysis identified 35 genome-wide significant loci associated with myopia. Integrative SMR and colocalization analyses consistently prioritized CPNE1 (SMR: FDR < 0.05; colocalization: PP_{H4} = 0.988). MR analysis supports a causal protective role of CPNE1 in myopia (Wald [OR] = 0.97; IVW [OR] = 0.98). Transcriptomic profiling demonstrated significant downregulation of CPNE1 in myopic sclera (log₂FC = -7), and LASSO regression identified CPNE1 as a key feature gene. ScRNA-seq and IHF localized CPNE1 expression predominantly to scleral fibroblasts. In the LIM model, CPNE1 expression was significantly decreased, while AAV-mediated overexpression of CPNE1 attenuated axial elongation and refractive error progression. Mechanistically, CPNE1 overexpression was associated with upregulated α -SMA levels, suggesting a potential role in scleral remodeling.

Conclusions: These findings establish CPNE1 as a novel potential therapeutic target for myopia.

Abstract No.: 201438

Causes and Outcomes of Explantations of Iris-Fixated Phakic Intraocular Lenses in Patients With Corneal Endothelial Cell Loss

First Author: Jooye **PARK**

Co-Author(s): Yong-soo **BYUN**, So-hyang **CHUNG**, Hyun Seung **KIM**, Hye-yeon **YOON**

Purpose: To evaluate the risk factors contributing to corneal endothelial cell density (ECD) loss associated with iris-fixated phakic intraocular lenses (pIOLs) and to assess postoperative ECD changes until 1 year after explantation.

Methods: This retrospective study included 114 eyes (61 patients) that underwent explantation of Artisan (n=55) or Artiflex (n=59) pIOLs due to progressive ECD loss. Preoperative ocular parameters were analyzed, and ECD changes were tracked up to 1 year postoperatively. Receiver operating characteristic (ROC) curves were used to determine cutoff values for preventing significant post-explantation ECD loss at postoperative 1 year.

Results: The mean pre-explantation ECD was 1637 cells/mm² in the Artisan group and 1769 cells/mm² in the Artiflex group. The risk factors of decreased ECD were a small anterior chamber angle (ACA) and the distance of the nasal edge of the IOL to the endothelium in both groups. The difference in fixation length between temporal and nasal fixation in the Artisan group, and fixation length and iris pigmentation grading in the Artiflex group were additional risk factors. Cutoff values of preoperative ECD to minimize irreversible ECD loss were 1683.5 cells/mm² (Artisan) and 1648 cells/mm² (Artiflex).

Conclusions: Both anatomical and inflammatory factors contribute to ECD loss in eyes with iris-fixated pIOLs. Close monitoring of anterior segment changes

and ECD is essential to determine optimal timing for explantation and to prevent irreversible endothelial damage.

Abstract No.: 204471

Central Regulation in Myopia Development: Evidence From Optic Nerve Pathways in Myopic Mice

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Co-Author(s): Zhouyue **LI**, Xiao **WANG**, Jin-yi **XU**, Xiao **YANG**

Purpose: This study aimed to explore the regulating role of optic nerve conduction in refractive development in the murine model and its potential mechanism.

Methods: Optic nerve conduction in mice was blocked by optic nerve crush (ONC), with the Sham surgery (SHAM) group serving as the control. The 21-day-old C57BL/6 mice were divided into four groups: ONC group, SHAM group, optic nerve crush and lens-induced (ONC-LIM) group, and sham surgery and lens-induced (SHAM-LIM) group. The refraction was detected with retinoscopy after pupils dilated with compound tropicamide and ocular biological parameters were measured by optical coherence tomography in vivo at baseline and 2 weeks after the intervention. Bulk RNA-sequencing analysis was conducted with the mouse retina between the ONC group and the SHAM group.

Results: After ONC, 50% of the mice showed a myopic shift and 25% showed a hyperopic shift, and the changes of axial length (AL) were consistent with refraction. The ONC-LIM group did not show myopia shift and axial elongation similar to the SHAM-LIM group, suggesting that optical defocus could not induce a myopic shift in mice after ONC. RNA-seq analysis revealed several neural-related pathways, such as glutamatergic synapse, GnRH signaling, and long-term depression.

Conclusions: This study suggested that intact optic nerve conduction is required for murine emmetropization and lens-induced myopia. The potential mechanism may involve the central nervous system.

Abstract No.: 205336

Changes in Anterior Segment and Fundus Structure After ICL Surgery for High Myopia

First Author: Yifei **PENG**

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Purpose: The study aims to investigate the effects of implantable collamer lens (ICL) implantation on intraocular pressure (IOP), anterior chamber angle, and fundus structure.

Methods: This prospective study enrolled patients with high myopia undergoing ICL implantation. IOP,

angle opening distance (AOD), angle recess area (ARA), trabecular-iris space area (TISA), trabecular iris angle (TIA), vault, disc RPC vessel density (DRVD), foveal avascular zone area (FAZ area), superficial vessel density (SVD) and deep vessel density (DVD) in the macular region were measured preoperatively, 1 day, 1 week and 3 months postoperatively. Paired t-tests, Mann-Whitney U tests, repeated-measures ANOVA, and Spearman correlation were performed, with significance set at $P < 0.05$.

Results: This study enrolled 63 eyes that completed follow-up. IOP peaked at one week and returned to baseline by 3 months. Postoperative anterior chamber angle parameters narrowed significantly ($P < 0.05$). At 3 months, nasal AOD750 and ARA750 increased, while selected TIA values showed further narrowing ($P < 0.05$). Parafoveal and paracentral SVD exhibited transient decreases in specific regions at 1 week, recovering to preoperative levels by 3 months. Similarly, DVD decreased significantly ($P < 0.05$) in the inferior parafoveal and temporal paracentral areas at 1 week and normalized by 3 months. DRVD dropped at 1 week and recovered. FAZ narrowed at 1 day ($P < 0.05$) and stabilized.

Conclusions: ICL implantation led to transient IOP and macular vessel density changes, which recovered by 3 months. However, a significant anterior chamber angle was narrowed, and a reduced FAZ area persisted.

Abstract No.: 207086

Comparative Evaluation of Different (Peripheral Defocus-Based) Spectacle Designs in Preventing Myopia Progression: 2-Year Results From a Double-Blinded Randomized Clinical Trial

First Author: Vinay GUPTA

Co-Author(s): Rebika, Swati PHULJHLE, Rohit SAXENA, Namrata SHARMA

Purpose: This study aimed to evaluate and compare the 2-year efficacy of different peripheral defocus-based spectacle designs [Defocus Induced Multiple Segment (DIMS), Highly Aspherical Lenslets (HALT), and Cylindrical Annular Refractive Element (CARE)] in controlling myopia progression.

Methods: This was a prospective, interventional, double-blinded, randomized clinical trial. Children aged 5-15 years, with myopia between -1D and -8D and documented myopia progression of $\geq 0.5D$ /year, were randomly assigned (1:1:1) to wear either DIMS, HALT, or CARE spectacles full-time. Ethical approval was obtained. Cycloplegic refraction and axial length measurements were recorded at baseline and 2-year follow-up. The primary outcome was the change in the rate of myopia progression. All analyses were performed based on the intention-to-treat principle.

Results: One Hundred Twenty participants (40 in each group: DIMS, HALT, and CARE) with a mean age of 10.1 ± 3.3 years (57% male) were enrolled. At the 2-year follow-up, the rate of myopia progression reduced by $0.4 \pm 0.12D$ /year (58.8%) for the DIMS-group, $0.39 \pm 0.11D$ /year (58.6%) for the HALT-group, and $0.33 \pm 0.13D$ /year (49.6%) for the CARE-group. The change in axial length was $0.18 \pm 0.1mm$ /year, $0.19 \pm 0.13mm$ /year and $0.22 \pm 0.12mm$ /year after 2 years of DIMS, HALT and CARE spectacles wear respectively. Inter-group comparisons showed a significant difference in the rate of myopia progression between DIMS and CARE ($P: 0.042$) and between HALT and CARE ($P: 0.047$). No significant differences were found between HALT and DIMS for any parameter. No adverse events reported with any design.

Conclusions: Spectacles incorporating peripheral defocus (DIMS, HALT, and CARE) were safe and significantly effective in reducing the rate of myopia progression. Among the three designs, DIMS and HALT exhibited comparable and significantly better efficacy than CARE spectacles at 2-year follow-up.

Abstract No.: 202589

Corneal Higher-Order Aberrations as Key Predictive Indicators of Axial Elongation in Myopic Children With Orthokeratology: A Single-Center Prospective Cohort Study

First Author: Ju ZHANG

Co-Author(s): Weiyun SHI

Purpose: This prospective study aimed to investigate changes in corneal higher-order aberrations (HOAs) in myopic children using orthokeratology (ortho-k) lenses and their relationship with myopia progression.

Methods: A total of 112 children aged 8-13 years were divided into group A (axial elongation ≤ 0.1 mm/y with ortho-k) and group B (axial elongation > 0.1 mm/y with ortho-k). At baseline, 1, 6, and 12 months following the initiation of lens wear, HOAs and corneal peripheral defocus were evaluated.

Results: Ninety-three patients completed the 1-year follow-up. The mean axial elongation was -0.07 ± 0.15 mm/y in group A, versus 0.32 ± 0.17 mm/y in group B. No statistical differences were observed in HOAs and corneal peripheral defocus at 1, 6, and 12 months ($F=0.653, 0.878; P > 0.05$). Multivariate linear regression showed axial elongation was negatively correlated with Δ HOAs, peripheral defocus, and Δ horizontal coma (standardized beta= $-0.331, -0.318, -0.209; P=0.006, 0.001, 0.010$, respectively) and positively correlated with the treatment zone diameter (standardized beta= $0.261, P=0.003$). Multivariate logistic regression identified Δ HOAs, peripheral defocus, Δ horizontal coma, and treatment zone as key factors distinguishing group A from group B (OR= $0.009, 0.455, 0.123, 12.172; P=0.036, 0.003, 0.032, 0.019$, respectively). The ROC

curve for Δ HOAs had an area of 0.803 with a cut-off value of 0.834 μm .

Conclusions: The Δ HOAs were more effective independent predictors of axial elongation than corneal peripheral defocus in children using ortho-k lenses. The Δ HOAs greater than 0.834 μm may lead to axial elongation ≤ 0.1 mm/y. These findings can be beneficial to fitting and optimizing ortho-k lenses.

Abstract No.: 204374

Correlations Between Photoreceptor Cell and Retinal Blood Flow Parameters in Low to Moderate Myopia by Adaptive Optics Scanning Light Ophthalmoscopy

First Author: Yingfan **WANG**

Co-Author(s): Manman **HUANG**, Changgeng **LIU**, Qian **LIU**, Yu **ZHANG**

Purpose: To study the association between photoreceptor cells and blood flow parameters of low to moderate myopia via novel adaptive optics scanning light ophthalmoscopy (AOSLO).

Methods: The 158 subjects were divided into three groups according to spherical equivalent. AOSLO was used to quantify the spatial characteristics of photoreceptor cell, including density, spacing, regularity, and dispersion; to measure fundus vascular blood flow, including vessel wall thickness (VW), lumen diameter (LD), vessel diameter (VD), the wall-to-lumen ratio (WLR), the cross-sectional area of the vascular wall (WCSA), and blood flow velocity; and to evaluate the association between cells and blood flow parameters using ANOVA and Pearson's correlation coefficients.

Results: With the increase of diopter, the significant difference of photoreceptor cell spacing increased gradually ($P < 0.001$), and was positively correlated with axial length (AL) and LD, it was negatively correlated with spherical equivalent (SE), cell density and WLR. The differences of LD, VD and WCSA increased with the increase of diopter ($P = 0.007$; $P = 0.008$; $P = 0.038$). There was a positive correlation between LD, AL, VW, VD, WCSA, blood flow velocity and velocity standard deviation. LD, VD and WCSA were negatively correlated with SE.

Conclusions: Photoreceptor cell spacing, LD, VD, and WCSA exhibited positive correlations with AL, while displaying negative correlations with SE. Cell spacing demonstrated a negative correlation with cell density. There was significant positive correlation between LD, VD, VW and WCSA, and they were positively correlated with blood flow velocity; whereas VD and WCSA were significantly positively with gender. The findings may help to understand the occurrence and development mechanism of myopia, and have potential value in clinical assessment of pathological changes in myopic retinopathy.

Abstract No.: 203690

Cry1 Deficiency Triggers Circadian Disruption and Evolutionarily Conserved Scleral Remodeling to Drive Myopia Pathogenesis

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Co-Author(s): Congying **LI**, Shi-ming **LI**, Xinyu **LI**, Meijun **WANG**

Purpose: Circadian rhythm disruption caused by altered photoperiod is mechanistically linked to myopia pathogenesis, though core molecular determinants remain elusive. Cryptochrome 1 (Cry1), a pivotal circadian phototransducer, mediates light entrainment, yet its direct role in refractive development is undefined.

Methods: Using wild-type (WT) and Cry1^{-/-} mice under controlled photoperiods (LD: 12h light/12h dark; LL: 24h light; DD: 24h dark), we integrated longitudinal refraction, axial length (AL), corneal curvature, circadian behavior, scleral histomorphology, retinal transcriptomics, and cross-species scleral mechanotransduction assays.

Results: Compared to LD, LL induced myopia in WT mice (-1.69 ± 1.16 D vs. LD 5.06 ± 0.81 D; $P < 0.001$), accompanied by downregulated Cry1 expression ($P = 0.034$). Cry1^{-/-} mice exhibited severe circadian arrhythmia (free-running period: 22.48 ± 0.29 h vs. WT 23.89 ± 0.09 h; $P < 0.001$) and impaired photoreceptor function (reduced a-wave peak amplitudes under light adaptation: -9.38 ± 1.98 μV vs. WT -17.10 ± 1.45 μV ; $P = 0.012$; and delayed b-wave implicit times under dark adaptation: 30.22 ± 1.96 ms vs. WT 22.53 ± 2.31 ms; $P = 0.024$). Additionally, Cry1^{-/-} mice developed spontaneous myopia by week 9 (refraction: 2.42 ± 0.71 D vs. WT 8.55 ± 0.69 D; $P < 0.001$; AL: 3.11 ± 0.03 mm vs. WT 3.02 ± 0.02 mm; $P = 0.02$), with concomitant scleral thinning (17.83 ± 1.07 μm vs. 23.87 ± 0.95 μm ; $P = 0.014$). Crucially, LL elicited no refractive shift in Cry1^{-/-} mice ($P = 0.580$), establishing Cry1 as essential for photoperiod-dependent refractive regulation. RNA-seq analysis identified significant transcriptomic alterations in Cry1^{-/-} retinas, with pathways related to extracellular matrix (ECM) remodeling and stress responses being enriched. Notably, LL upregulated scleral cyclic adenosine monophosphate (cAMP) in WT mice ($P = 0.031$), while Cry1 deficiency also resulted in upregulated cAMP ($P = 0.012$). However, LL failed to further increase cAMP in Cry1^{-/-} mice, suggesting that LL induces myopia through the Cry1–cAMP axis. Additionally, Cry1^{-/-} mice exhibited increased Hif-1 α and α -smooth muscle actin (α -SMA) expression, indicative of myofibroblast transdifferentiation. This regulation was conserved in human scleral fibroblasts, where hypoxic exposure downregulated CRY1 expression at both transcriptional and translational levels.

Conclusions: Cry1 deficiency causes intrinsic circadian disruption that activates evolutionarily conserved

scleral remodeling program-encompassing oxidative stress, ECM dysregulation, and hypoxic signaling to drive myopia pathogenesis. This positions Cry1 as a master regulator of light-dependent ocular growth.

Abstract No.: 201338

Detection and Localization of Paravascular Abnormalities Using Dream OCT in Highly Myopic Eyes

First Author: Tomonari TAKAHASHI

Co-Author(s): Kyoko OHNO-MATSUI, Hiroyuki TAKAHASHI

Purpose: Paravascular abnormalities (PVA) are frequently observed in highly myopic eyes, but detailed investigations regarding their localization and associated factors remain limited. This study aimed to detect PVA using en face imaging with Dream OCT (Intalight®) and to evaluate its distribution and related factors.

Methods: We retrospectively analyzed 135 eyes of 72 highly myopic patients (17 men, 55 women) who visited the Institute of Science Tokyo, between December 2024 and June 2025. PVA was assessed on en face images obtained with Dream OCT. Eyes were divided into PVA-positive and PVA-negative groups, and associations with axial length, refractive error, and age were analyzed. PVA localization was classified into six regions relative to the optic disc: superior and inferior quadrants on the nasal side, papillomacular area, and temporal side.

Results: PVA was identified in 68 eyes (50.4%). The PVA-positive group had significantly longer axial length (29.24 ± 1.72 mm vs 26.99 ± 2.37 mm, $p < 0.001$) and greater myopic refractive error (-13.57 ± 3.91 D vs -7.78 ± 5.07 D, $p < 0.001$). PVAs were predominantly located in the papillomacular area, while nasal regions showed fewer PVAs ($p < 0.001$). PVA frequency increased with age, being observed in 23.5% of eyes under 40 years and 66.7% of eyes aged 40 years or older ($p = 0.0048$).

Conclusions: PVA is more prevalent in older patients with high myopia and primarily occurs in the papillomacular region. En face imaging with Dream OCT is a valuable tool for the detection and localization of PVA.

Abstract No.: 200316

Determining Safe Dosage Parameters for Red Light Photobiomodulation in Myopia Control: Mathematical Modeling and Animal Validation

First Author: Mengtian KANG

Co-Author(s): John PHILLIPS, Qianqian SONG, Ningli WANG, Wenjun XU

Purpose: Photobiomodulation (PBM) for myopia control has gained widespread attention, with increased choroidal perfusion as a potential therapeutic mechanism. This study investigated 650nm red laser retinal irradiance, dose factors, and safety thresholds through mathematical modeling, animal experiments, and molecular biology approaches.

Methods: A light propagation model incorporating optical parameters was established using the radiative transfer equation (RTE) and Henyey-Greenstein phase function. Ex vivo retinal irradiance was measured under 2mW, 5mW, 10mW, and 20mW conditions for model validation. Form-deprivation myopia models in chicks and guinea pigs received PBM treatment. RT-PCR, Western blot, immunofluorescence, electron microscopy, and TUNEL techniques assessed photoreceptor and RPE viability to determine damage thresholds. Axial length and refractive parameters were measured to evaluate myopia control efficacy.

Results: The mathematical model demonstrated predictable retinal irradiance calculations with relative differences of 0.0540-0.1075. Retinal irradiance increased non-linearly with greater laser power, shorter axial length, and larger pupil diameter. According to GB/T 7247.9-2016 MPE standards, safe parameters for human eyes (24.0mm axial length, 205mm source distance, 180s exposure) required pupil diameter ≤ 4.26 mm and power ≤ 2 mW. Animal experiments showed 2mW red light controlled axial elongation and myopic shift, but >10 mW induced structural changes in ONL and RPE with apoptotic cells and upregulated Bax/Bcl-2 pathways.

Conclusions: The RTE mathematical model validated through animal eyes can predict 650nm red laser retinal irradiance and determine safe exposure ranges. Red light demonstrates myopia control within safe limits but causes photoreceptor damage beyond safety thresholds, crucial for optimizing therapeutic benefits versus potential risks.

Abstract No.: 205208

Development and Validation of Predictive Models Based on the First-Month AL Change for the Long-Term Efficacy of Ortho-K in Myopic Children

First Author: Zhenbang **RUAN**

Co-Author(s): Wenlong **HAO**, Yin **HU**, Jinyun **JIANG**, Zhouyue **LI**, Chuqi **XIANG**, Xiao **YANG**

Purpose: Orthokeratology (ortho-k) is a widely used therapy to slow myopia progression, but individual responses to treatment often vary among myopic children. This study aimed to identify simple and practical predictors and develop predictive models for the long-term efficacy of ortho-k treatment in myopic children.

Methods: The training cohort data and external validation cohort data were collected from two separate prospective studies conducted at Zhongshan Ophthalmic Center, respectively. Baseline variables and first-month change in axial length (AL) were entered into logistic regression to develop predictive models to assess the 1-year efficacy of ortho-k treatment on retarding AL elongation. Nomograms and an online calculator were used to present the final models, while receiver operating characteristic (ROC) curves, calibration curves, and decision curve analysis (DCA). Internal validations, external validations were further used to assess the models.

Results: The training cohort comprised 150 myopic children, and the external validation cohort comprised 88 myopic children. Age and first-month AL change were included in the final predictive model for excessive myopia progression, with area under the ROC curves (AUC) above 0.84. Solely the first-month AL change was included in the final predictive model for rapid myopia progression with an AUC above 0.85. All the discrimination, calibration, and clinical net benefit performed excellently in training and external validation cohorts.

Conclusions: First-month AL change and age are simple and practical predictors for long-term efficacy of ortho-k treatment in myopic children. Predicting ortho-k efficacy after the first month will provide eye care practitioners with guidance to evaluate subsequent outcomes and adjust follow-up plans.

Abstract No.: 208123

Differential Effect of Outdoor Time on Myopia Prevention in Hyperopic and Premyopic Children

First Author: Ziyi **QI**

Co-Author(s): Jun **CHEN**, Xiaohu **DING**, Mingguang **HE**, Xiangui **HE**, Xun **XU**

Purpose: To assess whether time outdoors effectively prevents myopia in premyopic children.

Methods: This post-hoc subgroup analysis was nested in the Shanghai Time Outside to Reduce Myopia (STORM) study, a prospective, school-based cluster-randomized trial. Participants included 6 to 9-year-old schoolchildren who were all examined with cycloplegic refraction. Premyopia was defined as -0.50 diopters (D) $<$ spherical equivalence (SE) $\leq +0.75$ D. Findings were validated using the Guangzhou Outdoor Activity Longitudinal (GOAL) study. Participants were randomized into three groups: Control (usual outdoor activities), Test I (additional 40 minutes of daily outdoor time), and Test II (additional 80 minutes of daily outdoor time). Two-year cumulative incidences of myopia were the primary outcome. Adjusted relative risk (aRR) and relative reduction were assessed between intervention and control groups.

Results: The STORM study included 5067 participants, 3506 of whom were premyopia with a mean age of 7.4 years and 54.4% boys. Among premyopic children, the two-year cumulative incidences of myopia were 64.1% (Control), 55.6% (Test I), and 58.7% (Test II). aRRs were 0.87 (95% CI: 0.74-1.02) for Test I and 0.93 (95% CI: 0.79-1.10) for Test II, reflecting relative reductions of 13% and 7%, respectively. In hyperopic children, aRRs were 0.49 (95% CI: 0.36, 0.69) for Test I and 0.88 (95% CI: 0.66, 1.18) for Test II, indicating relative reduction of 51% and 12%, respectively. Consistent findings were observed in the GOAL study, with aRRs of 0.91 (95% CI: 0.75-1.10) for premyopic and 0.67 (95% CI: 0.46-0.96) for hyperopic children over two years, corresponding to relative reductions of 9% and 33%, respectively.

Conclusions: While increased outdoor time significantly reduced myopia incidence in hyperopic children, its effect was limited in premyopic children. These findings suggest that more intensive intervention strategies are needed for premyopic children to effectively prevent myopia.

Abstract No.: 201148

Effect of Optical Defocusing Frame Glasses on the Prevention of Myopia in Non-Myopic Children Aged 5–8

First Author: Yanhua **WANG**

Purpose: This study was to investigate the significance of preventing myopia using defocus spectacle lenses in non-myopic children aged 5-8.

Methods: The study included a total of 97 non-myopic children aged 5-8. All subjects were divided into two groups. One group (experimental group, 42 eyes) wore O.T.O.G.E. lenses, while the other group (control group, 55 eyes) wore no glasses. Refractive outcomes and axial length (AL) were measured in all subjects and then again six months and one year later for comparison. T-tests were used to compare the growth of spherical equivalent refraction (SE) and AL between the two groups.

Results: At the end of six months, the experimental group had less SE myopic shift and AL elongation than the control group ($0.01 \pm 0.20D$ vs. $0.32 \pm 0.38D$, $0.08 \pm 0.06mm$ vs. $0.19 \pm 0.09mm$, respectively) ($P < 0.01$). Moreover, at the end of one year, the experimental group had less SE myopic shift and AL elongation than the control group ($0.26 \pm 0.26D$ vs. $0.55 \pm 0.59D$, $0.21 \pm 0.09mm$ vs. $0.44 \pm 0.20mm$, respectively) ($P < 0.01$).

Conclusions: Wearing defocus spectacle lenses in non-myopic children aged 5-8 could slow the decrease in the degree of hyperopia and the growth of AL and delay the onset of myopia.

Abstract No.: 202767

Effects of Different Intervention Methods on Myopia Progression in Children

First Author: Sok Man **UN**

Co-Author(s): Iat Fan **LAI**

Purpose: To compare the efficacy of low-concentration atropine, defocus-incorporated multiple-segment spectacle lenses (DIMS), and low-concentration atropine combined with DIMS in the treatment of myopia in children.

Methods: A total of 85 children (166 eyes) with myopia aged 5-12 years old who were treated in Kiang Wu Hospital from April 2019 to April 2022 were included. The eyes were allocated into three groups: low-concentration atropine (54 eyes), DIMS (56 eyes), and the combined group (56 eyes). The spherical equivalent power (SE) and axial length were followed up for 1 year.

Results: At baseline, there were no significant differences in sex, age, or axial length, but there were significant differences in equivalent spherical power ($F=7.268$, $P < 0.001$). The combined treatment group ($-3.9 \pm 1.61 D$) was more myopic than the other groups. SE increased significantly over 1 year in the atropine group ($-0.41 \pm 0.47 D$), DIMS group ($-0.39 \pm 0.44 D$), and combined treatment group ($-0.38 \pm 0.44 D$); however, there were no significant differences ($P > 0.05$). Axial length increased significantly over 1 year in the atropine group ($0.24 \pm 0.19 mm$), DIMS group ($0.21 \pm 0.29 mm$), and combined treatment group ($0.17 \pm 0.16 mm$); there were no significant differences between the groups ($P > 0.05$).

Conclusions: There was no significant difference between low-concentration atropine, DIMS and low-concentration atropine combined with DIMS in the treatment of myopia in children. Compared with wearing single-vision glasses which was investigated in other epidemiological investigations, the three myopia treatment methods examined herein can control the progression of myopia.

Abstract No.: 202582

Efficacy and Safety of Low-Concentration Atropine Eye Drops Combined With Defocus Incorporated Multiple Segments for Moderate and High Myopia Control (LA-DIM Study)

First Author: Meinan **HE**

Co-Author(s): Ruihua Wei, Bei **DU**

Purpose: This paper reports a trial protocol aimed at evaluating the efficacy and safety of low-concentration atropine eye drops (0.02% and 0.04%) combined with defocus incorporated multiple segments (DIMS) for the control of moderate and high myopia in Chinese children.

Methods: A multi-centre, double-masked, non-inferiority, randomized trial was designed. 272 subjects aged 6 - 12 years with myopia ranging from $-3.00D$ to $-9.00D$ were enrolled. Participants were allocated in a 1:1:1:1:1 ratio (DIMS group, 0.02% atropine group, 0.04% atropine group, 0.02% atropine combined with DIMS group, 0.04% atropine combined with DIMS group) from four centres. Each participant was instructed to instil one drop of the assigned treatment into each eye daily and visit the research centre every 6 months.

Results: Currently, 210 participants have completed the 12-month follow-up. After 12 months, the axial length progression in the group treated with DIMS combined with 0.04% atropine was significantly less than that in other groups (DIMS vs. 0.02%A vs. 0.04%A vs. DIMS+0.02%A vs. DIMS+0.04%A: $0.29 \pm 0.14mm$ vs. $0.29 \pm 0.17mm$ vs. $0.29 \pm 0.20mm$ vs. $0.22 \pm 0.14mm$ vs. $0.17 \pm 0.18mm$, $p=0.045$). The spherical refractive progression was significantly different over the groups (DIMS vs. 0.02%A vs. 0.04%A vs. DIMS+0.02%A vs. DIMS+0.04%A: $-0.49 \pm 0.34D$ vs. $-0.53 \pm 0.49D$ vs. $-0.31 \pm 0.46D$ vs. $-0.29 \pm 0.44D$ vs. $-0.23 \pm 0.38D$, $p=0.038$).

Conclusions: The LA-DIM study will be the first to report on the efficacy of low-concentration atropine combined with DIMS for the control of moderate to high myopia in Chinese children. For the 12-month period, the combination of DIMS and 0.04% atropine demonstrated greater efficiency in axial length and spherical refractive control.

Abstract No.: 204873

Efficacy of Twice Daily 0.01% Atropine for Myopia Control: A Randomized Controlled Trial

First Author: Jin **ZHANG**

Co-Author(s): Jie **CHEN**, Xiaoman **LI**, Jianing **ZHANG**

Purpose: To evaluate the efficacy of twice daily 0.01% atropine eye drops for myopia control.

Methods: A one-year, prospective, randomized, controlled trial. A total of 207 children aged 6-12 years

(cycloplegic sphere diopters at least -0.50 diopter, astigmatism less than 1.50 D) were randomly assigned in a 1:1:1 ratio to three groups: 0.01% atropine twice daily (0.01% TD), 0.01% atropine once nightly (0.01% OD), and 0.04% atropine twice daily (0.04% OD). All the bottles were masked to subjects.

Results: After 12 months, the mean changes in spherical equivalent (SE) in the 0.01% TD, 0.01% OD, and 0.04% OD groups were -0.61 ± 0.42 D, -0.72 ± 0.52 D, and -0.39 ± 0.56 D, respectively (0.01% TD vs. 0.01% OD, $P = 0.250$; 0.01% TD vs. 0.04% OD, $P < 0.01$), with a respective mean increase in axial length (AL) of 0.33 ± 0.20 mm, 0.41 ± 0.19 mm, and 0.27 ± 0.22 mm (0.01% TD vs. 0.01% OD, $P = 0.033$; 0.01% TD vs. 0.04% OD, $P = 0.101$). Visual acuity, accommodation amplitude, and accommodative facility were not affected in each group.

Conclusions: Twice daily 0.01% atropine was more effective than once nightly in slowing myopia progression in myopic children, though it did not achieve the same efficacy as higher concentration atropine. All concentrations were well-tolerated with no adverse effects.

Abstract No.: 201479

Eight-Year Clinical Trial of Low-Concentration Atropine for Myopia Progression (LAMP1) Study: Phase 5 Report

First Author: Yuzhou **ZHANG**

Co-Author(s): Jason C. **YAM**

Purpose: To determine the optimal treatment cessation strategy on "how to stop treatment" to minimize rebound by evaluating the myopia progression of two treatment cessation approaches: Stop versus Taper.

Methods: Children aged 4–12 years originally from the Low-Concentration Atropine for Myopia Progression (LAMP1) study were followed up for 8 years. Subjects receiving atropine drops during Phase 4 (years 4 and 5) were recruited for follow-up for 3 years, including year 6 (pre-cessation period) and years 7 and 8 (cessation period). All recruited subjects were randomized into Stop and Taper groups at a 1:1 ratio. During the pre-cessation period, the Stop group received 0.05% atropine eye drops for a full year, while the Taper group received 0.05% atropine for 6 months and then 0.025% atropine for another 6 months. During the cessation period, all subjects stopped the treatment and were monitored for 2 years. Generalized estimating equations were used to compare the changes in spherical equivalent (SE) progression and axial length (AL) elongation between groups.

Results: A total of 180 (73.2%) of 246 children from the fifth year completed 8 years of follow-up. The SE progressions for stop and taper groups over 3 years were $-0.78\text{D} \pm 0.78\text{D}$ and $-0.54 \pm 0.68\text{D}$ ($P = 0.006$), and the AL elongations were $0.44 \pm 0.32\text{mm}$, and

$0.33 \pm 0.24\text{mm}$ ($P = 0.002$), respectively. Younger age and more myopic SE at pre-cessation were associated with SE progression (both $P < 0.001$) and AL elongation (both $P < 0.001$) over 3 years.

Conclusions: Taper approach achieved better treatment cessation efficacy than Stop approach.

Abstract No.: 201564

Evaluating the Effectiveness of Once Versus Twice Daily 0.01% Atropine Eye Drops in Myopia Control

First Author: Akila **RAMKUMAR**

Co-Author(s): Kayalvizhi N, Asha **THARSIS**

Purpose: To compare the efficacy of once daily versus twice daily application of low-dose atropine 0.01% (LDA) in controlling the progression of myopia.

Methods: This was an ambi-directional cohort study carried out in a tertiary eye care center. Children between 6 and 18 years of age with documented myopia progression of more than 0.50D and/or an increase in axial length by more than 0.2mm with once daily application of 0.01% atropine for between 6 and 12 months of starting treatment were considered as moderate responders. The study included these moderate responders, 24 children as controls who continued with a single daily application of LDA, and 24 in the interventional group who were started on twice daily LDA.

Results: The mean increase in spherical equivalent (SE) among those who received 0.01% atropine twice daily was 0.182 ± 0.266 . This was significantly lesser ($p < 0.01$) than the mean increase (0.398 ± 0.394) in spherical equivalent among those who continued with a single daily dose. The axial length elongation lesser than 0.2mm was 39.1% in the intervention group and 76.5% in the control group, although the difference was not statistically significant ($p = 0.27$).

Conclusions: Twice daily application of 0.01% atropine had better control in slowing the spherical equivalent and axial length elongation in children with progressive myopia. A larger study group and longer follow-up may be needed to substantiate the finding.

Abstract No.: 206665

Exploratory Clinical Study on the Effectiveness and Safety of Light Diffraction Frame Glasses in Controlling Myopia in Children

First Author: Wei **XU**

Co-Author(s): Xiaofeng **ZHU**

Purpose: This study evaluates the efficacy and safety of D.O.E spectacle frames in reducing the onset and progression of myopia, and compares them with conventional multifocal micro-lens spectacle frames.

Methods: This is a prospective, single-center, double-blind, randomized controlled exploratory clinical study. A total of 36 eligible children aged 6–8 years were enrolled, with best-corrected distance visual acuity of both eyes ≥ 0.8 and near visual acuity ≥ 1.0 . Subjects were randomly assigned to wear D.O.E (study group, $n=19$) or highly aspherical lenslets (H.A.L.T) frame glasses (control group, $n=17$). The right eye was used as the observation eye, with an observation period of 3 months. Measurements of best corrected visual acuity (BCVA), pre- and post-cycloplegic SER, axial length (AL), choroidal thickness (ChT), and other biological data were performed at baseline and at 1, 2, and 3 months after wearing the glasses. Subjective scores of wearing comfort were also collected.

Results: After 3 months of wearing, there were significant differences in SER and AL changes between the D.O.E group and the H.A.L.T group (SER: $[-0.07 \pm 0.30]D$ and $[-0.33 \pm 0.42]D$, $P=0.044$; AL: $[-0.06 \pm 0.12]mm$ and $[0.02 \pm 0.09]mm$, $P=0.039$). In addition, the mean ChT change in the D.O.E group was $29.28 \pm 26.66 \mu m$, and in the H.A.L.T group it was $16.88 \pm 17.18 \mu m$ ($P=0.114$). There were no significant differences in BCVA and subjective scores between the two groups.

Conclusions: D.O.E lenses effectively slow the progression of myopia in young children, providing a new perspective on myopia prevention and control that differs from traditional defocus theories, but further large-sample RCT studies are needed for evaluation.

Abstract No.: 201303

Fibroblast-Loaded Injectable Polysaccharide-Based Hydrogel for Scleral Remodeling to Prevent the Development of Myopia

First Author: Jingwen HUI

Co-Author(s): Quanhong HAN

Purpose: The innovative therapeutic strategy of utilizing injectable hydrogels loaded with scleral fibroblasts for posterior scleral reinforcement (PSR) aims to prevent myopia by strengthening the structural integrity of the sclera to resist axial elongation.

Methods: In this work, we develop a fibroblast-loaded carboxymethyl chitosan-aldehyde hyaluronic acid (CMCS-HA-CHO) injectable hydrogel for scleral remodeling. The CMCS-HA-CHO hydrogel is formed through simple mixing under mild conditions via Schiff base reaction between CMCS and HA-CHO.

Results: CMCS-HA-CHO hydrogel can be injected into the posterior sclera at low modulus, and its modulus increases with time, and the encapsulated fibroblasts can maintain good activity. Both hydrogel and fibroblast-loaded hydrogel were proven to be effective in shortening the axial length of myopic eyes in the guinea pig form deprivation model. Particularly, the fibroblast-loaded hydrogel has the best therapeutic

effect due to the synergy of cell therapy and physical compression, which always keeps the eye axis shortened within 4 weeks.

Conclusions: In conclusion, we prepared a fibroblast-loaded CMCS-HA-CHO hydrogel to prevent the development of myopia. In the guinea pig models, hydrogels and fibroblasts-loaded hydrogels effectively shortened the axial length of myopia. The fibroblast-loaded hydrogel group has a longer therapeutic effect, its sclera thickness becomes significantly thicker, and its tensile modulus is elevated, which proves the success of sclera remodeling. This fibroblast-loaded CMCS-HA-CHO hydrogel has the advantages of being minimally invasive and having good biocompatibility, and is a very promising option to prevent the development of myopia.

Abstract No.: 206880

Finite Element Analysis and Clinical Validation of Fluid Reservoir Thickness in Scleral Lens Fitting

First Author: Xuefei LI

Co-Author(s): Fan LU, Shenglong LUO, Meixiao SHEN, Junjie WANG

Purpose: To develop a finite element model (FEM) for predicting fluid reservoir (FR) thickness after scleral lens (SL) fitting and to validate its accuracy against clinical outcomes.

Methods: A total of 37 eyes (22 normal, 15 irregular corneas) were included. OCT-derived ocular geometries were used to construct subject-specific FEMs in ABAQUS. Simulated FR thickness was compared with clinical OCT measurements obtained 4 hours after stable SL wear. The FR was divided into three annuli: central, mid-peripheral, and peripheral. Paired t-tests and agreement analysis were used to assess consistency across regions. Correlation strength was quantified by the coefficient of determination (R^2), prediction error by root mean squared error (RMSE), and spatial distribution similarity by normalized cross-correlation (NCC).

Results: In both groups, only five regions showed statistical differences ($P < 0.05$), with minor central differences (normal: $10.85 \mu m$; irregular: $10.66 \mu m$). Agreement analysis demonstrated stronger consistency in the normal group, particularly in the center ($R^2 = 0.871$, RMSE = $42.35 \mu m$). In the irregular cornea group, the central annulus showed a mean prediction error within $100 \mu m$ (RMSE = $80.96 \mu m$). NCC analysis indicated high spatial similarity (mean NCC > 0.85 , with few cases below 0.8).

Conclusions: The personalized SL FEM accurately predicted FR thickness in both normal and irregular corneas. Simulated outcomes closely matched clinical OCT measurements after stable settling, supporting its

potential to guide individualized SL fitting and enhance fitting efficiency.

Abstract No.: 203133

Identification of IGFBP3 as a Key Gene in Myopia and Its Involvement in Crucial Biological Processes and the Microenvironment

First Author: Shichong JIA

Co-Author(s): Guoge HAN, Jie YU

Purpose: RNA methylation has emerged as a significant contributor to myopia progression. Here, we aimed to identify the key RNA methylation regulator and investigate its potential functions, as well as its associated immune characteristics, in relation to myopia.

Methods: First, we identified key RNA modifications related genes by weighted gene co-expression network analysis (WGCNA) based on the expression profile of RNA methylation-related genes in myopia using the dataset downloaded from the GEO database. CIBERSORT was used to infer the proportion of immune-infiltrating cells and analyze the correlation between gene expression and immune cell content. Drug-Gene Interaction database (DGIdb) was used to obtain the potential drug through the gene's drug network. Further validation of gene up-regulation in myopic cell model was conducted using RT-qPCR and Western blotting, while the role of IGFBP3 was assessed via knockout experiments.

Results: Utilizing WGCNA, we identified IGFBP3 as a key gene in myopia, demonstrating its predictive capacity for the disease's progression (AUC: 0.789). Using a hypoxic cell model of myopia, we demonstrated that hypoxia-induced human scleral fibroblasts (HSFs) had high IGFBP3 expression. Further analysis revealed its targeted genes were mainly enriched in the regulation of T cell activation and the MAPK signaling pathway. There were significant differences in Eosinophils, Macrophages M0, Mast cells activated, and NK cells activated between the control and the myopia group ($p < 0.05$). CIBERSORT further showed that it was positively correlated with macrophages M0 and mast cells activated and significantly negatively correlated with Mast cells resting and Tregs ($p < 0.01$). The knockdown reversed the hypoxia-induced elevation in apoptosis and the reduction in cell proliferation in HSFs. Moreover, IGFBP3 down-regulation resulted in a rise in protein levels of COL1A1 and a decrease in α -SMA, which is a classic biomarker for sclera remodeling. DGIdb showed that celecoxib is expected to be a targeted drug.

Conclusions: Our study uncovers significant alterations in IGFBP3 expression in myopia, offering novel insights that may pave the way for innovative diagnostic and therapeutic strategies in myopia management.

Abstract No.: 201168

Immediate Impact of Augmented Reality Visual Training on Choroidal Thickness and Accommodative Function: A Small Sample Study

First Author: Hongwei DENG

Purpose: The aim of this study is to evaluate the immediate effects of a single AR visual training session, integrated with a vision function restoration model, on ChT and AF.

Methods: Twenty healthy volunteers aged 6 to 13 years participated in the study. Participants were randomly assigned to an AR group ($n=11$) or a blank control group ($n=9$). A prospective self-controlled design was employed to assess changes in ChT before and after training using optical coherence tomography angiography. At the same time, AF was measured both before and after the training session. The AR group underwent a single session of visual training, with post-training metrics recorded within five minutes. The blank control group rested for 30 minutes before remeasuring the same metrics.

Results: Following a single AR visual training session, the AR group demonstrated a significant reduction in average ChT within the 0-1 mm zone, from $332.85 \pm 79.00 \mu\text{m}$ to $324.11 \pm 73.52 \mu\text{m}$ ($p = 0.007$). Additionally, AF significantly increased from $5.05 \pm 1.38 \text{ cpm}$ to $8.05 \pm 1.81 \text{ cpm}$ ($p = 0.004$). A positive correlation was observed between spherical equivalent and the change in ChT within the 0-1 mm zone ($r = 0.962$, $p = 0.009$).

Conclusions: A single AR visual training session combined with a vision function restoration model was associated with a short-term decrease in ChT and a significant improvement in AF. The integration of AR with DTx demonstrates potential for myopia intervention, suggesting a novel avenue for optimizing digital therapeutics.

Abstract No.: 205039

InNOut: A Perception-Aligned Machine Learning Model for Light-Based Indoor-Outdoor Classification in Myopia Research

First Author: Raymond NAJJAR

Co-Author(s): Daniella MAHFOUD, Zhiqun TANG

Purpose: To develop and validate a perception-aligned machine learning model (InNOut) utilizing real-life spectral light exposure data to objectively classify indoor and outdoor settings.

Methods: Spectral light exposure data (73,879 minutes) were collected from twenty-two adults (29.6 ± 4.5 years) using wrist-worn multi-channel sensors over 7 days. Participants labeled indoor and outdoor periods with an event button and diaries; these cross-referenced labels served as ground truth. InNOut was trained on

80% of the data using gradient boosting to classify indoor/outdoor environments, then tested on 20%. Performance was evaluated using receiver operating characteristic (ROC) curve analysis and compared to the conventional 1,000-lux threshold and to human perception derived from a survey of 400 participants (33.9 ± 11.3 years), including 17 light-and-health experts, who classified 183 real-world photographs paired with light data.

Results: InNOut achieved excellent performance (Area under the ROC curve [AUC] = 0.92; 95% CI, 0.92–0.93) with sensitivity of 73.9% (72.2–75.5) and specificity of 94.5% (94.1–94.9). It outperformed the conventional 1,000-lux threshold and showed high agreement with experts (83.5%) and the general public (80.8%). Both InNOut and survey participants reliably classified clear outdoor (balconies, bus stops, open walkways) and indoor settings, while ambiguous scenes (e.g., windowed spaces, inside vehicles) were usually labeled as indoor by participants but as outdoor by the model, reflecting spectral light properties.

Conclusions: InNOut provides a robust, perception-aligned framework to objectively classify indoor and outdoor environments based on light exposure. This enables accurate monitoring of outdoor time, supports behavior-changing applications, and may help disentangle the roles of light and viewing distance in myopia prevention.

Abstract No.: 206747

Investigating the Shared Genetic Architecture Between Myopia and Glaucoma: An Update in Methodology

First Author: Zuyi **YANG**

Purpose: Observational studies have shown that myopic eyes have a higher risk of primary open-angle glaucoma (POAG). Mendelian randomization (MR) analyses further confirmed a strong bidirectional genetic causal association between myopia and POAG. However, their shared genetic underpinnings remain unclear. A previous study using linkage disequilibrium score regression (LDSC) and polygenic risk score (PRS) failed to identify evidence of genetic overlap between myopia and POAG, yet such approaches may underestimate overlap, especially when genetic variants exert balanced concordant and discordant effects on the two phenotypes. Our study employed innovative methods, including MiXeR and cond/conjFDR analyses, to explore the genetic overlap between myopia and POAG.

Methods: We investigate the extent of polygenic overlap using the bivariate causal mixture model (MiXeR), leveraging summary statistics from recent large genome-wide association studies for myopia (Ncases = 65,574) and POAG (Ncases = 15,229). Additionally, we identify shared genomic loci through conditional/conjunctive FDR analyses.

Results: MiXeR showed a considerable polygenic overlap (Dice coefficient = 46.6%) between myopia and POAG. Among all shared variants, the proportion of variants with concordant effect directions was 71.9%. Subsequent conjunctive FDR analysis identified 31 distinct shared loci (conjFDR < 0.05) jointly associated with both traits. These shared loci are predominantly located in intergenic (15.8%) or intronic (63.1%) regions. The 139 protein-coding genes mapped by these shared loci have been implicated in ocular structure development and extracellular matrix metabolism.

Conclusions: By unraveling the shared genetic architecture between myopia and POAG, we identified several loci associated with both traits and provided insights into the molecular mechanisms underlying this complex relationship.

Abstract No.: 205219

Long-Term Outcomes of Myopia Control Strategies in Intermittent Exotropia: A Real-World Study of Myopia Control Spectacles and Orthokeratology

First Author: Mengya **HAN**

Co-Author(s): Yin **HU**, Stephen **VINCENT**, Xiao **WANG**, Xiao **YANG**

Purpose: This real-world study evaluated the effectiveness of myopia control spectacles (MCS) and orthokeratology (ortho-k) in slowing myopia progression and supporting binocular function in children with intermittent exotropia (IXT), highlighting treatment outcomes from routine clinical practice.

Methods: Clinical data were obtained from myopic children with IXT who completed at least two years of follow-up. After applying inclusion and exclusion criteria, 70 children were assigned to the MCS group. Using PSM, 82 and 76 children were included in the single-vision (SV) and orthokeratology ortho-K groups, respectively.

Results: After two years, both the MCS and ortho-k groups demonstrated significantly less axial elongation and myopia progression compared to the SV group (both, $P < 0.0001$), with no significant difference between MCS and ortho-k ($P > 0.05$). The MCS group also exhibited better preservation of distance and near stereoacuity than the ortho-k (both $P < 0.0001$) and SV groups ($P = 0.01$ and $P < 0.001$, respectively). For distance exodeviation, the MCS group showed a smaller increase than the ortho-k and SV groups ($P < 0.01$ and $P < 0.0001$, respectively), and the ortho-k group displayed less increase than the SV group ($P = 0.01$). A similar pattern was observed for near exodeviation, and the difference between MCS and ortho-k approached significance ($P = 0.05$).

Conclusions: MCS and ortho-K effectively slowed myopia progression in children with basic-type IXT. In

this high-risk population, MCS may additionally help preserve binocular function. These findings provide a foundation for future studies extending to broader IXT populations.

Abstract No.: 200639

Multidimensional choroidal changes after 0.01% atropine eye drops treatment for 2 years and prediction for the response: Results from 0.01% Atropine Eyedrops in Children with Myopia and Intermittent Exotropia (AMIXT)

First Author: Zijin WANG

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Purpose: To investigate multidimensional choroidal changes during 24-month 0.01% atropine treatment and develop prediction models for myopia control efficacy.

Methods: The secondary analysis of data from the AMIXT trial included 290 myopic children aged 6-12 years (195 atropine vs 95 placebo) with OCT/OCTA images. We longitudinally assessed one-dimensional (1D)/2D/3D choroidal parameters and choriocapillaris metrics (subfoveal choroidal thickness [SFCT], luminal area [LA], stomal area [SA], total choroidal area [TCA], luminal volume [LV], stromal volume [SV], total choroidal volume [TCV], choroidal vascularity index [CVI], 3D-CVI, and choriocapillaris flow deficit percentage [CcFD%]).

Results: Atropine-treated eyes exhibited transient choroidal thickening peaking at 4 months and experienced slightly decreasing thereafter, contrasting with progressive thinning in controls (between-group differences in SFCT change [Δ SFCT] = 11.22 μ m [95% CI, 3.21 to 19.23], $P=0.006$; Δ TCA within 3 mm perifoveal zone [Δ TCA_3] = 28.29 $\times 10^3 \mu$ m² [95% CI, 8.81 to 47.78], $P=0.004$; Δ TCV_3 = 53.68 $\times 10^6 \mu$ m³ [95% CI, 16.30 to 91.06], $P=0.005$). 3D parameters demonstrated superior predictive values, with 4-month Δ LV_3 showing moderate correlations to 24-month SE progression ($r=0.49$, $P<0.001$). The prediction model integrating baseline factors, 4-month Δ AL, and Δ LV_3 predicted 24-month Δ SE with an R^2 of 0.41, and the logistic model predicted atropine response (SE progression ≤ 0.50 D/year) with an AUC of 0.89 (95% CI, 0.83 to 0.96).

Conclusions: The 0.01% atropine induces transient choroidal expansion predictive of long-term myopia control, with 4-month LV change serving as a good predictive biomarker. The quantitative volumetric OCT parameter enables early treatment response monitoring and personalized prognosis estimation.

Abstract No.: 201857

Myopia Progression Associated With Atropine Therapy in Children: A 10-Year Retrospective Study

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Purpose: To evaluate real-world myopia progression associated with atropine therapy in children at a tertiary hospital over a 10-year period.

Methods: This retrospective case-series included children treated with atropine at the National University Hospital, Singapore, between June 2015 and June 2024. Children aged < 16 years with > 2 manifest refractions or 3 axial length (AL) and had no previous intra-ocular surgeries were included. AL and refraction data were collected at baseline and follow-ups. Atropine therapy was individualised and adjusted based on progression. A multivariate linear regression model was used to identify factors associated with AL elongation.

Results: A total of 1,209 children (2,403 eyes; mean age: 8.65 ± 1.92 years old) were included, with a mean follow-up duration of 33.6 months. Most children were initiated on 0.01% atropine once nightly (ON) (92.3%), followed by 0.05% ON (5.3%). The mean refractive progression rate was -0.324 ± 0.439 D/year, and the mean AL elongation rate was 0.191 ± 0.185 mm/year, ranging from 0.400 mm/year (3 years old) to 0.049 mm/year (15 years old). Multivariate analysis showed that older age ($\beta = -0.037$, 95% CI = (-0.041, -0.033), $p < 0.001$) and longer baseline axial length at treatment initiation ($\beta = -0.019$, 95% CI = (-0.027, -0.011, $p < 0.001$) were significantly associated with slower AL elongation, while gender, race, and initial refraction were not ($p > 0.05$).

Conclusions: In a real-world clinical setting, atropine therapy was associated with low progression rates, with older age at initiation and longer baseline axial length linked to slower AL elongation.

Abstract No.: 207316

Noncycloplegic Methods for Screening Myopia and Pre-Myopia in Preschool Children

First Author: Jianfeng ZHU

Purpose: This study aimed to develop and evaluate noncycloplegic screening strategies for detecting both myopia and pre-myopia in preschool-aged children.

Methods: Uncorrected distance visual acuity (UDVA) was assessed using a logMAR chart. Refractive status was measured before and after cycloplegia using the Vision Screener SL-100. In addition, axial length (AL) and corneal curvature radius (CR) were obtained under

noncycloplegic conditions with the IOL Master-700. Logistic regression modeling was applied to formulate accurate screening protocols for myopia and pre-myopia without cycloplegia.

Results: The study enrolled 1,308 children with a mean age of 4.3 ± 0.9 years, including 640 girls (48.9%). Myopia (cycloplegic spherical equivalent [SE] ≤ -0.5 D) was identified in 2.8% ($n = 36$) of participants, while pre-myopia (cycloplegic SE > -0.5 D but $\leq +0.75$ D) was present in 21.9% ($n = 286$). Screening performance, as measured by the area under the receiver operating characteristic curve (AUC), was limited for UDVA alone in detecting pre-myopia (AUC = 0.52). Noncycloplegic SE yielded an AUC of 0.70, and AL alone achieved an AUC of 0.63. The combination of noncycloplegic SE with the AL/CR ratio produced the most favorable diagnostic accuracy with minimal assessments, yielding an AUC of 0.74 for pre-myopia and 0.94 for myopia. Incorporating UDVA did not enhance screening performance further.

Conclusions: Isolated UDVA measurement demonstrated inadequate accuracy for identifying myopia or pre-myopia in young children. Under noncycloplegic conditions, a combined metric incorporating SE and AL/CR ratio proved to be an effective strategy for screening both pre-myopia and myopia in the preschool population.

Abstract No.: 205045

Optic Nerve Head Changes Over 15 Years – From the Atropine Treatment Long-Term Assessment Study

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Purpose: To investigate optic nerve head (ONH) changes over 15 years in original participants of the Atropine for the Treatment of Myopia 2 (ATOM2) study.

Methods: A total of 148 myopic participants who were treated with 0.01%, 0.1% or 0.5% atropine eye drops from the ATOM2 trial were included. At three study visits (baseline, 5-year, 15-year), participants underwent cycloplegic autorefractometry, ocular biometry, and fundus photography. Additional optical coherence tomography (OCT) imaging was performed at recall. Fundus photographs were morphometrically examined for ONH ovality, torsion, parapapillary atrophy (PPA), disc-fovea distance, position of the central retinal vascular trunk (CRVT), angle kappa, and vertical distance between the arterial arcade (VDA). Bruch's membrane opening (BMOD), gamma zone, and Bruch's membrane overhang were measured in OCT images.

Results: Comparisons showed similar ONH characteristics across atropine treatment groups. Myopic refractive error increased from -4.54 ± 1.64 diopters (D) at baseline to -6.88 ± 2.4 D at 15 years

($p < 0.0001$). Axial length (AL) increased from 25.08 ± 0.89 mm to 26.31 ± 1.01 mm ($p < 0.0001$). Significant changes in ONH parameters after 15 years included PPA and position of the CRVT ratio (p -values < 0.0001). Age, AL, and spherical equivalent refraction (SER) were associated with optic disc changes ($p < 0.0001$). AL, SER, and PPA were associated with the BMOD area or the gamma zone (p -values < 0.0001). Age ($p < 0.0001$), PPA ratio ($p = 0.0017$), and disc-fovea distance ratio ($p = 0.0300$) were associated with a myopic progression of more than -2D during the 15 years of observation.

Conclusions: This long-term study suggests that myopic subjects showed increased PPA and nasal CRVT shift from childhood into young adulthood.

Abstract No.: 209422

Peripheral Refraction Dynamics in Myopic Teenagers: An In Vivo Analysis Post Cycloplegia

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Purpose: To investigate the effect of accommodation on peripheral refraction in children and adolescents with myopia.

Methods: One hundred and five teenagers with myopia were consecutively recruited in this study. According to their refraction, participants were divided into low, moderate, and high myopia groups. Peripheral refraction of each participant was captured before and after cycloplegia by multispectral refractive topography (MRT, Thondar, Shenzhen), Total relative defocus value (TRDV) and relative defocus values (RDV) at 15° (RDV- 15°), 30° (RDV- 30°), and 45° (RDV- 45°), together with quadrant-specific RDVs for the superior (RDV-S), inferior (RDV-I), temporal (RDV-T), and nasal (RDV-N) fields, were extracted from each participant's right eye for subsequent analysis. A paired t-test was employed to assess the differences in RDV between pre- and post-cycloplegia conditions. Additionally, a two-way ANOVA was conducted to examine the variations in RDV across the three groups.

Results: Cycloplegia induced significant changes in RDV of myopic participants. RDV- 15° remained stable, whereas TRDV, RDV- 30° , RDV- 45° , and all quadrant-specific RDVs (S, I, T, N) shifted significantly toward hyperopia (all $P < 0.001$). Moreover, the magnitude of change increased with retinal eccentricity: the farther the measurement from the fovea, the larger the post-cycloplegic hyperopic shift. Comparing pre- to post-cycloplegic RDV shifts across low, moderate, and high myopia revealed significant group differences in Δ TRDV and in Δ RDV at 45° , the inferior, and the nasal quadrants (all $P < 0.05$). Changes were consistently larger in low and moderate myopia than in high myopia, whereas low and moderate myopic eyes did not differ significantly from each other.

Conclusions: After cycloplegia, peripheral refraction shifted markedly toward hyperopia and grew increasingly eccentric with visual-field angle in myopic adolescents; the change was significantly larger in eyes with low or moderate myopia than in those with high myopia.

Abstract No.: 201471

Phenotyping Glaucomatous and Non-Glaucomatous Optic Neuropathy in High Myopia Using Lamina Cribrosa Depth Benchmarks

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Purpose: To characterize optic neuropathy in high myopia (HM) using lamina cribrosa depth (LCD) benchmarks derived from normal HM eyes.

Methods: This cross-sectional study included 282 HM eyes (axial length ≥ 26.0 mm). Eyes were first classified as normal or abnormal (glaucoma or glaucoma suspect) based on clinical diagnosis. LCD thresholds from normal HM eyes (25th and 75th percentiles: 353.16 μ m, 513.96 μ m) were used to stratify abnormal eyes into presumed high myopic optic neuropathy (HMON, LCD < 353.16 μ m), mixed (LCD = 353.16–513.96 μ m), or presumed glaucoma (Glc, LCD > 513.96 μ m). Key parameters included ganglion cell complex (GCC) and retinal nerve fibre layer (RNFL) thickness, minimum rim width (MRW) derived from optic nerve head optical coherence tomography scans divided radially into octants; visual field mean deviation (MD) and papillomacular bundle (PMB) sensitivity.

Results: Comparing HMON eyes (n=41) with normal (n=80), significant GCC thinning was observed across all sectors; also RNFL thinning in all regions apart from superior and nasally. HMON GCC and RNFL thinning were most marked superonasal and inferonasal. Glc eyes (n=57) demonstrated GCC and RNFL thinning in all sectors compared to normal, apart from inferonasally, superonasally and nasally. MRW was thinner in all sectors in Glc but not HMON eyes compared to normal. The mixed group (n=104) showed GCC and RNFL thinning in all sectors except the nasal sector. HMON, Glc and mixed groups had significantly lower MD and PMB sensitivity than normal.

Conclusions: LCD-based stratification reveals distinct structural and functional phenotypes with HM that may differentiate HMON from Glc.

Abstract No.: 203779

Progression Patterns and Risk Factors of Axial Elongation in Young Adults With Nonpathologic High Myopia: Three-Year Large Longitudinal Cohort Follow-Up

First Author: Kangjie KONG

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Purpose: To investigate the progression patterns and risk factors of axial elongation in young adults with nonpathologic high myopia.

Methods: A total of 1043 eyes of 563 participants (3515 medical records) aged 18 to 50 years with nonpathologic high myopia (axial length [AL] ≥ 26 mm; myopic maculopathy < diffuse chorioretinal atrophy; without posterior staphyloma) were included from 1546 participants (6318 medical records). Annual axial elongation was calculated via linear mixed-effect models. The associated risk factors of axial elongation were determined by ordinal logistic regression analysis, with generalized estimate equations for eliminating an interocular correlation bias.

Results: Based on 5359 times of AL measurements, the annual axial elongation of participants (mean [SD] age 31.39 [9.22] years) was 0.03 mm/year (95% confidence interval [CI], 0.03–0.04; $P < .001$) during a 30.23 (6.06) months follow-up. Severe (>0.1 mm/year), moderate (0.05–0.09 mm/year), mild (0–0.049 mm/year), and nil (≤ 0 mm/year) elongation was observed in 122 (11.7%), 211 (20.2%), 417 (40.0%), and 293 (28.1%) eyes. The following risk factors were significantly associated with axial elongation: baseline AL ≥ 28 mm (odds ratio [OR], 4.23; 95% CI, 2.95–6.06; $P < .001$); age < 40 years (OR, 1.64; 95% CI, 1.18–2.28; $P = .003$); axial asymmetry (OR, 2.04; 95% CI, 1.26–3.29; $P = .003$), and women (OR, 1.52; 95% CI, 1.13–2.05; $P = .006$). Using antiglaucoma medications was a protective factor (OR, 0.46; 95% CI, 0.27–0.79; $P = .005$), which slowed 75% of axial elongation from 0.04 (0.06) to 0.01 (0.06) mm/y ($P < .001$).

Conclusions: Axial elongation continued in young adults with nonpathologic myopia. Risk factors included longer baseline AL and axial asymmetry, younger age, and woman. Topical use of anti-glaucoma medications may be useful to reduce ongoing axial elongation.

Abstract No.: 205028

Prospective Myopia Cohort Study in Singapore (PROMYSE)

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Purpose: High myopia is linked to severe complications such as retinal detachments and myopic macular degeneration (MMD). Despite these known associations, data on their prevalence and incidence are scarce.

Methods: This prospective observational study included Singaporean participants aged ≥ 16 years with a spherical equivalent refraction (SER) of ≤ -0.5 diopters (D) and without pre-existing eye conditions. Participants provided written informed consent and underwent comprehensive ophthalmological exams, repeated at one- and two-year follow-ups. Descriptive statistical analysis was performed.

Results: A total of 753 participants (mean age 36.5 ± 12.3 y; 60% male; 94% Chinese) were examined at baseline. The mean decimal best-corrected visual acuity (BCVA) was 0.97 ± 0.1 , the mean axial length (AL) of right eyes was 26 ± 1.6 mm, and the mean SER was -5.4 ± 3.6 D. At baseline, the prevalence of retinal tears was 0.4%, retinal detachment occurred in 0.1%, and staphyloma was present in 5%. Dome-shaped macula, intrachoroidal cavitations, or myopic traction maculopathy were found in 0.7% of right eyes (RE). Comparable results were noted for left eyes (LE). After two years, 45% of participants ($n=340$) returned for follow-up. AL and SER remained unchanged. MMD grade 1 in RE increased from 66% to 68%, and MMD grade 2 rose from 9% to 10%. There was a significant increase in peripheral lattice degeneration from 4% to 9% ($p=0.01$).

Conclusions: Over two years, AL and SER did not increase. Myopia-related complications were low. However, a significant rise in peripheral retinal changes was observed over two years. This dataset offers an overview of the prevalence of myopic macular degeneration and other complications in middle-aged Asian myopes.

Abstract No.: 202971

Quantification of Posterior Staphyloma Severity Using Scleral Curvature Analysis and Its Association With Anterior and Posterior Segment Alterations in High Myopia

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Purpose: To develop a novel curvature-based method for quantifying posterior staphyloma (PS) severity and investigate its relationship with anterior and posterior segment parameters in highly myopic eyes.

Methods: A single-center, cross-sectional study included 385 eyes from 252 patients with high myopia (axial length AL ≥ 26 mm). All eyes underwent multimodal imaging: IOL-Master 700 (AL), CASIA 2 (anterior segment), B-mode ultrasonography (posterior scleral contour), and fundus/OCT (myopic maculopathy grading). PS Severity Index (PSI): Derived from posterior scleral curvature variations using AutoCAD segmentation. Calculated as: $PSI = [K - \max(K_1, K_2, \dots, K_n) - K] \times 100\%$, where K_i = segmental curvature. Anterior segment parameters: including anterior chamber

angle (AOD, ARA, TISA), iris volume, and lens metrics (decentration, volume). Myopic maculopathy: graded per international photographic classification.

Results: Mean PSI was 0.46 ± 0.262 , increasing significantly with AL ($P = .021$). PS severity distribution: mild (46.4%), moderate (33.8%), severe (17.5%), extreme (2.3%). Anterior segment associations: PS severity correlated with anterior chamber angle parameters (AOD250, ARA250, TISA250; all $P < 0.05$), iris volume ($P = 0.042$), and lens decentration ($P = 0.002$), but not AL or vitreous volume ($P > .05$). AL stratification (26–28/28–30/ ≥ 30 mm): Anterior chamber volume/iris volume remained stable ($P > .05$), while lens volume/vitreous volume increased significantly ($P < .05$). Anterior chamber angle widened with AL ($P = 0.002$). Myopic maculopathy (79.3% prevalence): Severity correlated with PSI ($P < .05$), AL ($P < .05$), and anterior angle parameters (TISA750, AOD500; $P < .05$).

Conclusions: This study establishes the first quantitative, curvature-based PS severity grading system, revealing significant links between PS biomechanics and anterior segment alterations—particularly anterior chamber angle widening. These findings underscore the eyeball as an integrated biomechanical system in high myopia, suggesting PS severity may serve as a biomarker for anterior segment remodeling and glaucoma risk.

Abstract No.: 204835

Repeated Low-Level Red-Light Therapy Combined With Orthokeratology for Myopia Control in Spain: A Randomized Controlled Trial

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Purpose: To evaluate the 12-month efficacy and safety of repeated low-level red-light (RLRL) therapy combined with orthokeratology (ortho-k) for myopia control in Spanish children.

Methods: In this single-site, randomized, parallel-group, non-blinded clinical trial (ClinicalTrials.gov identifier: NCT06899139), children aged 10–13 years with myopia ranging from -0.75 to -6.75 D were recruited and randomly assigned to either the combined RLRL plus ortho-k group (RCO) or the ortho-k-only group. Ortho-k participants wore lenses for ≥ 8 hours nightly, while RCO participants additionally received RLRL therapy twice daily (3 minutes per session, 5 days per week). Follow-up assessments were performed at 6, 9, and 12 months. The primary outcome was axial length (AL) change from baseline to 12 months; macular thickness (MT) was also assessed.

Results: A total of 26 children were enrolled (11 in RCO, 15 in ortho-k). After 12 months, the adjusted

mean AL change was -0.111 mm (95% CI, -0.142 to -0.080) in the RCO group versus $+0.104$ mm (95% CI, 0.074 to 0.133) in the ortho-k group, with a between-group difference of -0.215 mm (95% CI, -0.258 to -0.172 ; $p < 0.001$). The adjusted mean MT increase was greater in the RCO group ($+0.690$ μ m; 95% CI, 0.362 to 1.019) compared with the ortho-k group ($+0.199$ μ m; 95% CI, -0.112 to 0.510 ; $p = 0.033$). In the RCO group, 80% of children achieved AL shortening > -0.05 mm, while none in the ortho-k group did. No severe adverse events occurred.

Conclusions: RLRL therapy combined with ortho-k is effective and safe for slowing myopia progression in Spanish children. These findings support the generalisability of this synergistic approach across diverse ethnic groups.

Abstract No.: 201200

Shortening of Axial Length and Scleral Curvature Changes Following Repeated Low-Level Red-Light Therapy in Children With High Myopia

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Purpose: To identify factors associated with axial length (AL) shortening and fundus changes after 12-month repeated low-level red-light (RLRL) therapy in highly myopic children.

Methods: Highly myopic patients aged 8 to 18 years who underwent RLRL therapy at the Institute of Science, Tokyo, between October 2022 and August 2023 were included. Spherical equivalent (SE), AL, choroidal thickness in 9 ETDRS subfields, and posterior scleral curvature on optical coherence tomography (OCT) were evaluated at baseline and 12 months. Quantitative OCT analysis of scleral height was also performed. Analyses were conducted in the per-protocol population using right-eye data.

Results: Twenty-six patients (54% male; mean age, 11.2 ± 2.6 years; baseline SE, -9.4 ± 1.7 D; AL, 27.0 ± 1.0 mm) were analyzed. After 12 months, mean SE reduction was 0.28 ± 0.21 D, mean AL shortening was 0.01 ± 0.10 mm, and mean macular choroidal thickness increased by 26 ± 21 μ m. No significant interregional difference in choroidal thickening was observed, but 5 patients (19.2%) were subjectively assessed as having scleral curvature change. Multivariate regression identified macular choroidal thickening ($\beta = -0.68$) and scleral curvature change ($\beta = -0.27$) as significant predictors of AL shortening ($R^2 = 0.64$; $P < 0.01$). Quantitative OCT analysis demonstrated that eyes initially showing higher temporal and lower nasal scleral contour exhibited a temporal reduction and a significant nasal increase ($P = 0.011$) after therapy, consistent with posterior scleral flattening.

Conclusions: Axial shortening after RLRL therapy was associated with choroidal thickening and localized scleral curvature changes in highly myopic children.

Abstract No.: 201358

Shortening of Axial Length and Thickening of the Choroid Following Repeated Low-Level Red-Light Therapy in Adults With High Myopia

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Purpose: To investigate the effects of 2-month repeated low-level red-light (RLRL) therapy on macular choroidal thickness (mCT) and axial length (AL) in adults with high myopia, and to evaluate changes in other biological parameters associated with RLRL therapy.

Methods: In this prospective interventional study, 30 adults (aged 21–64 years) with high myopia (spherical equivalent refraction [SER] ≤ -6.0 diopters) who visited the Institute of Science Tokyo Hospital between December 2023 and November 2024 were enrolled. Eyes with hereditary chorioretinal disorders were excluded. All participants underwent home-based RLRL therapy for 2 months. At baseline, 1 month, and 2 months, fundus autofluorescence (FAF), optical coherence tomography (OCT), and polarization-sensitive OCT were performed. SER, AL, and mCT were measured at each visit.

Results: Of the 30 participants, 28 completed RLRL therapy, while 2 discontinued due to personal preference. No adverse subjective symptoms or severe fundus abnormalities were detected in any participant. At 2 months, compared with baseline, significant improvements were observed: mean SER (-12.76 ± 3.66 D vs -13.07 ± 3.42 D, $P < 0.05$), AL shortening (29.17 ± 1.58 mm vs 29.23 ± 1.59 mm, $P < 0.05$), mCT thickening (103.35 ± 31.86 μ m vs 90.91 ± 27.71 μ m, $P < 0.01$), and choroidal polarimetric entropy decreasing (0.315 ± 0.15 vs 0.304 ± 0.16 , $P < 0.05$). Compared with baseline, 82.1% of eyes showed $>5\%$ increase in mCT, and 67.9% showed $>10\%$ increase.

Conclusions: RLRL therapy, previously reported to be effective for myopia control in children, also demonstrated a significant effect on biological parameters in highly myopic adults.

Abstract No.: 206858

Sleeping With Lights on Drives Childhood Myopia Independent of Sleep Duration: A Five-Year Cohort Study

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Purpose: To examine the association between sleeping with a light on and childhood myopia, and to explore whether sleep duration trajectories within light type influence myopia development.

Methods: In this 5-year cohort of 2,098 school-aged children, nighttime light exposure (on/off) and type (fluorescent vs. incandescent) were recorded annually, with six-year average fluorescent exposure categorized as low, medium, or high. Sleep duration trajectories within light type were classified using group-based trajectory modeling (GBTM). Incident myopia was defined as spherical equivalent refraction ≤ -0.50 D. Associations were estimated using multivariable logistic regression and generalized estimating equations, adjusting for demographic, behavioral, and familial covariates.

Results: Sleep duration trajectories were not independently associated with myopia (long vs. short: OR = 1.03, 95% CI: 0.82–1.30, $P = 0.792$). In contrast, sleeping with a light on significantly increased myopia risk (OR = 1.25, 95% CI: 1.01–1.57, $P = 0.048$). A clear dose–response was observed for fluorescent light exposure (medium vs. low: OR = 1.83, 95% CI: 1.01–3.35, $P = 0.050$; high vs. low: OR = 1.82, 95% CI: 1.15–2.87, $P = 0.011$). At 6 years, children exposed to nighttime illumination demonstrated greater myopic progression, longer axial length, higher AL/CR ratio, elevated intraocular pressure, and thinner lens thickness (all $P < 0.05$). Subgroup analyses by fluorescent exposure consistently confirmed that sleep duration did not influence myopia incidence or ocular growth (all $P > 0.05$).

Conclusions: Sleeping with a light on, particularly under higher fluorescent exposure, constitutes a modifiable risk factor for childhood myopia, whereas sleep duration trajectories within each light type appear to have no measurable effect. Limiting ambient nighttime illumination may provide a simple and scalable preventive strategy.

Abstract No.: 203867

Spectacle Lenses With Highly Aspherical Lenslets for Myopia Control in Children: A Systematic Review and Meta-Analysis

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Purpose: This study aimed to evaluate the efficacy of spectacle lenses with highly aspherical lenslets (HAL) in controlling myopia progression in children by assessing

changes in spherical equivalent refraction (SER) and axial length (AL).

Methods: This study employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. PubMed, Google Scholar, and ScienceDirect were searched for systematic reviews of randomized controlled trials (RCTs). Primary outcomes were changes in SER (diopters) and AL (millimeters). Risk of bias was assessed using the Cochrane risk assessment tool. Meta-analysis was performed using RevMan version 5.4.1.

Results: Three RCTs with 325 participants were identified. HAL lenses significantly reduced axial elongation compared to single-vision spectacle lenses (SVL) (MD = -0.22 mm; 95% CI: -0.33 to -0.10 ; $p < 0.001$; $I^2 = 96\%$). Similarly, HAL lenses significantly slowed the progression of myopia as measured by SER (MD = 0.51 D; 95% CI: 0.17 to 0.86 ; $p = 0.004$; $I^2 = 97\%$) compared to SVL. Funnel plots showed symmetrical distribution, suggesting low risk of publication bias. Despite high heterogeneity, consistent directional effects were observed across studies.

Conclusions: Spectacle lenses with highly aspherical lenslets are effective in slowing both axial elongation and myopia progression in children. These lenses represent a promising, non-invasive optical strategy for myopia control in children.

Abstract No.: 209751

Study on the Role of NF- κ B-Regulated Pyroptosis in Myopia

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Purpose: The rising global prevalence of myopia highlights the need to elucidate its molecular mechanisms. NF- κ B plays a crucial role in myopia progression, while pyroptosis is closely associated with various ocular diseases. However, the role of pyroptosis in myopia remains unexplored. Given that NF- κ B regulates pyroptosis, this study aims to explore whether NF- κ B influences myopia progression by modulating pyroptosis.

Methods: NF- κ B expression was knocked down in ARPE-19 cells and lens-induced myopia (LIM) mice using lentiviral shRNA. In vitro, LPS-treated ARPE-19 cells were assessed for viability (CCK-8), apoptosis (TUNEL), pyroptosis markers (NLRP3, caspase-1, GSDMD-N; qPCR/Western blot/immunofluorescence), and inflammatory cytokines (ELISA). In vivo, axial length, refractive error, and retinal structure (H&E staining) were evaluated, along with the levels of inflammatory cytokines and the expression of pyroptosis-related proteins and Lumican in the sclera.

Results: NF- κ B knockdown alleviated LPS-induced cytotoxicity and apoptosis in ARPE-19 cells, suppressed inflammatory cytokines (IL-1 β , IL-18, TNF- α), and

downregulated pyroptosis markers. In LIM mice, NF- κ B knockdown reduced axial elongation, decreased diopter values, improved retinal structure, and lowered the levels of inflammatory cytokines and pyroptosis markers.

Conclusions: This study provides evidence that NF- κ B promotes myopia progression by inducing pyroptosis, suggesting that targeting the pyroptosis pathway may represent a more precise and effective therapeutic strategy compared to NF- κ B itself for myopia intervention.

Abstract No.: 205077

TNF- α but Not IL-17 and IL-4 Promoted Myopic Retinopathy in BestCre-Lrp2fl/FL KO Mice

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Co-Author(s): Xuexue **CUI**, Wen **DENG**, Jian **LIU**, Heping **XU**, Caijiao **YI**, Xiangling **YUAN**

Purpose: Inflammation is known to be involved in the pathogenesis of myopic retinopathy. Studies have reported high levels of inflammatory cytokines in high myopic patients. This study aimed to understand how the Th1, Th2, and Th17-type immune responses affect the progression of myopic retinopathy in the BestCre-Lrp2fl/fl KO mice.

Methods: 2-week-old BestCre-Lrp2fl/fl KO mice were treated intraperitoneally (i.p.) with TNF- α (75ug/g of body weight) or IL-4 (75/g of body weight) or IL-17A (25ug/g of body weight) twice a week for 8 weeks. Blood samples were collected at 6h and 72h after i.p. for the measurement of inflammatory cytokines. OCT was used to measure the axial length and retinal thickness. Retinal function was evaluated by ERG and optokinetic reflex. Eyeballs were collected and processed for immunofluorescent staining of retinal neurons, synaptic structures, Iba-1+ microglia, and phalloidin (for RPE cell structures).

Results: The serum levels of TNF- α , IL-4 and IL-17A increased significantly 6 h after i.p. treatment. TNF- α and IL-17A treatment reduced the population of CD11b+ monocytes, CD11b+LY6C+inflammation monocytes, but increased the population of B220+ B cells, CD11b+LY6C-monocytes in the blood and spleen in BestCre-LRP2fl/fl KO. IL-4 treatment increased the population of Ly6G+/CD11b+neutrophils, Ly6C-/CD11b+/ CD117+ mast cells, CD11b+ monocytes, DC, but decreased the population of CD4+ T cells and B220+ B cells. TNF- α , but not IL-17 or IL-4, treatment significantly reduced a-, b-, c-waves and Ops. Immunofluorescence staining showed that the BestCre-Lrp2fl/fl KO eyes had RPE cell dysmorphology, subretinal microglial accumulation, and reduced rod and cone cell numbers.

Conclusions: TNF- α promotes the progression of myopic retinopathy.

Abstract No.: 205169

The Association of Smart Watch Usage on Myopia Progression in Primary School Students: A 1-Year Prospective Observation

First Author: Runtong **MA**

Co-Author(s): Yin **HU**, Zhipeng **LAI**, Xiao **YANG**

Purpose: To explore the impact of smart watch usage on changes of refraction and axial length in primary school students.

Methods: A 1-year prospective, school-based, observational study. 661 students (Grade 5 at baseline, ages 11-13) were invited. The cycloplegic spherical equivalent refraction (SER), axial length (AL) and questionnaires were measured at baseline and 1-year visit.

Results: 526 participants (mean age, 11.31 ± 0.47 years; 52.3% male) completed the 1-year study, and were divided into three groups based on smart watch time (<0.5, 0.5-1, >1h/day). Participants with more daily smart watch usage (>1h/day) showed more significantly myopic shift in refraction (-0.95 D) and axial elongation (0.47 mm) compared to those with moderate (0.5-1h/day: -0.29 D and 0.25 mm) or low (<0.5h/day: -0.33 D and 0.28 mm) usage (both $p < 0.001$). The weekday time of the smart watch was strongly associated with SER ($r = -0.173$, $p < 0.001$) and AL changes ($r = 0.163$, $p < 0.001$). The generalized linear mixed model revealed that total screen time ($\beta = -0.07$ for SER change, $\beta = 0.03$ for AL change, both $p < 0.001$) and weekday smart watch usage ($\beta = -0.58$ for SER change, $\beta = 0.16$ for AL change, both $p < 0.001$) were significantly associated with myopic shifts in refraction and axial elongation.

Conclusions: Observational data indicate an association between total screen time (including smartwatches) and myopic shifts in refraction or axial elongation. These findings suggest that reasonable management of screen time may be needed.

Abstract No.: 205017

The Effectiveness of Red-Light Therapy on Myopia Control Depends on Its Direct Effect: A Mediation Analysis

First Author: Hongyu **WEI**

Co-Author(s): Qin **CHEN**, Ching-yu **CHENG**, Zhi Da **SOH**, Hua **ZHONG**

Purpose: To investigate whether alterations in subfoveal choroidal thickness and peripheral retinal refraction mediate the efficacy of repeated low-level red-light (RLRL) therapy for myopia control.

Methods: We conducted a mediation analysis within a multicenter, randomized controlled trial. A total of 300 myopic children were included in this analysis. Participants in the RLRL group wore single-vision spectacles and received red-light therapy twice daily for 12 months. The control group wore spectacles only,

without any additional myopia-control intervention. Axial length, spherical equivalent refraction, subfoveal choroidal thickness, and total refractive difference value were measured at baseline and at follow-up visits over 12 months.

Results: After 12 months, RLRL therapy significantly attenuated axial length and myopic shift in spherical equivalence compared with controls, accompanied by sustained increases in choroidal thickness and reductions in peripheral hyperopic defocus. Mediation analysis revealed that changes in choroidal thickness and peripheral refraction accounted for 24.83% and 6.79%, respectively, of the effect on axial length inhibition, and 28.79% and 5.97% of the effect on spherical equivalent control. The remaining effects were attributable to the direct impact of red-light (68.39% for axial length and 65.24% for spherical equivalence). Notably, choroidal thickening emerged as the predominant mediator within the first three months.

Conclusions: RLRL therapy exerted a predominantly direct effect on myopia control, while changes in choroidal thickness and peripheral defocus partially mediated its effectiveness.

Abstract No.: 200663

The Efficacy of Orthokeratology Lenses Combined With Diffusion Optical Technology for Myopia Control in Children With a Family History of High Myopia: Does It Alleviate Retinal Neural Adaptation?

First Author: Yujing LI

Co-Author(s): Kai WANG

Purpose: This study aimed to evaluate the efficacy of combining orthokeratology (Ortho-K/OK) lenses with Diffusion Optics Technology (DOT) lenses for controlling axial length (AL) elongation in myopic children with a family history of high myopia.

Methods: A prospective cohort study was conducted from June 2023 to June 2024. The participants were divided into OK lenses monotherapy (n=32) and OK+DOT combination therapy (n=32) groups. Patients in both groups wore only OK lenses for the first six months. Patients in the combination group were fitted with DOT lenses after demonstrating poor AL control (≥ 0.2 mm growth) during the first 6 months of wearing only OK lenses. AL was measured every 3 months over the 18-month follow-up.

Results: The OK+DOT group presented significantly greater AL growth at 3-6 months (0.12 ± 0.05 mm vs. -0.01 ± 0.19 mm, $p=0.001$) before DOT intervention. After combination, AL growth rates normalized to levels comparable to the OK lenses group (6-9 months: 0.06 ± 0.10 mm vs. 0.08 ± 0.09 mm, $p=0.309$). However, at 15-18 months, the combination group presented slightly greater AL growth (0.08 ± 0.06 mm vs. 0.05 ± 0.04

mm, $p=0.043$). Repeated measures analysis of variance revealed significant time-dependent changes in AL growth in the OK+DOT group (partial $\eta^2=0.153$, $p=0.005$).

Conclusions: The combination of OK and DOT effectively reduced AL growth in patients with inadequate response to OK lenses alone, suggesting that multi-mechanistic myopia control may require dynamic adjustments to maintain long-term efficacy.

Abstract No.: 201538

The Role of Ciliary Muscle Contraction in Myopia Onset Through Clinical, Animal, and Single-Cell RNA Sequencing Studies

First Author: Peng ZHOU

Co-Author(s): Zhao-yang MENG

Purpose: To investigate the biomechanical and cellular-molecular mechanisms by which ciliary muscle contraction contributes to the development of myopia.

Methods: Axial length was measured as an indirect approach to assess the tension transmission from ciliary muscle contraction along the eye wall. We compared cycloplegia (ciliary muscle relaxed) and non-cycloplegia (ciliary muscle contracted) groups to measure axial length in children and adolescents using a Nidek interferometer and in mice using a Topcon OCT. Post-mortem mouse eyes underwent single-cell transcriptomic sequencing for cellular analysis.

Results: Axial length increased by 0.0236 ± 0.0017 mm in 389 adolescent eyes (320 Chinese, 69 Caucasian) during muscle contraction ($t=28.80$, $P<0.001$), with similar increases of 0.0687 ± 0.0172 mm observed in mice ($t=4.46$, $P<0.001$). Analysis of 48,509 cells identified fibroblasts transitioned from subcluster 3 to 1, increasing sensitivity to mechanical stimuli, extracellular matrix secretion, and eye growth during ciliary muscle contraction. Cellchat analysis showed heightened activity in pathways related to immunity, cell adhesion, proliferation, and extracellular matrix composition.

Conclusions: Ciliary muscle contraction may initiate myopia by mechanically transmitting forces and involving inflammatory mediators and immune cells. These interactions trigger fibroblast differentiation and scleral extracellular matrix remodeling, underscoring the complex mechanisms underlying myopia onset and progression.

Abstract No.: 203974

The Shenzhen Model for Myopia Prevention: Artificial Intelligence – Empowered Strategies in a Super-Megacity of the Greater Bay Area

First Author: Haoxi ZHONG

Purpose: Myopia has become a global public health priority, particularly in East Asia's rapidly urbanizing

regions. Shenzhen, a super-megacity of over 20 million residents and a key hub of the Guangdong–Hong Kong–Macao Greater Bay Area, has pioneered an artificial intelligence (AI)–driven, citywide approach to childhood myopia prevention and control.

Methods: Since 2019, Shenzhen has implemented annual school-based myopia screening covering more than 1.8 million students aged 6–18 years. Over 20 million individual-level vision health records have been accumulated, forming one of the world's largest myopia databases. These data underpin digital vision health archives, predictive AI models (deep learning, time-series forecasting, survival analysis), and smart intervention platforms. Integration with wearable outdoor-activity sensors and mobile applications enables real-time feedback for schools, families, and healthcare providers.

Results: Universal coverage of school-aged children was achieved, enabling precise identification of high-risk subgroups and individualized prevention strategies. AI-powered prediction improved referral efficiency, reduced unnecessary clinic visits, and facilitated timely interventions. Early program evaluations show a measurable slowing of myopia progression in targeted cohorts. The initiative also fostered a regional alliance of >150 hospitals and schools, strengthening knowledge transfer across the Greater Bay Area.

Conclusions: The “Shenzhen Model” demonstrates that AI-powered, population-level myopia prevention is feasible in a super-megacity setting. Its integration of big data, artificial intelligence, and preventive public health offers a scalable framework for other global urban centers, contributing to equitable and sustainable eye health solutions.

Abstract No.: 205325

The Transition From Pre-Myopia to Myopia in School-Age Chinese Children: Not All Pre-Myopes Rapidly Become Myopic

First Author: Xiaohu **DING**

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Purpose: To quantify the age-specific rates of conversion from pre-myopia to myopia in pre-myopic school children, and to identify risk factors associated with this conversion.

Methods: Data on subjects aged 7–15 at baseline from the Guangzhou Twin Eye Study (GTES), with 12 years of follow-up visits, were used for this analysis. Data on children aged 6 at baseline from the Guangzhou Outdoor Activity Longitudinal study (GOALS) were used for validation. Subjects were classified into 4 refractive categories based on spherical equivalent (SE): significant hyperopia ($SE \geq 2.0D$), mild hyperopia ($0.75 < SE < 2.0D$), pre-myopia ($-0.5 < SE \leq 0.75D$) and myopia ($SE \leq -0.5D$). Pre-myopes were split into two subgroups: incident myopes (IM) and remain not

myopic (RNM). Risk factors for incident myopia were examined.

Results: Among the 7 to 12-year-old pre-myopes, between 30% to 35% became myopic over the next year. After 12 years of age, the incidence rate dropped to 16.2% at 17 years old. Myopic shifts the IM subgroup have greater changes in SE than established myopes, while the RNM subgroup showed rates of change like those in the mild and significant hyperopes. Following an academic rather than vocational school pathway was a significant risk factor for the development of myopia in multivariate analysis. Similar patterns were seen in the GOAL data.

Conclusions: These results show that only a minority of pre-myopes are at risk of rapid development of myopia. Rates of myopic shift in SE and axial elongation in the IM group were higher than those in established myopes.

Abstract No.: 204200

The Trend Analysis: The Burdens of Refraction Disorders in Children and Adolescents From 2010 to 2021 in Global, Regional, and National

First Author: Yanxin **XU**

Co-Author(s): Zongyin **GAO**

Purpose: Exploring the burdens of refractive disorders among children and adolescents globally, regionally, and nationally between 2010 and 2021.

Methods: This was a population-based study using 2010–2021 data on the burden of refraction disorders from the Global Burden of Diseases, Injuries, and Risk Factors Study 2021 (GBD 2021). The burden of refraction disorders was evaluated in terms of case numbers, rates per 100,000 population, and average annual percentage changes (AAPCs) in prevalence rates and years lived with disability (YLDs). The burden was compared between 2010–2019 and 2020–2021.

Results: The AAPCs in prevalence and YLDs rates (both: -0.23 , 95% confidence interval [CI]: -0.25 to -0.20) decreased from 2010 to 2019, but the AAPCs did not show a significant downward trend between 2020 and 2021, with prevalence AAPC of -0.03 (95% CI: -0.10 to 0.02), YLD AAPC of -0.02 (95% CI: 0.09 to 0.04). Approximately two-thirds of regions exhibited an increasing trend between 2020 and 2021, which mainly concentrated in lower socioeconomic development regions. While East Asia shows a significant downward trend, with the most evident manifestation in China, with an AAPC of -2.97 . Moreover, only children under the age of 9 years exhibited an increased trend globally.

Conclusions: The burden of refraction disorders among children increased in most regions worldwide from 2020 to 2021 compared to the past decade. High sociodemographic index regions did not show an increased trend. We should adopt more effective

prevention and control measures to slow down the progression of refraction disorders, especially for younger children.

Abstract No.: 203919

Through Parents' Eyes: A Cross-Sectional Survey on Outdoor Time and Myopia in Singapore

First Author: Eric JIN

Co-Author(s): Pavithra ASHOK, Jermaine HAN, Daniella MAHFOUD, Najiya MEETHAL, Raymond NAJJAR

Purpose: This study aims to evaluate Singaporean parents' knowledge and perceptions regarding myopia and outdoor time, quantify their children's daily outdoor time, and explore perceived barriers to increasing time spent outdoors.

Methods: In this cross-sectional study, parents of Primary 1 to 3 students, from 42 public primary schools, completed a 22-item online questionnaire that captured baseline demographics, parental knowledge of myopia and outdoor time, children's outdoor habits and after-school activities, and barriers and parental commitment to increasing outdoor exposure. Chi-square/Fisher's exact tests analysed categorical variables, and Spearman's rank correlation assessed non-parametric associations.

Results: A total of 264 parents (40.9 ± 4.84 years) were included in this study. Children were on average 6.9 ± 0.81 years old, with 19.7% being myopic. Most parents (81.5%) rated their knowledge about myopia as good or very good, and recognized outdoor time as protective (89.8%). Only 5.7% of children spent >2h/day outdoors on weekdays, compared to 40.9% on weekends. Non-myopic children and those with parents not working full time were more likely to spend over 1h/day outdoors on weekdays (both $p < 0.05$). Key weekday barriers were academic demands (38.2%) and parental unavailability (34.9%), while weekend barriers included weather (29.5%), academics (26.9%), and enrichment classes (23.1%). Parental commitment strongly correlated with estimated children's outdoor time (weekday $p = 0.62$, weekend $p = 0.77$; $p < 0.001$).

Conclusions: Despite high parental awareness, most children fail to meet recommended outdoor durations for myopia prevention. Increasing time outdoors at schools, supporting working parents, and creating weather-resilient outdoor spaces may help translate awareness into action, lowering myopia risk in Singaporean children.

Abstract No.: 203702

Violet Light Enhances Adolescent Myopia Risk by Impeding the Development of Retinal VIP-Amacrine Cells During Critical Periods

First Author: Xuhong ZHANG

Co-Author(s): Ye SHEN, Jianping TONG, Xiaoyu WANG, Hong ZHU

Purpose: Drastic changes in the light environment significantly impact the visual health and even physical and mental health. While the role of light in early visual development is fundamental, the mechanisms behind its effects remain unclear. Myopia, characterized by an earlier onset and complex underlying mechanisms, is a critical condition affecting the visual health of adolescents worldwide.

Methods: We selected 400 nm violet light as our intervention. The critical exposure period was identified as postnatal days 14 to 28 (P14-P28). VIP::Ai14 mice were utilized to examine the impact of violet light on cellular development, morphology, and function. Patch clamp electrophysiology was employed to study the effects of violet light and virus on VIP-ACs. Immunoelectron microscopy was applied to detect changes in VIP-containing secretory vesicles.

Results: We demonstrate for the first time that exposure to short-wavelength violet light during the postnatal neuroplasticity window (P14~P28) in mice increases the risk of myopia by inhibiting the maturation of vasoactive intestinal peptide-expressing amacrine cells (VIP-ACs). Violet light suppresses dendritic arborization, graded potentials, and VIP secretion in VIP-ACs, and impairs retinal pathway function. Crucially, VIP derived from VIP-ACs exerts a predominant regulatory control over retinal development, thereby contributing to the pathogenesis of myopia. These findings identify violet light as a vital environmental trigger and VIP-ACs as spectral-sensitive modulators of retinal circuit formation. This links impaired neuropeptide signaling during a critical developmental period to increased myopic susceptibility.

Conclusions: This research underscores the impact of specific light wavelengths on visual nerve development and clarifies the underlying mechanisms.

Neuro-Ophthalmology

Abstract No.: 204506

Association Between GLP-1 Receptor Agonist Use and Risk of Isolated Cranial Nerve Palsy in Patients With Type 2 Diabetes

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*Co-Author(s): Hsin Ho **CHANG**, Hui-chen **CHENG**, Min-huei **HSU***

Purpose: To evaluate the association between GLP-1 receptor agonist (GLP-1RA) therapy and the time-dependent risk of isolated cranial nerve (CN) III, IV, and VI palsy in patients with type 2 diabetes mellitus (T2DM).

Methods: Using the TriNetX Research Network, a retrospective cohort of T2DM patients from 2006–2024 was identified. Patients prescribed GLP-1RAs were 1:1 propensity-score matched with those receiving non-GLP-1RA therapies, controlling for demographics, comorbidities, medications, and lab variables. Kaplan–Meier analysis and Cox proportional hazard models were used to assess time-dependent risks from 3 months to 5 years.

Results: After matching (702,886 patients per group), GLP-1RA users had significantly lower early cumulative risk of CN palsy at 3 months (HR 0.711; 95% CI, 0.581–0.869; $p=0.001$), 6 months (HR 0.743; 95% CI, 0.633–0.872; $p=0.086$), and 1 year (HR 0.857; 95% CI, 0.758–0.970; $p=0.014$). The protective effect declined at 2 years (HR 0.945; $p=0.258$) and was no longer observed by 5 years (HR 1.037; $p=0.359$). Subgroup analysis showed significantly reduced 3-month risk for CN III palsy (HR 0.693; $p=0.006$) and CN VI palsy (HR 0.735; $p=0.022$), but not for CN IV.

Conclusions: GLP-1RA therapy is associated with a significant, yet transient, reduction in risk of CN III and CN VI palsy in T2DM patients during the first year of treatment, suggesting a possible neuroprotective effect.

Abstract No.: 200144

Cellular Senescence Mediates Retinal Ganglion Cell Survival Regulation in Mice Post-Optic Nerve Injury

*First Author: Tsz Kin **NG***

*Co-Author(s): Xin **BIN**, Yao **YAO***

Purpose: Retinal ganglion cell (RGC) death is the critical pathological cause of irreversible visual impairment and blindness in optic nerve injury. We previously investigated the patterns of 11 modes of cell death in the mouse retina post-optic nerve injury. In this study, we aimed to identify additional signalling pathways regulating RGC survival in rodents post-optic nerve injury.

Methods: Retinal transcriptomes post-optic nerve injury were determined by RNA sequencing analysis. The expression of cellular senescence markers was evaluated in the retina post-optic nerve injury. Transforming growth factor receptor type II inhibitor (LY2109761) and senolytics (dasatinib and quercetin), counteracting cellular senescence, were applied to confirm the involvement of cellular senescence in RGC survival post-optic nerve injury.

Results: RNA sequencing analysis identified the upregulation of inflammation and cellular senescence-related genes in the retina post-optic nerve injury. Increased expression of senescence-associated β -galactosidase (SA- β gal) in RGCs and activation of microglia were also found. LY2109761 treatment suppressed p15 and p21 protein and SA- β gal expression and promoted RGC survival post-ON injury, while decreasing the expression of cell death markers in the retina. Consistently, dasatinib and quercetin treatments can promote RGC survival and alleviate the reduction of ganglion cell complex thickness and pattern electroretinography activity post-optic nerve injury, while reducing SA- β gal, p15, p21, microglial activation, and cell death marker expression.

Conclusions: This study revealed the activation of cellular senescence in the mouse retina post-optic nerve injury and contributed to RGC survival regulation. Targeting cellular senescence can promote RGC survival after optic nerve injury, suggesting a potential treatment strategy for traumatic optic neuropathy.

Abstract No.: 207131

Changes in Optic Nerve During Horizontal Eye Movements: A 3D MRI Study

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Purpose: To investigate structural changes in the optic nerve (ON) induced by horizontal gaze using three-dimensional (3D) magnetic resonance imaging (MRI), and to analyze their associations with ocular parameters.

Methods: A cross-sectional study was conducted using orbital MRI scans of 48 healthy participants obtained during central and lateral gazes. The ON was segmented from the optic nerve head (ONH) to the optic chiasm using ITK-SNAP. We measured the length and diameter of the segmented ON, as well as various morphometric parameters (e.g., axial distance, eyeball volume) using Vascular Modeling Toolkit (VMTK). In addition, intraorbital ON length was specifically extracted using a self-developed MATLAB script to isolate the orbital segment from the full-length centerline. We compared the ON length, intraorbital ON length, and diameter between the central and lateral gaze positions, and analyzed correlations with ocular parameters. Statistical analysis was performed

using Python to assess the significance of observed differences and correlations.

Results: The ON was successfully segmented and extracted from MRI scans obtained during central and lateral gaze in all subjects. The total ON length was 49.33 ± 3.17 mm and the intraorbital ON length was 15.07 ± 2.74 mm, showing significant differences between the eyes (right, 49.10 ± 3.42 mm; left, 49.57 ± 2.92 mm; $P = 0.029$) and between sexes (male, 50.49 ± 3.46 mm; female, 47.71 ± 1.73 mm; $P < 0.001$). The total ON diameter was 4.87 ± 0.43 mm and the intraorbital ON diameter was 5.18 ± 0.67 mm, also showing significant differences between the eyes (right, 4.93 ± 0.40 mm; left, 4.82 ± 0.45 mm; $P = 0.028$) and between sexes (male, 5.00 ± 0.45 mm; female, 4.69 ± 0.31 mm; $P < 0.001$). The intraorbital ON length significantly increased during lateral gazes compared to central gaze (2.59 ± 0.85 mm in adduction and 2.27 ± 1.03 mm in abduction, $P = 0.004$), while intraorbital ON diameter significantly decreased (adduction, -0.20 ± 0.56 , $P < 0.001$; abduction, -0.26 ± 0.60 , $P < 0.001$). Age showed a significant negative correlation with intraorbital ON length change during lateral gaze (adduction, $r = -0.256$, $P = 0.012$; abduction, $r = -0.214$, $P = 0.037$), while no significant correlations were observed with other ocular parameters.

Conclusions: Horizontal eye movements induce significant elongation and thinning of the optic nerve. These findings suggest that the optic nerve undergoes elastic deformation. Further mechanical studies are needed to clarify the biomechanical implications of these changes.

Abstract No.: 208278

Chronic Alcohol-Consumption Related Effects on Pupillary Light Reflex and Eye Tracking (CARPET) – a Systematic Review

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Co-Author(s): Kam Lung Kelvin **CHONG**, Ka Hei Kenneth **LAI**, Chi Pui Calvin **PANG**, Chee Yung Clement **THAM**, Wing Lam Stephany **TAI**, Yiu Man Hanson **WONG**

Purpose: This systematic review aims to analyze findings of the effect of chronic alcohol abuse on Pupillary Light Reflex (PLR) and Eye Tracking (ET).

Methods: This systematic review was conducted in accordance with the PRISMA guideline. A search of the English literature was performed using the online databases including Scopus, Medline, PubMed, and Cochrane, as well as citation searching. Data extraction was conducted using predefined structural tables.

Results: Of 448 screened articles, 7 were selected. Regarding PLR, long-term alcohol misuse results in a shortened latency ($p < 0.05$) and a lengthened half-dilation time compared to baseline ($p < 0.05$), marking it role as a physiological marker. Furthermore, chronic alcohol abuse has been associated with a clear

pupillary response in healthy people. Study suggested that it predicts the prognosis of detoxified alcohol-dependent subjects ($n=2$), comparable to the results from Alcohol Use Questionnaire ($p < 0.05$) likely due to locus coeruleus-norepinephrine system dysfunction that is involved in attention and decision-making. Alternatively regarding ET, 3 studies show that alcohol abuse causes diminished oculomotor control in saccade velocity, fixation stability, and pupillary reactivity. Alcohol intoxication impairs visuo-motor functions, reducing cerebellar-related eye movement control, and inhibitory control of eye movements. ET serves as an objective physiological marker for alcohol intoxication and predicts relapse risk.

Conclusions: Future research directions include the detection of using wearables and portable devices. The development of pupillary reactivity and eye tracking biomarkers supports personalized treatment of alcohol use disorder and aids abstinence.

Abstract No.: 204880

Clinical Analysis of the Characteristics of Peripapillary Hyperreflective Oval Mass-like Structures in Adult Patients with High Myopia

First Author: Hashimoto **KINJI**

Co-Author(s): Yi **CAI**

Purpose: Objective: To characterize the clinical features of peripapillary hyperreflective ovoid mass-like structures (PHOMS) in highly myopic adults and to identify the key factors associated with their presence, height, and internal vascularity.

Methods: Methods: In this cross-sectional study, 199 highly myopic adults (398 eyes) were enrolled. Key parameters including axial length, spherical equivalent, and optic disc tilt were measured. The presence, height, and internal blood flow of PHOMS were determined using optical coherence tomography (OCT) and optical coherence tomography angiography (OCTA). Patients were divided into blood flow-positive subgroup and blood flow-negative subgroup according to the presence of internal blood flow in PHOMS. The correlations of age, equivalent spherical refraction, axial length, and optic disc tilt with the occurrence of PHOMS, as well as the correlation between internal blood flow of PHOMS and various factors, were analyzed. Multivariate logistic regression models were used to identify independent risk factors.

Results: Results: PHOMS were present in 93 of 398 eyes (23.4%). After multivariate adjustment, the presence of PHOMS was independently associated with longer axial length (OR = 1.392, 95% CI: 1.141–1.699, $P < 0.001$), greater myopic spherical equivalent (OR = 1.12, 95% CI: 1.013–1.254, $P = 0.028$), and greater optic disc tilt (OR = 1.169, 95% CI: 1.103–1.239, $P < 0.001$). PHOMS height was positively correlated with these three factors (all $P < 0.01$). Among the 93 PHOMS-

positive eyes, OCTA showed that 57 eyes (61.3%) had internal blood flow. Crucially, while multiple factors were associated with blood flow in univariate analysis, only greater optic disc tilt remained as an independent predictor in the multivariate model (OR = 1.246, 95% CI: 1.033–1.501, $P = 0.01$).

Conclusions: Conclusion: PHOMS are a common finding in highly myopic adults. A more negative spherical equivalent, longer axial length, and greater optic disc tilt are associated with a higher likelihood of PHOMS occurrence and greater PHOMS height. More significantly, optic disc tilt is the primary independent predictor for the presence of internal blood flow, suggesting that mechanical stress plays a key role in the vascular characteristics of these lesions.

Abstract No.: 209926

Clinical and Morphological Characteristics of Patients With Peripapillary Hyperreflective Ovoid Mass-Like Structure (PHOMS)

First Author: Damla **CULHA**

Co-Author(s): Hakan **ÖZDEMİR**

Purpose: To evaluate the clinical and morphological characteristics of eyes with peripapillary hyperreflective ovoid mass-like structures (PHOMS).

Methods: The clinical records, standard mode and enhanced depth imaging (EDI) mode spectral-domain optical coherence tomography (SD-OCT), fundus autofluorescence (FAF), and B-scan ocular ultrasonography (USG) of patients with PHOMS were retrospectively reviewed. The etiology of PHOMS, spherical equivalent (SE), integrity of the photoreceptor layer (PRL) below PHOMS, inversion of the retinal pigment epithelium (RPE) under PHOMS into the scleral canal, the lateral margin shape of PHOMS, and the outermost retinal layer observed at the highest point of PHOMS were evaluated.

Results: Seventy-two eyes of 42 patients with PHOMS were evaluated. The majority of patients were female (71.43%), under 18 years old (78.57%), and had myopic refraction (mean SE, -2.97 diopters). Optic disc drusen and optic disc edema were detected in 4 eyes each, and 64 eyes (37 patients) showed myopic tilted discs. Deterioration of the PRL under PHOMS was observed in all eyes. Inversion of the RPE was present in 55 eyes (76.39%). Oval-shaped margins were seen in 50 eyes (69.44%). PHOMS almost always exceeded the upper border of the outer nuclear layer.

Conclusions: PHOMS, which can occur due to various etiological factors, is more common in myopic females in the pediatric age group, almost always causes deterioration of the PRL, and may present with different margin characteristics.

Abstract No.: 202367

Comparison of the Effectiveness of Using Liquid Crystal Glasses “Srabo Glasses” and Transcutaneous Electrical Stimulation to Improve Visual Functions in Children With Partial Optic Nerve Atrophy

First Author: Igor **AZNAURYAN**

Co-Author(s): Karmen Artenian **ARTENIAN**, Satenik **AGAGULIAN**, Victoria **BALASANYAN**, Natalia **KURYSHEVA**, Alexander **LAVER**, Svetlana **RYCHKOVA**

Purpose: To compare the effectiveness of using liquid crystal glasses (LCG) and transcutaneous electrical stimulation (TES) in the functional treatment of congenital partial optic nerve atrophy in children.

Methods: We observed 99 school-age children with congenital PONA caused by perinatal pathology. Depending on the treatment, the children were divided into three groups: 1) 32 children who studied with LCG; 2) 35 children who underwent a course of classical TES; 3) 32 children who received combined treatment, including classes with LCG and TES. The study groups were comparable in terms of key clinical characteristics.

Results: A significant increase in visual acuity was observed in the better-seeing eye and the worse-seeing eye as a result of treatment in all three groups of children ($p < 0.001$). The improvement in visual acuity was more pronounced with combined than isolated use of TES and LCG ($p < 0.05$). As a result of using the LCG, alone or in combination with TES, we observed increases in the number of children with orthotropy and in the number of children with normal retinal correspondence ($p < 0.001$). After using TES alone, the number of children with normal fusion amplitude was comparable before and after treatment ($p > 0.05$).

Conclusions: Thus, the use of LCG alone or in combination with TES in children with congenital partial optic nerve atrophy, caused by perinatal pathology, allows for an increase in visual acuity, improved electrophysiological parameters, reduced the magnitude of deviation, improved fusion ability, and increased the number of children with binocular vision.

Abstract No.: 208435

Effect of Repeated Low-Level Red Light Therapy on Myopia Progression in Children and Adolescents: A Multicenter Randomized Controlled Trial

First Author: Ying **CHEN**

Co-Author(s): Jie **CHEN**, Hongyi **LI**, Xiaoman **LI**, Jia **QU**

Purpose: To evaluate the efficacy and safety of repeated low-level red light therapy (RLRL) in slowing myopia progression in children and adolescents.

Methods: This prospective, multi-center, randomized, open-label, parallel-controlled trial enrolled 200 eligible children aged 8–12 years with myopia

(spherical equivalent refraction, SER -0.75 to -6.00 D), anisometropia <1.5 D, and best corrected visual acuity ≥ 5.0 between January 2023 and June 2024. Participants were randomized to either the RLRL group or the control group. The primary outcome was axial length (AL) change at 12 months; secondary outcomes included SER, subfoveal choroidal thickness (SFCT), and accommodative flexibility (AF).

Results: A total of 177 children (92 in the RLRL group and 85 in the control group) completed the study. After 12 months, the mean change in AL was 0.03 ± 0.22 mm in the RLRL group versus 0.33 ± 0.18 mm in the control group ($P < 0.001$). The mean change in SER was 0.07 ± 0.48 D versus -0.63 ± 0.45 D, respectively ($P < 0.001$). SFCT increased significantly in the RLRL group ($18.52 \pm 31.74 \mu\text{m}$) but decreased in the control group ($-8.30 \pm 28.53 \mu\text{m}$, $P < 0.001$). Both groups showed improvements in AF from baseline. No adverse effects on vision or retinal structure were observed in the RLRL group.

Conclusions: Twelve months of RLRL therapy significantly slowed the progression of SER and AL in myopic children, with a favorable safety profile. These findings support RLRL therapy as a promising intervention for myopia control, although further studies are required to determine long-term efficacy and potential rebound after cessation.

Abstract No.: 202725

Implantable Self-Powered Composite Scaffold Based on Nanozyme Hydrogel: Promoting Optic Nerve Regeneration via Multiplex Synergistic Effects in Immunomicroenvironment Regulation

First Author: Jian **WU**

Co-Author(s): Ningli **WNG**, Jing **WU**

Purpose: To address the constrained regeneration of retinal ganglion cells (RGCs) and the impediment to optic nerve regeneration imposed by the inhibitory microenvironment.

Methods: A self-powered composite scaffold was engineered, incorporating an iron-zinc nanozyme hydrogel (reactive oxygen species scavenging), a micro self-powered battery (sustained electric field), and rutin-loaded electrospun fibers (anti-inflammatory activity).

Results: This biodegradable scaffold enables continuous trans-window electrical stimulation of transected optic nerves. Rutin is rapidly released to exert anti-inflammatory effects, while nanozymes potentiate ROS clearance. The three components synergistically drive macrophage polarization toward a pro-regenerative phenotype, suppress pro-inflammatory factors, and enhance RGC survival, proliferation, and migration.

Conclusions: The drug-loaded layer was fabricated via electrospinning, and the conductive nanozyme

hydrogel layer via a «one-pot» approach. Using commercial precursors (biodegradable Mo anode, high-specific-surface-area Zn cathode), the preparation is facile. The nanozyme-doped hydrogel exhibits 0.52 N cm^{-1} adhesiveness (ensuring stability). The scaffold has 78 % stretchability; its conductive layer maintains 2.48 S m^{-1} conductivity under stretching, facilitating signal transmission. The electrospun layer achieves 24.3 Mg g^{-1} drug loading (79% encapsulation), with 43 % rutin released within 3 days and sustained long-term release. Outputting 0.5 V stably, the scaffold regulates the microenvironment. Its adhesiveness/conductivity enables physiological signal detection (EEG, EOG, etc.). ABTS/TMB/DPPH assays validate antioxidant capacity. Cellular studies confirm it promotes RGC survival and axon regeneration via multi-mechanism microenvironment modulation, offering a novel optic nerve repair strategy.

Abstract No.: 205455

Metabolomic Signatures Across Leber Hereditary Optic Neuropathy, Dominant Optic Atrophy, and Wolfram Syndrome: A Large-Scale Comparative Analysis

First Author: Xuehao **CUI**

Co-Author(s): Patrick **YU-WAI-MAN**

Purpose: To perform the first large-scale metabolomic profiling across three inherited optic neuropathies (ION) — Leber hereditary optic neuropathy (LHON), dominant optic atrophy (DOA), and Wolfram syndrome (WS) — compared to healthy and Parkinson's disease (PD) groups, to identify disease-specific and shared metabolic signatures for potential diagnostic biomarkers or therapeutic targets.

Methods: Untargeted plasma metabolomics was performed in LHON ($n=56$), DOA ($n=75$), WS ($n=11$), PD ($n=40$), and healthy controls (HC, $n=55$). Patients were relatively young and male-skewed; mean onset ages were 25 ± 16 (LHON), 10 ± 10 (DOA), and 12 ± 3 years (WS). Visual acuity was poorer in LHON (logMAR 1.62 ± 0.56) compared with DOA (0.88 ± 0.48), and DOA-plus accounted for 24% of DOA cases. Genotypic stratification included three classical LHON mutations and the rare m.12719T variant. Statistical and multivariate analyses (Welch's t, ANOVA, sPLS-DA, $FDR < 0.05$) were combined with pathway enrichment. Machine learning classifiers (XGBoost, ANN, SVM, etc.) were built after LASSO feature selection, and SHAP was applied for interpretability.

Results: sPLS-DA showed clear separation of ION from HC and PD. Enriched pathways included upregulated creatine and glycine/serine/threonine metabolism and downregulated branched-chain amino acid, nicotinamide, and sphingolipid metabolism. Discriminating metabolites included guanosine, creatinine, 2-pyrrolidinone, and sphingosine-1-phosphate. A novel LHON m.12719T

subgroup (n=3) displayed profound accumulation of 3-methylglutaryl carnitine, implicating defective fatty-acid β -oxidation and correlating with more severe vision loss. The LASSO-XGBoost model achieved AUC 0.91 (test set) for four-class classification, with SHAP confirming amino acid and lipid metabolites as key drivers.

Conclusions: This multi-disease metabolomic study highlights shared and disease-specific metabolic abnormalities in ION, reflecting underlying mitochondrial dysfunction. These optic neuropathy-specific metabolic signatures, distinct from those in PD, suggest novel metabolite biomarkers for diagnosis and metabolic-targeted therapies.

Abstract No.: 210247

Modulating the Retinal Neuroimmune Microenvironment With an Engineered Exosome-Loaded Dehydroepiandrosterone Peptide Hydrogel

First Author: Zhuhong **ZHANG**

Purpose: Retinal ischemia-reperfusion (RIR) injury induces a neuroinflammatory microenvironment characterized by microglial activation and inflammatory responses. This study developed a multifunctional hydrogel system to specifically modulate this neuroinflammatory milieu and provide neuroprotection.

Methods: We constructed an engineered exosome-loaded self-assembling peptide hydrogel (BBR-hExos@DHEA-Pep), combining dehydroepiandrosterone with an IGF-1 mimetic peptide and exosomes from berberine-pretreated, hypoxia-exposed R28 cells. The system was evaluated in rat RIR models through intravitreal injection, with a comprehensive assessment of neuroinflammatory responses using transcriptomics, molecular assays, and immunohistochemistry.

Results: BBR-hExos@DHEA-Pep significantly attenuated neuroinflammation by reducing pro-inflammatory factors (IL-6, IL-1 β , iNOS) and promoting microglial polarization from M1 to M2 phenotype. It suppressed activation of neuroinflammatory pathways, including Wnt5a/NF- κ B and STAT3 signaling, while enhancing anti-inflammatory IL-10 expression. The hydrogel provided sustained neuroprotection, preserving retinal ganglion cells and visual function for 28 days with a single injection.

Conclusions: This engineered hydrogel system effectively modulates the neuroinflammatory microenvironment in RIR injury through multiple mechanisms, offering a promising therapeutic strategy for neuroinflammatory retinal diseases by simultaneously addressing microglial activation and neuronal damage.

Abstract No.: 205695

Multimodal Ocular Manifestations in Chinese Neurofibromatosis Type 1 Patients: Addressing the Unmet Need for Asian Population Data

First Author: Shipeng **GUO**

Co-Author(s): Haonan **MA**, Jie **PENG**, Mingyang **WANG**, Peiquan **ZHAO**

Purpose: To investigate the prevalence and multidimensional characteristics of various neurofibromatosis type 1 (NF1)-related ocular manifestations in the Asian population, based on a large Chinese NF1 cohort.

Methods: A total of 228 NF1 patients were consecutively enrolled. Visual acuity (VA) and intraocular pressure (IOP) were measured. Various NF1-related ocular signs were screened and assessed through slit-lamp biomicroscope examination, ultra-widefield fundus (UWF) photography, near-infrared reflectance (NIR) imaging, and optical coherence tomography (OCT).

Results: A total of 228 Chinese NF1 patients were enrolled. Lisch nodules were detected in 82.82% patients, and the prevalence increased with age by puberty. Positive correlation was revealed between the total number of Lisch nodules and age. A predilection for inferior distribution of Lisch nodules was observed, and darkening of Lisch nodules with age was primarily illustrated. Choroidal abnormalities were observed in 89.94% patients. Significantly higher prevalence of choroidal abnormalities, compared with Lisch nodules, was verified. Both the total number and total area of choroidal abnormalities showed a positive correlation with age. A predominance of distribution of choroidal abnormalities in the posterior pole was demonstrated, and the fundus regions involved expended with age. The prevalence of optic pathway glioma (OPG), retinal vascular abnormalities (RVAs), retinal astrocytic hamartomas (RAHs), and iris mammillations was 1.98%, 9.47%, 1.83%, and 8.37%, respectively.

Conclusions: This study reported the comprehensive ophthalmic clinical spectrum of Chinese NF1 population, estimated the prevalence of various NF1-related ocular manifestations, and described multidimensional characteristics of several NF1-related ocular signs, filling the critical gap in Asian population data on NF1-related ophthalmic manifestations.

Abstract No.: 204709

Optic Nerve Sheath Fenestration: A Decisive Surgical Step Against Visual Collapse

First Author: Usha **KIM**

Purpose: To evaluate the visual outcomes of optic nerve sheath fenestration surgery in patients with optic disc edema.

Methods: Retrospective analysis of 119 eyes from 93 patients who underwent optic nerve sheath fenestration surgery for vision-threatening optic disc edema was assessed for 5 years in our tertiary center. Demographic details, including age, gender, and laterality, were recorded. VA was assessed preoperatively, at postoperatively day 15, and at 3 months using the Log MAR scale. The Wilcoxon signal-rank test was used for statistical comparison.

Results: Ninety-three patients between 17 to 65 years of age were included in the study. Out of which 76% patients underwent unilateral and 26% underwent bilateral sequential surgery. The mean age of patients was 38.04 +/- 11.21 years. Of the total patients, 39.60% were male and 60.4% were female. There was a statistically significant improvement in VA on postoperative day 15 ($p < 0.05$). However, the change between preoperative and 3-month postoperative VA was not statistically significant ($p = 0.5057$). Based on final follow-up, VA improvement was noted in 37.25% of age, no change in 28.43% and worsening in 34.31%. patients who had defective color vision and central field, few showed a little improvement. For most of the patients, the fields remain defective until the last follow-up.

Conclusions: Optic nerve sheath fenestration is an effective modality for reducing optic disc edema in the treatment of unresponsive cases of intracranial hypertension, to other management options; hence, timely intervention can improve the quality of life. In our study, we have observed stabilization of vision post-ONSD with no further deterioration and marginal improvement of vision in the other eye in most cases, along with minimal improvement in Visual fields in a few cases, and patients felt symptomatically better in terms of quality of vision.

Abstract No.: 207203

Optical Coherence Tomography Angiography Parameters As Biomarkers for Preclinical Alzheimer's Disease

First Author: Narayanan **BALAKRISHNAN**

Purpose: To analyse the role of OCTA in the diagnosis of preclinical alzheimer's disease.

Methods: Sixty-two healthy individuals aged 60-93 were subjected to a positron emission tomography (PET) scan and OCTA. PET scans were visually rated for cortical amyloid-beta ($A\beta$) positivity. FAZ size and vessel densities for the inner and outer ring of the macular ETDRS grid and in a 3-6 mm ring around the optic nerve head (ONH) were measured. OCTA measures were associated with the visual $A\beta$ score.

Results: In 13 individuals who were amyloid positive, it was noted that they had higher vessel density than those who were amyloid negative in all regions, but did not differ in FAZ size.

Conclusions: This higher vessel density picked up by OCTA can serve as an easy, non-invasive, and reliable biomarker for preclinical AD.

Abstract No.: 203463

Plasma Proteomic Signature From the Retinal Photoreceptor Layer Predicts Diabetes and Multi-Organ Complications

First Author: Wei **WANG**

Purpose: To develop and validate a plasma proteomic signature, derived from photoreceptor layer thickness (PLT), that predicts incident type 2 diabetes (T2D), systemic complications, and mortality.

Methods: We analyzed 53,014 participants from the UK Biobank (median follow-up: 12.3 years) for discovery and internal validation, and 1,584 participants from the Guangzhou Diabetic Eye Study (GDES) for external validation. PLT was quantified by optical coherence tomography (OCT). Plasma proteomics was profiled using the Olink Explore platform. An elastic-net regression model generated a proteomic signature (Pro-PLT). Outcomes included incident T2D, microvascular and macrovascular complications, dementia, liver disease, and mortality.

Results: Cross-sectional analyses identified 91 plasma proteins significantly associated with PLT ($PFDR < 0.05$), enriched in inflammatory, vascular, and metabolic pathways. Pro-PLT mediated up to 59.9% of the association between PLT and diabetic outcomes. In longitudinal analyses, Pro-PLT significantly predicted 16 incident outcomes, including T2D ($HR = 2.23$), diabetic retinopathy ($HR = 2.94$), heart failure ($HR = 2.19$), dementia ($HR = 1.91$), and cardiovascular mortality ($HR = 2.32$). Incorporating Pro-PLT into existing risk models improved discrimination in 53 of 64 models (ΔC -index: 0.073-0.228) and enhanced net reclassification by an average of 31.5%. Predictive gains were consistent across genetic risk strata and validated externally in a multi-ethnic cohort.

Conclusions: Pro-PLT is a novel, minimally invasive biomarker that reflects systemic protein-driven pathways underlying retinal thinning. It enables early and precise risk stratification for diabetes and multi-organ complications, surpassing conventional models and supporting personalized prevention strategies.

Abstract No.: 202077**Prognostic Factors of Visual Outcomes, Relapse, and Multiple Sclerosis Conversion in Pediatric Optic Neuritis: A Systematic Review and Meta-Analysis***First Author: Angelina Riadi Alim* **SUPRAPTO***Co-Author(s): Angelina Patricia* **CHANDRA**, *Ametya* **MIRANDA**, *Syntia* **NUSANTI****Purpose:** To determine the prognostic factors of visual outcome, relapse, and conversion to multiple sclerosis (MS) in pediatric optic neuritis.**Methods:** The review protocol was registered in PROSPERO (CRD420251129139). Google Scholar, Science Direct, PubMed, Cochrane, Proquest, Wiley, and Scopus were searched for studies examining at least one predictive factor for visual acuity (VA), relapse, and conversion to MS. Meta-analysis was performed for factors that were reported in at least two studies to evaluate the pooled relative risk.**Results:** From 983 records, 33 studies involving 2070 patients were included. 82% studies were predominantly female and the mean proportion of children achieving final VA $\geq$ 20/40 or recovery to initial VA was 75%. Meta-analysis of 13 prognostic factors across 3 outcomes showed that age <10 years (RR 0.59, 95%CI 0.41-0.85; $p=0.005$) was significantly associated with better final VA. Male gender (RR 0.61, 95%CI 0.42-0.90; $p=0.01$), MOG-IgG (RR 2.59, 95%CI 1.13-5.95; $p=0.03$), and AQP4-IgG (RR 3.85, 95%CI 1.27-11.73; $p=0.02$) were significant predictors of recurrence, while MOG-IgG (RR 0.20, 95%CI 0.07-0.59; $p=0.004$), CSF oligoclonal bands (RR 5.05, 95%CI 3.89-6.55; $p<0.00001$), and brain MRI lesions (RR 7.38, 95%CI 3.50-15.58; $p<0.00001$) were significant predictors of conversion to MS.**Conclusions:** Age at onset, gender, MOG-IgG, AQP4-IgG, CSF oligoclonal bands, and brain MRI lesions are important prognostic factors of pediatric optic neuritis.**Abstract No.: 200485****Relapse-Independent Disease Activity in Neuromyelitis Optica Spectrum Disorder***First Author: Jae Ho* **JUNG***Co-Author(s): Jae Ryong* **SONG****Purpose:** To investigate relapse-independent disease activity (RIDA) through retinal structural progression in neuromyelitis optica spectrum disorder (NMOSD) patients and evaluate risk factors affecting ongoing retinal degeneration during relapse-free periods.**Methods:** This retrospective cohort study included AQP4-IgG-positive NMOSD patients over 18 years with longitudinal SD-OCT for ≥ 12 months. Baseline visit was the first examination ≥ 3 months after recent ON onset, with the index period [JJ1.1] being ≥ 12 months of relapse-free periods. OCT parameters, including

peripapillary retinal nerve fiber layer (pRNFL) and macular ganglion cell-inner plexiform layer (mGCIPL) thickness, were calculated using linear regression. Eyes were classified as affected or unaffected by ON history. Risk factors including demographics and early treatment (within 12 months after ON) were analyzed.

Results: 73 eyes from NMOSD patients were analyzed (29 affected, 44 unaffected). Both affected and unaffected eyes demonstrated progressive retinal thinning during relapse-free periods, with pRNFL thinning of -0.75 ± 1.60 $\mu\text{m}/\text{year}$ ($p=0.04$) and -0.55 ± 1.07 $\mu\text{m}/\text{year}$ ($p<0.01$), respectively. Similarly, mGCIPL thinning occurred in both groups (-0.30 ± 1.01 vs -0.13 ± 0.53 $\mu\text{m}/\text{year}$). B cell depletion therapy showed a protective effect against mGCIPL thinning (-0.07 ± 0.95 vs -0.30 ± 0.56 $\mu\text{m}/\text{year}$ in untreated, $p=0.06$), with early treatment being more effective than delayed treatment (0.27 ± 0.72 vs -0.27 ± 0.74 $\mu\text{m}/\text{year}$, $p=0.04$).**Conclusions:** NMOSD demonstrates significant RIDA with ongoing retinal structural degeneration occurring even during relapse-free periods. B cell depletion therapy provides significant protection against RIDA-associated retinal damage and successfully prevents progressive GCIPL thinning, achieving structural preservation.**Abstract No.: 200956****Relationships of Retinal Microvascular Changes and Biomarker-Based Alzheimer's Disease Diagnosis***First Author: Chunwen* **ZHENG***Co-Author(s): Carol Y.* **CHEUNG**, *Vincent C.t.* **MOK**, *Truong Xuan* **NGUYEN**, *Anran* **RAN****Purpose:** Previous studies have reported associations between retinal microvasculature and symptom-based diagnosis of Alzheimer's disease (AD). However, symptom-based diagnosis is limited by its non-specific clinical presentations, which delay AD-specific pathology detection at early stages. This study aims to identify associations between quantitative retinal vascular metrics measured from fundus photographs and AD defined by positron emission tomography (PET) biomarkers.**Methods:** A prospective cohort was recruited from Prince of Wales Hospital and the Chinese University of Hong Kong Eye Center. AD diagnosis was confirmed by significant amyloid-beta ($A\beta$) uptake on PET. Retinal vasculature was imaged with a fundus photograph. Vascular metrics were quantified using AutoMorph, an automated retinal vascular morphology quantification pipeline. Generalized estimating equations were used to identify differences between groups, accounting for inter-eye correlation. Multivariate analyses were used and adjusted for age, gender, hypertension, diabetes, dyslipidemia, stroke, heart disease, smoking, and axial length.

Results: A total of 82 patients underwent PET were involved, with 78 eyes in A β -positive and 86 eyes in A β -negative group. Arteriolar fractal dimension ($P = 0.010$) and arteriolar vessel density ($P = 0.010$) were significantly reduced in A β -positive group. Subjects with A β -positive were associated with lower arteriolar fractal dimension ($OR = 0.879$, 95% CI: 0.790 - 0.967, $P = 0.018$) and arteriolar vessel density ($OR = 0.886$, 95% CI: 0.803 - 0.965, $P = 0.018$).

Conclusions: Reduced arteriolar fractal dimension and arteriolar vessel density were associated with A β -positive status. The current study provides evidence to support using fundus photography as a non-invasive means of early AD detection.

Abstract No.: 202409

Retinal Nerve Fibre Layer and Ganglion Cell Layer Thicknesses in Children With Attention-Deficit/Hyperactivity Disorder

First Author: Xiu Nian **CHEN**

Co-Author(s): Jason **YAM**

Purpose: To investigate the association of retinal nerve fiber layer (RNFL) and ganglion cell layer (GCL) thicknesses with attention-deficit/hyperactivity disorder (ADHD) and its subtypes.

Methods: Peripapillary RNFL (p-RNFL), GCL (p-GCL) thickness, macular RNFL (m-RNFL), and GCL (m-GCL) were measured by Swept-source optical coherence tomography (SS-OCT). ADHD diagnosis and its subtypes, predominantly inattentive (ADHD-IA), predominantly hyperactive-impulsive (ADHD-HI), or combined type (ADHD-C), were made by psychiatrists based on ICD-10 criteria. Additionally, the parental version of the SWAN questionnaires was also used to assess symptoms of ADHD.

Results: Among 8174 children were included, comprising 363 (4.44%) children diagnosed with ADHD and 7811 children serving as controls. ADHD children have a thinner global p-RNFL ($110.46 \pm 13.53 \mu\text{m}$ vs $112.25 \pm 12.23 \mu\text{m}$, $P = 0.003$) and p-GCL ($42.78 \pm 4.43 \mu\text{m}$ vs $43.28 \pm 4.64 \mu\text{m}$, $P = 0.01$) thickness than controls. Thicknesses of p-RNFL, p-GCL and m-GCL in order from thickest to thinnest were ADHD-C type, ADHD-IA type, controls, ADHD-HI type, with significant P trend ($P = 0.001$, $P = 0.001$, $P = 0.002$, respectively). Among ADHD children, each one-point increase in attention-deficit scores were found to be thinner in p-RNFL ($\beta = -2.39$, $P = 0.01$), m-RNFL ($\beta = -0.55$, $P = 0.008$), p-GCL ($\beta = -0.62$, $P = 0.03$) and m-GCL ($\beta = -1.49$, $P < 0.001$).

Conclusions: A thinner p-RNFL and p-GCL thickness was observed in children with ADHD, particularly in ADHD-C subtype, which may be a potential biomarker to identify different subtypes of ADHD.

Abstract No.: 205660

Rolipram Reprograms Lipopolysaccharide-Induced Neurotoxic Activation of Astrocytes via the Cyclic AMP Signaling Pathway: Implications for Retinal Degenerative Diseases

First Author: Linglin **ZHANG**

Co-Author(s): Chaoqiang **GUAN**, Zhijie **LI**, Sudena **WANG**

Purpose: Astrocytes contribute to the pathogenesis of retinal neurodegenerative diseases, including AMD, DR, and glaucoma. The phosphodiesterase-4 (PDE4)/cAMP pathway has emerged as a potential therapeutic target. This study investigates whether modulating this pathway with Rolipram can reprogram neurotoxic astrocyte activation.

Methods: Primary mouse astrocytes were stimulated with LPS (80 ng/ml) in the presence or absence of Rolipram. Reactive and A1-type neurotoxic responses were assessed by qPCR (GFAP, LCN2, C3, IL-6, IL-1 β , IL-12B) and Western blot (p-STAT1, caspase-1). Morphology and LCN2 expression were evaluated via immunocytochemistry.

Results: LPS induced a robust reactive phenotype, characterized by hypertrophic morphology, increased branching, and upregulation of pro-inflammatory cytokines (IL-6, IL-1 β , IL-12B), A1 markers (LCN2, C3), and signaling molecules (p-STAT1, caspase-1). Rolipram treatment significantly reversed LPS-induced morphological hypertrophy and reduced LCN2-positive cells. At the molecular level, Rolipram selectively suppressed IL-1 β , IL-6, IL-12B, and activation of p-STAT1 and caspase-1, while C3 and GFAP mRNA levels remained largely unchanged.

Conclusions: Enhancing cAMP signaling with Rolipram does not merely suppress astrocyte activation but reprograms astrocytes away from a neurotoxic state. It selectively attenuates harmful inflammatory pathways (STAT1/inflammasome axis) and morphological reactivity while preserving certain activation markers. Fine-tuning astrocyte phenotype via the PDE4/cAMP pathway may represent a novel therapeutic strategy for retinal diseases characterized by chronic neuroinflammation.

Abstract No.: 200391

Senolytics Promote Retinal Ganglion Cell Dendrite and Axonal Regeneration in Mice After Optic Nerve Injury

First Author: Wen **YAO**

Co-Author(s): Xin **BIN**, Tsz Kin **NG**, Shuyi **ZHOU**

Purpose: To consolidate our previous findings on cellular senescence mediating retinal ganglion cell (RGC) survival regulation after optic nerve (ON) injury, we aimed to further determine the treatment

effect and mechanisms of senolytics (dasatinib and quercetin), which can specifically remove the senescent cells, on RGC dendrites and axons in mice post-ON injury.

Methods: C57BL/6 and Thy1-YFP mice were treated intragastrically with dasatinib and/or quercetin after ON injury. The number and morphology of dendrites and axons were analyzed. Microglia activation, cellular senescence, and cell death marker expression were evaluated. Retinal transcriptomics was applied to explore the mechanisms of dasatinib and quercetin.

Results: Dasatinib and quercetin treatments significantly reduced the number of senescent cells and cellular senescence marker expression in the ganglion cell layer post-ON injury. Both dasatinib and quercetin treatments significantly attenuated dendritic shrinkage and increased the number of regenerated axons after ON injury. Meanwhile, the P1-N2 amplitude of pattern electroretinography was significantly restored in the dasatinib and quercetin-treated mice. Microglia activation was significantly reduced upon dasatinib and quercetin treatments. RNA sequencing analysis showed that the differentially expressed genes in the dasatinib and quercetin treatment were associated with histone modification, mitochondria, and metal ion binding.

Conclusions: Dasatinib and quercetin can promote dendrite and axonal regeneration post-optic nerve injury. Targeting cellular senescence can be a potential strategy for ON injury treatment.

Abstract No.: 204628

Single-Cell RNA Sequencing Reveals the Ferroptosis Landscape and Identifies DUSP6 as a Therapeutic Target in Diabetic Retinal Injury

First Author: Xinlu **LI**
 Co-Author(s): Yan **MEI**

Purpose: Diabetic retinal neuropathy (DNR), an early and irreversible stage of diabetic retinopathy, is characterized by neuronal damage and glial apoptosis. This study aimed to investigate the role of ferroptosis in the pathogenesis of DNR and to explore potential therapeutic targets.

Methods: Single-cell RNA sequencing (scRNA-seq) was employed to delineate cellular heterogeneity and transcriptomic changes in a rabbit model of DNR. The neuroprotective effect of ferroptosis inhibition was assessed, and the function of Dual Specificity Phosphatase 6 (DUSP6) in modulating ferroptosis-related pathways was evaluated using both in vivo and in vitro models. In vivo experiments were conducted in alloxan-induced diabetic rabbits, while the in vitro system utilized primary mouse Müller cells exposed to high-glucose conditions.

Results: A comprehensive single-cell transcriptomic landscape of retinal injury in DNR was established.

The analysis revealed enrichment of ferroptosis-related pathways and gene expression in specific retinal cell subpopulations. Functional assays in both the diabetic rabbit model and high-glucose-treated Müller cells demonstrated that ferroptosis is a major pathological mechanism underlying DNR, and that its inhibition substantially mitigates retinal cell injury. Integration of scRNA-seq data with Mendelian randomization analysis identified DUSP6 as a pivotal anti-ferroptotic regulator in DNR. Mechanistically, DUSP6 exerted neuroprotective effects by activating the GPX4/DHODH/FSP1 axis, an important pathway for ferroptosis suppression.

Conclusions: Ferroptosis plays a significant role in the progression of DNR. Therapeutic upregulation of DUSP6 protects Müller cells from ferroptosis and attenuates retinal damage by promoting GPX4/DHODH/FSP1 inhibitory pathways.

Abstract No.: 201222

Single-Side Stimulation of Lateral Rectus for Congenital Nystagmus

First Author: Zequn **MIAO**
 Co-Author(s): Lejin **WANG**

Purpose: Congenital nystagmus (CN) is an ocular motor disorder leading to impaired visual function and quality of life. This study evaluates the safety and efficacy of lateral rectus neuromuscular stimulation (Lejin Procedure) as a novel treatment for CN.

Methods: A multicenter, prospective, single-group trial with a 6-month follow-up was conducted across three medical centers in China. Participants diagnosed with CN underwent implantation of a lateral rectus stimulator (i-NYS device, SuperVision Technologies). The outcomes included changes in Best Corrected Visual Acuity (BCVA), Nystagmus Acuity Function (NAFX), Foveation Period (FP), Nystagmus Frequency (NF), Nystagmus Amplitude (NA), and abnormal head posture (AHP).

Results: The study included 61 patients (26 children [8 to 18yr]; 35 adults [≥18 years]). At the 6-month follow-up, significant improvements were observed in all outcome measurements. All participants underwent successful implantation without major surgical complications. For the eyes that underwent surgery, 91.8% patients had improved BCVA with an average of 0.28 LogMAR (2.8 lines) improvement. Mean NAFX increased by 65.4% (from 0.433 to 0.716, $P < 0.001$). The FP increased by 587% (from 134.3 to 923.3 ms/s, $P < 0.001$). The mean NA and NF decreased by 84.1% ($P < 0.001$) and 79.4% ($P < 0.001$), respectively. AHP improved in 62.5% (5/8) of the patients. The procedure-related adverse events included only one case of conjunctival granuloma. There were no other adverse events during the 6-month follow-up period.

Conclusions: This study provides the first clinical evidence supporting lateral rectus neuromuscular stimulation as an effective therapy for CN.

Abstract No.: 206276

The Effect of Postmenopausal on Non-Arteritic Anterior Ischemic Optic Neuropathy Incidence

First Author: Antonia KARTIKA

Co-Author(s): Rusti HANINDYASARI, Dianita VEULINA GINTING, Prettyla YOLAMANDA

Purpose: To evaluate the effect of postmenopausal on non-arteritic anterior ischemic optic neuropathy (NAION) incidence.

Methods: This is a retrospective cross-sectional study designed to assess the impact of postmenopausal on the incidence of NAION. Sampling was conducted using a non-probability total sampling method, involving all subjects who met the inclusion criteria. The data used were obtained from medical records collected between January and December 2024.

Results: A total of 117 female patients with NAION were analyzed, with the majority (65.3%) being postmenopausal for more than one year. The most common comorbidities were hypertension (78.0%), followed by dyslipidemia (35.6%) and diabetes mellitus (33.1%). A total of 33.9% of patients experienced visual improvement after therapy, with a slightly higher proportion observed in the menopausal group. Chi-square test results indicated no significant association between postmenopausal status and the occurrence of NAION ($p=0.839$).

Conclusions: This study indicates that postmenopausal, characterized by reduced estrogen levels, is not significantly associated with the incidence of NAION.

Abstract No.: 206787

Utility of Freitag et al's Visual Field Criteria in Low-CAS Dysthyroid Optic Neuropathy

First Author: Kenneth Ka Hei LAI

Co-Author(s): Kelvin CHONG, Kervin DELLOSA, Alan LEE, Chiu Ming NG, Chi Pui PANG, Clement THAM, Marco VAN BOSWELL, Varan VONGSILPAVATTANA, Alvin YOUNG, Hunter KI YUEN

Purpose: Dysthyroid optic neuropathy (DON) represents the most vision-threatening manifestation of thyroid eye disease (TED). Diagnosis is often delayed in patients with low clinical activity score (CAS), where conventional inflammatory signs may be subtle or absent. Freitag et al's visual field (VF) criteria have been proposed as an objective method for diagnosing and monitoring DON, yet their role in low-CAS presentations remains insufficiently studied.

Methods: We conducted a retrospective cohort study of consecutive DON patients managed at the CUHK

between 2011 and 2025. Freitag et al's visual field (VF) criteria were interpreted by 2 ophthalmologists independently using Humphrey VF 24-2 testing. VF findings were evaluated against clinical and radiological parameters.

Results: Eighty-two patients (54 female; mean age 60 ± 10 years; 7 euthyroid; 17 smokers) were included. Stage 1b defects (isolated paracentral scotomas) were the most frequent, occurring in $n=39$ (47.6%). Stage 2a arcuate defects were the second most common, identified in $n=14$ (17.1%). Scatter defects were noted in $n=9$ (11.0%), while Stage 1a isolated central/paracentral depressions occurred in $n=8$ (9.8%). Less frequent were Stage 1c altitudinal changes ($n=4$, 4.9%), Stage 2b advanced arcuates ($n=2$, 2.4%), and Stage 3 generalized depression ($n=2$, 2.4%). Rare patterns included central/paracentral dense scotomas ($n=2$, 2.4%), superior altitudinal loss ($n=1$, 1.2%), and enlarged blind spot ($n=1$, 1.2%). Importantly, patients with Grade 2 or above (Stages 2a–3) were more likely to require surgical orbital decompression ($P<0.05$).

Conclusions: Freitag et al's criteria provide diagnostic and prognostic value in low-CAS DON. Grade 2 or higher strongly predicts the need for surgical decompression.

Abstract No.: 201366

"Decoding Diagnostic Dilemma"- Clinical Spectrum and Therapeutic Outcomes of Juvenile Double Seronegative Myasthenia Gravis

First Author: Deepti JOSHI

Purpose: To highlight clinical, serological, and neurophysiological features of juvenile double seronegative myasthenia gravis (DSNMG).

Methods: Fifteen children with clinical features suggestive of ocular myasthenia gravis and serologically tested as DSNMG were evaluated for extended antibody assay, including LRP4 and Cortactin. Additionally, RNST and response to therapy were noted.

Results: We assessed 15 children with double seronegative myasthenia gravis. 10 of 15 (66.6%) were positive for LRP4 and had an extremely good prognosis with sole Pyridostigmine. 3 (20%) were positive for cortactin antibody, of which 1 needed immunosuppressant therapy with azathioprine. 2 children had inconclusive antibody reports, and both needed immunosuppressant therapy. No generalisation/thymus involvement was noted. The repetitive nerve stimulation test was negative in 50% DSNMG. In such cases, single fibre electromyography was positive.

Conclusions: Juvenile double seronegative myasthenia gravis presents with mainly ocular symptoms with less generalization and with an extremely good prognosis with immunosuppressants. The dilemma is just

diagnosing them with extra suspicion and an extended antibody assay.

Ocular Imaging

Abstract No.: 203990

Advancing Prognostic Precision in Coats Disease: High-Definition OCT Biomarkers and Their Clinical Implications

First Author: Ziyi **ZHOU**

Co-Author(s): Guorui **DOU**, Manhong **LI**, Yusheng **WANG**, Zifeng **ZHANG**

Purpose: To evaluate the clinical utility of spectral-domain optical coherence tomography (SD-OCT) in detecting early morphological biomarkers associated with macular fibrosis, which is a critical determinant of irreversible vision loss in Coats disease, and to establish an imaging-guided prognostic framework for improved patient management.

Methods: This retrospective cohort study analyzed multimodal imaging data from 43 eyes of 43 patients with Coats disease (Stages 2A–3A2). OCT features such as intraretinal/subretinal fluid, exudation, hyperreflective foci (HRF), and epiretinal membrane were quantified.

Results: SD-OCT demonstrated superior sensitivity in detecting subclinical pathology compared to conventional modalities. It identified subretinal fluid in 48.8% of eyes, in which 12 were missed by FP and 3 by B-scan. Subretinal fluid (OR = 201.145, $p = 0.011$) and subretinal exudation were significantly associated with macular fibrosis development. HRF, suggestive of inflammatory activity, was observed in 16.3% of eyes. Stage 3A1 patients with subretinal fluid showed the highest fibrosis progression rate (46.2%). OCT also enabled layer-specific localization of hard exudates, predominantly within the inner nuclear (81.4%) and outer nuclear (76.7%) layers.

Conclusions: This study underscores the critical role of SD-OCT in transforming Coats disease management by enabling early detection of high-risk features which predict macular fibrosis, particularly subretinal fluid. Implementing routine OCT screening allows for risk stratification, timely intervention, and personalized treatment planning, ultimately mitigating poor visual outcomes. These findings advocate for the integration of OCT into standard protocols to guide clinical decision-making and improve long-term visual prognosis.

Abstract No.: 205981

Analysis of Corneal Biomechanical Indices Using the Standard Global Population Compared With the New Corneal Biomechanical Indices Optimized for the East Asian Population in Filipino Eyes

First Author: Maria Isabela **DE GUIA**

Co-Author(s): Keshia Lourdes **DUYONGCO-LENON**

Purpose: To evaluate whether corneal biomechanical indices optimized for East Asian populations provide improved diagnostic accuracy compared with globally standardized indices in Filipino eyes screened for refractive surgery.

Methods: The study included 180 Filipino patients (360 eyes) who underwent refractive surgery screening at a tertiary center from 2022 to 2024. Corneal tomography was performed with the Pentacam AXL, and biomechanical parameters were assessed using the Corvis ST. Corneal Biomechanical Index (CBI) and Tomographic and Biomechanical Index (TBI) derived from the global population were compared with their East Asian-optimized counterparts (cCBI and cTBI). Agreement was assessed using Bland–Altman analysis and Pitman’s test, while diagnostic performance was evaluated with receiver operating characteristic curves, sensitivity, specificity, and area under the curve (AUC) comparisons using DeLong’s test.

Results: Significant differences were observed between global and East Asian indices (mean differences: 0.314 for CBI vs. cCBI; 0.154 for TBI vs. cTBI; all $p < .001$). East Asian cCBI showed higher sensitivity (75.0%) but lower specificity (65.3%) than global CBI (50.0% sensitivity, 86.9% specificity). Global and East Asian indices achieved perfect discrimination in right eyes (AUC = 1.000). In left eyes, East Asian cTBI provided higher specificity (94.9% vs. 82.9%) while maintaining 100% sensitivity. No statistically significant AUC differences were found between global and East Asian indices.

Conclusions: Corneal biomechanical indices optimized for East Asian populations demonstrated enhanced sensitivity and specificity for Filipino eyes compared with global indices. These findings support the integration of ethnicity-specific thresholds into refractive surgery screening protocols to improve risk stratification and patient safety.

Abstract No.: 204363

Anterior Scleral Shape in Keratoconus and Its Spatial Relationship With Kmax Location

First Author: Qihao **SUN**

Co-Author(s): Mengyi **WANG**, Xiao **YANG**

Purpose: To investigate the characteristics of the anterior scleral shape in patients with keratoconus (KC), and to identify the spatial relationship between maximum keratometry (Kmax) location and anterior scleral shape.

Methods: In this prospective, cross-sectional study, 62 KC eyes and 116 control eyes were assessed using the Pentacam HR CSP module. Scleral sagittal height (SSH) was measured along eight semimeridians at 12–16 mm chord lengths. Kmax vector magnitude (Kvm) and angle (Kva) were computed to localize the steepest corneal region. ΔKva was defined as the absolute difference between Kva and 270° . Correlation and regression analyses examined associations between SSH, Kmax, and various factors.

Results: In controls, SSH increased from superior-temporal to temporal and decreased from inferior-nasal to nasal ($p < 0.001$). KC eyes exhibited a counterclockwise-shifted pattern, with elevations from superior to superior-temporal and declines from inferior to inferior-nasal. SSH was greater in KC eyes in the superior-temporal, inferior-temporal, and inferior meridians (all $p < 0.05$). Kvm correlated negatively with SSH in the superior-nasal, superior, inferior-nasal semimeridians ($r = -0.29$ to -0.251 , $p < 0.05$). ΔKva correlated positively with SSH in nasal, superior-nasal, inferior-temporal, inferior-nasal meridians ($r = 0.254$ to 0.421 , $p < 0.05$). Regression revealed larger ΔKva , older age, and male gender were associated with greater overall SSH. (all $p < 0.05$).

Conclusions: KC eyes exhibit a counterclockwise-shifted anterior scleral profile, with a steeper profile in the superior-temporal, inferior-temporal, and inferior meridians compared to the control group. Kmax location is spatially related to regional SSH, and a larger ΔKva is associated with greater global scleral sagittal height.

Abstract No.: 202520

Assessment of Photoreceptor Recovery and Visual Function Utilizing Adaptive Optics and Microperimetry in Patients With Surgically Closed Macular Holes

First Author: Jiayi **SONG**

Purpose: This study investigated the association between photoreceptor structural restoration and visual function outcomes in patients undergoing surgery for closed macular holes (MHs) using adaptive optics scanning laser ophthalmoscopy (AOSLO) and microperimetry.

Methods: A retrospective observational study was conducted involving 31 eyes from 28 patients who underwent vitrectomy with internal limiting membrane (ILM) peeling for idiopathic MHs. Postoperative monitoring (3 months to 2 years) included best-corrected visual acuity (BCVA), MH diameter and duration, optical coherence tomography (OCT), 4° retinal mean sensitivity (RMS), fixation rates, 68.2% binary contour ellipse area (BCEA) of microperimetry, and AOSLO-derived cone density. Based on OCT, patients were classified as type 1 (closed MH with no

foveal neurosensory defect) or type 2 (closed MH with foveal neurosensory defect).

Results: Type 1 closures showed significantly better photoreceptor recovery, with cone migration toward the fovea and dense islet formation, consistent with intact inner segment/outer segment on OCT. These patients had better BCVA and higher RMS, correlating with improved cone density. Type 2 closures exhibited sparse cone distribution and large, high-density cells, suggesting glial proliferation and exposed retinal pigment epithelium (RPE). MH size was the key predictor of type 1 closure, rather than duration or preoperative BCVA.

Conclusions: AOSLO reveals that type 1 closure facilitates cone migration and leads to better neuroretinal repair, BCVA, and retinal sensitivity. Type 2 closure shows limited photoreceptor recovery and more glial proliferation, resulting in poorer visual outcomes. Photoreceptor density and migration are critical for optimal visual recovery after MH surgery.

Abstract No.: 202167

Comparison between Diagnostic Accuracy of Two Non-Mydriatic Handheld Smartphone Fundus Cameras for Diabetic Retinopathy Screening: A Prospective Study

First Author: Arshad **MEHMOOD**

Co-Author(s): Muhammad **ABDUL REHMAN SIDDIQUI**, Arooba **HANNAN**, Altamash **SHAHRIYAR GHAZANFAR**

Purpose: Comparison between diagnostic accuracy, image quality and practical considerations between two handheld non-mydriatic fundus cameras- Eyer (Phelcom Technologies, USA) and Viva (Volk Optical, USA) as opposed to a traditional fundus camera (Triton, Topcon, Japan). We aimed to explore the potential of non-mydriatic handheld fundus cameras for DR screening.

Methods: This was a prospective study conducted between January and March 2025. We included adult diabetic patients presenting to our clinic with no past history of any treatment. Macula centred images with both Eyer and Viva cameras were taken before dilation. Images which were deemed ungradable were repeated after dilation. A macula centred image with a Topcon fundus camera was taken after dilation and this was treated as the reference-standard for this study. The images were graded for image quality and DR by two graders. Any disagreement was resolved upon consultation with a retina specialist.

Results: We included 903 images of 301 eyes of 165 patients. The mean age was 63.3 ± 11.8 years. There were 32 (10.8%) ungradable images with Eyer and 33 (11.1%) with Viva post-dilation. Sensitivity for referable DR was 79.0% and 76.5% for Eyer and Viva respectively. Specificity was 89.0% for Eyer and 95.2% for Viva. Both cameras had comparable image quality. There was

substantial inter-grader agreement with both Eyer ($k = 0.61$) and Viva ($k = 0.72$).

Conclusions: Both handheld fundus cameras showed promise, performing close to the required cutoff for DR screening. Further validation studies with staged mydriasis are needed in community settings to better evaluate their suitability for widespread DR screening.

Abstract No.: 206595

Cone Photoreceptor Damage and Reorganization in Laser-Induced Retinopathy: Evidence From Adaptive Optics Imaging

First Author: Dong **FANG**

Co-Author(s): Wei **CHI**, Shaochong **ZHANG**

Purpose: To investigate structural and functional changes of cone photoreceptors in laser-induced retinopathy (LIR) and to characterize their reorganization during recovery.

Methods: A longitudinal study was conducted on 15 eyes of 13 LIR patients and 38 control eyes. Participants underwent adaptive optics scanning laser ophthalmoscopy (AO-SLO), spectral-domain OCT, and microperimetry. Lesion morphology and cone metrics were analyzed at baseline and up to 6 months of follow-up.

Results: At baseline, AO-SLO revealed hyporeflective lesions with hyperreflective clumps (mean area: $97,128 \pm 107,478 \mu\text{m}^2$), along with reduced cone density, increased spacing, and irregularity compared with controls (all $P < 0.05$). Lesion size correlated with OCT ellipsoid zone defects ($r = 0.84$, $P < 0.001$) but not with retinal sensitivity. In 13 of 15 lesions (87%), a cluster of irregularly distributed bright cones was present at the lesion margin, which we term a «cone halo.» Over 6 months, 93% of lesions contracted significantly (to $27,560 \pm 26,901 \mu\text{m}^2$, $P = 0.031$). In 87% of cases, the perifoveal «cone halo» expanded (5092 ± 4264 vs. $16,169 \pm 16,771 \mu\text{m}^2$, $P = 0.02$). Cone density within halos increased ($27,942 \pm 6,970$ vs. $36,700 \pm 9,257$ cones/ mm^2 , $P = 0.01$) with reduced spacing ($P = 0.04$). Retinal sensitivity showed only marginal improvement ($P = 0.20$).

Conclusions: LIR causes pronounced cone disruption, while recovery involves a distinct perifoveal «cone halo» reflecting photoreceptor reorganization even in chronic adult lesions. These findings provide novel insight into intrinsic retinal repair mechanisms and the complex structure–function relationship in LIR.

Abstract No.: 206281

Correlation of Cone- and Rod-Derived Retinal Nonperfusion on Ultrawide Field Fluorescein Angiography With Diabetic Retinopathy Severity and Diabetic Macular Edema

First Author: Recivall **SALONGCAY**

Co-Author(s): Lizzie Anne **AQUINO**, Anna Karina **LEOPANDO**, Tunde **PETO**, Paolo **SILVA**

Purpose: To evaluate cone- and rod-specific nonperfusion indices (CPI, RPI) on ultrawide field fluorescein angiography (UWF-FA) and their correlation with diabetic retinopathy (DR) severity and center-involving diabetic macular edema (ciDME).

Methods: Sixty-nine eyes of 43 diabetic patients underwent UWF color photography (UWF-CP), UWF-FA, and macular optical coherence tomography (OCT). DR severity was graded by a masked reader on UWF-CP. UWF-FA images were segmented into posterior pole (≤ 10 mm from fovea), mid-periphery (10–15 mm), and far periphery (> 15 mm), and into the macula, within ETDRS fields, and extended peripheral fields. Ischemic areas were quantified using ImageJ to calculate nonperfusion index (NPI), CPI, and RPI. ciDME was determined on OCT. Correlations were analyzed using Pearson coefficients (r).

Results: DR severity correlated significantly with global NPI ($r = 0.56$, $p < 0.0001$) and across all retinal zones ($r = 0.35$ – 0.57). Both CPI (global: $r = 0.56$, $p < 0.0001$; zones: $r = 0.42$ – 0.59) and RPI (global: $r = 0.55$, $p < 0.0001$; zones: $r = 0.40$ – 0.59) showed similar associations. ciDME presence was also correlated with NPI (global: $r = 0.40$, $p = 0.0014$; zones: $r = 0.42$ – 0.54), CPI (global: $r = 0.47$, $p = 0.0001$; zones: $r = 0.32$ – 0.55), and RPI (global: $r = 0.46$, $p = 0.0002$; zones: $r = 0.33$ – 0.54).

Conclusions: Cone- and rod-related retinal nonperfusion strongly correlates with DR severity and ciDME. UWF-FA may help identify high-risk eyes and guide surveillance of ischemia-related progression. Further studies are needed to define ischemic thresholds predictive of vision-threatening complications.

Abstract No.: 205289

Determinants of Retinal Mitochondrial Redox Status in Young Adults With Myopia Free From Retinal Degeneration

First Author: Qiuruo **JIANG**

Co-Author(s): Shisong **RONG**, Chenfeng, Junfeng, Shihao, Zhanhao

Purpose: To evaluate the mitochondrial redox status of macular and optic-disc regions in myopic eyes without retinal degenerative changes, and to identify related ocular and lifestyle factors.

Methods: We conducted a hospital-based cross-sectional study at the Eye Hospital of Wenzhou

Medical University (April–June 2025). A total of 431 young adults with myopia (862 eyes) but no retinal degeneration completed questionnaires and underwent comprehensive ophthalmic examinations. Retinal metabolic stress was assessed using the OcuMet Beacon Imager, which quantifies flavoprotein autofluorescence (FPF) as an indicator of mitochondrial redox status. Associations were analyzed using linear mixed-effects regression, adjusting for age, sex, height, and weight. Ocular parameters (axial length [AL], AL/corneal radius [AL/CR], keratometry [Km], spherical equivalent [SE], cup-to-disc ratio [CDR]) and lifestyle variables were included.

Results: Participants had a mean age of 25.8 ± 7.2 years and a mean SE of -4.80 ± 2.08 D. Multivariable analyses revealed that more myopic refraction, longer AL, and higher AL/CR were significantly associated with lower macular and optic-disc FPF ($P < 0.001$), whereas higher Km were linked to higher FPF at both regions ($P < 0.001$). Larger CDR and anisometropia correlated with higher optic-disc FPF only ($P = 0.05$). Lifestyle factors, including longer outdoor time, more frequent exercise, and greater coffee consumption, were positively associated with FPF ($P < 0.05$).

Conclusions: The mitochondrial redox status of the healthy retina in myopic eyes is closely linked to myopia severity and optic-disc morphology, and is modulated by lifestyle behaviors. FPF may serve as a potential metabolic biomarker that complements structural measures in characterizing dynamic changes in myopia.

Abstract No.: 200379

Diagnostic Accuracy of a Smartphone-Based Device (VistaView) for Detection of Diabetic Retinopathy: A Prospective Study

First Author: Arshad **MEHMOOD**

Co-Author(s): Muhammad **ABDUL REHMAN SIDDIQUI**, Danish **SHABBIR**, Rida **SHAHZAD**

Purpose: This study compares the diagnostic accuracy of a smartphone-based VistaView camera to that of a desk-mounted fundus camera (Triton Topcon). We also compare the agreement between graders for DR screening between VistaView images and Topcon images.

Methods: This prospective study took place between December 2021 and June 2022 in Pakistan. Diabetic patients were imaged following mydriasis using both VistaView and Topcon cameras at the same sitting. All images were graded independently by two graders based on the ICDR criteria. Individual grades were assigned for the severity of DR and maculopathy. Diagnostic accuracy was calculated using the Topcon camera as the gold standard. Agreement between graders for each device was calculated as the intraclass correlation coefficient (ICC) and Cohen's kappa (k).

Results: A total of 1428 images were available from 371 patients with both cameras. After excluding ungradable images, a total of 1231 images were graded. The sensitivity of VistaView for any DR was 69.9% (95% CI 62.2–76.6%) while the specificity was 92.9% (95% CI 89.9–95.1%), and PPV and NPV were 80.5% (95% CI 73–86.4%) and 88.1% (95% CI 84.5–90.9), respectively. For VistaView, the ICC of DR grades was 78% between the two graders, and that of maculopathy grades was 66%. The Cohen's kappa for retinopathy grades of VistaView images was 0.61 (95% CI, $p < 0.001$), while that for maculopathy grades was 0.49 (95% CI, $p < 0.001$).

Conclusions: The VistaView offers moderate diagnostic accuracy for DR screening and may be used as a screening tool in LMIC like Pakistan.

Abstract No.: 206634

Diagnostic Performance of the Overall Superior-Inferior Peripapillary RNFL Thickness Symmetry for Early Glaucoma

First Author: Kunliang **QIU**

Co-Author(s): Qianqian **HE**, Lexi **HUANG**

Purpose: To evaluate the diagnostic performance of the overall symmetry of the superior-inferior peripapillary RNFL thickness (S-I symmetry score) in detecting early primary open-angle glaucoma (POAG).

Methods: This study included 100 early POAG [with visual field mean deviation (MD) ≥ -6 dB] and 104 normal control subjects, using Cirrus HD-OCT to obtain pRNFL thickness data. The overall superior-inferior RNFL thickness symmetry score (S-I symmetry score) was a quantitative parameter based on the normalized absolute pRNFL thickness difference between superior and inferior hemifields relative to their average. The two hemifields were divided by the disc-fovea line instead of the conventional horizontal line, with the major vascular components removed from the RNFL. Potential factors (e.g. age, disc area, and spherical equivalent) associated with the S-I symmetry score were assessed with regression analysis. The diagnostic performance was evaluated by receiver operating characteristic (ROC) curve analysis. Statistical analyses were performed using SPSS and MedCalc software.

Results: The S-I symmetry score was significantly higher in the control group ($95.81 \pm 3.01\%$) than in the POAG group ($82.38 \pm 12.31\%$) ($p < 0.001$). The S-I symmetry score was not significantly associated with age, spherical equivalent, and sex. The area under the ROC curve (AUC) for the S-I symmetry score was 0.918 (95% CI: 0.872 to 0.951), outperforming the average RNFL thickness (AUC: 0.814; 95% CI: 0.754 to 0.865). In the earlier-stage subgroup (MD ≥ -3 dB, $n=44$), the S-I symmetry score achieved an AUC of 0.954 (95%CI 0.905 to 0.982), better than in the later stage (MD < -3 dB, $n=59$) (AUC 0.895; 95%CI 0.834 to 0.939).

Conclusions: The novel overall intraocular S-I symmetry score showed good performance for the early diagnosis of POAG. It has the potential to better assist ophthalmologists in clinical practice after being integrated with OCT devices and further clinical testing.

Abstract No.: 206021

Enhance Diabetic Retinopathy Grading by AI-Assisted Vascular Biomarker Evaluation Using Ultra-Widefield Swept-Source Optical Coherence Tomography Angiography (UWF-SSOCTA)- DRIVE Study

First Author: Wenting **ZHOU**

Co-Author(s): Tai Yong **LOH**, Yue **QIU**, Wei Hing **SEAH**, Juling **SIA**, Wenjun **SONG**, Linyi **ZHUANG**

Purpose: To evaluate diabetic retinopathy (DR) biomarkers on ultrawide field swept-source optical coherence tomography angiography (UWF SS-OCTA) using a deep learning model, and to assess their correlation with clinical DR severity.

Methods: This prospective, cross-sectional study included 158 eyes from 120 patients across all DR stages, imaged with 29×24 mm UWF SS-OCTA. Key metrics included nonperfusion area (NPA) index (NPI = total NPA/gradable area), number of neovascularisations (NVs), and intraretinal microvascular abnormalities (IRMAs) in different regions using a self-developed extended ETDRS grid: central zone (≤9mm), mid-zone (9–18mm), and outer-zone (>18mm). All biomarkers were quantified using a custom-built deep learning model with manual refinement.

Results: Total NPI significantly increased with DR severity ($p < 0.001$). In PDR eyes, an NPI >10.9% yielded 77% sensitivity for predicting PDR. Higher NPI correlated with the presence of NVD ($p = 0.028$), increased NVE count ($p = 0.007$), and posteriorly located NVEs ($p = 0.02$). In early DR, NPI rose gradually from mid (0.9–2.9%) to outer (1.1–4.2%) zones, whereas in severe NPDR and PDR, NPI surged in the mid (13.2–21%) and plateaued in the periphery (14.2–26.7%). In comparison, the number of IRMAs peaked (80.3%) in the mid-zone from moderate NPDR onwards at the leading edge of ischemia.

Conclusions: UWF SS-OCTA enables rapid, quantitative, and comprehensive assessment of DR biomarkers. AI-enhanced OCTA-driven DR grading allows reproducible risk stratification. Quantitative biomarkers such as NPI and IRMAs are powerful predictors for DR progression and hold promise for objective endpoints in clinical trials.

Abstract No.: 204645

Hemoglobin Oxygen Saturation and Retinal Vascular Diameter in Myopic Eyes

First Author: Geng **WANG**

Co-Author(s): Kunliang **QIU**, Zixuan **XIAO**

Purpose: To evaluate the correlation of the retinal vascular diameter with retinal hemoglobin oxygen saturation in myopic eyes by scanning laser ophthalmoscope (SLO).

Methods: Sixty-one eyes from 61 patients were included. All subjects underwent SLO imaging with dual lasers (532 nm and 633 nm). The retinal arteries (DA) and veins (DV) were labeled, and the diameters of DA and DV were measured. The oxygen saturations of hemoglobin in arteries (SO_{2A}) and veins (SO_{2V}), and their differences (SO_{2AV}) were estimated from the optical densities of the vessels on the images at the two wavelengths.

Results: For vessel diameter, significant correlation of spherical equivalent (SE) with DA ($r = 0.32$) and DV ($r = 0.41$) was found ($P < 0.05$), while significant correlation was only observed between axial length (AL) and DV ($r = -0.41$, $P < 0.01$). For the retinal oxygen saturation, the SO_{2V} in the high myopia group ($73.21 \pm 21.42\%$) was significantly higher than that in the normal group ($55.81 \pm 21.69\%$) and the low and moderate myopia group (56.88 ± 13.83 , $P < 0.05$). The SE was significantly correlated with SO_{2A} ($r = -0.29$) and SO_{2V} ($r = -0.36$) ($P < 0.05$), and AL was also significantly correlated with SO_{2A} ($r = 0.27$) and SO_{2V} ($r = 0.30$) ($P < 0.05$). No significant correlations were found between SO_{2AV} and SE and AL ($P > 0.05$).

Conclusions: This study revealed a negative correlation of SO_{2A} and SO_{2V} with myopic diopters in younger adults. The retinal vascular diameter of myopic eyes decreases with the severity of myopia.

Abstract No.: 205722

Identification of Epiretinal Membrane-Prone Eyes and Feature Analysis From Optical Coherence Tomography by Deep Learning

First Author: Yi-ting **HSIEH**

Co-Author(s): Hsu-hang **YEH**

Purpose: To develop deep learning models using macular optical coherence tomography (OCT) to identify ERM-prone eyes and to elucidate relevant predictive features.

Methods: Macular OCT scans from a single institution were retrospectively reviewed. Eyes were included in the healthy group if both eyes showed no retinal diseases or macular abnormalities. Eyes were classified as ERM-prone if they appeared normal while the fellow eye exhibited idiopathic ERM. After age- and sex-matching, 606 eyes in the healthy group and 549 eyes in the ERM-prone group were included. Horizontal

B-scan OCT images centered on the foveal pit, superior foveal margin, and inferior foveal margin were used to train convolutional neural network (CNN) models.

Results: Among the single-scan models, the foveal pit-centered OCT achieved the best performance with an accuracy of $66.08 \pm 1.18\%$, recall of $60.84 \pm 8.49\%$, specificity of $70.62 \pm 9.30\%$, and an area under the receiver operating characteristic curve (AUROC) of $69.72 \pm 1.73\%$. The support vector machine model incorporating age and sex achieved the highest overall performance with an accuracy of $66.92 \pm 3.00\%$, recall of $61.96 \pm 7.56\%$, specificity of $71.13 \pm 7.21\%$, and AUROC of $71.64 \pm 2.36\%$. Heatmap analysis revealed that the vitreoretinal interface and foveal pit morphology were key discriminative regions, independent of posterior vitreous detachment status.

Conclusions: Deep learning models can differentiate between healthy and ERM-prone eyes with modest accuracy. Subtle structural changes at the vitreoretinal interface and in foveal pit morphology appear to be predictive features. These models offer valuable insights into early, preclinical structural alterations associated with ERM development.

Abstract No.: 203466

In Vivo Biomechanical Analysis of Ciliary Muscle Based on Digital Image Correlation Technology

First Author: Jingsong **WANG**

Co-Author(s): Fan **LU**, Shenglong **LUO**, Yilei **SHAO**, Junjie **WANG**

Purpose: To overcome the limitations of traditional static morphological analysis in ciliary muscle research, this study introduced Digital Image Correlation (DIC) technology into ciliary muscle biomechanical research, aiming to establish a quantitative analysis method for the dynamic strain of the ciliary muscle in vivo.

Methods: Two commercial swept-source optical coherence tomography (OCT) devices (CASIA2 and VG200D) were used. Through simulated deformation and ncorr algorithm analysis, the optimal device (CASIA2) and mode (R8) were screened out. A total of 2 participants were recruited in each of the three groups: low myopia, high myopia, and middle-aged to elderly. The Badal optical system was used to acquire ciliary muscle images in non-accommodated and 5D accommodation-induced states. The optimized ncorr algorithm was applied for DIC analysis to calculate displacement, strain, and average effective strain based on the von Mises formula.

Results: The ROI (Region of Interest) identification rate ranged from 81% to 92%, and displacement and strain in the non-accommodated state were close to zero. Under accommodation, the displacement and strain of the ciliary muscle in the three groups showed a trend of «low myopia group > high myopia group

> middle-aged to elderly group». The young myopic groups exhibited horizontal compression and vertical stretching, while the middle-aged to elderly group showed minimal changes.

Conclusions: This study successfully established the aforementioned analysis method, achieving sub-pixel level quantitative measurement, revealing differences in ciliary muscle mechanical responses among different populations, providing indicators for functional assessment, advancing research from static to dynamic, and facilitating the diagnosis and treatment of ocular refractive diseases.

Abstract No.: 203663

Inherited Retinal Diseases Observed by Multimodal Imaging Assisted by Adaptive Optics Scanning Laser Ophthalmoscopy

First Author: Wei **ZHOU**

Purpose: To investigate the differences in photoreceptors within the macular region of a group of inherited retinal diseases (IRD). The multimodal imaging change mechanisms and their impact on retinal structure and function were systematically analyzed.

Methods: Structural changes in retinal fundus autofluorescence (FAF) and optical coherence tomography (OCT) were observed in four patients with IRD from different families and subtypes with corresponding alterations of cone photoreceptor at the same locations examined by adaptive optics scanning laser ophthalmoscopy (AOSLO).

Results: In this study, morphological changes and density decreases of cone photoreceptors to varying degrees could be observed in all four different IRD patients. AOSLO can perform cell-level imaging of cone photoreceptor, and the morphology is highly correlated with vision. In AOSLO images, the dark areas are indicators of cone photoreceptor degeneration and apoptosis. Even if the outer layer changes of OCT are similar, the morphology of photoreceptors and the visual acuity and visual field manifestations of patients are the accumulation of different highly reflective materials in the macular region.

Conclusions: Compared with FAF and OCT, AOSLO images can directly show the structural damage of cone photoreceptor and are more consistent with the visual acuity and visual field manifestations of IRD patients.

Abstract No.: 204195**Interocular Differences in Retinal Curvature in Anisometropic Patients and Their Association With Myopic Degree Differences***First Author: Gongpeng SUN**Co-Author(s): Meixia ZHANG*

Purpose: To investigate regional differences in Gaussian retinal curvature (RC) between fellow eyes of anisometropic patients and their associations with interocular disparities in myopic parameters.

Methods: In this cross-sectional study, ultra-widefield swept-source optical coherence tomography (24 mm × 20 mm field) was performed in 121 anisometropic patients. Three-dimensional retinal morphology reconstruction based on Bruch's membrane was utilized to derive Gaussian RC. The retina was segmented into macular, peripheral, and six concentric annular regions (I-VI). Paired t-tests or Wilcoxon signed-rank tests were applied to evaluate interocular RC differences, with Spearman correlation analysis examining associations between RC variations and myopic parameter disparities.

Results: Mean interocular differences were 1.95 ± 0.95 D for spherical equivalent (SE) and 0.79 ± 0.46 mm for axial length (AL). The more myopic eye exhibited significantly steeper macular RC ($P < 0.001$) and flatter peripheral RC ($P < 0.001$) compared to the fellow eye. Macular/peripheral RC disparities demonstrated significant correlations with SE/AL differences (both $P < 0.05$). Region-specific analysis revealed positive correlations between AL and RC I-III differentials, whereas inverse correlations were observed for RC V-VI (all $P < 0.01$).

Conclusions: Anisometropic patients demonstrate biomechanical divergence characterized by macular steepening and peripheral flattening in the more myopic eye during axial elongation, suggesting region-dependent retinal adaptation mechanisms.

Abstract No.: 203580**Investigate the Interconnected Innervations of the Lacrimal Functional Unit in Terms of Changes in Lacrimal Gland Volume***First Author: Can YANG**Co-Author(s): Xuanwei LIANG, Kerui WANG*

Purpose: To investigate changes in LG volume in patients with unilateral LDO or prosthetic eye and to explore the neural link within the lacrimal functional unit.

Methods: CT images of both lacrimal glands were retrospectively reviewed for 11 patients with unilateral CNLDO, 40 patients with unilateral PANDO, 25 patients with unilateral prosthetic eye, and sex/age-matched healthy controls. Differences in the volume of the LG between the control subjects, the affected side,

and the contralateral healthy side were examined. Correlation analysis was used to assess the relationship between LG volume and disease duration.

Results: LG volumes in the CNLDO-affected side group were significantly reduced compared to the control group ($P = 0.019$). Similarly, the LG volumes in the PANDO-affected side group were significantly lower than those observed in the control group ($P < 0.001$) and similar to the non-PANDO side group ($P = 0.053$). 25 patients with a prosthetic eye were included. The anophthalmic group had significantly smaller LG volumes compared to the control group and the contralateral side group, with P-values of 0.021 and 0.041, respectively. Negative correlations were found between disease duration and LG volumes in both the PANDO ($r = -0.328$, $P = 0.019$) and anophthalmic ($r = -0.407$, $P = 0.044$) groups.

Conclusions: Compared to the control group, patients with unilateral LDO or prosthetic eye had smaller LG volumes on the affected side. Prolonged unilateral LDO and enucleation or evisceration are associated with reduced LG volume.

Abstract No.: 201786**Linking Endogenous Glucocorticoids to Fundus Alterations: An Ultra-Widefield Optical Coherence Tomography Angiography (UWF-OCTA) Study on Patients With Cushing's Syndrome (CS)***First Author: Linxin WEI**Co-Author(s): Youxin CHEN, Qing ZHAO, Xinyu ZHAO*

Purpose: To explore choroidal and retinal alterations in CS patients using UWF-OCTA and investigate their associations with endogenous glucocorticoids.

Methods: This prospective observational study enrolled 48 CS patients and 48 age- and sex-matched controls. 24×20 mm² UWF-OCTA images were analyzed to assess qualitative pachychoroid features and quantitative metrics including vessel flow density (VFD), retinal and choroidal thickness and volume, choroidal vascularity/stromal volume and index (CVV/CSV and CVI/CSI) across central, peripheral, and whole regions. Generalized estimating equations were utilized for inter-group comparisons and association analyses between OCTA parameters and hormonal levels.

Results: The CS group had a significantly larger proportion of eyes with pachyvessels, along with elevated choriocapillaris (CC)-VFD, choroidal thickness and volume across all the assessed regions than controls ($p < 0.05$). Conversely, large/medium choroidal vessel layer (LMCV)-VFD and CVI of the central and whole regions in CS eyes were significantly reduced ($p < 0.05$). Retinal alterations in CS eyes included increased peripheral superficial capillary plexus (SCP)-VFD, lower SCP-vessel length density, higher deep capillary plexus-VFD, thicker inner retinal

layers, and thinner outer retinal layers compared to controls ($p < 0.05$). Univariate association analyses revealed that total cortisol and 24-h urinary free cortisol negatively correlated with central CC-VFD and positively correlated with peripheral SCP-VFD ($p < 0.05$). Moreover, negative associations existed between adrenocorticotrophic hormone levels and LMCV-VFD across all the regions ($p < 0.05$).

Conclusions: CS represents an optimal model for investigating the effects of endogenous hypercortisolism on the choroid and retina.

Abstract No.: 206043

Longitudinal Treatment Response in Proliferative Diabetic Retinopathy (PDR) Tracked With Ultrawide-Field Swept-Source Optical Coherence Tomography Angiography (UWF SS-OCTA) -DRIVE PDR Study

First Author: Wenting **ZHOU**

Co-Author(s): Yusra **ASAD**, Wei Hing **SEAH**, Wenjun **SONG**

Purpose: To characterise six-month vascular and vitreoretinal interface changes after treatment in proliferative diabetic retinopathy (PDR) using Ultrawide-Field Swept-Source Optical Coherence Tomography Angiography (UWF SS-OCTA).

Methods: In this prospective longitudinal study, 42 eyes of 26 patients were imaged with 29×24 mm and 6×6 mm UWF SS-OCTA at baseline, 1, 3, and 6 months. Neovascularisations (NVs) size on vitreoretinal segmentation and non-perfusion area (NPA) on all-retinal-layer segmentation were quantified using customised AI algorithms with manual adjustment. Other key parameters include foveal avascular zone (FAZ), parafoveal vessel density (VD), and the status of posterior vitreous detachment (PVD).

Results: Baseline imaging confirmed NV in every eye and showed a moderate correlation between total NPA and FAZ size ($r = 0.465$, $p < 0.001$). Larger NPAs were linked to higher NV counts ($p = 0.007$) and more posteriorly located NV elsewhere (NVE) ($p = 0.02$). Mean NV size fell significantly after treatment, with the steepest decline at month 1; 33 eyes (78 %) showed regression, nine progressed. Adjunct anti-VEGF produced a larger, though non-significant, additional NV reduction ($p = 0.68$). Global ischaemic metrics - NPA Index (total NPA/total gradable area), FAZ, and VD—remained stable over six months ($p = 0.47$, 0.36 , 0.23). Partial PVD at NV sites was present in 12 eyes at baseline; three progressed, and two developed vitreous haemorrhage attributable to posterior hyaloid traction.

Conclusions: UWF SS-OCTA offers a rapid, repeatable, and quantifiable tool for monitoring PDR therapy, including tracking vascular response, detecting tractional risk, and guiding treatment decisions.

Abstract No.: 203303

Macrophage-Like Cells at the Vitreoretinal Interface as a Potential Imaging Biomarker of Inflammation in Myopic Macular Neovascularization

First Author: Yuchen **QIAN**

Co-Author(s): Li **ZHANG**, Ting **ZOU**

Purpose: Myopic macular neovascularization (mMNV) is a neurovascular complication of pathologic myopia, with growing evidence implicating inflammation in its pathophysiology. Imaging biomarkers capable of reflecting inflammatory activity could enhance mMNV management and elucidate disease mechanisms. This study explores the clinical utility of macrophage-like cells (MLCs) at the vitreoretinal interface as a potential inflammatory biomarker in mMNV, assessed via optical coherence tomography angiography (OCTA).

Methods: This retrospective, cross-sectional study included 86 eyes, which were categorized into three groups: non-high myopia ($n = 32$), simple high myopia ($n = 35$), and high myopia with mMNV ($n = 19$). En face OCTA images of the vitreoretinal interface were obtained to quantify the density and mean area of MLCs. Additionally, multiple ocular parameters were measured and analyzed, including best-corrected visual acuity (BCVA), axial length (AL), macular retinal thickness (MRT), choroidal thickness (ChT), choroidal vascularity index (CVI), as well as vessel densities of the superficial and deep capillary plexuses. Analysis of Variance and correlation analyses were conducted, and analysis of covariance (ANCOVA) was used to adjust for confounding factors such as age and to compare intergroup differences.

Results: Both MLC density ($p < 0.001$) and mean area ($p < 0.001$) were significantly increased in the mMNV group compared to the non-high myopia and simple high myopia groups, whereas no significant differences were observed between the two control groups. Further subregional analysis revealed that in patients with mMNV, MLCs not only increased in number but also showed a tendency to accumulate towards the foveal center. Correlation analysis indicated that MLC density and area were significantly correlated with multiple parameters, including age, axial length, best-corrected visual acuity, macular retinal thickness, choroidal thickness, choroidal vascularity index, and superficial and deep capillary plexus densities.

Conclusions: OCTA provides a non-invasive method to quantify MLCs at the vitreoretinal interface as a potential imaging biomarker of inflammation, holding promise for both monitoring mMNV progression and understanding the pathogenic role of inflammation in mMNV development.

Abstract No.: 204677

Multimodal Imaging Reveals Superior Sensitivity of Spectral-Domain OCT in Detecting Subclinical Retinal Astrocytic Hamartomas in Tuberous Sclerosis

First Author: Guorui **DOU**

Co-Author(s): Dongjie **SUN**, Jiaxing **SUN**, Yusheng **WANG**, Zi-yi **ZHOU**, Jinting **ZHU**

Purpose: To evaluate and compare the diagnostic performance of spectral-domain optical coherence tomography (SD-OCT) versus conventional fundus photography in detecting retinal astrocytic hamartomas (RAH) in patients with tuberous sclerosis complex (TSC), and to establish imaging-based criteria for early and subclinical lesion identification.

Methods: This cross-sectional study included 60 TSC patients (120 eyes). All participants underwent comprehensive ophthalmoscopic examination, fundus photography, and multimodal imaging with SD-OCT and infrared imaging. Lesion characteristics, including maximal thickness (MT), basal diameter (BD), reflectivity, and intraretinal features, were analyzed. ROC curve analysis was applied to determine optimal cut-off values for detecting lesions not visible on fundus photos.

Results: SD-OCT identified 117 RAHs in 45 patients (75%), whereas fundoscopy detected only 64 lesions in 33 patients (55%). Among these, 53 lesions (45.3%) were exclusively detected by SD-OCT. These subclinical lesions were significantly smaller in both MT ($205 \pm 133 \mu\text{m}$ vs. $423 \pm 26 \mu\text{m}$, $p < 0.05$) and BD ($1741 \pm 152 \mu\text{m}$ vs. $2475 \pm 134 \mu\text{m}$, $p < 0.05$). ROC analysis indicated that an MT threshold of $271 \mu\text{m}$ effectively discriminated lesions undetectable by fundoscopy (AUC = 0.84). SD-OCT further enabled detailed morphological classification and revealed novel features such as intratumoral cavities and vitreous seeding.

Conclusions: SD-OCT exhibits significantly higher sensitivity than fundoscopy in detecting RAHs, especially small or subclinical lesions (MT < $271 \mu\text{m}$). Incorporating SD-OCT into standard TSC ophthalmic screening may improve diagnostic accuracy, facilitate early intervention, and enhance systemic correlation studies supporting revised surveillance guidelines for TSC patients.

Abstract No.: 204269

Multimodal Imaging in Macular Telangiectasia Type 2: A Correlation Study Between Fundus Autofluorescence and Fluorescein Angiography

First Author: Dogukan **COMERTER**

Purpose: This study aimed to analyze the findings of spectral-domain optical coherence tomography (SD-OCT), fundus autofluorescence (FAF), and fluorescein

angiography (FA) in patients with idiopathic macular telangiectasia (MacTel) type 2.

Methods: This retrospective, cross-sectional study included 18 MacTel patients evaluated with SD-OCT (Spectralis). Fundus examinations consisted of color fundus photography, B-scan OCT, FAF, and FA imaging. OCT findings assessed included irregularities in the inner and outer retinal layers, loss of the outer nuclear layer and ellipsoid zone (EZ), intraretinal cavitation, intraretinal pigment proliferation, accumulation of retinal pigment epithelium (RPE) hyperplasia, presence of right-angled venules, and the internal limiting membrane (ILM)-drape sign. Hyperfluorescent areas detected with FA and FAF were manually measured using the “draw region” function, and the results from both imaging modalities were compared.

Results: A total of 34 eyes diagnosed with MacTel were evaluated. EZ loss showed the strongest negative correlation with best-corrected visual acuity (BCVA) ($p = 0.006^{**}$). RPE accumulation, intraretinal cavitation, and the presence of right-angled venules were also significant factors affecting BCVA ($p = 0.038$, $p = 0.043$, and $p = 0.027$, respectively). The ILM-drape sign showed no significant impact on vision. A significant correlation was found between hyperfluorescent areas detected with FAF and FA ($r = 0.897$; $p < 0.01$). The most common imaging pattern observed with both FAF and FA was “increased hyperautofluorescence” (94%). In only two eyes, hyperautofluorescence was detected with FAF without corresponding leakage on FA. A statistically significant difference was found between the hyperfluorescent areas measured on FAF and FA, with FA demonstrating larger leakage areas compared to FAF ($p = 0.0001$).

Conclusions: This study supports that FAF and OCT are more effective than FA in detecting vascular abnormalities before the onset of clinical symptoms. FAF findings became evident in the early stages, while FA did not demonstrate significant changes. As the disease progressed, hyperfluorescent leakage areas on FA were larger than those observed on FAF, reflecting a distinct change in disease course.

Abstract No.: 207757

Myopic Choroidal Neovascularization With Dilated Choroid Vessels Is Prone to Progression Into Subretinal Fibrosis Following Anti-Vascular Endothelial Growth Factor Therapy: A Retrospective Study

First Author: Xiangjun **SHE**

Co-Author(s): Yun **ZHANG**, Qiwei **CAI**

Purpose: This retrospective study aimed to identify risk factors for subretinal fibrosis (SF) and evaluate the response to anti-vascular endothelial growth factor (anti-VEGF) therapy in patients with myopic choroidal neovascularization (mCNV), with a specific focus on

the role of dilated choroidal vessels (DCVs) in disease progression.

Methods: In this retrospective study, patients with high myopia (spherical equivalent < -6.0 D, pathological myopia, Asian ethnicity) and active mCNV lesions, diagnosed between 2021 to 2023, were evaluated. The location of DCVs and mCNV was assessed, and macular thickness, submacular choroid thickness, best-corrected visual acuity, CNV area, and foveal density were measured at baseline and during follow-up. The presence of posterior staphyloma was evaluated at baseline. SF around the mCNV was evaluated lesions during follow-up. The time to SF detection was recorded using survival analysis. Risk factors for SF were analyzed using Kaplan–Meier and multivariable Cox regression analyses.

Results: A total of 46 eyes from 46 patients were included, with a mean age of 54.17 ± 14.37 years, and a baseline spherical equivalent of 12.36 ± 3.21 D. The logarithm of the minimum angle of resolution for the mean visual acuity was 0.70 (0.40–1.30), and the mean macular thickness was 313.11 ± 63.57 μ m at baseline. DCV was detected in 29 of the 46 eyes (63.0%), and the median time to detect SF was 43.41 [95% confidence interval (CI): 37.27–49.55] months. Multivariable Cox regression analysis identified submacular DCV [hazard ratio (HR): 14.93, 95% CI: 5.72–38.91, $P < 0.001$] and absence of posterior staphyloma (HR: 43.48, 95% CI: 12.15–156.32, $P = 0.002$) as independent predictors of SF. The presence of DCV under the fovea compared to the peripheral zone achieved a poorer therapeutic response and was prone to progress to SF after anti-VEGF therapy ($P = 0.041$).

Conclusions: Submacular DCV is associated with poor therapeutic response to anti-VEGF therapy and an increased risk of SF in patients with mCNV.

Abstract No.: 203510

Observational Study of Retinal Perivascular Spaces in Retinal Diseases Using an Adaptive Optics Scanning Laser Ophthalmoscope (AO-SLO)

First Author: Li ZHANG

Purpose: The glymphatic system contributes to central nervous system (CNS) homeostasis maintenance, and its function highly depends on the anatomy of perivascular spaces (PVS) and the physiological regulation of aquaporin-4 (AQP4). Studies have reported the existence of PVS around retinal vessels with high AQP4 expression, suggesting the retinal glymphatic system may be involved in intraocular homeostasis. Adaptive optics (AO) technology provides non-invasive observation of structures like retinal photoreceptor cells and vascular endothelial cells in vivo. This study aims to utilize an adaptive optics scanning laser ophthalmoscope (AO-SLO) to observe perivascular spaces.

Methods: A cross-sectional study was conducted using an adaptive optics retinal imaging system (AO-SLO; Mona Ila, Robotra Technologies) on participants with diabetic retinopathy (DR) and control subjects. Branch retinal arteries and veins at 2 disc diameters (PD) from the optic disc were measured.

Results: PVS were found around both retinal arteries and veins, exhibiting differences from cerebral PVS. The mean venous diameter was 108.0 μ m with a perivenous PVS of 25.1 μ m in DR patients, compared to 105.2 μ m and 27.7 μ m respectively in controls. The mean arterial diameter was 80.1 μ m with a perarterial PVS of 19.4 μ m in DR patients (Stage I-II), compared to 76.5 μ m and 25.4 μ m, respectively, in controls. Statistically significant differences in PVS were found around arteries and in controls.

Conclusions: This study utilizes high-resolution AO-SLO in vivo imaging to reveal retinal PVS in the physiological and pathological states of DR, suggesting glymphatic dysfunction may participate in the pathological processes of retinal inflammation and macular edema.

Abstract No.: 203687

Peripheral Ganglion Cell Complex Thickness and Retinal Microvasculature in Myopia Using Wide-Field Swept-Source OCT

First Author: Yinhang ZHANG

Co-Author(s): Fei LI, Deming WANG, Xiulan ZHANG

Purpose: This study aims to investigate the impact of axial elongation on ganglion cell complex thickness (GCCT) and retinal capillary density (CD) using wide-field swept-source optical coherence tomography angiography.

Methods: A retrospective cross-sectional analysis was conducted involving 506 eyes. Fovea-centered scans were obtained to assess the subregional GCCT and capillary density across the whole retina, the superficial capillary plexus (SCP), and the deep capillary plexus (DCP) among three groups: normal control, high myopia (HM) eyes with axial length < 28 mm, and HM eyes with axial length > 28 mm. Regional variations (central vs. peripheral, quadrants difference [superior, inferior, nasal, and temporal]) were analyzed.

Results: In HM eyes with axial length > 28 mm, GCCT and retinal CD exhibit a general decline in most regions ($P < 0.05$). In HM eyes with axial length < 28 mm, significant reductions were observed specifically in peripheral regions, as in the GCCT beyond the 3×3 mm² area and CD in the 9–12 mm whole retina, 9–12 mm superior SCP, and 6–12 mm DCP ($P < 0.05$). Maximum GCCT and retinal CD reduction with axial elongation was observed in subregions beyond 6×6 mm².

Conclusions: GCCT beyond the 3×3 mm² area and peripheral retinal CD beyond the 6×6 mm² area were more susceptible to axial elongation and are thereby

deserving of particular attention. It is necessary to evaluate different regions during the clinical assessment of the effect of myopia on the fundus and pay close attention to the peripheral retina.

Abstract No.: 200122

Presumed Retinal Micro(nano)plastics: A Bayesian Framework for Hypothesis Generation in Ocular Imaging

First Author: Aik Kah TAN

Purpose: Despite the known presence of micro(nano)plastics (MNPs) in multiple human tissues, they have never been documented in the retina. This study proposes a novel imaging-based hypothesis: that findings such as tiny discrete foci on fundus photography and hyperreflective foci on OCT may represent retinal MNPs. Using a Bayesian analysis, this work quantitatively evaluates the plausibility of this hypothesis, providing a rational foundation for the future development of MNP-specific retinal imaging tools.

Methods: A Bayesian model was constructed to evaluate the hypothesis under strong initial skepticism (prior probability $P(H) = 0.01$). Varying likelihoods of observed imaging evidence were analyzed under both null and alternative assumptions. Posterior probabilities and Bayes Factors were calculated to quantify hypothesis support and guide future imaging research.

Results: The model yielded a posterior probability of $P(H|E) = 0.023$ and a Bayes Factor of 2.33—representing weak but non-negligible evidence in favor of MNP presence. Despite a low prior, reproducible imaging features more than doubled the degree of belief. Sensitivity analysis showed the model was more influenced by priors than likelihoods, reinforcing the value of informed clinical suspicion in early hypothesis generation.

Conclusions: This hypothesis offers dual scientific value. If TRUE, it introduces environmental ophthalmology, impacting toxicology and public health. If FALSE, it uncovers the retina's nanoparticle barrier—a breakthrough in resilience biology and drug delivery. Either outcome reframes the retina as a paradoxical system, prompting high-impact inquiry at the intersection of environmental exposure, biological defense, and hypothesis-driven imaging science.

Abstract No.: 202558

Quantifying Edema and Fibrosis in Thyroid Eye Disease: The Role of Quantitative Synthetic MRI

First Author: Sien Ping CHEW

Co-Author(s): Duo Jin XIA, Haiyang ZHANG, Huifang ZHOU

Purpose: Edema and fibrosis are crucial factors in distinguishing disease activity in thyroid eye disease (TED). Accurate activity assessment of TED is essential for clinical decision-making but remains challenging with current subjective scoring systems. This study investigates the diagnostic value of synthetic MRI, specifically Magnetic Resonance Image Compilation (MAGiC), which combines quantitative T1, T2, and proton density (PD) mapping, for the objective evaluation of TED activity.

Methods: A total of 113 TED patients, including 49 with active and 64 with inactive disease, were included in the analysis. Patients underwent MRI using a 3T MRI scanner with MAGiC for simultaneous acquisition of T1, T2, and PD maps. Image quality was assessed based on spatial resolution, contrast, and legibility of key anatomical structures such as extraocular muscles and lacrimal glands, comparing MAGiC with conventional Dixon imaging. Diagnostic accuracy was evaluated using receiver operating characteristic (ROC) curve analysis.

Results: Synthetic MRI demonstrated high reproducibility with excellent ICCs (ranging from 0.755 to 0.985). The T1 + PD model showed the highest diagnostic accuracy, with significant associations between IR_T1 and IR_PD with TED activity. The T1 + T2 + PD model also demonstrated strong performance, although the inclusion of T2 provided only marginal improvements. The T1 + PD model was identified as the most reliable combination for evaluating TED activity, providing a robust and objective tool for clinical decision-making.

Conclusions: The T1 + PD model offers a clinically feasible method for assessing TED activity, which could improve disease staging and guide therapeutic decisions. These findings support the potential of MAGiC-based synthetic MRI in clinical practice, particularly for patients with borderline or ambiguous clinical features.

Abstract No.: 201490

Quantitative Assessment of Peripheral Choroidal Vasculature on UWF ICGA in Posterior Uveitis Using Advanced Imaging Processing Techniques

First Author: Ashish **MARKAN**

Co-Author(s): Airuddha **AGARWAL**, Rupesh **AGRAWAL**, Vishali **GUPTA**

Purpose: To quantitatively evaluate the peripheral choroidal vasculature in patients with posterior uveitis using UWF ICGA.

Methods: Retrospective study design. Patients, aged 18-50 years, registered in the uveitis clinic and diagnosed with posterior uveitis, were recruited as cases. Fellow eyes of the patients who underwent UWF FFA and ICGA for other ocular pathologies were recruited as controls. Early and mid-phase FFA ICGA images were used to analyze (using affine registration and advanced image processing techniques) various choroidal vascular parameters. We undertook a quantitative assessment of peripheral choroidal vasculature on UWF ICGA by leveraging image processing algorithms using the Python programming language. Choroidal vessel densitometry (CVD), asymmetry of choroidal outflow (ACO), the diameter of the prominent choroidal vessel, and the distance between the ampulla and optic nerve were assessed in eyes with posterior uveitis and the control group.

Results: A total of 31 cases and 14 controls were included. The choroidal vessel densitometry and diameter of inferior choroidal vessels were significantly altered in posterior uveitis as compared to the control group. Other parameters, like the asymmetry of choroidal outflow and the ampulla distance from the optic nerve, were comparable in both groups.

Conclusions: Quantifying choroidal vascular parameters can help clinicians monitor the disease progression and response to therapy. Our study also showed that CVD was markedly decreased, and the diameter of prominent choroidal vessels in the inferior quadrant was significantly increased in posterior uveitis as compared to the control group.

Abstract No.: 202524

Reducing Label Noise in Multi-Category Retinal Images Datasets: Data Cleaning Based on the CleanLab Framework

First Author: Yongleng **FANG**

Co-Author(s): Haoyu **CHEN**

Purpose: The study aims to verify the ability of CleanLab to identify label noise in ophthalmic public datasets, and provide more accurate retinal images.

Methods: The study used an open-source framework CleanLab to perform data cleaning on three multi-category datasets of fundus photography to identify

label issues, near-duplicates, and outliers. The results were independently authenticated by three experienced ophthalmologists.

Results: After data cleaning, the CleanLab framework detected label noise in all three public datasets. The ODIR-5K and Eye Diseases Classification datasets contained near-duplicates, but the MuReD dataset did not. Although the corrections of label issues proved only moderately reliable (28.6–45.8 %) across these three datasets, the CleanLab nonetheless detected 61–547 mislabeled and 4–19 out-of-distribution images in total. And the outlier detection across three datasets additionally identified 2–28 mislabeled images.

Conclusions: The CleanLab can identify the undiscovered label noise in ophthalmic multi-category public datasets. Although the CleanLab achieves only modest accuracy in label correction, its capacity to rapidly identify near-duplicate images and potentially mislabeled samples substantially alleviates the burden of data-cleaning efforts. This study substantiates a promising pathway to enhance the quality of publicly accessible datasets, which represents a meaningful contribution to the improvement of model performance in subsequent machine-learning research.

Abstract No.: 204918

Swept Source Optical Coherence Tomography Angiography (SS-OCTA) Assessment of Choroidal Structure in Vitreoretinal Lymphoma Patients and Their Changes During Intravitreal Methotrexate Chemotherapy

First Author: Xinyi **ZHOU**

Co-Author(s): Qing **CHANG**, Junxiang **GU**

Purpose: To evaluate choroidal structure changes in vitreoretinal lymphoma (VRL) patients during intravitreal methotrexate (MTX) therapy and quantitative characteristics of active VRL at the choroidal level using swept source optical coherence tomography angiography (SS-OCTA).

Methods: In this retrospective study, patients diagnosed with VRL who received intravitreal MTX chemotherapy from January 2022 to December 2023 were included, along with healthy volunteers of the same age range and sex ratio. Three-phase intravitreal MTX chemotherapy consisting of induction, consolidation, and maintenance was scheduled. SS-OCT/OCTA images obtained before intraocular chemotherapy and by the end of each phase of treatment were reviewed. Choroidal thickness (CT), choriocapillaris (CC) perfusion area, choroidal vessel volume (CVV), choroidal vascularity index (CVI), and choroidal stromal volume (CSV) were analyzed.

Results: Forty-four eyes of 29 VRL patients (15 males, 14 females) were enrolled in this study. CT, CVV, and CSV decreased significantly by the end of the induction

phase and maintained a continuous decrease during intravitreal MTX chemotherapy (all $P < 0.05$), while CC perfusion area and CVI remained statistically comparable. Comparative analysis demonstrated significantly lower CVI in VRL eyes versus normal controls across all measured regions (all $P < 0.05$), while CT, CVV, and CSV showed no intergroup differences.

Conclusions: VRL eyes demonstrated a decreased CVI, which reflected lymphoma-induced structural changes at the choroidal level. Following intravitreal MTX treatment, CT, CVV, and CSV all showed a significant reduction.

Abstract No.: 200680

The Role of En Face Imaging of Retinal Pigment Epithelium Alterations in Rapid Classification of Central Serous Chorioretinopathy Using Widefield Swept-Source Optical Coherence Tomography

First Author: Zhengwei **ZHANG**

Purpose: To investigate the role of widefield en face imaging of retinal pigment epithelium (RPE) alterations using swept-source optical coherence tomography (SS-OCT) for rapid classification of central serous chorioretinopathy (CSCR).

Methods: In this cross-sectional, single-center study, eyes diagnosed with unilateral CSCR were included. Volume SS-OCT scans (12-mm × 12-mm) were obtained for all the participants. High-quality structural en face images were automatically generated at the level of Bruch's membrane based on artificial intelligence to evaluate the RPE alterations.

Results: The study included 122 affected eyes from patients with unilateral CSCR, with a mean age of 46.3 ± 9.1 years. In 51 out of the 122 cases, fundus autofluorescence (FAF), fundus fluorescein angiography (FFA), indocyanine green angiography (ICGA), and en face imaging were assessed simultaneously. Among these, 17 eyes were categorized as complex CSCR. FAF exhibited the highest detection rate of RPE abnormalities (94.1%). En face imaging revealed RPE abnormalities in 15 out of 17 eyes (88.2%), while ICGA detected RPE abnormalities in 12 out of 17 eyes (70.6%). Only 6 out of 17 eyes (35.3%) showed RPE abnormalities in FFA. The RPE alterations in the remaining 71 eyes with CSCR were evaluated solely using en face imaging, wherein 17 eyes were designated as complex CSCR and 54 eyes were categorized as simple CSCR.

Conclusions: Evaluation of RPE alterations using widefield en face imaging has potential as a reliable, noninvasive approach to rapid classification of CSCR using the latest classification system.

Abstract No.: 205882

Thickness of the Eyelid Skin (Epidermis and Dermis) in Filipino Adults Using Ultrasound Biomicroscopy: A Preliminary, Descriptive, Cross-Sectional Study

First Author: Pauline Gabrielle **LACSAMANA**

Co-Author(s): Honeylen **TEO**

Purpose: Ultrasound biomicroscopy (UBM) provides high-resolution imaging of ocular structures and shows potential for eyelid skin assessment. No published data exist on epidermal and dermal eyelid thickness using UBM, and regional variability remains poorly characterized. Establishing normative values may aid oculoplastic and aesthetic practice. This study aimed to determine eyelid epidermal and dermal thickness in Filipino adults with Fitzpatrick Skin Phototype IV.

Methods: A descriptive cross-sectional study was conducted at St. Luke's Medical Center, Manila (July–August 2025). Sixty Filipino adults (30 males, 30 females) with normal eyelids and Fitzpatrick Skin Type IV were enrolled. Exclusion criteria included prior eyelid surgery, periocular trauma, disease, or hypersensitivity. Imaging was performed with the Sonomed Escalon VuMAX HD (50 MHz probe). Standardized upper and lower eyelid scans were obtained after topical anesthesia. Thickness was measured using device software, converted to micrometers, and analyzed descriptively.

Results: UBM was performed in 60 participants (10 per subgroup). In six young adults (18–39 years), the epidermis was uniformly thin (40–80 μ m), while dermal thickness showed regional variability. In the upper eyelid, thickness ranged from 540 μ m at the margin to 773 μ m beneath the brow; in the lower eyelid, from 650 μ m at the margin to 845 μ m at the lid–cheek junction. Dermal differences accounted for most variability.

Conclusions: UBM demonstrated regional heterogeneity in eyelid thickness, with thicker zones in peri-brow and lid–cheek regions. These baseline findings, which represent the first UBM data in Filipinos, are relevant for surgical planning, incision design, and device calibration, and support further age- and sex-specific studies.

Abstract No.: 202508

Towards In Vivo Cellular Visualization of Crystalline Lens With Full-Field Optical Coherence Tomography

First Author: Peng **XIAO**

Co-Author(s): Shang **HUANG**, Zhongzhou **LUO**, Jinze **ZHANG**

Purpose: To develop a non-invasive imaging technique capable of visualizing cells within the crystalline lens to advance our understanding of lens development and cataract formation.

Methods: We customized full-field optical coherence tomography (FFOCT) prototypes optimized for murine (NA=0.8) and human (NA=0.3) crystalline lens imaging. Utilizing spatial incoherent illumination ($\lambda=840\text{nm}$, $\Delta\lambda=30\text{nm}$), the effects of anterior ocular media aberrations on system resolution were mitigated when imaging the lens inside the eye. Simultaneous defocusing correction was conducted during in-depth scanning. Multi-plane en face image fusion strategy was adapted for larger field-of-view of curved lens epithelial cells (LECs) layer. Validation encompassed in situ and in vivo murine imaging, as well as first-in-human in vivo trials.

Results: The FFOCT systems achieved three-dimensional micron-scale resolution. Murine imaging visualized the anterior capsule as a hyper-reflective layer, while beneath it, the mosaic distribution of LECs. Murine LECs density exhibited biphasic decline from 25k to 6k cells/ mm^2 (from P0 to P30) followed by gradual stabilization ($\sim 6.5\text{k cells/mm}^2$ at P60). Concomitant cellular remodeling included initial hypertrophy (5.4 to 12.5 μm diameter, from P0 to P30) and subsequent compaction (10.9 μm at P60). Uniform rows of fiber cells, as well as suture structures and developmental voids, were then observed below the Murine LECs layer. Human imaging resolved distributions of LECs (10-15 μm), parallel arrays of cortical fiber cells, and Y-suture structures with micron-level details.

Conclusions: This study demonstrates the significant potential of FFOCT as a valuable tool to provide unprecedented cellular-level insights into the crystalline lens.

Abstract No.: 207160

Type 4 Macular Neovascularization (NV): A New Member of the Optical Coherence Tomography (OCT) Classification of NV Age-Related Macular Degeneration (AMD)

First Author: Hiok Hong CHAN

Co-Author(s): Gemmy CHEUNG, Alessandro FEO, David SARRAF

Purpose: To describe the clinical and multimodal imaging features of a novel form of macular neovascularization (MNV), designated Type 4 MNV, defined by mixed Type 1 and Type 2 neovascularization (NV), extensive intraretinal anastomotic NV, and central posterior hyaloid fibrosis (CPHF).

Methods: This multicenter retrospective observational case series included patients with neovascular age-related macular degeneration (AMD) exhibiting both Type 1 and 2 MNV and an overlying anastomotic intraretinal NV network. This was confirmed with OCT and OCT angiography (OCTA). Demographics, baseline visual acuity (VA), and OCT imaging biomarkers, including the hyperreflective oblique band (HOB)

sign, CPHF, epiretinal membrane (ERM), and OCTA NV subtype, were assessed.

Results: Eleven eyes from eleven patients (mean age: 76.9 years; 36.4% female) met the inclusion criteria. Baseline VA was logMAR 1.56 ± 0.45 ($\approx 20/630$), and 90.9% of subjects presented with severe visual loss. All eyes showed the HOB sign. CPHF was observed in 81.8% (9/11 subjects). ERM with radial traction was present in 81.8%. OCTA illustrated mixed Type 1 and 2 MNV with a prominent overlying intraretinal anastomotic network extending into the preretinal space.

Conclusions: Type 4 MNV represents a distinct AMD phenotype with aggressive anatomical features, including mixed Type 1 and 2 MNV, inner retinal and preretinal proliferation, anastomosis, and retinal disorganization. The visual prognosis is invariably poor with recalcitrance to anti-VEGF therapy. The recognition of this signature NV lesion subtype further refines the MNV classification system and can impact therapeutic strategies for neovascular AMD.

Abstract No.: 202977

Ultra-Widefield Fundus Fluorescein Angiography: Findings in Takayasu Arteritis

First Author: Manu SHARMA

Co-Author(s): Mohit DOGRA, Ramandeep SINGH, Basav TIGARI

Purpose: Takayasu arteritis is an uncommon vascular disorder. Fundus fluorescein angiography (FFA) plays a key role in staging and managing Takayasu retinopathy (TR). In this study, we assessed the utility of ultra-widefield FFA (UWF-FFA) in providing additional diagnostic information and influencing management decisions.

Methods: Retrospectively, Takayasu Arteritis (TA) patients with TR who underwent UWF-FFA were enrolled. Standard $7 \times 30^\circ$ ETDRS fields representing conventional imaging were superimposed over the UWF-FFA images. The extra information yielded by UWF-FFA and its advantages over standard $7 \times 30^\circ$ ETDRS fields were noted.

Results: Seventy-eight eyes of 39 patients (mean age: 31.31 ± 10 years; 34 females) were included. On UWF-FFA, 5(6.4%) eyes had stage 4; 33 (42.3%) stage 3, 11 (14.1%) stage 2, 7(9.0%) stage 1 and, 22(28.2%) eyes were normal. On conventional imaging, 4 (5.1%) eyes had stage 4, 1(1.3%) had stage 3, 17(21.8%) had stage 2, and 33(42.3%) had stage 1, and 23(29.5%) eyes were normal. Change in stage was seen in 41 (52.6%) eyes with $p \text{ value} < 0.05$, which was statistically significant. On UWF-FFA, peripheral capillary non-perfusion areas in 28 (35.9%) eyes, and neovascularization in 1(1.4%) eye.

Conclusions: UWF FFA helped to pick up extra information in 26(33.3%) eyes and perform sight-saving

treatment (laser) in 28 (35.9%) eyes. Hence, it should be the preferred imaging modality in TA patients.

Abstract No.: 205488

Widefield Indocyanine Green Angiography Evaluating Choroidal Vein Drainage Pattern and Choroidal Vein Alterations in Acute and Chronic Central Serous Chorioretinopathy

First Author: Xinlei HAO

Purpose: To access the distribution of choroidal vein drainage pattern and the choroidal vein alterations in choroidal vascular hyperpermeability (CVH) areas in eyes with acute and chronic central serous chorioretinopathy (CSC) using widefield indocyanine green angiography (WF-ICGA).

Methods: In this retrospective observational study, medical records and multimodal imaging of 127 patients (165 eyes) with CSC were reviewed. The number and location of dominant vortex veins and CVH areas on WF-ICGA images were evaluated. Choroidal vein alterations, including fusiform, bulbosity, sausageing, choroidal vein confluence, and intervortex venous anastomosis, were identified in CVH areas. The differences in choroidal features were compared between the acute and chronic groups.

Results: Sixty-three acute CSC eyes and 102 chronic CSC eyes were evaluated. In this study, 125 eyes (75.76%) exhibited an asymmetric pattern of choroidal vein drainage routes. The chronic CSC group had more CVH areas compared with acute CSC eyes in general ($P < 0.001$). Compared with chronic CSC eyes, CVH areas in acute CSC eyes were more likely to occur in the dominant vortex vein system ($P = 0.006$). Regarding the choroidal vein alterations, all kinds of anatomical changes were significantly more pronounced in chronic CSC eyes compared with the acute group ($P < 0.001$ for all), with sausageing and intervortex venous anastomosis more commonly observed in the chronic group ($P < 0.001$ and $P = 0.002$, respectively). The best corrected visual acuity (BCVA) of chronic symmetric CSC was significantly better than that of chronic asymmetric CSC cases ($P = 0.006$), with the BCVA showing a correlation with the frequency of sausageing dilations ($P = 0.032$). An increased number of sausageing dilation was associated with poorer visual acuity in chronic asymmetric CSC.

Conclusions: Choroidal vascular remodeling occurs throughout the entire course of the CSC, with the formation of an intervortex venous anastomosis creating a new drainage path that helps ameliorate choroidal vein congestion over time.

Abstract No.: 206704

Windows to Memory: Pupillometry as a Specific Biomarker of Long-Term Memory

First Author: Agatha WONG

Co-Author(s): Lok Man Andy AU, Yu Yin Zenobia CHAU, Kam Lung Kelvin CHONG, Yiu Man Hanson WONG

Purpose: To systematically evaluate the utility of pupillometry as a non-invasive biomarker for long-term memory (LTM) retrieval, and to assess its potential as an accessible alternative to traditional neurophysiological methods.

Methods: Following the PRISMA guidelines, quantitative studies were identified via Scopus (1st January 2000–1st July 2025) using the search terms “pupillometry», “pupillary response (PR)”, and “long-term memory (LTM)”. Screening was conducted independently using Covidence. Studies were included if they examined the association between PR and any form of LTM retrieval and targeted healthy participants, while papers focusing solely on short-term memory were excluded. Static pupillometry data, namely pupil size, constriction, and dilation patterns, were extracted, with included studies stratified into episodic, semantic, and procedural memory for specificity.

Results: A total of 585 studies were identified using search terms, and 34 studies (1,732 patients) met the inclusion criteria. Twenty-one studies associate greater pupil dilation and baseline pupil size with successful LTM retrieval across all forms of LTM ($p \leq 0.01$), with the remaining 13 observing distinct pupillary patterns during the retrieval of LTM. Differences in pupil dynamics also reflect individual differences, age-related changes, and effort levels. On the other hand, dysregulated arousal, as indicated by inconsistent pupil responses, correlates with poorer memory performance.

Conclusions: Providing a low-cost, reproducible approach, infrared pupillometry holds potential for screening and self-monitoring of memory-related disorders, including mild cognitive impairment and Alzheimer's disease, by identifying distinct pupil dynamics linked to cognitive load, retrieval effort, and attentional regulation in LTR.

Ocular Oncology and Pathology

Abstract No.: 207298

A Machine Learning Pipeline to Analyse Global Sentiment and Factors Influencing Retinoblastoma Treatment Hesitancy

First Author: Wai Chak CHOY

Co-Author(s): Lijia CHEN, Wai Kit CHU, Chi Pui PANG, Clement THAM, Emily Suhan WONG, Jason Cheuk Sing YAM, Yuzhou ZHANG

Purpose: The use of social media in cancer research, patient support, and information sharing has been well documented. Using retinoblastoma as a model, we utilise the abundance of information provided from Twitter to understand patients' treatment-seeking behaviour and barriers, as well as investigate its application in research and epidemiology.

Methods: Posts on retinoblastoma were extracted from Twitter. We trained Bidirectional Encoder Representations from Transformers models (BERT) to identify relevance and conducted sentiment analysis. The Hierarchical Dirichlet Process was trained to identify topics with BERTopic for sensitivity analysis. We enriched user profiles with OpenStreetMap-based geotagging and coreNLP-based occupation tagging. Retinoblastoma outcomes were obtained from a systematic review and meta-analysis, which covered articles published between January 1, 1981, and October 8, 2021.

Results: The dataset covered 2,382,511 posts from 797,870 Twitter users. Stronger negative sentiment towards enucleation ($\beta = -0.924$ [95%CI = -1.367--0.481]) but not chemotherapy ($\beta = -0.116$, [95%CI = -0.444--0.211], $P = 0.4763$) was associated with worse overall survival outcome. Active participation of clinical staff ($\beta = -0.105$, CI = -0.186--0.024, $P = .0111$) and academia ($\beta = -0.116$, CI = -0.208--0.252, $P = .0126$) correlated with lower enucleation hesitancy. Lack of disease understanding and the need for more support and counselling remained the most significant barrier to receiving treatment worldwide, as reflected by both intensity and number of tweets. The number of new posts per year related to treatment barriers and enucleation hesitancy showed exponential growth after 2016 ($\beta_{\log\text{-linear}} = 0.957$, $P = .0021$).

Conclusions: Social media is extensively used for retinoblastoma education and support, with positive sentiment on social media associated with better survival. Targeted information dissemination by trained personnel should improve acceptance in vulnerable zones and outcomes.

Abstract No.: 206682

Altered Mitochondrial DNA Copy Number and Biogenesis Gene Expression Correlates With Clinicopathological Features in Retinoblastoma Patients

First Author: Athang SAWANT

Co-Author(s): Bilal AHMED, Bhavna CHAWLA, Seema KASHYAP, Neiwete LOMI, Rachna SETH, Lata SINGH

Purpose: Retinoblastoma (Rb) is a common childhood cancer in India. The genetic foundation of the disease is well-documented; however, the subsequent metabolic adaptations, especially those related to mitochondria, are increasingly acknowledged as crucial in facilitating retinoblastoma progression and therapeutic chemoresistance. This study, therefore, aims to measure the mitochondrial copy number and expression of its biogenesis genes in Rb.

Methods: This was a prospective study which included 51 Rb patients. Mitochondrial DNA copy number (mtDNA) and biogenesis genes expression (PGC1- α , NRF1, NRF2, TFAM and POLRMT gene) were analysed using quantitative real-time PCR (qRT-PCR). Protein expression was evaluated by immunohistochemistry (IHC) and further validated using western blotting. Statistical analysis was performed to correlate their expression with clinicopathological parameters and patient outcome.

Results: There was a male preponderance (56%) and 17 patients were <2 years old. Histopathology revealed high-risk features in 50.98% cases, with necrosis and calcification in 43.13% and 50.98% cases, respectively. Poorly differentiated Rb (PDRB) was found in more than 90% of cases. qRT-PCR results showed significant upregulation of PGC1- α , TFAM, and POLRMT genes in more than 80% of cases. Western blotting and IHC results were consistent with qRT-PCR for PGC1- α and TFAM protein. The mtDNA copy number was significantly higher in primary Rb. On statistical analysis, PDRB and HRFs ≥ 1 were positively significant with PGC1- α , TFAM, and POLRMT expression.

Conclusions: This is the first of its kind study showing the evidence of differential expression of mitochondrial biogenesis genes and altered mtDNA copy number in Rb patients.

Abstract No.: 204554

An Unusual Variant of Eyelid Sebaceous Carcinoma With Central Squamous Differentiation

First Author: Maitha AL ASMI

Co-Author(s): Syed ALI RAZA RIZVI

Purpose: Sebaceous carcinoma of the eyelid is a rare and aggressive malignancy that often masquerades as benign conditions or mimics basal cell carcinoma. Histological variants with squamous differentiation are

exceedingly uncommon. Early recognition and accurate diagnosis are crucial for optimizing outcomes.

Methods: A 63-year-old male with a significant smoking history presented with a three-month history of progressive, painless right lower eyelid swelling. Examination showed an ulcerative lesion with malignant features, including madarosis, eyelid margin distortion, telangiectatic vessels, and a palpable preauricular lymph node. Excisional biopsy under frozen section with Hughes flap reconstruction was performed.

Results: Histopathology confirmed sebaceous carcinoma with rare squamous differentiation, demonstrating lobular growth, comedonecrosis, and deep invasion into muscle (9 mm), with intraepidermal and conjunctival extension. Surgical margins were free of tumor cells, and the tumor was staged as pT3NxMx (AJCC 8th Edition). Imaging revealed no definite metastasis apart from a nonspecific lung nodule. Despite advice for neck dissection and parotidectomy, the patient declined further surgery and opted for radiotherapy. On follow-up, eyelid reconstruction was stable with no evidence of recurrence.

Conclusions: Sebaceous carcinoma with squamous differentiation is an unusually rare histopathological variant with significant diagnostic and therapeutic implications. This case highlights the need for a high index of suspicion, comprehensive histopathological assessment, and multidisciplinary input in eyelid tumors. Awareness of such unusual presentations expands understanding of sebaceous carcinoma behavior and emphasizes the importance of individualized treatment planning.

Abstract No.: 204287

Characterization of Early Metastatic Subpopulations in Uveal Melanoma: Single-Cell Insights Into SPP1+ Cells and Their Interactions With Macrophages

First Author: Jingting LUO

Co-Author(s): Yang LI, Heng WANG, Wenbin WEI

Purpose: To identify highly invasive subpopulations of tumor cells that may be responsible for early uveal melanoma (UM) metastasis at the single-cell level and to analyze their interactions with immune cells.

Methods: Single-cell RNA sequencing was conducted on eleven samples from eleven UM patients who underwent primary enucleation. The patients were categorized into metastasis (M+) and non-metastasis (M-) groups based on whether metastasis occurred during the three-year follow-up. The results were validated using bulk RNA-seq data from 133 patients from our cohorts (n=53) and TCGA human UM patients (n=80). The clustering was confirmed by immunofluorescence. Cell proliferation and invasiveness were evaluated using CCK8 and transwell

assays. Apoptosis was analyzed using flow cytometry after Annexin V-FITC/PI staining. The relative expression levels of genes were assessed using RT-qPCR.

Results: A secreted phosphoprotein 1 (SPP1) + cluster that may be related to early metastasis and high invasiveness was identified by comprehensive bioinformatics analysis and confirmed by immunofluorescence in UM sections. In vitro experiments supported that SPP1 promotes UM cell proliferation, migration, and invasion. Moreover, CCL3+ macrophages were associated with poor prognosis, and the HMGB1-TIM-3 axis may serve as a potential immune checkpoint target. Consequently, SPP1+ melanoma cell populations will likely interact with CCL3+ macrophages, highlighting their possible role in the metastatic process.

Conclusions: Our study reveals early metastatic mechanisms in UM by identifying highly invasive SPP1+ melanoma cells and their interaction with macrophages, providing potential therapeutic targets for the metastatic process.

Abstract No.: 210221

Complete Regression of an Unusual Case of Reactive Retinal Astrocytic Tumor in the Posterior Pole of the Retina With Shortened Interval Anti-VEGF Injection

First Author: Luyun LIANG

Co-Author(s): Yiqin DUAN

Purpose: To explore the effective therapeutic options for Retinal Vasoproliferative Tumor (RVPT), describe a case of successful treatment of an unusual RVPT located in the posterior pole of the retina in a 16-year-old male patient.

Methods: To review the clinical manifestations, imaging features, and therapeutic regimen of a male patient diagnosed with RVPT in Changsha Aier Eye Hospital in September 2021.

Results: RVPT is a rare benign retinal glioma. Their development may be triggered by retinal ischemia and hypoxia, as well as the presence of inflammatory factors. However, the progression rate of these tumors is unpredictable. Once the primary intraocular lesion or inflammatory factors are activated, RVPT tends to induce extensive reactive retinal gliosis. The tumor mass can rapidly grow from a few millimeters to fill the entire vitreous cavity, leading to an extremely poor prognosis, also the treatment efficacy for RRAT has been reported to be relatively low in the literature. A 16-year-old male patient was diagnosed with the rare tumor RVPT due to a sudden decrease in vision over a short period of time, treated with shortened intervals between intraocular anti-VEGF injections and an increased frequency of laser treatments. Over the course of a ten-month follow-up, the tumor completely

regressed, and visual acuity in the right eye significantly improved.

Conclusions: Shortening the intervals between anti-VEGF injections and increasing the frequency of retinal laser treatments may provide a more effective approach for rapidly controlling RVPT growth and preserving vision. Compared with traditional vitrectomy, the treatment applied in this case greatly lessened patient suffering, effectively prevented enucleation, and offered a novel clinical approach for RVPT treatment.

Abstract No.: 205495

Diagnostic Yield, Safety and TCGA Risk Stratification of Transretinal Vitrector Biopsy in AJCC Stage 1–2 Choroidal Melanoma: A Retrospective Cohort Study

First Author: Adrian Fung

Co-Author(s): Svetlana Cherepanoff, Max Conway, Nikita Garg, Min Huang, Stephen Wong, Michael Zhang

Purpose: To evaluate the diagnostic yield, safety and TCGA molecular classification from vitrector biopsy in early-stage uveal melanoma and compare outcomes by clinical indication.

Methods: This single-centre retrospective study included patients with AJCC stage cT1–2 choroidal melanoma who underwent transretinal vitrector biopsy between 2019 and 2024. Demographics, tumour features, biopsy indication (diagnostic vs prognostic), and treatment details were recorded. Diagnostic yield was assessed using cytomorphology, BAP1 immunohistochemistry (IHC), and chromosomal microarray (CMA). TCGA risk classification was defined as Group A–D (CMA) or A/B (BAP1 retained) vs C/D (BAP1 aberrant). Post-biopsy complications were recorded up to 6 months.

Results: Twenty-nine eyes from 29 patients (mean age 58 years, range 18–95) were analysed. Cytological diagnosis was achieved in 27/29 cases (93%), CMA-based classification in 27/29 (93%), and BAP1 IHC in 22/29 (76%). Either cytology or CMA yielded diagnostic results in 28/29 cases (97%). All prognostic biopsies (11/11) yielded interpretable cytology, CMA, and BAP1 IHC. Diagnostic biopsies yielded cytology in 16/18 (89%), CMA in 16/18 (89%), and BAP1 IHC in 11/18 (61%). High metastatic TCGA risk profiles (Group C/D) were identified exclusively in T1/1a tumours. Two patients (6.9%) required vitrectomy for post-biopsy haemorrhage. No cases of tumour dissemination, endophthalmitis, or retinal detachment were observed within 6 months.

Conclusions: Transretinal vitrector biopsy is a safe, high-yield procedure for prognosis and diagnosis in early-stage choroidal melanoma. TCGA-based high-risk molecular profiles can be identified in low-stage

tumours, highlighting the limitations of AJCC staging alone and the utility of vitrector biopsy for personalised risk stratification.

Abstract No.: 204707

Distinct Genomic Signatures in Bilateral Ocular Mantle Cell Lymphoma

First Author: Usha Kim

Purpose: To analyze the genomic alterations in ocular adnexal lymphoma and look for the specific signatures in a unique case of bilateral ocular mantle cell lymphoma.

Methods: Whole-exome and transcriptome sequencing were done on 19 and 13 lymphoma tumors, respectively. The integration of exome and transcriptome data was performed to identify the key altered pathways.

Results: We identified ROS1 as a novel, recurrently mutated gene in 26% of cases, in addition to known mutations in EP300 (26%), TNFAIP3 (21%), and TBL1XR1 (11%). Patients with mutant ROS1 had shorter progression-free survival. Among the recurrent mutations, TNFAIP3 alterations were significantly correlated with recurrence, and IGLL5 mutations with dissemination. Analysis of both eyes in a bilateral ocular mantle cell lymphoma showed ATM and KMT2D mutations in one eye, while the other displayed ROS1 and BIRC3 mutations.

Conclusions: Significant genetic alterations at both the genomic and transcriptomic levels provide a comprehensive insight into the molecular characteristics of Ocular lymphoma. This integrated approach of clinical and genetic analyses suggests new avenues for targeted clinical interventions in Ocular lymphoma.

Abstract No.: 206917

Evolution of Intra-Arterial Chemotherapy Technique and Outcomes in Retinoblastoma: A 15-Year Retrospective Study From a Tertiary Referral Center

First Author: Nattarat Tang-Ananchai

Co-Author(s): Thanaporn Kritfuangfoo, Duangnate Rojanaporn

Purpose: To evaluate the efficacy of intra-arterial chemotherapy (IAC) for intraocular retinoblastoma through a 15-year retrospective review.

Methods: This retrospective study included all patients with intraocular retinoblastoma treated with primary or secondary IAC at a tertiary referral center in Thailand. IAC techniques and drug protocols were revised across two periods (Period 1: 2009–2017 and Period 2: 2018–2023). Globe salvage and visual outcomes were assessed by patient and tumor characteristics.

Results: A total of 63 eyes from 60 patients with intraocular retinoblastoma were included. IAC was administered as primary treatment in 46.0% and secondary treatment in 54.0% of eyes. The overall globe salvage rate was 71.4%, with significantly higher success in eyes receiving primary IAC (86.2%) compared to secondary IAC (58.8%, $p = 0.025$). Salvage outcomes improved markedly in Period 2 (91.7% vs. 44.4%, $p < 0.001$), alongside increased use of triple-drug regimens and improved catheterization success (93.5% vs. 77.3%, $p = 0.002$). Group E tumors had the lowest salvage rates, but subclassification revealed that some E1 eyes remained salvageable. Multivariable analysis identified retinal detachment (HR, 6.54; $p = 0.023$) and secondary IAC (HR, 12.93; $p = 0.020$) as independent predictors of treatment failure. For visual outcomes, macular involvement was associated with poorer final visual acuity. Although no variables remained significant in multivariable analysis, retinal detachment was associated with worse vision in univariable analysis.

Conclusions: IAC is an effective treatment for intraocular retinoblastoma, with improved globe salvage over time, particularly in primary IAC and triple-drug regimens. Early intervention and individualized treatment approaches are key to optimizing both globe preservation and visual outcomes.

Abstract No.: 204843

Exome Sequencing of Basal Cell Carcinoma of the Eyelids in Japanese Patients Characterizes Distinct and Shared Mutation Profiles Across Populations and Identifies New Oncogene

First Author: Masato **AKIYAMA**

Co-Author(s): Yuya **FUJII**, Noriko **HIMORI**, Yusuke **SANO**, Mika **TANABE**

Purpose: To elucidate the genetic landscape of basal cell carcinoma (BCC) of the eyelids in the Japanese population.

Methods: We conducted exome sequencing analyses in 46 patients with eyelid BCC who underwent surgical resection at two university hospitals in Japan. Sequence libraries for tumor- and blood-derived DNA were prepared using the SureSelectXT Library Prep Kit and sequenced on a NovaSeq 6000. The sequence reads were analyzed following the best practice of Mutect2. Gene-level statistical significance was estimated by dNdScv. The results were compared with those from a large-scale analysis conducted in the Western cohort (Bonilla et al., Nat Genet 2016).

Results: We successfully sequenced all samples. The tumor mutation burden was 8.6 ± 9.5 mutations/Mb (mean $\pm$ standard deviation), which was much lower than that reported in the previous study (65 mutations/Mb). Seven recurrently mutated genes (PTCH1, PTPN14, TP53, ARID1A, SLC25A3, KMT2D, and SMO) were identified at a false discovery rate $< 5\%$. Among them, SLC25A3 has not been previously reported.

Recurrent mutations ($N \geq 4$) were found in SMO and SLC25A3. Comparison of mutation frequencies in each gene with the previous study showed a significant positive rank-correlation ($\rho = 0.62$, $P = 4.52 \times 10^{-3}$); however, mutation frequencies of PTCH1 (50%) and TP53 (26%) in Japanese BCC were lower than those in the previous study (PTCH1: 79%; TP53: 61%).

Conclusions: While the genetic landscape of BCC in Asian patients is similar to that in Western patients, the mutation burden and the frequencies of mutated genes may differ across populations.

Abstract No.: 206769

Eyelid Malignancies in Indonesia: Insights From a Multicenter Study on Clinical Features and Outcomes

First Author: Mutmainah **MAHYUDDIN**

Co-Author(s): Neni **ANGGRAINI**, Raden Angga **KARTIWA**, Delfitri **LUTFI**, Purjanto Tepo **UTOMO**

Purpose: Eyelid malignancies are relatively common and treatable if detected early. In Asian populations, sebaceous gland carcinoma (SGC) is as frequent as basal cell carcinoma (BCC), while Indonesian single-center studies have reported inconsistent findings. Diagnosis is further complicated as eyelid malignancy can mimic benign conditions, often leading to misdiagnosis, recurrence, and even metastases. This study aimed to present the clinical characteristics and outcomes of eyelid malignancies in Indonesia.

Methods: This retrospective descriptive study utilized medical records of patients with histopathologically confirmed eyelid malignancies who underwent surgery in eleven referral hospitals across nine Indonesian provinces from January 2016 to December 2022. A consecutive sampling method was applied. Data collected included clinical characteristics, treatments, and outcomes. Statistical analyses were performed using IBM SPSS.

Results: A total of 574 patients were included, with females comprising 58.0%. The mean age was 59 ± 15 years and 35.5% presented within six months of disease onset. Basal cell carcinoma was the most frequent malignancy (45.5%), followed by SGC (20.2%) and squamous cell carcinoma (15.0%). Surgery was the primary treatment in 94.9% of patients, predominantly wide excision. Based on AJCC classification, 61.3% presented with stage T3a or higher. Although metastases were infrequent, recurrence occurred in 22.6% of patients and SGC showed the highest recurrence rate.

Conclusions: Eyelid malignancies in Indonesia are frequently diagnosed at advanced stages, with BCC as the most common subtype and SGC showing the highest recurrence rate. This underscores the need for early histopathological confirmation to improve outcomes.

Abstract No.: 204525

High Single-Treatment Success Using Plaque Radiotherapy for Vasoproliferative Tumors

First Author: Hung-da CHOU

Co-Author(s): Amit ARORA, Guy NEGRETTI, Mandeep SAGOO, Ian STOKER

Purpose: To review the outcomes of vasoproliferative tumor (VPT) following brachytherapy.

Methods: A retrospective case series in a national referral center. Clinical features were assessed by multimodal imaging. Single-treatment success was defined as a regression of the tumor or tumor activities without recurrence. Data are presented as median (Q1, Q3).

Results: Twenty-five eyes were analyzed. Brachytherapy was given with an apex dose of 80 Gy in all except one eye and a median tumor base dose of 181 Gy (145, 260 Gy). After 32 months of follow-up, single-treatment success was observed in 24/25 eyes (96%), and 16/25 eyes (64%) showed significant thickness regression of 0.5 mm or more. In a multivariate regression model, older age ($\beta = 0.472$; 95% CI, 0.005, 0.024; $P = 0.005$), poorer baseline VA ($\beta = 0.467$; 95% CI, 0.028, 0.155; $P = 0.007$), and baseline foveal hard exudates ($\beta = 0.469$; 95% CI, 0.191, 1.055; $P = 0.007$) were predictors of less VA improvement. A higher tumor base radiation dose, adjusted by baseline diameter, predicted significant tumor shrinkage (adjusted OR = 1.025; 95% CI, 1.001-1.059; $P = 0.04$), and the receiver operation curve analysis showed 183.5 Gy scleral dose has the best cut-off value to achieve tumor shrinkage (73% sensitivity, 90% specificity).

Conclusions: Ruthenium-106 brachytherapy has a high single-treatment success for VPT. An adequate tumor base radiation dose should be considered. Early treatment before exudation reaches the fovea is more likely to result in VA improvement.

Abstract No.: 201948

Hippo Pathway-Mediated Cytokine Dysregulation Drives Immune Evasion in Uveal Melanoma

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Co-Author(s): Seema KASHYAP, Neiwete LOMI, Seema SEN, Lata SINGH, Mithalesh Kumar SINGH

Purpose: Uveal melanoma (UM) frequently metastasizes despite effective local control. Oncogenic GNAQ/11 mutations dysregulate Hippo signaling, leading to YAP/TAZ activation that may alter cytokine networks and immune evasion. We investigated the association between Hippo pathway activity, cytokine expression, and aggressive features in UM.

Methods: We quantified plasma cytokine levels (IL-6, IL-1 β , IL-17, IFN- α , IFN- γ) in 70 UM patients using ELISA at baseline and 3-month postoperative follow-up.

These were correlated with histopathology, immune infiltration, and YAP/TAZ nuclear localization.

Results: Patients were predominantly male, >40 years, and presented with advanced-stage UM. High-risk tumors (epithelioid morphology, high mitotic index, BAP1 loss) showed strong nuclear YAP/TAZ expression and elevated IL-6 and IFN- γ levels. At follow-up, IL-6 and IL-1 β decreased, whereas IFN- γ and IL-17 increased. Hippo pathway dysregulation significantly correlated with aggressive histology, immune infiltration, and poor outcomes (15 metastases, 7 deaths). In contrast, low-risk tumors exhibited intact Hippo signaling and a less inflammatory cytokine profile.

Conclusions: Hippo pathway dysregulation promotes cytokine-driven immune modulation in UM and is linked to aggressive tumor behavior. Therapeutic targeting of Hippo-cytokine crosstalk may provide novel immunotherapeutic strategies for high-risk UM patients.

Abstract No.: 205257

IgG4-Positive Ocular Adnexal Extranodal Marginal Zone Lymphoma as an Aggressive Clinical Subtype

First Author: Rong LU

Purpose: To investigate the distribution and clinicopathological characteristics of IgG4-positive ocular adnexal lymphoma (OAL).

Methods: A retrospective single-center cohort study was conducted, enrolling 377 patients diagnosed with OAL between October 2014 and October 2024. Medical records of all patients were comprehensively reviewed to assess the distribution of IgG4-positive cases. Clinical features (e.g., local orbital structure involvement, T-stage, systemic involvement), histopathological indicators (e.g., Ki-67 index, IgG4-positive plasma cell count), and follow-up outcomes (e.g., recurrence time, reoperation rate) were compared between IgG4-positive and IgG4-negative groups. The main outcome measures were baseline differences in local/systemic involvement and recurrence risk during follow-up.

Results: IgG4-positive cases were most common in extranodal marginal zone lymphoma (EMZL, 23.3% [75/322]). Compared with IgG4-negative EMZL, IgG4-positive EMZL had higher involvement of eyelid, lacrimal gland, optic nerve and other orbital structures (all $P < 0.05$), more T3-T4 stages and systemic involvement, higher Ki-67 index (20.08 ± 6.56 vs. 14.13 ± 5.03 , $P < 0.0001$), and positive correlation between IgG4-positive plasma cells and T-stage/Ki-67 (all $P < 0.001$). IgG4-positive patients had earlier recurrence (2.04 ± 1.21 vs. 3.71 ± 1.23 years), higher reoperation rate (31.3% vs. 15.7%, $P = 0.023$), lower recurrence/reoperation-free survival (all $P < 0.01$), and IgG4-positive EMZL was associated with higher recurrence risk (HR=2.04, 95%CI:1.07-3.91, $P = 0.031$).

Conclusions: IgG4-positive EMZL represents a more aggressive clinical subtype. Additionally, IgG4 positivity may indicate increased recurrence risk and higher likelihood of systemic involvement, thereby warranting intensive follow-up and comprehensive evaluations.

Abstract No.: 206842

Intravitreal Dexamethasone Implant in Radiation-Induced Macular Edema

First Author: Ekaterina **MALAKSHINOVA**

Co-Author(s): Vera **YAROVAYA**, Andrey **YAROVVOY**

Purpose: To present the results of intravitreal dexamethasone (ID) in patients with macular edema after plaque radiotherapy of UM.

Methods: ID was performed in 130 patients (130 eyes) with ME, which developed after RT. Among them, 39 (30%) patients were men, 91 (70%) were women. The average age of patients was 53 years (from 14 to 70 years). The average visual acuity (VA) before treatment was 0.21 (range from 0.002 to 0.7). According to optical coherence tomography, the average value of central macular thickness (CMT) before intravitreal injections was 330 ± 86 microns, the average value of volume cube (VC) – 12 ± 2 . The average amount of intravitreal injections was 3 (from 1 to 10)

Results: The average VA after was 0.4. Based on the data of changes in VA, 14% patients had stabilization of the process, 57% showed improvement. According to optical coherence tomography, the average CMT value after ID was 251 ± 95 microns ($p < 0.001$), and the average VC value was 8 ± 4 ($p < 0.001$).

Conclusions: The single centre experience of ID has shown its effectiveness in reducing the height of CMT and improving or stabilizing visual acuity, which makes their use in radiation retinopathy reasonable.

Abstract No.: 201722

Level of Oxidative Stress Before and After Systemic Chemotherapy in Patients With Sebaceous Gland Carcinoma of the Eyelid

First Author: Rajendra **MAURYA**

Co-Author(s): Priyanka, Sanjay **BOSAK**, Asha **DEVI**

Purpose: To evaluate serum expression of Superoxide Dismutase (SOD) & Malonaldehyde (MDA) before and after anticancer chemotherapy and to find out its impact on response of chemotherapy (CT).

Methods: Thirty-two histopathologically proven cases of Sebaceous Gland Carcinoma (SGC) of the eyelid and 16 sex matched controls were studied for serum SOD & MDA. Serum biomarkers of oxidative stress were estimated before and after neoadjuvant chemotherapy (Cis-platin & 5FU). Response to chemotherapy was evaluated according to the WHO criteria.

Results: The majority (22, 68.8%) of cases were in the advanced stage. The histopathological

grading was well differentiated type in 9;28.1% cases, moderately differentiated in 11;34.3% and poorly or undifferentiated in 12; 37.5% cases. Overall response (CR+PR) of CT was 68.8% while in 18.8% cases there was no response, and the rest 12.5% had progressive disease. Level of sSOD was significantly increased after chemotherapy (mean $\pm$ SD 3.4275 ± 0.37256 Vs 4.2519 ± 0.17029), and level of MDA was markedly reduced after chemotherapy (Mean $\pm$ SD 5.5712 ± 0.32779 Vs 4.5146 ± 0.23209). sSOD was significantly reduced in patients having lymph node metastasis in comparison to those without lymph node metastasis (p value < 0.001). Post-chemo level of sMDA increased more in the advanced stage (5.8407 ± 0.20212) than the early stage (5.3608 ± 0.17753). There was no significant difference in the post-chemo level of both biomarkers, as histopathological differentiation was considered.

Conclusions: Serum MDA & SOD can be important biomarkers of oxidative stress, which significantly affect the response to chemotherapy.

Abstract No.: 203622

Licorice Extracts Inhibit Uveal Melanoma Progression by Suppressing the Nucleocytoplasmic Translocation of High Mobility Group Box 1

First Author: Haowen **LI**

Co-Author(s): Yuning **CHEN**, Zhaoxun **FENG**, Yang **LI**, Yueming **LIU**, Jingtong **LUO**, Wenbin **WEI**

Purpose: Uveal melanoma (UM), the most prevalent primary intraocular malignancy in adults, exhibits poor post-metastatic survival after metastasis. Licorice extracts demonstrate significant tumor-suppressive activity via high mobility group box 1 (HMGB1) targeting. This study aims to elucidate the mechanistic role of HMGB1 in UM progression and the therapeutic potential of licorice extracts.

Methods: HMGB1 expression was modulated by siRNA-mediated knockdown or cDNA plasmid overexpression. RNA sequencing of UM cell lines facilitated signaling pathway enrichment prediction. Proliferation, invasion, and apoptosis were assessed using CCK-8, colony formation, transwell assays, and flow cytometry. UM cells (C918, OCM1A, OMM2.3) were treated with glycyrrhizin (GL), 18β -glycyrrhetic acid (18β -GA), or diammonium glycyrrhizinate (DG). Tumor growth in vivo was evaluated in BALB/c-nu immunodeficient mice inoculated with UM cells.

Results: Elevated HMGB1 expression was associated with worse prognosis, advanced pathological classification, and increased tumor stage. HMGB1 knockdown suppressed UM cell proliferation, migration, invasion, promoted apoptosis, and inhibited tumor growth in vivo. Licorice extracts (GL, 18β -GA, and DG) similarly reduced proliferation, migration, and invasion of UM cells and induced

apoptosis. These extracts specifically impeded HMGB1 nucleocytoplasmic translocation without affecting total expression. Gene Set Enrichment Analysis revealed HMGB1 downregulation dysregulated autophagy. HMGB1 knockdown suppressed autophagy, while its overexpression promoted autophagy. HMGB1-Beclin-1 interaction was confirmed by co-immunoprecipitation. Licorice extracts additionally inhibited tumor cell autophagy and promoted DNA damage.

Conclusions: HMGB1 contributes to tumor invasiveness in UM patients by regulating autophagy and DNA damage repair. Licorice extracts may impede UM progression by inhibiting HMGB1 nucleocytoplasmic translocation and disrupting autophagy/DNA damage repair pathways.

Abstract No.: 204529

Metabolic Reprogramming Driving Extraocular Invasion of Retinoblastoma

First Author: Rong LU

Co-Author(s): Yaoming LIU, Junjie TANG, Zhihui ZHANG

Purpose: Retinoblastoma (RB) is the most common intraocular malignant tumor in children. During its vitreous seeding and extraocular invasion stages, the tumor microenvironment exhibits characteristics of hypoxia and nutrient deprivation. This study aimed to investigate the molecular mechanism by which metabolic reprogramming drives RB invasion.

Methods: Single-cell metabolic profiles of RB were mapped based on single-cell RNA sequencing to identify key factors in energy metabolism pathways. In vitro models, the effects of key molecules on cellular functions were explored by gene modulation, and changes in metabolic pathways were analyzed by combining transcriptomics and metabolomics. An orthotopic intraocular xenograft model of RB in nude mice was established to evaluate the in vivo intervention effect of targeting key metabolic targets.

Results: The lactate transporter MCT1, glutamine transporter ASCT2, and key glycolytic enzyme ALDOA were specifically highly expressed in invasive cell subsets. In vitro experiments demonstrated that inhibition of MCT1 led to lactate accumulation in RB cells; inhibition of ASCT2 interfered with glutamine uptake by RB cells; knockdown of ALDOA disrupted glycolysis and ATP synthesis, thereby inhibiting tumor invasive ability. In vivo experiments showed that inhibition of ALDOA, blocking of lactate transport, or glutamine transport could all significantly delay the invasive progression of intraocular tumors in mice.

Conclusions: RB exhibits significant metabolic heterogeneity. The lactate transporter MCT1, glutamine transporter ASCT2, and key glycolytic enzyme ALDOA are specifically highly expressed in invasive subsets and serve as key pro-invasive metabolic targets. Targeted

inhibition of these key metabolic targets can effectively suppress the progression and invasion of RB.

Abstract No.: 203391

Metastasis-Essential Genes Define Prognostic Subtypes and Therapeutic Targets in Uveal Melanoma

First Author: Chen HOU

Co-Author(s): Meixia ZHANG

Purpose: To elucidate the molecular determinants underlying uveal melanoma (UM) progression and to establish clinically relevant subtypes, biomarkers, and therapeutic candidates for advanced disease.

Methods: We integrated genome-wide CRISPR-Cas9 knockout screening data with transcriptomic profiles from TCGA and GEO cohorts. Molecular subtypes were identified based on metastasis-essential genes, followed by clinicopathological correlation, genomic and immune profiling, and drug sensitivity analysis. Functional validation of the candidate compound 5Z-7-oxozeaenol was performed in vitro using UM cell lines and in vivo in mouse models. A prognostic gene signature was constructed and validated across independent datasets.

Results: We identified 26 metastasis-essential genes enriched in cell cycle regulation, mRNA stability, and mitotic control, which stratified UM patients into three robust molecular subtypes with distinct outcomes. The high-risk subtype, validated in external cohorts, exhibited chromosome 3 monosomy, SCNA cluster D, epithelioid histology, advanced stage, and poor survival. This subtype showed enrichment of immune cell migration, interferon signaling, epithelial-mesenchymal transition, metabolic reprogramming, immune checkpoint activation, and genomic instability, reflecting an aggressive and immunosuppressive phenotype. Drug screening highlighted 5Z-7-oxozeaenol as a potent inhibitor of proliferation, migration, and invasion, while inducing apoptosis in UM cells. In vivo, the compound suppressed intraocular tumor growth and liver metastasis without systemic toxicity. Furthermore, a five-gene prognostic signature (PSMD14, NOP58, PSMA4, PAFAH1B1, EPRS) was established, demonstrating robust predictive power for survival across datasets.

Conclusions: The identified molecular subtypes provide insight into UM heterogeneity, the five-gene signature offers a clinically applicable prognostic biomarker, and 5Z-7-oxozeaenol represents a promising therapeutic candidate for advanced UM.

Abstract No.: 202793**Microneedle Scleral Patch: A Transscleral Drug Delivery Study for Retinoblastoma***First Author: Vishal RAVAL**Co-Author(s): Vamsi Krishna VENUGANTI*

Purpose: We aimed to design, fabricate, and evaluate the pharmacokinetic properties of topotecan loaded with a microneedle scleral patch (MSP) in the rabbit eye.

Methods: The MSP was fabricated using a 3D-printed mastermold. MSP was fabricated using a high-molecular-weight sodium hyaluronate biopolymer containing 90 conical microneedles in a 15x6 array format (10 x 5 x 0.2 mm). MSP was loaded with 100 µg of topotecan to study its pharmacokinetics across the choroid-retina complex.

Results: The dimensions of microneedles (MN) were uniform across the array, measuring 555 +/- 4 µm length, 342 +/- 3 µm width, and 23 µm tip diameter. In the ex vivo goat eye model, the required insertion force was 0.026 Newton per needle, which was 50 times lower than the compression strength of 1.27 N per needle. The MNs were inserted up to a depth of 225 µm. MNs were completely dissolved in phosphate buffer (pH 7.4) within 25 s. The average amount of topotecan HCl in 15 MSP was 99.39 ± 12.45 µg. In the in vivo rabbit model (9 eyes, choroid-retina complex), topotecan levels peaked at 1 hour (2.75 ± 2 µg/ml) and decreased at 2 hours (0.64 ± 0.3 µg/ml), attaining 200 times the therapeutic target level. At 8 hours, the drug level was undetectable (0.02 ± 0.01 µg/ml). The patch completely dissolved within 2-4 minutes without fundus changes.

Conclusions: MSP fabricated using sodium hyaluronate has the physical attributes required for transscleral drug delivery in clinical applications. Topotecan-loaded MSP achieved therapeutic target levels for retinoblastoma. MSP offers a promising alternative drug delivery route for treating RB.

Abstract No.: 206664**Mitochondria-Driven Pro-Ferroptotic and Anti-Ferroptotic Genes in the Progression of Intraocular Childhood Cancer***First Author: Lata SINGH**Co-Author(s): Bilal AHMED, Bhavna CHAWLA, Seema KASHYAP, Nikhil KUMAR, Neiwete LOMI, Rachna SETH*

Purpose: Retinoblastoma is the most common intraocular tumour that occurs in children. Mitochondrial dysfunction and increased reactive oxygen species have been found in cancerous cells, including Rb. Mitochondria play a diversified role in the process of ferroptosis, iron metabolism, the OXPHOS pathway, etc. Therefore, the aim of the study is to investigate the expression of mitochondrial-mediated ferroptosis genes in Rb patients.

Methods: This prospective study includes 71 Rb cases (50 primary and 21 chemoreduced Rb cases). Real-Time PCR was performed to assess the mRNA expression levels of mitochondrial genes (BAX, ACSF2, LONP1, CISD1, SOD2 & MFRN1/2) along with anti-ferroptosis, GPX4 gene. Immunoexpression of GPX4 was also determined, followed by western blotting. The expression levels of these genes were correlated with clinicopathological parameters.

Results: There was a male preponderance in this study. In 50 primary Rb cases, high mRNA expression of Bax was observed, followed by LONP1. While MFRN1/2, SOD2, and CISD1 were moderately expressed, and ACSF2 was downregulated. GPX4 was upregulated in our cases. Post-laminar optic nerve and optic nerve head invasion were observed in 22% and 40%, respectively. In 21 chemoreduced cases, although we observed similar levels of gene expression for MFRN1/2, BAX, CISD1, LONP1, and SOD2, GPX4 was downregulated, and ACSF2 was upregulated.

Conclusions: Our findings revealed dysregulation of mitochondrial genes involved in oxidative stress and apoptosis, which may have a potential role in tumour progression of Rb. Further studies could provide a better insight into these genes in the prognostication of Rb patients.

Abstract No.: 202267**Molecular Basis for Cavitory Retinoblastoma***First Author: Peiwei CHAI**Co-Author(s): Jiayan FAN, Renbing JIA*

Purpose: Cavitory retinoblastoma (CRB) represents a unique variant of retinoblastoma (RB) distinguished by the presence of translucent cavities, which are discernible through ophthalmoscopic examination. The present study was designed to elucidate the clinical implications and molecular signatures of CRB, thereby enhancing our understanding of this distinct subtype of RB.

Methods: A multicentric, nested case-control, retrospective cohort study combining spatial proteomic analysis.

Results: In a longitudinal study encompassing 1360 RB patients, conducted over a 13-year timeframe from June 2008 to February 2022, cavitory spaces were detected within the tumors of 48 eyes of 46 patients. A control cohort of 180 eyes from 138 age-matched patients with non-CRB was selected, maintaining a 1:3 case-control ratio. Laser-captured spatial proteomic analysis was conducted to explore the pivotal molecular changes within this specific subtype. Cavitory RB was linked to enhanced metastasis-free survival ($P = 0.007$) and overall survival ($P = 0.03$), as well as an increased proportion of well-differentiated status ($P < 0.001$) and a reduced incidence of vitreous seeding ($P = 0.02$). Spatial proteomic analysis, immunofluorescence,

and immunohistopathology revealed a lower MYCN expression in CRB than in non-CRB. Silencing MYCN in patient-derived xenografts using AAV recapitulated these phenotypes of CRB, including the formation of translucent cavities and the emergence of cone-like rosettes.

Conclusions: This study establishes a novel genetic-phenotypic association, revealing that diminished MYCN expression induces the formation of translucent cavities. This phenotype is indicative of a less aggressive, well-differentiated CRB subtype with a more favorable prognosis.

Abstract No.: 206913

Ocular Complications of Brachytherapy in Patients With Uveal Melanoma

First Author: Ekaterina MALAKSHINOVA

Co-Author(s): Vera YAROVAYA, Andrey YAROVVOY

Purpose: To evaluate the incidence and spectrum of complications following brachytherapy for uveal melanoma.

Methods: A retrospective analysis was performed on a cohort of 800 patients with uveal melanoma treated with Ruthenium-106 plaque brachytherapy at S. Fyodorov Eye Microsurgery Federal State Institution between 2018 and 2025. Patients were followed for a mean period of 28 months. The primary outcomes were the development and time to onset of radiation-related complications.

Results: In our series, the most frequent complications were radiation retinopathy (24%), cataract (26%), and maculopathy (19%). Neovascular glaucoma, a vision-threatening complication, developed in 1% of cases. A notable observation from our data was a significant correlation between scleral dose greater than 761 mm and an increased risk of radiation macular edema ($p < 0.001$) and radiation-induced cataract ($p=0.001$).

Conclusions: Our clinical observations confirm a high burden of radiation-induced complications following brachytherapy for uveal melanoma, consistent with existing literature. These findings underscore the necessity for close, long-term monitoring and the proactive management of sequelae. Personalized risk assessment based on tumor dimensions and location is crucial for predicting and mitigating visual loss.

Abstract No.: 201161

Ophthalmic Manifestations and Treatment Outcomes in Leukemia: A Comparative Analysis of Clinical Spectrum, Visual Prognosis and Predictors of Disease Remission Across Subtypes

First Author: Dhwanee AGARWAL

Co-Author(s): Rajeev Reddy PAPPURU, Vishal Ramesh RAVAL, Mudit TYAGI

Purpose: To conduct an analysis of ophthalmic manifestations in leukemic patients and evaluate their impact on visual outcomes and disease remission.

Methods: This retrospective, comparative study included 244 patients (378 eyes) diagnosed with leukemias between January 2016 and 2024. Data included demography, leukemia type, ophthalmic manifestations, imaging modalities, treatment modalities (ocular and systemic), treatment outcomes (relapses or remission), and final visual acuity. Univariate and multivariate regression analysis were performed to identify correlations and predictive features associated with visual outcomes.

Results: The mean age of patients was 34.9 ± 22.1 years (range, 1-88 years). ALL was the most common subtype (58%). Acute forms manifested earlier in life and were more aggressive. The presence of posterior segment manifestations (64%) was more than that of anterior segment manifestations (52%). Myeloid leukemia types were more often associated with hemorrhagic manifestations, whereas lymphoid types were associated with non-hemorrhagic manifestations. Univariate regression analysis showed that the presence of ERM (OR 0.110, 95% CI: 0.012-0.951, $p=0.04$), submacular hemorrhage (OR 0.091, 95% CI: 0.010-0.763, $p=0.027$) and type of leukemia-AML (OR 3.195, 95% CI: 1.697-6.012, $p<0.000$), or CML (OR 6.39, 95% CI: 3.130-13.041, $p<0.000$) had significant association with poor visual outcome. Multivariate regression analysis revealed AML (OR 2.769, 95% CI: 1.392-5.507, $p=0.004$) and CML (OR 7.313, 95% CI: 3.326-16.074, $p<0.000$) as independent predictors of poor visual outcome.

Conclusions: Ophthalmic manifestations are major diagnostic and prognostic clues for leukemias. Pattern recognition facilitates timely recognition, risk stratification, and disease remission prediction.

Abstract No.: 204706

Our 25 Years of Retinoblastoma Care in a Tertiary Eye Care Centre

First Author: Usha KIM

Purpose: To evaluate the outcome of our treatment strategies for life-saving, globe salvage, and vision preservation, and genetic methods to predict and prevent retinoblastoma in the last 25 years.

Methods: A study was conducted on 1,100 patients diagnosed with retinoblastoma from 1998 to 2024. The clinical, demographic, and genetic data of the patients were collected and evaluated for the outcomes in terms of their survival, preservation of the globe, and vision. Genetic testing was done to find out the risk of RB in family members, and counselling was done.

Results: During the last 25 years, 1,100 patients were treated with multimodal treatments, focal therapy, chemotherapy, and enucleation. Patients from multiple districts of Tamil Nadu and other Indian states, along with 36 from other countries, were given treatment. Among them, 80% have completed the treatment and are still under regular follow-up. Family history of retinoblastoma and other cancers was found in 8.25%. De novo germline and somatic mutations were found in 38% and 20% of bilateral and unilateral patients, respectively. Among the 244 eyes preserved, a good visual outcome was found in 129 (6/6 vision), and it could be preserved in 53 patients of Groups D and E.

Conclusions: Retinoblastoma management has evolved from lifesaving enucleation to preserving eyes and vision through early diagnosis, targeted therapies, and a better understanding of genetics. Identifying germline mutation now plays a key role in guiding treatment, surveillance, and family counselling.

Abstract No.: 203918

Pegylated Interferon Alpha 2a for the Management of Ocular Surface Squamous Neoplasia

First Author: Murtuza **NURUDDIN**

Co-Author(s): Rifat **AKHTER**, Soma Rani **ROY**

Purpose: Here we report our experience in the management of Ocular Surface Squamous Neoplasia (OSSN) with Pegylated Interferon Alpha 2a (Peg-interferon Alpha 2a) instead of Interferon alpha 2b, which is an effective immunotherapeutic agent to treat OSSN. We have used Peg-Interferon Alpha 2a instead of Interferon Alpha 2b because of the ease of availability. There is a structural difference in respect of amino acid at position 23 between these two agents. The addition of Peg (Polyethylene Glycol) increases the half life.

Methods: Seven eyes of seven patients were diagnosed as having OSSN clinically. Three patients underwent histopathological confirmation as well. All patients treated with Peg-interferon Alpha 2a (36 microgram/milliliter). Three patients received 0.2 milliliter (72 microgram) intralesional injection of peg-interferon alpha 2a twice at one-month intervals. Topical therapy was prescribed for 4 to 6 months and continued for at least one month even after complete resolution.

Results: All patients showed complete resolution without any significant side effects. It was well tolerated by every patient. No recurrence was observed for a minimum period of 6 months up to 4 years.

Conclusions: Peg-interferon alpha 2a is a safe and effective alternative for the management of OSSN.

Abstract No.: 206511

Proteomic Profiling of Aqueous Humor and Blood in Uveal Melanoma: Biomarker Discovery and Brachytherapy-Induced Changes

First Author: Heyan **LI**

Co-Author(s): Wenbin **WEI**

Purpose: To investigate proteomic alterations in aqueous humor (AH) and blood samples from patients with uveal melanoma (UM), and to evaluate the potential impact of brachytherapy through comparative proteomic analysis.

Methods: AH samples were obtained during brachytherapy or cataract surgery, while blood samples were collected prior to treatment. Differential expression protein analysis, Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment analyses were performed. Diagnostic models were developed using the Least Absolute Shrinkage and Selection Operator (LASSO) algorithms. Model performance was assessed using receiver operating characteristic (ROC) curves.

Results: A total of 4,184 proteins were identified in blood samples, with 1,275 differentially expressed proteins (DEPs) between UM patients and controls. In AH samples, 2,459 proteins were identified, among which 531 DEPs distinguished UM patients from controls, and 113 DEPs differentiated pre- and post-brachytherapy samples. Enriched pathways in blood included cytoplasmic translation and neurodegeneration-related pathways, while complement activation and humoral immune response were prominent in AH. Post-treatment AH samples showed enrichment in leukocyte migration, and IL-17-related inflammatory pathways. Notably, S100A family members (S100A2, and S100A8/9) exhibited significant expression changes after therapy. Specifically, CD209 showed a significant expression level decrease after the surgery. Machine learning models highlighted fibrinogen genes (FGA, FGB, and FGG) as a potential biomarker capable of distinguishing UM patients from healthy controls in both AH and blood, with AUC reaching 0.792.

Conclusions: Proteomic profiling changes may not only reveal the molecular landscape in UM, but deepen the understanding of the effects of brachytherapy treatment.

Abstract No.: 204032

Rapamycin-Loaded Tumor-Derived Exosomes Inhibit Melanoma B16-F10 Cell Proliferation and Induce Apoptosis

First Author: Yuxin LI

Co-Author(s): Yuntao HU

Purpose: To evaluate the effects of rapamycin-loaded tumor-derived exosomes (Exos-RAPA) on melanoma B16-F10 cell proliferation, apoptosis, and ocular safety.

Methods: Exos-RAPA were generated from murine melanoma B16-F10 cells. Uptake by B16-F10 cells was visualized by confocal microscopy, and proliferation inhibition was assessed by CCK-8 assay. An orthotopic uveal melanoma model was established by suprachoroidal injection of B16-F10 cells in C57BL/6 mice, followed by treatment with Exos-RAPA, rapamycin in dimethyl sulfoxide (RAPA-DMSO), or PBS. Tumor progression was monitored by in vivo imaging and color Doppler ultrasound. Apoptosis was evaluated by apoptosis assays and TUNEL staining.

Results: Exos-RAPA were successfully constructed and efficiently internalized by B16-F10 cells. Exos-RAPA inhibited proliferation with an IC50 of 53.95 nM. In vivo imaging showed significantly smaller tumors in the Exos-RAPA group versus controls at day 14 ($P < 0.01$). Doppler ultrasound revealed reduced vascular density in Exos-RAPA-treated tumors. In ARPE-19 cells, apoptosis was significantly higher in the RAPA-DMSO group compared to Exos-RAPA and PBS ($P < 0.001$). Retinal tissues in the RAPA-DMSO group showed more TUNEL-positive cells, confirming the superior safety of Exos-RAPA.

Conclusions: Exos-RAPA effectively suppressed B16-F10 proliferation and induced apoptosis, while demonstrating improved ocular safety compared to free rapamycin. These findings suggest Exos-RAPA as a promising targeted therapy for uveal melanoma.

Abstract No.: 201112

Retinoblastoma Management and Outcomes: The New Zealand Experience Over 23 Years

First Author: Hannah NG

Co-Author(s): Cheefoong CHONG, Yvonne NG, Karen TSUI

Purpose: This nationwide study of retinoblastoma patients examined the epidemiology, diagnosis, evolution of management, and outcomes over time.

Methods: A retrospective review of all retinoblastoma patients referred to and managed at the Department of Ophthalmology, Auckland District Health Board, Auckland, between 2000-2023. We examined demographics, timing of diagnosis to treatment, grading and staging, treatment modalities, visual outcomes, and survival rates.

Results: Seventy-two patients (101 eyes) were diagnosed during the study period. Among them, 37 (51%) were of European ethnicity, 19 (26%) NZ Māori, 7 (10%) Asian, 4 (6%) Pacific, and 5 (7.5%) others. 15% were familial and 9 of these patients were diagnosed within the first month of birth. 85% of patients had sporadic disease with at least one eye showing group D or E disease (IIRC). Primary enucleation was the most common treatment modality in 54 out of 101 eyes (53%), with 24 (44%) of these eyes showing high-risk features on histology, warranting adjuvant intravenous chemotherapy. Intravenous chemoreduction with focal laser or cryotherapy was performed in 30 eyes (30%), with focal treatment only in 14 (14%). Intravitreal (5%) and intra-arterial (2%) chemotherapy were delivered as secondary treatments. Of the 29 (40%) bilateral cases, the binocular best corrected visual acuity was 6/12 or better in 22 (76%). The remainder had worse than 6/30 due to involvement of the macula. 2 were bilaterally enucleated. The survival rate was 100%.

Conclusions: This study presents an up-to-date dataset of retinoblastoma patients and their management from a New Zealand perspective.

Abstract No.: 206100

SPP1+ Neutrophils Mediate Resistance to Immune Checkpoint Blockade in BAP1-Inactivated Tumors Through the CCL2-CCR2 Axis

First Author: Jiahao SHI

Co-Author(s): Yixiong ZHOU

Purpose: BAP1 inactivation is the key driver event of uveal melanoma (UM) and is observed in other cancers. It is associated with resistance to immune checkpoint blockade (ICB) and poor prognosis. This study aimed to elucidate the mechanisms by which BAP1 loss induces an immunosuppressive tumor microenvironment (TME) and confers ICB resistance.

Methods: Using BAP1-knockdown (KD) murine cancer cell lines and human UM cell lines, we evaluated ICB response in vitro/vivo. Single-cell RNA sequencing (scRNA-seq) of tumor-infiltrating immune cells, flow cytometry, and ex vivo co-culture assays were employed to characterize immune cell dynamics. Proteomic and transcriptomic analyses were used to identify key secreted factors.

Results: Here, we show that BAP1 inactivation promotes an immunosuppressive tumor microenvironment (TME), marked by increased M2-like macrophage and Neutrophil infiltration. Single-cell transcriptomic analysis revealed an expansion of SPP1+ neutrophils in ICB-treated, BAP1-inactivated tumors. These SPP1+ neutrophils display a pro-tumorigenic phenotype and confer resistance to anti-PD-1 therapy by engaging with cytotoxic T cells via PD-1/PD-L1 signaling. Notably, depletion of neutrophils but not macrophages restored sensitivity to ICB in BAP1-

inactivated tumors. Mechanistic investigations revealed that BAP1 loss significantly upregulated chemokine (C-C motif) ligand 2 (CCL2) secretion, driving neutrophils to polarize into the SPP1+ subset, delaying neutrophil apoptosis, and promoting ICB resistance. This resistance can be significantly mitigated by targeting the CCL2-CCR2 axis.

Conclusions: Our findings underscore the role of BAP1 in modulating the immune landscape and suggest that targeting CCL2-CCR2-mediated neutrophil polarization may overcome ICB resistance in BAP1-inactivated tumors.

Abstract No.: 204369

Secondary Vitreoretinal Lymphoma: A Single-Center Retrospective Analysis of Clinical, Pathological, and Molecular Characteristics

First Author: Qing **CHANG**

Co-Author(s): Shixue **LIU**

Purpose: This study aimed to investigate the clinical characteristics, pathological manifestations, and prognostic factors of secondary vitreoretinal lymphoma (SVRL).

Methods: A retrospective, single-center study was conducted on patients diagnosed with SVRL between December 2013 and January 2025. Clinical data were analyzed using descriptive statistics and survival analysis.

Results: Twenty-three patients with SVRL were included. The median age at ocular symptom onset was 56.3 years, with a higher female proportion (74.4%). The most frequent primary tumor sites were lymph nodes (26.1%) and the nasopharynx (21.7%). The most common pathological diagnoses were diffuse large B-cell lymphoma (DLBCL) (57.9%) and NK/T-cell lymphoma (26.3%). The median interval from ocular onset to diagnosis was 47 months. Common ocular manifestations included vitreous opacities (88.9%) and retinal lesions (47.1%), with a cytology positivity rate of 92.3%. The MYD88 L265P mutation was detected in 63.6% of patients. Patients who were MYD88 mutation-negative or had received targeted therapy demonstrated shorter progression-free survival (PFS) and overall survival (OS). Intraocular fluid circulating tumor DNA (cfDNA) analysis revealed high mutation frequencies in MYD88, CD79B, PIM1, ETV6, PRDM1, and ARID1B.

Conclusions: SVRL predominantly affects middle-aged women, frequently originating from lymph nodes or the nasopharynx, with DLBCL being the primary histological subtype. Both cytological and molecular testing, including cfDNA analysis, are valuable for diagnosis. The MYD88 mutation status and prior targeted therapy are significant prognostic factors, underscoring their importance for patient survival outcomes.

Abstract No.: 200561

Sentinel Lymph Node Biopsy for Sebaceous Gland Carcinoma and Ocular Adnexal Malignant Melanoma in Chinese Patients: A 14-Year-Cohort

First Author: Venice Sze Wai **LI**

Co-Author(s): Jason **CHAN**, Karen Kar Wun **CHAN**, Kelvin Kam Lung **CHONG**, Kenneth Ka Hei **LAI**, Eddy **WONG**, Alvin Lerrmann **YOUNG**, Hunter Kwok Lai **YUEN**

Purpose: To evaluate the diagnostic and prognostic values of sentinel lymph node biopsy (SLNB) in Chinese patients with sebaceous gland carcinoma (SGC) and ocular adnexal malignant melanoma (MM).

Methods: We conducted a retrospective review of all patients with SGC or ocular adnexal MM (including conjunctival melanoma and MM of eyelid) who underwent SLNB from January 2011 to May 2025 across 3 hospitals in Hong Kong. Outcomes measures included lymphoscintigraphy detection rate, SLNB positivity, false-negativity, recurrence, metastasis, disease-free (DFS), and overall survival (OS).

Results: Eleven patients (mean age 62.8 ± 18.5 years, 8 females) were included. Seven (64%) had ocular adnexal MM, and four (36%) had SGC. SLNB detection rate on lymphoscintigraphy was 90.9% (10/11). Positive SLNB rate was 18.2% (2/11), all in recurrent MM (histologically confirmed regrowth post-treatment). False-negative rate (nodal recurrence or distant metastasis after negative SLNB) was 22.2%. Over a mean follow-up of 35.8 months (SD 41.5), local recurrence, nodal, and distant metastases rates were 18.2% (2/11), 27.3% (3/11), and 18.2% (2/11), respectively, exclusively in MM. No SGC patients experienced recurrence or metastasis. Median DFS and OS were 19.5 and 30 months, respectively, with no significant differences between primary pathologies or SLNB status. T staging $\geq 2b$, and presentation or development of recurrence or metastasis, had significantly shorter DFS (both $p < 0.05$).

Conclusions: SLNB is technically feasible with minimal morbidity. In our cohort, SLNB can identify occult nodal metastasis in recurrent ocular adnexal MM, representing a high-risk subgroup. Absence of metastasis in SGC patients suggests a more limited role, warranting further investigation. SLNB status and T-stage were significant predictors of survival.

Abstract No.: 203519

Shifting Clinical Characteristics of Uveal Melanoma in an Aging Population: A 20-Year Chinese Cohort Study

First Author: Haowen **LI**

Co-Author(s): Yuning **CHEN**, Yang **LI**, Yueming **LIU**, Yangxu **TAO**, Wenbin **WEI**

Purpose: This study aimed to summarize the evolving characteristics and prognostic trends of uveal

melanoma (UM) patients treated at Beijing Tongren Hospital in the context of population aging.

Methods: A single-center retrospective study was conducted, including UM patients treated in the Ophthalmology Department of Beijing Tongren Hospital from January 2004 to March 2025.

Results: A total of 2,578 UM patients were included, with a median follow-up of 31.0 months (IQR 13.0–53.0). The median age at diagnosis was 49.0 years (IQR 40.0–57.0), with 1,323 males (51.3%) and 1,255 females (48.7%). The median basal tumor diameter was 12.1 mm (IQR 10.1–14.4), and the median tumor height was 7.0 mm (IQR 4.9–9.3). Metastases occurred in 354 patients (13.7%), and 245 deaths (9.5%) were recorded. Annual patient volume generally increased from 2004 to 2019, declined in 2020, and subsequently rebounded. The mean age at diagnosis exhibited an upward trend over time, and the median basal tumor diameter increased significantly, whereas the median tumor height showed no consistent trend. Survival analysis revealed longer MFS in the 2004–2014 group compared to the 2015–2025 group ($p < 0.001$), though OS did not differ ($p=0.15$). Significant differences in MFS existed among the 2004–2011, 2012–2018, and 2019–2025 groups ($p=0.005$), with the 2004–2011 cohort demonstrating the best MFS and the 2019–2025 group the worst. The 2019–2025 group had superior OS compared to the 2004–2011 and 2012–2018 groups ($p=0.002$ and $p<0.001$, respectively), while OS between the 2004–2011 and 2012–2018 groups showed no significant difference ($p=0.052$).

Conclusions: This study identified evolving disease characteristics in UM patients in the context of population aging, marked by increasing age at diagnosis, larger tumor dimensions, and elevated metastatic risk.

Abstract No.: 210362

Sonidegib: Efficacy and Safety in Treatment of Basal Cell Carcinoma

First Author: Jian LI

Co-Author(s): Jianguang ZHONG

Purpose: To explore the efficacy, safety, and clinical practice strategies of sonidegib in the treatment of eyelid basal cell carcinoma.

Methods: A retrospective analysis was conducted on 6 patients with locally advanced eyelid BCC (stage T3 or higher) admitted to our hospital from 2023 to 2025. All patients received oral sonidegib at 200 mg/day, with treatment continued until disease progression or intolerable toxicity. The objective response rate (ORR), progression-free survival (PFS), and drug-related adverse events (AEs) were evaluated.

Results: Among the 6 patients, 4 (66.67%) achieved partial response (PR), and 1 (16.67%) had stable disease (SD). The median PFS was 14.2 months. The

average reduction in tumor volume was 62.3% (per RECIST 1.1 criteria). All 6 patients (100%) avoided orbital exenteration, with preservation of the eyeball and visual function. Common AEs included muscle spasms (53.3%), dysgeusia (40%), and alopecia (33.3%), all of which were grade 1–2. One patient had a temporary treatment interruption due to elevated creatine kinase and resumed treatment after.

Conclusions: Sonidegib significantly improves the tumor control rate and organ preservation rate in locally advanced eyelid BCC, providing an effective alternative for patients at high risk of surgery. Individualized management of muscle spasms and metabolic toxicities should be emphasized. Future studies with larger sample sizes are needed to verify long-term efficacy and explore the synergistic mechanisms of combination with radiotherapy and immunotherapy.

Abstract No.: 204952

Spontaneous Bilateral Vitreous Hemorrhage: A Rare Initial Presentation in Trilateral Retinoblastoma

First Author: Alex SUA

Purpose: To demonstrate a rare case of retinoblastoma where vitreous hemorrhage was an early and significant sign.

Methods: Case report of a one-year-old child presenting with acute bilateral visual loss secondary to vitreous hemorrhage.

Results: A previously healthy 17-month-old male, born full-term, sought consultation because of mild peri-orbital erythema on his left eye. There was no history of ocular trauma, significant medical or family history of bleeding disorders, retinal vascular disease, or eye tumor. Anterior segment examination was unremarkable. He was treated with antibiotics, but similar symptoms occurred in the contralateral eye. His condition worsened with a decrease in vision to hand motion and the appearance of vitreous hemorrhage in his left eye, followed by the right. No evidence of a solid intraocular tumor was demonstrated on B scan ultrasonography. Despite vitrectomy, recurrent hemorrhages and subsequent retinal detachments occur. Cytopathological analysis of the vitreous samples showed hemorrhages, inflammatory cells, cellular debris, and fibro-cellular membranes suggestive of proliferative retinal vascular disease. He presents two weeks post-operatively with a bulging left eye necessitating enucleation, which showed diffuse infiltrating retinoblastoma with high-risk features including choroidal, optic nerve, and subarachnoid invasion. MRI imaging revealed a contralateral intraocular tumor requiring enucleation and a synchronous midline pineal mass. The patient underwent intensive chemotherapy with radiotherapy and remained disease-free two years post-treatment.

Conclusions: This case highlights the importance of considering retinoblastoma in the differential diagnosis of unexplained pediatric vitreous hemorrhage. It underscores the need for vigilance and thorough diagnostic workup when confronted with unusual signs, as timely intervention can significantly impact outcomes.

Abstract No.: 205883

Thermotherapy for Retinoblastoma: Approaches and Long-Term Results

First Author: Denis VOLODIN

Co-Author(s): Vera YAROVAYA, Andrey YAROVVOY

Purpose: to retrospectively evaluate the long-term results of laser thermotherapy for retinoblastoma and determine the predictors of treatment success.

Methods: We retrospectively reviewed the clinical records of 251 patients (306 eyes, 1635 tumors) treated with laser thermotherapy for intraocular retinoblastoma between March 2011 and April 2023. The median age at the time of thermotherapy was 12 months (from 1 to 78 months). For the vast majority of tumors, thermotherapy was used as the second-line treatment (n=1587, 97%); primary thermotherapy was used for small tumors of group A (n=48, 3%). The median tumor thickness was 0.7 mm (range, 0.3-4.2 mm), the median tumor base – 1.5 mm (range, 0.6-13.4 mm). Most of the tumors (n=942, 58%) were located in the preequatorial zone, while 588 tumors (36%) were in the postequatorial zone. 6% of tumors (n=105) had central localization. Thermotherapy using near-infrared radiation (810 nm) was delivered via transpupillary or transscleral routes. Approaches included conventional thermotherapy for small postequatorial tumors, «step-by-step» repeated thermotherapy for resistant «cavitary» tumors, transpupillary thermotherapy with simultaneous scleral depression, and transscleral thermotherapy for preequatorial tumors. The median follow-up period was 68 months (range, 6-168 months).

Results: Complete tumor regression was observed in 1510 tumors (91,5%). In 18 tumors (1%), we observed incomplete tumor regression. Tumor progression or recurrence was observed in 140 tumors (8%). Multivariate statistical analysis identified tumor thickness ≤ 0.8 mm ($p<0.0001$), tumor basal diameter ≤ 1.5 mm ($p<0.0001$), pre- and postequatorial tumor location ($p=0.0145$), dark and medium fundus pigmentation ($p<0.0001$), and number of treatment sessions ≤ 2 ($p=0.0391$) as statistically significant predictors of thermotherapy success. ROC-analysis demonstrated 3 and more predictors to be a statistically significant «cut-off» value for thermotherapy success ($p<0.001$, AUC=0.851) and relative risk for thermotherapy application in tumors having < 3 predictors of success made up 11.6926. Complications of laser thermotherapy occurred in 12 eyes (4%). The most frequent complications were focal iris atrophy

and lens opacity (n=6), preretinal/pretumoral vitreous hemorrhage (n=5). Eye retention was achieved in 93% of the treated eyes (n=285). Twenty-one eyes (7%) were enucleated after thermotherapy because of tumor progression (n=14), inability of adequate tumor monitoring (n=2), phtisis bulbi (n=5).

Conclusions: Thermotherapy is a highly effective method of small Rb treatment with a low complications rate, that, however, requires a careful patients' and tumors' selection with systemic and multifactor analysis.

Abstract No.: 204546

Three SS-OCT Flags to Spot Malignant Choroidal Tumors Fast: A 5-Year, 305 Eyes, Single-Center Study From China

First Author: Yitong LI

Co-Author(s): Wenbin WEI

Purpose: Early recognition of malignant choroidal tumors is challenging, and head-to-head comparisons of swept-source optical coherence tomography (SS-OCT) features across tumors and mimics are limited. This single-center study from Beijing Tongren Hospital (China) sought a concise, clinically applicable SS-OCT rule for malignancy triage in Chinese patients.

Methods: We retrospectively analyzed 305 eyes from 298 consecutive patients with clinically or histopathologically confirmed choroidal tumors between July 2019 and March 2024 at Beijing Tongren Hospital. Univariable and multivariable logistic regression identified independent malignancy indicators; diagnostic performance was estimated with bootstrapped 95% CIs.

Results: The cohort comprised 133 malignant eyes (melanoma 113, lymphoma 11, metastasis 9) and 172 benign/mimic eyes (hemangioma 92, nevus 39, osteoma 32, others). Multivariable analysis identified three independent indicators of malignancy: complete loss of overlying choriocapillaris (OR=52.3, 95%CI: 4.85–552.7), optical shadowing (OR=104.1, 95%CI: 5.33–2028.8), and subretinal fluid extending >3 mm beyond the tumor margin (OR=24.2, 95%CI: 2.14–274.0). Diagnostic performance: choriocapillaris loss—sensitivity 0.962 (95%CI: 0.926–0.992), specificity 0.750 (0.682–0.816), negative predictive value (NPV) 0.962 (0.927–0.992); subretinal fluid >3 mm—sensitivity 0.714 (0.639–0.788), specificity 0.831 (0.776–0.884); presence of any of the three features—sensitivity 0.985 (0.960–1.000), NPV 0.976 (0.938–1.000). Subgroup analyses showed choriocapillaris loss distinguished melanoma from nevus (sensitivity 0.923, specificity 0.973). In amelanotic lesions, choriocapillaris loss or subretinal fluid >3 mm achieved 100% sensitivity for malignancy detection.

Conclusions: Three SS-OCT features—complete choriocapillaris loss, optical shadowing, and subretinal

fluid >3 mm beyond the margin—constitute a simple, high-sensitivity triad for rapid identification of malignant choroidal tumors, supporting early triage in primary and referral settings.

Abstract No.: 205021

Ultrathin Choroidal Cutter Biopsies for Lesions 1.5 mm or Thinner and Thin Biopsies for Lesions 1.6–2.5 mm Thick

First Author: Hung-da CHOU

Co-Author(s): Sarah COUPLAND, Antonio ELEUTERI, Heinrich HEIMANN, Rumana HUSSAIN, Helen KALIRAI

Purpose: To review the outcomes and complications of thin choroidal biopsies.

Methods: Medical records of patients with lesions 1.5 mm or thinner (“Ultrathin Group”) and 1.6 mm – 2.5 mm thick (“Thin Group”) who had a transretinal cutter-biopsy were reviewed. Diagnostic biopsy success was defined as having either a definitive diagnosis or a tentative diagnosis that included lesions suggestive of a nevus. Prognostic biopsy success was defined as obtaining the chromosome 3 status.

Results: One hundred and thirty-four biopsies in the Ultrathin Group and 281 biopsies in the Thin Group were analyzed. The mean follow-up was 4.1 ± 4.0 years. Diagnostic biopsy success was obtained in 85% (46/54) for the Ultrathin Group and in 96% (121/126) for the Thin Group. Prognostic biopsy was successful in 75% (60/80) for the Ultrathin Group and 79% (123/155) for the Thin Group. Moderate-to-severe biopsy-related complications were documented in 8.2% (Ultrathin) and 4.3% (Thin) Groups. Thicker lesional thickness and biopsy done during the second 10 years were associated with prognostic biopsy success (β [95% CI], 0.530 [0.211, 0.848]; p -value = 0.001 and β [95% CI] 1.240 [0.926, 1.560]; p -value <0.0001, respectively), but not with diagnostic biopsy success or complications.

Conclusions: In most patients, ultrathin or thin transretinal cutter biopsy assisted with clinical management in eyes with atypical lesions and provided genetic prognostication.

Abstract No.: 206848

Uveal Melanoma: Treatment Approaches and Prognostic Outcomes Based on the American Joint Committee on Cancer (AJCC) Staging in a Tertiary Referral Center

First Author: Thansit SRISOMBUT

Co-Author(s): Thanaporn KRITFUANGFOO, Duangnate ROJANAPORN

Purpose: This study aims to comprehensively evaluate the clinical characteristics, treatment outcomes, and prognosis of uveal melanoma (UM) based on the 8th

edition of the American Joint Committee on Cancer (AJCC) staging system.

Methods: A retrospective analysis was conducted on patients diagnosed with UM at a tertiary referral center in Thailand between 2010 and 2024. Data on clinical presentation, diagnostic methods, treatment approaches, and long-term outcomes were systematically reviewed and analyzed.

Results: A total of 106 patients were analyzed, with a mean diagnostic age of 51.6 years (range 16–86). Most tumors arose in the choroid (94.3%), with fewer in the ciliary body (3.8%) and iris (1.9%). Staging (AJCC 8th edition) showed T1 (18.9%), T2 (17.9%), T3 (48.1%), and T4 (15.1%). Treatments included enucleation (53.8%), Ruthenium-106 brachytherapy (29.2%), endoresection with brachytherapy (16.0%), and exoresection (0.9%). At a median 37.3-month follow-up, globe salvage was 44.3%. Kaplan-Meier estimates revealed 5- and 10-year distant metastasis rates of 22%, with overall survival rates of 78% and 71%. Melanoma-related death incidence was 3.4 per 100 person-years, varying by stage: 1.4 (T1), 3.5 (T2), 4.1 (T3), and 9.6 (T4). Multivariate analysis identified distant metastasis as the sole independent prognostic factor for overall survival (HR 50.6, $p < 0.001$).

Conclusions: In conclusion, UM prognosis in this Southeast Asian cohort is strongly influenced by distant metastasis, emphasizing the critical importance of early detection, accurate staging, and individualized treatment to optimize long-term survival outcomes.

Ophthalmic Epidemiology and Prevention of Blindness

Abstract No.: 200864

A 31-Year Overview of Presbyopia Trends and Regional Variations (1990–2021)

First Author: Tianyu WANG

Co-Author(s): Xianyao PENG, Yinan WU, Xiaoping XU

Purpose: To provide an assessment of the prevalence and disability-adjusted life years (DALYs) associated with presbyopia from 1990 to 2021.

Methods: In this cross-sectional study, epidemiologic data were gathered from the Global Burden of Disease (GBD) database, covering persons of all ages with presbyopia in 204 countries and 21 regions from January 1, 1990, to December 31, 2021; data analysis was completed on 30 September 2024.

Results: In 2021, global presbyopia cases reached 1.16 billion (95% UI, 0.88–1.51 billion), a 169.91% increase (95% UI, 151.49%–187.12%) since 1990. Associated DALYs rose from 4.32 million (95% UI, 1.94–8.41) to 11.65 million (95% UI, 5.21–22.42). The prevalence

rate increased from 9,788.66 to 13,436.18 per 100,000, while the DALY rate rose from 98.26 to 135.52 per 100,000. The middle SDI region had the highest DALYs in 2021. South Asia saw the largest prevalence increase (EAPC 2.37, 95% UI, 2.03–2.71). South Africa had the highest prevalence rate (28,268.53 per 100,000), and Southern Sub-Saharan Africa had the highest DALY rate (251.60 per 100,000). Aging populations and limited vision care access drove the rising global burden.

Conclusions: This study highlights significant regional disparities in the burden of presbyopia, indicating that the global burden of presbyopia has risen significantly, with marked regional, age, and gender disparities. Low- and middle-income countries bear a disproportionately high burden. These data provide useful references for healthcare professionals, policy makers, and researchers to strengthen and consolidate management strategies.

Abstract No.: 203287

A Cohort Analysis Focus on the Relationship Between Follow-Up Adherence and Corneal Graft Rejection

First Author: Ting **ZHANG**

Co-Author(s): Hua **GAO**, Shuhan **GUO**, Jinhui **LIU**

Purpose: Regular postoperative surveillance plays a critical role in allograft survival after penetrating keratoplasty (PK). This retrospective cohort study analyzed the clinical characteristics of PK cases and investigated the relationship between follow-up compliance and corneal graft rejection.

Methods: Data of patients undergoing PK from June 2018 to January 2022 were analyzed. The patients were divided into two groups (normal group vs. rejection group) using keywords as designated terms for the computer to flag rejection events. Logistic regression was employed to analyze the association between specified follow-up intervals and allograft rejection risk.

Results: Analysis of 635 patients (540 normal vs. 95 rejection eyes) revealed no significant baseline differences between groups in demographics or clinical factors. Farmers were the predominant occupation in both groups (50.5% vs. 51.9%). Fungal keratitis was the primary PK indication (40.7% vs. 34.7% rejection). Other common indications included corneal ulcer perforation, keratitis, corneal leukoplakia, and bullous keratopathy. The median graft survival time was 308 days with an overall rejection rate of 15.0%. Additionally, male patients exhibited significantly higher rejection rates compared to females (17.3% vs. 10.3%, $P = 0.018$). The rejection group had a shorter routine follow-up interval than the normal group before rejection onset (21.5 vs. 32.5 days, $P < 0.0001$). Paradoxically, its follow-up interval before rejection was longer than the routine interval (82.0 vs. 21.5 days, $P < 0.0001$). The results indicate a positive correlation between follow-up intervals and rejection risk. For

each increase in monitoring interval category (e.g., <1 month $\rightarrow$ 1-2 months $\rightarrow$ 3-4 months $\rightarrow$ 5-6 months $\rightarrow$ >6 months), the odds of rejection occurrence increase by approximately 3.88 times (OR = 3.88, $p < 0.001$).

Conclusions: The results indicate a positive correlation between prolonged follow-up intervals and rejection risk. Measures to improve follow-up adherence are helpful for reducing corneal graft rejection.

Abstract No.: 201355

A Proteomic Profile of the Ocular Phenome: Systemic Signatures, Predictive Value, and Causal Insights Across 131 Ocular Diseases and Traits

First Author: Duanke **LIU**

Co-Author(s): Li **CHEN**, Hanruo **LIU**, Ningli **WANG**

Purpose: To test whether systemic plasma proteins can capture intraocular pathology and enable early detection, risk stratification, and therapeutic targeting of major eye diseases.

Methods: To systematically evaluate the relevance of the plasma proteome to ocular phenotypes, we profiled 2,920 circulating proteins in 53,016 UK Biobank participants across 80 clinically defined eye diseases and 51 quantitative ocular traits. We integrated association analyses, protein-based prediction models, Mendelian randomization, and unsupervised clustering to uncover predictive, causal, and mechanistic insights.

Results: We uncovered $>5,800$ protein-phenotype associations, with the strongest signals in diabetic retinopathy, intraocular pressure, and ISOS-RPE thickness. Plasma proteins such as GDF15, VSIG4, and PLAUR were consistently associated across phenotypes, implicating inflammation, vascular leakage, and complement signaling as convergent mechanisms. Proteome-based models outperformed clinical predictors in multiple conditions (e.g., AUC = 0.913 for diabetic retinopathy) and identified distinct risk gradients. Mendelian randomization supported causal roles for 144 proteins, including therapeutically actionable targets. Hierarchical clustering of 80 ocular phenotypes revealed six proteome-defined ocular modules, linking anatomically diverse traits through shared systemic biology and suggesting a new molecular taxonomy of eye health.

Conclusions: Circulating proteins capture key features of ocular pathology, enabling noninvasive risk assessment and molecular subtyping. Plasma proteomics may serve as a practical tool for early detection and therapeutic targeting in ophthalmology.

Abstract No.: 205756

Accuracy Assessment and Cost-Effectiveness Analysis of Visual Screening for Primary School-Aged Children in Nakhon Pathom by Primary Care Unit Comparing With Optometrist at Metta Pracharak (Wat Rai Khing) Hospital

First Author: Thanwarat **CHAIPHO**

Co-Author(s): Arpha **PORNSETH**, Kulawan **ROJANANUANGNIT**, Phantaraporn **TANGTAMMARUK**, Fahsiri **TAVONVUNCHAI**

Purpose: To evaluate the diagnostic accuracy and cost-effectiveness of two community-based vision screening models—teacher-led and public health officer (PHO)-led—for primary school children in Thailand, using optometrist screening as the gold standard.

Methods: This cross-sectional study enrolled 402 students aged 6–12 years in Nakhon Pathom. Visual acuity screenings by teachers and PHOs were compared against comprehensive examinations by a licensed optometrist. Diagnostic performance was assessed using sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). A cost-effectiveness analysis was also performed.

Results: A total of 402 children were enrolled (51.0% male, 49.0% female), with a mean age of 9.01 ± 1.63 years (range 6–12). The prevalence of refractive error was 27.4%. Compared to the optometrist reference, teacher-led screening demonstrated high sensitivity (83.8%) but lower specificity (76.3%), with a PPV of 57.4% and NPV of 92.5%. Conversely, PHO-led screening yielded lower sensitivity (70.3%) but higher specificity (92.1%), with a PPV of 77.2% and NPV of 89.0%. Both community-based models proved to be economically viable alternatives to screening conducted by an optometrist.

Conclusions: The findings indicate a clear trade-off between the two community-based screening models. Teacher-led screening showed higher sensitivity, making it more effective at identifying children with visual impairment, though at the cost of lower specificity. Conversely, screening by public health officers demonstrated a higher specificity, reducing false positives, but had a lower sensitivity. Both methods are feasible and economically viable alternatives to optometrist-led screening for the early detection of visual impairment in this population.

Abstract No.: 203215

Artificial Intelligence-Assisted Community-Based Ocular Screening Integrated Into Primary Healthcare for Older Adults in China: Design and 2-Year Follow-Up Results

First Author: Gu **ZHENG**

Co-Author(s): Xinting **LIU**, Fan **LU**, Meixiao **SHEN**, Cong **YE**

Purpose: To describe the design, objective, and application effect of a pioneering community-based eye exam and healthcare study that investigated to improve the provision of ocular services to the elderly.

Methods: In this prospective study, comprehensive eye examinations were incorporated into annual physical assessments at community health centers, leveraging cutting-edge automation, digital documentation, and real-time data transmission technologies. Participants aged ≥ 60 years underwent four key tests: presenting distance visual acuity, autorefractometry, intraocular pressure measurement, and non-mydriatic fundus photography, enabling efficient detection of prevalent age-related eye diseases. To ensure diagnostic precision, a dual-validation system combining artificial intelligence-driven analysis with on-site expert confirmation was implemented for high-risk case identification. Additionally, a tiered management strategy featuring expedited referral pathways was established to facilitate timely tertiary care access.

Results: Among 3,785 eligible residents, 3,459 (91.4% response rate) completed initial screening, with an average examination duration of 4–8 minutes. Following expert validation, 1,466 participants (42.4%) required advanced hospital-based evaluation. Substantial unmet ophthalmic needs were uncovered, with prevalence rates of uncorrected refractive error (14.6%), cataract (22.7%), age-related macular degeneration (19.8%), glaucoma suspect (12.4%), and diabetic retinopathy (4.6%). Longitudinal analysis at 2-year follow-up demonstrated significant visual health improvements, particularly in younger cohorts (60–69 years), whereas the older subgroup (80–84 years) exhibited progressive decline.

Conclusions: This investigation establishes a transformative model for geriatric vision care, demonstrating exceptional feasibility, scalability, and effectiveness through its synergistic integration of technological innovation and community health infrastructure. The paradigm holds substantial promise for nationwide implementation, offering a blueprint for enhancing primary ophthalmic healthcare delivery across aging populations.

Abstract No.: 208374**Associations of Long-Term Joint Exposure to Multiple Ambient Air Pollutants With the Incidence of Age-Related Eye Diseases***First Author: Yingan LI*

Purpose: The associations between long-term joint exposure to low levels of multiple air pollutants and the incidence of common age-related eye diseases (AREDS), including cataract, glaucoma, and age-related macular degeneration (AMD), remain underexplored.

Methods: We conducted a prospective cohort study using UK Biobank data from 441,567 participants without cataract, glaucoma, or AMD at baseline. An air pollution score was constructed to assess the combined effect of multiple air pollutants, including PM_{2.5}, PM_{2.5-10}, PM₁₀, NO₂, and NO. Cox proportional hazards models were used to evaluate associations.

Results: Over a median follow-up of 14.41 years, 55,104 participants developed cataract, 11,940 glaucoma, and 9,060 AMD. A relatively stronger association was observed between combined exposure to multiple pollutants and AREDS incidence compared to exposure to individual pollutants. For every interquartile range increase in the air pollution score, the risk of incident AREDS increased by 4-5% (cataract, HR [95% CI], 1.05 [1.04-1.06]; glaucoma, 1.04 [1.02, 1.06]; AMD, 1.04 [1.01, 1.07]), suggesting the potential additive or synergistic effects of exposure to pollutant mixtures. Compared to individuals in the lowest exposure quartile, those in the highest had a 13%, 9%, and 14% greater risk of developing cataract (1.13 [1.10-1.16]), glaucoma (1.09 [1.03-1.15]), and AMD (1.14 [1.07-1.22]), respectively.

Conclusions: Long-term joint exposure to multiple air pollutants, even at low concentrations, is associated with an increased risk of AREDS incidence, suggesting that reducing air pollution levels could improve human ocular health. These findings provide a more comprehensive understanding of air pollution's impact on ocular health in the real world.

Abstract No.: 205664**Astigmatism Trends in the Hong Kong Adult Population From 2015 to 2024: The Hong Kong Children Eye Study.***First Author: Anakin Chu Kwan LAI**Co-Author(s): Li Jia CHEN, Ka Wai KAM, Jason Cheuk Sing YAM, Alvin L YOUNG*

Purpose: Astigmatism is the most common refractive error in both children and adults. Our study revealed significant increases in the prevalence and severity of child astigmatism from 2015. This study aims to examine trends in refractive (RA) and corneal astigmatism (CA) in the Hong Kong adult population during the same period.

Methods: We analyzed parents of children recruited in the Hong Kong Children Eye study (HKCES), a population-based cross-sectional study. Astigmatism was measured with an autorefractor and an IOL Master. RA was defined as ≥ 1.0 diopter (D) of cylindrical power, while CA was defined as a ≥ 1.0 D difference between the steepest and flattest corneal meridians. The annual prevalence of RA and CA was age-standardized according to the census data and served as the primary outcomes.

Results: A total of 28,330 participants were included, comprising 10,037 males (35.4%), aged 20-59 years. The age-standardised prevalence rate (ASR) for RA increased from 32.0% (95%CI: 28.9, 35.3) in 2015 to 34.1% (95%CI: 30.1, 37.9) in 2024, ($p > 0.05$); For CA, the ASR rose from 39.6% (95%CI: 36.2, 43.6) in 2015 to 48.5% (95%CI: 44.6, 52.8) in 2024, ($p < 0.05$). Regression showed increases of 0.096D ($p < 0.001$) for RA and 0.086D ($p < 0.01$) for CA after adjusting for age and gender.

Conclusions: In 2024, one-third of adults in Hong Kong had at least 1D of RA, and nearly half had at least 1D of CA. The prevalence of CA increased significantly over the past decade, while the rise in RA was minimal, suggesting potential compensation by internal astigmatism.

Abstract No.: 205825**Astigmatism Types Effects on Internal Astigmatism and Compensation in Children: Hong Kong Children Eye Study***First Author: Ka Wai KAM**Co-Author(s): Arnold CHEE, Li Jia CHEN, Erica SHING, Jason YAM, Alvin YOUNG*

Purpose: Astigmatism is highly prevalent among schoolchildren in Hong Kong. Children demonstrate distinct patterns of internal astigmatism (IA) to compensate for corneal astigmatism (CA). This study aims to investigate the associations between astigmatism subtypes, IA, and compensation factors (CF) in schoolchildren with a minimum of 0.5 dioptre (D) of refractive astigmatism (RA).

Methods: RA in children was assessed following cycloplegia and classified into simple myopic (SMA), compound myopic (CMA), mixed (MA), simple hyperopic (SHA), and compound hyperopic astigmatism (CHA) based on the location of the focal planes. IA was calculated through vector components J0 and J45. CF were determined by dividing IA by CA in respective vectors. Generalized linear models were used where variances were unequal.

Results: 4,027 children with a mean age of 7.6 ± 1.0 years were analysed. CMA was associated with male sex ($p = 0.019$), older age ($\beta = -0.143$, 95%CI -0.201 to -0.085, $p < 0.001$), longer axial length ($\beta = -0.143$, 95%CI -0.158 to -0.129, $p < 0.001$) and deeper anterior

chamber ($\beta = -0.019$, 95%CI -0.022 to -0.015, $p < 0.001$). CHA possessed the greatest mean IA value of 0.61D whereas CMA and SMA had the least of 0.55D. 56.1% of CHA displayed over-compensation as opposed to 7.9% and 7.6% in CMA and SMA respectively. On the contrary, 55.6% and 52.9% of CMA and SMA under-compensated their astigmatism, compared to 8.2% in CHA.

Conclusions: Children with hyperopic astigmatism over-compensate their corneal astigmatism, whereas children with myopia are more likely to suffer a greater amount of astigmatism as a result of lower IA and under-compensation in myopic astigmatism.

Abstract No.: 201499

Availability and Accessibility of End-to-End Diabetic Eye Care Services in Indonesia: A Spatial Analysis

First Author: Rima Afifah **POTRI**

Co-Author(s): Fariza Rahma **SAFIRA**, Muhammad Bayu **SASONGKO**, Firman Setya **WARDHANA**, Felicia **WIDYAPUTRI**

Purpose: Indonesia is among the countries with the fastest-growing diabetes and diabetic retinopathy (DR), with the annual increase of DR-related vision-threatening and blindness being 24.5 and 8.33/1000 individuals with diabetes. These data suggest the lack of diabetic eye care services in the country. This study aimed to assess the availability and accessibility of DR care from screening (DRS) to treatment facilities in Indonesia.

Methods: This was a comprehensive descriptive study comprising data review on national and local DR care resources, guided interviews with diabetic eye care stakeholders, and spatial analyses of DRS and treatment facilities access from each district in Indonesia. Availability was defined as the presence of DR care service in each province, while accessibility was the distance between the closest population cluster and the nearest DR care services (km).

Results: Of over 25,000 primary health centers across 38 provinces, none actively performed DRS. Although all provinces had DRS, only 26 (68.42%) had DR treatment facilities. Approximately 2.8 million (8.65%) individuals with diabetes had access to DRS facilities within 50 km, whilst 30.4 million (91.35%) had to travel 50-692 km to obtain DRS. More importantly, 2.2 million (6.65%) had DR treatment facilities within 100 km, while 31.0 million (93.35%) were at least 100-1,400 km away.

Conclusions: Our study suggests that disparities in DR care existed, and that a large proportion of individuals had a lack of access to DRS and DR treatment. These data strongly highlight the need to improve the availability of DR care in Indonesia.

Abstract No.: 201845

Bidirectional Relationship Between Myopia and Mental Disorders

First Author: Dan-lin **LI**

Co-Author(s): Chen-wei **PAN**

Purpose: Myopia and mental disorders share common environmental and behavioral risk factors. Previous studies have been inconsistent regarding the association between them; this systematic review and meta-analysis aim to explore the association between myopia and mental disorders.

Methods: Databases including PubMed, Web of Science, Wiley online library, and Cochrane Library were searched for eligible publications from January 2000 to July 2024. Studies assessing the relationship between myopia and any one of the mental disorders were identified. Pooled odds ratios (ORs) and their corresponding 95% confidence intervals (95% CIs) were estimated using random-effects models.

Results: We identified 15 articles (2 cohort studies and 13 cross-sectional studies) examining the impact of myopia on mental disorders, involving 2841653 participants from 7 countries. Pooled results indicated that myopia was significantly associated with an increased risk of mental disorders (OR = 1.43, 95% CI 1.25, 1.61). Besides, a significant relationship was observed between the mental disorders and myopia (OR = 1.15, 95% CI 1.01, 1.29) through 8 articles, including 1942855 participants from 5 countries. Subgroup analyses showed that the association of myopia with both anxiety and depression was significant, with ORs of 1.49 and 1.21, respectively.

Conclusions: Myopia and mental disorders may influence each other, with each condition potentially exacerbating the risk of the other. These findings help to explore the possible interplay between mental disorders and myopia.

Abstract No.: 201244

Bridging the Gaps in Refractive Error Services in Malaysia: Insights From the National Eye Survey III and the Way Forward With SPECS 2030

First Author: Wan Radziah **WAN NAWANG**

Co-Author(s): Norasyikin **MUSTAFA**, Mohamad Aziz **SALOWI**, Siti Nurhuda **SHARUDIN**

Purpose: To report key indicators, including effective Refractive Error Coverage (eREC) among adults aged 50 years and older in Malaysia, based on the 2023 population-based eye survey.

Methods: The National Eye Survey III was a cross-sectional study employing the World Health Organization (WHO)-recommended Rapid Assessment of Avoidable Blindness (RAAB) methodology, conducted in Sarawak and the Eastern Region of Malaysia.

Individuals with refractive error were identified, and uncorrected and corrected (pinhole) visual acuities were measured. Refractive Error Coverage (REC) and eREC were calculated.

Results: Of 10,184 individuals enumerated, 9,709 were examined. Refractive error prevalence was higher in Sarawak (21.4%) than in the Eastern region (15.4%). Spectacle use for distance and near vision was consistently higher among females. eREC in the Eastern region was 42.7% in females and 34.1% in males, while in Sarawak, it was slightly higher in males (48.8%) than in females (47.6%). The quality gap was wider in the Eastern region (12.7%) compared with Sarawak (8.7%). Although the unmet need for distance correction was proportionally higher in Sarawak, the overall burden was greater in the Eastern region.

Conclusions: Regional differences in prevalence, spectacle use, and eREC highlight the need for targeted strategies. In line with WHO's SPECS 2030, Malaysia is initiating a nationwide program to bridge these gaps, ensure universal access to affordable, high-quality, people-centred refractive error services, and to achieve a 40-percentage point increase in eREC by 2030.

Abstract No.: 203755

Burden and Depression in Caregivers of Patients With Visual Impairment

First Author: Kavita BHATNAGAR

Purpose: Caregivers devoted to their patients often neglect their own needs, resulting in burden and depression.

Methods: A cross-sectional observation study of 270 caregivers for 109 permanent visually impaired patients, from category III onwards. Caregiver burden was measured using the Caregivers Burden Scale while depression levels were assessed using the Centre for Epidemiologic Studies Depression Scale.

Results: The mean caregiver age was 38.3 years (SD $\pm$ 14.34), and the majority (56.66%) belonged to a lower socioeconomic status according to the Kuppuswami scale 2021. Moderate to severe burden was found in 115 [42.59%] caregivers, while severe burden was found in 9 [3.33%]. The possibility of major depression was found in 32 [11.85%]. Noteworthy findings were higher burden and depression levels with increasing duration of caregiving ($p < 0.0000001$), female gender (burden p -value= 0.01614 and depression p -value= 0.01246), parents or spouse as caregivers had higher burdens ($p < 0.0002334$), and nuclear families had higher levels of depression ($p < 0.006499$). Illiterates had an elevated burden ($p < 0.001708$). A positive linear correlation between Caregivers Burden Scale scores and Centre for Epidemiologic Studies Depression scores in caregivers was found [R is 0.6479, $P < 0.00001$].

Conclusions: These findings underscore the need for tailored support interventions addressing the specific

needs of caregivers of visually impaired individuals, particularly those facing heightened burden and depression.

Abstract No.: 200149

Cataract Global Burden of Adolescents and Young Adults Between 1990 and 2021: Analyses of the Global Burden of Disease Study 2021

First Author: Zijing LI

Purpose: To investigate the trend of cataract burden in individuals aged 15 to 39 years from 1990 to 2021.

Methods: This cross-sectional study leveraged data from the Global Burden of Disease Study 2021. The analysis included prevalence and disability-adjusted life years (DALYs) rates, along with the associated estimated annual percentage changes (EAPCs), assessed at the global level and categorized by sex, sociodemographic index (SDI), geographic region, and country.

Results: In 2021, the global age-standardized prevalence rate (ASPR) was 51.095 per 100,000. From 1990 to 2021, the ASPR decreased by 5.615%, with an EAPC of -0.379. The age-standardized DALYs rate (ASDR) in 2021 was 5.541 per 100,000, decreasing by 20.498%, with an EAPC of -0.959. The reductions in EAPC for ASPR and ASDR were more pronounced in males than in females. The high-SDI region exhibited the greatest increase in the EAPC of ASPR and generally remained stable in the EAPC of ASDR. However, the low-middle-SDI region showed the greatest decrease in ASPR (EAPC: -1.246) and ASDR (EAPC: -1.889). Central Europe had the sharpest rise in both ASPR and ASDR among the 21 geographic regions, while South Asia saw the steepest decline. At the country level, the Central African Republic exhibited the largest increase, while Equatorial Guinea showed the greatest decrease in both ASPR and ASDR.

Conclusions: Over the past 32 years, the global burden of cataracts among adolescents and young adults has decreased; however, it remains a significant public health concern worldwide. Cost-effective and targeted strategies are needed to alleviate this burden.

Abstract No.: 207191

Characterization and Risk Factors of Astigmatism Among Children and Adolescents Aged 3-20 Years in Northwestern China

First Author: Lu YE

Co-Author(s): Yiming GUO, Yijin HAN, Jiaqi WANG, Junhan WEI

Purpose: To investigate the prevalence, severity, types, correction status, and associated risk factors of astigmatism among children and adolescents in Shaanxi Province, China.

Methods: A cross-sectional study was conducted involving 236,397 children aged 3-20 years from 641 schools across Shaanxi Province using multistage stratified cluster random sampling. Astigmatism was defined as $|\text{cylinder diopter}| \geq 0.5\text{D}$. Demographic information was collected via questionnaires. Refractive measurements were performed using an autorefractor without cycloplegia.

Results: The overall astigmatism prevalence was 73.81%, increasing with age (63.17% in 3-5-year-olds to 81.70% in 18-20-year-olds) and education level (62.08% in kindergarten to 82.71% in high school). Males had a higher prevalence (74.44%) than females (73.13%). Northern Shaanxi showed the highest prevalence (80.52%), followed by Central (73.18%) and Southern Shaanxi (69.21%). With-the-rule astigmatism (92.63%) and compound myopic astigmatism (63.00%) were predominant. Only 30.73% of astigmatic children received correction, with rates increasing with age (2.19% in 3-5-year-olds to 64.66% in 18-20-year-olds) and education level. In multivariate regression analysis, age, education level, male gender, Northern Shaanxi residence, and non-Han ethnicity were significant risk factors.

Conclusions: Astigmatism prevalence among children in Shaanxi Province is considerably higher than previously reported in other Chinese regions, with significant variations across demographic factors. The low correction rate, particularly among younger children, highlights the need for enhanced early screening and timely intervention programs to prevent visual function impairment.

Abstract No.: 201777

Chronotype, Age-Related Macular Degeneration and Outer Retinal Structure: Insights From the UK Biobank

First Author: Zihan **SUN**

Co-Author(s): Mahantesh **BIRADAR**, Paul **FOSTER**, Anthony **KHAWAJA**, Yue **LENG**, Robert **LUBEN**

Purpose: Chronotype—whether an individual is a «morning lark» or «night owl»—reflects the timing of their internal biological clock and is associated with various health outcomes. Genetic studies have identified chronotype-related loci that are enriched for genes expressed in retinal tissue, but epidemiological evidence remains limited. We therefore investigated the associations between chronotype, age-related macular degeneration (AMD), and retinal structure in the UK Biobank.

Methods: Chronotype was assessed via a self-administered questionnaire and categorized into extreme morning, moderate morning, moderate evening, and extreme evening types. The primary outcome was AMD, identified through a combination of self-reported diagnosis, hospital admission records, and manually graded retinal images. Secondary

outcomes included outer retinal layer thicknesses measured with OCT. Multivariable analyses were adjusted for sociodemographic, lifestyle, systemic, and ocular factors.

Results: Of the 443,404 UK Biobank participants included in the primary analysis, 16,916 had AMD. Compared to the extreme morning type, moderate morning (OR 1.05, 95% CI 1.01-1.09, $P = 0.02$), moderate evening (OR 1.06, 95% CI 1.01-1.10, $P = 0.008$), and extreme evening (OR 1.14, 95% CI 1.07-1.21, $P = 2.8 \times 10^{-5}$) groups all showed significantly higher odds of prevalent AMD. In 39,547 participants with retinal imaging, extreme eveningness was associated with thinner photoreceptor layers and thinner RPE-Bruch's membrane complex.

Conclusions: Eveningness, particularly extreme evening preference, is associated with increased odds of AMD and thinner outer retinal layers. Our findings suggest chronotype may be a novel risk factor for AMD, underscoring the importance of circadian rhythm in retinal health.

Abstract No.: 200434

Comparison of the Efficacy and Clinical Applications of Three Different Myopia Control Methods: RLRL, 1% Atropine, and OK Lens in Adolescent Children

First Author: Yunyun **WANG**

Purpose: To compare the efficacy and clinical application of repeated low-level red light (RLRL), 1% atropine gel, and orthokeratology lenses for myopia in adolescent children.

Methods: This study investigated 600 children aged 8–16 years with a spherical equivalent (SE) of -0.50 to -7.00 diopter (D) in the past 1 year. They were divided into four groups. In the RLRL group, the adjustable settings were 3/6/9, corresponding to powers of 0.35/0.65/0.95 mW. The other three groups were 1% atropine, orthokeratology lens (OK group), and control (single-vision spectacles [SVS]).

Results: After 1 year, the AL of the four groups increased by 0.05 ± 0.21 , 0.07 ± 0.16 , 0.25 ± 0.19 , and 0.41 ± 0.18 mm. When the OK group was compared with the RLRL, 1% atropine, and SVS groups, the difference was statistically significant ($P < 0.05$). In the RLRL group, the difference between 0.35 mW and 0.95 mW was statistically significant ($P < 0.05$). The KI (flat K) and K2 (steep K) in the four groups. The differences were statistically nonsignificant ($P > 0.05$). After 1 year, the four groups showed SE increases. The differences between the OK, RLRL, and 1% atropine groups and the SVS group were statistically significant ($P < 0.05$).

Conclusions: RLRL and 1% atropine exhibited better outcomes than OK lenses in controlling AL and SE increase. RLRL was effective at controlling myopia progression at powers of 0.35, 0.65, and 0.95 mW.

Abstract No.: 206449**Effective Refractive Error Coverage (eREC) and Its Determinants: The Ural Eye and Medical Study***First Author: Giulli KAZAKBAEVA**Co-Author(s): Mukharram BIKBOV, Jost JONAS, Songhomitra PANDA-JONAS*

Purpose: Uncorrected refractive error (URE) is a leading cause of global vision impairment. Effective Refractive Error Coverage (eREC), the proportion of individuals with a refractive error who have and use appropriate correction, is a key metric of health system performance. This study aimed to determine the eREC and identify its key sociodemographic determinants in a Russian population.

Methods: The Ural Eye and Medical Study (UEMS) is a population-based, cross-sectional study of participants aged 40+ years from urban and rural areas of the South Urals region. All participants underwent a comprehensive ophthalmological examination. eREC was calculated per the WHO definition, requiring possession of spectacles or contact lenses and achieving a presenting visual acuity of $\geq 6/12$. Sociodemographic and barrier data were collected via standardized questionnaires.

Results: Among 5,389 participants, the prevalence of refractive error requiring correction was 68.2%. The overall eREC was 55.4% (95% CI: 53.8–57.0). eREC was significantly lower in females than in males and demonstrated a progressive decline with increasing age after 50. Multivariate regression analysis confirmed that older age (particularly ≥ 50 years), female gender, lower income, rural Residence and lack of awareness about refractive correction were independent predictors of inadequate eREC.

Conclusions: Despite a high need, effective refractive error coverage in the Ural region is suboptimal and characterized by significant sociodemographic disparities. Public health strategies must prioritize affordability, health literacy, and equitable access, with targeted interventions for older adults, women, and rural communities to bridge this gap and eliminate preventable vision impairment.

Abstract No.: 208287**Evolution of Diabetic Retinopathy Screening Models in Central India: Transition From Manual to Offline AI-Based Detection Under Project C.A.R.E.***First Author: Gajendra CHAWLA**Co-Author(s): Aashul CHAWLA, Carol Y. CHEUNG, Chunwen ZHENG*

Purpose: To compare three sequential models of diabetic retinopathy (DR) screening implemented over 17 years in Central India—manual, teleophthalmology, and artificial-intelligence (AI)—based screening—and

to evaluate accuracy, cost, and acceptability of the AI model.

Methods: A retrospective descriptive cohort (2008–2024) with an embedded prospective arm (2025) was analyzed. Manual and teleophthalmology data comprised 16,428 diabetic subjects screened across 282 camps. The 2025 Project C.A.R.E. cohort included 490 diabetics screened using offline Medios AI integrated into a non-mydriatic fundus camera. Outcome measures included DR and vision-threatening DR (VTDR) detection, AI sensitivity/specificity, screening time, cost per VTDR detected, and patient–physician acceptability.

Results: DR prevalence was comparable across models: 22.6% (manual/tele) vs 23.4% (AI). VTDR among DR-positive cases was 20.1% and 21.1%, respectively ($p > 0.05$). AI sensitivity and specificity were 91% and 87% ($\kappa = 0.82$). Average screening time decreased from 45–50 min to 5.6 min, and cost per VTDR detected dropped from ₹10,960 to ₹3,480. Follow-up compliance improved from 34% to 52%. Acceptability was high—85% of patients and 76% of physicians endorsed AI screening for routine triage.

Conclusions: Offline AI-assisted screening significantly reduced screening time and cost while maintaining diagnostic accuracy and high acceptability. Project C.A.R.E. demonstrates a scalable, cost-effective framework for diabetic eye screening in resource-limited settings.

Abstract No.: 205800**Exploring Barriers to Cataract Surgery Uptake in Eastern Zone of Malaysia: Trends and Insights From the National Eye Surveys***First Author: Siti Nurhuda SHARUDIN**Co-Author(s): Fei Yee LEE, Norasyikin MUSTAFA, Mohamad Aziz SALOWI, Wan Radziah WAN NAWANG*

Purpose: This study examined shifts in barriers to cataract surgery uptake among adults 50 years and above in the Eastern Zone of Malaysia by comparing data from the 2014 and 2023 National Eye Surveys.

Methods: A population-based survey was conducted in 2023 using the RAAB methodology with multistage cluster sampling. Participants underwent standardized visual assessments and structured interviews on perceived barriers. Logistic regression identified factors associated with poor vision to assess temporal changes.

Results: In 2023, operable cataract prevalence was 15.9% lower than 21.3% in 2014. “Need Not Felt” remained the most cited barrier but declined from 55.8% to 38.9%. “Fear of Surgery” persisted at 16%, while “Local Reasons” rose from 10.6% to 21.9%. Predictors of poor vision shifted: in 2014, older age and “Need Not Felt” were strongest (AOR: 1.042, 95% CI 1.014, 1.070, $p=0.003$ and AOR: 4.288, 95% CI

2.644, 6.954, $p < 0.001$), respectively. While in 2023, “Fear of Surgery” (AOR: 2.205, 95% CI 1.190, 4.084, $p = 0.012$), “No Access” (AOR: 3.003, 95% CI 1.324, 6.810, $p = 0.008$), and “Local Reasons” (AOR = 2.650, 95% CI 1.497, 4.689, $p = 0.001$) significantly increased the likelihood of poor vision.

Conclusions: Traditional barriers, such as “Felt surgery not needed,” have declined, but emerging challenges, including cost, limited awareness, and accessibility, persist. Public health interventions addressing both longstanding and new barriers are essential to improve surgical coverage and reduce preventable blindness in the Eastern Zone of Malaysia.

Abstract No.: 208443

Female Predominance and Socio-Demographic Inequalities in Global Near Vision Loss Burden: Projected Trends and Disparities From 1990 to 2035

First Author: Guodong TANG

Co-Author(s): Hongsheng BI, Xiaoqi GONG, Jing LI, Jike SONG

Purpose: Near vision loss (NVL), a hallmark of aging populations, imposes a growing global health burden, exacerbated by demographic shifts and socioeconomic disparities. Despite its profound impact on productivity and quality of life, comprehensive analyses that integrate aging, socioeconomic development, and sex-specific disparities remain limited.

Methods: Using the Global Burden of Disease (GBD) 2021 dataset spanning 204 countries and territories (1990–2021), we evaluated the NVL burden through prevalence, disability-adjusted life years (DALYs), and sociodemographic index (SDI). Advanced methodologies included decomposition analysis to disentangle demographic and epidemiological drivers, Bayesian age-period-cohort (BAPC) modeling for projections, and frontier analysis to quantify SDI-linked inequities. Gender-stratified and age-specific trends were analyzed using joinpoint regression analysis.

Results: Global NVL prevalence surged from 428 million to 1.155 billion cases (1990–2021). Females exhibited a higher age-standardized prevalence (16,588 vs. 14,718 per 100,000 in 2021). South Asia had the highest burden (age-standardized DALYs: 208.0), whereas the Gulf Cooperation Council reported the lowest (93.8). Socioeconomic inequities widened: The DALY gap between high- and low-SDI regions expanded from 10.19 to 31.96. Population growth (65.3%) and epidemiological shifts (39.2%) drove DALY increases, offset marginally by aging (−4.4%).

Conclusions: NVL burden escalated disproportionately in low-SDI regions and among females, fueled by population growth and systemic healthcare gaps. Aging, while a minor contributor globally, critically affects the high-income Asia-Pacific region. Policymakers must

prioritize sex-sensitive refractive care programs, expand optical subsidies in underserved areas, and address digital near-work hazards to mitigate the premature onset of NVL.

Abstract No.: 206455

Forty Years of Global Retinopathy of Prematurity Management Outcomes: A Systematic Review and Meta-Analysis of Associations With Socioeconomic and Health-Care Factors

First Author: Wai Chak CHOY

Co-Author(s): Li Jia CHEN, Allan Wang Yee CHU, Yuen Tsing Adeline HO, Michelle Yuen-ching NG, Calvin Cp PANG, Noel PANG, Clement THAM, Emily WONG, Jason Cheuk Sing YAM, Yuzhou ZHANG

Purpose: Retinopathy of prematurity (ROP) is an important cause of childhood blindness. We aimed to investigate trends in global ROP anatomical and visual outcomes during the past 40 years. and investigate the association with socioeconomic and healthcare factors.

Methods: We performed a systematic review and meta-analysis by identifying articles in nine databases published between 1980 and 2021, regardless of language, and included articles with coverage on anatomical and visual outcomes. Reported studies were stratified by decade from 1980–2021. Socioeconomic and healthcare factors were extracted from the World Bank and the World Health Organisation data registry. Estimates were pooled by a random-effect model with a fixed-effect model for sensitivity analysis. Associated factors were analysed by multivariable linear regression.

Results: A total of 30,075 patients from 283 studies were included for analysis. Overall anatomical success rate in 1980–1990, 1990–2000, 2000–2010, 2010–2021 was estimated at 0.742 (CI=0.668–0.804), 0.887 (CI=0.847–0.917), 0.9146 (CI=0.877–0.941), and 0.960 (CI=0.922–0.980) respectively. Overall visual success rate was estimated at 0.6667 (CI=0.543–0.771), 0.6510 (CI=0.527–0.757), 0.763 (CI=0.668–0.838), and 0.890 (CI=0.424–0.989) for the above 4 decades. A similar improving trend was observed for advanced-stage cases. Only low-middle income countries showed an increase in overall anatomical success (beta=0.189, CI=0.073–0.305). For advanced cases, high-income countries showed increase in anatomical (beta=0.273, CI=0.064–0.482) and visual (beta=0.345, CI=0.041–0.648) success rate specifically for advanced cases. Prenatal care coverage (beta=0.389, CI=0.369–0.410), physician density (beta=0.813, CI= 0.743–0.884), and social insurance coverage (beta=0.763, CI= 0.738–0.789) were associated with ROP outcomes improvement.

Conclusions: Treatment outcomes have improved globally from 1980 to 2021. Improvements for advanced cases were mainly in high-income locations.

Improving accessibility, financing and technological transfer are important to improve global outcomes further.

Abstract No.: 201522

Gender Based Variability in the Incidence of Retinopathy of Prematurity in Multiple Gestation Premature Infants: A Retrospective Analysis From a Tertiary Care Eye Hospital

First Author: Rabeeah ZAFAR

Purpose: To investigate the incidence of retinopathy of prematurity (ROP) and the association of gender differences in the severity and treatment warranted-ROP in multiple gestation premature infants.

Methods: A 04-year retrospective comparative analysis was conducted on premature infants from multiple gestations who underwent ROP screening from January 2021 to December 2024 in a tertiary care eye hospital in Pakistan. The incidence rates of any ROP, severe ROP, and treatment-warranted ROP were assessed. Gender-based variation in the stage and severity of ROP was also analyzed using SPSS 26.0.

Results: A total of 224 premature infants underwent ROP screening, including 92 sets of twins, 12 triplets, and one set of quadruplets. In this study, the overall incidence of ROP was found to be 33% (n=74), with severe ROP (i.e., stage 4 or 5) occurring in 7.1% of infants (n=16). A significant gender difference was observed, with male infants predominating (p value <0.05). Treatment was required for 28 infants, with greater odds of requiring treatment in male infants (p=0.02, OR=1.4).

Conclusions: A strong association between male gender and retinopathy of prematurity exists in multiple gestation premature infants. Males are more prone to developing ROP and require treatment more often and earlier than their female counterparts. Furthermore, in contrast to the international protocols and International Classification of Retinopathy of Prematurity (ICROP), screening in Pakistan is conducted in infants with a gestational age of ≤ 35 weeks. This screening window, defined as ≥ 31 (in ICROP) and ≤ 35 weeks, yields significant findings and warrants further exploration to guide national-level policy.

Abstract No.: 206427

Gender Differences in Clinical and Demographic Profiles of Community Cataract Surgery: A Study From Garut Regency, West Java, Indonesia

First Author: Ilmah ILMAH

Co-Author(s): Nina RATNANINGSIH, Mayang RINI

Purpose: To describe the characteristics of cataract patients and their visual status prior to community-based cataract surgery, with a focus on gender

differences in Garut Regency during January–December 2024.

Methods: Patients aged over 18 years who underwent cataract extraction in community programs organized by the Community Ophthalmology Unit of a tertiary eye hospital were included. Demographic, clinical, and visual acuity data were collected. Descriptive statistics were applied, and associations between categorical variables were assessed using the Chi-Square test.

Results: A total of 816 patients were included. Most patients were male (50.9%) and 40–65 years old. The majority of subjects with a diagnosis of mature senile cataract were 47.5% male and 50.6% female. The most common comorbid systemic condition among men and women is hypertension (13.7% and 16.2%). As many as 37.6% of men and 43.3% of women have visual acuity in their better eye of less than 3/60. The percentage of visual acuity less than 3/60 in the operated eye was 91.8% in males and 93.8% in females. In this study, statistically significant differences between males and females were found in age ($P < 0.001$) and the diagnosis of the operated eye ($p = 0.002$).

Conclusions: In this study, most patients were aged 40–65 years with hypertension as the most common comorbidity. A high proportion presented with profound visual loss in the operated eye. Gender-related differences were statistically significant in terms of age and cataract diagnosis.

Abstract No.: 207915

Global Cohort Analysis of GUCY2D-Associated Inherited Retinal Dystrophy and Genotype-Phenotype Correlation Study

First Author: Yijing HU

Co-Author(s): Jie CHEN, Xiaoman LI, Yihan ZHENG

Purpose: To systematically review global case data of inherited retinal dystrophy (IRD) associated with GUCY2D gene mutations and analyze the correlation between GUCY2D genotypic features and clinical phenotypes.

Methods: This retrospective study included 419 IRD cases with GUCY2D mutations. Among these cases, 13 were collected from our ophthalmology center, while the remaining 406 cases were compiled from published clinical research reports worldwide. All underwent ophthalmic exams and molecular testing (Sanger or whole-exome sequencing). Using statistical methods, survival analysis, and linear regression, we systematically assessed correlations between GUCY2D mutation features and clinical phenotypes.

Results: This study included 419 IRD patients with GUCY2D mutations, identifying 134 distinct variants, with missense mutations being the most frequent type. The most prevalent pathogenic variants were c.2512C>T (p.Arg838Cys) and c.2513G>A (p.Arg838His), with allele frequencies of 20.11% (107/532) and

14.66% (78/532), respectively. Statistical analysis revealed significant differences in progression of visual acuity to blindness among different mutation types at position 838 ($P < 0.05$). Three novel pathogenic variants (c.1766A>T [p.His589Leu], c.2612T>G [p.Val871Gly], c.2099del [p.Pro700fs]) were first identified in the Chinese cohort, along with the first reported homozygous c.2512C>T carrier in a consanguineous family. Notably, the homozygous carrier showed distinct phenotypes from heterozygous cases, providing new insights into GUCY2D's functional and pathogenic mechanisms.

Conclusions: This study systematically elucidated the core association between GUCY2D mutation characteristics and clinical phenotypes of IRD. Through the identification of novel pathogenic variants and distinctive phenotypes associated with rare homozygous mutations, critical evidence was provided for studies on the functional mechanisms of the GUCY2D gene.

Abstract No.: 205877

Impact of Correcting Refractive Errors on Educational Outcomes: A Community-Based School Screening Study in South India

First Author: Sahithya **BHASKARAN**

Co-Author(s): Vijayalakshmi **PERUMALSAMY**, Jeyachandran S

Purpose: Uncorrected refractive error (URE) is the leading cause of visual impairment in Indian schoolchildren, yet spectacle coverage remains poor. This study assessed whether providing spectacles improves educational outcomes.

Methods: A cluster-randomized controlled trial was conducted across 18 government schools in Tamil Nadu. Of 11,117 screened students (mean age 10.7 ± 3.4 years), 552 (4.9%) had URE and underwent baseline educational assessment using the ELANA tool for reading and arithmetic. Intervention schools received spectacles, while control schools received referral cards. Post-assessment was done after 11 months

Results: A cluster-randomized controlled trial was conducted across 18 government schools in Tamil Nadu. Of 11,117 screened students (mean age 10.7 ± 3.4 years), 552 (4.9%) had URE and underwent baseline educational assessment using the ELANA tool for reading and arithmetic. Intervention schools received spectacles, while control schools received referral cards. Post-assessment was done at

Conclusions: The provision of spectacles significantly enhanced reading performance and overall educational outcomes in formative years. This first India-specific evidence underscores the critical role of school vision programs in improving both eye health and learning outcomes.

Abstract No.: 204045

Impact of Low Vision and Blindness on Characteristics of Developmental Delay in Children Younger Than 6 Years

First Author: Simaporn **SETTHAWONG**

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Purpose: To investigate the developmental impact of low vision and blindness on children under six with common ocular diseases.

Methods: This retrospective study reviewed records of new patients under six with visual impairment at Siriraj Hospital's low vision rehabilitation center (January 2017 to October 2022). Collected data included ocular, systemic, and developmental characteristics. Visual acuity in the better-seeing eye was recorded after refractive correction, and developmental domains with the Denver II. Univariable and multivariable logistic regression analyzed identified factors associated with developmental delay.

Results: Among 161 pediatric patients (mean age 24.9 ± 18.9 months), all had visual acuity worse than 1.07 ± 0.58 LogMAR. 83.2% were diagnosed with global developmental delay (GDD). The most common ocular causes were cortical visual impairment (CVI), optic neuropathy/atrophy, and optic nerve hypoplasia. Extremely poor visual acuity was significantly associated with GDD [adjusted odds ratio (AOR) 41.0] and delays in all domains: gross motor (AOR 10.0), fine motor (AOR 12.8), language (AOR 5.3), and personal-social skills (AOR 13.4) ($P \leq 0.002$). Multiple disabilities, particularly visual impairment with cerebral palsy, were significantly associated with gross (AOR 7.7) and fine motor delays (AOR 4.0) ($P < 0.05$). CVI was associated with language and personal-social skills (AOR 9.1 each) ($P < 0.05$).

Conclusions: Children with visual impairment, especially those with poorer acuity, CVI, and multiple disabilities, are at high risk for developmental delays across all domains. Early multidisciplinary intervention is strongly recommended.

Abstract No.: 207358**Implementation and Evaluation of a Large-Scale School Screening Program for Detection of Pediatric Keratoconus***First Author: Neelima **BALAKRISHNAN****Co-Author(s): Rashmi **DESHMUKH**, Rohit **KHANNA**, Pravin **VADDAVALLI***

Purpose: A large-scale school screening program was designed to detect the population-based prevalence of allergic eye disease, Vernal Keratoconjunctivitis, and keratoconus in school-going children with an age range from 5 to 15 years. This study aimed to screen, diagnose, and refer school-going children with early symptoms and signs of these disorders, thereby enabling timely detection and appropriate treatment.

Methods: Students with ages ranging from 5 to 15 years were screened at various public and private schools in both rural and urban areas of 3 representative states. All children were administered an initial triaging questionnaire which aimed to identify symptoms of allergy, subnormal vision or habitual eye rubbing, followed by vision evaluation. All children aged 10 to 15 years were subjected to topography evaluation by a Scheimpflug-based topographer or a hand-held Placido-based portable topographer. Those aged 5 to 10 years were subjected to topography, and if there were any signs of allergic eye disease or subnormal vision noted on initial screening. Children with suspicious features on topography or on questionnaire-based evaluation were referred to tertiary centers for subsequent management. Measured outcomes included demographic data, ocular diagnosis, and treatment provided.

Results: Of the total population screened, consisting of 50000 children, 13.5% were referred to tertiary centers. 2% of the screened children were diagnosed with abnormal topography, and 5.9% of the children were diagnosed with features consistent with ocular allergy.

Conclusions: This program provides a framework to perform large-scale school screening to detect keratoconus and allergic eye diseases.

Abstract No.: 205114**Improving Cataract Surgery Outcomes Through Quality Management and Benchmarking: A Five-Year Analysis From Vietnam***First Author: Minh Ha **TRAN****Co-Author(s): Van Quy **DAM**, Thi Phuong **NGUYEN***

Purpose: To evaluate five-year trends (2020–2024) in cataract surgery outcomes and complications at a district-level hospital in Vietnam, and to assess how structured quality management and internal benchmarking supported improved outcomes and safe surgical training.

Methods: All cataract surgeries performed between 2020 and 2024 were retrospectively analyzed. Data included demographics, surgical technique, surgeon seniority, pre- and postoperative uncorrected visual acuity (UCVA), and complications. Surgeons were categorized as senior (having performed ≥ 500 prior phacoemulsification cases, $n = 2$) or junior (in training, $n = 4$). Describe quality assurance and internal benchmarking processes that were implemented.

Results: A total of 6,996 surgeries were performed (610 in 2020, 1,008 in 2021, 1,523 in 2022, 1,880 in 2023, 1,775 in 2024). The mean patient age was 71 ± 6.3 years, and 61% were female. Phacoemulsification comprised 98% of procedures. Senior surgeons performed 62–96% annually. The proportion of patients with severe preoperative impairment (UCVA $<20/200$) decreased from 50.2% to 36.4%. Postoperative UCVA $>20/60$ improved steadily from 61.5% (2020) to 87.9% (2024). Borderline outcomes (UCVA $<20/60$ – $20/200$) declined from 36.2% to 10.2%, while poor outcomes (UCVA $<20/200$) remained $\leq 3.6\%$. Intraoperative complications (Oxford Cataract Treatment and Evaluation Team grade 2–3) decreased from 5.9% in 2020 to 0.3% in 2024. Reoperation rates were 0.66% in 2020, 0.20% in 2021, 0% in 2022, 0.42% in 2023, and 0.06% in 2024. Three cases of postoperative endophthalmitis occurred (0.043%). Quality control included systematic recording of all surgical data, monthly team review, and auditing of every complication case to guide corrective action and maintain safety during training.

Conclusions: Cataract surgery outcomes improved consistently over the five years, with the proportion of eyes achieving UCVA $>20/60$ increasing to nearly 88% by 2024. Rates of intraoperative complications, reoperations, and endophthalmitis remained very low and within international benchmarks. The structured application of quality management, systematic data review, and internal benchmarking was instrumental in driving these improvements, ensuring patient safety, and supporting safe surgical training for junior surgeons.

Abstract No.: 205356**Incidence of Visual Impairment in a Multiethnic Asian Population Over a 12-Year Period: The Singapore Epidemiology of Eye Disease Study***First Author: Gabriel Dawei **YANG****Co-Author(s): Miao Li **CHEE**, Ching-yu **CHENG**, Charumathi **SABANAYAGAM**, Yih Chung **THAM***

Purpose: To evaluate the 12-year incidence of visual impairment (i.e., low vision and blindness) and its causes in a multiethnic Asian population.

Methods: The Singapore Epidemiology of Eye Diseases (SEED) Study recruited 10,033 adults at baseline (2004–2011). At the 12-year follow-up (2017–2023),

4,523 participants (1,327 Malays, 1,558 Indians, 1,638 Chinese) were re-examined. Low vision was defined as best-corrected visual acuity (BCVA) $<20/40$ but $>20/200$ and blindness as BCVA $<20/200$ in the better-seeing eye, based on the United States criteria. Incident low vision and blindness were identified at follow-up, and their causes were ascertained through standardized clinical examinations, retinal photography grading, and review of medical records. Poisson regression model with robust variance was applied to examine risk factors' association with visual impairment.

Results: Over 12 years, the age-standardized incidence of low vision was highest among Malays at 5.4% (95% CI: 4.0 -- 7.2), compared with 2.8% (1.8 -- 4.4) in Indians and 1.7% (0.9 -- 3.0) in Chinese. For blindness, the corresponding incidences were 0.0% (0.0--0.0) in Malays, 0.1% (0.0--0.9) in Indians, and 0.6% (0.2--1.5) in Chinese. Cataract was the leading cause of incident visual impairment (59.3%), followed by diabetic retinopathy (7.7%) and age-related macular degeneration (6.4%). Incident visual impairment was significantly associated with older age, Chinese ethnicity, diabetes, chronic kidney disease, lower household income ($< SGD 2,000/month$), and lack of formal education (all $P \leq 0.02$).

Conclusions: In this multiethnic Asian cohort, the 12-year incidence of visual impairment varied across ethnic groups, with Malays showing the highest rates. Leading causes of visual impairment are mostly treatable, with cataract remaining the predominant cause.

Abstract No.: 207766

Large-Scale Study in Chengdu, China: The Prevalence of Myopia Full-Correction Decreased With Increasing Myopia in Adolescents

First Author: Jing WEI

Purpose: This study investigated the situation related to myopia among students in Chengdu, a city in western China, and analyzed the prevalence of myopia spectacle wear and myopia full-correction and their influencing factors to understand the current status of myopia prevention.

Methods: A total of 1,582 schools in seven districts of Chengdu City, China, enrolling a total of 417,337 students aged 6-18 years (elementary, middle, and high school) from 2020 through 2022. Examination items included uncorrected visual acuity (UCVA), slit lamp examination, and non-cycloplegic autorefraction. Myopia was defined as non-cycloplegic SE $\leq -0.50 D + UCVA > 0 \log MAR$ (age ≥ 6). The prevalence of myopia spectacle wear is defined as the number of people wearing glasses for myopia/the number of people with myopia (%) within the study population, and myopia

full-correction is defined as normal vision after wearing glasses for myopia ($\leq 0 \log MAR$ for 6 years and above).

Results: The average age of the entire survey population was (10.96 ± 3.5) years, and the overall prevalence of myopia was 48.7%, myopia spectacle wear was 65.7% and myopia full-correction was 50.5%. With increasing age and educational levels, the prevalence of moderate to high myopia, the prevalence of myopia spectacle wear, and the prevalence of myopia full-correction all rise. The prevalence of mild myopia full-correction (46.5%) was higher than that for moderate myopia (47.1%) and even higher than that for high myopia (39.6%). The correct utilisation rate of myopic spectacles was 33.17%, increasing with age and education levels, with the highest correct utilisation rate of 40.7% among those with moderate myopia.

Conclusions: The prevalence of myopia among children and adolescents in Chengdu is relatively low, and the prevalence of myopia spectacle wear and myopia full-correction need to be improved, and it was found that with the increase of myopia, the prevalence of myopia full-correction among adolescents decreased instead.

Abstract No.: 204518

Longitudinal Analysis of the Impact of Bilateral Visual Acuity on Sleep Quality and Depression Among Patients With Diabetes Mellitus

First Author: Wei LIN

Co-Author(s): Zhong LIN

Purpose: To investigate the impact of bilateral visual acuity (VA) on sleep quality and depression in patients with diabetic mellitus using longitudinal data of the Fushun Diabetic Retinopathy Cohort Study.

Methods: All participants completed the Pittsburgh Sleep Quality Index (PSQI) and Center for Epidemiologic Studies Depression (CES-D) scales. Participants were reexamined at least 1 year later. Patients were categorized into three groups: high bilateral VA, moderate bilateral VA, and low bilateral VA. The parameters of PSQI and CES-D were analyzed between three groups.

Results: We enrolled 1408 patients with gradable fundus photography. Multivariate logistic regression analysis showed no association between the presence of DR or vision-threatening DR and global PSQI score and CES-D scale score. Patients with better bilateral visual acuity (VA) had lower global PSQI scores (β coefficient, 95% confidence interval [CI]: $-1.45, -2.07$ to -0.83) and lower CES-D scale scores (β coefficient, 95% CI: $-2.15, -3.30$ to -1.00). Sleep latency, sleep disturbance, daytime dysfunction, global PSQI score, proportion of poor sleep, CES-D scale score, and proportion of depression were all higher in the group with lower bilateral VA. During follow-up, incidence

or progression of DR were not significantly associated with global PSQI scores and CES-D scale scores.

Conclusions: Using longitudinal data, our study found a positive association between sleep quality or depressed mood and bilateral VA, while no significant association was found with DR incidence or progression.

Abstract No.: 204487

Longitudinal Changes in Astigmatism and the Association With Myopia: Findings From a 6-Year Cohort of School Children in Guangzhou, China

First Author: Xianghua **TANG**

Co-Author(s): Yin **HU**, Pingxiao **YANG**, Xiao **YANG**

Purpose: To characterize the longitudinal changes in astigmatism among school-age children, specifically across different refractive development states, and to explore its association with myopia progression and axial elongation.

Methods: A six-year prospective cohort study was conducted among 2,942 primary school children (1,381 girls) from Guangzhou, China, with a mean baseline age of 7.43 years. From 2018 to 2024, annual follow-up visits were performed, including cycloplegic autorefraction and axial length (AL) measurements. Children were stratified based on their refractive development trajectories.

Results: The Persistent Myopia group exhibited the most significant astigmatism progression, increasing from -1.166 ± 1.258 D to -1.846 ± 1.429 D ($P = 0.0048$). Astigmatism changes primarily manifested as with-the-rule (WTR) or against-the-rule (ATR) shifts (J0), while oblique astigmatism (J45) remained stable across all groups. Multivariate regression suggested higher baseline myopia, more axial elongation, and a persistent myopic trajectory as key risk factors. Linear mixed-effects modeling revealed two opposing trends based on refractive development status. During emmetropization, astigmatism decreased ($+0.074$ D per -1 D spherical change), whereas it increased in cases of persistent myopia (-0.026 D per -1 D spherical change).

Conclusions: This study demonstrates that the natural progression of astigmatism in school-age children is closely associated with their refractive development state. Astigmatism increases with myopic progression but may decrease during emmetropization. The association between astigmatism progression, myopia, and axial elongation provides crucial insights for predicting astigmatism changes and for informing clinical strategies.

Abstract No.: 206364

Natural History and Outcomes of Childhood Anisometropia in a Large Real-World Cohort

First Author: Xiaodong **CHEN**

Co-Author(s): Zhe **PAN**, Yaxing **WANG**, Tien Yin **WONG**

Purpose: To investigate the natural history and clinical outcomes of childhood anisometropia in a large real-world cohort.

Methods: This study included a cross-sectional analysis of 203,314 children aged 3–17 years and a longitudinal cohort of 97,693 children aged 3–15 years, with a mean of 3.6 visits over 5.2 years. Anisometropia was defined as an interocular spherical equivalent (SE) difference ≥ 1.0 D. Outcomes included age-specific prevalence, annual SE and axial length (AL) changes, and incident high myopia ($SE \leq -6.0$ D). Mixed-effects models estimated annual SE and AL progression, and interval-censored Cox models assessed prognostic implications.

Results: Cross-sectionally, anisometropia prevalence showed a biphasic pattern, decreasing from ages 3–7 and increasing from 8–17 years. Longitudinally, children without anisometropia at baseline progressed faster in SE (-0.36 vs -0.04 D/year) and AL (0.33 vs 0.29 mm/year), with higher high-myopia incidence. The greatest risk occurred in children who newly developed anisometropia (HR, 1.61; 95% CI, 1.41–1.84). In contrast, children who remained anisometropic (HR, 0.67; 95% CI, 0.56–0.81) or whose anisometropia resolved (HR, 0.22; 95% CI, 0.16–0.30) had the lowest risks. Baseline anisometropia versus none was protective (HR, 0.39; 95% CI, 0.31–0.48). Findings were robust across multiple sensitivity analyses, including alternative thresholds of anisometropia and high myopia, age-, SE-, AL- specific subgroups, and propensity score-matched analysis.

Conclusions: Childhood anisometropia follows an age-dependent biphasic course and provides prognostic information. Absence of anisometropia predicted faster progression and greater high-myopia risk, while persistence or resolution appeared protective. Monitoring interocular asymmetry may aid early identification and risk stratification.

Abstract No.: 201534

Oculomics-Driven Stratification of High Genetic Risk Individuals: A Pilot Study

First Author: Xiayin **ZHANG**

Co-Author(s): Ching-yu **CHENG**, Yangqin **FENG**, Meng **WANG**

Purpose: The retina provides a unique window for non-invasive in vivo assessment of systemic diseases. Most age-related systemic conditions are polygenic and involve complex genetic backgrounds. However, conventional methods for identifying genetic risk are often costly and laboratory-intensive, hindering timely detection and stratification. This study aimed

to evaluate whether, and to what extent, the retina photographs can estimate polygenic risk scores (PRS) and risk-stratify common complex diseases and traits.

Methods: A total of 55,938 high-quality fundus images from European-ancestry UK Biobank participants were divided into training, validation, and test sets. We assessed 36 standardized polygenic risk scores (PRS) for 28 diseases and 8 quantitative traits, sourced from external GWAS. Image features were extracted using our state-of-the-art foundation model (GlobeReady) to minimize domain shifts. These features trained a linear regression model for continuous PRS prediction and a binary classifier for extreme PRS stratification (top 3%). Fundus-specific uncertainty calibration improved clinical interpretability. Age-stratified analyses were also performed.

Results: The model performed poorly in predicting continuous PRS, with the highest for POAG (MAE = 0.80, $R^2 = 0.02$) and height (MAE = 0.58, $R^2 = 0.004$). In contrast, extreme PRS classification was effective for PRS of POAG (AUC = 0.74, F1 = 0.64) and height (AUC = 0.72, F1 = 0.73). Age-related macular degeneration (AMD) showed moderate performance (AUC = 0.59; F1 = 0.61). Age stratification revealed optimal prediction of POAG in the 40–50 group, AMD and Alzheimer's in those over 60, and consistent height prediction across ages.

Conclusions: Retinal imaging noninvasively detects extreme genetic risk, particularly for ocular conditions and highly heritable traits like height.

Abstract No.: 203374

Prevalence and Risk Factors of Undiagnosed Diabetic Retinopathy: The Tianjin Diabetic Retinopathy Screening Cohort Study

First Author: Juping LIU

Co-Author(s): Han BO, Chen CHEN, Fei GAO, Liying HU, Xiaorong LI, Emmanuel Eric PAZO, Yu SHI, Xiuqing ZHU

Purpose: To determine the prevalence and risk factors of undiagnosed diabetic retinopathy (DR) in patients with type 2 diabetes in a northern Chinese population.

Methods: A total of 4,090 participants from the Tianjin Diabetic Retinopathy Screening Cohort Study were enrolled. All participants underwent a questionnaire survey, physical examination, and non-mydriatic fundus examination. Logistic regression was used to identify clinical and sociodemographic factors associated with undiagnosed DR. Subgroup analyses were performed based on the best-corrected visual acuity of the worse-seeing eye and the presence of vision-threatening DR.

Results: Up to 94.1% of participants with DR were previously undiagnosed. Adjusted multivariable logistic regression analysis demonstrated that a higher number of comorbid ocular diseases (odds ratio [OR], 0.33, 95% confidence intervals [CI], 0.27–0.40), a longer duration of diabetes (OR, 0.96, 95% CI, 0.94–0.98), advanced

stages of severe non-proliferative diabetic retinopathy (NPDR) (OR, 0.33, 95% CI, 0.22–0.50) or proliferative diabetic retinopathy (PDR) (OR, 0.22, 95% CI, 0.10–0.48) were significantly associated with an decreased risk of undiagnosed DR. Denying a history of hyperlipidemia (OR, 2.03, 95% CI, 1.47–2.81), denying a history of renal disease (OR, 1.89, 95% CI, 1.24–2.87), or being unaware of whether they had renal disease (OR, 2.96, 95% CI, 1.46–6.01) were associated with an elevated risk of undiagnosed DR. However, this association disappeared in the blindness subgroup.

Conclusions: A substantial proportion of DR patients remain undiagnosed. It is crucial to identify the risk factors associated with undiagnosed DR in order to achieve earlier disease detection and prevent avoidable vision loss.

Abstract No.: 200828

Projecting the Future Burden of Blindness and Vision Loss: A Global Epidemiological Study Integrating 30-Year Trends and Bayesian Forecasts to 2050

First Author: Quanyong YI

Co-Author(s): Wai Kit CHU, Xueli SHAO, Tianyu WANG, Hongfei WENG

Purpose: To assess global blindness and vision loss (BVL) burden, including cataract, glaucoma, age-related macular degeneration (AMD), refraction disorders, near vision loss, and other vision loss, from 1990 to 2021 through prevalence and disability-adjusted life years (DALYs).

Methods: Data from the Global Burden of Disease study were analyzed. Health inequalities and system efficiency were evaluated using Slope/Concentration Indices of Inequality (SII/CII) and frontier analysis.

Results: Near vision loss dominated BVL burden (2021: 40% of global DALYs), with cases rising 170% and age-standardized rates increasing significantly. Cataract prevalence cases doubled (42.33 to 100.57 million), but age-standardized rates showed minor fluctuations (1145.05 to 1181.01 per 100,000); its DALY rate declined (91.06 to 76.97). Refraction disorders prevalence increased (95.98 to 159.77 million), yet age-standardized prevalence/DALY rates decreased (prevalence: 2053.56 to 1919.66; DALY: 88.04 to 79.11 per 100,000). Glaucoma, AMD, and other vision loss saw rising raw cases but declining age-standardized rates globally. Middle SDI regions experienced the greatest burden growth. South Asia and Sub-Saharan Africa had the highest burdens. Lower sociodemographic index (SDI)/socioeconomic status correlated strongly with higher BVL burden, though absolute inequalities slightly narrowed.

Conclusions: Sustained BVL reduction requires strengthened eye health systems, expanded early detection and treatment of preventable conditions

(especially presbyopia), and prioritized care for aging populations.

Abstract No.: 201505

Proteomic Profiling of Lens Capsule in Cataract Patients From High- and Moderate-UV Regions (Tibet Versus Beijing)

First Author: Shumei TAN

Co-Author(s): Xiaodan JIANG, Xuemin LI, Ziyuan LIU, Yuchen WANG

Purpose: Ultraviolet (UV) radiation is a major risk factor for age-related cataract (ARC). This study compared proteomic alterations in ARC patients from high-UV (Tibet) and moderate-UV (Beijing) regions.

Methods: This observational study adhered to the ethical principles of the Declaration of Helsinki for medical research involving human subjects. Anterior lens capsules were collected from 5 Beijing and 6 Tibet ARC patients matched for age, sex, and clinical parameters. Proteomic analysis was performed using SP3-based LC-MS/MS and DIA-NN. Bioinformatics analysis included GO and KEGG enrichment in R.

Results: We identified 313 differentially expressed proteins (DEPs) ($p < 0.05$ and $|FC| \geq 1.5$). Key antioxidant proteins (GPX1, GPX3, and GPX4) were downregulated in the Tibet group, whereas MGST2 was upregulated. The lens structural protein CRYBB3 (β -crystallin) and the mitochondrial functional protein CYCS were also significantly downregulated in the Tibet group. GO analysis revealed significant differences in molecular functions—including oxidoreductase activity, antioxidant activity, structural molecule activity, phospholipid-hydroperoxide glutathione peroxidase activity, selenium binding, glutathione peroxidase activity, and peroxidase activity—between the two groups. KEGG analysis indicated upregulation of peroxisome and arachidonic acid metabolism, and downregulation of ribosome, glutathione metabolism, and phenylalanine metabolism in the Tibet group.

Conclusions: Chronic high-altitude UV exposure may promote ARC pathogenesis through impaired antioxidant capacity, dysregulated lipid metabolism, and suppression of glutathione pathways. These findings provide novel insights into the molecular mechanisms of UV-induced cataract and suggest potential therapeutic targets.

Abstract No.: 206242

SIGHT: Advancing Super-Specialty Eye Care to Grassroots Populations in Rural Uttar Pradesh

First Author: Diva MISRA

Purpose: To evaluate the effectiveness of the SwarnJyoti Initiative for Grassroots Healthcare Transformation (SIGHT) in reducing preventable

blindness by expanding retinal and glaucoma care in underserved rural communities.

Methods: Specialty outreach camps were organized in rural Lucknow and adjoining regions. Screening was conducted using handheld fundus cameras and rebound tonometers, supported by local health workers. Patients with abnormal findings were referred to the base hospital for subsidized or Ayushman Bharat-covered treatments, including intravitreal injections, retinal and glaucoma surgeries, and long-term medication support.

Results: From 2022–2023, SIGHT screened 6,000 patients, diagnosing 300 with retinal diseases and 121 with glaucoma. In 2024, screenings expanded to another 7,050 patients, with 450 retinal cases and 130 glaucoma cases identified. Among these, 57% received definitive interventions (surgeries/injections/medications) at reduced cost. Outcomes included improved visual prognosis, increased treatment compliance, and reduced disease burden compared with baseline community data.

Conclusions: SIGHT demonstrates that super-specialty eye care delivery is both feasible and impactful at the grassroots level. The program has successfully scaled up screening and treatment for retinal and glaucoma diseases in rural Uttar Pradesh, improving patient outcomes through affordable, technology-enabled, and government-supported interventions. Expansion into pediatric, oculoplasty, and corneal subspecialties is planned.

Abstract No.: 206369

Ten-Year Changes in Diabetic Retinopathy Prevalence in Indonesia From 2014 to 2024: A Multiple Cross-Sectional Survey

First Author: Herdifitriane YANUARISTI

Co-Author(s): Anggraeni PUSPITA, Muhammad SASONGKO, Firman WARDHANA, Rifa WIDYANINGRUM, Felicia WIDYAPUTRI

Purpose: Diabetic retinopathy (DR) remains a leading cause of preventable blindness, reflecting both diabetes control and access to screening. The Jogjakarta Eye Diabetic Study in the Community (JOGED.COM) was an ongoing, community-based survey to map the prevalence of DR in the Indonesian population initiated in 2014. In the same year, 2014, Indonesia began significant health reforms, including the implementation of national health insurance and the integration of eyecare into the national health system. Therefore, we aimed to compare DR prevalence over the past decade to reflect the impact of this health system reform.

Methods: This was a community-based, multiple cross-sectional study of individuals with type 2 diabetes in Yogyakarta. The first cohort was recruited between 2014 and 2016 ($n=1184$), and the second cohort was

between 2021 and 2024 (n=2785). We used multistage, clustered random sampling. Two fields of retinal photographs were graded using the modified Airlie House classification into mild, moderate, and vision-threatening DR (VTDR).

Results: DR and VTDR prevalence declined from 43.1% and 26.3% to 34.4% and 17.3%. Mild and moderate NPDR increased slightly, while severe NPDR and PDR decreased. Declines were more pronounced in urban areas. Urban residence (OR 1.45, 95%CI 1.20–1.75), oral medication (OR 2.67, 95%CI 1.04–6.85), insulin use (OR 5.23, 95%CI 1.95–14.02), and combination therapy (OR 4.57, 95%CI 1.73–12.02) were significantly associated with DR.

Conclusions: DR and VTDR prevalence have decreased over the past decade, reflecting the positive impacts of health system reform on improved screening and diabetes management. However, the burden of VTDR remained substantial, highlighting the continued need for systematic interventions in Indonesia.

Abstract No.: 204965

The Association Between Socio-Behavioral Variables and Visual Impairment Among the Chinese Elderly: A Population-Based Cross-Sectional Study

First Author: Augusta Avril **TANG**
Co-Author(s): Kendrick Co **SHIH**

Purpose: Our objectives were to examine for associations between socio-behavioral variables and visual impairment in Chinese subjects 50 years and older, and also estimate the age- and gender-adjusted rate of visual impairment in this population.

Methods: This was a population-based cross-sectional survey. We included subjects who were local Chinese residents aged ≥ 50 , and scoring ≥ 7 in the Abbreviated Mental Test score. The fieldwork included a comprehensive eye examination, body measurements, and questionnaires on marital status, housing condition, overnight work, and smoking status, and was carried out from 20th May 2019 to 24th January 2020.

Results: Of the 2,665 included subjects, those aged ≥ 80 (vs 50-59: AOR 1.040, 95% CI 1.025-1.054), being widowed (vs unmarried: AOR 1.011, 95% CI 1.001-1.022), living in rental estate (vs private housing: AOR 1.089, 95% CI 1.050-1.129), with VFL ≥ 13 (vs ≤ 12 : AOR 1.006, 95% CI 1.000-1.012), attributed to the 3rd quartile of working overnight (vs never worked overnight: AOR 1.013, 95% CI 1.002-1.024), and the 4th quartile of cigarettes-smoking (vs never smoked: AOR 1.044, 95% CI 1.017-1.073) had significantly worse visual acuity (BCVA). Comparing pinhole VA with best corrected VA, there was a significant decrease in the age-and-sex adjusted rate from 7.99% (6.42-9.95) to 0.83% (0.30-1.91).

Conclusions: Worse visual acuity was highest among cigarette-smokers, followed by night-shift workers in the Chinese elderly, with increased AORs in the high-risk groups of age ≥ 70 , BMI ≥ 25 , hypertension, and VFL ≥ 13 . We propose investigating the adequacy of access to eye-care services in low socioeconomic areas of Hong Kong, and conducting longitudinal studies for follow-up.

Abstract No.: 205409

The Changing Landscape of Barriers to Cataract Surgery Among Adults Aged 50 Years and Older in Sarawak Zone of Malaysia: Comparative Analysis From the National Eye Survey II and III

First Author: Siti Nurhuda **SHARUDIN**
Co-Author(s): Fei Yee **LEE**, Norasyikin **MUSTAFA**, Mohamad Aziz **SALOWI**, Wan Radziah **WAN NAWANG**

Purpose: This study examined barriers to cataract surgery among adults aged 50 years and above in Sarawak, Malaysia, comparing findings from the National Eye Survey II (2014) and III (2023).

Methods: A population-based cross-sectional survey was conducted in 2023 using the RAAB methodology with multistage cluster sampling. Eligible participants underwent standardized visual assessments and structured interviews on barriers to cataract surgery.

Results: Of 4,933 eligible individuals, 4,748 were examined (96.2%). Operable cataract prevalence decreased from 27.1% in 2014 to 20.1% in 2023. In 2014, the main barriers were “need not felt,” unawareness, and fear of surgery. By 2023, “need not felt” dominated (48.1%), followed by unawareness (14.8%) and fear (10.7%), while financial and access barriers declined. Logistic regression in 2014 showed cost, provider denial, no access, and local reasons were significant predictors of poor vision. In 2023, “need not felt” (AOR: 0.480, 95% CI 0.278, 0.843, $p=0.010$), inability to afford (AOR: 4.537, 95% CI 1.810, 11.373, $p=0.001$), provider denial (AOR: 5.482, 95% CI 1.006, 29.879, $p=0.049$), and local reasons (AOR: 1.99, 95% CI 1.116, 3.549, $p=0.020$) remained significant.

Conclusions: Barriers in Sarawak have shifted from financial and access-related issues to perceptual and attitudinal factors. However, both traditional and emerging barriers continue to predict poor visual outcomes. Strengthened health education, financial support, and community engagement are essential to promote timely surgery.

Abstract No.: 203462**Thirteen-Year Risk of Myopic Complications by 3D-MRI-Defined Eye Shape in the Zhongshan High Myopia Cohort***First Author: Wei WANG*

Purpose: The long-term prognostic value of three-dimensional magnetic resonance imaging (3D-MRI)-defined eye shape in high myopia is not well established. This study aims to evaluate the association between baseline eye shape and 13-year risk of myopic complications.

Methods: This longitudinal cohort study, the Zhongshan High Myopia Cohort (ZHMC), included 190 highly myopic eyes (axial length ≥ 26.0 mm) from 126 patients who underwent 3D-MRI imaging at baseline and were followed for 13 years at Zhongshan Ophthalmic Center, Guangzhou, China. The mean (SD) baseline age was 32.0 (13.9) years, and 48.4% were female. Baseline global and detailed eye shapes were classified on 3D-MRI as non-deformed vs deformed, and into spheroidal, ellipsoidal, conical, nasally distorted, temporally distorted, or barrel-shaped morphotypes. Primary outcomes were axial length (AL) elongation trajectories and cumulative 13-year incidence of pathologic myopia-related complications, including myopic macular degeneration (MMD) progression, posterior staphyloma, subfoveal choroidal thinning, visual field defects, and visual impairment.

Results: Deformed eyes showed significantly faster AL elongation than non-deformed eyes (0.091 mm/year vs 0.047 mm/year; difference, 0.044 mm/year; $P < .001$). Baseline deformation was associated with higher risks of fast AL elongation (adjusted odds ratio [OR], 3.59; 95% CI, 1.18–10.93), subfoveal choroidal thinning (OR, 9.18; 95% CI, 2.14–39.44), and incident visual field defects (OR, 11.25; 95% CI, 1.99–63.49). In morphotype-specific analysis, nasally distorted eyes had the highest risk of fast AL elongation (OR, 5.56; 95% CI, 1.35–22.91) and MMD progression (OR, 4.64; 95% CI, 1.44–14.88), while conical eyes showed markedly elevated risk of visual field defects (OR, 9.69; 95% CI, 1.50–62.73).

Conclusions: In this 13-year cohort of high myopia, 3D-MRI-defined eye shape was a strong predictor of subsequent axial elongation and vision-threatening complications. Distinct morphotypes conveyed heterogeneous risk profiles, supporting the utility of eye shape phenotyping for individualized risk stratification in high myopia.

Abstract No.: 204397**Validation of Community-Based Vision Screening by Trained Community Health Workers Against Optometrist Standards***First Author: Maneck NICHOLSON**Co-Author(s): Radhika KRISHNAN, Ashwini ROGYE, Anshu SINGH*

Purpose: In low-resource settings like India, access to optometrists is limited & expensive. We trained local women as community health workers (“Sakhi” in Hindi means “friend”) to perform vision screenings and evaluated the accuracy of their assessments to those of optometrists for cost-effective programs.

Methods: Community health workers underwent one month of training in vision assessment and basic eye examinations under the supervision of an optometrist. Screening included distance visual acuity (VA) using the PEEK ACUITY vision app, near VA using the near vision booklet (multiple languages, numbers, and symbols for illiterate people), a basic torchlight examination, and history taking for common eye conditions in individuals aged 5 years and above. Door-to-door screening in urban slums covered 20,000 individuals; a 2% subset ($n = 500$) was randomly re-examined by optometrists, with complete data for 384 individuals analysed. Results were examined qualitatively for referral ($< 6/12$, $< N6$) and quantitatively for each eye (distance and near VA, logMAR). Sensitivity, specificity, PPV, NPV, tests for significance, and Pearson correlations were used to assess agreement.

Results: Referral decisions showed high accuracy: 164 true positives, 216 true negatives, 21 false positives, 17 false negatives; sensitivity 88% (83.3–92.5%), specificity 91% (88.6–95.4%), PPV 88.6% (85.5–94.1%), NPV 92.7% (86.8–94.1%), kappa = 0.81. Distance VA showed good agreement: OD mean 0.1909 vs 0.1872 ($r = 0.732$, $p = 0.75$, ICC = 0.72); OS mean 0.1764 vs 0.1859 ($r = 0.054$, $p = 0.66$, ICC = 0.65). Near VA: OD 0.38 vs 0.36 ($p = 0.42$); OS 0.41 vs 0.34 ($p = 0.03$), likely reflecting testing order, fatigue, or optometrist sensitivity.

Conclusions: Trained community health workers demonstrated high sensitivity and specificity, with strong agreement with optometrists. These findings support the use of community health workers for large-scale, cost-effective vision screening in underserved populations.

Ophthalmic Trauma

Abstract No.: 206047

A Novel Animal Model of Intraretinal Proliferative Vitreoretinopathy Induced by Intravitreal Injection of 0.5M NaOH in Mice

First Author: Zhao YIMING

Co-Author(s): Lin XIAOFENG

Purpose: To establish a mouse model of retinal proliferation induced by retinal injury, and evaluate the retinal morphology and glial response in this animal model.

Methods: Healthy SPF C57BL/6J mice (6-8 weeks) were used in this study, and they were divided into the control group and the modeling group (intravitreal injection of four concentrations of NaOH solution: 0.3M, 0.5M, 0.75M, and 1.0M). On the 7th, 14th, and 28th day after modeling, eyeballs were enucleated for HE staining and immunofluorescence staining to observe retinal morphology, retinal thickness, and retinal gliosis.

Results: We developed a robust retinal injury model of intraretinal proliferative vitreoretinopathy in mice by intravitreal injection of 0.5M NaOH. At 7 days after modeling, HE staining images represented the retinal was thickening. Immunofluorescence staining showed that GFAP expression increased significantly, and Müller glial fibrous extended to the outer retina into the subretinal space, forming tiny glial scars. At 14 days after remodeling, retinal damage was aggravated with retinal folds, shrinkage of glial fibrous, and extensive glial scars. At 28 days after remodeling, retinal architecture was completely disorganized, and the retinas were thinning and shortening. Immunofluorescence staining with Vimentin and GS showed a large area of glial scars in the retina.

Conclusions: Intravitreal injection of 0.5M NaOH in mice can successfully elicit massive gliosis that will imitate the status of advanced proliferative vitreoretinopathy in patients. GFAP is a well-suited marker for early reactive gliosis. Glial responses and glial scars in the later stage can be evaluated by co-staining of Vimentin and GS in this animal model.

Abstract No.: 205093

Clinical Characteristics and Prognostic Factors of Visual Outcome in Patients With Anterior Chamber Foreign Bodies: A Retrospective Cohort Study

First Author: Shaolei HAN

Co-Author(s): Tingting WANG

Purpose: This study aimed to evaluate the clinical characteristics, management strategies, and prognostic factors affecting final best-corrected visual acuity

(BCVA) in patients with anterior chamber foreign bodies (ACFBs).

Methods: In this retrospective cohort study, 82 patients (82 eyes) with ACFBs who underwent intraocular foreign body removal between January 2012 and January 2022 were analyzed. Demographic characteristics, injury mechanisms, clinical manifestations, and surgical outcomes were systematically reviewed. Both univariate and multivariate logistic regression analyses were performed to identify factors associated with postoperative BCVA.

Results: Of 912 patients with intraocular foreign body (IOFB) injuries, 82 (9.0%) were diagnosed with ACFBs. The cohort exhibited a male predominance (85.36%) with a mean age of 39.18 years (range: 4–65). Time from injury to surgery ranged from immediate to 12 days (median: 1 day). Primary injury mechanisms included hammering metal (39.0%) and chiseling (12.2%). Foreign bodies comprised metallic fragments (63.4%), eyelashes (12.2%), and plant debris (8.5%). Common complications included traumatic cataract (26.8%) and secondary glaucoma (13.4%). Univariate analysis revealed significant correlations between final BCVA and baseline BCVA ($P < 0.001$), traumatic cataract ($P = 0.011$), secondary glaucoma ($P < 0.001$), and time to surgery >48 hours ($P = 0.025$). Multivariate analysis identified better baseline BCVA (OR = 11.24, 95% CI [6.38–19.82]) and absence of traumatic cataract (OR = 2.15, 95% CI [1.25–3.73]) as independent predictors of a favorable visual outcome.

Conclusions: Better baseline BCVA and the absence of traumatic cataract are critical determinants of good visual prognosis in ACFB patients. Our results support the clinical imperative of early surgical intervention (within 48 hours post-injury) and timely management of secondary complications for optimizing visual recovery.

Abstract No.: 203903

Clinical Features and Prognosis of Intraocular Foreign Body With Endophthalmitis

First Author: Hao CHEN

Co-Author(s): Yifan JIN, Wenlong WEI, Yong WEI, Zhenquan ZHAO

Purpose: To evaluate the clinical features and treatment outcomes of patients with IOFB with endophthalmitis, and analyze the prognostic factors affecting the anatomic and functional outcomes of patients.

Methods: Retrospective clinical study. A total of 1704 patients (1704 eyes) with IOFB were included. Endophthalmitis was diagnosed in 263 eyes. UCVA, BCVA, demographic and trauma characteristics, anatomical injury, clinical treatment, and outcome were recorded. GLMM was used to analyze the

correlation between the timing of treatment, nature of foreign body, nature of infection, number of operations, location of injury, and the anatomic and functional outcomes of patients.

Results: Mean age was 45.7±12.9 years. Magnetic, non-magnetic, unidentified metal and vegetable, mineral, animal and unidentified foreign bodies were 65.8%, 1.3%, 18.1%, 0.6%, 7.7%, 4.5%, 1.9%. The time between injury and removal of foreign body was (98.1±359.5) h. Microbiological examination showed 80 cases were positive for bacterial culture and 73 cases were negative. The mean preoperative UCVA was 1.67±0.79 logMAR. Preoperative visual acuity was strongly correlated with functional outcomes. Preoperative visual acuity and surgical method were closely related to the anatomical outcome. During 2015 to 2024, the incidence of intraocular foreign body-related endophthalmitis was 12.5%-22.7% with a fluctuating upward trend.

Conclusions: The incidence of intraocular foreign body-related endophthalmitis was 15.4%. In patients with intraocular foreign bodies with endophthalmitis, *Staphylococcus epidermidis* and *Bacillus cereus* are the first and second pathogenic bacteria. The incidence of endophthalmitis is not significantly reduced with intravitreal injection of cefazolin sodium. Preoperative UCVA and surgical method were closely related to the anatomic outcome of patients.

Abstract No.: 205840

Epidemiology and Surgical Outcomes of Mechanical Ocular Trauma in the United Kingdom: A Single-Centre Retrospective Study

First Author: Tsz Chun Jason WONG

Co-Author(s): Ankur BARUA, Hoi Ying Alicia LIU, Arijit MITRA

Purpose: Ocular trauma may cause significant visual impairment and numerous retinal complications without timely treatment, yet the epidemiology and surgical outcomes of ocular trauma in the Midlands, UK, remain outdated. This study aims to evaluate the characteristics of eye trauma patients and review their surgical outcomes.

Methods: A single-centre retrospective study was conducted on patients admitted with mechanical ocular trauma during 2022-2024 with surgical intervention. The Birmingham Eye Trauma Terminology (BETT) classification system and Ocular Trauma Score (OTS) were adapted to describe traumatic characteristics. Surgical outcomes were evaluated at presentation, immediately post-operation (post-op), and 3-month post-op using best-corrected visual acuity (BCVA) and intraocular pressure (IOP) adjusted score, which was calculated by absolute value difference between the reference range of 10-21 mmHg and the recorded IOP.

A smaller adjusted score indicates a better surgical outcome.

Results: Seventy-five patients (White 40%; Asian 29.3%) (mean age 43.3±22.0 years) were recruited. Males (80%) dominated ($p<0.0001$). The majority (86%) had graded OTS of 1-3. 73.3% had open wounds, 20% had intra-ocular foreign bodies, and 65.3% involved globe rupture. Notably, 25.3% presented with retinal detachment. Mean BCVA was improved at post-op and 3 months by 0.114 and 0.432 logMAR, respectively (both $p<0.0001$). Post-op, the mean IOP adjusted score improved by 1.861 mmHg ($p=0.005$) and stabilized without significant change at 3 months ($p=0.736$).

Conclusions: This study presented the updated epidemiology and surgical outcomes of traumatic eye injuries in the Midlands, using classification systems dedicated to ocular trauma on first-hand data. Our results show that timely operation may preserve and even enhance mean BCVA & IOP and avoid further structural or functional deterioration despite globe rupture and retinal detachment.

Abstract No.: 205843

Epidemiology and Surgical Outcomes of Traumatic Corneal Perforation: A Retrospective Study in a UK Tertiary Eye Emergency Centre

First Author: Tsz Chun Jason WONG

Co-Author(s): Ankur BARUA, Hoi Ying Alicia LIU, Arijit MITRA

Purpose: Corneal perforation is a frequent complication of ocular trauma and can cause significant visual impairment without timely treatment. However, there is a lack of up-to-date statistics that systematically summarise the epidemiology and clinical outcomes of traumatic corneal perforation in the United Kingdom (UK), especially in the Midlands.

Methods: A single-centre retrospective study was conducted on patients diagnosed with traumatic full-thickness corneal perforation between January 2022 and July 2024. The Birmingham Eye Trauma Terminology (BETT) Classification System and Ocular Trauma Score (OTS) were adapted to describe trauma characteristics. Surgical outcomes were evaluated with best-corrected visual acuity (BCVA) and intra-ocular pressure (IOP) at presentation, immediately post-operation, and three-month post-operation.

Results: Twenty-four cases (White, 41.7%; Asian, 33.3%; not specified, 25%) were recorded. Mean age was 42.2 years (SD=18.6), with no differences in eye laterality (left, 54.2%). The vast majority (87.5%) had graded OTS of 1-3. Males (85.7%) predominated the incidence. The majority, 58.3% had globe rupture, 95.8% open wounds, and 20.8% involved an intraocular foreign body. At presentation, the mean BCVA was 2.24 logMAR, with no significant changes at post-op (2.10)

and 3-month (1.91). The average IOP at presentation was 5.71, and improved and stabilized at 13.4 and 14 at post-operation and 3 months, respectively.

Conclusions: This study presented the updated epidemiology and clinical outcomes of traumatic corneal perforation cases in the UK Midlands. The ability to improve IOP to within the normal range highlights the importance of timely operation to effectively manage post-trauma hypotony and avoid further structural or functional deterioration despite globe rupture.

Abstract No.: 204853

Long-Term Outcomes After Pars Plana Vitrectomy for Branch Retinal Vein Occlusion With Vitreous Hemorrhage: A Retrospective Cohort Study From 2013 to 2022

First Author: Wei LIN

Co-Author(s): Mingxue REN, Yanlin ZENG

Purpose: To describe long-term outcomes after pars plana vitrectomy (PPV) for branch retinal vein occlusion (BRVO) with vitreous hemorrhage (VH) and identify factors that influence final vision and complications.

Methods: This was a single-centre, consecutive, retrospective cohort enrolling 341 eyes of 341 patients of BRVO with VH who underwent PPV between January 2013 and December 2022. Inclusion criteria were: BRVO with the presence of VH and a minimum follow-up of 3 months. Exclusion criteria were previous vitrectomy, concurrent retinal vascular disease, and other ocular diseases that influenced final outcomes.

Results: Mean age was 60.7 ± 9.8 years; 56.0% were female. Single-quadrant superotemporal BRVO predominated (58.6%). Intraoperatively, epiretinal membrane was present in 24.3%, macular oedema in 9.1%, retinal detachment in 24.0%, and neovascularisation elsewhere in 11.4%. Endolaser was applied in 96.5%, adjunct anti-VEGF in 7.0%, and silicone oil tamponade in 17.9%. Mean baseline BCVA was 1.38 ± 0.58 logMAR (Snellen $\approx 20/480$). At 3 months, BCVA improved to 0.56 ± 0.65 ($\approx 20/72$) and remained stable at 0.54 ± 0.75 ($\approx 20/69$) at a mean final follow-up of 21.4 ± 24.6 months (range 3–127). Multivariable regression identified baseline VA ($\beta = 0.094$, $P = 0.041$), postoperative neovascular glaucoma (NVG, $\beta = 2.195$, $P < 0.001$), and postoperative retinal detachment ($\beta = 1.661$, $P < 0.001$) as independent predictors of worse final VA, whereas pre-existing posterior vitreous detachment predicted better outcome ($\beta = -0.097$, $P = 0.034$). Complications occurred in 33.7% of patients. Recurrent VH (9.6%) and new-onset ME (8.8%) were most common; 4.4% developed recurrent retinal detachment requiring re-operation, and 0.6% developed NVG. Silicone oil tamponade and intraoperative retinal laser photocoagulation reduced the risk of recurrent VH (OR 0.129 and 0.193, respectively). Transient IOP

elevation >24 mmHg was noted in 7.0%, with only 1.5% progressing to secondary glaucoma.

Conclusions: PPV achieves rapid and sustained visual improvement in the majority of BRVO with VH. Final vision is principally determined by baseline acuity and avoidance of retinal re-detachment and neovascular glaucoma. Intraoperative retinal laser photocoagulation and appropriate tamponade selection minimise recurrent VH.

Abstract No.: 201699

Multi-Omics Profiling of Retinal Pigment Epithelium Reveals Enhancer-Driven Activation of RANK-NFATc1 Signaling in Traumatic Proliferative Vitreoretinopathy

First Author: Mengyu LIAO

Co-Author(s): Xiaohong WANG, Hua YAN

Purpose: To elucidate the epigenomic and transcriptomic reprogramming that underlies proliferative vitreoretinopathy (PVR) and to identify druggable signaling nodes in retinal pigment epithelium (RPE).

Methods: We subjected male mice to a standardized traumatic PVR model and performed ATAC-seq and ChIP-seq (H3K27ac, H3K4me1, H3K9ac) to capture chromatin accessibility and enhancer activation in freshly isolated RPE. Multi-omics sequencing was integrated to correlate enhancer states with gene-expression programs. Transcription-factor regulatory networks were constructed to identify master regulators, followed by intraocular delivery of (1) enhancer-blocking nanomedicines, (2) AAV-mediated NFATc1 shRNA, and (3) neutralizing anti-RANK antibody. Structural and functional outcomes were assessed by optical coherence tomography, electroretinography, and histopathology.

Results: Progressive PVR was accompanied by enhancer activation, with enhancers converging on the RANK-NFATc1 locus. Transcriptomic integration revealed a strong enhancer–promoter correlation driving fibroblast-associated gene signatures. Treatment with enhancer-blocking eNano-JQ1 reduced chromatin accessibility and PVR progression, AAV-shNFATc1 decreased NFATc1 and fibrosis, anti-RANK antibody attenuated membrane proliferation, collectively preserving retinal architecture and function.

Conclusions: Our findings elucidate the epigenetic basis underlying the activation of PVR-associated genes during RPE cell fate transitions and offer promising therapeutic avenues targeting epigenetic modulation and the RANK-NFATc1 axis for PVR management.

Abstract No.: 205132**Nine-Year Clinical Characteristics and Visual Outcomes of Post-Traumatic Endophthalmitis at a Tertiary Referral Centre in Thailand**

First Author: Dhanach **DHIRACHAIKULPANICH**
Co-Author(s): Thipsukon **AMNARTPANICH**, Pitipol **CHOOPONG**, Sathiya **KENGUNPANICH**

Purpose: To describe clinical characteristics, microbiological profiles, visual outcomes, and prognostic factors of post-traumatic endophthalmitis at a tertiary referral centre in Thailand.

Methods: A retrospective review was conducted of patients diagnosed with post-traumatic endophthalmitis between January 2014 and December 2022. Demographic data, clinical presentation, microbiological profiles, treatment, and outcomes were analyzed. Prognostic factors for poor final visual outcome (final visual acuity worse than 6/60) were assessed using logistic regression.

Results: Forty-eight eyes of 48 post-traumatic endophthalmitis patients were identified: 34 (70.8%) had penetrating injuries, 8 (16.7%) abrasions, and 6 (12.5%) ruptured globes. Causative organisms were identified in 25 patients (58.1%). Gram-positive bacteria predominated (29.1%), with *Staphylococcus* spp. (12.5%) and *Bacillus* spp. (10.5%) being the most common isolates. All patients (100%) received antimicrobial therapy, while 31 (64.6%) received topical corticosteroids. For surgical intervention, pars plana vitrectomy was performed in 28 patients (58.3%), while 5 patients (10.4%) required enucleation or evisceration. At final follow-up (median 7.7 months), 23 patients (47.9%) achieved visual acuity equal to or better than 6/60, whereas 15 (31.3%) remained with no light perception or required enucleation/evisceration. Univariable and multivariable logistic regression were performed for prognostic factors of poor visual outcome (visual acuity < 6/60). The analysis identified positive pathogen isolation (adjusted OR 6.57, 95% CI 1.67–25.88, $p=0.007$) as a predictor of poor outcome, while topical steroid treatment (adjusted OR 0.17, 95% CI 0.04–0.76, $p=0.020$) was associated with better prognosis.

Conclusions: Our findings highlighted the devastating visual consequences of post-traumatic endophthalmitis and suggested that identified positive pathogen isolation and topical steroid use might be potential prognostic factors for visual outcomes of post-traumatic endophthalmitis treatment.

Abstract No.: 205814**Open Globe Injuries and Their Visual Outcome Using Ocular Trauma Score in a Tertiary Care Centre of Central India**

First Author: Nidhi **MUNDADA**
Co-Author(s): Shobhita **KAVURU**, Rekha **KHANDELWAL**

Purpose: To assess visual outcome in Open globe injuries using the Ocular Trauma Score (OTS) at a tertiary care centre.

Methods: After ethical approval, a prospective study was conducted on all patients with open globe injury for a period of 24 months. Demographic data, injury details, initial visual acuity, time from injury to treatment, etc, were noted. The Ocular Trauma Score was calculated, and the final visual outcome at the end of three months after surgical intervention was compared with the OTS.

Results: The study included 55 open globe injury cases where M:F ratio was approximately 7:1. The average time from injury to presentation was 71.93 hours. 87.3% of injuries were penetrating, with farms and industries as the most common sites. The most common causes of OGIs were metallic objects (29.4%), glass (15.4%), and fireworks (9.4%). At presentation, 79% of patients had UCVA < 20/400. Post-treatment, 52% showed improvement in BCVA by two or more lines, while 45% remained unchanged, and 1.5% experienced deterioration. The visual prognosis was significantly influenced by the initial severity of injury, nature of the causative agent, and timely intervention ($p < 0.001$). Corneal injuries were the most frequent, followed by lens involvement and vitreous haemorrhage; the most common causes of poor vision were corneal scarring (34.5%) and traumatic cataract (30.9%).

Conclusions: Unilateral blindness is still largely caused by OGIs, particularly when they appear later. Even while frequent treatment improves outcomes, a significant portion of individuals do not regain functional eyesight. Early intervention and strict occupational safety measures could reduce the burden of OGIs.

Abstract No.: 205318**Overview of Ophthalmic Trauma in 2024**

First Author: Syeed Mehabub Ul **KADIR**
Co-Author(s): Md.Golam **HAIDER**, Ashfaque **KHAN**, Riffat **RASHID**

Purpose: to characterize the demographic profiles, patterns of injuries, management strategies, and clinical outcomes of individuals with ophthalmic injuries.

Methods: A Longitudinal study was conducted on ocular and adnexal injured patients at a tertiary eye hospital in Bangladesh from January to December 2024, including the injured patients of the mass

uprising movement in 2024. The study focused on gunshot-injured patients from July to December 2024. We analysed 1489 consecutive cases of ophthalmic injuries in 2024. Data collection included documenting the mechanisms of injury, imaging findings (X-ray, CT, B-scan), surgical interventions, and visual outcomes.

Results: A total of 1,489 ophthalmic trauma patients received treatment at NIOH. Among them, 700 cases were injured by gunshot in the July Revolution in Bangladesh. During the July Revolution, 699 out of 1,087 patients were treated at the National Institute of Ophthalmology. Radiological evaluations revealed metallic foreign bodies in 95.8% cases, while intraocular foreign bodies were found in 57.4% cases. Surgical interventions were required in 97.6% cases of ocular and adnexal injuries, primarily involving vitreoretinal surgery (63.9%), which was performed after a few weeks of primary repair for all patients. Severe vision loss was observed in 73.6% patients. Sixty-nine cases of bilateral ocular injuries exhibited worse outcomes.

Conclusions: Earlier management is an important tool for getting better outcomes for ophthalmic trauma patients. The ophthalmic trauma score may help assess the final visual outcome.

Abstract No.: 204365

Pediatric Traumatic Canalicular Lacerations: Epidemiology, Characteristics and Prognostic Factors

First Author: Shaolei HAN

Co-Author(s): Tingting WANG

Purpose: To investigate the epidemiological and clinical characteristics of pediatric traumatic canalicular lacerations and to analyze the prognostic factors influencing functional outcomes.

Methods: A retrospective study was conducted involving pediatric patients with primary canalicular lacerations treated at Hebei Eye Hospital between January 1, 2013, and December 31, 2022. Data on demographics, injury mechanisms, and surgical outcomes were collected through detailed medical record review. Univariate analysis using Fisher's exact test and multivariate logistic regression was performed to identify prognostic factors.

Results: A total of 89 pediatric patients (66 males and 23 females) with a mean age of 7.26 years were included. There were 65 patients with lower canalicular lacerations, 19 patients with upper lacerations, and 5 patients with concurrent lacerations. The most common cause of injury was trauma with sharp objects (52.8%), followed by electric bicycle accidents (18.0%), falls (18.0%), and dog bites (7.9%). Univariate analysis showed that the location of the laceration ($P=0.009$), mode of injury ($P=0.045$), and the time interval from injury to surgical repair ($P=0.032$) were significantly associated with functional outcomes.

However, age, gender, affected side, stent type, and removal timing did not significantly impact outcomes ($P>0.05$). Multivariate logistic regression analysis revealed that the time interval from injury to surgical repair was an independent prognostic factor for functional repair after surgery ($OR=16.43, 95\%CI 1.17-230.47, P<0.05$), while the location of the laceration and the mode of injury did not have a significant impact on the prognosis ($P>0.05$).

Conclusions: Time to surgical repair is an independent prognostic factor for functional recovery in pediatric canalicular lacerations. Improving public and caregiver awareness of injury risks and implementing preventive measures are essential to reduce incidence and improve outcomes.

Abstract No.: 204678

Posterior Segment Findings of Carotid-Cavernous Fistula Patients in a Tertiary Hospital

First Author: Oscar Jr ACOPIADO

Co-Author(s): Jose Carlo ARTIAGA, Felice Katrina RANCHE

Purpose: This study aims to describe the posterior segment findings in patients with carotid-cavernous fistulas (CCF), and to correlate these findings with treatment outcomes.

Methods: This is a single-center retrospective cross-sectional study employing a medical chart review of angiographically-confirmed CCF patients from January 2011 to December 2023. Demographic data, clinical findings, treatment, and posterior segment diagnoses were recorded for the initial visit and after at least 6 months of follow-up.

Results: A total of 141 patients, or 161 eyes, diagnosed with CCF using cerebral angiography were included. Direct CCF (DCCF) patients (63.8%) were of a younger population (mean age 35.2 years, $p<0.0001$), had male predominance (72.2%, $p<0.0001$), and generally had a history of trauma (95.6%, $p<0.0001$). Indirect CCF (ICCF) patients (36.2%) were more of an older population (mean age 50.6 years, $p<0.0001$), had female predominance (70.6%, $p<0.0001$), and were associated with vascular comorbidities such as hypertension (58.8%, $p<0.0001$) and diabetes (19.6%, $p<0.0001$). Mild to moderate visual impairment (VI) was more common in the indirect type (94.6%, $p=0.008$), while blindness VI was notably high in the direct type (14.6%). The most common posterior segment findings were retinal vessel tortuosity (35.2% in DCCF, 21.4% ICCF) and disc cupping (29.5% in DCCF, 23.2% in ICCF). The most common posterior segment diagnoses were secondary glaucoma (27.6% in DCCF, 25.0% in ICCF) followed by venous stasis retinopathy (21.9% in ICCF, 12.5% in DCCF). DCCF is associated with a high incidence of traumatic optic neuropathy, contributing to severe VI. No significant differences were observed by type

of CCF and type of treatment in terms of changes in posterior segment findings and diagnoses ($p>0.05$).

Conclusions: Approximately one-third of CCF patients will have posterior segment findings related to venous congestion, such as stasis retinopathy and secondary glaucoma, regardless of the type of CCF and treatment strategy. Blindness is more associated with DCCF.

Abstract No.: 203756

Revised Ocular Trauma Score (rOTS): To Develop and Internally Validate a Predictive Model for Visual Outcomes After Open Globe Injury

First Author: Thansit **SRISOMBUT**

Co-Author(s): Somporn **CHANTRA**, Dolchanok **DOLMAN**, Parinee **KEMCHOKNATEE**, Rinrada **KREESANG**, Pennung **THONGTONG**, Nattaporn **VONGSA**

Purpose: We aimed to develop and validate a prognostic scoring model for predicting poor visual outcomes in patients with open globe injury (OGI).

Methods: A retrospective cohort study of patients with OGI from two teaching hospitals in Thailand. 311 patients diagnosed with OGI between 2016 and 2023 were used to develop a multivariable logistic regression model predicting final visual acuity aimed at 6 months post-OGI. Visual outcomes were categorised into two groups using 20/200 as the cut-off for legal blindness. The model's performance was evaluated using receiver operating characteristic curve analysis. Internal validation was conducted with bootstrapping for 500 replications.

Results: Among the patients, 133 (42.77%) had visual acuity worse than 20/200 at the 6-month follow-up. The median follow-up time was 4.14 months, with an IQR of 3.00–11.74 months. Initial visual acuity (VA), relative afferent pupillary defect, rupture, and eyelid injury were among the strongest predictors of visual outcome. Discrimination and calibration of the scoring model were satisfactory, with a C-statistic of 0.8671, a slope of 1 and a calibration-in-the-large of 0. Risk groups were created, categorised as mild, moderate, and severe, with a C-statistic of 0.8094. The ORs for poor final VA ($\leq 20/200$) at 6 months were 1.51 (95% CI, 0.93–2.48) and 45.06 (95% CI, 11.20–387.94) in the moderate and severe risk groups, respectively.

Conclusions: Revised Ocular Trauma Score can be seamlessly used in emergency settings to predict visual outcomes in patients with OGI. Presenting visual acuity (VA) is the strongest predictor. External validation of our model is needed.

Abstract No.: 206226

Risk Factors of Refractory Hypotony After Vitrectomy in Open Globe Eye Injuries

First Author: Yuntao **HU**

Co-Author(s): Kang **FENG**, Wan **LU**, Zhizhong **MA**

Purpose: To explore the risk factors contributing to refractory hypotony in open globe injuries after vitrectomy.

Methods: A total of 211 eyes of open globe injuries were retrospectively studied from the Eye Injury Vitrectomy Study, EIVS. Among them, rupture 121 eyes; penetrating 52 eyes; perforating 15 eyes; intraocular foreign body 23 eyes. All injured eyes underwent vitrectomy. That refractory hypotony was supposed to be sustained IOP with silicon oil filled less than 10mmHg, and IOP without silicon oil less than 8mmHg. The mean time of follow-up was 20 months.

Results: Among the cases, 98 eyes (46.45%) met the criteria of refractory hypotony. rupture 64 eyes (65.31%); penetrating 19 eyes (19.39%); perforating 6 eyes (6.12%); intraocular foreign body 9 eyes (9.18%). Multivariate analysis revealed that refractory hypotony was significantly related to involvement of injuries with the ciliary body ($P=0.036$) or the choroid ($P=0.004$), and the scope of retinal coloboma ($P=0.003$), but there was no significant relation to the size of the eye wound.

Conclusions: In this study, we determined the risk factors of refractory hypotony after vitrectomy in open globe eye injuries. They included ciliary body or choroidal damage, and the scope of retinal coloboma and retinectomy. It may be helpful for saving injured eyes to take aim measures according to risk factors in the treatment of open globe injuries.

Abstract No.: 200688

Surgical Features of Traumatic Cataract: Lessons From 4 Years of War

First Author: Ilya **KOLOMIETS**

Purpose: To share clinical insights and refined surgical strategies for managing traumatic cataracts in wartime conditions, emphasizing visualization techniques, capsular management, and intraoperative decision-making in complex anterior segment trauma.

Methods: This retrospective clinical analysis summarizes the experience of traumatic cataract surgery over four years of active military conflict. The cases included eyes with anterior capsule rupture, zonular dialysis, vitreous prolapse, and intralenticular foreign bodies. Surgical workflow emphasized ocular stabilization, meticulous wound revision, and control of intraocular pressure prior to cataract removal. Intraoperative visualization was optimized via corneal epithelial debridement, vital dye-assisted capsulorhexis, and use of oblique illumination. Mechanical pupil dilation and synechiolysis were

employed for miotic pupils. Capsulorhexis technique was adapted to the state of zonular support, utilizing forceps, cystotome, or scissors. Anterior vitrectomy was performed in cases with vitreous loss. Hydroprocedures were cautiously used or replaced by viscodissection in the presence of suspected posterior capsule rupture. IOL fixation techniques were chosen based on intraoperative findings, including sulcus implantation, Yamane or Canabrava scleral fixation methods.

Results: Surgical outcomes were optimized through tailored intraoperative tactics addressing structural instability, poor visualization, and capsular compromise. Adaptability in instrumentation and IOL fixation allowed successful visual rehabilitation even in severely traumatized eyes.

Conclusions: Wartime conditions impose unique challenges in cataract trauma surgery, demanding flexible, experience-driven approaches. Mastery of visualization enhancement, individualized capsule management, and IOL fixation strategies is essential for safe and effective outcomes in high-stress surgical environments.

Abstract No.: 200475

Visual Outcome Following Firecracker Ocular Injuries – Multicentric Prospective Study

First Author: Deepika R
Co-Author(s): Sabarinath A

Purpose: To study the demographics, type of ocular injuries, management, and visual outcome of the patients with firecracker-related ocular injuries.

Methods: This is a multicentric prospective study conducted among 254 patients who presented to the emergency and outpatient departments during Diwali 2023 across various centers of the Aravind Eye Care System. Data collected include age, sex, laterality, best-corrected visual acuity (BCVA) at the time of presentation, presenting symptoms, type of firecracker, active participation or passive observation, type of ocular injury, management, and visual outcome.

Results: Out of 254 patients, 198 were males, and 56 were females. The Mean age of presentation was 19.76 ± 15.34 . 211 patients (83.3%). 1/3rd of our patients were observers. 14 % presented with blindness. 4 % had open globe injuries. 90 % had normal visual recovery with prompt measures, either conservative or surgical management based on injuries.

Conclusions: Patient with severe visual Impairment at presentation and those with Open Globe injuries had poorer outcome. The Lack of Knowledge about safety measures or failure to adhere to them contributed to the incidents.

Orbital and Oculoplastic Surgery

Abstract No.: 202444

A Case of Atypical Waardenburg Syndrome Caused by Chromosomal Microdeletion

First Author: Xianzhi ZHAO
Co-Author(s): Zeyi LI

Purpose: This study aims to report a case of atypical Waardenburg syndrome (WS) with ocular manifestations as the main feature, caused by a 22q12.3-q13.1 microdeletion (including the SOX10 gene).

Methods: A child with WS, admitted to the Joint Shantou International Eye Center of Shantou University and The Chinese University of Hong Kong on April 14, 2024, was selected as the research subject.

Results: A 7-year-old boy presented with a history of inability to fully open the left eye since infancy. No hearing impairment was noted. Physical examination findings included: depigmentation on the back skin; VOD: 0.1, corrected to 0.3 with -1.00DS/-5.00DC $\times$ 170°; VOS: 0.1, corrected to 0.3 with -2.50DS/-4.00DC $\times$ 25°; left palpebral fissure was 4mm shorter than the right; 45° exotropia of the left eye; complete gray-white iris of the left eye; and retinal depigmentation in both eyes. Chromosomal microarray analysis confirmed deletion of the SOX10 gene. The patient was diagnosed with Waardenburg syndrome upon admission. He first underwent left frontal muscle flap suspension surgery in our hospital. Subsequent left eye strabismus surgery was recommended.

Conclusions: Chromosomal microdeletions in Waardenburg syndrome (WS) are rarely reported, with only 6 relevant cases identified so far. We conclude that comprehensive molecular analysis of all WS-associated genes is essential. This analysis should encompass not only point mutations but also chromosomal microdeletions, to facilitate more accurate diagnosis and reduce the risk of missed or misdiagnoses of WS.

Abstract No.: 202788

A Case of Chronic Dacryocystitis Secondary to Nasolacrimal Duct Injury From an Orbital Fracture Repair Plate

First Author: Yasushi FUJITA
Co-Author(s): Miwa AIKAWA, Tomoyuki KASHIMA, Yohei SATO

Purpose: We report a case of chronic dacryocystitis resulting from iatrogenic nasolacrimal duct injury caused by an orbital fracture repair plate placed at another institution.

Methods: A 35-year-old woman sustained fractures of the left orbital floor and medial wall following a fall. She underwent orbital fracture repair at another hospital, after which she developed persistent left-sided epiphora and purulent discharge, leading to a diagnosis of chronic dacryocystitis. As symptoms persisted, she was referred to our institution. On presentation, examination revealed an elevated tear meniscus, complete obstruction on lacrimal irrigation from both upper and lower puncta, and purulent reflux. Orbital CT demonstrated that the implant traversed the nasolacrimal duct. Dacryoendoscopy directly confirmed the interruption of the duct by the implant.

Results: Through a transconjunctival inferomedial approach, partial removal of the orbital implant (Super Fixorb®) was performed at the site of ductal transection. Under dacryoendoscopic guidance, the residual nasolacrimal duct was visualized, and a lacrimal intubation tube was successfully placed. Postoperatively, lacrimal irrigation was patent, and the patient's symptoms resolved.

Conclusions: We encountered a rare case of nasolacrimal duct transection secondary to orbital fracture repair. This case highlights the importance of carefully considering the anatomical relationship between orbital implants, the lacrimal sac, and the nasolacrimal duct during fracture reconstruction to prevent iatrogenic injury.

Abstract No.: 203483

A Case of Lacrimal Sac Diverticula: Endoscopic Management and Literature Review

First Author: Wang CHENGMEI

Purpose: We would like to submit an original research article entitled "A Case of Lacrimal Sac Diverticula: Endoscopic Management and Literature Review". In the article, we aim to present a case of lacrimal sac diverticula. To improve the understanding and management of lacrimal diverticula and reduce the misdiagnosis rate. Early detection and surgical intervention for the disease can prevent complications like infection or fistula formation.

Methods: A 52-year-old female presented with a 4-year history of left eye epiphora. Clinical evaluation and imaging confirmed left lacrimal sac diverticulum and nasolacrimal duct obstruction. The patient underwent left endoscopic dacryocystorhinostomy (DCR) with lacrimal stent placement under general anesthesia. Intraoperatively, The diverticulum was integrated with the lacrimal sac cavity by resecting the interposing septum. Postoperatively, epiphora resolved completely, and the DCR ostium demonstrated optimal patency and epithelialization, at 1- and 3-month follow-ups.

Results: Under general anesthesia, endoscopic DCR with stent placement was performed. A cystic

mass severely compressed and displaced the native lacrimal sac inferonasally. The diverticular septum was excised, creating a unified sac cavity. At 1-month follow-up, epiphora resolved completely. Endoscopy confirmed a patent DCR ostium with sac-diverticulum communication. The stent was removed at 3 months, revealing a well-epithelialized, appropriately sized ostium.

Conclusions: Surgical intervention is recommended for symptomatic diverticula to prevent complications like infection or fistula formation. Options include dacryocystorhinostomy (DCR) and diverticulectomy.

Abstract No.: 202191

A Novel Nomogram Based on Orbital MRI Parameters for Early Prediction of Dysthyroid Optic Neuropathy in Thyroid-Associated Ophthalmopathy

First Author: Xianzhi ZHAO

Co-Author(s): Yongran LI, Zeyi LI

Purpose: This study aimed to assess orbital magnetic resonance imaging (MRI) differences across various severity levels of thyroid-associated ophthalmopathy (TAO) and compare them to healthy controls. Additionally, it investigated the correlation and diagnostic potential of multiple MRI parameters for dysthyroid optic neuropathy (DON).

Methods: Patients with TAO were classified into mild TAO (66 orbits), moderate-to-severe TAO (59 orbits), and DON (21 orbits). A control group of 25 healthy orbits was also included. Comprehensive ophthalmic exams were done. Generalized estimating equation (GEE) was used to analyze the clinical and MRI data. Univariate and multivariate binary logistic regression identified independent risk factors for DON. The predictive value of MRI parameters for DON was further evaluated using a nomogram, receiver operating characteristic curve, and decision curve analysis.

Results: Significant variations in angle between the medial rectus and optic nerve (AMR-ON) and angle between the lateral rectus and optic nerve (ALR-ON) were observed across the control, mild TAO, and moderate-to-severe TAO groups compared to the DON group ($P < 0.05$). Regression analysis revealed superior rectus muscle area (SRA) and AMR-ON as independent predictors of DON ($P < 0.05$). The SRA + AMR-ON nomogram demonstrated high predictive performance for DON, with an AUC of 0.906 ($P < 0.001$). DCA further confirmed that the SRA + AMR-ON model outperformed Muscle Index and Crowding Index in predictive efficacy for DON.

Conclusions: SRA and AMR-ON serve as independent predictors for DON, and the predictive model combining these parameters is highly effective in forecasting DON onset.

Abstract No.: 206274

Advancing Orbital Blowout Fracture Repair With AI-Assisted Surgical Planning

First Author: Yining WEI

Co-Author(s): Yuan DENG, Yinwei LI, Wodong SHI, Huifang ZHOU

Purpose: Precise reconstruction of orbital blowout fractures remains challenging, especially for large complex defects. Conventional approaches often result in suboptimal restoration of orbital anatomy and complications.

Methods: We applied a novel AI-assisted surgical planning method incorporating patient-specific 3D printed models in 20 patients with orbital blowout fractures. The main outcome was the efficacy of the surgical repair assessed at 6 months after the surgery. Visual acuity, enophthalmos, ocular movement, double vision condition, designing time of reconstructed orbital model, operative time, and complications were also evaluated.

Results: The method was effectively applied for all patients. Postoperative follow-up revealed no significant enophthalmos. CT scans confirmed adequate orbital reconstruction with no soft tissue incarceration. Four of 5 patients with preoperative visual impairment showed improved visual acuity. Ocular movement restriction was largely relieved, with only 2 patients exhibiting slight residual limitation. Diplopia improved in 10 of 11 affected patients, though 1 patient reported intermittent worsening. The mean time for designing the orbital model was 92.95 ± 7.36 seconds, and the average operation time was 44.65 ± 16.58 minutes. No severe complications were observed.

Conclusions: This AI-assisted method is safe and effective for orbital blowout fracture repair. By enabling precise anatomical reconstruction, it can enhance the patients' functional and cosmetic outcomes, offering a promising approach for individualized orbital reconstruction.

Abstract No.: 203103

Analysis of Eye-Related Factors Affecting the Formation of Amblyopia in Patients With Congenital Ptosis

First Author: Weiwei ZHANG

Co-Author(s): Xiaoxia REN, Jingjing WANG

Purpose: To observe the refractive characteristics and incidence of amblyopia in patients with congenital blepharoptosis, and analyze the eye related factors influencing the formation of amblyopia in patients with congenital ptosis.

Methods: Retrospective case analysis study. The clinical data of 696 cases (1,007 eyes) with congenital blepharoptosis in Shanxi Ophthalmic Hospital from January 2016 to December 2019 were retrospectively

analyzed, including uncorrected visual acuity, best corrected visual acuity, levator function, ptosis degree, spherical equivalent, astigmatism, astigmatism type, strabismus, and amblyopia. According to the degree of ptosis, the patients were divided into mild, moderate, and severe groups. The uncorrected visual acuity, best corrected visual acuity, spherical equivalent, spherical diopter, astigmatism, incidence of amblyopia, and astigmatism were compared among the three groups. Binary logistic regression was used to analyze the related factors of amblyopia in patients with congenital ptosis.

Results: 1. Patients with monocular amblyopia were more likely to have anisometropic, and patients with binocular amblyopia were more likely to have ametropic amblyopia (all $P < 0.05$). The incidence of amblyopia and astigmatism in patients with severe congenital ptosis was higher than that in mild and moderate patients (all $P < 0.05$). The astigmatism in severe patients was higher than that in mild to moderate patients ($P < 0.05$). 2. The incidence of amblyopia in OBL was higher than that in WTR and ATR ($P < 0.05$). 3. SE, amblyopic anisometropia, amblyopic ametropia, strabismus, and OBL were the risk factors of amblyopia with congenital ptosis.

Conclusions: 1. Patients with amblyopia in severe congenital ptosis are often accompanied by refractive abnormalities and/or strabismus. Compared with patients with mild to moderate congenital ptosis, the incidence of amblyopia and astigmatism in severe congenital ptosis patients was higher. 2. SE, amblyopic anisometropia, amblyopic ametropia, strabismus, and OBL were the risk factors of amblyopia with congenital ptosis.

Abstract No.: 203614

Analysis of Recurrence Reasons After Lacrimal Punctoplasty

First Author: Pang ZUOXIANG

Purpose: To analyze the possible reasons for recurrence after lacrimal punctoplasty.

Methods: During January 2022 to June 2024, 94 patients (178 eyes, 84 bilateral, 10 unilateral) with narrow or occluded lacrimal punctums received lacrimal punctoplasty by the same ophthalmologist. Among these, 15 cases (2 males, 13 females) showed no improvement in postoperative epiphora. Physical examination revealed edema and/or congestion of the lacrimal punctums, indicating stenosis or occlusion. We conducted further testings for common autoantibodies associated with ocular surface diseases (ESR, RF, SSA, SSB, HLA-B27, HLA-B51, HLA-DRw53-DNA). Fourteen patients underwent testing, while one male patient refused the examination and was subsequently lost to follow-up.

Results: Among 14 patients with postoperative recurrence, 11 (78.6%) tested positive for HLA-DRw53-DNA, with 4 cases additionally positive for HLA-B51. One female patient tested positive for HLA-B51, while another showed positivity for HLA-B27 with an ESR of 25 mm/h. The latter had a three-year history of iritis and ankylosing spondylitis. Only one patient tested negative for all markers. All patients demonstrated negative results in SSA/SSB/RF testing.

Conclusions: In cases of recurrence after lacrimal punctoplasty, the possibility of autoimmune disease should be considered. Further testing of relevant biomarkers is recommended, with HLA-DRw53-DNA, HLA-B27 and HLA-B51 being suggested as routine screening. Caution should be exercised before performing this procedure if there is or may be a history of autoimmune disease, or if there is congestion or edema of the lacrimal punctum.

Abstract No.: 202676

Anterior Segment Optical Coherence Tomography in Punctal Stenosis: A Clinical Correlation and Proposed Grading Scale

First Author: Tabitha GHEEVARGHESE

Co-Author(s): Shruthi TARA

Purpose: To correlate anterior segment optical coherence tomography (ASOCT) parameters with patient-reported symptoms and slit-lamp based punctal anatomy in punctal stenosis.

Methods: We conducted an observational, cross-sectional study of patients aged 50-80 years with idiopathic inferior punctal stenosis. A detailed history and clinical evaluation were done to exclude factors that could alter natural disease progression, iatrogenic interventions, and other causes of epiphora. Epiphora severity was assessed using the Munk scale, and external punctal anatomy was graded on slit lamp biomicroscopy using the Kashkouli scale. Swept-source ASOCT was used to measure parameters such as Outer Punctal Diameter (OPD), outer and inner Internal Punctal Diameters (oIPD, iIPD), Mean Internal Punctal Diameter (mIPD), and Vertical Punctal Depth (VPD).

Results: OPD showed the strongest correlation with Munk scale. A new metric introduced in our study, mIPD, demonstrated the most consistent and progressive correlation with Kashkouli scale. An OPD cut-off value was proposed to diagnose punctal stenosis in this age group. We also developed a grading scale based on mIPD to assess disease severity, monitor progression, and compare treatment outcomes. These results align with previously published studies on ASOCT in punctal stenosis.

Conclusions: The OPD cutoff had high sensitivity and positive predictive value and may be used as a screening tool. A grading system based on mIPD could accommodate inherent flaws in measurement using

ASOCT. This enables an objective approach to using ASOCT for diagnosis, providing research criteria and comparing treatment outcomes in punctal stenosis.

Abstract No.: 203285

Artificial Intelligence in Thyroid Eye Disease Imaging: A Systematic Review

First Author: Haiyang ZHANG

Co-Author(s): Hoi Chi CHAN, Xianqun FAN, Ziyuan LI, Huifang ZHOU

Purpose: This systematic review aims to characterize the current research landscape of artificial intelligence applications in thyroid eye disease, identifying key challenges and future directions.

Methods: Following PRISMA guidelines, a comprehensive literature search was conducted up to January 2025 across multiple databases. Studies utilizing AI with CT, MRI, nuclear, facial, or retinal imaging in TED patients were included. The quality of each study was critically assessed using the APPRAISE AI tool.

Results: A total of 41 studies were included, with sample sizes ranging from 33 to 2,288 participants, predominantly of East Asian ethnicity. Computed tomography and facial imaging were the most common modalities. The research addressed both clinical tasks (diagnosis, activity assessment, severity classification, and treatment prediction) and technical tasks, with image classification being the most frequent. Deep learning models, particularly ResNet and VGG, were predominantly employed. The overall quality of the included studies was moderate.

Conclusions: In conclusion, image-based AI demonstrates significant potential for enhancing diagnostic precision and guiding personalized treatment in TED. However, future work should focus on more robust study designs, developing public datasets, integrating multimodal imaging, and fostering interdisciplinary collaboration to accelerate clinical adoption.

Abstract No.: 201980

Bilateral Superior Ophthalmic Veins Infiltration by IgG4-related Ophthalmic Disease with concomitant Thyroid-Associated Orbitopathy: a Case Report

First Author: Elaine WONG

Co-Author(s): Karen Kar-wun CHAN, Kam Lung Kelvin CHONG, Alvin Lerrmann YOUNG

Purpose: Presentation of a rare case of definite IgG4-related ophthalmic disease with bilateral infiltration of superior ophthalmic veins (SOVs) and lacrimal glands.

Methods: Retrospective case report.

Results: A 69-year-old man with a history of thyrotoxicosis presented with a 6-year history of increasing prominence, eye redness, and lid swelling. He was clinically compatible with active Thyroid Associated Orbitopathy (TAO) with a clinical activity score of 4 out of 7. His Orbital Computed Tomography confirmed TAO; however, it incidentally found bilateral engorged SOVs. Cerebral angiogram ruled out carotid-cavernous fistula. The patient showed a partial response to two cycles of intravenous pulsed methylprednisolone but rebounded shortly. Orbital Magnetic Resonance Imaging was performed, which revealed marked dilatation of bilateral SOV filled with soft tissue, with adjacent infiltrative soft tissue densities and associated enlargement of bilateral superior ophthalmic nerves and lacrimal glands. Left anterior SOV and lacrimal gland incisional biopsies were performed. Pathology revealed a dense lymphoplasmacytic lesion with storiform fibrosis that stained more than 100 IgG4-positive cells per high-power field in the superior ophthalmic vein and lacrimal gland. Diagnosis of definite IgG4-related ophthalmic disease (IgG4-ROD) infiltrating bilateral SOV and lacrimal glands is reached. The patient was started on a Rituximab-biosimilar, with disease stabilization and improvement.

Conclusions: This case represents the first definite IgG4-ROD of SOV, presenting as gross bilateral SOV enlargement and coexisting with TAO. Good response was only achieved with anti-CD20 monoclonal antibodies. This important differential should be considered in bilateral, grossly enlarged, tumefactive SOVs.

Abstract No.: 201163

Biopsy First and Early Immunomodulation Protocol for Orbital Inflammatory Disease

First Author: Raghuraj HEGDE

Co-Author(s): Shruthi KRISHNA, Abhishek PATIL, Prithvi VISHWANATH

Purpose: To analyze the outcomes of early biopsy and immunomodulation as the first-line management of orbital inflammatory disease.

Methods: A prospective study of 50 patients with orbital inflammatory disease was conducted between September 2023 and May 2025 in a tertiary care center. Data collected and analyzed included demographic details, initial diagnosis and management before presentation, radiological findings, histopathological reports of the specimen, immunomodulation, case-appropriate systemic investigations, and response to treatment at 1, 3, and 12-month follow-up periods. Institutional Review Board approval was obtained.

Results: All cases had unilateral presentation except 1. 12 patients were treated with multiple trials of corticosteroids before presentation to our center. The majority of the patients were treated by incision

biopsy followed by immunomodulation. Few cases received only immunomodulation. Immunomodulation was initiated and modified at follow-ups by the immunologist. Statistical analysis showed that biopsy on presentation and initiation of early immunomodulation reduced recurrent episodes to a bare minimum and resulted in long-term remission.

Conclusions: The "Biopsy first" and early immunomodulation approach should be considered as the primary management of orbital inflammation instead of the standard practice of corticosteroid trial. Excellent remission rates can be achieved with this protocol.

Abstract No.: 206127

CD34+ Orbital Fibroblasts Contribute to the Pathogenesis of Thyroid Eye Disease via miR-182-5p

First Author: Sijie FANG

Co-Author(s): Yinwei LI, Jing SUN, Baiguang YU, Huifang ZHOU

Purpose: CD34+ orbital fibroblasts (OFs) play a pathogenic role in thyroid eye disease (TED). Several micro (mi)RNAs have been shown to promote TED progression. This study aims to explore the regulatory effects of miRNAs on CD34+ OFs and to find potential therapeutic targets.

Methods: In this case-control study, orbital connective tissues (OCTs) and OFs were obtained from 25 TED patients and 24 healthy donors. MiRNA-seq was performed to examine differential expression of miRNAs in OCTs, and miR-182-5p was selected for subsequent experiments. MiR-182-5p was detected in both CD34+ and CD34- OFs. The upstream regulators of miR-182-5p were studied. Downstream targets of miR-182-5p were analyzed. The functionality of miR-182-5p in CD34+ OFs was evaluated.

Results: MiR-182-5p was highly expressed in TED OCTs and their derived CD34+ OFs. TED OCTs displayed increased expression of interleukin (IL)-6, IL-17A, CD34, and phosphorylated STAT3 at Ser727 and Tyr705. Activation of IL-6/STAT3 signaling promoted the expression of miR-182-5p in CD34+ OFs. MiR-182-5p enhanced wound repair ability, proliferation, and RANTES expression while inhibiting apoptosis in CD34+ OFs. CD34+ OFs transfected with miR-182-5p were susceptible to TGF- β -initiated myofibroblast differentiation. Luciferase reporter and pull-down assays revealed Smad7 as the downstream target of miR-182-5p, which modulated the proliferation, migration, fibrosis, and apoptosis of CD34+ OFs.

Conclusions: The IL-6/STAT3/miR-182-5p pathway led to activation of CD34+ OFs. MiR-182-5p promoted the proliferation, migration, fibrosis, and anti-apoptosis of CD34+ OFs via targeting Smad7. Our findings suggest

that miR-182-5p may potentially serve as a therapeutic target for TED.

Abstract No.: 200145

Cellular and Molecular Mechanisms of Nasolacrimal Duct Obstruction: New Insights Into CD4+ T Cell-MIF-Fibroblast Pathways

First Author: Xinyue YU

Purpose: To describe the single-cell picture of the nasolacrimal duct in patients with nasolacrimal duct obstruction (NLDO) and elucidate the immunoregulatory mechanisms during local fibrosis.

Methods: We obtained the nasolacrimal ducts of 4 menopausal female patients by endoscopic DCR (Dacryocystorhinostomy), divided them into obstructive site and para-blocked site, performed single-cell sequencing of the samples, and analyzed the cell composition and cell-cell interactions. Subsequently, we obtained body fluid and tissue samples from 13 patients and performed tissue and cell experiments to verify the fibrosis mechanism.

Results: Ten major cell types were identified in 67,658 cells of the nasolacrimal duct. Intercellular communication analysis reveals the critical role of macrophage migration inhibitory factor (MIF) in fibroblast-immune cell interaction. Histological and cellular experiments showed that the site of nasolacrimal duct obstruction exhibited marked inflammation and fibrosis, and MIF, mainly derived from CD4+ T cells, could activate fibroblasts and promote their proliferation, which could be used as a therapeutic tool for the treatment of nasolacrimal duct obstruction, and secrete inflammatory cytokines and extracellular matrix, a process that is further amplified by the constant stimulation of CD4+ T cells by activated fibroblasts, creating a positive feedback loop.

Conclusions: This study delineates a comprehensive cellular picture of the nasolacrimal duct in NLDO patients, proposing that MIF-centered immunoregulatory circuits are key factors contributing to the progression of fibrosis. This study is of great significance for the understanding of the NLDO immunoregulatory mechanism and targeted therapy.

Abstract No.: 202931

Clinical Features of Chinese Patients With Thyroid Eye Disease: A Multicenter Retrospective Study

First Author: Chaoyu LEI

Co-Author(s): Huifang ZHOU

Purpose: Thyroid eye disease (TED) is a debilitating autoimmune disorder linked to thyroid dysfunction. There is limited knowledge of TED in Asian populations. This multicenter study characterizes the clinical

features and treatment response of TED in a large Chinese cohort.

Methods: A retrospective cross-sectional study included 4157 patients with TED from nine Chinese hospitals from February 2016 to July 2023. Disease severity and activity were evaluated according to the European Group on Graves' Orbitopathy (EUGOGO) standards. We examined associations of variables, including sex, age, smoking status, I131 treatment, consultation department, and geographical region, with clinical outcomes. Logistic regression and nomogram models were developed to examine associations with sight-threatening TED and, in a subgroup analysis (n=126), patients' responsiveness to intravenous glucocorticoid (IVGC) therapy.

Results: We included 4157 patients with a mean age and standard deviation (SD) of 45.96 ± 16.44 years. Of these, 63.6% (n=2644) were females. Over half (55.6%, n=2310) of participants were in the inactive phase, with a mean clinical activity score of 2.19 ± 1.61 (SD) for all patients. TED severity was categorized as mild (9.3%, n=385), moderate-to-severe (82.5%, n=3428), and sight-threatening (8.2%, n=344). The average degree of exophthalmos was 20.04 ± 5.27 mm, and 48.8% (n=2029) of patients had diplopia. Patients treated with I131 had higher disease activity (47.5%, n=468, vs. 43.5%, n=1379, $p < 0.05$). Coastal region patients exhibited more severe TED (sight-threatening cases: 10.1%, n=195 vs. 7.2%, n=147) and higher diplopia scores (1.00 ± 1.10 vs. 0.86 ± 1.09 , $p < 0.001$) than inland counterparts. TED severity was also greater in patients treated in Ophthalmology departments (mild cases: 6.0%, n=213; moderate-to-severe cases: 85.6%, n=3055) compared to Endocrinology departments (mild cases: 29.3%, n=172; moderate-to-severe cases: 63.5%, n=373). Nomograms had an area under the receiver operating curve of 0.742 (95% CI, 0.716-0.768) for sight-threatening TED and 0.759 (95% CI, 0.674-0.843) for IVGC therapy responsiveness.

Conclusions: We characterized the clinical features and treatment response of TED in a large Chinese cohort. These findings offer valuable insights informing TED risk stratification in Asian patients and forming a foundation for future prospective studies.

Abstract No.: 203844

Clinical, Diagnostic, and Treatment Characteristics of Orbital Liposarcoma

First Author: Xin KANG

Co-Author(s): Wei WU

Purpose: To clarify the clinical, diagnostic, and treatment characteristics of orbital liposarcoma.

Methods: A review was performed of electronic medical records, histopathology, radiological images, and follow-up information for 21 patients with orbital liposarcoma.

Results: The predominant clinical manifestation of this disease was painless exophthalmos. The most frequently encountered pathological types were well-differentiated and myxoid liposarcoma. Preoperative radiological images from 15 patients showed that orbital liposarcoma initially developed in extraocular muscle in 9 patients. Furthermore, all well-differentiated liposarcomas exhibited the radiographic characteristics of irregular and ill-defined adipose tissue, whereas only 12.5% of myxoid liposarcomas had the imaging characteristics. For the patients who exclusively underwent surgery, all of those with subtotal excisions experienced recurrence, 63.6% of marginal excisions recurred, and 50% of wide excisions resulted in recurrence. However, none of the patients who underwent marginal excisions or wide excisions combined with adjuvant radiotherapy exhibited recurrence. The analysis of magnetic resonance imaging findings in 3 patients who underwent neoadjuvant radiotherapy revealed that the tumor size remained stable in a patient with well-differentiated liposarcoma, whereas another patient with the same type of tumor exhibited a gradual increase in size. Conversely, a patient with myxoid liposarcoma experienced a significant reduction in tumor size following neoadjuvant radiotherapy.

Conclusions: Orbital liposarcoma demonstrated a propensity for developing in the extraocular muscle. The radiological images of orbital well-differentiated liposarcomas were characterized by irregular and ill-defined adipose tissue. Surgery combined with radiotherapy demonstrated potential in reducing recurrence rates. Notably, orbital myxoid liposarcoma exhibited greater sensitivity to radiotherapy compared to well-differentiated liposarcoma.

Abstract No.: 203327

Contrast-Enhanced Orbital MRI for Activity Assessment and Treatment Response Prediction in Thyroid Eye Disease

First Author: Duojin XIA

Co-Author(s): Sien Ping CHEW, Runchuan LI, Yinwei LI, Jing SUN, Zhangsheng YU, Huifang ZHOU, Haiyang ZHANG

Purpose: To investigate the performance of contrast-enhanced orbital MRI (T1-weighted contrast-enhanced [T1CE] and dynamic contrast-enhanced MRI [DCE-MRI]) for activity assessment and prediction of treatment response to intravenous glucocorticoid (IVGC) treatment in thyroid eye disease (TED).

Methods: A retrospective study of 59 active moderate-to-severe TED patients (36 responsive and 23 unresponsive) treated with IVGC, matched with Thirty-one inactive TED patients were included. T1CE and DCE-MRI were collected from each subject. Univariate and multivariate logistic regression analyses, as well as receiver operating characteristic (ROC) curves

(evaluated by area under the curve, AUC) were used to evaluate the diagnostic and predictive models.

Results: Active patients showed a higher signal intensity ratio of lateral rectus (LR-SIR) on T1CE and a higher wash-in rate of inferior rectus (IR-WIR) on DCE-MRI compared to inactive patients ($p < 0.05$). The AUC for T1CE and DCE-MRI-based models were 0.866, and 0.844, respectively. The combined model (LR-SIR and IR-WIR) significantly enhanced model performance (AUC = 0.914, 95% CI: 0.858–0.970). Responsive patients demonstrated a longer time to peak of lateral rectus (LR-TTP) than unresponsive patients ($p < 0.05$). The cutoff value of prediction probability was 0.678, and the AUC based on this model was 0.739 (95% CI: 0.608–0.807).

Conclusions: T1CE and DCE-MRI could effectively assist in TED activity assessment, and DCE-MRI could help predict IVGC treatment response. Specifically, LR-SIR and IR-WIR were indicators of TED activity, and IR-TTP was predictive of IVGC treatment response. Combining both contrast-enhanced sequences could further enhance the efficiency of TED activity assessment.

Abstract No.: 202666

Correlation Between Duration of Docetaxel Administration and Epiphora Severity in Nasopharyngeal Carcinoma Patients

First Author: Riani ERNA

Co-Author(s): Debby HANDAYATI HARAHAP, Alazi ALAZI, Denny SATRIA UTAMA

Purpose: Docetaxel, an effective chemotherapeutic agent for various cancers, including nasopharyngeal carcinoma, is associated with significant epiphora as a side effect. This study aimed to investigate the correlation between the duration of docetaxel administration and the severity of epiphora, as measured by the Munk score.

Methods: A descriptive study with a case series design was undertaken at the Eye Clinic of Dr. Mohammad Hoesin Hospital, Palembang, from January to August 2024. The study sample comprised 25 patients. Epiphora severity was measured using the Munk score. Statistical analysis was performed using Spearman's Rho correlation test.

Results: The majority of patients were male (68.2%) and aged ≤ 50 years (77.3%). The most common dose of docetaxel administered was 80 mg (91%). The most frequent duration of administration was 6 weeks (77.3%). Based on the Munk score, 86.4% of patients had a Munk score of 1, and 13.6% had a Munk score of 2. No significant differences were found in gender ($p = 0.445$), age ($p = 0.578$), or docetaxel dose ($p = 1.000$) based on the Munk score. However, there was a statistically significant difference in the duration of docetaxel administration according to the Munk score ($p = 0.001$). A moderately significant positive

correlation was observed between the duration of docetaxel administration and epiphora severity based on the Munk score ($r = 0.626$; $p = 0.001$).

Conclusions: Patients with a Munk score of 2 received docetaxel for the longest duration. A longer duration of docetaxel administration is associated with a higher Munk score for epiphora in patients with nasopharyngeal carcinoma.

Abstract No.: 203039

Direct Closure With Cantholysis to Simplify and Optimize Eyelid Coloboma Surgery in Treacher Collins Syndrome

First Author: Monica **SUMARWOTO**

Co-Author(s): Halimah **PAGARRA**, Andi **PRATIWI**, Noor **SYAMSU**

Purpose: Treacher Collins Syndrome (TCS) is a rare autosomal dominant congenital disorder. Common features include downslanting palpebral fissures, malar and mandibular hypoplasia, and lower eyelid coloboma. Ocular manifestations may also involve symblepharon and lacrimal system atresia. This case emphasizes the importance of recognizing the complexity of congenital anatomical defects associated with Treacher Collins Syndrome in order to design surgical strategies that can effectively manage these ocular abnormalities.

Methods: A 12-year-old boy presented with bilateral congenital eyelid coloboma, symblepharon, and lacrimal duct atresia, along with a history of labioschisis repair. Clinical findings led to a diagnosis of Treacher Collins Syndrome. Initial surgical management included sequential symblepharon release, punctal probing, and direct closure, with cantholysis performed on both eyes. Final outcomes demonstrated successful restoration of eyelid anatomy, improved ocular surface protection, and acceptable cosmetic appearance.

Results: In this case, the initial surgery using direct closure without cantholysis failed to correct the eyelid coloboma, leading to an unsatisfactory cosmetic result. A secondary procedure was performed with greater emphasis on palpebral tension management, utilizing direct closure combined with cantholysis.

Conclusions: In our case, a bilateral small-sized, full-thickness congenital eyelid coloboma affecting the medial one-third of the lower eyelid was effectively managed using direct closure combined with cantholysis.

Abstract No.: 201176

Early External Dacryocystorhinostomy in Acute on Chronic Dacryocystitis: Outcomes From a Single-Center Experience

First Author: Ritesh **VERMA**

Purpose: To evaluate the functional outcomes of early external dacryocystorhinostomy (DCR) in patients presenting with acute on chronic dacryocystitis.

Methods: A retrospective analysis was conducted of 15 patients who underwent external DCR with silicone intubation for acute on chronic dacryocystitis over 3 years at a single tertiary care institute. Patient demographics, clinical features, timing of surgery, postoperative outcomes, and complications were reviewed.

Results: The mean age of patients was 58 years (range: 44-76 years), with a mean duration of epiphora of 3 years. Six patients presented with an associated lacrimal fistula. There was spontaneous regression of the fistula in all cases. The mean interval between presentation and surgery was 1.5 days. The mean follow-up period was 11 months. Functional success, defined as resolution of epiphora with a patent ostium on syringing, was achieved in 14 of 15 patients (93.3%). One patient required revision DCR. No major intraoperative or postoperative complications were noted.

Conclusions: Endonasal DCR is well established in the management of acute dacryocystitis, whereas the literature on external DCR in such situations is scanty. Early external DCR with intubation is a safe and effective technique for acute on chronic dacryocystitis, including cases with lacrimal fistula, with high functional success and low complication rates.

Abstract No.: 202347

Efficacy and Safety of Oxymetazoline Hydrochloride 0.1% in Japanese Patients With Acquired Blepharoptosis: Results From a Randomized Phase 3 Trial

First Author: Eri **ISHIKAWA**

Co-Author(s): Hitoshi **ISHIKAWA**, Koji **OKA**

Purpose: To evaluate the efficacy and safety of oxymetazoline hydrochloride 0.1% ophthalmic solution (hereafter referred to as oxymetazoline 0.1%) in Japanese patients with acquired blepharoptosis.

Methods: Patients were randomized 1:1:1 to 3 treatment groups (oxymetazoline 0.1%, either once daily [QD] or twice daily [BID], or to placebo BID) for 3 months. Patients who received oxymetazoline 0.1% continued treatment for an additional 3 months. Those who initially received a placebo were re-randomized to either one of the active treatment groups for the remaining 3 months of the study. The primary efficacy endpoint was the superiority of oxymetazoline 0.1% to

placebo in marginal reflex distance (MRD-1) change at Day 14 (hour 2). Adverse drug reactions (ADRs) were recorded.

Results: Baseline MRD-1 (standard deviation) of the 336 patients analyzed (n=112 per group) was 1.31 mm (0.83). The MRD-1 change (LS mean $\pm$ standard error) from baseline to 14 days (hour 2) after treatment was 1.09 (0.07) mm and 0.93 (0.07) mm for QD and BID, with a difference from placebo of 0.59 ± 0.10 mm and 0.43 ± 0.10 mm (both $P < 0.0001$), respectively. At 3 months, ADRs were reported in 4.5%, 0.9% and 4.5% of placebo, oxymetazoline 0.1% QD and BID groups, respectively.

Conclusions: Oxymetazoline 0.1% QD and BID were superior to placebo in MRD-1 change from baseline at Day 14 in patients with acquired blepharoptosis, with no significant safety concerns over the study period.

Abstract No.: 202821

Efficacy of Botulinum Toxin A for Treatment of Benign Essential Blepharospasm and Hemifacial Spasm: A Hospital Based Study

First Author: Jamuna **GURUNG**

Co-Author(s): Prakash **GURUNG**

Purpose: Abnormal, involuntary spasms of the periorcular and/or facial musculature cause a debilitating disorder known as benign essential blepharospasm (BEB) and hemifacial spasm (HFS). We conduct a study to evaluate the efficacy of botulinum toxin A injections (BtA) for benign essential blepharospasm and hemifacial spasm.

Methods: A prospective observational study was conducted between January 2022 and December 2024. Data collected included diagnoses, patient characteristics, injection dates, doses administered, Jankovic spasm grading response scores before and after BtA injections, duration of effect, and adverse events.

Results: A total of 27 cases, which included 15 cases of hemifacial spasm and 8 cases of benign essential blepharospasm. The mean age of the patient was 58.78 ± 2.11 (range 42-88 years). There were more females, 19 (82.6%), than males, 4 (17.4%). The mean amount of Botox given for HFS was 26.8 ± 3.8 units and 55 ± 9.25 units for BEB. The mean Jankovic spasm grading score was 3.9 ± 0.19 (range 3-4) at presentation with the mean improvement in functional score to 0.81 ± 0.83 (range 1-3) at 3 months duration which was statistically significant $P < 0.001$. The mean duration of effect for HFS was 5.2 ± 0.9 months, and BEB was 4.6 ± 1.6 months. The common adverse effects noted were lagophthalmos 2 (7.4%), watering 2 (7.4%), and ectropion 1 (3.7%).

Conclusions: Our study showed that botulinum toxin injection is an effective and safe method for treating benign essential blepharospasm and hemifacial spasm.

However, the temporary effect, the need for repeated injections, and the cost of the treatment are its drawbacks.

Abstract No.: 206822

Efficacy of Triple Therapy in Dysthyroid Optic Neuropathy: Intravenous Methylprednisolone, Orbital Radiotherapy, and Mycophenolate Mofetil

First Author: Kenneth Ka Hei **LAI**

Co-Author(s): Fatema **ALJUFARI**, Marco **BOWSWELL**, Kelvin **CHONG**, Kervin **DELLOSA**, Alan **LEE**, Chiu Ming **NG**, Chi Pui **PANG**, Clement **THAM**, Varan **VONGSILPAVATTANA**, Alvin **YOUNG**, Hunter KI **YUEN**

Purpose: Dysthyroid optic neuropathy (DON) is a vision-threatening complication of thyroid eye disease. High-dose intravenous methylprednisolone (IVMP) is the standard first-line therapy, but many patients ultimately require orbital decompression. We evaluated the outcomes of an upfront triple therapy regimen consisting of high-dose IVMP, orbital radiotherapy (ORT), and mycophenolate mofetil (MMF) in the management of DON.

Methods: We conducted a retrospective cohort study of 82 patients with DON managed at a tertiary referral center between 2011 and 2025. All patients received upfront IVMP (cumulative dose 8 g), ORT, and MMF. Clinical parameters assessed included Clinical Activity Score (CAS), best-corrected visual acuity (BCVA), color vision, automated visual field, pupil responses, optic disc and fundus appearance, and extraocular motility. Surgical decompression was performed if signs of optic neuropathy persisted or worsened despite medical therapy.

Results: Eighty-two patients (54 female; mean age 60 ± 10 years; 7 euthyroid; 17 smokers) were included. DON reversed with medical therapy alone in 64 patients (78%), who maintained stable vision without the need for orbital decompression at a mean follow-up of 24 months. Significant improvements in CAS, BCVA, color vision, and visual fields were observed at 6 months post-therapy (all $p < 0.05$). Eighteen patients (22%) required orbital decompression; these patients were more likely to demonstrate higher differential intraocular pressure and severe apical crowding on imaging ($p < 0.05$). No severe adverse events were observed.

Conclusions: Upfront triple therapy with IVMP, ORT, and MMF was effective in improving visual outcomes in DON. Vision was preserved without surgical decompression in 78% of patients, suggesting that this combined medical approach may reduce surgical burden while providing meaningful and durable visual recovery.

Abstract No.: 203536**Efficacy of a Novel Three-Dimensionally Designed Customized Entropion Correction Device: A Prospective Randomized Trial***First Author: Lei XIONG**Co-Author(s): Zhang YI, Wang LIJUN*

Purpose: To evaluate the clinical efficacy of a patented, non-surgical entropion correction device based on three-dimensional design and facial scanning.

Methods: In this prospective trial, patients with mild-to-moderate entropion were randomized to an experimental group (n=12) receiving a personalized device manufactured (Granted utility model patent, Patent No:202422114533.4, Patent Grant Date: 2025/07/15) using three-dimensional design and facial scanning technology (1-2 hours/day wear) or a control group (n=12) receiving conventional care. The treatment period was 4 weeks, with outcome assessments conducted immediately after wearing, and on days 3, 7, 14, and 30. Outcome measures included pain (VAS), foreign body sensation, Schirmer's test, lid margin position, eyelash-cornea contact, and safety.

Results: The experimental group demonstrated significantly greater improvement in VAS scores than the control group at all post-wearing assessments (days 3, 7, 14, and 30; $P < 0.05$). Foreign body sensation improved significantly by day 3 ($P < 0.05$). Schirmer's test results showed significant improvement in the experimental group by day 7 ($P < 0.05$). Both the lid-globe angle and eyelash-cornea contact significantly improved at all observed time points compared to the control ($P < 0.05$). Only minor transient skin redness was observed with the device.

Conclusions: The three-dimensionally designed personalized correction device, requiring only 1-2 hours of daily wear, demonstrated rapid and superior efficacy within a 4-week treatment period compared to conventional methods, offering a safe and efficient non-surgical alternative for entropion management.

Abstract No.: 202758**Eyelid Defect Reconstruction Following Malignant Tumor Excision Using Auricular Cartilage as a Substitute of Tarsal Plate***First Author: Zeyi LI**Co-Author(s): Jianhao CAI, Cangeng XU*

Purpose: To evaluate the efficacy of auricular cartilage instead of tarsal plate combined with conjunctiva graft on eyelid reconstruction following eyelid malignant tumor resection for repairing eyelid defect.

Methods: This is a retrospective study including 18 patients with eyelid defects after excision of eyelid malignant tumors, 7 of whom had an entire eyelid defect, and the others had defects of more than half of the eyelid. All of the patients had undergone eyelid

reconstruction with auricular cartilage as a substitute for the tarsal plate. Postoperative follow-up varied from 6 months to 4 years.

Results: Of the 18 subjects who underwent eyelid reconstruction using auricular cartilage, all of which had excellent postoperative outcomes functionally and aesthetically, including repair of defected eyelid and coalesced auricular cartilage without symblepharon. However, in 1 case (5.6%), the auricular cartilage was exposed in postoperative week 1 that was healed after 2 months, and 2 cases (11.1%) had mild eyelid ectropion.

Conclusions: Auricular cartilage was adopted as a substitute for the tarsal plate to repair eyelid defects after eyelid malignant tumor resection. It has a similar histological structure to that of the tarsal plate, as it is convenient to extract and easy to survive. Conjunctival transplantation to reconstruct the palpebral conjunctiva is a key technique affecting the surgery effect.

Abstract No.: 200450**Eyelid Reconstruction Following Mohs Micrographic Surgery: Outcomes, Comparison of Techniques and Complications, an Asian Perspective***First Author: Daniel CHIN**Co-Author(s): Llewellyn LEE*

Purpose: To evaluate the surgical outcomes, complications, and recurrence rates in patients undergoing eyelid reconstruction following Mohs micrographic surgery.

Methods: This single-institution retrospective study included 25 patients who underwent eyelid reconstruction after Mohs surgery between January 1, 2014, and December 31, 2022. Data on demographics, lesion characteristics, surgical techniques, and outcomes were analysed.

Results: The mean patient age was 67.2 years (range: 49–89); 72% were male, and 28% were female. The majority were Chinese (68%), and the rest comprised other races (32%). Lesion sizes were classified as small (<20 mm, 36%), medium (20–30 mm, 40%), or large (>30 mm, 24%). The majority (88%) were basal cell carcinomas, with the lower eyelid most commonly affected (96%), particularly the medial canthus (50%). Reconstruction was successful in all 25 cases, with no evidence of tumour recurrence over a median follow-up period of 36 months. Reconstruction techniques included full-thickness skin grafts (upper inner arm: 64%; upper eyelid: 12%), upper eyelid tarsoconjunctival grafts with lower eyelid myocutaneous flaps (16%), the modified Hughes procedure (4%), and direct closure (4%). Complications requiring repeat surgical intervention occurred in 3 (12%) of cases, while minor complications managed conservatively occurred in 2

(8%). Post-operative issues included lagophthalmos (4%), medial ectropion (8%), and graft dehiscence (8%).

Conclusions: Eyelid reconstruction post-Mohs surgery can be successfully performed through various techniques tailored to defect size, location, and lamella involvement. Asian eyelids with prominent medial epicanthal folds, may benefit from full-thickness skin grafts.

Abstract No.: 201892

From Clinic to Single Cells: Largest Multicenter Lacrimal Gland Adenoid Cystic Carcinoma Cohort and a Therapy-Resolved Atlas Map Immune Ecosystems and Schwann Cell Programs

First Author: Mingshen MA

Co-Author(s): Xin KANG, Jing LI, Jianmin MA, Yong TAO, Liangyuan XU, Xinji YANG

Purpose: To investigate the clinical features, treatment strategies, and prognostic factors of lacrimal gland adenoid cystic carcinoma (LGACC), and to provide the first singlecell map of the tumor immune microenvironment (TIME) across clinical stages and therapeutic contexts, elucidating the role of Schwann cells in perineural invasion (PNI).

Methods: A multicenter retrospective cohort of 127 pathology-confirmed LGACC cases (2003–2024) was analyzed using Kaplan–Meier, Cox, and logistic models to identify independent prognostic factors. In a translational subset, fresh LGACC specimens spanning distinct clinical states underwent singlecell RNA sequencing with unsupervised clustering, lineage annotation, trajectory analysis, and ligand–receptor inference to characterize TIME remodeling across stage and therapy.

Results: LGACC presented predominantly in middle age with female predominance; imaging commonly showed solid masses with frequent orbital bone involvement. Combined surgery+radiotherapy associated with improved outcomes, while metastasis, high-grade bone infiltration, and Ki67 $\geq 20\%$ independently predicted worse prognosis. Singlecell profiling resolved malignant epithelial cells alongside diverse immune and stromal compartments, revealing stage and therapy-specific shifts in Tcell states, myeloid polarization, and CAF activation. Notably, Schwann cells were enriched at invasive and perineural niches, engaged in bidirectional ligand–receptor crosstalk with tumor cells consistent with neurotropic growth; Schwann cell burden and signatures correlated with PNI and metastatic dissemination.

Conclusions: LGACC presents with aggressive behavior; improved surgical outcomes are associated with radiotherapy, whereas metastasis, advanced bone infiltration, and elevated Ki67 predict worse survival. Singlecell RNA sequencing across stage and therapy

reveals corresponding shifts in immune–stromal ecosystems and implicates Schwann cells as mediators of PNI and metastasis, linking cellular circuitry to the observed clinical course.

Abstract No.: 206254

Improved ELDR Outcomes for TS-1–Related Canalicular Obstruction with a New Dacryoendoscope

First Author: Akemi IWASAKI

Co-Author(s): Yoichi MANABE

Purpose: To evaluate the clinical outcomes of endoluminal lacrimal duct recanalization (ELDR) for TS-1–related canalicular obstruction before and after the introduction of a new dacryoendoscope (EZ-Tb.). The new device enables smoother sheath manipulation and superior visualization, particularly in the canalicular segments.

Methods: A retrospective review was conducted of 12 patients who underwent ELDR for TS-1–induced canalicular obstruction. Patients treated before October 2023 were categorized as the old endoscope group (n=5), and those treated in October 2023 or later as the new endoscope group (n=7). The median age was 76 years (range, 62–82); 7 men and 5 women. Primary malignancies included gastric, pancreatic, breast, colorectal, and unknown cancers. The median duration of TS-1 administration prior to surgery was 11 months (range, 3–36 months). Outcomes assessed were: (1) obstruction site [mid-canalicular vs proximal canalicular], (2) tube placement [LACRIFAST CL when both canaliculi were recanalized; Masterka when only one canaliculus was recanalized; failure], and (3) postoperative irrigation patency.

Results: Obstruction sites were mid: 3/proximal: 2 in the old group and mid: 3/proximal: 4 in the new group. Tube placement was LACRIFAST CL: 3 and failure: 2 in the old group, versus LACRIFAST CL: 6 and Masterka: 1 in the new group. All patients who underwent successful tube placement maintained patent irrigation throughout the follow-up period.

Conclusions: The introduction of EZ-Tb. facilitated easier canalicular observation and eliminated insertion failures, allowing more consistent LACRIFAST CL placement. Although the sample size is limited, these findings suggest improved procedural success with the new dacryoendoscope.

Abstract No.: 206280**Interdisciplinary Surgery of Thyroid Eye Disease With Thyroid Disease: A One-Stage Approach***First Author: Yining WEI**Co-Author(s): Yinwei LI, Jing SUN, Huifang ZHOU*

Purpose: Thyroid eye disease patients with thyroid diseases requiring surgery need an appropriate treatment paradigm, and there lacks investigation on the surgical outcomes of one-stage approach of orbital decompression and thyroidectomy.

Methods: Fifteen patients who received one-stage surgery of orbital decompression and thyroidectomy from 2019 to 2023. Surgery was identified as successful if the expected exophthalmometry reduction was attained, thyroid function remained under control, and no cancer recurrence or metastasis was observed. Ophthalmic parameters, thyroid function, tumor recurrence or metastasis, surgical details, and patient satisfaction score were analyzed.

Results: One-stage surgery was successful in all patients. Exophthalmometry was reduced with thyroid eye disease activity controlled or improved. Thyroid function was under control after surgery with a significant decrease in autoantibodies. No cancer recurrence, metastasis, or severe complications were observed.

Conclusions: The one-stage approach of surgical management can achieve satisfactory surgical outcomes for thyroid eye disease patients with thyroid diseases requiring surgery.

Abstract No.: 206154**Intralesional Injection With Systemic Rituximab for Refractory Orbital MALT Lymphoma***First Author: Honglei LIU**Co-Author(s): Cuihong LIU, Jinhua LIU, Yujie WU*

Purpose: To evaluate the clinical efficacy and safety of intralesional (IL) and systemic rituximab in the treatment of refractory orbital MALT lymphoma.

Methods: Patients with a confirmed diagnosis of orbital MALT lymphoma via excisional biopsy were enrolled. All patients received a combination therapy of intralesional and systemic intravenous rituximab. The injection strategy was tailored based on the anatomical location of the lesion, primarily utilizing one of three approaches: subconjunctival, lacrimal gland, or periocular injection. The intralesional dose, ranging from 10 to 40 mg per lesion, was determined by the lesion volume. The intravenous dose was 150-200 mg per administration. Treatments were administered monthly and continued until the orbital lesion was no longer detectable on MRI.

Results: A total of 180 patients diagnosed with orbital MALT lymphoma underwent the combined intralesional and systemic rituximab therapy. Orbital lesions regressed in all but two patients, who were subsequently referred to the hematology department due to systemic symptoms. The mean number of treatment cycles per patient was 8. Five patients experienced mild to moderate allergic reactions during treatment, which were managed with symptomatic treatment (e.g., antihistamines or steroids). All patients completed the treatment regimen.

Conclusions: While the mechanism of action of local rituximab injection warrants further investigation, the combination of intralesional and systemic rituximab represents a safe and effective therapeutic option for refractory orbital MALT lymphoma.

Abstract No.: 203337**Investigating Factors Influencing Quality of Life in Thyroid Eye Disease: Insight From Machine Learning Approaches***First Author: Haiyang ZHANG**Co-Author(s): Xianqun FAN, Shuo WU, Lehan YANG, Huifang ZHOU*

Purpose: Thyroid eye disease (TED) is an autoimmune orbital disorder that diminishes the quality of life (QOL) in affected individuals. Graves' ophthalmopathy (GO)-QOL questionnaire effectively assesses TED's effect on patients. This study aims to investigate the factors influencing visual functioning (QOL-VF) and physical appearance (QOL-AP) scores in Chinese TED patients using innovative data analysis methods.

Methods: This cross-sectional study included 211 TED patients whose initial visit to our clinic was from July 2022 to March 2023. Patients with previous ophthalmic surgery or concurrent severe diseases were excluded. GO-QOL questionnaires, detailed medical histories, and clinical examinations were collected. The distribution of GO-QOL scores was analyzed, and linear regression and machine learning algorithms were utilized.

Results: The median QOL-VF and QOL-AP scores were 64.29 and 62.5, respectively. Multivariate linear regression analysis revealed age ($P = 0.013$), ocular motility pain ($P = 0.012$), vertical strabismus ($P < 0.001$), and diplopia scores as significant predictors for QOL-VF. For QOL-AP, gender ($P = 0.013$) and clinical activity ($P = 0.086$) were significant. The XGBoost model demonstrated superior performance, with an R^2 of 0.872 and a root mean square error of 11.083. Shapley additive explanations (SHAP) analysis highlighted the importance of vertical strabismus, diplopia score, and age in influencing QOL-VF and age, clinical activity, and sex in QOL-AP.

Conclusions: TED significantly affects patient QOL. The study highlights the efficacy of XGBoost and SHAP analyses in identifying key factors influencing the QOL

in TED patients. Identifying effective interventions and considering specific demographic characteristics are essential to improving the QOL of patients with TED.

Abstract No.: 201178

Lacrimal Gland Adenoid Cystic Carcinoma (LACC): Our Experience Over 30 Years at a Tertiary Care Centre

First Author: Sonam NISAR

Co-Author(s): Shahid ALAM, Avriel GUDKAR, Bipasha MUKHERJEE

Purpose: To evaluate the management outcomes and prognostic factors amongst patients with lacrimal gland adenoid cystic carcinoma (ACC).

Methods: This was a retrospective interventional study including 40 patients diagnosed with lacrimal gland ACC from 1990 to 2020. Information analysed included demographic profile, radiological features, histopathological sub-types, risk factors, and management outcomes. Outcome was evaluated based on the recurrence of the disease, metastasis, or death.

Results: A male (62.5%) preponderance with a mean age of 37.18 ± 14.9 years was seen. Excision was done in 27 patients, of which 20 received adjuvant radiotherapy, and Neo-adjuvant chemotherapy followed by excision was done in 1 patient. Exenteration was performed in 10 patients with adjuvant radiotherapy in 5 of them. No surgical intervention was done in 3 patients. Recurrence was seen in 20 (50%), metastasis in 13 (32.5%). Median follow-up 28.5 ± 34.84 months. The 5-year survival rate was 44.4%.

Conclusions: Female sex, age > 40 years, bony erosion on imaging, both tubular and basaloid subtypes, and only administration of adjuvant radiotherapy emerged as poor prognostic factors. Adjuvant radiotherapy may not be able to prevent micro-metastasis, and hence chemotherapy is warranted. Multimodal treatment may help in improving overall survival and reducing the incidence of local recurrence.

Abstract No.: 202446

Lateral Orbital Rim Advancement Plus Balanced Orbital Decompression: A Novel Surgery for Exorbitism Regression in Crouzon Syndrome

First Author: Weijin QIAN

Co-Author(s): Lianfei FANG, Yinwei LI, Huifang ZHOU

Purpose: As a type of syndromic craniosynostosis, Crouzon syndrome (CS) often presents with exorbitism, one of the most disfiguring features that patients urgently seek to correct. Current treatments are not ideal for those preferring less invasive solutions. Herein, we propose an innovative surgery called lateral orbital rim advancement combined with

balanced orbital decompression (LORA-BOD), targeting exorbitism regression in CS patients.

Methods: Three CS patients undergoing LORA-BOD surgery between August 2022 and September 2023 in our center were included. Demographic data, ophthalmological examination and imaging tests were collected. Exorbitism was evaluated using Hertel exophthalmometry and orbital computed tomography (CT), which is defined as the distance from corneal apex to interzygomatic line (CA-LO) or orbitale (CA-IO). Preoperative and postoperative outcomes were compared.

Results: Three patients (two females and one male) aged from 15 to 25 sought consultation for exorbitism regression and received LORA-BOD. All patients showed a decrease in postoperative exorbitism degrees, with an average regression of 7.25 ± 1.97 mm measured by Hertel exophthalmometry, 3.62 ± 1.65 mm by CA-LO and 4.29 ± 2.41 mm by CA-IO. Apart from exorbitism regression, exotropia improved as well, both contributing to a more harmonious aesthetic eye appearance. Overall, patients were satisfied with the treatment outcomes. No complications occurred during follow-up.

Conclusions: LORA-BOD surgery has shown outstanding efficacy as well as promising prospects in exorbitism regression of CS patients, which can be widely applied to treat patients with relevant demands.

Abstract No.: 203377

Long-Term Outcomes of Polycaprolactone (PCL) Implant Used for Orbital Fracture Repair in a Tertiary Hospital in South India

First Author: Samhitha H R

Co-Author(s): Annirudh GUPTA, Neeraja VARMA

Purpose: To evaluate long-term changes and integration of the PCL implant and look at the sequence of changes over time in patients at different timelines after surgery.

Methods: The study includes 8 patients, 6 males and 2 females, from an age range of 19-58 years, the oldest patient operated 2 years back, and the most recent patient operated 5 months back. Post op CT was done at 1-2 weeks for each patient, and Orbital MRI and CT were done at the present time to look for changes.

Results: All patients had BCVA 6/6 after surgery with no hyperglobus, implant extrusion, infection, or granuloma formation. Intraoperatively, there was ease in using the implant for small to large fractures. Post op edema and chemosis were minimal. Patients were comfortable post op with no pain or feeling of heaviness and were back to routine work as early as 1 week.

Conclusions: PCL is a bioresorbable implant that is easy to use with good results for floor and medial

orbital fractures, integrates with bone around 18-24 months, does not need to be removed at a later date and a better natural fit for the patient. It can be shaped intraoperatively for a precise fit.

Abstract No.: 202405

Medial Levator Suture and Eyelid Shortening: A New Technique for Durable Ptosis Repair in Floppy Eyelid Surgery

First Author: Alejandra VALENZUELA

Co-Author(s): Joseph ARNOLD, Chelsea YATES

Purpose: To provide a long-lasting outcome for patients with medial upper eyelid laxity in the context of floppy eyelid syndrome (FES) undergoing upper eyelid ptosis repair, by combining medial upper eyelid shortening with medial placement of the levator advancement suture.

Methods: A non-comparative study was conducted on patients with significant upper eyelid laxity and ptosis (MRD-1 of +2 mm or less with good levator function). Each patient underwent medial full-thickness horizontal upper eyelid shortening, combined with the medial placement of a single polyglactin-910 suture, positioned 2 mm lateral to the wound, through the tarsus to elevate the levator muscle.

Results: Twenty patients were included, all presenting with gross laxity of the medial upper eyelid and near-complete absence of the medial tarsus. Patient ages ranged from 17 to 86 years (mean: 53.1), with a marked male predominance (80%). Common symptoms included ocular discomfort, conjunctival irritation/papillary conjunctivitis with mucous discharge, epiphora, and spontaneous upper eyelid eversion. All patients experienced resolution of their ocular symptoms and maintained a stable, cosmetically pleasing outcome over a 12-month follow-up period.

Conclusions: Patients with FES tend to exhibit greater medial than lateral eyelid laxity and often present with associated upper eyelid ptosis due to chronic stretching of the levator aponeurosis. This new surgical approach offers a single, effective technique to address medial horizontal laxity—where maximal stretching occurs—while simultaneously correcting levator dehiscence through more medially positioned suturing, preserving the natural contour of the upper eyelid.

Abstract No.: 202452

Medial Levator Suture for Upper Lid Ptosis Repair in Floppy Eyelid Syndrome

First Author: Alejandra VALENZUELA

Co-Author(s): Chelsea YATES

Purpose: To provide a long-lasting outcome for patients with mild medial upper eyelid laxity in the context of floppy eyelid syndrome (FES) undergoing upper eyelid

ptosis repair, by one single medial placement of the levator advancement suture.

Methods: A non-comparative study was conducted on patients with mild upper eyelid laxity and ptosis (MRD-1 of +2 mm or less with good levator function). Each patient underwent a single placement of a double-armed polyglactin-910 suture, positioned 2 mm lateral to the most medial aspect of the tarsal plate to advance the levator muscle.

Results: Twenty patients were included, all presenting with mild laxity of the medial upper eyelid and presence of the medial tarsus, with a clear male predominance. All patients experienced an adequate and stable upper lid height and contour over a 6-month follow-up period.

Conclusions: Patients with FES tend to exhibit greater medial than lateral eyelid laxity and often present with associated upper eyelid ptosis due to chronic stretching of the levator aponeurosis. This new surgical approach offers a single, effective technique to address the challenging anatomical contour when the medial upper lid stretches, while simultaneously correcting levator dehiscence through more medially positioned suturing.

Abstract No.: 202441

Microbiological Profile of Bacterial Orbital Cellulitis in a Tertiary Center in Thailand: A Retrospective Study

First Author: Kanokrat PORNANICH

Co-Author(s): Angkoon LUANGARAM, Chutikan PREECHABORISUTHKUL

Purpose: To determine microbiological profile and risk factors for poor visual outcome and complications in bacterial orbital cellulitis at a tertiary referral center in Thailand.

Methods: A retrospective review was conducted of patients admitted with orbital cellulitis at Siriraj Hospital from 2009–2024. Clinical data, microbiological results, antibiotic use, and treatment outcomes were analyzed. Multivariable logistic regression was applied to identify predictors of poor visual outcome and complications.

Results: Of 220 patients with orbital cellulitis, 160(72.7%) were clinical diagnosed with bacterial infection. Mean age was 41.7 ± 25.5 years; 55% were male. At presentation, 42.7% had no visual impairment, while 43.4% had moderate-to-severe impairment. Cultures were positive in 53.7%. Gram-positive aerobes predominated(46.6%), followed by gram-negative aerobes(22.6%), anaerobes(18.5%) and facultative anaerobe(11.6%). The most common isolates were *Staphylococcus aureus*(21.2%), *Streptococcus* spp.(12.3%), and coagulase-negative *Staphylococcus*(8.9%); among gram-negatives, *Pseudomonas aeruginosa*(6.8%) and *Klebsiella* spp.(6.2%) predominated. Common empirical antibiotics

included clindamycin(28.8%), ceftriaxone(26.6%), and amoxicillin-clavulanate(10.6%). After treatment, 70.6% achieved no or mild impairment, while 20.6% had moderate-to-severe loss or required enucleation. Initial poor visual acuity(VA) and older age were significant predictors of poor final vision(VA<6/18). Poor initial VA and abnormal leukocyte counts(neutropenia or leukocytosis) were associated with complications, including subperiosteal/orbital abscess, intracranial extension, central retinal artery occlusion, optic neuropathy, and enucleation.

Conclusions: Bacterial infection is the predominant etiology in orbital cellulitis, with Staphylococcus aureus and Streptococcus species being the most common gram-positive organisms, followed by Pseudomonas aeruginosa and Klebsiella species as the most frequent gram-negative pathogens. Factors associated with poor visual outcomes include poor initial visual acuity and advanced age. Additionally, poor initial visual acuity and abnormalities in leukocyte count are significant factors contributing to complications in orbital cellulitis.

Abstract No.: 202896

Modified Frontalis Muscle Flap Advancement in Patients With Severe Ptosis

First Author: Que Anh VU

Co-Author(s): Thi Thu Hien NGUYEN

Purpose: To assess the effect of a modified frontalis muscle advancement technique for the treatment of severe congenital ptosis. The purpose of this technique is to achieve a more physiologic direction with the frontalis muscle flap and to avoid malpositions of the upper eyelid or ptosis of the eyelashes.

Methods: This is a retrospective, nonrandomized interventional case series of 21 eyes from 18 patients who exhibited severe ptosis and poor levator function. All patients under 12 years of age underwent surgical correction with frontalis muscle flap advancement and a pulley creation through the aponeurosis of the levator muscle. The minimum follow-up time was 12 months. Surgical outcomes were measured by using clinical photographs taken before and after surgery.

Results: The mean age of patients is 6.33 ± 2.3 years of age. The preoperative mean visual acuity of the ptosis eye did not change significantly. The mean MRD1 of ptosis eyes increased from 0.34 ± 0.43 preoperatively to 3.03 ± 0.53 postoperatively ($p < 0.001$). Lapgothalmos decreased from 1.79 ± 1.04 one week after surgery to 0.54 ± 0.59 at 12 months after surgery. There were no cases of upper eyelid entropion or eyelash ptosis after 6 months. However, two corneal complications were noted in two cases, requiring prolonged lubrication treatment after the initial surgery. Complications were observed in a case with monocular elevation deficiency syndrome and in one case of bilateral ptosis with skin laxity and poor frontalis muscle function.

Conclusions: The modified frontalis muscle flap is a safe and effective technique for severe ptosis correction, yielding satisfactory results with minor complications. A careful examination before surgery is highly recommended to ensure good outcomes and avoid complications after surgery.

Abstract No.: 201754

Modified Frontalis Muscle Flap Advancement in Patients With Severe Ptosis

First Author: Que Anh VU

Purpose: To assess the effect of modified frontalis muscle advancement techniques for the treatment of severe congenital ptosis. The purpose of this technique is to achieve a more physiologic direction with the frontalis muscle flap and to avoid malpositions of the upper eyelid or ptosis of the eyelashes.

Methods: This is a retrospective, nonrandomized interventional case series of 21 eyes from 18 patients who exhibited severe ptosis and poor levator function. All patients under 12 years of age underwent surgical correction with frontalis muscle flap advancement and a pulley creation through the orbital septum. The minimum follow-up time was 12 months. Surgical outcomes were measured by using clinical photographs taken before and after surgery.

Results: The mean age of patients is 6.33 ± 2.3 years of age. The preoperative mean visual acuity of the ptosis eye did not change significantly. The mean MRD1 of ptosis eyes increased from 0.34 ± 0.43 preoperatively to 3.03 ± 0.53 postoperatively ($p < 0.001$). Lapgothalmos decrease from 1.79 ± 1.04 one week after surgery to 0.54 ± 0.59 at 12 months after surgery. There were no cases of upper eyelid entropion or eyelash ptosis after 6 months. However, two corneal complications were noted in two cases, requiring prolonged lubrication treatment after the initial surgery. Complications were observed in a case with monocular elevation deficiency syndrome and in one case of bilateral ptosis with skin laxity and poor frontalis muscle function.

Conclusions: The modified frontalis muscle flap is a safe and effective technique for severe ptosis correction, yielding satisfactory results with minor complications.

Abstract No.: 204735

Modified Müller's Muscle Conjunctival Resection Combined With Levator Plication in Moderate to Severe Congenital Ptosis

First Author: Amirhossein AGHAJANI

Co-Author(s): Hanieh FAKHREDIN, Seyed Mohsen RAFIZADEH, Mohammad Taher RAJABI, Amin ZAND

Purpose: To present a modified surgical technique for the correction of moderate to severe congenital ptosis with poor levator function.

Methods: This prospective case series included 34 eyes from 34 patients with unilateral moderate to severe congenital ptosis, defined as marginal reflex distance-1 (MRD-1) ≤ 2 mm and levator function (LF) ≤ 5 mm. The surgical approach was combined Müller's muscle conjunctival resection with an extended range (12–17 mm) and levator plication. An «ideal» response was defined as a postoperative inter-eyelid MRD-1 difference of ≤ 0.5 mm, while an inter-eyelid MRD-1 difference of 0.5–1 mm was considered an «acceptable» response. Secondary outcomes included achieving an open visual axis. Eyelid contour was objectively graded as excellent, good, fair, or poor based on curvature and symmetry with the contralateral eyelid.

Results: At the 6-month follow-up, the overall success rate was 76.5%, with 26.5% achieving an ideal response and 50.0% achieving an acceptable response. Among the 25 cases with visual axis obstruction due to ptosis, only 1 case (4%) failed to achieve an unobstructed visual axis at 6 months. Excellent eyelid contour was achieved in 73.5% of cases at the 6-month follow-up.

Conclusions: This modified surgical technique demonstrates favorable functional and aesthetic outcomes for treating moderate to severe congenital ptosis in young adults with poor levator function. Further studies with larger cohorts and longer follow-up are needed to confirm its long-term efficacy and safety.

Abstract No.: 203513

Multi-Dimensional Tear Proteomic Signatures in Thyroid Eye Disease: Ophthalmopathy, Autoimmunity, and Hyperthyroidism

First Author: Runchuan LI

Co-Author(s): Yi PAN, Jing SUN, Yining WEI, Li YANG, Haiyang ZHANG, Huifang ZHOU

Purpose: Thyroid eye disease (TED) is the most common extrathyroidal manifestation of Graves' disease (GD). Despite its clinical significance, the pathogenic mechanisms and reliable diagnostic biomarkers for TED remain incompletely defined. Tear fluid offers a noninvasive window into disease-related molecular changes.

Methods: Tear samples were collected using Schirmer strips from 20 TED patients, 20 GD patients without ocular involvement, and 14 healthy controls. Proteomic profiling was performed using a pressure cycling technology-pulse data-independent acquisition mass spectrometry (PCT-PulseDIA-MS) workflow.

Results: A total of 5,966 tear proteins were quantified, representing the most comprehensive tear proteome to date. Differentially expressed proteins (DEPs) were identified through pairwise group comparisons. TED patients showed the most extensive tear proteomic alterations among the studied groups.

174 DEPs were associated with ophthalmopathy, 14 with autoimmunity, and 13 with hyperthyroidism. The ophthalmopathy-related DEPs were enriched in immune regulation, lipid metabolism, vascular function, and extracellular matrix remodeling. Several key DEPs showed significant correlations with clinical, laboratory, and imaging variables. A three-protein panel comprising CANT1, IGFBP7, and CASP14 showed high diagnostic accuracy in distinguishing TED from GD (AUC=0.971).

Conclusions: Tear proteomics reveals distinct molecular signatures shaped by the combined influences of ophthalmopathy, autoimmunity, and hyperthyroidism throughout the pathogenesis of TED, underscoring tear proteins as promising noninvasive diagnostic biomarkers.

Abstract No.: 202932

Multimodal Large Language Models for Orbital Disease Detection: A Sequential Sensitivity Analysis in Multinational, Multiracial Populations

First Author: Chaoyu LEI

Co-Author(s): Sunisa SINTUWONG, Chee Chew YIP, Huifang ZHOU

Purpose: Delayed diagnosis of orbital diseases is frequently attributed to limited clinical awareness and experience. This study aims to evaluate whether integrating diverse clinical data modalities can enhance the diagnostic accuracy of MLLMs for orbital diseases.

Methods: This multinational, multiracial, retrospective study focused on three orbital conditions: orbital inflammation, orbital tumors, and thyroid eye disease. The first dataset included 6,786 single-eye photographs in China, and was used to fine-tune a Contrastive Language–Image Pretraining (CLIP) model for initial triage. The second dataset, comprising 170 participants from China, Singapore, and Thailand, was used to evaluate a state-of-the-art MLLM (GPT-4o-Latest). We performed a sequential sensitivity analysis to progressively incorporate external eye photographs, chief complaints, racial information, and diagnostic reasoning prompts. We also assessed the MLLM's capability to autonomously generate medical reports and examination recommendations.

Results: When relying solely on external eye images, the top-1, top-3, and top-5 detection accuracies were $13.72 \pm 2.38\%$, $21.37 \pm 3.02\%$, and $25.68 \pm 2.96\%$, respectively. The fine-tuned CLIP model reached an overall three-class classification accuracy of 90.21%, with accuracies of 90.61% for healthy eyes, 88.18% for orbital diseases, and 92.69% for non-orbital diseases. Integration of all inputs and the formation of an AI agent boosted the top-5 accuracy to $85.29 \pm 0.59\%$. In addition, the model-generated medical reports scored 3.00 ± 0.03 in readability, 2.85 ± 0.25 in comprehensiveness, and 2.78 ± 0.27 in accuracy.

Conclusions: Integrating diverse multimodal data significantly enhances the diagnostic performance of MLLMs for orbital diseases. Our study demonstrated the potential of multimodal AI approaches in improving diagnostic accuracy and supporting clinical decision-making for rare and complex orbital diseases.

Abstract No.: 202903

Novel Tear Drop Rotation Surgery for the Treatment of Moderate to Severe Congenital Epiblepharon

*First Author: John **BLADEN***

*Co-Author(s): Tejaswi **BOMMIREDDY***

Purpose: Mild epiblepharon is successfully treated with 'scarless' techniques and stab incisions; however, recurrence occurs in moderate/severe epiblepharon. We describe a novel minimally invasive surgical technique for moderate to severe epiblepharon that hides the scar within the eyelid fold, and maintains the natural eyelid shape: specifically, a medially based tear drop blepharoplasty, tiny ellipse orbicectomy, combined with retractor everting sutures to avoid overcorrection or loss of the natural eyelid shape

Methods: Retrospective review between 2022-24 and greater than 1 year follow-up. Epiblepharon severity was categorised using class and keratopathy (K) grade pre- and post-operatively: classes 3 and 4 were included.

Results: Sixteen eyelids, from 8 East-Asian patients aged between 5 and 19 years, showed improvement in epiblepharon class (from a mean of 3.5 pre-operatively to a mean of 1.6 post-operatively) and keratopathy grade (from a mean of 2.4 pre-operatively to a mean of 0.4 post-operatively). Three eyelids who were class 4 at the outset had a class recurrence (no keratopathy recurrence) with symptoms from eyelash-conjunctival touch: two at 10 months and one at 17 months; re-do surgery with tear drop rotation technique was successful with no further recurrence.

Conclusions: The tear drop rotation surgery is an effective treatment for moderate to severe epiblepharon with minimal cosmetic effect on the East-Asian eyelid. Keratopathy improved in all cases, and remained better than pre-operatively. In addition, this technique can also be used for recurrent epiblepharon in a step-wise approach. As it is a minimally invasive procedure, recurrence of class can occur although resolution of keratopathy tends to persist.

Abstract No.: 204024

Objective 3D Analysis of Lateral Tarsal Strip: Quantifying Eyelid Fissure and Canthal Tilt Changes

*First Author: Adam **KOPECKY***

*Co-Author(s): Ludwig M **HEINDL**, Jan **NEMCANSKY**, Alexander C. **ROKOH***

Purpose: To objectively evaluate whether lateral tarsal strip (LTS) surgery for involutional lower eyelid malposition (ectropion and entropion) induces upper eyelid ptosis or alters periorcular dimensions at six-month follow-up, using 3D stereophotogrammetry.

Methods: Twenty patients with involutional lower eyelid malposition (12 ectropion, 8 entropion) underwent unilateral LTS. Standardized 3D facial scans (Vectra 3D) were obtained preoperatively and at six months. Primary outcomes were palpebral fissure height (PFH), palpebral fissure width (PFW), upper lid fold distance (FPD), canthal tilt (CT), lateral canthal angle (LCA), lower lid margin position (Pi), medial canthal angle (MCA; control), and interpupillary distance (PD; control). Exploratory outcomes included eyebrow-palpebral distance (EPD_M) and eyebrow length.

Results: LTS significantly increased PFH ($p < 0.001$) and PFW ($p = 0.016$) in operated eyes. FPD remained unchanged ($p > 0.1$), indicating absence of induced upper eyelid ptosis. Significant postoperative changes were detected in upper and lower palpebral margin lengths (UPMLm $p = 0.015$, LPMLm $p = 0.003$). MCA decreased significantly ($p < 0.001$), whereas LCA ($p = 0.145$) and CT ($p = 0.097$) remained stable. Parameters of the non-operated eye were stable throughout follow-up. Exploratory eyebrow parameters (EPD_M, EL_M, EL_S) demonstrated no consistent or clinically relevant changes.

Conclusions: LTS surgery effectively restores lower eyelid position by enlarging palpebral fissure height and width, without inducing upper eyelid ptosis, as objectively confirmed by 3D stereophotogrammetry. Eyebrow metrics remained stable. These findings highlight LTS as a reliable functional and aesthetic procedure for involutional lower eyelid malposition.

Abstract No.: 203846

Ocular and Orbital Manifestations of Encephalocraniocutaneous Lipomatosis (ECCL) in a Neonate: A Case Report From a Level III Hospital in Manila, Philippines

*First Author: Justine Mariz **LIMQUECO***

*Co-Author(s): Jan Eric **BALETE**, Nickey Angelo **CAYETANO**, Manuel **PALMERO***

Purpose: Encephalocraniocutaneous Lipomatosis (ECCL) is a rare neurocutaneous disorder that occurs sporadically. It mainly involves neurologic, cutaneous, and ocular anomalies. This case report presents

a 3-day-old Filipino patient who manifested with nevus psiloliparus, epibulbar dermoid choristoma, and multiple neurologic manifestations such as intracranial atrophy, multiple intracranial lipomas, and calcifications, all of which clinically fit the diagnostic criteria of ECCL.

Methods: The patient's ocular and cutaneous lesions were initially treated conservatively. Early diagnosis and prompt surgical management of the ocular lesions were eventually performed by excision of the epibulbar mass for cosmesis and to prevent further visual complications. A skin punch biopsy of the cutaneous lesions was also done, which confirmed the diagnosis of nevus psiloliparus.

Results: There is possible guarded visual and developmental prognosis given the ocular and neurological findings. However, the parents were heavily counseled for close monitoring and follow-up.

Conclusions: A multidisciplinary approach for management is warranted for this condition, given its numerous manifestations.

Abstract No.: 202529

Optimizing Surgical Management of Craniofacial and Orbital Fibrous Dysplasia: A Multi-Center Retrospective Cross-Sectional Study

First Author: Yinwei **LI**

Co-Author(s): Lianfei **FANG**, Yue **HE**, Zhifeng **SHI**, Huifang **ZHOU**

Purpose: Fibrous dysplasia (FD) is a rare osseous disorder with limited understanding. This study aimed to evaluate clinical characteristics of craniofacial FD (CFD) and orbital FD (OFD), explore vision impairment mechanisms, and identify recurrence risk factors.

Methods: A retrospective analysis was conducted on 54 CFD patients across three centers, including 30 patients with orbit involvement.

Results: OFD patients exhibited higher prevalences of polyostotic FD and McCune-Albright syndrome, and more often underwent debulking rather than radical surgery. Vision impairment was primarily attributed to compressive and stretched optic neuropathy. Polyostotic involvement ($p = 0.034$) was a risk factor for subjective recurrence. Surgery age <16 years ($p = 0.046$) and abnormal body mass index ($p = 0.002$) were associated with greater postoperative lesion regrowth volume.

Conclusions: OFD patients exhibit distinct clinical features. Optic canal decompression is not required for all OFD-related vision loss patients. Recurrence risk should be thoroughly assessed before surgery.

Abstract No.: 202990

Orbital Myoepithelial Carcinoma: Clinical Profile and Treatment Outcomes From a Single-Center Study

First Author: Wang **NAN**

Co-Author(s): Jing **LI**, Jianmin **MA**

Purpose: Orbital myoepithelial carcinoma (OMC) is an exceptionally rare malignancy with limited published data regarding its clinical behavior and management. This study aims to characterize the clinical, radiological, and histopathological features of OMC, and evaluate prognostic factors based on a single-institution case series.

Methods: A retrospective review was conducted of 12 patients with histopathologically confirmed OMC treated at Beijing Tongren Hospital between January 2000 and December 2024. Data collected included demographics, clinical presentation, imaging characteristics, treatment modalities, recurrence, and survival outcomes. Progression-free survival (PFS) and overall survival (OS) were analyzed.

Results: The cohort comprised 7 males and 5 females, with a mean age of 55.1 years. Common initial symptoms included abnormal globe position (41.7%). Tumors were frequently large (median diameter: 25.5 mm) and invasive, with sinonasal or intracranial extension in 41.7% of cases. Bone destruction was observed in 66.7% of imaging studies. A notable history of pleomorphic adenoma was present in 50% of patients. Over a mean follow-up of 6.6 years, the overall survival rate was 77.8%, with a recurrence rate of 55.6%. All patients with prior pleomorphic adenoma developed recurrence. The median progression-free survival was 3 years.

Conclusions: OMC is an aggressive orbital malignancy often associated with large tumor size, local invasion, and high recurrence rates, particularly in cases arising from pleomorphic adenoma. Long-term postoperative surveillance and multidisciplinary management are critical given the substantial risk of recurrence and progression.

Abstract No.: 201789

Outcomes of Intracanalicular Antibiotic Instillation and Surgical Management of Canaliculitis

First Author: Meghana **TANWAR**

Co-Author(s): Sabyasachi **CHAKRABARTY**, Usha **KIM**

Purpose: A retrospective review of treatment outcomes of canaliculitis -intracanalicular ointment instillation (IOI) or punctal snip and marsupialization (Sx) in achieving resolution of infection and patency.

Methods: The treatment modalities and outcomes of canaliculitis cases between January 2022 and February 2025 were studied. $p < 0.05$ was considered significant.

Results: Eighty-four cases with a median follow-up of 3 months with IOR(1-10) were eligible. The mean age was 59.67 ± 12.54 years. 72.6%(n=61) showed a lower canalicular involvement. The causative microbe could be identified in 65 cases, and 8 showed polymicrobial involvement. The most common isolate was *Staphylococcus* spp(n=21; 32.3%). 41.7%(n=35) patients received IOI alone, 50%(n=42) patients received a primary Sx and 8.3%(n=8) patients underwent IOI followed by Sx. The median IOIs per recipient was 5 (IQR 3-6). IOI was more successful than Sx in attaining canalicular patency(p=0.003).

Conclusions: IOI is more effective than Sx in treating canaliculitis. Intracanalicular antibiotic instillation requires multiple sittings but is more successful at attaining canalicular patency in canaliculitis. Surgery may be planned for a patient unwilling for further repeated follow-ups, but watering may persist post-surgery due to persistent canalicular blockage.

Abstract No.: 206155

Outcomes of Post-Teprotumumab Orbital Decompression in Residual or Reactivated Thyroid Eye Disease

First Author: Rolika **BANSAL**

Co-Author(s): Eman **AL-SHARIF**, Don **KIKKAWA**, Bobby **KORN**, Catherine **LIU**

Purpose: To assess the clinical outcomes of orbital decompression in patients previously treated with teprotumumab for thyroid eye disease (TED).

Methods: Retrospective analysis of TED patients post-teprotumumab who underwent orbital decompression for residual exophthalmos. Outcomes measures assessed were change in exophthalmos (primary outcome), diplopia, and CAS (secondary outcomes).

Results: We identified 139 TED patients who were treated with a full course of teprotumumab. A total of 38 orbits or 18% (25/139) patients underwent orbital decompression. Indications for surgery were residual disease (persistent exophthalmos and/or large angle diplopia) in 89% (34/38) or reactivated disease (increase in exophthalmos >2mm and/or CAS >4) in 11% (4/38). The mean interval prior to surgery was 8.6 ± 4.8 (range 1.0 - 26.0) months from the last infusion. The mean pre-decompression exophthalmos was 21.0 ± 2.0 (range 19.0 - 26.5) and the mean post-decompression exophthalmos was 19.2 ± 1.9 (range 16.0 - 24.0), corresponding to a reduction of 10% at a mean follow-up of 27.3 ± 11.8 (range 3.0 - 52.0) months. There were no cases of induced diplopia following decompression. Decompression led to resolution of diplopia in 23% (5/22) of cases without additional strabismus procedures. Prior to any treatment, the median CAS score was 4, which reduced to 2 post-teprotumumab and <1 post-orbital decompression.

Conclusions: Prior studies have shown that the rate of orbital decompression has declined significantly with the advent of teprotumumab. Our study shows that patients with residual or reactivated disease post-teprotumumab therapy, in the form of exophthalmos, diplopia, and elevated CAS score, can be further improved with surgical orbital decompression, providing disease control and excellent outcomes.

Abstract No.: 201641

Outcomes of Surgical Management in Moderate to Severe Contracted Anophthalmic Sockets: A 10-Year Retrospective Review

First Author: Alene, Ker Hsin **NG**

Co-Author(s): Pimkwan **JARU-AMPORN PAN**, Kanograt **PORN PANICH**

Purpose: To evaluate surgical outcomes in moderate to severe contracted anophthalmic sockets at a tertiary hospital, addressing a critical gap in the literature, particularly within Asian populations.

Methods: A retrospective review of 63 patients with Grade 3 and 4 socket contractures, classified by Tawfik's grading, was conducted at a tertiary hospital (January 2015–December 2024). Clinical data, surgical techniques, prosthetic rehabilitation, satisfaction, and complications were analyzed. Outcomes were defined as complete success (restoration of a deep fornix with stable customized prosthesis retention), partial success (persistence of focal scarring or symblepharon with prosthesis still retainable, often requiring adjustments), and failure (inability to retain prosthesis).

Results: Grade 4 sockets comprised 54.0%. Trauma (47.6%) and congenital anomalies (17.5%) were the leading etiologies. Following reconstruction, all patients retained a customized prosthesis: 71.4% achieved complete success and 28.6% partial success, with 85.7% reporting satisfaction. Oral mucous membrane grafts (OMMG) were most frequently employed (69.8%) and strongly predicted successful outcomes (OR = 11.3, p = 0.007). Dermis fat graft (31.7%) yielded 50% complete and 50% partial success, while hard palate grafts (19.0%) achieved 75% complete and 25% partial success. Persistent contracture was the predominant complication, significantly requiring multiple surgeries. Grade 4 sockets demonstrated higher complication rates and surgical burden, reflecting greater baseline scarring and tissue loss.

Conclusions: This 10-year review provides the most comprehensive dataset on contracted socket reconstruction in Asia. Stable prosthetic rehabilitation was achievable in all patients, though outcomes depended on severity and technique. OMMG proved pivotal for sustained success, while advanced contractures demanded more complex management, underscoring the importance of individualized strategies.

Abstract No.: 203506**Preliminary Clinical Application of Three Lacrimal Duct Reconstruction Techniques***First Author: Pang ZUOXIANG*

Purpose: To report the clinical application of three different methods of lacrimal duct reconstruction surgery in our hospital.

Methods: Since November 2022, 11 cases of lacrimal duct reconstruction have been carried out. Among them, 9 cases of lacrimal duct reconstruction using nasal mucosa (nasal mucosa group), 1 case of lacrimal duct reconstruction using nasolacrimal duct and lacrimal sac (nasolacrimal duct group), and 1 case of conjunctival dacryocystic anastomosis surgery. Postoperative care included antibiotic and corticosteroid eye drops, with triamcinolone acetonide nasal spray used in the first two groups. Regular follow-ups were scheduled within 3 months postoperatively, with subsequent visits as needed.

Results: In the nasal mucosa group, 6 cases have been followed up for over one year postoperatively (13-28 months postoperative), and 3 cases have been followed up for 5-8 months postoperative. Among them, 8 cases maintained intubation status without any epiphora symptoms. The fluorescein dye disappearance test (FDDT) showed negative results, and the lacrimal stent is properly positioned at the medial canthus, and the surgical stoma in the nasal cavity is well-formed. Patients in the nasolacrimal duct group had 6-month follow-ups showing no epiphora, good anastomotic and nasal mucosal healing, and the stent in a satisfactory position. The patients in the conjunctivodacryocystostomy group had 3-month follow-ups demonstrating no epiphora or discharge, a patent anastomosis, and the stent in a satisfactory position.

Conclusions: For refractory upper lacrimal duct obstruction, lacrimal duct reconstruction can effectively alleviate symptoms. The long-term outcomes of lacrimal duct reconstruction still require a large sample and long-term observation.

Abstract No.: 204328**Preoperative Intralesional Triamcinolone Acetonide and 5-Fluorouracil Injections: Enhancing Outcomes in Post-Traumatic Eyelid Cicatrix Reconstruction***First Author: Hisar DANIEL**Co-Author(s): Ferdy ISKANDAR*

Purpose: To evaluate the role of combined preoperative intralesional triamcinolone acetonide (TA) and 5-fluorouracil (5-FU) injections in improving surgical outcomes for post-traumatic eyelid cicatrix.

Methods: We describe two young adults with severe eyelid cicatrix after primary repair following motorcycle

trauma. Case 1 involved a 22-year-old female with a full-thickness lower eyelid rupture (>50% vertical loss). Case 2 was a 23-year-old male with a full-thickness upper eyelid rupture causing complete lagophthalmos and corneal exposure. Both developed significant eyelid contracture one month post-injury. A combined regimen of intralesional TA (4 mg/0.1 mL) and 5-FU (45 mg/0.9 mL) was administered weekly for three sessions, followed by eyelid re-reconstruction one week after the final injection.

Results: Marked improvement in eyelid mobility and reduction of cicatrix were observed in both cases prior to re-reconstruction. Postoperatively, eyelid contour and function were restored, lagophthalmos resolved, and corneal protection was achieved. Importantly, no adverse events related to the injections occurred.

Conclusions: Preoperative intralesional TA and 5-FU injections appear to favorably modulate scar remodeling and facilitate optimal conditions for eyelid re-reconstruction. This protocol demonstrates potential as a safe and effective adjunct for managing complex cicatricial eyelid deformities, particularly in high-risk post-trauma cases where functional and aesthetic outcomes are critical.

Abstract No.: 204127**Primary Results of the Phase-3 SatraGO-1 and SatraGO 2 Trials: Efficacy and Safety of Satralizumab in Thyroid Eye Disease***First Author: Dongmei LI**Co-Author(s): César A. BRICEÑO, Alexander BURDESKA, Oluwatobi IDOWU, Thomas KUENZEL, Santiago ORTIZ-PEREZ*

Purpose: Satralizumab is a humanized monoclonal antibody targeting IL-6R (interleukin-6 receptor) with a longer duration of circulation and subcutaneous dosing Q4W (every-4-weeks). SatraGO-1/SatraGO-2 trials are investigating satralizumab's efficacy and safety in moderate-to-severe, active and chronic-inactive TED (thyroid eye disease) participants.

Methods: SatraGO-1 (NCT05987423; n=131, 12 countries)/SatraGO-2 (NCT06106828; n=127, 10 countries) are ongoing, identical, global, phase 3, double-masked, two-stage randomized, placebo-controlled, 72-week multicenter studies. Participants aged ≥18 years with moderate-to-severe, active TED (symptom onset ≤12 months before baseline) or stable, chronic-inactive TED (diagnosed 1–10 years before screening) were eligible if systemic disease was controlled. Participants were randomized 1:1 to subcutaneous satralizumab or placebo at Weeks 0, 2, 4 (loading doses), then Q4W through Week 20 (maintenance). Week-24 primary efficacy endpoint was the proportion of active TED participants with proptosis response (≥2mm improvement from baseline in study eye). Secondary endpoints included proptosis response in all TED participants, overall response (≥2-point

reduction in clinical activity score from baseline and proptosis response in the study eye) in active TED, and proportion of patients achieving ≥ 1 grade improvement in diplopia. Safety included incidence, seriousness, and severity of adverse events.

Results: During abstract submission, trials are ongoing. By the proposed APAO presentation, the primary endpoint at Week-24, with key safety and secondary endpoints, will be available and presented.

Conclusions: SatraGO-1/SatraGO-2 are investigating IL-6R inhibition via satralizumab in TED participants. Primary efficacy and safety data are expected to provide insights into satralizumab's potential as a disease-modifying therapy for TED.

Abstract No.: 203023

Prolonged Subperiosteal Orbital Hemorrhage – a Case-Based Literature Review

First Author: Brigitha **RAHMADDINI NAVIRA PAPUTUNGAN**

Co-Author(s): Suliati P. **AMIR**, Halimah **PAGARRA**, Andi **PRATIWI**, Syukriyah **SOFYAN**

Purpose: Subperiosteal orbital hemorrhage (SOH) is an uncommon and potentially vision-threatening ailment. Traumatic subperiosteal hemorrhage mostly happens due to traumatic events to the craniomaxillofacial structure. This case report aims to present a case of subperiosteal orbital hemorrhage and to provide a review of similar cases from the existing literature.

Methods: The patient was a 15-year-old boy with a protruding left eye for two weeks, right after blunt trauma, along with a watery left eye and dizziness. Best corrected visual acuity (BCVA) was 20/30 PH 20/25, and the IOP was 30 mmHg on the left eye. Proptosis and 1 mm lagophthalmos were present on the left eye. There was no RAPD detected on both eyes, and the pupillary reflex on both eyes showed a normal response. There was restricted ocular movement in all directions of the affected eye. CT-Scan of the orbit showed left retrobulbar hemorrhage. He was diagnosed with proptosis of the left eye caused by retrobulbar hemorrhage of the left eye.

Results: In this case, anterior orbitotomy with cantholysis and hemorrhage evacuation was done on his left eye, and it was revealed that the hemorrhage was located in the subperiosteal rather than in the retrobulbar area. After one month of follow-up, the BCVA of the affected eye was 20/20 without any complications. The final CT Scan one month after hemorrhage aspiration revealed no hemorrhage in the subperiosteal space.

Conclusions: Traumatic subperiosteal orbital hemorrhage is rare in children, with surgical drainage offering good visual outcomes. Without adequate resolution, it may progress to a chronic hematic cyst.

Abstract No.: 200362

Prospective Clinical Study of Tocilizumab for the Treatment of Pediatric Patients With Thyroid Eye Disease

First Author: Pengsen **WU**

Co-Author(s): Guiqin **LIU**

Purpose: To evaluate the clinical efficacy and safety of tocilizumab in the treatment of pediatric patients with thyroid eye disease (TED).

Methods: This prospective clinical study included Pediatric patients with TED at Shenzhen Eye Hospital from September 2023 to December 2024. Inclusion criteria consisted of progressive worsening of ocular symptoms, including increased proptosis and/or eyelid retraction. The treatment protocol involved intravenous administration of tocilizumab (8 mg/kg) once every four weeks for a total of 3 to 6 doses. Outcome measures included: clinical activity score (CAS), proptosis, palpebral fissure height, and routine ophthalmic examinations. Patients were followed up for 6 months post-treatment.

Results: This study enrolled 11 pediatric TED patients (mean age 13.1 ± 2.3 years; range 9-17 years) with a female predominance ($n=10$, 90.9%). All patients received an average of (3.09 ± 2.34) doses of the medication. Treatment results showed that 10 patients responded well to the medication. Significant improvements were observed following treatment. Proptosis decreased from 18.45 ± 3.26 mm to 17.32 ± 2.98 mm ($P < 0.0001$). Palpebral fissure height reduced from 11.14 ± 1.81 mm to 10.05 ± 1.36 mm ($P = 0.0002$). CAS showed marked reduction from 1.73 ± 1.39 to 0.27 ± 0.46 ($P < 0.0001$). Regarding safety, 1 patient (9.09%) experienced mild neutropenia during tocilizumab treatment, which did not require special intervention and resolved spontaneously after discontinuation; no other adverse reactions were observed.

Conclusions: This study demonstrates that tocilizumab effectively treats pediatric thyroid eye disease with a low incidence of mild adverse effects, showing promising clinical application prospects.

Abstract No.: 201882

Prospective Study on the Epidemiology of Demodex in Pediatric Chalazion and the Possibility of Maternal Transmission

First Author: Ryo **KIKUCHI**

Co-Author(s): Tomoyuki **KASHIMA**

Purpose: Pediatric chalazion is a common eyelid disorder, but its underlying etiologies remain incompletely understood. Demodex infestation has been implicated in blepharitis and chalazion in adults, while its role in children and the possibility of maternal transmission are less clear. This study aimed to determine the prevalence of Demodex in pediatric

chalazion and to evaluate the potential maternal association.

Methods: From August 2024 to August 2025, a prospective interventional study was conducted in 31 children (mean age 6.97 ± 4.06 years) undergoing chalazion surgery under general anesthesia. During the procedure, eyelashes were epilated and examined microscopically for Demodex mites. Clinical features, including recurrence, anterior/posterior blepharitis, and maternal history of chalazion, were recorded. Additionally, maternal eyelashes were examined for Demodex to explore the possibility of vertical transmission.

Results: Among the 31 patients, 24 presented with primary chalazion and 7 with recurrent disease. Demodex was detected in 4 children (12.9%), and all isolates were identified as Demodex folliculorum. Anterior blepharitis was observed in 6 cases and posterior blepharitis in 4 cases. A maternal history of chalazion was noted in 3 of 31 cases, while Demodex was identified in only 1 mother.

Conclusions: Demodex can be detected in pediatric chalazion, particularly in recurrent cases with blepharitis. All positive cases involved D. folliculorum, suggesting this species may predominate in children. The low maternal positivity indicates that mother-to-child transmission is not a major factor. Larger studies are warranted to confirm species-specific roles and to guide preventive strategies.

Abstract No.: 201302

Quantification of Apical Crowding Using Computed Tomography and Its Relationship With Visual Function in Dysthyroid Optic Neuropathy

First Author: Shengnan CHENG

Purpose: To assess the performance of computed tomography-based extraocular muscle area (EOMA) measurement, as a marker of apical crowding, for early detection of dysthyroid optic neuropathy (DON) in patients with Graves' ophthalmopathy (GO).

Methods: Medical records and CT scans of 60 patients were reviewed: 36 with GO and DON, and 24 with GO without DON. On coronal CT slices 18 mm posterior to the inter-zygomatic line, the EOMA to orbital bone area ratio (EOMA/OA) was calculated. Apical crowding was also subjectively graded (Nugent score). Visual function parameters, including best-corrected visual acuity (BCVA, logMAR), visual field mean deviation (MD), pattern standard deviation (PSD), and pattern-reversal VEP P100 latency and amplitude, were evaluated. Correlation between EOMA/OA and visual function was analyzed. ROC analysis evaluated the sensitivity and specificity of EOMA/OA for DON detection.

Results: All visual function parameters except P100 amplitude ($P = 0.261$) differed significantly between

groups (all $P < 0.05$). The EOMA/OA ratio was significantly higher in DON orbits (0.72 ± 0.14 vs. 0.44 ± 0.16 , $P < 0.0001$), as was the Nugent score (2.19 ± 0.78 vs. 1.00 ± 0.91 , $P < 0.0001$). ROC analysis showed EOMA/OA predicted DON with 92% sensitivity and 71% specificity at a cutoff of 0.53, outperforming the Nugent score. EOMA/OA significantly correlated with BCVA, MD, PSD, and P100 latency.

Conclusions: The quantitative EOMA/OA ratio demonstrates high sensitivity and specificity for identifying DON in GO patients and correlates significantly with visual functional impairment, supporting its use for early detection.

Abstract No.: 205848

Risks and Benefits of Local Anesthesia Versus General Anesthesia in Endoscopic Dacryocystorhinostomy

First Author: Shelley CHANG

Co-Author(s): Yi-lin liao, Yen-chang CHU

Purpose: Endoscopic dacryocystorhinostomy (DCR) is a common procedure, typically performed for nasolacrimal duct obstruction (NLDO) under general anesthesia (GA), while performing it under local anesthesia (LA) may offer benefits to patients and surgeons. This study analyzes the outcomes and assesses the risks and benefits of performing endoscopic DCR under GA versus LA.

Methods: A retrospective chart review was conducted in patients aged 18 years or older with acquired NLDO who underwent endoscopic DCR at a tertiary center between January 2019 and December 2024. The primary outcome was the surgical failure, while secondary outcomes included operative time, intraoperative bleeding, complications, predictors of failure, and the need for revision surgery between the 2 groups. Surgical failure was evaluated using multivariable Cox proportional hazards models, adjusted for age and sex, with propensity score-matched analyses serving as sensitivity analyses. Potential predictors were initially screened through univariable analyses, and variables with a P -value < 0.15 were then entered into multivariable models. All statistical tests were two-tailed with a significance threshold of $P < 0.05$.

Results: The study enrolled 211 eyes of 163 patients, with 118 patients (160 eyes) in the GA group, and 45 patients (51 eyes) in the LA group. The mean age was 61.8 ± 12.2 years in the GA group, and 72.3 ± 12.7 years in the LA group. The duration of surgery was significantly shorter in the LA group ($P < 0.001$). Surgical success was comparable between groups, with the LA group exhibiting a shorter operative time ($P < 0.001$). No major adverse events were reported. Small lacrimal sac size was identified as an independent associated factor of surgical failure ($P < 0.001$).

Conclusions: LA offers a safe and effective alternative to GA for endoscopic DCR, particularly in older patients. Potential drawbacks include patient discomfort and an uncontrollable surgical field, which can be mitigated with appropriate patient selection. Both methods demonstrated similarly high success rates.

Abstract No.: 206311

Role of Conjunctival Map Biopsy in Determining Outcome in Sebaceous Gland Carcinoma

First Author: Kirthi KOKA

Co-Author(s): Md Shahid ALAM

Purpose: To evaluate the role of conjunctival map biopsy (MB) in nodular and diffuse variants of eyelid sebaceous gland carcinoma (SGC).

Methods: All patients with histopathologically proven SGC who underwent MB over the last twelve years were retrospectively analyzed.

Results: Twenty-eight patients with a mean age of 66.86 ± 11.68 were analyzed. There was no sex predilection. Nodular lesion was seen in ten patients (35.7%), whereas a diffuse presentation was seen in 18 patients (64.3%). Initial management consisted of an excision biopsy with lid reconstruction in 19 (67.8%) and incisional biopsy in 4 patients (14.3%). A total of 368 conjunctival MB sites were analyzed of which 162 (44.02%) sites were positive for pagetoid spread of SGC. The positivity of map biopsy was 14.6 % and 58.7% in nodular and diffuse variants, respectively ($p=0.001$). The mean follow-up period was 15.67 ± 19.79 months. Recurrence was seen in 7 patients at a mean duration of 11 ± 7.05 months, of which six patients had an initial diffuse eyelid involvement. A total of nine patients underwent exenteration, all of whom had a diffuse presentation on clinical examination and on map biopsy.

Conclusions: Diffuse SGC showed a statistically high positivity rate on MB compared to the nodular variant. Diffuse SGC had a higher recurrence rate and a higher probability of undergoing exenteration. Nodular SGC can also show pagetoid spread. Early recognition and treatment with topical chemotherapy can prevent recurrence. Hence map biopsy is recommended in all cases of SGC.

Abstract No.: 203475

Scarless Eyelid Augmentation and Lift (SEAL): Simultaneous Ptosis and Double Lid Technique

First Author: Stacey LAM

Co-Author(s): Alice GOH

Purpose: To introduce and evaluate the SEAL (Scarless Eyelid Augmentation and Lift) technique, a novel

posterior approach for simultaneous ptosis correction and double eyelid creation without external scars.

Methods: The SEAL technique utilizes a posterior white-line advancement combined with precise internal fixation to achieve functional elevation of the upper eyelid and aesthetic supratarsal crease formation. Patients undergoing SEAL were assessed for eyelid height, symmetry, crease definition, and complications. Follow-up included both functional and aesthetic outcomes, as well as patient satisfaction.

Results: Early experience demonstrates consistent improvement in margin reflex distance (MRD1), stable and natural-appearing double eyelid crease formation, and high patient satisfaction. No visible external scars or significant complications were observed.

Conclusions: The SEAL technique offers a reliable, minimally invasive approach for patients seeking both functional correction of ptosis and aesthetic enhancement through double eyelid creation, advancing the paradigm of scarless oculoplastic surgery.

Abstract No.: 203951

Suture-Assisted Three Snip Punctoplasty for Stenosed Punctum: A Novel Technique

First Author: Mohammad IDRIS

Purpose: To compare the usefulness of forceps versus 6/0 vicryl suture in opening the stenosed punctum surgically and excision during three snip punctoplasty.

Methods: Punctum was dilated with an appropriately sized dilator, followed by a lacrimal probe and syringing to check the patency of the nasolacrimal drainage system. Posterior wall of the inferior punctum is grasped with forceps compared with the same, where instead of forceps, a 6-0 vicryl suture is used for traction and holding. In both techniques, a triangular tissue with 60-degree angles to each other was removed with the base parallel to the inferior fornix. A video demonstration will be presented to explain both methods.

Results: Both forceps and suture were helpful in achieving a desired goal, but suture proved to be superior in completing three snip punctoplasty in terms of easy access and accurate triangle of tissue removal. Ten patients in group 1 (forceps group) and 10 patients in group 2 (suture group) were included. Age ranges from 41-78 years. Males were 09, females were 11. Two patients in group one showed restenosis. None of the patients in group 2 showed recurrence of stenosis.

Conclusions: Compared to the forceps technique, the suture technique was superior to surgically opening the stenosed punctum. Suture was found to facilitate the easy entry of scissors to get a desired size of tissue excision during three snip punctoplasty with no recurrence.

Abstract No.: 209071**TSHR-Targeting Nucleic Acid Aptamer Treats Graves' Ophthalmopathy via Novel Allosteric Inhibition***First Author: Yanchen ZHANG**Co-Author(s): Wencan WU*

Purpose: Dysregulated thyrotropin receptor (TSHR) signaling drives a spectrum of diseases, including the vision-threatening Graves' orbitopathy (GO). Despite its prominence as a therapeutic target, TSHR has remained pharmacologically intractable, with no clinically approved inhibitors. This study aims to bridge this critical gap by developing a novel TSHR-targeted therapy for GO, addressing the urgent unmet need for effective and precise treatments to halt its debilitating ocular complications.

Methods: A tandem approach combining protein-targeted cell-SELEX with specific functional selection was utilized to develop the aptamer YC3. Specifically, HEK293T cells engineered to highly express the TSHR protein were used as positive controls for cell-SELEX, while HEK293T cells that do not express TSHR served as negative controls. The levels of cAMP in the cells and the expression of phospho-ERK were measured as bio-functional indicators to assess the activity of the aptamers. The specificity and affinity of YC3 were evaluated using recombinant proteins, cell lines with varying TSHR expression levels, human and mouse tissues, and in vivo models. The binding site of YC3 on TSHR was investigated through competitive analyses, followed by molecular docking and dynamic simulations to predict the interaction details. These predictions were validated through site-directed mutagenesis. In vitro, the bio-function of YC3 in modulating TSHR signaling and its impact on the phenotypes of primary human orbital fibroblasts were assessed. In vivo, the effect of YC3 on orbital pathological remodeling was evaluated in GO mouse models using imaging, serological, and histopathological assessments.

Results: YC3 exhibited nanomolar affinity with robust pharmacodynamic efficacy. In vitro studies, YC3 potently reversed thyroid-stimulating antibodies (TSABs)-driven hyperactivation in primary human orbital fibroblasts, markedly suppressing pathogenic hallmarks of GO. In vivo studies, therapeutic administration of YC3 in a GO mouse model alleviated pathological remodeling of orbital tissues and improved ocular symptoms. Mechanistically, YC3 bound to a previously unidentified allosteric site within the leucine-rich repeat domain of TSHR, thereby inhibiting receptor activation.

Conclusions: This study identifies YC3 as a promising TSHR-targeted therapeutic candidate for GO and unveils a novel allosteric site for next-generation inhibitors. These findings underscore the translational potential of aptamers to dissect receptor mechanisms and uncover cryptic druggable sites, forging a critical

link between structural biology and precision-driven drug discovery.

Abstract No.: 201731**Targeted Delivery of Simvastatin via Neutrophil-Derived Exosomes Promotes Orbital Bone Defect Repair: A Translational Study***First Author: Yun SU**Co-Author(s): Xianqun FAN, Wanzhuo HE, Miao WANG*

Purpose: Orbital bone defects often lead to functional and aesthetic impairments. Current implants face challenges like inflammation and poor integration. This study developed a neutrophil exosome-based system (Exo-pep-Sim) for targeted delivery of simvastatin to enhance bone regeneration by modulating inflammation and promoting vascularized osteogenesis.

Methods: Exosomes derived from neutrophils were loaded with simvastatin via peptide modification. The system was characterized by TEM, nanoparticle tracking, and Western blot. In vitro assays included macrophage polarization (flow cytometry), osteogenic differentiation (ALP staining), and angiogenesis (tube formation). A rat orbital defect model was established, and repair was evaluated using Micro-CT and immunohistochemistry (CD31). Proteomics and pathway analysis were performed to explore mechanisms.

Results: Exo-pep-Sim showed sustained release ($82.3 \pm 5.6\%$ at 24 h) under high MMP-2 conditions. It significantly promoted M2 macrophage polarization ($38.7 \pm 3.5\%$ vs $15.2 \pm 2.1\%$, $p < 0.01$) and reduced IL-1 β . Micro-CT showed higher bone volume (BV/TV $45.3 \pm 4.7\%$ vs $19.8 \pm 3.2\%$, $p < 0.001$) and increased CD31+ vessel density (1.8-fold, $p < 0.01$). Key proteins (NRP1, VEGFR2, p-AKT) were upregulated, and PI3K-AKT/VEGF pathways were significantly activated.

Conclusions: The Exo-pep-Sim system effectively targets inflammatory sites, enhances M2 polarization, and improves vascularized bone repair, offering a promising clinically applicable strategy for orbital reconstruction.

Abstract No.: 200927**Tear miRNA Expression Profiles in Patients With Thyroid Eye Disease***First Author: Min Joung LEE**Co-Author(s): Hokyung CHOUNG, Bo Sook HAN, Namju KIM, Sang Earn WOO*

Purpose: To characterize tear microRNA (miRNA) expression profiles in patients with thyroid eye disease (TED) and identify candidate miRNA biomarkers associated with disease activity.

Methods: Total RNA was extracted from the tears of patients with TED (n=30) and healthy controls (HCs,

n=6). miRNA expression profiling was performed using the Nanostring assay, and differentially expressed miRNAs were identified based on TED activity. Selected miRNAs were validated using quantitative real-time polymerase chain reaction (qRT-PCR).

Results: Compared to HCs, 132 miRNAs were differentially expressed in TED patients. Bioinformatic analysis revealed enrichment in the MAPK signaling pathway, longevity regulation, and adherens junctions. Eleven miRNAs were significantly different between active and inactive TED: miR-193b-3p, miR-206, let-7i-5p, miR-146b-3p, miR-28-5p, miR-30a-3p, miR-485-3p, miR-499a-3p, miR-571, miR-579-3p, miR-874-5p. Among these, miR-571 and miR-579-3p were found to be significantly differentially expressed in the validation cohort by qRT-PCR.

Conclusions: We successfully profiled tear miRNA expressions in TED patients and identified several candidate miRNAs associated with disease activity. Notably, miR-571 and miR-579-3p showed significant differences in expression and may serve as tear biomarkers for TED activity. Further studies with larger cohorts are needed to confirm their roles in TED pathogenesis.

Abstract No.: 203135

Temporal Sequence Between Onset of Hyperthyroidism and Thyroid Eye Disease: A Multicenter Retrospective Study

First Author: Yujie **REN**

Co-Author(s): Chaoyu **LEI**, Huifang **ZHOU**

Purpose: Thyroid eye disease (TED) often coexists with hyperthyroidism, yet the clinical implications of their onset sequence remain unclear. This multicenter study aims to characterize the epidemiological patterns, clinical features, and serological indicators across different onset patterns.

Methods: A total of 3,834 TED patients were recruited from nine Chinese hospitals from February 2016 to July 2023 and stratified into three groups: simultaneous onset (SO), TED onset first (EF), and hyperthyroidism onset first (HF). Demographic data, clinical features, and serological indicators were analyzed.

Results: Among EF patients, 80.5% developed hyperthyroidism within 24 months of TED onset, while HF patients faced a prolonged risk of TED, with 80.3% developing it by 53 months post-hyperthyroidism onset. SO patients had the highest proportion of active (56.2%) and moderate-to-severe cases (85.0%). EF patients exhibited the highest sight-threatening cases (9.8%), smoking rates (22.3%), and longest disease duration. HF showed the highest proportion of elevated TPOAb (44.8%) and TRAb (71.4%). Logistic regression indicated HF and EF groups were less likely to be active than SO (OR: 0.442 and 0.626, respectively). In XGB, the onset sequence ranked as the third most influential

predictor of activity and severity. Among patients ≥ 60 years, HF cases were likely to have higher severity (OR: 2.60).

Conclusions: These results of the granular time-stratified analysis highlight the critical role of considering onset sequence in managing TED: EF patients require early endocrine evaluation, HF patients need prolonged ophthalmic monitoring, while SO patients may benefit from aggressive immunomodulation. Distinct serological indicators and progression patterns suggest underlying pathophysiological differences.

Abstract No.: 202830

The Scar That Kept Coming Back: Recurrent Unilateral Corneal Filament Formation Post Ptosis Surgery

First Author: Piyush **BAJAJ**

Co-Author(s): Ishita **KAK**

Purpose: To report a rare case of recurrent corneal filament formation secondary to localized tear pooling over a conjunctival scar following ptosis surgery.

Methods: A 67-year-old female presented to the ophthalmology outpatient department with complaints of bilateral redness, watering, and foreign body sensation. Slit-lamp examination revealed normal conjunctiva, lids, anterior segment, and posterior segment findings in both eyes, except for a single corneal filament located at the 1 o'clock position in the right eye. The filament was debrided, and the patient was initially managed conservatively as a case of dry eye with lubricants. However, the filament recurred at the same location over subsequent follow-ups.

Results: On detailed examination with eyelid eversion, a subtle conjunctival scar was noted on the upper tarsal conjunctiva directly opposing the site of filament formation. Upon re-evaluating the history, the patient recalled undergoing surgical correction for ptosis several years ago. It was hypothesized that the localized scar acted as a microreservoir for tear pooling, leading to focal desiccation of the corneal epithelium and recurrent filament formation.

Conclusions: This case highlights an uncommon but important sequela of ptosis surgery—localized conjunctival scarring leading to recurrent filamentary keratitis due to tear film disruption. It reinforces the importance of careful lid eversion in recurrent unilateral filament cases and thorough history-taking. Targeted management addressing the underlying cause is essential to prevent recurrence and patient discomfort.

Abstract No.: 205632

To Evaluate the Real-World Efficacy, Safety, and Outcomes of Cemiplimab for Advanced Periocular Conjunctival and Cutaneous Squamous Cell Carcinoma (SCC)

First Author: Nirodha **JAYAWICKREMA**

Purpose: Retrospective case series of adults treated with cemiplimab for periocular conjunctival or cutaneous SCC at Moorfields Eye Hospital (2021–2025).

Methods: Retrospective consecutive case review of all adult patients (≥ 18 years) with biopsy-proven periocular conjunctival or cutaneous SCC treated with cemiplimab between February 2021 and February 2025 at Moorfields Eye Hospital in London, UK. We included patients referred to our unit from other sites.

Results: We included 9 patients (mean age 66, range 43–79; 56% female; 78% Caucasian). Prior treatments included surgery (44%), radiotherapy (22%), and one exenteration. Tumour origin was conjunctival (56%), cutaneous (33%), or unknown (11%). 8 (89%) showed orbital invasion, including 2 with intracranial spread. Cemiplimab was indicated when surgery was refused or as palliative treatment in cases not amenable to localised treatment. Mean cemiplimab duration was 12.3 months (range 2.1–36.4). Immune-related adverse events included grade 2 hypothyroidism ($n=2$, continued therapy) and grade 2 hepatitis ($n=1$, discontinued). Complete and partial responses were seen in 22% and 33%, respectively; 44% progressed. No significant difference in response was observed between conjunctival and cutaneous SCC ($p=1.00$). 2 patients (22%) underwent exenteration after starting treatment. Average total follow-up was 50.8 months (range 17.4–130.6). One recurrence occurred 12 months after treatment cessation; no new metastases were reported during follow-up. Two patients died from unrelated causes.

Conclusions: The results underscore the potential of cemiplimab as globe-sparing and vision-preserving treatment in advanced periocular conjunctival and cutaneous SCC, including more aggressive and complex cases with intracranial involvement or perineural spread, both as primary and secondary treatment.

Abstract No.: 202457

Transcriptomic and Cellular Decoding of Brain Functional Alterations in Thyroid Eye Disease

First Author: Haiyang **ZHANG**

Co-Author(s): Xianqun **FAN**, Zilin **FANG**, Shufan **JIANG**, Yuting **LIU**, Huifang **ZHOU**

Purpose: This study aims to integrate resting-state functional MRI (rs-fMRI) and transcriptomics to reveal the brain alterations in thyroid eye disease (TED), and elucidate its molecular and cellular basis.

Methods: We combined rs-fMRI data from a retrospective cohort of 116 TED patients with transcriptomic data from the Allen Human Brain Atlas to reveal disease-associated brain regions. To validate the observed changes, we prospectively collected rs-fMRI and peripheral blood transcriptomic data from 39 TED patients and 42 healthy controls (HC). The integrative analysis of brain functional activities and peripheral blood transcriptomics was conducted to uncover the imaging-associated genes and validate key brain regions. Moreover, immune cell infiltration patterns were assessed to explore the immune mechanism underlying the transcriptomic and neural changes.

Results: The frontal, parietal, subcortical and brainstem were identified as potential disease-related brain regions in the TED retrospective cohort. Brain functional alterations were intimately related to synaptic signaling, neurovascular regulation and immune activation. Tissue and cellular level enrichment further showed its close association with cortex and neuron. The integration of rs-fMRI and peripheral blood data revealed alterations consistent with imaging-associated genes in TED. Furthermore, the relationship between immune cell infiltration and brain functional alterations was observed.

Conclusions: This study elucidates the brain functional alterations at the molecular and cellular level in TED, providing deeper insight into its brain-immune crosstalk.

Abstract No.: 200269

Treatment Outcomes of Early Versus Late Surgical Timing of Primary Orbital Blowout Fracture Repair in a Tertiary Hospital in Seoul, South Korea

First Author: Kervin Luke **DELLOSA**

Co-Author(s): Ho-seok **SA**, Min Kyu **YANG**

Purpose: Comparison of Treatment Outcomes Between Early and Delayed Repair of Orbital Blowout Fractures: A Single-Centre Study

Methods: This retrospective cohort study included 172 adult patients who underwent primary BOF repair between 2014 and 2024 in a tertiary center in Seoul, South Korea. Patients were categorized into early ($n=123$) and late ($n=49$) repair groups. Demographic data, fracture characteristics, and clinical outcomes were analyzed. Primary outcomes included changes in EOM motility and enophthalmos. Secondary outcomes included diplopia and infraorbital hypesthesia rates and resolution times, operative time, and complications.

Results: Preoperatively, early repair patients had poorer EOM motility (-0.93 vs -0.49 , $p=0.01$) while late repair patients had greater enophthalmos (1.77 vs 1.33 , $p=0.01$). Both groups showed significant postoperative improvement, with no differences in final motility

(-0.12 vs -0.04, $p=0.16$) and enophthalmos (0.23 vs 0.23, $p=1.00$). Residual diplopia rates were similar, with all cases resolving within one year (67.7 vs 87.1 days, $p=0.83$). Residual infraorbital hypesthesia rates (4.4% vs 6.3%, $p=0.76$) and recovery times (109.4 vs 122.8 days, $p=0.85$) were also comparable. Operative time and complication rates did not differ significantly.

Conclusions: BOF repair beyond 4 weeks yields favorable outcomes comparable to early repair in ocular motility, enophthalmos correction, and neurosensory recovery without increasing complications. Observation may be appropriate in select patients with low enophthalmos risk or improving symptoms. Delayed repair remains effective for patients with persistent diplopia or late-presenting enophthalmos.

Abstract No.: 203847

Unveiling ROBO1: A Candidate Target in Fibrosis Through Integrated Single-Cell Transcriptomics and Proteomics of the Lacrimal Gland in IgG4-Related Ophthalmic Disease

First Author: Zhiyan **XU**

Co-Author(s): Linyang **GAN**, Xiaowei **LIU**

Purpose: IgG4-related ophthalmic disease (IgG4-ROD) is a chronic orbital inflammatory condition causing tissue dysfunction and fibrosis; the lacrimal gland (LG) is a frequently involved site. The mechanisms driving LG fibrosis remain unclear. This study aims to define cellular heterogeneity and fibrosis-related mechanisms in LG from IgG4-ROD patients versus healthy controls.

Methods: Fourteen fresh LG samples (7 IgG4-ROD, 7 controls) were collected during surgery and dissociated within 4 hours for optimal viability. Six samples underwent single-cell RNA sequencing; analyses were performed in R (v5.3.0). Proteins were extracted and analyzed from the remaining eight samples. Immunofluorescence staining verified protein expression and subcellular localization.

Results: Single-cell RNA sequencing analyses identified 13 major LG cell types. "TNF signaling via NF- κ B" and "epithelial_mesenchymal_transition" pathways were enriched in LG mesenchymal cells in IgG4-ROD. Sex-specific differentiation patterns were noted in acinar cells. A significant loss of mature secretory acinar cells was observed in IgG4-ROD. Joint gene-protein expression analysis showed 93.41% concordance. Roundabout Guidance Receptor 1 (ROBO1) was markedly upregulated and co-localized with SLIT3 in fibroblasts in IgG4-ROD versus controls.

Conclusions: We present a comprehensive single-cell atlas of LG in IgG4-ROD, revealing resident cell dysplasia and identifying ROBO1-SLIT3-associated fibroblast activation as a potential therapeutic target for LG fibrosis.

Abstract No.: 204393

White Matter Alterations of the Visual Pathway in Thyroid Eye Disease

First Author: Yinwei **LI**

Co-Author(s): Mengda **JIANG**, Haiyang **ZHANG**, Huifang **ZHOU**

Purpose: Thyroid eye disease (TED), particularly its sight-threatening complication, dysthyroid optic neuropathy (DON), profoundly impacts patients' visual health. The pathological changes in the white matter (WM) fibers within the intracranial visual pathway in TED have been infrequently studied. Understanding these changes holds crucial importance for exploring the pathogenesis and prognosis of TED. This paper is to utilize fixel-based analysis (FBA) to clarify the type of microstructural damage occurring in the visual pathway in TED.

Methods: Twenty-eight TED with DON patients, 28 TED without DON patients, and 28 healthy controls (HCs) were enrolled in this study. All the subjects underwent multishell diffusion MRI using echo planar imaging. Fiber density (FD) and fiber-bundle cross-section (FC) were calculated to characterize WM microstructural alteration in TED visual pathway. The correlations between FBA metrics and visual field index and mean deviation were examined.

Results: Both DON and non-DON groups showed significant FD loss in the right optic tract compared with HCs, with DON patients experiencing more severe FD loss. Only DON patients had FD loss in the right optic radiation (OR) compared with the non-DON patients and HCs, with no FC difference across groups. FD in DON patients' ORs significantly correlated with visual field index ($r = 0.857$) and mean deviation ($r = 0.751$).

Conclusions: Both DON and non-DON affect the WM microstructure of the visual pathway to varying extents. Visual field metrics can reflect the severity of FD damage to the OR in the visual pathway of DON patients.

Pediatric Ophthalmology and Strabismus

Abstract No.: 200204

0.01% Atropine Eyedrops in Children With Myopia and Intermittent Exotropia (AMIXT): A 2-Year Randomized Clinical Trial

First Author: Hu **LIU**

Co-Author(s): Tianxi **LI**, Zijin **WANG**

Purpose: To evaluate the efficacy and safety of 0.01% atropine eyedrops on myopia progression, exotropia conditions, and binocular vision in children with

myopia and intermittent exotropia (IXT) over a 2-year treatment period.

Methods: This randomized, double-masked, placebo-controlled trial enrolled 300 children aged 6–12 years with myopia and IXT at the First Affiliated Hospital of Nanjing Medical University, China, between December 2020 and September 2022. Participants were randomly assigned in a 2:1 ratio to receive either 0.01% atropine or a placebo.

Results: At 2 years, the atropine group exhibited significantly slower spherical equivalent progression (-1.09 D vs. -1.53 D; $P < .001$) and axial length elongation (0.57 mm vs. 0.78 mm; $P < .001$) than the placebo group. The two groups were similar in changes in distant magnitude of exodeviation (0.25 PD vs. 0.88 PD; $P = .31$), near magnitude of exodeviation (-2.22 PD vs. -0.51 PD; $P = .09$), distant exotropia control (-0.06 vs. 0.01 ; $P = .66$), and near exotropia control (0.01 vs. 0.07 ; $P = .69$). Accommodative amplitude decreased significantly in the atropine group (-3.33 D vs. -0.05 D; $P < .001$). Binocular vision and adverse effects showed no significant difference across groups ($P > .05$).

Conclusions: The findings suggest that 0.01% atropine eyedrops, though compromising accommodative amplitude to some extent, can be used effectively and safely in slowing myopia progression, yet without interfering with exotropia conditions or binocular vision in children with myopia and IXT.

Abstract No.: 208578

A Hybrid Surgical Approach: LR Recesson With Augmented, Compartmentalized MR Plication for Small-Angle Exotropia and Convergence Insufficiency

First Author: Juan **DING**

Co-Author(s): Yueping **LI**, Wei **ZHANG**

Purpose: Convergence-insufficiency intermittent exotropia (CI-IXT) with a near–distance difference (NDD) ≥ 10 prism diopters (PD) is difficult to correct when the angle is small (< 25 PD). We evaluated the efficacy and safety of combining lateral rectus recession (LRc) with compartmentalized inferior medial rectus plication (CIMRP), guided by neuromuscular compartment anatomy, in achieving stable ocular alignment and functional improvement in children.

Methods: A retrospective analysis was conducted on 69 pediatric CI-IXT patients (mean age: 8.13 ± 2.46 years) who underwent LRc + CIMRP between September 2022 and January 2024. Outcomes included near/distance deviations, NDD, control scores, stereopsis, and complications, assessed preoperatively and postoperatively at 1 day, 2 months, 6 months, and final follow-up (≥ 12 months).

Results: Significant reductions were observed in near deviation (median: -30 (-32 , -28) PD to -12 (-16 , -6) PD), distance deviation (-20 (-20 , -18) PD to -6

(-10 , -1) PD), and near-distance difference (NDD) (10 (10 , 10) PD to 4 (4 , 6) PD; all $P < 0.001$). The surgical success rate was 88.41% at both 2 and 6 months, decreasing slightly to 81.16% at the final follow-up (≥ 12 months). The overcorrection rate peaked at 8.7% at 2 months and subsequently stabilized at 2.9%, whereas the undercorrection rate gradually increased to 15.9%. Control scores and near stereoacuity demonstrated significant improvement ($P < 0.001$ and $P < 0.05$, respectively). No complications such as scleral perforation, muscle slippage, or anterior-segment ischemia were observed.

Conclusions: LRc combined with CIMRP is a safe and effective surgical approach for small-angle CI-IXT, providing significant and stable correction of NDD and ocular alignment with minimal complications. This technique leverages compartmentalized innervation principles to selectively enhance convergence, offering a refined alternative to conventional methods. Further prospective studies are warranted to validate long-term outcomes.

Abstract No.: 201706

A Rare Intronic ABCA4 Variant Causing Stargardt Disease in a Filipino Adolescent: A Case Report

First Author: Raphael **GUMAFELIX**

Co-Author(s): Michelle **LINGAO**

Purpose: To report a case of Stargardt disease (STGD1) associated with an intronic mutation in the ABCA4 gene.

Methods: The patient underwent a comprehensive ophthalmic evaluation, multimodal imaging, sequence analysis, and deletion/duplication testing of the ABCA4 gene.

Results: A 14-year-old Filipino female presented with a five-year history of progressive, painless bilateral decrease in central vision and color vision deficits, without associated night blindness. Best-corrected visual acuity was 20/400 in both eyes, with refractive errors of -3.00 sph -1.50 cyl $\times 166^\circ$ OD and -3.00 sph -2.25 cyl $\times 174^\circ$ OS. Anterior segment examination was unremarkable. Fundus evaluation revealed macular atrophy with a beaten-bronze appearance. Fundus autofluorescence showed central hypoautofluorescence and patchy subretinal flecks throughout the posterior pole. Optical coherence tomography of the macula demonstrated retinal thinning, loss of retinal pigment epithelium integrity, and photoreceptor degeneration. Analysis of the nerve fiber layer and ganglion cell complex revealed thinning of the macular ganglion cell complex. Automated perimetry revealed bilateral central scotomas with generalized field depression. Sequence analysis of the ABCA4 gene revealed compound heterozygosity for two pathogenic variants, c.302+4A>C (intronic) and c.878T>G (p.Met293Arg, missense). Notably, targeted

parental testing revealed that the mother carries the missense variant and the father the intronic variant, confirming autosomal recessive inheritance and illustrating the clinical relevance of familial genotyping.

Conclusions: This case underscores the presence of a pathogenic intronic ABCA4 variant in a Filipino patient, broadening the known mutation spectrum of Stargardt disease and highlighting the value of genetic screening and family-based testing in the Philippines.

Abstract No.: 201214

A Study on the Accuracy of the Gaze-Tilt Test in Predicting the Postoperative Head Posture Improvement in Patients With Congenital Superior Oblique Palsy

First Author: Siyuan HE

Co-Author(s): Xiaotong LI, Wei ZHANG

Purpose: To investigate the accuracy of the gazetilt test in predicting the postoperative head posture improvement in patients with congenital superior oblique palsy (CSOP).

Methods: A diagnostic test was conducted, enrolling children aged 3 to 6 years diagnosed with unilateral CSOP and scheduled for unilateral inferior oblique weakening surgery between May 2023 and January 2024. Preoperatively, the single eye cover test and the gazetilt test were used to assess the patients' compensatory head posture improvement. The overall predictive accuracy, predictive accuracy for different head position improvement outcomes, and error rates (false positive rate and false negative rate) of the two methods were compared by evaluating the predicted outcomes against the actual head postures at postoperative day 1 and month 1. The paired ttest, paired Wilcoxon signedrank test, and paired chisquare test were used for statistical analysis.

Results: Thirty-two children (17 males, 15 females) were analyzed. Preoperative head tilt was 77.5° (75.0°–80.75°); postoperative day 1 and month 1 angles were 88.0° (82.64°–89.99°) and 88.9° (87.35°–90.0°). The gazetilt test predicted 87.0° (86.0°–89.07°), closer than the single eye cover test (83.0°; 80.27°–87.3°). Gazetilt had higher accuracy (86.36%/81.48%) and lower false negatives (15.63%/18.75%) than the single eye cover test (50.0%/44.44%; 43.75%/56.25%), with smaller prediction errors, all statistically significant ($P < 0.05$).

Conclusions: Compared to the single eye cover test, the gazetilt test demonstrated higher accuracy and smaller predictive errors in predicting the postoperative head posture improvement in patients with CSOP.

Abstract No.: 203333

AI-Assisted Abnormal Eye Movement Detection System: A Nationwide, Multicenter Study

First Author: Xiaotong LI

Co-Author(s): Wei ZHANG

Purpose: Strabismus has diverse etiologies, leading to heterogeneous clinical manifestations and complex diagnosis and treatment. To develop an AI-assisted abnormal eye movement detection system to enhance the diagnostic and treatment potential of primary medical institutions.

Methods: The study was conducted in three stages. Stage 1: model development and internal validation using 27,974 images, including three framework structures: 1) strabismus type recognition model, 2) abnormal extraocular muscle recognition model, and 3) fundus photography-based torsion judgment model. Stage 2: prospective external validation using 3,948 images from four hospitals. Stage 3: evaluation of AI's effect on clinicians' diagnostic ability using 75 patients from 15 hospitals.

Results: Framework 1 achieved accuracies of 0.857–0.921 for different strabismus types. Framework 2 achieved functional judgment accuracies of 0.71–0.98 for extraocular muscles. Framework 3 achieved an overall judgment accuracy of 0.935 and an FDA torsion angle deviation of $-0.40 \pm 1.53^\circ$. With AI assistance, doctors' diagnostic accuracy improved by 12%, the missed diagnosis rate decreased by 17.3%, and the surgical design rationality increased by 22.67%.

Conclusions: The abnormal eye movement detection system has the potential to significantly improve the strabismus diagnosis and treatment capabilities of young doctors.

Abstract No.: 204183

Accuracy of a System Combining Virtual Reality and Artificial Intelligence for Screening Pediatric Strabismus

First Author: Yumeng WANG

Co-Author(s): Jing FU

Purpose: To explore the accuracy of a system combining virtual reality (VR) and artificial intelligence (AI) for screening pediatric strabismus.

Methods: A total of 131 subjects aged 3–18 years were included in this study, out of which 110 were included in the final data analysis. Among them, 28 were normal, 60 patients had external strabismus, 18 patients had internal strabismus, and 4 patients had vertical strabismus. After the patients were independently diagnosed and evaluated by two strabismus and pediatric ophthalmologists, the mean value was used as the gold standard. All patients completed the AI system within 2 minutes. The

agreement between the two methods for diagnosis and classification of strabismus was compared by the Kappa consistency test. The agreement between the two methods for measuring ocular strabismus results was assessed by Bland-Altman plots, and interclass correlation efficiency (ICC), and linear regression plots were used to analyze the two methods' correlations.

Results: The system screened for strabismus with a sensitivity of 83.0%, a specificity of 79%, and moderate agreement with manual results (Kappa=0.562, $p<0.001$). The system performed well in the diagnosis and classification of strabismus (Kappa=0.749 for external strabismus, Kappa=0.898 for internal strabismus, and Kappa=1 for vertical strabismus, $p<0.001$). In terms of measuring the angle of ocular deviation, the two methods were strongly correlated ($R=0.7595$) and highly consistent ($p>0.05$) in the near mode of esotropia, and although the correlation was high ($R=0.7652$) in the far mode and the ICC results showed high consistency (ICC=0.689), the BA charts showed poorer consistency. The two methods showed strong correlation ($R=0.731$ and 0.561) in the near and far looking modes in the exotropia group, but the agreement was low (ICC<0.4, $p<0.05$).

Conclusions: The system combines VR and AI can be used clinically to screen pediatric strabismus with high sensitivity and specificity.

Abstract No.: 200442

Additive Effect of Highly Aspherical Lenslet Target (HALT) Spectacles to Children Inadequately Controlled by Atropine Monotherapy

First Author: Bryan **SIM**

Purpose: To assess the efficacy of combination myopia control spectacle lens (HALT) with atropine in children still progressing whilst on low-dose atropine (LDA).

Methods: Children aged 6-11 years old still progressing on atropine (by $>-0.5D$ in at least 1 eye in the past 6 months) were started on HALT (Essilor® Stellest®) glasses. Change in spherical equivalent (SE), cycloplegic autorefraction (cAR) and axial length (AL), were calculated prior and after treatment.

Results: Fifty children (age 8.9 ± 1.1 years) were recruited and divided into: Group A: on atropine 0.01% (A0.01) daily ($n=20$); and Group B: on A0.01 twice daily ($n=5$); or A0.025 daily ($n=25$). The majority (86%) of the children were ethnic Chinese (Table 1). No significant difference in baseline SE, cAR, AL, or pupil size was noted between groups. Prior to study, myopia progression was estimated at $-0.60D/0.24mm$ over 6 months. After the addition of HALT glasses, the change in SE/AL decreased to $-0.06D/0.06mm$ over the first 6 months. At 12 months, the overall change in SE/AL was $-0.15D/0.14mm$. Benefit appeared to be present in all age groups. A hyperopic shift in AL was seen in 11

children (24%) at 12 months. However, progression of $>0.5D$ was noted in 20%, with 18% and 40% progressing by $>0.3mm$ and $>0.15mm$, respectively.

Conclusions: These findings showed that children still progressing on low-dose atropine benefited from the addition of HAL glasses. Significant reductions in SE and AL was noted in children as young as 7YO.

Abstract No.: 201604

Anterior Segment Clues to Posterior Segment Disease in Infants With Congenital Corneal Opacities: A Clinical and Genetic Perspective

First Author: Sonam **YANGZES**

Co-Author(s): Amit **GUPTA**, Savleen **KAUR**, Simar **SINGH**

Purpose: To describe an anterior-posterior segment phenotype in infants presenting with bilateral congenital corneal opacity, thick corneas, and shallow anterior chambers, and to explore its association with retinal pathology and genetic mutations.

Methods: An observational case series was conducted on four infants (eight eyes) at a tertiary pediatric ophthalmology center. All were presented at birth with bilateral corneal opacities along with various retinal changes. Multimodal imaging included anterior segment OCT, ultrasound biomicroscopy (UBM), and B-scan ultrasonography. Whole exome sequencing (WES) was performed to identify pathogenic variants. Fundus examination and fluorescein angiography were conducted for family screening.

Results: All infants had thickened corneas (>850 microns), flat or shallow anterior chambers accompanied by posterior segment findings suggestive of vitreoretinopathy, including vitreous hemorrhage, falciform folds, and retinal detachment. AS-OCT and UBM revealed retrocorneal hyperreflective membranes and vitreous stalks suggestive of fibrovascular proliferation. WES identified homozygous or heterozygous mutations in LRP5 and BMP4, implicating Wnt/TGF- β pathway dysregulation. Family screening revealed peripheral vascular anomalies in two of the four families (50%).

Conclusions: Infants with congenital corneal opacity, thick corneas, and shallow anterior chambers may harbor underlying vitreoretinal pathology due to posterior fibrotic contracture. Mutations in LRP5 and BMP4 suggest a genetic and developmental etiology, resembling a "pseudo-Peters" phenotype. This underscores the importance of posterior segment imaging and genetic evaluation in such presentations.

Abstract No.: 205924

Artificial Intelligence-Quantified Fundus Tessellated Density and Its Association With Myopia Severity in Chinese Children: A Cross-Sectional Study

First Author: Nan LIU

Co-Author(s): Li LI, Jifeng YU

Purpose: This study aimed to quantitatively assess the whole fundus tessellated density (FTD) using artificial intelligence(AI) and evaluate its association with myopia severity in Chinese children with myopia.

Methods: A cross-sectional analysis was conducted on participants with myopia from Beijing Children's Hospital, Capital Medical University, from October 2023 to June 2024. AI technology was used to quantitatively measure FTD based on fundus photographs. Participants were classified into mild, moderate, and high myopia(HM) groups based on cycloplegic spherical equivalent (SE) values. To explore the relationship between FTD and SE, Spearman correlation coefficients along with linear regression analysis were utilized. The ability of FTD to discriminate HM was assessed using a receiver operating characteristic (ROC) curve.

Results: The study included 263 children aged 6-12 years. Median FTD values were 0.01 (IQR: 0.00–0.02), 0.01 (IQR: 0.00–0.03), and 0.04 (IQR: 0.01–0.12) for the three groups respectively. Significant difference was found when comparing the HM group with the mild and moderate myopia groups ($P < 0.001$). A negative correlation between FTD and SE was observed (Spearman coefficient: -0.41 , $P < 0.001$). The modified linear regression analysis additionally supported the significant correlation between FTD and SE ($P < 0.001$), and indicated that an increase of one unit in FTD resulted in a reduction of SE by 7.17D. The area under the curve (AUC) of FTD for identifying HM was 0.75 (95% CI: 0.68–0.81). Combining FTD with axial length-to-corneal radius ratio (AL/CR) improved the discriminative performance, achieving an AUC of 0.94 (95% CI: 0.91–0.97), significantly higher than AL, AL/CR, FTD, or FTD combined with AL ($P < 0.05$). The cutoff values were $FTD \geq 0.03$ and $AL/CR \geq 3.27$.

Conclusions: AI-quantified FTD demonstrates a significant correlation with the severity of myopia.

Abstract No.: 205482

Atropine and Spectacle Lens Combination Treatment (ASPECT): 24-Month Interim Results of a Randomised Controlled Trial for Myopia Control

First Author: Rosario GOMEZ-DE-LIANO

Co-Author(s): Rafael BELLA-GALA, Julian GARCIA-FEIJOO, Noemi GUEMES-VILLAHOS, Elena HERNANDEZ-GARCIA, Paloma PORRAS-ANGEL, Paula TALAVERO-GONZALEZ

Purpose: This randomized controlled trial (RCT) aims to evaluate the long-term efficacy of combination treatment using 0.025% atropine and Defocus Incorporated Multiple Segments (DIMS) spectacle lenses compared to 0.025% atropine and single vision (SV) lenses in slowing myopia progression over 24 months.

Methods: RCT conducted on myopic children aged 4-16 years, randomised into two treatment groups: 0.025% atropine and SV lenses (group A) or 0.025% atropine and DIMS lenses (group B). Cycloplegic spherical equivalent refraction (SER) and axial length (AL) were measured at baseline, 6, 12, 18, and 24 months (M).

Results: Seventy-one patients completed the 24M follow-up: $n=34$ in group A, mean age 8.97 ± 2.8 years; $n=37$ in group B, mean age 9.78 ± 2.75 years. At 12M and 24M, mean $AL \pm SD$ change was 0.18 ± 0.13 mm and 0.36 ± 0.24 mm in group A ($p=0.01$), and 0.09 ± 0.17 mm and 0.22 ± 0.25 mm in group B ($p=0.02$), respectively. Mean $SER \pm SD$ progression at 12M and 24M visit was -0.16 ± 0.31 D and -0.37 ± 0.60 D in group A ($p=0.90$), and -0.17 ± 0.35 D and -0.19 ± 0.62 D in group B ($p=0.23$), respectively. Younger subjects ($\beta = -0.066$, $p < 0.001$), greater baseline AL ($\beta = 1.041$, $p < 0.001$) and group A ($\beta = -0.132$, $p=0.02$) were associated with an increase in AL over 24M.

Conclusions: Combination treatment with 0.025% atropine and DIMS spectacle lenses is more effective in controlling axial elongation than 0.025% atropine with SV lenses in myopic children over a 24-month period, though SER differences were not significant. While full sample analysis is pending, current findings suggest an additive effect of the two treatments, with a stronger impact in the first year.

Abstract No.: 203982

Augmented Medial Rectus Recession vs BTXA Therapy in AACE and Predictors for Recurrence: A Prospective, Nonrandomized Clinical Trial

First Author: Yueping LI

Purpose: To compare the motor and sensory outcomes and quality of life (QOL) of augmented medial rectus recession (aMRc) and Botulinum Toxin A (BTXA) therapy

in acute acquired comitant esotropia (AACE) treatment, and to investigate the predictors of recurrence.

Methods: We conducted a prospective, non-randomized clinical trial that enrolled 63 AACE patients with a disease course of 6 months to 2 years and deviation angles of 15 to 60 PD. The patients were assigned to BTXA (n=31) and aMRc group (n=32). We compared and analyzed the deviation angles, fusion amplitudes (FA) of convergence and divergence, stereopsis, and scores of quality of life (QOL) and diplopia between the two groups before treatment and at 2, 4, 6, and 12 months post-treatment.

Results: Both groups exhibited significant improvements in motor and sensory outcomes. The aMRc group showed more stable and satisfactory deviation than the BTXA group at 6 and 12 months post-treatment, with a significant increase in divergent FA. The aMRc group achieved a higher success rate (93.75%) than the BTXA group (64.52%) one year post-treatment. QOL improved significantly in both groups after treatment, except for reading function in the BTXA group. Compared with the BTXA group, the aMRc group showed greater improvements in self-perception, general function, and diplopia scores ($P < 0.05$). Survival analysis revealed a significant difference between the two groups ($P = 0.0046$). Treatment method and convergent FA at near before treatment were identified as recurrence predictors ($P = 0.023$ and 0.025).

Conclusions: Augmented MRc treatment was superior to BTXA injection in AACE patients with courses > 6 months during 1-year observation, particularly in maintaining alignment, eliminating diplopia, and improving divergent fusion amplitude and QOL.

Abstract No.: 202105

Axial Length Dynamics and Safety of Occlusion Therapy in Pediatric Amblyopia: A Longitudinal Analysis

First Author: Wentong YU

Co-Author(s): Yunsu HE, Jinrong LI, Xuan QIU, Yun WEN, Junpeng YUAN

Purpose: To evaluate the impact of occlusion therapy on the elongation of axial length (AL) in children with amblyopia using real-world big data.

Methods: A cohort of 2,932 children aged 3-15 years undergoing occlusion therapy with varying patching durations was analyzed using longitudinal data from the Zhongshan Ophthalmic Center (May 1, 2019–September 30, 2023). Retrospective analyses utilized multivariable linear regression to assess associations between patching duration and AL elongation. Generalized estimating equations (GEE) were used to evaluate interocular AL differences. The analyses were adjusted for factors including revisit interval, age, sex, baseline best-corrected visual acuity (BCVA), initial AL,

spherical equivalent, amblyopia type, and concurrent treatments.

Results: The mean annual AL increase was 0.23 ± 0.22 mm. Patching had no significant overall effect on AL elongation ($\beta = -0.02$; $p = 0.12$), even for long daily patching (≥ 5 hours/day). Subgroup analyses revealed reduced AL elongation in patched eyes of school-age children (6–12 years) with shorter baseline ALs, suggesting age- and baseline-specific effects. GEE analysis showed no significant interocular differences except among preschool children (3–5 years), where observed eyes exhibited slightly less AL elongation compared to fellow eyes.

Conclusions: Occlusion therapy is safe for amblyopia management. Tailored regimens based on age and baseline ocular characteristics are recommended to optimize therapeutic outcomes.

Abstract No.: 206640

Binocular Visual Dysfunction: A Novel Biomarker for Rapid Myopia Progression in Adolescents

First Author: Zhongfei CHEN

Purpose: This study aims to investigate the association between binocular visual dysfunction and the progression of myopia in adolescents. Moving beyond traditional biological ocular parameters, we innovatively explore this relationship from a cerebral visual perspective, analyzing the impact of visual perceptual deficits on myopia development.

Methods: In this one-year prospective study, 104 myopic adolescents (aged 8–14) were categorized into two groups based on annual changes in spherical equivalent refraction and axial length: Group A (slow progression, $n=51$; SER: -0.50 to -0.75 D, $AL < 0.3$ mm/year) and Group B (rapid progression, $n=53$; SER ≤ -1.00 D, $AL \geq 0.3$ mm/year). Visual perceptual functions, including perceptual eye position and dynamic random dot stereopsis, were assessed using a standardized system.

Results: Significant intergroup differences were observed in visual perceptual functions. The mean near perceptual eye position deviation was greater in Group B (100.52 pixels) than in Group A (57.62 pixels, $P=0.043$). The prevalence of dynamic stereopsis impairment was also significantly higher in Group B (67.9% vs. 23.5%, $P < 0.05$). No significant differences were found in other stereopsis tests.

Conclusions: This study demonstrates a strong correlation between rapid myopic progression and deficits in binocular visual function, particularly perceptual eye position deviation and dynamic stereopsis impairment. These findings suggest that visual perceptual assessment may serve as a biomarker for identifying adolescents at risk of rapid myopia progression.

Abstract No.: 208798

Brainwashing Excyclotorsion

First Author: Vincent PARIS

Purpose: Classical approaches to excyclodeviation, such as double Maddox testing, Knapp's classification, and inferior oblique (IO) recession have remained unchanged for years. This prospective study challenges those paradigms, emphasizing the role of the superior rectus (SR) in torsional analysis and proposing a more dynamic clinical framework.

Methods: We studied 117 consecutive patients with unilateral excyclotorsion over seven years, all operated on by the same surgeon. Torsion was assessed subjectively via the Hess-Weiss method and objectively via fundus examination. Vertical deviation was evaluated in head tilt and downgaze, introducing a "fourth step test" to assess SR contracture. Surgery focused on the superior oblique (SO), with anterior transposition of the resected tendon. In cases of complete palsy or recurrent excyclotorsion, IO anterior nasal transposition was performed. Procedures were guided by intraoperative elongation testing.

Results: Success, defined as resolution of head tilt, vertical deviation, torsion, and asthenopia, was achieved in all cases using one to five surgical steps. Combined oblique muscle surgery was required in 55%, IO nasal transposition in 7%, and single IO recession in 37%. SR recession was needed only in two elderly patients. The fourth step test was positive in 76%. Reintervention was rare and mostly related to acquired Brown syndrome.

Conclusions: This study demonstrates that we can rethink our clinical mindset, examination methods, classification, and surgical strategies in this frequent pathology. Patient-centered outcomes are best achieved through tailored oblique muscle surgery, minimizing the need for SR or inferior rectus recession.

Abstract No.: 206592

Breaking the Pattern: Addressing Large Angle A-Pattern Exotropia With Superior Oblique Overaction in Helveston Syndrome

First Author: Nur Aisyah RAHMAWATI

Co-Author(s): Anna Puspitasari BANI

Purpose: To report a case of successfully managed Helveston syndrome presenting with large-angle A-pattern exotropia and vertical deviation.

Methods: A 29-year-old female presented with outward and downward deviation of the left eye (LE) since childhood, without abnormal head posture or diplopia. Best-corrected visual acuity was 6/6 in both eyes, with normal anterior and posterior segments, except for 10 degrees of right incyclotorsion on fundus examination. Primary position showed a 55 prism diopters (PD) of exotropia with a large left hypertropia

of 50 PD, asymmetrical superior oblique overaction (SOOA, LE>RE), and asymmetrical dissociated vertical deviation (DVD, LE>RE), consistent with Helveston syndrome. Sensory testing exhibited LE suppression. She underwent bilateral rectus recession (9 mm) with half-width infraplacement, combined with right SO lengthening of 8 mm chicken suture. Due to residual hypertropia, a second surgery of left inferior rectus recession (5 mm) and right superior rectus recession (5 mm) was performed 6 months later.

Results: Six months after the second surgery, the A-pattern had completely collapsed, with 4 PD esophoria in the primary position and diminished DVD. The downshoot on the LE improved from +3 to +1, with the residual movement likely due to end-to-end tendon suturing without a spacer. No complications such as SO underaction, ptosis, or diplopia occurred, but unmasking of right SOOA was observed. However, she has not consented to further procedure.

Conclusions: Management of Helveston syndrome requires individualized surgical planning according to the degree of A-pattern, SOOA, DVD, and fundus torsion. A tailored, and possibly multiple-staged surgical approach can achieve satisfactory functional and cosmetic outcomes.

Abstract No.: 202892

Changes in Choriocapillaris Blood Flow Density and Associated Factors Affecting Axial Elongation in Chinese Children and Adolescents With Mild to Moderate Myopia: A Cross-Sectional Study

First Author: Cui XIN

Co-Author(s): Liping CHEN, Xuefeng SHI

Purpose: To investigate changes in choriocapillaris blood flow density (CFD) and identify factors influencing axial elongation in Chinese children and adolescents with mild to moderate myopia.

Methods: A hospital-based cross-sectional study was conducted. A total of 288 participants aged 8 to 15 years were recruited from Tianjin Eye Hospital, including 186 children and adolescents with myopia and 102 age-matched participants without refractive error who served as the control group. Based on cycloplegic spherical equivalent (SE), the myopic participants were further categorized into moderate and mild myopia groups. Refractive power was determined through refraction tests, while various parameters—including axial length (AL) and choriocapillaris flow density (CFD)—were obtained through ophthalmic examinations. Statistical analyses were performed to examine changes in CFD and to identify factors associated with axial length.

Results: AL and SE differed significantly among all three groups (all $P < 0.001$). SFCT was significantly lower in the moderate myopia group compared to

the mild myopia and control groups ($P < 0.05$ for both comparisons), while no significant differences in SFCT or FRT were found between the mild myopia and control groups (all $P > 0.05$). CFD peri was significantly lower in the moderate myopia group compared to both the mild myopia and control groups ($P = 0.006$ and $P < 0.001$, respectively), while no significant differences were found in CFD-fovea or CFD-para among the three groups ($P > 0.05$). Spearman correlation analysis revealed significant negative correlations between AL and SE ($r = -0.770$), SFCT ($r = -0.170$), CFD-fovea ($r = -0.347$), CFD-para ($r = -0.368$), and CFD-peri ($r = -0.359$) (all $P < 0.01$). Hierarchical regression analysis identified SE ($\beta = -0.751$, $P < 0.001$) and CFD-peri ($\beta = -0.118$, $P = 0.005$) as independent predictors of axial length, with the final model explaining 71.5% of its variance ($R^2 = 0.715$).

Conclusions: Choriocapillaris blood flow density in the macular region changes in the early stages of myopia, showing decreases in the perifoveal region. Both SE and CFD-peri may serve as potential biomarkers for predicting axial length elongation in the early stage of myopia.

Abstract No.: 204139

Changes of Accommodation and Convergence After Strabismus-Corrected Surgery for Basic Type Intermittent Exotropia

First Author: Zhao **YIYANG**

Co-Author(s): Fu **JING**

Purpose: To explore the difference in binocular accommodation and convergence before and after strabismus-corrected surgery for basic type intermittent exotropia during a 24-month follow-up.

Methods: Observational study. A total of 138 children aged 3-14 years who have strabismus-corrected surgery for their basic-type intermittent exotropia were recruited in this study. All patients underwent assessments of spherical equivalent (SE), axial length (AL), exodeviation, visual and perceptual function, stereopsis, control ability scores, and binocular function relating to accommodation and convergence. Examinations were conducted at baseline and 6-, 12-, 18-, and 24 months after surgery. Self-comparison before and after surgery was adopted. Paired t-tests were used to investigate the parameter changes.

Results: The SE, AL, exodeviation, visual and perceptual function, stereopsis, and control ability scores showed prominent differences before and after surgery till 24-month follow-up. The changes of horizontal phoria showed significant difference at 6-, 18- and 24 months ($t = -2.593$, $p = 0.018$; $t = -2.714$, $p = 0.016$; $t = -2.926$, $p = 0.009$). Accommodative convergence/accommodation ratio (AC/A) showed differences and tend to decrease at 12-, 18- and 24 months ($t = -2.493$, $p = 0.020$; $t = 2.636$, $p = 0.013$; $t = -2.410$, $p = 0.022$). At 18 months, the binocular positive relative

accommodation (PRA) ($t = 2.804$, $p = 0.009$), accommodative amplitude (AMP) ($t = -3.408$, $p = 0.002$), and accommodative response ($t = -2.444$, $p = 0.020$) showed changes and a tendency toward the normal range. At 24 months, the accommodative facility (AMF) began to change ($t = 2.061$, $p = 0.046$).

Conclusions: The strabismus-corrected surgery not only altered the exodeviation, visual and perceptual function, stereopsis, and control ability for a long time, but also changed the parameters of the accommodation and convergence, especially the horizontal phoria and AC/A ratio, which also have a long-term change.

Abstract No.: 202011

Characteristic Thinning of Temporal Parafoveal Retinal Thickness in Patients With Intermittent Exotropia

First Author: Tao **SHEN**

Co-Author(s): Mengya **HAN**, Jianhua **YAN**

Purpose: To quantitatively compare the temporal parafoveal retinal thickness between intermittent exotropia (IXT) and healthy controls using optical coherence tomography, exploring the relationship between retinal structural changes and retinal correspondence.

Methods: Twenty basic type IXT with an exodeviation angle of 35 prism diopters (PD) were compared with 20 age-matched healthy controls. All enrolled participants underwent a comprehensive ophthalmic evaluation, including optical coherence tomography, axial length, prism alternate cover test, retinal correspondence, and stereoacuity. The retinal thickness at the parafoveal position corresponding to the exodeviation angles of 25 PD, 30 PD, 35 PD, 40 PD, and 45 PD was measured. Interocular symmetries of the retinal thickness were analyzed according to ocular laterality or dominance in the IXT group. Comparative analysis of temporal parafoveal retinal thickness was conducted between the IXT group and the normal control group. According to the retinal correspondence, IXT patients were divided into the anomalous retinal correspondence (ARC) group and the non-ARC group, and further comparative analysis was conducted on retinal thickness between the two groups.

Results: The temporal parafoveal retinal thickness was symmetrical between the eyes in IXT patients without significant interocular difference ($P > .05$). However, the retinal thickness at the corresponding parafoveal position of the exodeviation angle (35 PD) was significantly reduced in IXT patients ($P < .0001$), which was thinner in the nondominant eyes of the ARC group ($P = .007$).

Conclusions: Patients with IXT showed characteristic thinning of the retinal thickness in the temporal parafoveal region corresponding to the exodeviation

angle, presenting a structure similar to a shallow “pseudo-fovea.”

Abstract No.: 204221

Clinical Pattern of Duane Retraction Syndrome

First Author: Tariq ALDOAIS

Purpose: To evaluate the clinical pattern of Duane retraction syndrome.

Methods: A cross-sectional observational study was conducted from June 2022 to December 2024 at Rowad Alnour Eye Hospital, Sanaa region, Yemen. Participants gave verbal consent prior to data collection. Data was collected using a sheet containing eighteen simple items, which include demographic data, family history, surgical history, and the clinical characteristics of the disease. Forty-three patients were included in this study.

Results: Out of 43 duane patients, there was female predominance with a percentage of 65.1% compared with male patients 34.9%. The mean age of the subjects was 6.7 years old. Oldest 26y.o. and youngest one year at time of diagnosis. There was female predominance with a percentage of 65.1% compared with male patients 34.9%. The mean age of the subjects was 6.7 years old. Oldest 26y.o. and youngest one year at time of diagnosis. Refraction of the affected eye ranged from emmetropia to different degrees of astigmatism. Emmetropes were most commonly observed with a percentage of 26.8% followed by hypermetropia and hypermetropic astigmatism of affected eyes with percentages of (27.9% and 4.7%) respectively. The least types of refractive errors were myopia, astigmatism, and the myopic astigmatism with percentages of (0%, 2.3% and 2.3%) respectively. Left eye was more commonly affected than right eye (60.5% and 34.9%) respectively.

Conclusions: DRS consists of a complex set of involvement, including an abnormal head position, globe retraction, pseudoptosis in adduction, or abnormal eye movements. Though DRS is present at birth, in the early stages, it may appear only as an abduction deficit.

Abstract No.: 204515

Clinical and Histopathological Correlation of Peters' Anomaly in King Khaled Eye Specialist Hospital (KKESH)

First Author: Ghadah ALQAHTANI

Co-Author(s): Aljawhara ALDAMRI, Abdulrahman ALFARHAN, Hind ALKATAN, Rawan ALSHABEEB, Ahmed MOUSA

Purpose: Peters' Anomaly (PA), the commonest form of anterior segment dysgenesis, is a congenital condition characterized by corneal opacity together with

iridocorneal adhesions or lenticulocorneal adhesions. This study aims to describe and correlate the clinical and histopathological findings of PA patients in a tertiary eye care hospital in Saudi Arabia.

Methods: This study is a retrospective descriptive study. Data of all patients who were clinically diagnosed with PA or anterior segment dysgenesis and underwent Keratoplasty between January 2004 and December 2020 in King Khaled Eye Specialist Hospital were included. Medical records were reviewed to extract clinical and histopathological data of their corneal buttons.

Results: Fifty-seven eyes of 38 patients were included; 26 (68.4%) of whom were females. The inheritance was sporadic in the majority of eyes, 45 (78.9%). Clinically, 35 (61.4%) eyes presented with central corneal opacity, and 17 (29.8%) with diffuse corneal opacity. Fifty-four (94.7%) had associated glaucoma upon presentation. Type I PA was present in 41 (71.9%), while type II was found in 15 (26.3%). Histopathologically, absent Bowman's layer was observed in 35 (61.4%) of the included eyes, diffuse scarring of stroma in 46 (80.7%), centrally absent Descemet membrane in 42 (73.7%), absent endothelium in 17 (29.8%), and uveal tissue adhesion to the posterior cornea in 33 (57.9%). Corneal graft was clear in 22 (38.6%) eyes.

Conclusions: Peter anomaly shows diverse clinical and histopathological features, and various severities of corneal opacities. Further studies on the role of histopathological features in predicting the visual outcome and graft survival are suggested.

Abstract No.: 200621

Common Diagnostic and Therapeutic Misunderstandings in Congenital Fibrosis of Extraocular Muscles: A Case Series Approach

First Author: Nguyet MINH DUONG

Co-Author(s): Hanh NGUYEN, Truyen NGUYEN

Purpose: Congenital Fibrosis of Extraocular Muscles (CFEOM) is a rare condition that presents significant diagnostic and therapeutic challenges. This study aims to highlight five common misunderstandings in the diagnosis and treatment of CFEOM, using clinical case examples to demonstrate the importance of accurate clinical judgment and selective use of diagnostic tools.

Methods: A retrospective review of clinical cases diagnosed with CFEOM at our institution was conducted. We analyzed cases that exemplify common misunderstandings, focusing on diagnostic errors, improper imaging, and inappropriate treatment approaches. The cases were reviewed to identify key issues and propose corrective strategies.

Results: The following misunderstandings were identified: (1) Routine magnetic resonance imaging (MRI) is unnecessarily ordered for all CFEOM cases. (2) MRI slices are not properly selected; quasi-coronal

(perpendicular to the orbital axis) and quasi-sagittal (parallel to the orbital axis) slices are crucial. (3) Genetic testing is frequently ordered for every case, though it is only needed for prenatal counseling or when specific genetic syndromes are suspected. (4) CFEOM is sometimes mistaken for an isolated ocular condition, though it may be associated with systemic disorders like developmental delays. (5) Ptosis surgery is performed before strabismus correction, leading to exposure keratopathy; strabismus should be addressed first.

Conclusions: This case series emphasizes the importance of clinical diagnosis in CFEOM, highlighting the need for selective use of genetic and imaging tests. Proper understanding of these common misunderstandings can improve patient outcomes by ensuring appropriate treatment strategies and minimizing complications.

Abstract No.: 206699

Comparing Lateral Rectus Recession and Bupivacaine Injection of Medial Rectus With Conventional Recession–Resection in Moderate-Angle Intermittent Exotropia

First Author: Arash **MIRMOHAMMADSADEGHI**
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Purpose: To compare the clinical outcomes of lateral rectus (LR) recession and bupivacaine injection of medial rectus (MR) with conventional recession–resection (R&R) surgery in patients with moderate-angle intermittent exotropia.

Methods: This prospective study included 105 patients with intermittent exotropia between 25–30 prism diopters (PD), treated at a single tertiary center. Patients were assigned to either bupivacaine injection of MR combined with LR recession (n=53) or standard R&R surgery (n=52). Follow-up evaluations were conducted at 1, 6, 12, 18, and 24 months postoperatively. The primary outcome was surgical success, defined as exotropia ≤ 10 PD or esotropia ≤ 5 PD in the primary position. Secondary outcomes included postoperative angle changes, need for prism, and complication rates.

Results: The bupivacaine group demonstrated statistically significantly higher success rates than the R&R group across all follow-up intervals (P-value < 0.05). The R&R group had significantly higher overcorrection rates (P-value < 0.001), while none of the bupivacaine patients were overcorrected. The bupivacaine group consistently showed an undercorrection rate of 20.75%, which was significantly higher than the 7.69% rate in the R&R group at all follow-up time points (P-value < 0.001). No serious complications were reported in either group at all follow-up time points.

Conclusions: Adding bupivacaine injection of MR to LR recession appears to be a safe, effective, and minimally invasive alternative to traditional R&R surgery for moderate-angle intermittent exotropia. It is associated with favorable outcomes, low complication rates, and no overcorrection. Further randomized, controlled trials with extended follow-up are necessary to confirm these findings.

Abstract No.: 204059

Comparing the Efficacy of Defocus Incorporated Multiple Segments (DIMS) Spectacle Lenses and 0.01% Low-Dose Atropine in Slowing Myopia Progression in Indian Children

First Author: Shruti **NISHANTH**
Co-Author(s): Ameena **JENNIFER**, Arockia Agila

Purpose: To compare the one-year efficacy of DIMS spectacles and 0.01% low-dose atropine in slowing myopia progression.

Methods: A total of 162 myopic patients aged 7–12 years were assigned to either a DIMS group (n=80) or an atropine group (n=82) based on parental choice. Cycloplegic spherical equivalent refraction (SER) and axial length (AL) were measured at baseline, 6, and 12 months.

Results: After one year, the DIMS group showed a significantly lower mean SER progression (−0.258D) compared to the atropine group (−0.486D) (p=0.007). The mean AL elongation was also lower in the DIMS group (0.109 mm) compared to the atropine group (0.153 mm), though this difference was not statistically significant (p=0.17). A significantly higher proportion of patients in the DIMS group showed no or low SER progression at one year (88.7%) compared to the atropine group (63.3%) (p=0.0001). The DIMS spectacles were particularly effective in children aged 10 years and above, with a significantly slower SER progression (−0.21D vs −0.49D; p=0.0006) and AL elongation (0.06 mm vs 0.15 mm; p=0.001) compared to the atropine group.

Conclusions: DIMS spectacles were more effective than 0.01% atropine in slowing myopia progression in Indian children over one-year period, with the most significant effect in the older age group (10 years and above). The high proportion of DIMS users with no or low progression highlights its strong efficacy as a primary intervention for myopia control.

Abstract No.: 206893

Comparison of 3-Photograph Versus 5-Photograph Grading for Retinopathy of Prematurity Screening

First Author: Sudarshan SESHASAI

Co-Author(s): Tsai SHIH HSIANG ANDREW, Tay SU ANN

Purpose: To compare the diagnostic performance of 3-photograph versus 5-photograph grading protocols against clinical examination for detecting retinopathy of prematurity (ROP) and treatment-requiring ROP.

Methods: This prospective study evaluated 64 premature infants (31 males, 33 females) who underwent retinal imaging for ROP screening, yielding 138 eye evaluations. The mean gestational age of infants was 26.4±2.3 weeks, the mean birth weight was 912±380 grams, and the mean corrected gestational age at imaging was 39.1±5.0 weeks. Each eye was independently graded using both 3-photograph (posterior pole, nasal, temporal) and 5-photograph (adding superior and inferior images) protocols by masked graders. Clinical examination served as the reference standard, classifying cases into Type 1 ROP (treatment-requiring), Type 2 ROP (pre-threshold), other ROP (ROP not meeting Type 1 or 2 ROP), or no ROP. Sensitivity and specificity were calculated.

Results: Of 138 evaluations, 110 (79.7%) had ROP, including 8 (5.8%) with Type 1 ROP and 42 (30.4%) with Type 2 ROP. Both protocols achieved identical 96.4% sensitivity for detecting any ROP, while 3-photograph grading demonstrated superior specificity (92.9% versus 89.3%). Critically, both protocols achieved 100% sensitivity for Type 1 ROP (8/8) and Type 1 or Type 2 ROP combined (50/50), with no treatment-requiring cases missed.

Conclusions: Three-photograph grading demonstrated equivalent sensitivity with superior specificity compared to 5-photograph grading, detecting all treatment-requiring and pre-threshold ROP. The streamlined 3-photograph protocol may be sufficient for ROP screening, potentially improving efficiency and infant tolerability without compromising detection of clinically significant disease.

Abstract No.: 201976

Comparison of Two Different Extraocular Muscle Suturing Techniques for Strabismus Surgery

First Author: Tiantian ZHOU

Co-Author(s): Hu LIU, Hui ZHU

Purpose: To compare the surgical outcomes after bilateral medial rectus recession (BMR) or bilateral lateral rectus recession (BLR) performed with the 3-point fixation (3PF) vs 2-point fixation (2PF) suturing techniques.

Methods: Patients diagnosed with concomitant esotropia or concomitant exotropia and undergoing BMR or BLR with the 3PF or 2PF techniques between January 2022 and January 2025 were included. Postoperative deviation angles were recorded at regular follow-up visits. A Cox proportional hazards model was used to estimate the association between suturing techniques and surgical outcomes. The primary outcome was overcorrection, defined as distant eso/exodeviation >10 prism diopters (PD) after BLR or BMR. The secondary outcome was undercorrection/recurrence, defined as distant exo/esodeviation >10 PD after BLR or BMR.

Results: A total of 248 patients were included. Of these, 113 underwent surgery with 2PF, and 135 with 3PF. The cumulative incidence of overcorrection was higher in the 2PF group (33.72%; 95% CI, 30.39% to 37.22%) compared with the 3PF group (13.09%; 95% CI, 11.71% to 14.43%) across the follow-up period (difference: 20.64%, 95% CI, 16.96% to 24.28%). Patients in the 3PF group had a 62% decreased risk of overcorrection compared with those in the 2PF group (hazard ratio [HR] =0.38; 95% CI, 0.16 to 0.91). The suturing technique was not associated with undercorrection/recurrence (HR =1.07; 95% CI, 0.42 to 2.76).

Conclusions: These findings support that the 3PF suturing technique is a superior alternative to the 2PF technique for reducing overcorrection in bilateral horizontal rectus muscle recession surgery.

Abstract No.: 205864

Correlation Analysis of Fundus Tessellation Density and Refractive Parameters in Preschool Children

First Author: Jiawen WANG

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Purpose: To investigate the age-related changes in fundus tessellated density (FTD) in preschool children aged 3–5 years and analyze its correlation with spherical equivalent (SE), axial length (AL), and corneal curvature radius (CR).

Methods: This retrospective study included 183 children aged 3–5 years from a kindergarten in Beijing between April 2023 and April 2025. Data collected included SE, AL, corneal curvature (K), and color fundus photographs. Artificial intelligence (AI) algorithms were used to quantitatively assess the choroidal exposure area and FTD. Participants were divided cross-sectionally into three age groups: 3-year-old (n=45), 4-year-old (n=55), and 5-year-old (n=83). The correlations between FTD and SE, AL, and height were analyzed. Dynamic developmental curves were plotted. Longitudinal follow-up was performed in 25 children to track dynamic changes in ocular parameters during eye development.

Results: The overall incidence of tessellated fundus in normal children aged 3–5 years was 79.78%. Cross-sectional analysis showed that AL and AL/CR increased significantly with age, while no statistically significant differences were observed in FTD, SE, or CR among age groups ($P < 0.05$). FTD was significantly positively correlated with AL and CR ($P < 0.05$) but not with SE or height ($P > 0.05$). Longitudinal analysis revealed that for every 1 cm increase in height, SE decreased by 0.029 D ($P = 0.043$) and AL increased by 0.033 mm ($P = 0.002$). For every 1 mm increase in AL, SE decreased by 0.301 D ($P = 0.007$).

Conclusions: Fundus tessellated density may serve as a sensitive biomarker for ocular wall extensibility in children, and its developmental trajectory provides a new indicator for early warning of myopia.

Abstract No.: 206367

Depth-Resolved Axial Analysis of Retinal Vasculature Development in Very Premature Infants

First Author: Ye HE

Co-Author(s): Christian ALTENBACH, Xiaorong LI, Juping LIU, Srinivas SADDA, Irena TSUI

Purpose: To investigate region-specific effects of anti-VEGF treatment on retinal vascular development in very premature infants using depth-resolved OCTA axial profiles, focusing on differences between parafoveal and perifoveal capillary layer formation.

Methods: This retrospective study included 17 premature infants (30 eyes), including 10 treated with intravitreal anti-VEGF for retinopathy of prematurity (ROP) and 7 untreated. OCTA scans ($10^\circ \times 10^\circ$, 512 B-scans) were acquired using the Spectralis Flex platform. A custom algorithm generated depth-resolved OCTA axial profiles by averaging flow signal intensity at each of 100 depth levels from the inner limiting membrane to the outer plexiform layer using LabView. Two retinal zones were analyzed: the parafoveal region ($1.68\text{--}2.5^\circ$, $86\text{--}128$ pixels) and the perifoveal region ($3.34\text{--}4.16^\circ$, $171\text{--}213$ pixels), across four quadrants. Subjects were stratified by postmenstrual age (PMA <50 vs. ≥ 50 weeks) and treatment status.

Results: In the parafovea, anti-VEGF-treated infants <52 weeks PMA predominantly exhibited a single SCP peak, with minimal ICP or DCP signal, while untreated infants of the same age already demonstrated a visible ICP and occasional weak DCP peak. By ≥ 52 weeks, both groups developed clearer ICP and DCP peaks, but these were sharper and more distinct in untreated infants. In the perifovea, treated infants <52 weeks occasionally showed three vascular peaks, though ICP and DCP remained shallow with little progression over time. Conversely, untreated infants demonstrated progressive strengthening of both ICP and DCP peaks, with markedly sharper profiles by ≥ 52 weeks.

Conclusions: Anti-VEGF-treated infants showed delayed maturation of deeper capillary plexuses, though it's unclear if this reflects treatment effects or greater prematurity. Depth-resolved OCTA revealed regional and temporal differences in vascular development.

Abstract No.: 206897

Diplopia Quantifying as an Indicator for Botulinum Toxin Type A Injection to Acute Acquired Concomitant Esotropia With Micro-Deviation

First Author: Jie HAO

Co-Author(s): Jing FU

Purpose: To determine whether diplopia quantifying can serve as an indicator for botulinum toxin type A (BTX-A) injection in acute acquired concomitant esotropia (AACE) patients with micro-deviation.

Methods: The patients were divided into three groups. The diplopia quantifying score was evaluated based on reports of near reading and straight-ahead distance gaze diplopia severity. The success rate of diplopia elimination was calculated as the proportion of patients with diplopia score eliminated to never or rarely at follow-up to the total number of patients. A non-inferiority analysis with a margin of 10% as a priori was performed. Logistic regression and the Receiver Operating Characteristic curve were used for analysis.

Results: Seventy AACE patients were enrolled, with 92.9% completing the diplopia questionnaire at the final follow-up. After BTX-A injection, high success rates of diplopia elimination were observed across all groups during follow-up, although these rates slightly decreased over time. The non-inferiority analysis demonstrated that the success rates of diplopia elimination in patients with micro-deviation were comparable to those with small or moderate deviations at 1 month, 3 months, and 6 months. In the regression analysis, the interval from disease onset to treatment initiation was positively associated with diplopia scores and was an independent risk factor for the success rate of diplopia elimination, with a critical cut-off value of 30 months.

Conclusions: This study innovatively highlighted that diplopia quantifying can serve as an indicator for the intervention in AACE patients with micro-deviation that can eliminate diplopia symptoms without inferiority to small to moderate deviations.

Abstract No.: 201165

Discovery of Tear Protein Markers for Non-Invasive ROP Screening: Potential Association Between Omics Dysregulation in Tear Fluid and Blood Serum Samples

First Author: Alicia Hoi Ying LIU

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Purpose: Retinopathy of prematurity (ROP) is a leading cause of preventable childhood blindness. Current screening via indirect ophthalmoscopy is stressful and skill-dependent.

Methods: A case-control, cross-sectional study identifying novel tear protein markers of ROP. Tear fluid from ROP (n = 13) and non-ROP preterm infants (n = 21) was collected with Schirmer strips. Tear proteins were quantified with label-free SWATH-MS, followed by functional and pathway enrichment analyses.

Results: A total of 2,279 tear proteins were quantified; 50 were consistently dysregulated in both Spectronaut and DIA-NN software. Protein-protein interactions show enhanced lipid metabolism and transport driven by the reduced apolipoprotein A1 (APOA1, Log2FC = -1.4), APOA4 (Log2FC = -1.4), and APOD (Log2FC = -1.2). Pathway enrichment analysis showed reduced LXR/RXR (liver X receptor/retinoid X receptor) signalling (p < 0.01). Concurrently, the serum showed upregulated aspartate transaminase (AST) and alanine transaminase (ALT), which is consistent with the reduced LXR/RXR signalling. Reduced LXR signalling lowers cholesterol efflux and anti-inflammatory signalling, leading to altered lipid metabolites and lipid raft formation, which may increase oxidative stress and upregulate VEGF and angiogenesis, resulting in ROP neovascularisation.

Conclusions: This is one of the first comprehensive, untargeted tear proteome analyses in ROP. Our study revealed a potential association of dysregulated apolipoproteins, lipid metabolism, and LXR/RXR signalling in ROP angiogenesis. These changes in ROP tear samples mirror the blood serum alterations within the same patient cohort, supporting tear fluid as a feasible and promising non-invasive screening tool for ROP.

Abstract No.: 208269

Effect of Secondhand Smoke on Children's Ocular Microbiome

First Author: Qihang SUN

Co-Author(s): Xiangtian LING, Jason YAM, Yuzhou ZHANG

Purpose: To investigate whether secondhand smoke (SHS) exposure alters the ocular surface microbiome (OSM) in children and to explore potential functional consequences.

Methods: A total of 491 children aged 3-18 years were enrolled, including 142 SHS-exposed and 349 unexposed controls. Conjunctival swabs were collected and analyzed by 16S rRNA gene sequencing targeting the V3-V4 region. Sequencing data were processed with Qiime2 and DADA2, and taxonomic classification was based on the SILVA 138 database. Alpha diversity and beta diversity were compared using t-tests and PERMANOVA. Differentially abundant taxa were identified using LEfSe, and predicted functional pathways were analyzed using PICRUST2 with MetaCyc and KEGG annotation.

Results: No significant differences in alpha or beta diversity were detected between SHS-exposed and control groups. Both groups were dominated by Firmicutes, Proteobacteria, and Actinobacteriota. However, SHS exposure enriched opportunistic genera, including Massilia and Serratia, while reducing commensal taxa such as Anaerococcus and Dietzia. Functional prediction showed enrichment of metabolism pathways such as L-methionine salvage, biphenyl, heparin, and toluene degradation and immune-related pathways, including complement activation, T and B cell receptor signaling, MAPK, and TGF-beta pathways.

Conclusions: SHS exposure did not affect overall microbial diversity but induced compositional and functional shifts favoring opportunistic pathogens and immune modulation. These changes may increase susceptibility to ocular infections or inflammation, highlighting the importance of minimizing SHS exposure in children.

Abstract No.: 200433

Efficacy and Safety Analysis of 0.05% Atropine Combined With Orthokeratology With Progressive Myopia

First Author: Yunyun WANG

Purpose: To study the additive effect and safety of 0.05% and 0.01% atropine in progressive myopia patients wearing OK lenses.

Methods: A total of 125 patients with progressive myopia after wearing OK lenses for 1 year. They were randomly divided into 3 groups. In group A, 42 eyes were treated with OK lens combined with 0.01% atropine; 45 eyes in group B were combined with 0.05% atropine, and 38 eyes in the control group continued to wear the same type of OK lens.

Results: Compared with before treatment, the AL in groups A, B, and control increased 1 year after treatment, respectively: 0.23±0.08mm, 0.12±0.05mm, 0.31±0.03mm, the increase in group B was significantly lower than that in group A and control group (P<0.001). After 1year treatment, the SE of the three groups increased by -0.35±0.68D, -0.12±0.35D and -56±0.43D, respectively, and the increase of group B

was significantly lower than that of group A and control group ($P < 0.001$). One year after treatment, the relative position relationship between the defocus ring and pupil under photopic pupil the difference in A was statistically significant ($P = 0.001$). During treatment, the occurrence of adverse reactions among the three groups was no statistical significance between the three groups ($P > 0.05$).

Conclusions: Orthokeratology combined with 0.01% and 0.05% atropine can effectively slow down the rapid growth of AL and myopia, 0.05% atropine combined with orthokeratology has a better control effect on progressive myopia.

Abstract No.: 202933

Efficacy and Vascular Redevelopment of Anti-Vascular Endothelial Growth Factor Therapy for Stage 2 Early-Diagnosed Familial Exudative Vitreoretinopathy

First Author: Haonan MA

Co-Author(s): Jie PENG, Peiquan ZHAO

Purpose: To report the efficacy of anti-vascular endothelial growth factor (VEGF) therapy in stage 2 familial exudative vitreoretinopathy (FEVR) diagnosed under 3 months of age, and to present the first evidence of continued peripheral vascular growth and its influencing factors.

Methods: This retrospective, consecutive study included 24 eyes (14 patients) between January 1, 2017, and December 1, 2024. Outcome measures were the response to anti-VEGF treatment and the vascular growth assessed by disc-vascularized border/disc-fovea (DB/DF).

Results: The median age of patients at treatment was 10.5 days, with a median follow-up duration of 22 months. Nineteen (79%) eyes showed "Regression," and 3 (13%) demonstrated "Persistence". Among them, six eyes received additional laser photocoagulation. The remaining two (8%) eyes showed "Progression" and underwent lens-sparing vitrectomy. The generalized estimating equations model revealed that retinal vessels continued to grow progressively after treatment ($\beta = 0.0010$; 95% CI, 0.0005–0.0014; $P < 0.001$). The segmented mixed model demonstrated that the relative DB/DF ratio increased at a rate of 0.004 per week (95% CI, 0.0023–0.0056) until 35.4 weeks post-treatment.

Conclusions: Anti-VEGF therapy may effectively regress the high vascular activity of stage 2 early-diagnosed FEVR and promote continued vascular growth toward the periphery.

Abstract No.: 202111

FGF10 / IGSF3 Variants in Bony Congenital Nasolacrimal Duct Obstruction: A Genotype-Phenotype Study of Syndromic Versus Isolated Disease

First Author: Yuchen LI

Co-Author(s): Chengyue ZHANG

Purpose: To identify pathogenic variants associated with congenital bony nasolacrimal duct obstruction (bony CNLDO) and to clarify genotype-phenotype correlations.

Methods: In this single-center retrospective case study, children with clinically confirmed bony CNLDO and their relatives underwent detailed ophthalmic, systemic examinations, orbital computed tomography (CT), and maxillofacial magnetic resonance imaging (MRI). Whole-exome sequencing (WES) was performed on peripheral blood samples. Bioinformatics tools were utilized to predict variant pathogenicity, and classifications were performed according to the American College of Medical Genetics and Genomics (ACMG) guidelines.

Results: Thirty-two participants were included in this study, comprising six families and seven sporadic cases. WES identified eight novel FGF10 variants, including six missense mutations (c.598C>G, c.316T>G, c.395T>C, c.316T>C, c.327C>G, c.332T>G), one intronic splicing mutation (c.429+2T>A), and one heterozygous deletion at chromosome 5p12 encompassing the FGF10 gene. Two sporadic cases had no identifiable pathogenic variants. All patients with FGF10 variants exhibited a syndromic aplasia of lacrimal and salivary glands (ALSG) phenotype characterized by bony CNLDO, punctal anomalies, and hypoplasia of lacrimal, parotid, and submandibular glands. Three novel IGSF3 variants were also identified, including two missense mutations (c.2872G>C, c.2531G>A) and one nonsense mutation (c.2416G>T). In contrast, individuals carrying IGSF3 variants showed isolated bony CNLDO with normal glandular morphology.

Conclusions: Bony CNLDO is predominantly a monogenic disorder involving FGF10 or IGSF3. FGF10 mutations are associated with syndromic, gland hypoplasia, whereas IGSF3 mutations result in isolated bony CNLDO. These findings enhance understanding of the genetic heterogeneity and genotype-phenotype correlations underlying bony CNLDO, with implications for genetic diagnosis and counseling.

Abstract No.: 202130

Factual Evidence on Digital Therapeutics in Pediatric Amblyopia — Insights Into Rapid Axial Elongation Risk

First Author: Yunsi HE

Co-Author(s): Lei FENG, Jinrong LI, Xuan QIU, Yun WEN, Ying YAO, Wentong YU

Purpose: To evaluate the impact of daily digital therapeutics (DTx) on the risk of rapid axial elongation (RAE) in children with amblyopia using data from clinical settings.

Methods: This retrospective cohort study included 1394 children 3-to-12 years of age with amblyopia, 477 of whom received DTx. Children in the DTx group underwent 30 minutes of daily vision therapy, with axial length (AL) measured at baseline and during follow-up. Cox proportional hazards models were used to assess the risk of RAE, defined as an annual axial elongation exceeding safety thresholds based on age and myopia status. The primary outcome was the hazard ratio (HR) for RAE associated with DTx, adjusted for age, sex, best-corrected visual acuity, cycloplegic spherical equivalent refraction, amblyopic eye, type of amblyopia, and baseline AL.

Results: Six hundred forty-one children (45.98%) experienced RAE. Use of DTx increased the risk of RAE by 65% (HR, 1.65; 95% confidence interval, 1.40- 1.96; $P < 0.001$), with consistent findings across all subgroups ($P > 0.05$ for interaction). The increased risk was noted particularly in children with hyperopia, suggesting the potential for DTx to influence axial growth in this population.

Conclusions: Digital therapeutics are associated with an increased risk of RAE in children with amblyopia, highlighting the need for careful monitoring of AL during therapy. Although DTx offers visual acuity improvements, its potential impact on ocular growth should be balanced, particularly in children with hyperopia and prematurity.

Abstract No.: 205867

Feasibility of an App-Based Assessment Tool for Cerebral Visual Impairment Screening

First Author: Sahithya BHASKARAN

Co-Author(s): Harini KANNAN, Vijayalakshmi PERUMALSAMY

Purpose: Cerebral visual impairment (CVI) is a leading cause of pediatric blindness, but often goes undiagnosed in part due to access barriers. Visual perceptual (VP) skills are critical for understanding cognitive vision, yet traditional evaluation methods rely on numerous expensive physical tools. We evaluated whether an app-based assessment could serve as a feasible alternative to standard physical tools.

Methods: Children with suspected CVI who were referred for assessment were included. Subjects completed the physical kit assessment and the app-based assessment. We compared the child's ability to complete each of the ten visual perceptual skills tests in both modalities, the time to complete each modality and each specific skill test, and the difficulty of the task based on how much prompting or help the child needed

Results: Of 51 children, 34 completed the physical kit, and 37 completed the app-based assessments. The app showed 85% agreement with the physical kit. Task difficulty was rated higher in the app 25% of the time, lower 14%, and the same 60%. Completion time was only 11 seconds longer in the app (SD=18 s). In 5 out of 7 tasks with levels, at least 60% of children who successfully completed the task got to the highest level. 63% of children were able to successfully complete more tasks in the app than in the physical kit.

Conclusions: App-based visual perceptual tests are a promising, low-cost, scalable tool for CVI screening, providing comparable results with added accessibility and efficiency. This app could improve early detection and intervention for children with CVI.

Abstract No.: 205852

Feeding the Retina: Can DHA Drop the Risk of ROP?

First Author: Nadhira Rahma AUGUSTRIA

Co-Author(s): Julie Dewi BARLIANA, Angieta Putri SUPRAPTO

Purpose: Retinopathy of prematurity (ROP) is a major cause of preventable childhood blindness worldwide, particularly affecting high-risk infants. Access to advanced treatment remains limited in developing countries such as Indonesia. Docosahexaenoic acid (DHA) supplementation has been proposed to reduce the risk of severe ROP.

Methods: We conducted a systematic review through PubMed and Scopus using relevant keywords to identify studies reporting the effect of enteral DHA supplementation and ROP. Eligible studies were screened based on predefined inclusion criteria. Meta-analysis was performed using RevMan 5.4 software.

Results: All six studies (n=890 infants) included were eligible for meta-analysis. Analysis indicated enteral DHA supplementation has no significant effect on the incidence of any stage ROP (OR 0.98; 95% CI 0.72–1.34; $p=0.90$; $I^2=3\%$). Subgroup analysis comparing high-dose versus low-dose DHA likewise demonstrated no difference in ROP risk (OR 0.95; 95% CI 0.12–7.32; $p=0.96$; $I^2=0\%$). However, pooled analysis of four RCTs reporting ROP type 1 showed that DHA supplementation was associated with a significant reduction in incidence (OR 0.51; 95% CI 0.30–0.89; $p=0.02$; $I^2=20\%$). Small earlier studies (n=58 infants)

reported no significant difference in ROP-needed treatment. In contrast, the latest larger trials (n=316 infants) showed reduced risk of severe ROP in the DHA supplementation group.

Conclusions: Enteral DHA supplementation does not reduce the overall incidence of any stage ROP but significantly lowers the risk of ROP type 1. DHA has emerged as a promising strategy to prevent severe ROP in high-risk infants.

Abstract No.: 206241

Global and Regional Trends in Retinopathy of Prematurity: Global Disparities in Visual Impairment, Projected to 2050

First Author: Wai Chak **CHOY**

Co-Author(s): Emily Suhan **WONG**, Jason Cheuk Sing **YAM**, Yuzhou **ZHANG**

Purpose: To analyze trends in ROP-related visual impairment from 1990 to 2021 and identify risk factors for increased prevalence of visual loss with disease burden projection to 2050.

Methods: Utilizing the Global Burden of Disease 2021 dataset to identify ROP-related visual outcomes across 204 countries from 1990 to 2021, we incorporated socioeconomic risk factors and healthcare indicators from the dataset and employed machine-learning models for forecasting until 2050.

Results: The total number of patients globally with visual loss due to retinopathy of prematurity remained stable from 1990-2021. Low SDI and low-middle SDI countries accounted for the majority of ROP related visual loss cases in 2021. The largest disparity lies in the prevalence of ROP-related blindness, which remains disproportionately high in low and low middle SDI countries, but a sharp decline has been seen since 2000s. The prevalence pattern shows a shifting burden of ROP-related visual impairment, with high-middle SDI countries in particular experiencing an increasing prevalence rate in all grade visual loss related to ROP. Multivariable regression analysis identified lower primary completion rate (estimate=-2.33[95%CI=-3.11--1.55]), higher out-of-pocket healthcare expense (estimate=2.61[95%CI=1.86-3.35]), lower social insurance coverage (estimate=-2.79[95%CI=-3.76--1.82]), lower prenatal screening coverage (estimate=-3.91[95%CI=-4.63--3.19]) and nursing staff density (estimate=-2.07[95%CI=-3.03--1.11]) were associated with higher visual loss prevalence. Projections indicate that without targeted interventions, the burden of ROP-related visual impairment will continue to escalate, particularly in high-middle and middle SDI regions

Conclusions: Significant disparities remain between SDI groups, especially for ROP-related blindness. The global burden of ROP-related visual loss may further increase,

particularly for middle to high-middle SDI countries without timely intervention.

Abstract No.: 203837

Impact of Surgery on Reading Ability in Children With Infantile Esotropia

First Author: Bibigul **BEGEEVA**

Co-Author(s): Ivan **STEPANETS**

Purpose: Infantile esotropia disrupts binocular vision early and may impair reading. As reading is a key academic skill, this study was designed to evaluate functional outcomes beyond visual acuity by assessing changes in reading performance before and after surgical correction in children aged 8–10 years.

Methods: A prospective study was conducted on 18 children (aged 8–10 years) with infantile esotropia who underwent surgical alignment. Reading ability was assessed with standardized, age-appropriate charts. Three parameters were measured: maximum reading speed (MRS, words/min), critical print size (CPS, smallest fluent print size), and reading acuity (RA, minimum legible print size with errors). Evaluations were performed preoperatively and at 3 months postoperatively.

Results: All parameters improved significantly after surgery. - MRS increased from 100 ± 13 to 132 ± 14 words/min ($p < 0.005$). - CPS improved from 0.36 ± 0.06 to 0.27 ± 0.05 logMAR ($p < 0.005$). - RA improved from 0.29 ± 0.07 to 0.21 ± 0.05 logMAR ($p < 0.005$). These findings demonstrate better reading fluency and fine visual function after alignment.

Conclusions: Surgical correction of infantile esotropia in children aged 8–10 years restores ocular alignment and significantly enhances reading performance. Improvements in MRS, CPS, and RA emphasize the value of including reading assessment in postoperative follow-up. Early surgery may provide substantial visual and educational benefits.

Abstract No.: 200905

Is Amblyopia of Any Severity Fully Treatable at Any Age?

First Author: Sameera **IRFAN**

Purpose: To determine whether visual recovery in amblyopia is influenced by a patient's age at presentation.

Methods: In a prospective interventional study, 1701 consecutive cases with poor vision were included irrespective of the patient's age. After wearing refractive correction for 8-12 weeks and experiencing no further improvement in the BCVA, amblyopia therapy was initiated, comprising full-time patching of the good eye, along with active use of the amblyopic eye through reading and writing for at least 6 hours daily. Regular two-weekly follow-ups were conducted.

The endpoint of therapy was achieving a BCVA equal to that of the good eye. A regular post-patching follow-up was conducted for 1-3 years. Statistical analysis comparing visual acuity at the start and end of therapy was performed using a paired t-test for each group.

Results: There were 896 male and 805 female cases. 1383 cases (81.3%) had previously failed amblyopia therapy. Forty-nine cases (2.9%) dropped out of the study. For a simplified analysis of the results, the 1701 cases were divided into three age groups: Group A, aged 4-7 years (473 cases), Group B, aged 8-12 years (618 cases), and Group C, aged 13-46 years (610 cases). The overall success rates after therapy for 2-4 months were 97.6%.

Conclusions: Full visual recovery is possible in amblyopia of any severity and age. The age of a patient at presentation should not preclude the initiation of therapy. Compliance with therapy is the only limiting/deciding factor.

Abstract No.: 206108

Longitudinal Alterations in Cerebral Large-Scale Functional Network Connectivity Associated With Exodrift Following Surgery in Children With Intermittent Exotropia

First Author: Ying WANG

Co-Author(s): Jianlin GUO, Jingjing JIANG, Li LI, Yun PENG

Purpose: To investigate alterations in children with intermittent exotropia (IXT) by comparing the large-scale brain network functional connectivity (FC) preoperatively and postoperatively using functional magnetic resonance imaging (fMRI), and analyzing the relationship between changes in FC and postoperative exodrift in IXT patients.

Methods: A prospective cohort study. 20 children diagnosed with IXT who underwent extraocular muscle surgery by a single surgeon were enrolled. Assessments included the evaluation of angle of deviation, binocular fusion, distance and near stereopsis, and cerebral network FC both preoperatively and 1 month postoperatively. The amount of exodrift was also recorded at 1 month postoperatively. Utilized a longitudinal analysis to compare the dynamic changes in large-scale brain network FC following surgical intervention, and investigated the association between FC alterations and postoperative exodrift.

Results: Resting state fMRI at 1 month postoperative revealed a significant increase in FC between the sensorimotor network (SMN) and the bilateral superior occipital gyrus (SOG), a component of the visual network (VN), compared to preoperative baseline ($\Delta\text{FC}_{\text{SMN-SOG.R}} = 0.082 \pm 0.110$, $T = 4.158$; $\Delta\text{FC}_{\text{SMN-SOG.L}} = 0.085 \pm 0.106$, $T = 3.959$). The mean postoperative exodrift was -3.90 ± 7.49 PD, showing significant negative correlations with pre- and post-

operative FC alterations between the SMN and SOG.R ($r = -0.457$, $P = 0.043$) / SOG.L ($r = -0.575$, $P = 0.008$).

Conclusions: A significant increase in the FC between SMN and SOG (VN) was observed in patients with IXT postoperatively, with FC alterations exhibiting a negative correlation with the exodrift following surgery, suggesting that the plasticity of the central nervous system plays a crucial role in maintaining alignment stability after surgery.

Abstract No.: 200940

MRI Evaluation of Cranial Nerve Abnormalities and Extraocular Muscle Fibrosis in Duane Retraction Syndrome and Congenital Extraocular Muscle Fibrosis

First Author: Shiqi LIU

Co-Author(s): Xiaotong LI, Wei ZHANG

Purpose: To investigate the alterations in extraocular muscles (EOMs) by magnetic resonance imaging (MRI) among patients diagnosed with Duane retraction syndrome (DRS) and congenital fibrosis of the extraocular muscles (CFEOM), who present with various cranial nerve anomalies.

Methods: A case-control study was conducted to evaluate 27 patients with DRS and 14 patients with CFEOM. All patients underwent MRI scans of the brainstem and orbital examination. Neurodevelopmental assessments were conducted through MRI, and the maximum cross-sectional area and volumes of EOMs were obtained. Three types of models were constructed using machine learning decision tree algorithms based on EOMs to predict disease diagnosis, cranial nerve abnormalities, and clinical subtypes.

Results: Patients with bilateral CN VI abnormalities had smaller volumes of LR, MR, and IR muscles compared to those with unilateral involvement ($P < 0.05$). Similarly, patients with CFEOM and unilateral third cranial nerve abnormalities had a smaller maximum cross-section of SR compared to the contralateral eye ($P < 0.05$). In patients with both CN III and CN VI abnormalities, the volume of SR was smaller than in patients with CN III abnormalities alone ($P < 0.05$). The prediction model using EOMs volume showed a diagnostic precision of 82.5% for clinical cases and 60.1% for predicting cranial nerve abnormalities. Nonetheless, the precision for identifying clinical subtypes was only 41.7%.

Conclusions: The distinctive volumetric alterations in EOMs among individuals exhibiting distinct cranial nerve anomalies associated with DRS or CFEOM provide valuable diagnostic insights into Congenital Cranial Neurodevelopmental Disorders (CCDDs). MRI analysis of EOMs should be emphasized.

Abstract No.: 204906**Machine Learning Model Tool Development for Prediction of Neonatal Retinal Hemorrhage Using Birth Parameters***First Author: Juahn OH**Co-Author(s): So Young KIM, Juahn OH, Minah PARK*

Purpose: Neonatal retinal hemorrhage (NRH) affects newborns, with macular involvement risking visual impairment. Early detection is critical, yet systematic screening is limited by a pediatric ophthalmologist shortage and equipment needs. This study developed a machine learning model to predict NRH severity using routine delivery data and created a web-based clinical tool implementing this trained model.

Methods: We retrospectively analyzed a 10-year cohort dataset of 123,855 neonates, including 96,596 without NRH and 27,259 with NRH. NRH severity was classified using the standardized retinal hemorrhage (RH) scoring system (0-12 scale). Clinical predictors included sex, delivery mode, gestational age, birth weight, and Apgar scores at 1 and 5 minutes. Additional engineered features were the Apgar score difference and the weight-to-gestational-age ratio. Four ML models—Extreme Gradient Boosting (XGBoost), Random Forest, Light Gradient Boosting Machine (LightGBM), and K-Nearest Neighbors (KNN)—were trained with 5-fold cross-validation. Performance was evaluated using multi-class area under the curve (ROC-AUC) and F1-weighted score.

Results: For 13-class severity prediction (RH scores 0-12), XGBoost performed the best (ROC-AUC 0.784, F1 0.684), surpassing Random Forest (AUC 0.762, F1 0.653), LightGBM (AUC 0.734, F1 0.609), and KNN (AUC 0.623, F1 0.695). When applied to binary NRH detection, the model demonstrated strong screening performance with 87% sensitivity and 78% specificity.

Conclusions: This represents the largest ML study on NRH and first clinical application for multi-class severity prediction at birth. The tool transforms routine delivery data into triage signals, enabling clinicians to prioritize high-risk neonates for referral. This scalable solution addresses gaps in neonatal eye care, particularly in resource-limited settings.

Abstract No.: 202479**Macular Thickness & Vascular Density Changes Following Treatment in Unilateral Amblyopia: An OCTA-Based Prospective Study***First Author: Mariam SAAD**Co-Author(s): Siddharth AGRAWAL, Rajat SRIVASTAVA*

Purpose: To evaluate structural & vascular changes in amblyopic eyes pre- & post-treatment using optical coherence tomography (OCT) and OCT angiography (OCTA), and to correlate these changes with visual outcomes.

Methods: This prospective observational study included 60 children (5–12 years) with unilateral amblyopia (strabismic, anisometropic, or deprivation). All subjects underwent baseline and post-treatment assessment after 3 months of occlusion and dichoptic therapy. Functional parameters included best-corrected visual acuity (BCVA) and contrast sensitivity (CS). OCT and OCTA were used to measure central macular thickness (CMT), ganglion cell–inner plexiform layer (GCL–IPL) thickness, macular volume, and superficial vascular density. Statistical analyses compared amblyopic versus fellow eyes, and pre- versus post-treatment changes.

Results: At baseline, amblyopic eyes showed significantly worse BCVA (0.94 ± 0.43 vs 0.05 ± 0.06 logMAR, $P < 0.001$), reduced CS (0.52 ± 0.33 vs 1.50 ± 0.00 , $P < 0.001$), increased CMT (251.2 ± 32.7 vs 241.0 ± 17.5 μm , $P < 0.001$), thicker GCL–IPL (83.9 ± 6.9 vs 78.5 ± 6.1 μm , $P < 0.001$), and reduced vascular density ($44.5 \pm 3.4\%$ vs $53.5 \pm 3.0\%$, $P < 0.001$). Post treatment, amblyopic eyes demonstrated significant improvement in BCVA (to 0.72 ± 0.42 , $P < 0.001$) and contrast sensitivity (to 0.72 ± 0.32 , $P < 0.001$), along with a reduction in CMT and GCL–IPL thickness, and an increase in superficial vascular density (to $45.6 \pm 3.1\%$, $P < 0.001$). Non-amblyopic eyes showed no significant change.

Conclusions: Amblyopic eyes demonstrated increased macular thickness and reduced vascular density, both improved after therapy. These structural and vascular changes paralleled functional recovery, highlighting OCTA's role in monitoring retinal plasticity during treatment.

Abstract No.: 208434**Modeling a Multi-Disciplinary Clinic for Complex Pediatric Uveitis Management***First Author: Mary HO**Co-Author(s): Assunta HO, Sophia LI, Andrew MAK, Regina YIU, Alvin YOUNG*

Purpose: To evaluate the model for a multi-disciplinary combined pediatric rheumatology and ophthalmology clinic.

Methods: This retrospective study was conducted from June 2024 to September 2025, involving a total of 25 cases co-managed in the combined clinic. The clinic is equipped with a slit lamp, indirect biomicroscopy, and clinical photography modalities.

Results: Of the cases, 68% required combined immunomodulatory therapy (IMT) and systemic bridging steroids for control, while the remaining cases required biologics combined with IMT. The biologic agents utilized included anti-TNF alpha (adalimumab) and IL-6 inhibitors (tocilizumab). The ages of the children ranged from 2 to 16 years. The most common etiologies were: idiopathic panuveitis (36%), idiopathic

chronic anterior uveitis (32%), JIA-associated anterior uveitis (8%), Behçet's-associated uveitis (12%), B27-associated uveitis (8%), and sarcoidosis (4%). The model demonstrated over a 60% reduction in clinic visits, shortened consultation durations, and a decrease in the total period of systemic steroid use.

Conclusions: The combined pediatric rheumatology and ophthalmology clinic provides an effective approach for managing complex cases, facilitating discussions on cases requiring surgical intervention for glaucoma, perioperative management of steroids, and minimizing the family burden, along with potential risks and side effects from systemic medications.

Abstract No.: 206643

Multidimensional Assessment of Stereopsis Deficits in Children With Congenital Ptosis

First Author: Jinxin SONG

Purpose: To investigate the patterns of stereopsis deficits in children with congenital ptosis by comparing static and dynamic stereopsis, and to characterize impairments related to distinct visual pathways.

Methods: In this prospective observational study, 80 postoperative children with congenital ptosis (46 boys, 34 girls; mean age 5.79 ± 2.03 years) underwent standardized binocular vision testing. Static random-dot stereopsis and dynamic disparity stereopsis were assessed, and discordant results were analyzed using paired comparisons.

Results: Static stereopsis deficits were present in 41.2% (33/80) of patients, whereas dynamic stereopsis deficits occurred in 57.5% (46/80). Among them, 13 patients showed deficits only on static testing, 26 only on dynamic testing, 20 on both, and 21 on neither. McNemar's test indicated that dynamic stereopsis deficits were more prevalent than static deficits ($\chi^2 = 3.69$, exact $P = 0.035$).

Conclusions: Children with congenital ptosis demonstrate multidimensional stereopsis impairment, with dynamic stereopsis being more frequently affected. This pattern may reflect pathway-specific vulnerability to motion disparity processing. Incorporating both static and dynamic assessments provides a more comprehensive profile of stereopsis deficits and may guide individualized visual rehabilitation strategies.

Abstract No.: 205858

Muscle Transplantation in the Management of Large-Angle Exotropia: A Single-Eye Surgical Approach

First Author: Pankhudi VERMA

Co-Author(s): Amit KUMAR, Amit RAJ

Purpose: To evaluate the outcomes of muscle transplantation in patients with large-angle

exotropia, focusing on its efficacy as a single-eye surgical intervention that avoids manipulation of the contralateral healthy eye.

Methods: We present a case series of eight patients with large-angle exotropia (>50 prism diopters), each managed with unilateral lateral rectus recession combined with medial rectus muscle transplantation. Surgical planning was tailored according to individual deviation magnitude and duction patterns. Postoperative outcomes were assessed based on alignment in primary gaze, binocular function, and ocular motility.

Results: All eight patients achieved satisfactory postoperative alignment within 8 PD in primary gaze, with preservation of full ductions and no significant complications.

Conclusions: Muscle transplantation represents a safe and effective option in the surgical management of large-angle exotropia. Notably, this method facilitates significant alignment through unilateral surgery, obviating the need to operate on the contralateral, non-deviating eye.

Abstract No.: 204097

Nasal Insertion of the Superior Oblique Tendon Presenting As Brown Syndrome

First Author: Ahmed AWADEIN

Co-Author(s): Ahmed ALI

Purpose: Anomalous ocular muscle insertions are a rare cause of ocular motility disturbances.

Methods: We report the clinical presentation and the intraoperative findings of two cases with abnormally nasally inserted superior oblique tendons presenting with a Brown syndrome-like clinical picture.

Results: Case no 1 was a 5-year-old girl presenting with a chin-up position. There was bilateral limitation of elevation in adduction, -4 on the right side and -3 on the left side, with $+1$ downshoot on adduction on either side. Patient was orthotropic in down-gaze with a small V-pattern exotropia. Case no 2 was a 4-year-old boy presenting with an esotropia of 35Δ that was partially corrected with his spectacles to 20Δ . Ductions showed -4 defective elevation in the adduction of the right eye. Surgical exploration in both cases revealed abnormal nasal insertion of the superior oblique tendons. The line of insertion had a convexity facing superonasally. The posterior fibers were inserted 7-8 mm posterior and just nasal to the nasal border of the superior rectus insertion, while the anterior fibers were shorter and inserted 5 mm nasal and 4 mm posterior to the nasal edge of the superior rectus insertion. In both cases, there was improvement in the elevation on adduction after superior oblique lengthening.

Conclusions: Abnormal nasal insertion of the superior oblique muscle enhances the depressor effect of the muscle and can create a Brown-like picture.

Abstract No.: 201849

Neural Basis of Impaired Binocular Vision in Strabismus

First Author: Shuai **CHANG**

Co-Author(s): Ming **MENG**, Yan **YANG**, Xinping **YU**

Purpose: To investigate neural activation and representational patterns in early visual areas across the transition from the presence to the disappearance of diplopia in strabismus, by comparing monocular and binocular viewing between strabismic and control individuals.

Methods: We recruited 26 strabismic patients (16 with diplopia, 10 without) and 20 controls. Functional MRI was performed while participants viewed oriented Gabor stimuli under dominant-eye, non-dominant-eye, and binocular viewing. Analyses focused on early visual ROIs, including BOLD activation and multivoxel pattern analysis (MVPA) for orientation decoding.

Results: In V1, controls showed stronger BOLD responses under binocular than monocular viewing, whereas strabismic patients—especially those without diplopia—exhibited weaker binocular than monocular activation. Binocular and dominant-eye responses in controls were significantly higher than in strabismic groups. MVPA revealed above-chance decoding across all conditions, but binocular decoding accuracy was significantly higher in controls, with similar effects in V2. Cross-eye decoding showed that, in both strabismic groups, non-dominant eye input could not be reliably decoded when classifiers were trained on binocular or dominant-eye data.

Conclusions: Strabismus disrupts the normal binocular enhancement of the early visual cortex. Although orientation information was decodable across conditions, decoding accuracy was reduced in strabismic individuals, particularly under binocular viewing. Cross-eye decoding further indicated ineffective integration of non-dominant eye input, suggesting abnormal binocular information integration as a neural basis for the disappearance of diplopia and impaired binocular function in strabismus.

Abstract No.: 202531

New Onset Esotropia Following Hyperopic Orthokeratology

First Author: Jayvee **RIVERA**

Co-Author(s): Kevin **DY**, Sonal **FARZAVANDI**

Purpose: To report a child with partially accommodative esotropia (PAET) with a high AC/A ratio after initiating hyperopic orthokeratology.

Methods: Case report.

Results: An eight-year-old Chinese girl, hyperopic since age four and previously asymptomatic with spectacles, presented with a new onset intermittent esotropia. At age seven, she began hyperopic orthokeratology lens wear, which she continued for six months. During this period, she developed horizontal diplopia and inward deviation of the right eye. The family subsequently discontinued orthokeratology lens use. The visual acuity was right eye 6/6 (+6.0 D sph / -2.00 cyl x170) and left eye 6/6 (+4.25D sph / -1.75 cyl x50). Cover test with glasses showed a residual esotropia of 35 PD for far and 45 PD for near. The AC/A ratio was 11.67:1D (gradient method). The child was given executive bifocals and prism adapted with 15 PD base-out for the right eye and 15 PD base-out for the left eye to achieve orthophoria, and is pending surgery.

Conclusions: To our knowledge, this is the first documented case of new onset PAET with high AC/A ratio after initiating hyperopic orthokeratology. This case emphasizes the prudence required when prescribing orthokeratology in hyperopic children. The resultant decompensation into a constant strabismus with symptomatic diplopia is an extremely unnerving consequence for the family.

Abstract No.: 206179

Objective Associations Between Postural Asymmetry and Refractive Error in a Student Population

First Author: Bolin **DENG**

Co-Author(s): Zhengzheng **WU**

Purpose: To evaluate the associations between objectively measured postural misalignments and refractive errors, as well as ocular biometric parameters, among students in Ziyang, China.

Methods: A cross-sectional study was conducted involving 567 students aged 12–18 years. All participants underwent comprehensive ocular examinations, including cycloplegic autorefraction and axial length (AL) measurements. Postural parameters (head tilt, shoulder imbalance, forward head posture) were quantified using a photogrammetric analysis system based on standardized photographs.

Results: The study cohort (mean age: 14.96 ± 1.60 years; 43.39% male) had a myopia prevalence of 82.54% and an anisometropia prevalence of 34.74%. Multivariate analysis indicated that older age, female sex, and shoulder imbalance were significant independent predictors of a more myopic spherical equivalent (SE). Specifically, shoulder imbalance was significantly associated with a more negative SE ($\beta = -0.48$, $P = 0.030$) and longer AL ($\beta = 0.24$, $P = 0.025$). Head tilt was a significant risk factor for anisometropia ($OR = 1.71$, $P = 0.013$) and was correlated with greater interocular differences in SE ($\beta = 0.22$, $P = 0.026$) and AL ($\beta = 0.11$, $P = 0.007$). No significant associations

were observed between forward head posture and any refractive parameters.

Conclusions: Asymmetrical postural misalignments are significantly associated with refractive errors in adolescents, with distinct patterns: head tilt is linked to anisometropia, while shoulder imbalance correlates with higher myopic severity and axial elongation. Postural assessment may hold potential value in refractive error management.

Abstract No.: 204887

Ocular Comorbidities and Trace Element Dysregulation in Childhood Excessive Blinking: A Real-World Cohort Study

First Author: Huihui CHU

Co-Author(s): Jifeng YU

Purpose: Childhood excessive blinking lacks a comprehensive characterization of ocular comorbidities and potential neurological associations. This real-world cohort study investigates ocular comorbidities and analyzes trace element profiles in the subgroup with tic disorders.

Methods: A total of 533 children with excessive blinking (January 2020–April 2025) were enrolled. Demographic/clinical data were extracted from electronic records. A subgroup of tic disorder patients (n=64) and controls (n=21) underwent blood analysis for seven trace elements (Cu, Zn, Ca, Mg, Fe, Mn, Pb) using ICP-MS.

Results: • Ocular Comorbidities: 91.6% (488/533) had ≥ 1 eye disease. Most prevalent were dry eyes (67.0%), conjunctivitis (27.8%; allergic: 11.4%, bacterial: 7.3%), and ametropia (25.1%). • Age/Gender Differences: Allergic conjunctivitis was higher in boys (13.3% vs. 7.3%, $P < 0.05$) and school-age children (≥ 7 years); bacterial conjunctivitis predominated in preschoolers (< 7 years). Myopia was significantly higher in school-age children (25.7% vs. 6.9%, $P = 1.69 \times 10^{-8}$). • Tic Disorder Subgroup (12.0%, 64/533): Higher prevalence in school-age children (15.7% vs. 9.1%, $P = 0.020$). Blood analysis revealed significant dysregulation: $\downarrow$ Cu, Zn, Mg, Fe, Mn, Pb ($P < 0.001$), and $\uparrow$ Ca ($P = 1.44 \times 10^{-13}$) versus controls.

Conclusions: Childhood excessive blinking is strongly associated with ocular comorbidities (primarily dry eyes). A distinct subgroup with tic disorders exhibits trace element dysregulation, suggesting potential neurophysiological mechanisms. Screening for ocular disease and targeted neurological evaluation are recommended.

Abstract No.: 206850

Outcomes of Additional Posterior Barrage Laser in Early Stage 4A Retinopathy of Prematurity

First Author: Devesh KUMAWAT

Co-Author(s): Shoryavardhan AZAD, Ritweez SAHU

Purpose: To evaluate the outcomes of posterior barrage laser (PBL) in addition to standard peripheral laser (SPL) of avascular retina in eyes with stage 4A retinopathy of prematurity (ROP).

Methods: This ambispective observational study included preterm infants with zone II early stage 4A ROP managed with PBL at a tertiary referral center in North India between January 2024 and June 2025, with a minimum follow-up of 12 weeks. All eyes underwent additional PBL along the posterior edge of the junction, in conjunction with SPL. Anatomical outcomes were assessed in terms of regression or progression of tractional retinal detachment (TRD), requirement for lens-sparing vitrectomy (LSV), and final macular status. Adverse events, including vitreous hemorrhage, retinal breaks, or rhegmatogenous retinal detachment, were noted.

Results: Twenty-five eyes of 14 infants were included. Mean gestational age was 30.6 ± 1.6 weeks, and mean birth weight was 1408 ± 235 grams. Barrage was performed as primary treatment in 22 eyes (planned in 17; unplanned in 5, where infants were unfit for LSV) and as rescue in 3 eyes. TRD involved zone II anterior in 18 eyes (72%) and zone II posterior in 7 eyes (28%), with a mean extent of 3.96 ± 1.03 clock hours, and plus disease in 21 eyes (84%). Median follow-up was 54 weeks (range 12–80 weeks). Regression occurred in 23/25 eyes (92%), with residual traction in 2 eyes. TRD progressed in 2 eyes, requiring LSV. No adverse events were observed.

Conclusions: Posterior barrage laser, combined with standard peripheral laser, is effective in early stage 4A zone II ROP with low height and < 6 clock hour extent, promoting regression and reducing the need for vitrectomy.

Abstract No.: 204203

Outcomes of Four-Point Scleral Fixated Intraocular Lens in Paediatric Eyes

First Author: Li Yen CHAN

Co-Author(s): Shuan DAI, Ye LI

Purpose: To report the visual and refractive outcomes of scleral-fixated intraocular lens (SFIOL) for the management of paediatric ectopia lentis.

Methods: A retrospective chart review of children who underwent SFIOL, using the Akreos AO60 or Luxgood IOL from June 2019 to March 2025, was undertaken.

Results: Forty-seven eyes of 28 children were included for review. The mean age at surgery was 7.69 ± 3.44

years, with a median follow-up time of 24 months (IQR 37, range 1-77). The main indication was ectopia lentis secondary to Marfan Syndrome (39 eyes, 83%). Best corrected visual acuity (BCVA) was maintained or improved from the preoperative BCVA in 93.5% of eyes. Median postoperative BCVA improved to 0.2 (IQR 0.18) at 1-year follow-up ($p < 0.01$). There was a myopic shift at 12 months postoperatively (median -0.31, IQR 1.63), but this was not statistically significant. In 31 eyes that had more than 1 year of follow-up, residual refractive error was within 1.00D for 19 eyes, within 2.00D for 7 eyes, within 3.00D for 5 eyes, and greater than 3.00D for 5 eyes. Retinal detachment occurred in 2 eyes (4.3%), and asymptomatic IOL tilt/decentration was noted in 1 eye (3.03%).

Conclusions: SFIOL was a safe and effective method for the correction of aphakia in children with insufficient zonular or capsular support. There was a significant improvement in visual acuity for all patients, no new cases of amblyopia, and minimal postoperative complications.

Abstract No.: 202306

Pamrevlumab Targeting CTGF: A Translational Approach to Prevent Pediatric Posterior Capsular Opacification

First Author: Lely Retno **WULANDARI**

Co-Author(s): Happy Kurnia **PERMATASARI**, Hidayat **SUJUTI**, Sri **WINARSIH**

Purpose: Posterior capsular opacification (PCO) is a frequent complication after pediatric cataract surgery, and no effective pharmacologic prevention exists. This study investigated whether pamrevlumab, an anti-connective tissue growth factor (CTGF) antibody, reduces TGF- β 2-induced activation of pediatric lens epithelial cells (LECs).

Methods: Pediatric LECs (capsulorhexis specimens; ethical approval obtained) were pretreated with Pamrevlumab (50–150 μ g/mL) one hour before TGF- β 2 (10 ng/mL). Proliferation (CCK-8) at 24, 48, and 72 h and migration (wound-healing; 0–72 h, larger area = less migration) were analyzed by ANOVA with Tukey post hoc. Primary endpoint: proliferation at 72 h; secondary: wound-area at 72 h.

Results: At 72 h, proliferation was 2.44 ± 0.04 (Pamrevlumab 50 μ g) versus 2.69 ± 0.09 (TGF- β 2), a 9.3% reduction ($p < 0.001$; Cohen's $d = 0.72$, moderate-large effect). Pamrevlumab 100 μ g yielded 2.54 ± 0.02 (5.6% reduction; $d = 0.60$), while 150 μ g showed no effect. A greater wound area was retained by the 50 μ g group (34.5% vs. 24.1% of baseline), indicating less migration (between-group $p = 0.122$; within-group $p = 0.002$; $d = 0.56$). These results demonstrate consistent dose-response trends, and clinically meaningful endpoints. A plausible mechanism is CTGF blockade, limiting extracellular matrix deposition and myofibroblastic transition.

Conclusions: Pamrevlumab attenuates TGF- β 2-driven LEC proliferation and preserves wound area, addressing a therapeutic gap in pediatric PCO prevention. This strategy could preserve vision, lower retreatment rates, and lessen the incidence of PCO. Ocular delivery/safety assessment and molecular validation are the next steps.

Abstract No.: 206624

Pediatric Endophthalmitis: Clinical Profile and Visual Outcome Following Vitrectomy in a South Indian Patient Cohort

First Author: Prema **SUBRAMANIAM**

Co-Author(s): Abhishek **DAS**, Ninan **JACOB**, Parag **SHAH**, Narendran **VENKATAPATHY**, Vivek Kumar **JHA**, Chandravathan **KAPARTHI**

Purpose: To investigate the etiology, microbiological spectrum, and visual outcomes following vitrectomy for pediatric endophthalmitis.

Methods: Retrospective analysis was conducted on all patients under 16 years of age diagnosed with infectious endophthalmitis from a single institution from January 1, 2020, to June 30, 2025. The clinical characteristics, aetiology, microbiological spectrum, management, and visual outcomes were analysed. Subgroup analysis included patients who underwent Two-staged vitrectomy (Vitreous biopsy with blind core vitrectomy with empirical antibiotics at day 1, followed by repeat core vitrectomy at day 5–7).

Results: A total of 89 eyes were included, with a mean age of 8.1 ± 4.5 years. Trauma was the most common etiology (75.3%), followed by endogenous endophthalmitis (21.3%). Overall, 35 (39.3%) cases had positive cultures: gram-positive (16.8%), gram-negative (15.7%), and fungal (6.7%). The final visual outcomes were 20/200 or better in 37 (41.5%) eyes. The difference between the mean baseline (2.16 ± 0.67) and final visual acuity (1.50 ± 1.16) was statistically significant. Subgroup analysis of 15 patients who underwent staged vitrectomy showed a 60% culture positivity rate and final visual acuity of 20/200 or better in 46.6% of cases.

Conclusions: Trauma is the most common aetiology in pediatric endophthalmitis. Two-staged vitrectomy can be considered for severe vitritis with poor media clarity over single-stage vitrectomy for better visual outcomes and a minimal complication rate.

Abstract No.: 205870

Percepto: A Digital Screening Tool for Cerebral Visual Impairment

First Author: Sahithya BHASKARAN

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Purpose: Cerebral Visual Impairment (CVI) affects 25% of children under 3 in Tamil Nadu, diminishing their learning, mobility, and daily activities if left unaddressed. Current CVI assessment tools are expensive and require expertise to administer, leaving many children struggling without support. We aimed to develop a digital screening tool to screen for CVI.

Methods: Percepto is an innovative, game-based screening app that transforms complex assessments into engaging activities. Designed for use by pediatricians, educators, and field workers, Percepto collects key response metrics to provide insight into a child's visual perceptual abilities, identifying children at risk for CVI.

Results: Our prototype has shown promising results in clinical settings, and with continued data collection, we aim to integrate machine learning for precise risk prediction.

Conclusions: By making CVI screening affordable and accessible, we can intervene early, helping children get the support they need to thrive. This tool ensures no child's potential is limited by undiagnosed CVI.

Abstract No.: 201567

Perceptual Learning for Refractive Amblyopia With Limited Response to Conventional Therapy: Real-World Outcomes and a Decision Tree Approach

First Author: Mengya HAN

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Purpose: This study evaluated the effectiveness of perceptual learning (PL) using a decision tree approach applied to real-world data in refractive amblyopic patients with limited response to conventional therapy.

Methods: Real-world clinical data were derived from 108 patients with refractive amblyopia who had previously received standard treatment for at least 6 months but showed minimal improvement, defined as a change in best-corrected visual acuity (BCVA) of less than 0.1 logarithm of the minimum angle of resolution (logMAR). All patients subsequently underwent a structured PL program targeting contrast sensitivity. Visual outcomes were assessed before and after the PL intervention.

Results: Overall, 35.2% of patients (n=38) achieved clinically meaningful BCVA improvement, including

14.8% (n=16) with significant gains. Multivariate linear regression identified baseline BCVA ($\beta = -0.192$, $P < 0.001$), and age ($\beta = 0.005$, $P = 0.007$) as significant predictors of BCVA improvement ($R^2 = 0.673$). A bagging-based machine learning model highlighted younger age (<8.2 years) and poorer baseline BCVA (≥ 0.12 logMAR) as key factors associated with benefit. Subgroup analysis further revealed that younger children and those with poorer baseline visual acuity showed greater post-training improvement in BCVA ($P < 0.001$). Across age and baseline acuity subgroups, improvements in contrast sensitivity were consistently observed.

Conclusions: Perceptual learning is a promising adjunctive approach for improving visual acuity in refractive amblyopic patients with limited response to conventional therapy. Using real-world evidence, we developed an interpretable decision tree model to identify patients most likely to benefit, offering practical support for individualized treatment planning.

Abstract No.: 201950

Persistent Diplopia Despite Intraocular Lens Exchange in a Patient With Latent Strabismus

First Author: Ralene SIM

Co-Author(s): Sonal FARZAVANDI

Purpose: To describe a case of decompensated long-standing diplopia after sequential cataract surgery with toric intraocular lens (IOL) implantation and subsequent IOL exchange.

Methods: Case report of clinical presentation, surgical interventions, and postoperative course.

Results: A 64-year-old Chinese male hairdresser and motorcyclist with a 6-year history of prism-corrected diplopia presented in February 2023 with bilateral visual blurring. Visual acuity was 6/60 (pinhole 6/30) in the right eye and 6/19 (pinhole 6/12) in the left eye. Nuclear sclerotic cataracts (RE NS2+ C4+, LE NS2+ C2+) and myopic astigmatism (RE -3.50/-0.75x85; LE -3.25/-0.25x80) were noted. The left eye was dominant. Monovision was planned (RE -2.00 D, LE plano). Right eye cataract surgery with toric IOL implantation was performed (3 April 2023). Postoperatively, BCVA improved to 6/12 but diplopia developed despite well-positioned IOL. He proceeded with left eye surgery (12 May 2023), achieving BCVA 6/9.5, but remained symptomatic. Orthoptic assessment revealed comitant exotropia (2 PD) and right hypotropia (6 PD), consistent with decompensated squint worsened by monovision. Prisms were prescribed, but he remained intolerant. Given persistent diplopia, right IOL exchange to a monofocal non-toric IOL (aim plano) was performed (9 June 2025). Postoperatively, BCVA was 6/7.5+1 RE and 6/6-2 LE, but residual diplopia persisted (XT 4 PD, R hypotropia 4 PD).

Conclusions: This case highlights the risk of decompensating latent strabismus after monovision and toric IOL implantation. Even with an IOL exchange, fusion may not recover. Thorough preoperative orthoptic assessment and careful counselling are crucial for patients with pre-existing prism use or long-standing diplopia before refractive cataract surgery.

Abstract No.: 204967

Plus Is Not the Sole Indicator: Imaging Predictors of Retinopathy of Prematurity Progression – Analysis of 42,000 Babies in South-Indian Cohort

First Author: Prema SUBRAMANIAM

Co-Author(s): Abhishek DAS, Ninan JACOB, Parag K SHAH, Narendran VENKATAPATHY, Vivek KUMAR JHA

Purpose: To analyze the risk of development of Treatment Requiring ROP (TROP) in fundus imaging showing Peripheral Vascular Shunting (PVS) and Islands of Ischemic Retina (IIR) without plus

Methods: A retrospective analysis of tele-screening images captured using wide-field fundus imaging from January 2020 to July 2025, based out of a tertiary eye care centre, was included. Fundus images showing PVS and IIR were included. Demographic and clinical data such as gestational age (GA), birth weight (BW), post-conceptual age (PCA) at PVS, zone, number of quadrants of PVS, presence of IIR, and PCA at TROP were collected.

Results: A total of 42,000 babies screened. 795 babies (1.8%) had PVS, of which 103 babies (12.9%) developed TROP. The Mean GA and BW were 30.4 weeks and 1365 g, respectively. The Mean PCA at shunting was 33 weeks. The average number of Quadrants of PVS was 3.4, TROP in Zone 1 was seen in 37% and in Zone 2, it was seen in 63%. Average duration from shunting to TROP was 3.2 weeks, and IIR was noted in 46%. Subgroup analysis showed shunting in all 4 quadrants, and treatment duration was 2 weeks in zone 1 TROP.

Conclusions: ROP evolves in phases, from vasoconstriction to vasoproliferation, hampering the development of plus in some zone 1 disease. The presence of PVS and IIR should be considered as predictors of ROP progression, and follow-up should be scheduled closely.

Abstract No.: 204296

Posterior Scleral Reinforcement Combined Exotropia Surgery in High Myopia Children: An Observational Study

First Author: Haiyun YE

Purpose: To assess outcomes of combined posterior scleral reinforcement (PSR) and exotropia surgery in children with high myopia, evaluating axial length (AL)

control, best-corrected visual acuity (BCVA), retinal vascular changes, and strabismus correction.

Methods: This retrospective study analyzed 62 children (124 eyes; mean age 9.19 years) treated at Shanghai Children's Hospital (2021-2024) with ≥ 6 -month follow-up. AL, spherical equivalent (SE), BCVA, exotropia angle, and ETDRS-grid-based angio-OCT analysis of nine retinal zones were examined by standard ophthalmic assessments.

Results: Postoperatively, BCVA improved slightly, and AL showed a non-significant reduction. All grafts remained stable without complications. Exotropia angle decreased significantly ($p < 0.05$). Contrast sensitivity (CST) improved at high spatial frequencies (12/18 cpd bilaterally; 6 cpd right eye). Foveal and superior parafoveal vessel density increased significantly in both superficial (SCP) and deep capillary plexuses (DCP) ($p < 0.05$). FAZ area decreased significantly in SCP/DCP (right SCP most pronounced). Perifoveal vessel density (300 μ m) improved significantly except in the left DCP. No significant correlation existed between AL reduction and vascular improvements.

Conclusions: Our findings demonstrate that combined PSR and exotropia surgery effectively controls AL in pediatric high myopia while significantly improving retinal microcirculation. The angio-OCT detected vascular improvements appear more pronounced and immediate than AL changes, suggesting this modality may serve as a sensitive biomarker for monitoring myopia progression. Additionally, this combined approach successfully corrects ocular misalignment and enhances binocular visual function.

Abstract No.: 204351

Prediction and Research on Risk Factors for Premature Retinopathy in Low Birth Weight Fetuses Less Than 32 Weeks

First Author: Yi Yuan LIANG

Co-Author(s): Qiong WU

Purpose: To investigate the current situation of retinopathy of prematurity (ROP) in our hospital and analyze the influencing factors, so as to provide a scientific basis for the formulation of clinical treatment and preventive strategies.

Methods: A retrospective study of 322 cases of premature infants with a gestational age of < 32 weeks who underwent fundus examination at Northwest Women's and Children's Hospital from January 1, 2024, to January 1, 2025. The incidence of the ROP group was according to the screening results, and all premature infants were divided into an ROP group (160 cases, 160 eyes) and a non-ROP group (162 cases, 162 eyes). The general clinical data and perinatal-related data of the two groups of premature infants were compared, and the influencing factors of premature

infants with ROP were analyzed by multivariate logistic regression.

Results: A total of 322 preterm infants were included in this study, and the results of the fundus screening showed that 160 cases of ROP patients were detected, 162 cases of non-ROP, and the total incidence of ROP was 49.7% (60/322), of which 17.1% (55/322) required treatment; According to the international classification standard of ROP determine the severity (ROP is divided into 5 stages, stage I is the lightest, stage V is the most serious), in 160 eyes of ROP, 76 eyes (47.50%) were stage I, 48 eyes (30%) were stage II, 36 eyes (22.%) were stage III, combined with PLUS 42 eyes (26.3%), and no cases of stage IV and V were found. By comparing the clinical relevant data the two groups of preterm infants, it was concluded that there was no difference in gender, respiratory system diseases, cardiovascular system, digestive system, infection, hydrocephalus intestinal and extraintestinal nutrition methods, and whether breast-feeding was compared between the two groups of preterm infants (all $P > 0.05$), birth weight, gestational age, and 20-day weight gain value of the ROP group were all lower than those of the non-ROP group (all $P < 0.05$), and the number of days of oxygen inhalation and mechanical ventilation were higher than those of the non-ROP group, and the proportion of history asphyxia after birth, combined nervous system diseases, anemia, blood transfusion therapy, and neonatal sepsis were higher than those of the non-ROP group (all $P < 0.05$). Multivariate Logistic regression analysis showed that combined anemia (OR = 2.497, 95% CI 1.258-4.957, $P < 0.05$); combined blood transfusion therapy (OR = 2.316, 95% CI: 1.245-4.309, $P < 0.05$), more than 21 days of oxygen inhal (OR = 1.974, 95% CI: 1.022-3.814, $P < 0.05$, 20-day weight gain (OR = 0.997, 95% CI: 0.995-1.000, $P < 0.05$) was associated with an increased risk of ROP in preterm infants, and the larger gestational age of preterm infants was a protective factor for occurrence of ROP.

Conclusions: low gestational age at birth, oxygen ination, neonatal anemia and blood transfusion therapy are high risk factors

Abstract No.: 202921

Preliminary Efficacy of Intravitreal Faricimab for Type 1 Retinopathy of Prematurity: A Prospective Pilot Study

First Author: Haonan MA

Co-Author(s): Jie PENG, Peiquan ZHAO

Purpose: This study aimed to present the first report on the preliminary efficacy, reactivation rate, and safety of intravitreal faricimab (IVF), a novel bispecific antibody, in patients with type 1 retinopathy of prematurity (ROP).

Methods: This prospective, non-randomized, interventional pilot case series evaluated IVF (3 mg/0.025 mL) monotherapy in patients with type 1

ROP. The primary outcomes were treatment response, the reactivation rate, and the interval to reactivation. Secondary outcomes included the absence of ocular complications and significant systemic adverse events.

Results: A total of 10 eyes from 5 patients with type 1 ROP were enrolled, all of whom completed at least 16 weeks of follow-up. The mean gestational age at birth was 27.17 ± 0.60 weeks (range, 26.29–28.00 weeks), and the mean birth weight was 1132 ± 344 g (range, 910–1760 g). All eyes (100%) demonstrated complete regression of ROP with continued retinal vascularization. Two eyes (20%) experienced reactivation at 15 weeks after treatment and underwent repeat IVF injection. At the last follow-up, all eyes achieved complete vascularization or zone III, with no unfavorable anatomical outcomes, ocular complications, or systemic adverse events.

Conclusions: IVF monotherapy demonstrated good efficacy and safety in type 1 ROP and may provide lower reactivation rates and greater durability than ranibizumab. Larger prospective randomized controlled studies with longer follow-up are needed to confirm these findings.

Abstract No.: 206391

Preliminary Observation on the Effect of Hyperopic Defocus Lens on the Growth of Eye Axis in Children With Hyperopia

First Author: Jing ZHANG

Purpose: To observe the effect of a hyperopic defocus lens on the growth of the children's eye axis.

Methods: We collected data from children under 5 years old wearing corrective glasses for hyperopia, requiring emmetropic status ≤ 6.00 DS after cycloplegic refraction, astigmatism < 2.00 DC, and no anisometropia. Using multispectral topography, we examined retinal defocus and custom-made hyperopic refractive lenses. The study observed axial length (AL) changes before and after lens fitting.

Results: The study included 74 children (148 eyes), with 37 males (50%) and 37 females (50%). The average age at initial wear of hyperopic lenses was 6.78 years (range 5-11 years). Post-wear observation lasted 291 days (range 108-637 days). Pre-wear AL showed an average annual increase of 0.199 mm, while post-wear increased by 0.279 mm. Among 34 eyes with AL < 21 mm, the pre-wear increase was 0.133mm vs. post-wear 0.225 mm, representing a 69.2% increase. For 100 eyes with 21-23mm AL, pre-wear showed 0.212mm vs. post-wear 0.288 mm, indicating a 35.8% increase. In 14 eyes with AL > 23 mm, pre-wear showed 0.363mm vs. post-wear 0.348 mm, showing no significant effect. Eyes with equivalent spherical power (SER) ≤ 3 D showed pre-wear AL growth of 0.186mm vs. post-wear 0.290 mm, a 55.9% increase. For 70 eyes with 3-6 SER, pre-wear showed 0.198mm vs. post-wear 0.262 mm, a 32.3%

increase. In 54 eyes with SER $\geq 6D$, pre-wear showed 0.204mm vs. post-wear 0.296 mm, representing a 45.1% increase.

Conclusions: Hyperopic defocus lens can promote the growth of the eye axis in hyperopic children, and the effect is better when the eye axis is shorter and the equivalent spherical degree is greater, but it still needs to expand the sample and extend the follow-up time for observation.

Abstract No.: 200535

Prevalence of Pediatric Eye Disease in Peri-Urban Nepal: A Population-Based Study

First Author: Manisha **SHRESTHA**

Purpose: This prospective, population-based study was performed to assess the burden of pediatric eye disease in peri-urban Nepal.

Methods: A door-to-door census was conducted to identify all children aged 3-8 years in 3 geographic wards. Children were screened in the community using the Spot vision screener. Children who failed screening and a 10% random sample of those that passed screening were referred for a comprehensive eye examination by a masked pediatric ophthalmologist. Population-level prevalence data were calculated using probability sampling weights accounting for non-response.

Results: Of the 2,091 eligible children, 1731 (82.8%) were screened, of which 376 were referred: 213 (12.3%) who failed screening and 163 (9.4%) who passed screening (random sample). 317 children (84.30%) attended the referral visit. The most common diagnoses were visually significant refractive error (21.1%), amblyopia (15.1%), and strabismus (12.3%). The prevalence of visually significant childhood eye disease in Nepal was higher than that previously reported in high-income countries.

Conclusions: Rates of preventable pediatric vision loss are higher in low- and middle-income countries, but there is limited data regarding the prevalence of childhood eye disease at the population-level. Determining the prevalence of childhood eye disease in low-resource settings allows for a data-driven approach to create and evaluate screening strategies designed to detect preventable childhood vision loss.

Abstract No.: 207073

Quantification and Comparison of Saccade Dynamics in Subjects With Horizontal Strabismus Pre and Post Strabismus Surgery Using Novel REMOBI Device

First Author: Vinay **GUPTA**

Co-Author(s): Rebika, Zoi **KAPOULA**, Swati **PHULJEHE**, Rohit **SAXENA**

Purpose: The study aims to quantify and compare the saccade parameters (Latency, velocity amplitude, duration, and disconjugacy) using the novel REMOBI device before and after strabismus surgery.

Methods: This was a prospective observational study that enrolled individuals with horizontal strabismus, aged 20–40 years, with visual acuity better than 6/12, who underwent strabismus surgery (Resection & Recession) in one eye. Ethical approval and informed consent were obtained. Horizontal deviation was assessed using the prism-bar cover-test. Participants wore a head-mounted eye tracker that captured wide-angle saccadic eye movements at 200 Hz. Testing was conducted with the REMOBI device, generating a saccadic audiovisual target at a distance of 40cm. Eye movement analysis was carried out using AIDEAL software, evaluating saccadic parameters in both directions. All assessments were performed at baseline(pre-surgery) and 3-month post-surgery follow-up.

Results: Fifty-five subjects with a mean age of 28.2 ± 6.4 years were included with a baseline horizontal deviation of 51 ± 12 prism-dioptres. The deviation significantly reduced to 8 ± 4 prism-dioptres 3-month post-surgery. The saccadic parameters at baseline before surgery [amplitude(Right: $10.2 \pm 2.2^\circ$; Left: $12.2 \pm 2.6^\circ$), latency(Right: 291 ± 54 ; Left: 279 ± 48), duration (Right: 104 ± 26 msec; Left: 88 ± 19 msec), average velocity (Right: $57 \pm 26^\circ/\text{sec}$, Left: $68 \pm 23^\circ/\text{sec}$) and saccade disconjugacy (Right: 2.85 ± 1.3 ; Left: 3.9 ± 2.2)] were significantly different at 3-month post-surgery follow-up [amplitude (Right: $15.4 \pm 2.1^\circ$; Left: $15.8 \pm 2.2^\circ$), latency (Right: 253 ± 46 ; Left: 248 ± 39), duration (Right: 69 ± 14 msec; Left: 63 ± 12 msec), average velocity (Right: $165 \pm 31^\circ/\text{sec}$, Left: $188 \pm 35^\circ/\text{sec}$) and saccade disconjugacy (Right: 2.2 ± 1.1 ; Left: 2.4 ± 1.5)] ($P < 0.05$ for all).

Conclusions: The REMOBI device enables an objective and precise evaluation of saccadic parameters in individuals with horizontal strabismus. At the three-month follow-up, all recorded saccadic parameters demonstrated significant improvement, indicating enhanced binocular coordination and more synchronized eye movements following strabismus surgery.

Abstract No.: 200830

Reading Eye Movement Improvements After Strabismus Surgery in Children With Intermittent Exotropia: A Prospective Cohort Study

First Author: Yan YANG

Co-Author(s): Shuai CHANG, Jinen HOU, Jing LIU, Jiangtao LOU, Xinping YU

Purpose: To compare reading speed and associated eye movement patterns in children with intermittent exotropia (IXT) preoperatively and at six months postoperatively, relative to age-matched controls.

Methods: In this prospective cohort study, children aged 10–14 years with IXT completed the International Reading Speed Texts (IReST) under binocular viewing while eye movements were recorded using an EyeLink 1000 Plus eye tracker (SR Research, Canada) at baseline (preoperatively), 2-month, and 6-month postoperative follow-up. Age-matched visually normal children served as controls and were tested once. Eye movement metrics included mean fixation duration, total fixation count, number of regressions, saccade amplitude, saccade velocity.

Results: A total of 59 children with intermittent exotropia (IXT) (mean age: $11.54 \pm 1.69y$) and 37 healthy controls (mean age: $11.03 \pm 2.12y$) were enrolled. At baseline, fixation parameters did not differ significantly between groups; however, IXT patients exhibited reduced forward saccade velocity and poor vertical amplitude during reading ($p < 0.05$) than healthy controls. In 30 IXT patients reassessed 2 months after surgery, fixation measures remained stable, whereas total and forward saccade velocity and amplitude improved significantly ($p < 0.05$). At 6-month follow-up ($n = 18$), further enhancements in saccadic dynamics were observed, most notably in saccade velocity and vertical amplitude ($p < 0.05$, Cohen's $d > 0.9$).

Conclusions: Children with IXT showed impaired saccadic control despite stable fixation. Strabismus surgery led to significant improvements in saccadic dynamics, particularly at six months, suggesting potential benefits for reading performance and functional visual outcomes in clinical practice.

Abstract No.: 203605

Reading Performance in Children With Decompensated Exophoria: Improvement After Surgical Treatment

First Author: Ivan STEPANETS

Co-Author(s): Bibigul BEGEEVA

Purpose: Decompensated exophoria in children may compromise binocular vision and reduce reading performance. Because reading ability is fundamental for academic development, it is important to assess functional outcomes beyond standard visual acuity.

This study aimed to evaluate changes in maximum reading speed (MRS), critical print size (CPS), and reading acuity (RA) before and after surgical treatment in pediatric patients with decompensated exophoria.

Methods: A prospective study included 25 children (aged 7–10 years) diagnosed with decompensated exophoria who underwent surgical correction. Reading performance was assessed using standardized age-appropriate reading charts. Three parameters were measured: MRS (words per minute), CPS (smallest print size read fluently), and RA (minimum legible print size including errors). Assessments were performed preoperatively and 3 months postoperatively.

Results: All three reading parameters showed statistically significant improvement after surgery. • MRS increased from 112 ± 14 to 148 ± 17 words/min ($p < 0.005$). • CPS improved from 0.30 ± 0.05 to 0.23 ± 0.04 logMAR ($p < 0.005$). • RA improved from 0.22 ± 0.06 to 0.16 ± 0.05 logMAR ($p < 0.005$). These results demonstrate both enhanced fluency and improved fine visual function during reading following surgical alignment.

Conclusions: Surgical correction of decompensated exophoria in children aged 7–10 years not only restores ocular alignment but also significantly enhances functional reading performance. Improvements in MRS, CPS, and RA emphasize the importance of including reading assessments in postoperative evaluation. Early surgical intervention may provide substantial visual and educational benefits in this population.

Abstract No.: 200319

Rebalance Binocular Temporal Vision Improves the Stereopsis in Amblyopia

First Author: Changwu TAN

Co-Author(s): Longqian LIU, Tong LIU, Alexandre REYNAUD, Xi WANG

Purpose: To investigate the effects of binocular temporal balance on stereopsis, and the effect of rebalancing interocular delay (IOD) on stereopsis in patients with amblyopia.

Methods: We recruited sixteen healthy controls and ten adult amblyopes. Stereoscopic acuity (SA) was measured by using a digital stereopsis detection paradigm with two stimulus durations (50 and 200 ms). In controls, Binocular Temporal Imbalance (Con-BTI) was induced by placing neutral density filters (NDF; 1, 1.3, and 2 log units) over one eye, and then Binocular Temporal Rebalance (Con-BTR) was achieved by delaying stimulus onset in the fellow eye. In amblyopes, IOD was quantified with a mouse-tracking paradigm, and SA was assessed under three conditions: imbalanced IOD (Amb-BTI), IOD rebalanced by matched NDF (Amb-BTR-NDF), or by delaying stimulus onset in the faster eye (Amb-BTR-Delay).

Results: In controls, SA was elevated under Con-BTI at 1.3 and 2 NDFs relative to baseline ($P \leq 0.023$). Compared with Con-BTI, Con-BTR improved SA at 2 NDF ($P \leq 0.037$), while at 1.3 NDF the improvement reached significance at 200 ms ($P = 0.021$). In amblyopes, SA under Amb-BTR-Delay was significantly better than under Amb-BTI (50ms: 1609" versus 2295"; 200ms: 1186" versus 1650"; $P \leq 0.038$). No difference was found between Amb-BTR-NDF and Amb-BTI (50ms: 2059" versus 2295"; 200ms: 1680" versus 1650"; $P \geq 0.482$).

Conclusions: Binocular temporal imbalance impairs stereopsis, whereas rebalancing restores it in normal populations. In amblyopia, delaying stimulus onset in the faster eye to rebalance binocular temporal vision improves stereopsis. These findings highlight the potential interventions targeting binocular temporal balance to improve binocular function in amblyopia.

Abstract No.: 204894

Refractive and Corneal Astigmatism: Characteristics, Interrelationship, and Visual Impact in Children

First Author: Nguyen Le Hoang **NGUYEN**

Co-Author(s): Tuan Anh **LE**, Huy Dinh Minh **TRAN**

Purpose: To investigate the characteristics and interrelationship between refractive astigmatism (RA) and corneal astigmatism (CA), and their impact on visual performance in children.

Methods: A cross-sectional study examined 582 children (1164 eyes) aged 6-15 years in Ho Chi Minh City, Vietnam. Comprehensive examinations, including refraction, keratometry, axial length measurement, and optical aberration analysis, were performed. Vector analysis using J0 and J45 components assessed the RA-CA relationship.

Results: Mean refractive astigmatism was -1.26 ± 1.05 D while corneal astigmatism was -1.41 ± 0.91 D, with significantly higher values observed in females than males ($p < 0.01$). Mean keratometry was 43.38 ± 1.37 D (females: 43.67 ± 1.37 D vs males: 43.08 ± 1.30 D, $p < 0.01$). Astigmatism prevalence was 60.4%, predominantly with-the-rule (92.2%). A strong positive correlation was found between RA and CA ($r = 0.76$, $p < 0.001$), with vector analysis revealing a higher correlation for the J0 component compared to the J45 component. Best corrected visual acuity deteriorated with increasing astigmatism severity, from 0.005 LogMAR in non-astigmatic eyes to 0.048 LogMAR in severe astigmatism ($p < 0.001$). Strong negative correlations existed between both RA and CA with astigmatic aberrations ($r = -0.76$ and $r = -0.80$, respectively).

Conclusions: Corneal astigmatism is the primary determinant of refractive astigmatism in children, with

progressively decreasing visual acuity accompanying increasing astigmatism severity.

Abstract No.: 205277

Retinal and Microvasculature Characteristics in Schubert-Bornschein Congenital Stationary Night Blindness: An OCT and OCTA Study

First Author: Wenlong **HAO**

Co-Author(s): Mengya **HAN**, Yin **HU**, Songshan **LI**, Zhenbang **RUAN**, Chuqi **XIANG**, Xiao **YANG**

Purpose: To investigate the characteristics of retinal structure and macular microvasculature in Schubert-Bornschein congenital stationary night blindness (S-B CSNB) and identify their structure-function association.

Methods: Genetically confirmed CSNB patients and age, sex, spherical equivalent, axial length-matched control subjects underwent complete ophthalmic examination, optical coherence tomography (OCT), and optical coherence tomography angiography (OCTA). Retinal sublayer thickness and vessel density at foveal and parafoveal areas, as well as foveal avascular zone (FAZ) parameters, were measured using OCT and OCTA.

Results: A total of 44 eyes of 44 CSNB patients, comprising 21 with complete CSNB and 23 with incomplete CSNB, and 22 eyes of 22 control subjects were examined. The thickness of parafoveal inner retinal layers was thinner in the CSNB groups than in the control group, especially in the iCSNB group. The vessel density of the superficial vascular complex (SVC), as well as the FAZ parameters in the iCSNB group, were significantly lower compared with the cCSNB and control groups. Multivariate analysis revealed that the parafoveal thickness of the inner nuclear layer (INL) and the vessel density of the SVC were significantly correlated with BCVA in all CSNB patients.

Conclusions: This study revealed the retinal structural characteristics in subtypes of S-B CSNB. The structural deterioration of inner retinal cells and superficial retinal vessels best reflects the degenerative changes of S-B CSNB and its considerable relations with visual outcome, which will enhance the understanding of the functional status of this disease.

Abstract No.: 205122

Retinopathy of the Mature Newborn (ROM): A Consensus Statement on Diagnosis and Management

First Author: Daoman **XIANG**

Co-Author(s): Wensi **CHEN**

Purpose: To address the nosological challenge of classifying ROP-like retinal pathology in full-term newborns that does not fit existing definitions (e.g., FEVR), this consensus aimed to establish and standardize the new disease entity «Retinopathy of the Mature Newborn (ROM).»

Methods: The Children's Ophthalmology Committee of the China Medicine Education Association convened a panel of experts to develop a consensus through iterative discussions based on clinical experience and literature review. ROM was defined as retinal vascular dysplasia in infants born at ≥ 37 weeks' gestation, presenting with ROP-like features but not meeting full criteria for ROP or FEVR. Two subtypes were proposed: ROM-FEVR (with genetic background) and idiopathic ROM (iROM). A structured diagnostic pathway incorporating fundus examination, parental screening, and genetic testing was established, along with follow-up and treatment recommendations.

Results: The consensus formally recognizes ROM as a distinct clinical entity. It provides a diagnostic flowchart, 10 key recommendations, and illustrative case examples demonstrating the utility of the ROM classification. The new terminology helps avoid misdiagnosis and reduces the psychosocial burden associated with the "familial" label of FEVR, thereby improving clinician-family communication.

Conclusions: The introduction of ROM represents a significant advance in understanding retinal disorders in full-term newborns, addressing previous nosological confusion. This consensus offers a standardized framework for the diagnosis, subclassification, and management of ROM, facilitating early detection, appropriate intervention, and systematic follow-up, with important clinical and psychosocial implications.

Abstract No.: 203283

Retrolental Fibroplasia as a Biomarker for Stage 5B Familial Exudative Vitreoretinopathy

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Co-Author(s): Zupeng **LU**, Haonan **MA**, Jie **PENG**, Wenting **ZHANG**, Peiquan **ZHAO**

Purpose: To report the characteristics of retrolental fibrosis (RLF) for eyes with stage 5B familial exudative vitreoretinopathy (FEVR).

Methods: In this retrospective case series, RLF images at lensectomy from 26 patients (29 eyes) with FEVR were compared to those from 22 patients (28 eyes) with retinopathy of prematurity (ROP). The relative size of the RLF area and diameter to the cornea was determined. The presence or absence of RLF characteristics, including relatively small area (rsA) and diameter (rsD), dense (DE), not adherent to the ciliary processes (NA), and sharp edge (SE), were compared.

Results: The RLF in FEVR eyes had a smaller area (35.0% vs 47.7%, $P < 0.001$) and a smaller diameter (57.4% vs 68.0%, $P = 0.002$) than those in ROP eyes. The rsA was set at $<42.5\%$ of the area of the cornea, and the rsD was set at $<60.2\%$ of the horizontal diameter of the cornea. The rsA or rsD was attributed to the diagnosis of FEVR ($P = 0.008$, $P < 0.001$) rather than the presence of prior treatment, age of lensectomy, or complications

of the anterior segment. The FEVR eyes had more frequent characteristics than ROP eyes for DE (55.2% vs 25.0%, $P = 0.031$), NA (48.3% vs 0.0%, $P < 0.001$), and SE (58.6% vs 28.6%, $P = 0.033$). The combination of NA and rsD had a sensitivity of 65.5% and specificity of 92.9% with the area under the curve of 0.805.

Conclusions: The combination of NA and rsD can be a specific biomarker for patients with stage 5B FEVR.

Abstract No.: 204850

Risk Factors and Prevalence of Retinopathy of Prematurity in Very Low Birth Weight Preterm Infants: A Meta-Analysis

First Author: Wensi **CHEN**

Co-Author(s): Daoman **XIANG**

Purpose: The present study explored the risk factors and prevalence of retinopathy of prematurity in very low birth weight preterm infants by a meta-analysis method.

Methods: PubMed, Embase, Cochrane Library, and Web of Science databases were searched with a cut-off date of 15 March 2024. Stata 15.0 was used to merge and analyze the data, and the quality of the included studies was assessed using the Newcastle-Ottawa Scale.

Results: Fourteen articles (including three case-control studies and 11 cohort studies) involving 12,666 newborns were finally included. The results of the meta-analysis found that blood transfusion [OR=1.83, 95%CI (1.42, 2.35), $P=0.001$], gestational age [OR=1.67, 95%CI (1.27, 2.20), $P=0.001$], gestational weight at birth [OR=1.05, 95%CI (1.02, 1.08), $P=0.02$], sepsis [OR=1.47, 95%CI (1.26, 1.71), $P=0.02$], intraventricular hemorrhage [OR=1.67, 95%CI (1.25, 2.22), $P=0.001$], lung disease [OR=2.08, 95%CI (1.37, 3.17), $P=0.001$], necrotizing small bowel colitis [OR=1.71, 95%CI (1.24, 2.36), $P=0.001$], and congenital arterial ductus arteriosus [OR=1.72, 95%CI (1.31, 2.25), $P=0.003$] were risk factors for retinopathy of prematurity in very low birth weight preterm infants.

Conclusions: Based on the current study, we found that retinopathy of prematurity should be prevented early in very-low-birth-weight preterm infants with a combination of blood transfusions, small gestational weeks, low gestational weight, sepsis, intraventricular hemorrhage, lung disease, necrotizing small bowel colitis, and congenital arterial ductus arteriosus.

Abstract No.: 201475**Risk Factors and Surgical Options for Recurrent Retinal Redetachments in an Australian Paediatric Population***First Author: Thuan NGUYEN**Co-Author(s): Lawrence LEE, Cindy LIU, Shaheen SHAH, Abhishek SHARMA*

Purpose: To determine risk factors for recurrent paediatric retinal detachments (RD) from a tertiary paediatric ophthalmology referral centre.

Methods: Retrospective study of all children ≤ 18 years old who underwent RD repair at the Queensland Children's Hospital, Brisbane, from November 2014 to December 2022. Primary outcome measures were anatomic success and best corrected visual acuity (BCVA).

Results: Sixty-eight patients, for a total of 76 eyes (75% male) were included. Median age was 11 (IQR 8.5-13). 42 eyes (55.3%) had anatomic reattachment after initial surgery, improving to 54 eyes (71.1%) at final follow-up. Multivariate analysis found younger age (OR 1.14, $p=0.047$) and proliferative vitreoretinopathy (OR 2.85, $p=0.037$) predictive of recurrent detachment, while protective factors included scleral buckle (SB) only (OR 0.16, $p=0.036$) and combined vitrectomy and scleral buckle (PPV/SB) (OR 0.33, $p=0.050$). Developmental ocular conditions (OR 5.00, $p=0.035$) were a risk factor for final anatomic detachment. Presence of only one retinal tear (OR 0.05, $p=0.030$), SB only (OR 0.05, $p=0.015$) and combined PPV/SB (OR 0.15, $p=0.020$) were protective against recurrent RD at final follow up. Final BCVA was inferior in the PPV group compared to both SB only ($p<0.001$) and combined PPV/SB groups ($p=0.039$).

Conclusions: We identified multiple protective and risk factors for recurrent retinal detachments in a complex paediatric cohort, guiding prognosis and post-operative follow-up timing.

Abstract No.: 201007**Safety and Efficacy of Low-Dose Atropine in Nepalese Children With Progressive Myopia: Phase – II and III Report***First Author: Namrata GUPTA**Co-Author(s): Srijana ADHIKARI, Manish POUDEL*

Purpose: To evaluate the progression of myopia following cessation of low-dose atropine 0.01% (washout phase) and to determine the efficacy and safety of retreatment in Nepalese children over a 5-year follow-up.

Methods: This retrospective observational study was conducted at Tilganga Institute of Ophthalmology as part of the Nepal Atropine Myopia Study. Children aged 6–16 years with baseline myopia -2.00 D to -6.00 D and annual progression >0.5 D were enrolled.

Phase I involved 2 years of atropine treatment, Phase II was a 1-year washout, and Phase III included 2 years of retreatment for children with progression >0.5 D during Phase II. Main outcome measures are Spherical equivalent (SE) and axial length (AL) progression at years 3 (washout) and 5 (retreatment).

Results: Of 200 children, 105 (52.5%) completed follow-up. During washout, 52 (49.5%) showed >0.5 D progression, while 53 (50.5%) remained stable. Forty-four progressing children restarted atropine. In the progressive group, mean SE changed from -4.4 D (year 2) to -5.3 D (year 3) and -5.8 D (year 5). Mean AL increased from 25.1 mm to 25.3 mm and 25.5 mm, respectively. Progression rates slowed significantly after retreatment. No major ocular or systemic side effects were reported.

Conclusions: Low-dose atropine 0.01% does not completely halt myopia but significantly reduces progression, particularly after retreatment, supporting its safety and efficacy as a long-term myopia control strategy in children.

Abstract No.: 206397**Sandhoff Disease Presenting With Cherry-Red Spots in a Pediatric Patient: A Case Report***First Author: Kaixuan CUI**Co-Author(s): Zhenquan WU, Guoming ZHANG, Xinyu ZHAO*

Purpose: To report a rare case of infantile Sandhoff disease initially detected through fundus abnormalities and confirmed by genetic testing, highlighting the role of ophthalmic examination in the diagnosis of systemic neurodegenerative disorders.

Methods: A 14-month-old boy presented with developmental regression and abnormal fundus findings. Clinical history, systemic evaluation, ophthalmic examination, fundus photography, fundus fluorescein angiography (FFA), optical coherence tomography (OCT), and genetic analysis were performed.

Results: Fundus examination revealed bilateral macular "cherry-red spots." OCT demonstrated subtle inner retinal edema with indistinct retinal layers. Systemic examination showed generalized hypotonia and global developmental delay, without cardiac or pulmonary abnormalities. Genetic testing identified compound heterozygous mutations in the HEXB gene, confirming the diagnosis of infantile Sandhoff disease.

Conclusions: Cherry-red spots are a key ocular hallmark of lysosomal storage diseases. This case emphasizes the importance of detailed ophthalmic evaluation in infants with unexplained neurodevelopmental delay. Early recognition and genetic confirmation of Sandhoff disease facilitate accurate diagnosis, appropriate counseling, and multidisciplinary management.

Abstract No.: 206187

Spatial Distribution and Type Differences of Binocular Suppression in Patients With Concomitant and Intermittent Exotropia: A Multidimensional Clinical Study Based on Dynamic Binocular Visual Function Reconstruction

First Author: Zhengzheng WU

Purpose: To compare the preoperative binocular suppression levels between patients with concomitant exotropia (CXT) and intermittent exotropia (IXT), and to explore the spatial distribution characteristics of suppression in the foveal and extrafoveal regions, aiming to provide a basis for precise preoperative evaluation and personalized treatment strategies.

Methods: A total of 170 patients with exotropia were included, consisting of 106 CXT patients and 64 IXT patients. Preoperatively, binocular suppression was quantitatively assessed using a binocular separation visual system, evaluating suppression in the foveal (0.5°) and extrafoveal (10°) regions. The suppression level was classified into four grades based on perceptual integration: R0 (no suppression), R1 (mild suppression), R2 (moderate suppression), and R3 (unilateral suppression). The Mann-Whitney U test was used to compare the differences in suppression levels between the two groups.

Results: Preoperatively, the suppression levels in both the foveal and extrafoveal regions were significantly higher in CXT patients than in IXT patients (foveal: 2.64 ± 0.62 vs. 2.36 ± 0.84 , $p=0.022$; extrafoveal: 1.84 ± 1.28 vs. 1.23 ± 1.34 , $p=0.005$). This suggests that CXT patients experience more severe and widespread binocular suppression. Moreover, suppression levels in the foveal region were generally higher than in the extrafoveal region for all patients.

Conclusions: Binocular suppression in exotropia patients exhibits significant type-specific and spatial distribution-specific characteristics. CXT patients have more severe suppression than IXT patients, with higher suppression in the foveal region compared to the extrafoveal region. These baseline differences suggest that CXT and IXT may represent different levels of binocular visual system impairment. Therefore, precise preoperative suppression evaluation is crucial before planning surgical and rehabilitation strategies.

Abstract No.: 206249

Spectacles Induced Esotropia in Myopic Patients

First Author: Heba FOUAD

Co-Author(s): Ahmed AWADEIN

Purpose: To introduce an unreported group of myopic children who present with spectacle-induced Esotropia in the absence of a high AC/A ratio, and to report the

results of bilateral medial rectus recession in this group of patients.

Methods: A retrospective study included 12 patients with ET up to 50 PD induced by spectacle correction. Patients were orthotropic without spectacles, and the age range was from 5 to 19 years, with pure horizontal muscle imbalance. The AC/A ratio was normal. MRI imaging for assessment of any extra-ocular muscle pathology was performed, and the results were normal. Patients with a history of extra-ocular surgeries, neurological abnormalities, vertical muscle imbalance >5 pd, oblique muscle dysfunction, and paralytic or restrictive strabismus were excluded. Patients were managed by bilateral medial rectus recession, using Kenneth Wright's surgical dose table. The study was conducted at the Aboryosh Pediatric Hospital, Cairo University. Success was defined as orthotropia or small-angle ET <10 pd.

Results: No intraoperative complications were recorded, spherical equivalent of refractive error ranged from -7.25 D to -14.50 D OD, and from -6.25 D to -16.50 OS. MR recession ranged from 5 to 7.5 mm. Six months post-operatively, 10 patients (83.3%) were orthotropic, and 2 (16.7%) patients showed residual ET with glasses of 25 PD.

Conclusions: Some myopic patients might present with ET induced by spectacle correction, in the absence of high AC/A ratio and normal MRI of extra-ocular muscles. Bilateral medial rectus recession seems to be a good option for the treatment of esotropia induced by spectacle correction in myopic patients.

Abstract No.: 201605

Spectrum of Congenital Corneal Staphyloma: Clinicopathologic Insights and Genetic Associations in a Case Series Undergoing Keratoplasty

First Author: Sonam YANGZES

Co-Author(s): Amit GUPTA, Vipasha SHARMA

Purpose: To describe the clinical and histopathological spectrum of congenital corneal staphyloma (CCS) in a series of rare cases, including genetic correlations and surgical outcomes following keratoplasty.

Methods: This retrospective case series includes six patients presenting with congenital corneal staphyloma managed at a tertiary eye care center. The cohort comprised two cases of corneal dermoid with central staphylomatous extension, one case of corneal keloid, one syndromic case associated with Kabuki syndrome, and two cases harboring BMP4 gene mutations. All patients underwent penetrating keratoplasty or tectonic grafting, and detailed anterior segment imaging, systemic evaluation, and genetic testing were performed where indicated. Excised corneal buttons were subjected to histopathological examination.

Results: All cases presented at birth with dense corneal opacification, protrusion, and associated ocular anomalies. Histopathology revealed dense fibrovascular proliferation in dermoid and keloid cases, disorganized stromal architecture with absent Descemet's membrane and endothelium in BMP4-associated staphylomas, and collagenous thickening in the Kabuki-associated case. Genetic testing confirmed pathogenic or likely pathogenic variants in BMP4 in two cases and Kabuki syndrome in one. Surgical intervention led to globe preservation and improved cosmesis in all cases, though visual prognosis remained guarded due to associated anterior segment dysgenesis and microphthalmia.

Conclusions: Congenital corneal staphyloma represents a phenotypically and genetically heterogeneous entity. Early surgical intervention is essential for anatomical restoration, while histopathology and genetic work-up provide valuable insights into underlying pathomechanisms. A multidisciplinary approach is critical for diagnosis, management, and counseling in these complex pediatric cases.

Abstract No.: 206015

Strabismus Following Endonasal Sinus Surgery (ESS): A 10-Year Retrospective Analysis of Clinical Profile and Outcomes

First Author: Lily **MYINT**

Co-Author(s): Manjushree **BHATE**

Purpose: To evaluate the clinical characteristics, ocular motility deficits, strabismus patterns, and management outcomes in patients developing strabismus following Endonasal Sinus Surgery (ESS).

Methods: This retrospective study was conducted over 10 years (2015–2025) at a tertiary eye care center. Demographic details, type and severity of ocular motility restriction, strabismus pattern, imaging findings, and management (surgical, prisms, or observation) were documented. Outcomes were assessed in terms of ocular alignment and symptomatic improvement.

Results: Fifteen patients were identified, with a male-to-female ratio of 2.7:1 (11:4) and a mean age of 41.5 years (range 24–66 years). Ocular motility limitation was present in (n=13; 87%) patients. Limitation of adduction was most commonly involving the medial rectus (n=8; 53%). Large-angle exotropia was the predominant pattern, with a deviation range of 30–75 prism diopters (PD). Management varied: 6 patients (40%) underwent strabismus surgery, showing improvement but residual deviation in most; 1 patient (7%) was managed with prisms, achieving partial symptomatic relief; and 6 patients (40%) were observed conservatively, some showing spontaneous resolution. 2 patients (13%) were lost to follow up and did not receive further management. Despite

intervention, restrictive cases often showed incomplete recovery.

Conclusions: Strabismus is a rare but significant complication following Endonasal sinus surgery, typically presenting as restrictive large-angle exotropia. Surgical correction and prisms provide functional improvement, though complete resolution is uncommon. Early recognition and multidisciplinary management are crucial to optimize outcomes.

Abstract No.: 200945

Superior Oblique Tucking Combined With the Ipsilateral Inferior Oblique Muscle Botulinum Toxin Injection: A New Strategy for Treatment of Superior Oblique Palsy

First Author: Xinping **YU**

Purpose: This study evaluates intraoperative botulinum toxin injection to the ipsilateral inferior oblique during superior oblique tucking (SOT) to minimize postoperative regression and the risk of iatrogenic Brown syndrome.

Methods: This retrospective study analyzed 15 patients with Knapp II or III SOP undergoing either isolated SOT (n=8) or SOT combined with ipsilateral inferior oblique botulinum toxin injection (n=7). Vertical deviation, abnormal head posture (AHP), and iatrogenic Brown syndrome incidence were assessed at short-term (<2 weeks) and long-term (8–12 months) follow-up.

Results: Seven patients in the combined group aged 19.14 ± 14.92 years, with 4 males (57.14%) and followed 9.43 ± 1.81 months, which similar as the 8 patients in SOT group of 18.25 ± 17.56 years and 5 males (62.50%) with followed 9.86 ± 1.68 months. At the final visit, combined group gained significantly lower distance vertical deviation at primary position (2.14 ± 2.64 PD vs. 7.57 ± 5.19 PD; $P=0.04$), and in down gaze (1.57 ± 2.50 PD vs. 9.71 ± 5.80 PD; $P=0.02$). Greater vertical deviation correction (14.71 ± 6.24 PD vs. 5.57 ± 5.56 PD; $P=0.03$) and superior stability in maintained correction were observed in combined group. Additionally, this group exhibited enhanced long-term AHP improvement (85.71% vs. 14.29%; $P=0.03$) and a lower incidence of iatrogenic Brown syndrome (28.57% vs. 85.71%; $P=0.05$).

Conclusions: Combination of SOT with ipsilateral inferior oblique botulinum toxin injection significantly improved vertical deviation correction (particularly in down gaze), improved abnormal head posture, and mitigated the risk of iatrogenic Brown syndrome.

Abstract No.: 206183

Supra-Maximal Strabismus Surgery in Internuclear Ophthalmoplegia: A Case Series

First Author: Leena PATEL

Co-Author(s): Maria THEODOROU

Purpose: Internuclear Ophthalmoplegia (INO) frequently causes large-angle exotropia with diplopia. Any lesion affecting the medial longitudinal fasciculus, eg, demyelinating diseases and cerebrovascular events, can cause INO. Botulinum toxin or 'standard' strabismus surgery often causes unsatisfactory outcomes, although Adams et al(2009) and Roper-Hall et al (2008) published small successful case series over 15 years ago. We present the outcomes of 4 patients undergoing supra-maximal strabismus surgery.

Methods: Retrospective case notes review of patients who have had supra-maximal surgery for bilateral INO between 2021 and 2024.

Results: All patients had bilateral INO secondary to Multiple Sclerosis. Mean age was 45 years (39-57) with varying degrees of adduction deficit (-2 to -4). Three patients had bilateral squint surgery, and one had unilateral. All had medial rectus resect of 8-10mm, and lateral rectus recessions (>8mm). Mean pre-operative exotropia(XT) for near fixation was 60 prism dioptres(PD) (range 50-85) and for distance 50PD(range 40-60). Postoperatively, this reduced to 5PD XT (range 6ET(esotropia)-14XT), and at distance it was 5PD ET (20ET-4XT). 1 year postoperatively, 3 had a much smaller residual XT, and 1 had a controlled exophoria with proven fusion. 3 did not require further treatment, 1 is undergoing botulinum toxin injection (unilateral lateral rectus rather than bilateral pre-op).

Conclusions: Our case series, though limited by small numbers, supports that supra-maximal surgery can lead to significant improvement in ocular alignment, resolution of diplopia, and restoration of binocular single vision. Supra-maximal surgery should be considered as a treatment option in patients with bilateral INO.

Abstract No.: 201864

Surgical Management and Visual Outcomes in Pediatric Stickler Syndrome: A Retrospective Single-Center Study

First Author: Yaojia HU

Co-Author(s): Jing TIAN

Purpose: Stickler syndrome is a rare hereditary connective tissue disorder characterized by high myopia, vitreous anomalies, and early-onset retinal detachment, frequently resulting in significant visual impairment. This study aimed to characterize the demographic and genetic features of hospitalized children with Stickler syndrome, document their family histories and socioeconomic context, describe surgical treatment pathways and costs, and evaluate

postoperative outcomes. Our goal was to generate evidence to inform early screening strategies and improve the long-term management of this rare but vision-threatening disorder.

Methods: We conducted a retrospective study of 19 children (29 hospital admissions) diagnosed with Stickler syndrome at a tertiary ophthalmic center between 2022 and 2024. Demographic characteristics, family history, genetic testing results, surgical interventions, costs, and visual outcomes were collected. Univariate analyses were performed to compare preoperative and postoperative visual acuity and intraocular pressure.

Results: Most patients were full-term (94.7%), singleton births (89.5%), and resided in rural areas (68.4%). while vitrectomy and other advanced procedures may be performed in patients with retinal detachment or other severe complications. Mean intraocular pressure remained within the normal range perioperatively in both eyes (right eyes: preoperative 17.60 ± 2.52 mmHg and postoperative 20.23 ± 0.84 mmHg; left eyes: preoperative 16.63 ± 2.37 mmHg and postoperative 20.75 ± 2.03 mmHg; $P < 0.01$). The median interval between initial hospitalization and disease progression was 7.57 months.

Conclusions: Pediatric Stickler syndrome requires early recognition and proactive management to prevent severe visual loss. Our findings underscore the importance of family-based screening, timely surgical intervention, and comprehensive follow-up.

Abstract No.: 205866

Surgical Management of Type II Monocular Elevation Deficit Associated With Horizontal Deviation Using Knapp's Procedure Combined With Resection

First Author: Nithya SRIDHARAN

Co-Author(s): Antony Arockiadass BASKARAN

Purpose: This retrospective study shows the outcome of adding resection on one vertically transposed horizontal rectus for correcting horizontal strabismus in type II monocular elevation deficit (MED).

Methods: Ten cases of type II MED with horizontal strabismus who underwent full tendon Knapp's along with resection of the medial rectus for exotropia and the lateral rectus for esotropia were taken. All patients had ptosis with elevation restriction. The resection is done for 3mm in the medial rectus or lateral rectus based on the horizontal deviation. 2 cases had posterior fixation sutures done. The postoperative follow-up was at 4 weeks and 6-12 months.

Results: In the esotropia group, the mean vertical deviation for distance and near were 33.0pd and 27.60pd, which reduced to 4.0 and 4.80pd postoperatively. The mean horizontal deviation correction was 18.20pd /18.0pd, decreased to

10.20pd/11.60 postoperatively for distance and near. Exotropes had vertical deviation corrected preoperatively (distance- 30.20pd / near- 31.80pd) to postoperative values (distance- 14.60pd / near- 10.40pd). Horizontal deviation in exotropia reduced to 8.80pd / 12.4pd from 10.40 / 18.6pd for distance / near, respectively. Overall, the mean vertical correction was 29 PD (distance) and 23 PD (near) in esotropes, and 16 PD and 21 PD in exotropes. Horizontal correction averaged 8 PD for distance in exotropes and ~2 PD for near in both groups.

Conclusions: Knapp's procedure with adjunctive horizontal rectus resection provides effective vertical correction in MED with associated horizontal deviation. Horizontal correction was minimal but clinically useful, with no significant adverse effects noted during follow-up.

Abstract No.: 203822

Surgical Outcome and Saccadic Parameters Following True Muscle Transplantation in Horizontal Comitant Strabismus

First Author: Chavi **HARKAWAT**

Co-Author(s): Rebika **DHIMAN**, Deepak **GUPTA**, Vinay **GUPTA**, Rohit **SAXENA**

Purpose: To investigate the surgical outcome and saccadic parameters following true muscle transplantation in horizontal comitant strabismus.

Methods: Thirty participants (15 with exotropia and 15 with esotropia) with best-corrected visual acuity of $\geq 6/18$ in both eyes and horizontal strabismus of ≥ 60 prism diopters (PD) underwent augmented R&R with muscle transplantation in one eye. Saccadic parameters were assessed using the novel REMOBI device. Eye movement analysis was performed using AIDEAL software to evaluate saccadic dynamics. Vertical palpebral aperture width (PAW) was measured in primary gaze, abduction, and adduction. Comparison of pre- and post-operative primary deviation, vertical PAW, duction limitation, and saccadic parameters was evaluated (baseline and 6-month follow-up).

Results: The mean baseline deviation of 74 ± 9 PD improved significantly to 6 ± 2 PD postoperatively ($p < 0.05$). No significant changes were observed in vertical PAW ($p > 0.05$), and minimal postoperative limitation of extraocular movements was noted. Saccadic parameters of the operated eye showed significant improvement at 6 months compared with baseline ($p < 0.05$). 13 % (2/15) of patients with esotropia developed consecutive exotropia, and 26% (4/ 15) and 13 % (2/15) of patients with exotropia and esotropia had residual deviation of mean 25 ± 6 PD and 25 ± 7 PD, respectively.

Conclusions: Augmented R&R with true muscle transplantation not only achieves satisfactory ocular alignment in large-angle strabismus but also restores

coordinated extraocular movements including saccades.

Abstract No.: 201181

Surgical Outcomes of Slanted Bilateral Lateral Rectus Recession in Children With Intermittent Exotropia With Convergence Insufficiency: A Comparative Analysis Based on Preoperative Deviation Angles

First Author: Bo Young **CHUN**

Co-Author(s): Soolienah **RHIU**

Purpose: This study aimed to investigate the efficacy of slanted bilateral lateral rectus recession (S-BLR) in children with intermittent exotropia with convergence insufficiency (IXT-CI), analyzing outcomes based on preoperative deviation angles.

Methods: This retrospective study included 115 pediatric patients with IXT-CI who underwent S-BLR and were followed up for a minimum of one year postoperatively. Patients were divided into two groups based on preoperative deviation angles: the moderate-angle group (Group 1, $n=62$), having patients with distant deviation angles ≥ 20 prism diopters (PD) and ≤ 30 PD; and the large-angle group (Group 2, $n=53$), having patients with distant deviation angles ≥ 35 PD. The surgical outcome measures included postoperative deviation angles, final success rates, the impact of the slanting procedure, and the effect/dose ratio.

Results: Statistical analysis revealed significant inter-group differences in mean deviation angles at distance throughout the postoperative period ($p < 0.05$). However, final success rates were comparable between the two groups ($p = 0.314$). Group 2 demonstrated significantly higher values for both the impact of slanting procedure (9.7 PD/mm vs. 7.3 PD/mm, $p < 0.0001$) and the effect/dose ratio (2.20 PD/mm vs. 2.06 PD/mm, $p = 0.014$) compared to Group 1.

Conclusions: The enhanced surgical effect observed in the large-angle group, as evidenced by greater impact of slanting procedure and effect/dose ratio, suggests that S-BLR may be particularly efficient in IXT-CI patients with larger preoperative deviations.

Abstract No.: 204921

The First Structured Orthoptic Binocular Vision Training Program in Hong Kong: Bridging Service Gaps in the Management of Intermittent Exotropia and Amblyopia

First Author: Sze Lok Gabriela **CHONG**

Co-Author(s): Kam Chuen **CHAN**, Simon Tc **KO**, Po Lin **LEOW**, Peter **LEUNG**, Tsz Hin **MAK**, Alan **TSANG**, Ho On **WONG**, Patrick Kw **WU**

Purpose: Intermittent exotropia (IXT) and amblyopia are prevalent childhood visual disorders in Hong Kong. Long-standing service gaps, including limited orthoptic

manpower and inadequate progress monitoring, have led to deteriorating alignment, impaired binocular vision development, and suboptimal visual outcomes. To address these challenges, a Structured Orthoptic Binocular Vision Training Program was launched in 2020 across two public hospitals.

Methods: The program integrates individualized training plans including convergence, anti-suppression, and fusional vergence exercises, a standardized grading system for exotropia control, enhanced compliance monitoring, and active parental engagement. Clinical and service outcomes were assessed through retrospective analysis of patient records and parental feedback collected between 2020 and 2024.

Results: A total of 542 patients participated, including 450 with IXT and 92 with amblyopia. Among amblyopic patients, 95% achieved the best corrected visual acuity of 1.0. For IXT cases, 96% showed improved fusional range and squint control. Overall, 2,460 treatment sessions were delivered. Four percent of IXT patients transitioned to surgical intervention, while 12% exited the program with stable alignment. The standardized grading system enabled the appropriate discharge of improved patients from the strabismus surgery waiting list, reducing its burden by 80%. Parental satisfaction exceeded 96%, with reporting observable progress and enhanced functional outcomes. Personalized rehabilitation strategies and consistent encouragement were keys to maintaining treatment adherence.

Conclusions: This structured program effectively bridges service gaps in IXT and amblyopia management. It enhances treatment compliance, improves binocular vision outcomes, and optimizes surgical resource allocation. The model demonstrates scalability and sustainability, offering a promising framework for strengthening orthoptic care standards in Hong Kong.

Abstract No.: 201820

The Outcome and Patient Satisfaction of the Nasal Transposition of the Split Lateral Rectus Muscle for Oculomotor Nerve Palsy

First Author: Miao KONG
Co-Author(s): Junhong LI

Purpose: To evaluate the outcomes and complications associated with nasal transposition of the split lateral rectus muscle (NTSLR) procedure, and assess the satisfaction of the patients and/or patients' parents with respect to the surgery outcome in patients with complete oculomotor nerve palsy.

Methods: This is a retrospective study. All patients with complete oculomotor nerve palsy treated between February 2016 and July 2023 with Y splitting and transposition of the lateral rectus muscle to the medial rectus muscle were included. The patient satisfaction was assessed using a 5 Likert scale.

Results: A total of 7 patients were included. Patients had a preoperative horizontal deviation ranging from -90 to -120PD. Of the 7 patients, one achieved orthotropia, two were slightly overcorrected (+8PD, +15PD), and others were undercorrected (-15PD, -20PD) in the primary position after surgery. Those three patients with orthotropia or overcorrection had satisfactory appearance in the primary position at the last visit, but they were not satisfied with the almost fixed eyeball since they had an obvious restriction in abduction and had little improvement in adduction. However, the other four patients with slightly undercorrection in the primary position after the operation were more satisfied since there was no severe restriction of both abduction and adduction.

Conclusions: Acceptable cosmetic results can be achieved in the treatment of complete oculomotor nerve palsy by transporting the split lateral rectus muscle to the medial rectus muscle. In view of patient satisfaction, slightly undercorrection is better than orthotropia and overcorrection.

Abstract No.: 208425

The Relationship Between the Appearance Features of Children's Eyelids and Astigmatism

First Author: Haihua LIU
Co-Author(s): Rongjun LIU

Purpose: This study aimed to explore the relationship between the appearance features of children's eyelids and astigmatism, and to investigate potential predictive factors for astigmatism based on eyelid appearance.

Methods: This cross-sectional survey included 3- to 6-year-old children from the Department of Ophthalmology Center, Peking University First Hospital. Clinical data, including external eye images and personal information, were collected. Six factors representing the appearance features of children's eyelids were defined and analyzed for their correlation with astigmatism. These factors included palpebral fissure tilt angle (AIP), ratio of the inner canthal distance to the pupillary distance (EFD/PD), angle between the lower eyelid margin's horizontal line and the line connecting the inner canthus (ALEIE), ratio of the area of the upper eyelid covering the cornea to the total corneal area (UCATA), upper eyelid lash tilt angle (AUEI), and ratio of the vertical to horizontal diameter of the cornea (VDHD). The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Peking University First Hospital.

Results: Thirty participants were included in the study. Statistically significant differences were found in UCATA, AUEI, ALEIE, and EFD/PD between different astigmatism groups ($P < 0.001$). Multiple logistic regression analysis indicated correlations between UCATA, AUEI, and EFD/PD factors and astigmatism.

Specifically, UCATA ($\beta=-3.28$, $P<0.001$), AUEI ($\beta=1.46$, $P<0.001$), and EFD/PD ($\beta=0.28$, $P<0.001$) were significantly associated with astigmatism.

Conclusions: The study suggests that UCATA, EFD/PD, and AUEI could be predictive factors for astigmatism. These findings may enhance the understanding of the complex interplay between eyelid morphology, eyelid pressure, and corneal astigmatism.

Abstract No.: 201811

The Safety and Effectiveness of 0.03% Tacrolimus Ointment in Pediatric Patients Presenting With Vernal Keratoconjunctivitis

First Author: Muhammad Ajmal **CHAUDHARY**

Purpose: To evaluate the safety and effectiveness of tacrolimus 0.03% ointment in treating pediatric patients with vernal keratoconjunctivitis (VKC).

Methods: This prospective, interventional study included 60 children with bilateral VKC. Patients in the tacrolimus cohort were treated with 0.03% tacrolimus ointment twice daily for 60 days, followed by once daily application for 60 days, and then once on alternate days for two months. The control group got topical 0.1% fluorometholone drops, thrice a day for two weeks, after which the dose was gradually tapered for the next two weeks. During the follow-up period, both groups received topical 0.1% olopatadine eye drops twice daily. Improvement in symptoms and signs was documented among the groups to measure the success of the therapy, and their severity was rated using a four-point scale.

Results: This study included 60 children with bilateral VKC. The mean age of both groups was similar. Papillary hypertrophy and conjunctival hyperemia were the most common signs, while itching was the most frequent symptom. After treatment, symptoms and signs decreased significantly in both groups. However, at three and six months, the group treated with 0.03% tacrolimus ointment showed a more notable improvement in symptom and sign scores. The tacrolimus group tolerated the treatment well, with only a few complaining of a stinging sensation. The control group experienced one incidence of elevated intraocular pressure.

Conclusions: Tacrolimus 0.03% ointment is an effective treatment for VKC in pediatrics. This treatment may help chronic VKC patients and lower the risk of steroid-related problems in these patients.

Abstract No.: 203339

The Study of Peripheral Refractive Profile in Children With Myopia

First Author: T S **SURENDRAN**

Co-Author(s): Sumita **AGARKAR**, Akshay **BADAKERE**, Neha Nitin **KOTWAL**, Asha **THARSIS**

Purpose: To study the profile of children with myopia and to investigate the distribution and relationship between central and peripheral refractive error.

Methods: This cross-sectional study looked at data from 60 children between the ages of 8 and 14. The data included central Spherical equivalent and peripheral spherical equivalent using an open-field auto-refractometer (WAM-5500, Grand Seiko CO. LTD., Hiroshima, Japan) at two specific locations: nasal and 25 temporal. We calculated descriptive statistics, found the mean and standard deviation of the differences between central and peripheral measurements, and checked the correlation between the central refractive error and these differences.

Results: The average central refractive error was $-3.79D$. The average absolute difference between central and nasal peripheral refraction was $0.96\pm0.74D$, while the average difference on the temporal side was $1.13\pm0.88D$. Most of the central-to-peripheral refractive error differences were less than 2 D. We found a weak positive correlation between the central refractive error and the difference with both nasal ($r=0.21$) and temporal ($r=0.11$) peripheral refraction.

Conclusions: Our findings suggest there's only a weak link between the magnitude of central myopia and the peripheral refractive profile. This means that central refractive error alone may not be a strong predictor of peripheral refractive state, highlighting the need for more research into other factors that influence it. This work helps us better understand the complexity of childhood myopia, especially now that new peripheral defocus-modulating glasses are available to help control its progression.

Abstract No.: 201659

Therapeutic Use of Atropine 1% Eye Drop in Accommodative Excess

First Author: Saima **SHAMS**

Co-Author(s): Mehedi **HASAN**, Mostafa **HOSSAIN**, Sidratulmuntaha **NAZNIN**

Purpose: To evaluate the role of atropine eye drop in the management of accommodative excess.

Methods: An 11-year-old child had complaints of blurred vision for both near and distance, along with a headache. The unaided visual acuity of each eye was 6/60 for distance and N8 for near. Dry retinoscopy showed myopization up to $-4.75D$ with no improvement in visual acuity. On examination, there was 8 prism diopter esophoria for distant and 12 prism

diopter esophoria at near. MEM retinoscopy reveals Lead with poor stereopsis. Near point accommodation was 6 cm, no break of near point of convergence till 6 cm amplitude of accommodation was 16.5 dioptre. Cycloplegic refraction was done, and it was +1.00 dioptre. The patient was prescribed two spectacles with +1.00 Dioptre for distant and +2.50 Dioptre for near vision. With spectacles, the vision was 6/12 and N5. Atropine 1% eye drop was prescribed for 30 days. The patient was advised to follow up after 45 days in the post-cycloplegic state. Visual acuity was improved to 6/9 (unaided). Then, the final visual acuity was 6/6 (partial) for distant and N6 at near with +0.75 diopre. This spectacle was prescribed. Asthenopic symptoms are also relieved. The patient was advised not to continue the atropine eye drops.

Results: In addition to significant improvement of vision, Atropine 1% eye drop relieves the symptoms of asthenopia in accommodative excess.

Conclusions: Not all visual impairment is refractive error. Cycloplegic refraction confirms the diagnosis, and atropine 1% eye drop can also be used therapeutically in accommodative excess.

Abstract No.: 201872

Ultrasound Biomicroscopic Characteristics of the Anterior Segment in Patients With Primary Congenital Glaucoma

First Author: Anh Tm **DAO**

Co-Author(s): Anh Tv **BUI**, Son N **NGUYEN**

Purpose: To evaluate ultrasound biomicroscopic features of the ocular anterior segment in patients with primary congenital glaucoma.

Methods: This is a cross-sectional study; 16 patients diagnosed with primary congenital glaucoma were included in the study, and an anterior segment ultrasound was performed under anesthesia using VuMax Ophthalmic Ultrasound with a 50MHZ frequency probe.

Results: Sixteen cases (9 males and 7 females) with 24 eyes with primary congenital glaucoma (PCG) were confirmed, with a mean age of 5.8 ± 3.1 years. 16 eyes (66.7%) had abnormal angle structure, 41.7% had iris anterior insertion, and ciliary body attachment to the iris was found in 12.5%. PCG eyes have greater corneal diameter, anterior chamber depth, and zonular length than normal eyes (12.7 ± 1.23 mm, 3.9 ± 0.4 mm, 1.5 ± 0.4 mm with $p < 0.001$, $p < 0.001$, and $p < 0.05$, respectively). The mean iris thickness in the study group was 0.27 ± 0.07 mm, smaller than that of the normal group, $p < 0.05$.

Conclusions: Ultrasound biomicroscopy is a useful method to detect structural changes of the anterior segment in patients with PCG. This tool can help confirm diagnosis as well as contribute to understanding pathogenesis.

Abstract No.: 200397

Virtual Reality-Based Vision Therapy for Intermittent Exotropia: A Randomized Clinical Trial

First Author: Hui **ZHU**

Co-Author(s): Hu **LIU**

Purpose: To assess the efficacy and safety of virtual reality-based vision therapy (VRVT) in children with intermittent exotropia (IXT).

Methods: Children aged 6 to 18 years with previously untreated IXT were enrolled between July 1, 2023, and November 17, 2024. Eligibility criteria included an exodeviation magnitude of 10 to 30 prism diopters at distance, an exotropia control score of 1 to 3 at both distance and near, and a cycloplegic spherical equivalent (SE) between -6.00 diopters (D) and +0.50 D in both eyes, with an interocular SE difference less than 2.50 D. Participants were randomly assigned in a 1:1 ratio to receive VRVT or no intervention for 12 weeks. The primary outcome was the change in the distance exotropia control score from baseline to week 12. Participants with at least one post-randomization assessment were analyzed for treatment efficacy.

Results: Among 177 randomized participants, 161 were included in the analysis. At week 12, the median change in distance exotropia control score was -0.33 (interquartile range [IQR], -1.00 to 0.00) in the intervention group versus 0.00 (IQR, -0.33 to 0.33) in the control group ($P < 0.001$, Mann-Whitney U test). Significant between-group differences were also observed in near exotropia control score, magnitude of exodeviation at both distance and near, near stereoacuity, near point of convergence, as well as simultaneous perception and retinal correspondence (all $P < 0.05$). No intervention-related adverse events were reported.

Conclusions: Our findings support the value of VRVT as a safe and effective intervention for children with IXT.

Abstract No.: 207020

Visual Axis Opacification and Complications After Bag-in-the-Lens Intraocular Lens Implantation in Pediatric Cataract Surgery: A Systematic Review

First Author: Brigitta Marcia **BUDIARDJA**

Co-Author(s): Dian Estu **YULIA**

Purpose: Pediatric cataract is a leading cause of childhood blindness, and visual axis opacification (VAO) remains a major challenge in its surgical management. The bag-in-the-lens (BIL) intraocular lens was developed to minimize this risk. This systematic review evaluates the rate of VAO following BIL IOL implantation in pediatric cataract cases, along with associated intraoperative and postoperative complications.

Methods: This review included studies with pediatric patients who received cataract surgery with primary IOL implantation using BIL IOL that evaluated the VAO rate. A comprehensive search was performed across five databases (PubMed, Cochrane Library, EBSCO, Scopus, and ProQuest). Risk of bias was assessed using the NHLBI Quality Assessment Tool.

Results: From 97 studies identified, seven met the inclusion criteria, comprising five case series and two cohort studies. Reported VAO rates ranged from 4.6% to 46%. In most cases where VAO developed, the BIL IOL was not correctly positioned, preventing its intended mechanism of confining lens epithelial cells from functioning effectively. Reported intraoperative complications included vitreous prolapse, iris-related events, capsule-related complications, and IOL luxation. Postoperative complications included glaucoma and IOL dislocation.

Conclusions: Current evidence on BIL IOL outcomes in pediatric cataract is limited. When anterior and posterior capsule edges are properly positioned within the IOL groove, BIL IOL implantation is associated with a relatively low risk of VAO. Further high-quality comparative studies are required to establish its safety, efficacy, and potential advantages over other IOL designs in pediatric cataract surgery.

Refractive Surgery

Abstract No.: 201598

A Ring to Protect Vision: Role of Capsular Tension Rings to Prevent Posterior Capsule Opacification in High Myopia; a Systematic Review and Meta-Analysis

First Author: Cynthia VIRYAWAN

Co-Author(s): Faraby MARTHA

Purpose: To evaluate the effectiveness of capsular tension rings (CTR) in preventing posterior capsule opacification (PCO) in patients with high myopia undergoing cataract surgery

Methods: A systematic search was performed in PubMed, Cochrane, Scopus, and ProQuest databases up to March 2025. Eligible studies included patients with high myopia undergoing cataract surgery using CTR and no CTR, reporting outcomes of PCO or Nd:YAG capsulotomy. Risk of bias was evaluated using the Newcastle–Ottawa scale

Results: CTR use was associated with a significantly smaller PCO area compared to controls. Furthermore, meta-analysis of PCO presence revealed a significant difference ($p=0.05$), indicating that CTR use was associated with lower incidence and severity of PCO compared to the control group. Three studies showed a significant reduction in Nd:YAG capsulotomy rates with

CTR (OR 0.34, $p=0.007$, moderate heterogeneity 49%), indicating a 66% risk reduction. While CTRs did not fully prevent PCO, they reduced its severity. Long-term benefits for intraocular lens stability were inconsistent.

Conclusions: CTRs may reduce PCO severity and decrease the need for Nd:YAG capsulotomy in high myopia patients. However, prophylactic use remains controversial and should be considered primarily in those with zonular instability or retinal pathologies that increase the risk of Nd:YAG capsulotomy. Further randomized controlled trials with long-term follow-up are needed to confirm safety and efficacy.

Abstract No.: 201826

An Innovative Marking Method for Astigmatism Correction of Small Incision Lenticule Extraction

First Author: Jiamei ZHANG

Co-Author(s): Yan WANG, Pinghui WEI, Yanan WU, Lulu XU, Xinheng ZHAO

Purpose: To evaluate the effectiveness of a novel method with cyclotorsion compensation and epithelial marking in improving the accuracy of astigmatic axis correction of small incision lenticule extraction (SMILE) surgery.

Methods: This prospective study adopted a novel epithelial-marking strategy for 103 eyes of 55 subjects undergoing SMILE for myopia and myopic astigmatism correction. Combined with compensation of static cyclotorsion, these accurate and clear markings could quantify the value of cyclotorsion. Two local, symmetric spots were ablated along the same direction of the static cyclotorsion angle. These markers were then aligned to adjust for static cyclotorsion of the SMILE procedure.

Results: A tendency towards external torsion in both eyes was found, with a mean static cyclotorsion of $(0.147 \pm 3.113)^\circ$ in right eyes and $(-2.128 \pm 3.396)^\circ$ in left eyes. At 3-month follow-up, all eyes achieved uncorrected distance visual acuity (UDVA) of 20/25 or better and retained their corrected distance visual acuity (CDVA). None of the eyes had a residual cylinder value exceeding -0.50 D. The absolute value of angle of error (AoE) was only offset by $(1.863 \pm 2.897)^\circ$, with 89% of eyes showing an angular shift of less than $\pm 5^\circ$, indicating minimal misalignment

Conclusions: This novel epithelial-marking approach can provide accurate, safe, and effective outcomes for astigmatism treatment in SMILE surgery. It offers more precise, quantitative intraoperative cyclotorsion compensation during the femtosecond laser scanning, representing a currently accurate and reliable solution for astigmatism correction

Abstract No.: 204562

Analysis of Factors Influencing Postoperative Refractive Outcomes in SMILE Based on XGBoost Model

First Author: Mingdong ZHANG

Co-Author(s): Yan WANG

Purpose: To analyze the influence of individual parameters on the postoperative refractive outcomes of small incision lenticule extraction (SMILE) in myopic eyes using the XGBoost model.

Methods: This study included 477 patients (922 eyes) of SMILE from Tianjin Eye Hospital. We take the postoperative spherical equivalent (SE) as the XGBoost model's label and divided the patients into two groups: the poor refractive outcomes group ($SE \leq -0.50$ D) and the good refractive outcomes group (-0.50 D < $SE < +0.50$ D), to analyze the factors influencing postoperative refractive outcomes. The XGBoost model took 72 clinical parameters, including corneal biomechanical parameters, corneal morphological parameters, surgical-related parameters, and preoperative refractive parameters as features, selected 42 eyes from the good refractive outcomes group randomly, and all eyes (a total of 42 eyes) from the poor refractive outcomes group to conduct 100 times influence factors analysis. Each analysis can obtain the average gain value of each factor that affects the difference in surgical results. The number of occurrences and average gain values of all parameters in 100 analyses are counted, and the number of occurrences is used as a reference standard. Factors that appeared more than 50 times were considered to have a more important influence on the outcomes of refractive surgery. The 10 parameters with the highest occurrence frequency were selected as the most important factors affecting the postoperative refractive outcomes. And we used SPSS to divide these 10 parameters into 10 equal groups, spaced every 10 percentiles, to compare postoperative SE and parameter value range when the SE value was the largest or a significant change was determined.

Results: The 10 most important factors influencing postoperative refractive outcomes included PTA (Percentage thickness ablation), SE, R Per F(Center of zone radius between the anterior corneal 7 and 9mm rings), HC (Highest concavity) Time, Deflection Amp Max (The time of maximum deflection amplitude), RST (Residual stroma thickness), Rs F(Steep radius of curvature in the anterior cornea's center), LTmax (The maximum lenticule thickness), SSI(The corneal stress-strain index) and SD (spherical diopter). When PTA $\geq 25.09\%$, LTmax ≥ 139 μ m, SE ≤ -7.00 D, or SD ≤ -6.75 D, the postoperative SE significantly increased (all $P < 0.05$), with averages of -0.183 D, -0.171 D, -0.188 D, and -0.184 D. After controlling for age, intraocular pressure, and corneal thickness, the postoperative SE significantly increased when HC time was ≥ 17.422 and

Deflection Amp Max (ms) ≥ 16.616 , reaching -0.209 D and -0.202 D.

Conclusions: More corneal thickness ablation, longer HC Time and Deflection Amp Max (ms), lower SSI, and higher preoperative refractive error may result in poor postoperative refractive outcomes. Appropriate nomogram adjustments could improve results. And the refractive outcomes after the SMILE may be influenced by the preoperative biomechanical properties of the cornea.

Abstract No.: 202937

Application of Refractive Lens Replacement (RLE) in Patients With Short Ocular Axis

First Author: Shunhua ZHANG

Purpose: Patients with short ocular axis usually have hyperopia, impairment of near vision, and risk of anterior chamber angle closure. RLE surgery can simultaneously solve cataracts, the risk of anterior chamber angle closure, hyperopia, and presbyopia. Therefore, short ocular axis patients benefit more from RLE surgery. But there is still controversy because some problems remain unsolved, such as high surgical risk and difficulty in IOL calculation. It is necessary to conduct a comprehensive evaluation of the effectiveness and safety of RLE surgery for short eye axis patients.

Methods: A total of 39 patients with short eye axis (AL < 22.5mm) who underwent bilateral RLE by phacoemulsification combined with ATLAS Atri839MPIOL implantation surgery at Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, from January 2021 to June 2024, were included. Systematic examinations were conducted on the first day, first month, and sixth month after surgery. The evaluations include uncorrected vision of far, medium, and near, apparent refraction, iTrace examination, defocus curve, and VF-14 visual scale. Intraoperative and postoperative complications were recorded.

Results: Visual acuity: The patient's preoperative UDVA, UIVA, and UNVA were 0.30 (0.10,0.54) log MAR, 0.50 (0.30,0.80) log MAR, 0.60 (0.47,0.80) log MAR, and the corresponding numbers of the first day postoperatively were 0.00 (0.00,0.01) log MAR, 0.00 (0.00,0.01) log MAR, and 0.00 (0.00,0.10) log MAR. The proportions of UDVA, UIVA, and UNVA equal to or better than 0.1 log MAR at 6 months after surgery were 93.6%, 87.2%, and 85.9%, respectively. The refractive prediction error at 6 months after surgery was -0.070 ($-0.331, 0.163$) D. The detachment rates of far vision and near vision were 93% and 100%, respectively. There were no intraoperative or postoperative complications.

Conclusions: The combination of RLE and ATLAS Atri839MP IOL implantation can solve cataract, risk of angle closure, hyperopia and presbyopia in

patients with short ocular axis. It demonstrates good safety and effectiveness. Thorough preoperative testing, customized IOL selection, and gentle surgical technique are the keys to successful outcomes.

Abstract No.: 200480

CAMP Protocol With ZOOM Simulator: A New Proprietary Software for Hyperopic Presbyopic LASIK Planning

First Author: Zain KHATIB

Purpose: To evaluate the clinical outcomes of hyperopic presbyopic LASIK using the CAMP protocol, a novel treatment strategy combining conservative Q-value modulation with personalized monovision planning, aided by a real-time ray diagram simulator (ZOOM Simulator).

Methods: A total of 52 eyes from 26 hyperopic presbyopic patients underwent bilateral Custom-Q LASIK using the CAMP protocol on the Alcon Wavelight EX500 platform. Planning incorporated Binocular Inherent Accommodation (BIA), monovision testing, and simulated depth of focus (DOF) profiles via the ZOOM Simulator. The simulator allowed individualized adjustment of Q-value modulation (max -0.36) and monovision offset (up to -1.5 D), ensuring optimal binocular DOF overlap. A standardized surgical technique was followed, and outcomes were evaluated at 6 months. Main outcome measures included uncorrected and corrected distance and near visual acuity, refractive predictability, spectacle independence, and subjective satisfaction.

Results: At 6 months, 88.5% achieved binocular UDVA of 6/6 or better, and 92.3% achieved UNVA of J2 or better. Mean final SEQ was $+0.08 \pm 0.43$ D in distance eyes and -0.76 ± 0.45 D in near eyes. No eye lost more than one line of CDVA. Spectacle independence was achieved in 77% of patients. Patient-reported satisfaction scores were high, and dysphotopsia was minimal.

Conclusions: The CAMP protocol offers a safe, effective, and customizable approach to treating hyperopic presbyopia using individualized planning and Q-modulation. The ZOOM Simulator enables real-time visualization of DOF profiles, improving clinical precision and patient outcomes.

Abstract No.: 202401

Changing the Paradigm: Laser Vision Correction As Early Intervention for Accommodative Strabismus

First Author: Igor AZNAURYAN

Co-Author(s): Victoria BALASANYAN, Evgenii MORDYUKOV

Purpose: The aim of the work was to assess the parameters of patients before and after laser correction

for their accuracy relative to the expected result, and the stability of the effect.

Methods: A total of 50 patients aged 5 to 15 years (average 6.7 ± 0.3) years with hypermetropia, accommodative, and partially accommodative strabismus were observed. Of these, high hyperopia was observed in 17 patients, moderate hyperopia in 20 patients, and mild hypermetropia in 13 patients; complex hypermetropic astigmatism was observed in 33 patients. In 70% of cases, clinically significant convergent strabismus with an accommodative component of 5 to 30 degrees was observed.

Results: As a result, we observed a change in AL of 0.15 during the follow-up period. The standard deviation of refractive values (SE) is 2.61 before laser correction and 2.13 after laser correction. Mean change in sph of 3.27 diopters after laser correction, cyl of 2.39 diopters, and Ax of 3. Change in visual acuity (VIS): an average improvement of ≈ 0.15 (from 0,83 to 0,98 conventional units). Change in strabismus angle: on average, a decrease of $\approx 8,6$ degrees (from $\approx 16,8^\circ$ to $\approx 8,2^\circ$). Corneal opacities are minimal (mean 0.3/3).

Conclusions: The surgery resulted in a significant reduction in hyperopia (average ≈ 3.27 D). Postoperative refraction approached emmetropia (normal vision). A significant decrease in the angle of strabismus was noted (on average by 8.6°). Slight enlargement of the axis (AL) of the eye after surgery (mean $\approx 0,2$ mm).

Abstract No.: 202908

Clinical Results of SMILE PRO Using Corneal Apex and Cyclotorsion-Guided Lenticule Centration

First Author: Olesia ZIIATDINOVA

Co-Author(s): Chun Chun HE, Lina ZHOU

Purpose: To evaluate visual outcomes following SMILE PRO laser vision correction with adjusted lenticule centration and cyclotorsion for the treatment of myopia and astigmatism.

Methods: Fifty eyes of patients (mean age: 27 years; mean corneal thickness: $525.3 \mu\text{m}$) with myopia ranging from -1.50 to -6.5 diopters (D) and astigmatism from -1.50 to -3.75 D underwent SMILE PRO treatment. Preoperative lenticule centration was determined using Pentacam apex data. Cyclotorsion alignment was managed by placing two corneal surface markers (2–3 mm from the limbus) along the horizontal meridian under slit-lamp guidance. During docking, lenticule centration was adjusted relative to the Pentacam blue fixation dot, and the vacuum interface was rotated according to the corneal markers. Visual acuity and refraction outcomes (UCVA, MCVA, autorefractometry) were assessed at 1 day, 1 week, 1 month, and 3 months postoperatively.

Results: At day 1, 97.5% of eyes achieved UCVA equal to or better than preoperative MCVA. Mean SE was

$\pm 0.42 \pm 0.23$ D with residual astigmatism 0.40 ± 0.17 D. At week 1, 98.3% of eyes achieved UCVA equal to or better than MCVA, with stable refractive error. At 1 month and 3 months, nearly all eyes maintained UCVA equal to or better than preoperative MCVA, with mean SE close to plano and residual astigmatism ≤ 0.40 D.

Conclusions: SMILE PRO with adjusted lenticule centration based on corneal apex alignment and cyclotorsion control provides excellent refractive accuracy and visual outcomes in patients with myopia and astigmatism. At 3 months, nearly all patients achieved their target MCVA with stable refractive results.

Abstract No.: 203718

Comparative Analysis of Vertical Coma Aberrations in SMILE Surgery: Visumax 800 Versus Visumax 500

First Author: Ankita **SANJAY KULKARNI**

Co-Author(s): Sri **GANESH**, Supriya **SMAKA SRIGANESH**, Savio **SYLVAN PEREIRA**

Purpose: To evaluate and compare the vertical coma aberrations induced by SMILE surgery performed on Visumax 500 and Visumax 800 platforms, shedding light on their impact on visual quality.

Methods: This prospective study included 128 eyes from patients undergoing SMILE for myopia or myopic astigmatism (<10 D spherical equivalent), evenly divided between Visumax 500 and Visumax 800 groups. Comprehensive preoperative and postoperative assessments (UCVA, manifest refraction, slit lamp, Pentacam, MS-39, ATLAS topography, ITrace, HD Analyzer) were conducted at baseline, Day 1, Day 15, and 3 months. Patients with corneal pathology, cataracts, or angle kappa >0.5 mm were excluded. Vertical coma was analyzed and correlated with angle kappa values.

Results: At 3 months, mean vertical coma was significantly lower in the Visumax 800 group (-0.029 ± 0.060) compared to the Visumax 500 group (0.020 ± 0.052). More detailed analysis by angle kappa revealed that the Visumax 800 consistently induced less vertical coma across subgroups (<0.3 and >0.3 mm), with statistically significant differences. Furthermore, the Visumax 800 group showed superior objective scatter index (OSI) values, indicating enhanced optical quality.

Conclusions: Our findings present compelling evidence that SMILE surgery using Visumax 800 induces less vertical coma aberration and offers improved optical quality compared to Visumax 500. This data supports the evolution of refractive laser technology toward optimized visual outcomes and patient satisfaction.

Abstract No.: 203230

Comparative Evaluation of Lenticule Quality in Small Incision Lenticule Extraction (SMILE) Using VisuMax 800 Versus VisuMax 500

First Author: Meiyun **LI**

Purpose: To evaluate the surface characteristics of the lenticule extracted by Small Incision Lenticule Extraction (SMILE) using VisuMax 500 and VisuMax 800.

Methods: In this study, twelve eyes treated with small incision lenticule extraction were included at the Eye and ENT Hospital of Fudan University (Shanghai, China) from November 2024 to January 2025 and divided into two groups: Group VisuMax 500 and Group VisuMax 800. The extracted lenticules were immediately fixed for electron microscopy after removal. Both the anterior and posterior lenticular surfaces were scanned using scanning electron microscopy (SEM), and the quality of the lenticule was assessed using a 16-point scoring system.

Results: The mean surface characteristic scores of the lenticules in Group VisuMax 800 and Group VisuMax 500 were 13.39 ± 1.12 and 13.88 ± 0.65 , respectively, showing no significant difference between the two groups ($P=0.29$). In Group VisuMax 800, no significant difference was observed in the overall surface characteristics between the anterior (13.22 ± 1.24) and posterior surfaces (13.53 ± 2.02) ($p=0.83$). Similarly, the anterior (14.07 ± 0.25) and posterior surfaces (13.86 ± 0.82) showed no significant difference in Group VisuMax 500 ($p=0.64$). Furthermore, intergroup analysis confirmed comparable surface characteristics for both anterior ($p=0.17$) and posterior ($p=0.74$) lenticule surfaces.

Conclusions: The lenticules extracted using the VisuMax 800 demonstrated high quality and were comparable to those obtained with the VisuMax 500.

Abstract No.: 203486

Compare the Clinical Outcome of 5 Different Keratorefractive Lenticule Extraction (KLEx) and Laser-Assisted in Situ Keratomileusis (LASIK)

First Author: I-hung **LIN**

Co-Author(s): Chao-kai **CHANG**, Chen-cheng **CHAO**, Tsung-jen **WANG**

Purpose: To compare clinical outcomes of five keratorefractive lenticule extraction (KLEx) techniques — SMILE (Zeiss Visumax 500), SMILE Pro (Zeiss Visumax 800), CLEAR (Zeimer Z8), SmartSight (Schwind ATOS), SILK (Johnson & Johnson Elita), and LASIK (Alcon EX 500), focusing on uncorrected distance visual acuity (UDVA), residual refractive error, Effective Optical Zone (EOZ), Central Stromal Thickness Reduction (CCSR), contrast sensitivity, and higher-order aberrations (HOAs).

Methods: A prospective study was conducted at Taipei Nobel Eye Clinic (Aug 2024–Jan 2025), involving 72 SMILE (144 eyes), 82 SMILE Pro (164 eyes), 8 CLEAR (16 eyes), 26 SmartSight (52 eyes), 7 SILK (14 eyes), and 5 LASIK (10 eyes) patients. Pre- and post-operative BCVA, UDVA, EOZ, CCSR, contrast sensitivity, and HOAs were analyzed. Baseline characteristics (age, sex, sphere, cylinder, programmed optical zone) were matched across groups.

Results: Patients' average age ranged from 29–33 years. Preoperative spherical errors were -4.63 to -6.15D and cylindrical errors -0.68 to -1.30D. One month post-op, UDVA was similar across all groups (0.016 to 0.055 logMAR), with residual refractive errors near OD. All groups had smaller EOZ compared to POZ, with LASIK showing the largest reduction (1.35mm) and SILK the least (0.59mm). KLEx techniques overestimated CCSR by 12–26µm, while LASIK underestimated by 8µm. Contrast sensitivity and increases in HOAs were comparable among all procedures.

Conclusions: At one month post-op, all five KLEx techniques and LASIK showed comparable results in UDVA, residual errors, contrast sensitivity, and HOAs. However, EOZ reduction was greatest in LASIK and least in SILK, with KLEx overestimating and LASIK underestimating CCSR.

Abstract No.: 203634

Comparing Early Visual Quality: SMILE Pro (VisuMax 800) vs. SMILE (VisuMax 500)

First Author: Chen LI

Co-Author(s): Yuehua ZHOU

Purpose: To compare the early postoperative visual quality after myopia with astigmatism correction using SMILE pro with the VisuMax 800 versus SMILE with the VisuMax 500.

Methods: A prospective randomized case-control study was conducted, including 120 eyes undergoing VISUMAX 800 SMILE pro and 120 eyes undergoing VisuMax 500 SMILE at our hospital. Visual acuity, MRSE, higher-order aberrations (HOAs), including total HOAs, and contrast sensitivity were evaluated preoperatively and at 1 week, 1 month, and 3 months postoperatively.

Results: At 3 months postoperatively, 71.1% of eyes in the SMILE pro group achieved UDVA $\geq 20/16$, which was significantly higher than 55% in the SMILE group ($P = 0.041$). Additionally, 52.2% of eyes in the SMILE pro group gained ≥ 1 line of Snellen CDVA, superior to 36.7% in the SMILE group ($P = 0.043$). No significant difference in postoperative MRSE was observed between the two groups. At 3 months, total HOAs were lower in the SMILE pro group compared with the SMILE group ($0.431 \mu\text{m}$ vs $0.554 \mu\text{m}$, $P = 0.047$). Vertical coma was also significantly lower in the SMILE pro group ($P = 0.036$), whereas no significant differences were found in horizontal coma or spherical aberration ($P > 0.05$).

Furthermore, contrast sensitivity at 6.0 cpd and 12.0 cpd was significantly higher in the SMILE pro group than in the SMILE group ($P = 0.016$ and $P = 0.021$, respectively).

Conclusions: Both SMILE techniques demonstrated efficacy and safety in myopia correction. Compared with conventional SMILE, SMILE pro provided superior outcomes in terms of visual improvement, reduction of higher-order aberrations, and preservation of contrast sensitivity.

Abstract No.: 201686

Comparing the Effect of Mechanical and Tetracaine-Assisted Epithelial Debridement on Central Corneal Endothelial Cells in PRK

First Author: Nader NASSIRI

Co-Author(s): Sara KAVOUSNEZHAD, Kourosh SHEIBANI

Purpose: To compare the effects on central corneal endothelial cells measured by confocal microscopy after photorefractive keratectomy (PRK) with mitomycin C (MMC) using mechanical and tetracaine-assisted epithelial debridement methods.

Methods: In this prospective, randomized, comparative study, 44 patients (88 eyes) with myopia of up to -6.00 diopters were enrolled. Each patient's right eye was randomly assigned to either the tetracaine-assisted or the mechanical debridement group, with the left eye assigned to the other method. Preoperative and 3-month postoperative assessments were conducted using confocal microscopy. These assessments measured epithelial thickness, the number of keratocytes in the anterior, mid, and posterior stroma, and the characteristics of central corneal endothelial cells. These characteristics included cell density, mean cell area, polymegathism, and hexagonality.

Results: No statistically significant differences were observed between the two groups considering the mean epithelial thickness at the 3-month follow-up. Additionally, there was no statistically significant difference in central corneal endothelial cell characteristics, including mean cell density, mean cell area, mean hexagonality, or mean polymegathism. The density of mid and posterior stromal keratocytes remained unchanged compared to baseline in both groups. However, a significant decrease in anterior stromal keratocyte density was observed in both groups three months after surgery, with no significant difference between the two debridement methods.

Conclusions: The effects of PRK with MMC using mechanical or tetracaine-assisted epithelial debridement methods on central corneal endothelial cells are similar. Additionally, both techniques lead to comparable reductions in stromal keratocyte density in the anterior stromal layer.

Abstract No.: 200240
Comparison of 110- and 145- μ m Small-Incision Lenticule Extraction Cap Thickness

First Author: Siamak ZAREI-GHANA VATI

Purpose: To investigate the visual, refractive, and biomechanical outcomes of small incision lenticule extraction (SMILE) with two different cap thicknesses.

Methods: Thirty-four patients were included in this prospective, randomized, contralateral eye study. Subjects were randomized to receive SMILE surgery with a 110- μ m cap thickness in one eye and 145- μ m cap thickness in the fellow eye. Uncorrected and corrected distance visual acuity, contrast sensitivity (CS), total higher order aberrations (THOAs) and corneal biomechanical properties were compared 3 months after surgery.

Results: Postoperative refractive and visual outcomes, CS and THOAs were similar between the two groups ($P > 0.05$ for all parameters). At 3 months postoperatively, there was a significant difference in Corvis ST Biomechanical Index (CBI); stiffness parameter at first applanation (SP A1), and Integrated Radius between the two groups (all $P < 0.05$).

Conclusions: Eyes with thicker SMILE corneal caps showed no advantage regarding visual acuity, CS and THOAs over eyes with thinner caps. However, higher cap thickness may result in better corneal biomechanical properties postoperatively.

Abstract No.: 203697
Comparison of Clinical Outcomes Between Ray-Tracing-Guided and Wavefront Aberration-Guided FS-LASIK for Myopia Correction

*First Author: Mingyan WANG
Co-Author(s): Yuehua ZHOU*

Purpose: This prospective study included patients undergoing either RTG FS-LASIK or WFG FS-LASIK, with a 12-month postoperative follow-up. Assessments using the iDesign™/InnovEyes SightMap™ systems evaluated wavefront, tomographic, and biomechanical parameters. Visual acuity, refraction, higher-order aberrations (including total HOA), MRSE, and contrast sensitivity were measured pre- and postoperatively.

Methods: This prospective study included patients undergoing either RTG FS-LASIK or WFG FS-LASIK, with a 12-month postoperative follow-up. Assessments using the iDesign™/InnovEyes SightMap™ systems evaluated wavefront, tomographic, and biomechanical parameters. Visual acuity, refraction, higher-order aberrations (including total HOA), MRSE, and contrast sensitivity were measured pre- and postoperatively.

Results: This study analyzed 46 patients who underwent RTG FS-LASIK and 46 who received WFG FS-LASIK. At 12 months postoperatively, the spherical

equivalent refraction (MRSE) was significantly better in the RTG FS-LASIK group (0.13 ± 0.28 D) compared to the wavefront-guided group (-0.17 ± 0.28 D; $P < 0.001$). At 3 and 12 months, the RTG FS-LASIK group showed significantly lower values of total higher-order aberrations (HOA), trefoil, and spherical aberration (all $P < 0.05$). Uncorrected visual acuity (UCVA) at 12 months improved to -0.08 ($-0.18, -0.08$) logMAR in the RTG FS-LASIK group and -0.08 ($-0.18, -0.08$) logMAR in the wavefront-guided group, compared to preoperative values of 1.00 (0.70, 1.30) logMAR and 0.82 (0.82, 1.30) logMAR, respectively (all $P < 0.05$). The RTG FS-LASIK group also demonstrated significantly higher contrast sensitivity under 6.0 cpd, 12.0 cpd, 18.0 cpd, and under glare conditions at 12.0 cpd and 18.0 cpd (all $P < 0.05$). Compared to preoperative values, both groups showed significant reductions in total HOA, coma, trefoil, SRI, SAI, and spherical aberration.

Conclusions: Both techniques effectively corrected myopia and astigmatism. However, from the perspective of superior optical quality, RTG FS-LASIK resulted in significantly fewer higher-order aberrations, less trefoil and spherical aberration, and better preservation of contrast sensitivity compared to wavefront-guided FS-LASIK.

Abstract No.: 203688
Comparison of Postoperative Outcomes of SMILE 4.0 Guided by Cycloplegic and Manifest Refraction

*First Author: Mingyan WANG
Co-Author(s): Yuehua ZHOU*

Purpose: To compare the clinical efficacy of SMILE 4.0 surgery guided by cycloplegic refraction versus manifest refraction inputs based on a VISULYZE-generated nomogram in patients with myopia and astigmatism.

Methods: This study included 144 patients (245 eyes) with myopia and astigmatism who underwent SMILE 4.0 from September to December 2024. Based on the preoperative refraction method, patients were categorized into a cycloplegic group (79 patients, 134 eyes) or a manifest refraction group (65 patients, 111 eyes). Visual and refractive outcomes were assessed preoperatively and at 1 week, 1 month, and 3 months postoperatively, with VISULYZE-based nomogram predictions compared at 3 months and all complications recorded.

Results: At 3 months post-op, the cycloplegic refraction group showed significantly better predictability of the spherical equivalent (SE), with 96.27% (129 eyes) achieving a result within ± 0.50 D of the target, compared to 92.79% (103 eyes) in the manifest refraction group ($P=0.048$). Both groups exhibited strong correlations between attempted and achieved SE. The mean error (ME) was significantly lower in the cycloplegic group than in the manifest group ($P=0.012$).

Additionally, the correction of spherical error (S) differed significantly between groups ($P=0.001$). Strong correlations were observed between target-induced astigmatism (TIA) and surgically induced astigmatism (SIA) in both groups ($R^2 = 0.95$ vs. 0.91), with a lower index of success (IS) observed in the cycloplegic group ($P=0.007$).

Conclusions: Both cycloplegic and manifest refraction-guided SMILE 4.0 procedures proved safe and effective. At 3 months, the cycloplegic group demonstrated superior outcomes in spherical equivalent and power, suggesting it may be preferred for optimizing refractive results.

Abstract No.: 202875

Comparison of the Central Corneal Thickness Reduction Outcomes After SMILE and SMILE Pro for Myopia: A Retrospective Matched Case-Control Study

First Author: Xin **ZHANG**

Co-Author(s): Yuxia **GUO**, Chunming **LI**

Purpose: SMILE Pro was performed using the CentraLign aid for vertex centration, making it much easier to accurately measure and study central corneal thickness (CCT) reduction. To evaluate the agreement between the predicted and measured CCT reduction after SMILE and SMILE pro surgery, and explore the clinical application value of CentraLign aid in the real world of China.

Methods: This was a retrospective, matched, and case-control study (1:2) controlled for preoperative CCT and spherical equivalent (SE). One eye for each patient was randomly selected and included for analysis. CCT was measured by corneal tomography captured with Pentacam preoperatively and 1 month postoperatively. The measured CCT reduction was calculated by comparing the preoperative with postoperative CCT. Comparative statistics and linear regression analyses were performed.

Results: A total of 150 patients were enrolled. The mean predicted CCT reduction was $97.63 \pm 21.74 \mu\text{m}$ in SMILE group and $100.93 \pm 24.33 \mu\text{m}$ in SMILE Pro group. The prediction of the laser platform was found to overestimate the measured CCT reduction for both groups (SMILE: $8.2 \pm 5.3 \mu\text{m}$, SMILE Pro: $7.57 \pm 5.17 \mu\text{m}$). No statistically significant difference was observed in the CCT reduction outcome between the two procedures. In the SMILE Pro group, the difference between predicted and measured CCT reduction was found to be significantly related to the predicted CCT reduction ($P < 0.001$), preoperative SE ($P < 0.001$), and optical zone ($p < 0.05$).

Conclusions: SMILE Pro has been introduced in China for more than a month, making corneal thickness research clearer. Our results showed the actual CCT reduction was less than the estimated one, filling the

existing research gap and having significant clinical value. Larger samples, long-term, and more studies concerning different refractive powers are still needed.

Abstract No.: 206911

Corneal Dynamic Radiomics as a Novel Biomarker for Detection of Forme Fruste Keratoconus

First Author: Shenglong **LUO**

Co-Author(s): Xuefei **LI**, Kuangching **LIN**, Fan **LU**, Junjie **WANG**

Purpose: To propose CVS-omics, a radiomics framework integrating dynamic Corvis ST (CVS) imaging with machine learning, and to evaluate corneal dynamic texture features as a novel biomarker for detecting forme fruste keratoconus (FFKC).

Methods: A total of 410 eyes were evaluated, including 265 normal eyes and 145 FFKC eyes. Radiomics texture features were extracted from Corvis ST (CVS) images acquired at three key biomechanical phases: initial state, first applanation, and maximum deformation. Machine learning models, including Random Forest (RF), C5.0, and XGBoost, were trained on 328 eyes and independently validated on a test set of 82 eyes. Diagnostic performance was evaluated using receiver operating characteristic (ROC) analysis and compared with traditional biomechanical parameters.

Results: The CVS-omics RF model achieved superior diagnostic performance (AUC = 0.989, sensitivity = 0.931, specificity = 0.962, accuracy = 0.951), significantly outperforming traditional CVS parameters (best AUC = 0.728). Integration of dynamic texture features from multiple deformation phases improved diagnostic accuracy compared to single-time-point analysis. Machine learning models demonstrated high generalizability of dynamic texture features (XGBoost and C5.0 AUC > 0.83).

Conclusions: CVS-omics effectively detects subtle alterations in FFKC with superior accuracy compared to conventional biomechanical parameters. These radiomics-derived features may serve as novel biomarkers, complementing existing diagnostics and supporting clinical decision-making in keratoconus management.

Abstract No.: 200254

Corneal Epithelial and Stromal Thickness Profile After Photorefractive Keratectomy (PRK) Using Anterior Segment Optical Coherence Tomography (AS-OCT)

First Author: Basitali **LAKHANI**

Purpose: To study the epithelial remodeling after photorefractive keratectomy (PRK) using Anterior Segment Optical Coherence Tomography (AS-OCT).

Methods: This prospective observational study was performed from October 2018 to March 2020. 85 eyes with simple myopia in the age group of 21-38 years, and spherical equivalent range of -2.25 to -6 underwent PRK with Mitomycin-C (MMC). Epithelial and corneal thickness maps were acquired by AS-OCT preoperatively and postoperatively at 1 week, 1 month, 3 months, and 6 months.

Results: The visual acuity of all patients was 0 LogMAR until 6 months. We observed epithelial thickening of the cornea at 1 week, followed by a decrease at 1 month, and a slight increase at 3 months and 6 months. The mean corneal thickness increased from the baseline values in the central 2mm to 5mm and 5 to 7mm zones at 6 months, respectively ($p < 0.001$).

Conclusions: The corneal epithelial thickness increased up to 6 months after PRK-MMC and did not have any significant effect on the visual acuity.

Abstract No.: 203444

Early Objective and Subjective Evaluation of Visual Quality After KLEx With VISUMAX 800

First Author: Ruoyan **WEI**

Co-Author(s): Meiyan **LI**, Xingtao **ZHOU**

Purpose: To evaluate early visual quality after keratorefractive lenticule extraction (KLEx) using VISUMAX 800 femtosecond laser for myopia correction.

Methods: This prospective cohort study included 193 eyes of 97 consecutive myopic patients (mean SE -4.48 ± 1.66 D) who underwent KLEx using the VISUMAX 800 at Fudan University Eye and ENT Hospital. Standardized preoperative and postoperative evaluations included slit lamp, visual acuity, manifest refraction, corneal topography, wavefront aberration, and subjective visual quality questionnaires. All patients completed the 3-month follow-up protocol.

Results: All procedures were successfully completed with high patient satisfaction. The efficacy and safety indices were 1.07 ± 0.11 and 1.10 ± 0.11 , respectively. No eye lost two or more lines of CDVA. Among eyes targeted for plano correction, 99% (184/185) achieved UDVA ≥ 1.0 . All eyes achieved SE within ± 0.50 D of the target. Total higher-order aberration (HOA), coma, and trefoil increased significantly (all $p < 0.05$), while spherical aberration showed no significant changes ($p > 0.05$). Postoperative glare and halo symptoms became less frequent, severe, and bothersome over time, yet scores of glares remained above baseline levels. Multivariate analysis identified coma (OR=1.68, $p=0.02$) and scotopic pupil diameter (OR=1.92, $p=0.01$) as individual factors for postoperative glare and haloes, respectively.

Conclusions: KLEx with VISUMAX 800 demonstrated excellent safety, efficacy, and predictability for myopia correction, with high patient satisfaction. The early postoperative glare and halo gradually diminished.

Abstract No.: 208882

Effect of Different Concentrations of Mitomycin C on Corneal Nerve Regeneration and Ocular Pain Score After SPT-TransPRK for Moderate Myopia

First Author: Taorui **YU**

Co-Author(s): Chunxiao **YAN**, Lijun **ZHANG**

Purpose: To investigate the effects on corneal nerve regeneration and early ocular surface pain index in moderate myopia undergoing transepithelial photorefractive keratectomy with smart pulse technology (SPT-TransPRK) combined with 0.01% and 0.02% mitomycin C (MMC).

Methods: Prospective self-controlled study. Thirty patients (60 eyes) with preoperative spherical equivalent -6.00 to -3.00 D who voluntarily underwent binocular refractive surgery from October 2022 to January 2023 in the ophthalmic laser center of Dalian Third People's Hospital were included. The study used an in vitro pairing design, with one eye randomly using 0.01% MMC for the MMC0.01 group (30 eyes), and the other eye using 0.02% MMC for the MMC0.02 group (30 eyes). Confocal microscopy was used to observe the repair of subepithelial nerves in different areas of the cornea before and 14 days, 1 month, and 3 months after surgery. Image J software was used to analyze the changes in central corneal nerve fiber density (CNFD) and nerve fiber length (CNFL). The visual acuity and the degree of pain scored by visual analogue scale (VAS) were recorded before and 1, 3, 7, 14 days after surgery.

Results: There was no statistically significant difference in CNFD and CNFL in the central corneal region between the MMC0.01 group and the MMC0.02 group before and 14 days, 1 month, and 3 months after surgery ($P > 0.05$). Compared with preoperative values, CNFD and CNFL in both groups decreased at 14th days postoperatively, and gradually increased at 1 and 3 months postoperatively. The differences at each time point were statistically significant compared to preoperative values ($P < 0.001$). The postoperative pain levels in both the MMC0.01 and MMC0.02 groups were within a mild to moderate range, and decreased with recovery time. On the first day after surgery, the VAS of the two groups were 4.15 ± 0.83 and 5.39 ± 1.18 , respectively. And on the third day after surgery, they were 2.31 ± 0.84 and 3.07 ± 0.83 , respectively. The differences were statistically significant ($P < 0.001$; $P = 0.001$). But there was no statistically significant difference in VAS scores between the two groups on the 7th and 14th day after surgery. There were statistically significant differences in UCVA between the two groups on the 1st, 3rd, and 7th day after surgery (all $P < 0.001$), with the MMC0.01 group having a better UCVA. Within 3 months after surgery, two patients showed a grade 0.5 haze (6.67%) in both eyes.

Conclusions: The combination of 0.01% and 0.02% MMC during surgery has a similar promoting effect on

nerve regeneration in the early postoperative period (within 3 months) of SPT-TransPRK. At 3 months after surgery, the central nerve fibers in the ablation area of both groups of corneas did not return to preoperative levels. The use of 0.01% MMC during surgery has better eye pain relief and faster visual recovery in the early postoperative period.

Abstract No.: 203470

Effect of Intraoperative Mitomycin C Application at Different Concentrations on Corneal Densitometry After Transepithelial Photorefractive Keratectomy

First Author: Lijun ZHANG

Co-Author(s): Taorui YU

Purpose: This study aimed to investigate corneal densitometry (CD) and haze after transepithelial photorefractive keratectomy (TPRK) in patients treated with or without mitomycin C (MMC) at concentrations of 0.01% and 0.02%.

Methods: This retrospective study analyzed 138 eyes of 138 patients who underwent surgery and were categorized into three groups based on intraoperative MMC concentration: the MMC0.02 group (0.02% MMC), the MMC0.01 group (0.01% MMC), and the Control group (no MMC), with 46 eyes per group. Corneal haze and Corneal densitometry were assessed preoperatively and at 2 weeks, 1 month, and 3 months postoperatively. Corneal densitometry was performed across different concentric radial zones (0-2, 2-6, and 6-10 mm annulus) and layers (anterior, central, posterior, and total).

Results: The incidence of haze was significantly lower in the MMC0.01 (6.52%) and MMC0.02 (4.35%) groups than in the Control group (15.22%) ($P=0.048$ and $P=0.01$, respectively), the MMC0.01 and MMC0.02 groups showed no significant differences in haze incidence ($P=0.244$) in the third month after surgery. In terms of corneal densitometry, three months after surgery, the central layer CD values in the 0-2 mm zone (MMC0.01: 14.48 ± 1.21 GSU vs MMC0.02: 14.56 ± 1.01 GSU vs Control: 15.23 ± 1.25 GSU) and the posterior layer CD values (MMC0.01: 11.49 ± 0.70 GSU vs MMC0.02: 11.40 ± 0.70 GSU vs Control: 11.96 ± 0.78 GSU) were significantly lower in both MMC groups compared to the Control group (all $P < 0.05$). In the 2-6 mm zone, the posterior layer CD values (MMC0.01: 10.41 ± 0.75 GSU vs MMC0.02: 10.38 ± 0.59 GSU vs Control: 10.88 ± 0.71 GSU) and total layer CD values (MMC0.01: 13.39 ± 0.54 GSU vs MMC0.02: 13.36 ± 0.49 GSU vs Control: 13.65 ± 0.51 GSU) were significantly lower in both MMC groups than in the Control group (all $P < 0.05$). However, no significant differences in CD values were found between the MMC0.01 and MMC0.02 groups across any zone or layer (all $P > 0.05$).

Conclusions: Both 0.01% and 0.02% MMC are similarly effective in preventing haze and enhancing corneal clarity following TPRK surgery.

Abstract No.: 205273

Explainable Artificial Intelligence for Preoperative Prediction of Night Vision Disturbances After SMILE Surgery

First Author: Dan CHENG

Co-Author(s): Kai-ming RUAN, Mei-xiao SHEN, Shi-qi SUN, Yu-feng YE

Purpose: To develop an interpretable artificial intelligence (AI) model for predicting night vision disturbances (NVCs) following Small Incision Lenticule Extraction (SMILE) surgery based on optical zone and pupil-related parameters.

Methods: This prospective study utilized preoperative clinical and biometric data from patients undergoing SMILE. A novel threshold was established to classify postoperative visual quality outcomes. Feature selection was performed using a regularization technique, and multiple machine learning models were trained and evaluated. Model interpretability was enhanced using a game theory-based explanatory method.

Results: A key optical parameter ratio was identified as a highly significant predictor of NVCs. Among the models tested, a tree-based ensemble algorithm demonstrated superior predictive performance on both internal and external validation sets. Explainable AI analysis highlighted several preoperative factors including pupil size, refractive error, and corneal morphology as the most influential contributors to postoperative visual quality outcomes.

Conclusions: This study presents a robust and interpretable AI framework for preoperative prediction of NVCs after SMILE. The model enables personalized risk assessment and surgical planning, contributing to improved patient counseling and postoperative satisfaction, without disclosing critical technical details.

Abstract No.: 202730

Five-Year Outcomes of IC-8 Small-Aperture IOL Implantation: Monocular and Bilateral Results in a Single-Center Study

First Author: James Michael JACOMINA

Co-Author(s): Robert Edward ANG

Purpose: To report outcomes of IC8 small-aperture intraocular lens (IOL) implantation in a single eye center.

Methods: This retrospective review included 54 patients who underwent IC8 implantation: 44 received monocular implantation, and 10 received bilateral implantation. The binocular group was subdivided into patients with a virgin fellow eye, a history of refractive

surgery, and those with prior IC8 inlay. Postoperative visual outcomes were assessed over 5 years. Parameters included uncorrected distance (UDVA), intermediate (UIVA), and near acuity (UNVA), best corrected distance acuity (BDVA), refractive measures (sphere, cylinder, MRSE), and cumulative visual acuity indices.

Results: In the monocular group, all patients achieved UDVA of 20/25 or better, with 78% reaching 20/20. CDVA was 92.9% at 20/25 and 100% at 20/32 or better. Over 5 years, mean UDVA (0.09 ± 0.07) and UIVA (0.11 ± 0.04) showed mild regression, while UNVA remained stable with slight improvement. MRSE improved from +0.47 D in year 1 to -0.05 D by year 5. In the bilateral group, 95% achieved UDVA of 20/25 or better, and 10% achieved 20/20 or better, with refraction stable over time (MRSE -0.35 D at year 1 to -0.13 D at year 5). At the latest follow-up, binocular outcomes were favorable: mean UDVA was 0.03 in IC8 + virgin eyes, 0.15 in IC8 + post-refractive eyes, and 0.05 in IC8 + post-inlay eyes.

Conclusions: IC8 implantation was associated with reliable visual function across near, intermediate, and distance ranges. Monocular eyes demonstrated gradual refractive regression, whereas bilateral implantation maintained stability over 5 years.

Abstract No.: 201263

Five-Year Results of Lenticule Transplantation for Hyperopic Residual Refraction and Presbyopia After Laser In Situ Keratomileusis

First Author: Ceren Ece **SEMİZ**

Co-Author(s): Fetih Furkan **ARSLAN**, Njomza **HIMA-MUSA**, Faruk **SEMİZ**

Purpose: To evaluate the long-term efficacy, safety, and corneal morphological changes of fresh lenticule transplantation for hyperopic residual refraction and presbyopia following LASIK (Laser in Situ Keratomileusis).

Methods: This study included 84 eyes of 42 patients (aged 32.9 ± 7.5 years, range 22–44) with post-LASIK hyperopic residual refraction (+1.00 to +6.00 D) and cylinder (+0.75 to +2.50 D). Donor lenticules, obtained from 20–29-year-old patients who had undergone SMILE (Small Incision Lenticule Extraction) for myopic correction, had a mean thickness of 88.4 ± 28.1 μ m, diopter -4.42 ± 1.40 D, and optical zone 660 ± 15 μ m. In recipient corneas, the LASIK flap was left untouched; instead, a 140- μ m intrastromal pocket was created, and a fresh lenticule was transplanted with a -0.50 D target. Follow-up evaluations included uncorrected and corrected distance visual acuity (UDVA, CDVA), slit-lamp biomicroscopy, corneal topography, pachymetry, and anterior segment optical coherence tomography. All patients completed a 5 years of follow-up.

Results: No cases of rejection, complications, or surgical revision occurred during follow-up. At 5 years, UDVA improved from 0.63 ± 0.21 to 0.03 ± 0.03 logMAR, UNVA from J7 to J2 (40 cm) and J6 to J3 (80 cm). Central corneal thickness increased from 490.0 ± 33.8 to 572.3 ± 27.1 μ m, sphere decreased from $+3.95 \pm 1.40$ to -0.40 ± 0.13 D, K1 from 41.52 to 44.27 D, and K2 from 42.87 to 44.98 D. Q-value shifted from -0.43 to -0.79. All changes were significant ($p < 0.001$).

Conclusions: This procedure safely modifies corneal asphericity while improving both distance and near visual acuity.

Abstract No.: 201760

Flexivue Microlens for Treatment of Presbyopia: Clinical Evidence of Long-Term Safety, Efficacy, and Versatility

First Author: Vladimir **FEINGOLD**

Co-Author(s): Siqi **DAI**

Purpose: To evaluate the safety and efficacy of Flexivue Microlens in treating emmetropic presbyopic patients.

Methods: This was a prospective study of 421 patients who underwent implantation of Flexivue Microlens with a follow-up duration of 3 years. Patient age ranged from 40 to 60 years, and all had an uncorrected near visual acuity (UCNVA) of 20/50 or worse. The microlens power ranged from +1.50 D to +3.00 D. Implantation was performed at a depth of 300 μ m within a stromal pocket created using a femtosecond laser.

Results: After surgery, 93% of patients achieved uncorrected near visual acuity (UCNVA) of 20/40 or better, with a mean improvement of 5 ETDRS lines. Binocular uncorrected distance visual acuity (UCDVA) of 20/40 or better was achieved in 98.4% at 24 months and 99.5% at 36 months. Endothelial cell density remained unchanged, and intraocular pressure was stable throughout the study. Patient satisfaction was very high. The microlens could be safely removed if replacement was required or if patients were unable to adapt to multifocality.

Conclusions: Flexivue Microlens implantation in 421 emmetropic presbyopes demonstrated safety, efficacy, and high patient satisfaction, supporting its role as a viable option for presbyopia correction.

Abstract No.: 204781

LALEX (Laser Assisted Lenticule EXtraction) Provides Wider Horizons for High Myopia

First Author: Sami **ALRABIAH**

Purpose: To study the possibility of correcting higher degrees of myopia by LALEX, that were not possible in regular Femtolasik, yet not to cross the safety limits such as 1) Residual bed thickness; 2) Over-flattening the K value; 3) Reaching the toxic levels of spherical aberration

Methods: At Alrabiah Medical Center, Kuwait, using Z8 Ziemer Femtolasik, 96 myopic patients with myopia varying from -7.00 to -10.00 diopters underwent the LALEX procedure to correct their high myopia, compared to a similar group of patients (age, sex) with myopia from -1.00 to -6.00 diopters underwent the routine Femtolasik procedure to correct their myopia. All patients had investigations such as Retinoscopic refraction, Topography, Tomography, Pachmetry, measuring High order aberrations, corneal biomechanics. On months 2-4-6 post procedures. All patients had repeated all their investigations.

Results: The results of LALEX for higher errors of refractions were very encouraging, with excellent post-operative vision and no compromise of the safety limits.

Conclusions: LALEX has proven itself to be safe and effective in treating high myopia.

Abstract No.: 203335

Long-Term Safety and Efficacy of Personalized Directional EVO ICL V4c Implantation in Patients With Relatively Shallow Anterior Chambers and High Crystalline Lens Rise

First Author: Wenjie **LIU**

Co-Author(s): Lingling **NIU**, Xingtao **ZHOU**

Purpose: To assess long-term safety and efficacy of personalized, UBM-guided directional EVO ICL V4c implantation in eyes with relatively shallow anterior chambers and high crystalline lens rise (CLR).

Methods: Prospective study of 72 patients (143 eyes) with customized ICL sizing/orientation based on WTW, ACD, horizontal/vertical STS, STSL, pupil size, iris configuration, and ciliary sulcus width. Eyes were stratified by ACD: Group A 2.8–3.0 mm, Group B >3.0–3.3 mm, Group C >3.3 mm. Outcomes included UDVA, CDVA, refraction, IOP, ECD, ACA, ACV, lens density, and ICL vault with ≥3-year follow-up.

Results: Safety index ranged 1.21–1.23 and efficacy index 1.10–1.15 across groups. CDVA improved ≥2 lines in 22–26% and by 1 line in 40–49%; no losses occurred. UDVA ≤0 logMAR was achieved in 96–100% of eyes (all ≤0.3). Manifest spherical equivalent was within ±0.50 D in 76–80% and within ±1.00 D in 96–100%. Mean vault differed by ACD (A 325±193 μm, B 457±168 μm, C 490±153 μm; P<0.05). No significant intergroup differences were found for IOP, ECD, or lens density, while ACD, ACV, and ACA differed significantly (P<0.05).

Conclusions: Personalized, UBM-guided directional EVO ICL V4c implantation provided durable visual efficacy and a favorable safety profile over ≥3 years in eyes with shallow anterior chambers and high CLR. Vault increased with deeper ACD, while IOP, ECD, and lens density remained stable, supporting use of this approach in anatomically challenging eyes.

Abstract No.: 201588

Management of Hyperopic Residual Refraction and Presbyopia After Trifocal Intraocular Lens Implantation With Lenticule Transplantation

First Author: Njomza **HIMA-MUSA**

Co-Author(s): Fetih Furkan **ARSLAN**, Ceren Ece **SEMIZ**, Faruk **SEMIZ**

Purpose: To evaluate visual outcomes after myopic lenticule transplantation in pseudophakic patients with hyperopic residual refractive error and presbyopia.

Methods: This retrospective study included 32 patients (64 eyes), aged 41–62 years, with hyperopic residual refraction and presbyopia following trifocal intraocular lens (IOL) implantation. Residual hyperopia ranged from +0.75 to +1.75 D, presbyopia from +1.00 to +2.50 D, and astigmatism from +0.50 to +1.25 D. Donor lenticules, obtained from individuals aged 20–33 years who had undergone SMILE (Small Incision Lenticule Extraction) for myopic refractive error correction, had a mean thickness of 43.52 ± 7.22 μm (range: 30–50 μm) and were sized 0.5 mm larger than the recipient's optic zone to minimize glare. A stromal pocket was created using the SMILE module, and a convex-shaped myopic lenticule—0.5 D greater than the residual error—was implanted based on the lower keratometric value. All patients were followed for 1 year.

Results: At 1 year, UDVA improved from 0.35 ± 0.20 to 0.003 ± 0.01 logMAR, corneal central thickness increased from 500.39 ± 18.88 to 543.66 ± 19.37 μm, spherical error decreased from +1.20 ± 0.28 to -0.33 ± 0.30 D, cylindrical error from 0.92 ± 0.32 to 0.37 ± 0.13 D, K1 from 41.02 ± 1.27 to 43.52 ± 0.79 D, K2 from 41.98 ± 1.28 to 43.88 ± 0.80 D, and Q-value from -0.41 ± 0.03 to -0.59 ± 0.05 (all p < 0.001).

Conclusions: Myopic lenticule transplantation effectively addresses residual hyperopia and presbyopia after trifocal IOL by enhancing corneal asphericity and improving vision at all distances.

Abstract No.: 203481

One-Year Follow-Up of Retinochoroidal Changes After ICL Implantation in High Myopia: Insights From UWF-SS-OCTA and AI-Based 3D Modelling

First Author: Wang **XUZE**

Co-Author(s): Han **WEI**

Purpose: To investigate the long-term changes in retinal and choroidal structure and perfusion in highly myopic eyes following ICL V4c implantation, using ultra-widefield swept-source optical coherence tomography angiography (UWF-SS-OCTA) combined with a three-dimensional modeling algorithm.

Methods: Retinal and choroidal parameters, including retinal thickness (RT), capillary plexus

density, foveal avascular zone (FAZ), retinal curvature, choroidal thickness (CT), and three-dimensional choroidal vascularity index (3D-CVI), were assessed preoperatively and at multiple postoperative time points. Repeated measures mixed-effects models were employed to compare pre- and postoperative measurements and to explore correlations among the parameters.

Results: Significant improvements in refractive outcomes and visual acuity were achieved postoperatively, with a stable safety profile and no major complications. Retinal thickness and perfusion exhibited transient changes within the first month, followed by gradual normalization. Retinal curvature slightly increased postoperatively, without statistical significance. Choroidal parameters, especially CT and 3D-CVI, demonstrated a progressive and sustained increase across most regions, with the most pronounced changes in the foveal and perifoveal zones. Correlation analysis revealed surgical duration and axial length as key factors influencing retinal and choroidal responses, respectively.

Conclusions: ICL V4c implantation in high myopia leads to dynamic yet self-limiting changes in retinal morphology and perfusion, alongside sustained enhancement in choroidal vascular parameters. The use of 3D-CVI offers deeper insights into choroidal remodeling and perfusion recovery, highlighting the long-term ocular safety and structural adaptation following ICL implantation.

Abstract No.: 203594

Phakic Presbyopic Intraocular Lenses: A Systematic Review

First Author: Javier H. **GONZALEZ-LUGO**

Co-Author(s): Jorge L. **ALIÓ**, Jorge **ALIÓ DEL BARRIO**, Marcielle **GHANEM**, Hao **ZHANG**

Purpose: Presbyopia remains one of the greatest unmet needs in refractive surgery. While corneal and lens-exchange procedures are established options, they carry significant trade-offs, including decreased contrast sensitivity, photic phenomena, and increased retinal detachment risk in young myopes. Phakic intraocular lenses (pIOLs) designed for presbyopia correction aim to restore full-range vision while preserving the natural crystalline lens.

Methods: This systematic review was registered in PROSPERO (CRD420251138158) and conducted according to PRISMA guidelines. MEDLINE, EMBASE, Cochrane Library, and trial registries were searched through July 2025. Eligible studies included clinical trials and observational series reporting refractive, visual, safety, and patient-reported outcomes of presbyopia-correcting pIOLs.

Results: Six studies comprising 354 eyes of presbyopic patients aged 38–62 years were included.

Contemporary designs evaluated were the EVO Viva ICL (extended depth of focus), the trifocal Implantable Phakic Contact Lens (IPCL), and the iris-fixated ArtiPlus lens. Across studies, $\geq 75\%$ of eyes achieved refractive outcomes within ± 0.50 D of target, and spectacle independence reached 80–90%. Binocular defocus curves demonstrated functional vision across distance, intermediate, and near. Patient satisfaction was consistently high. Visual disturbances such as glare and halos were common but generally mild. No sight-threatening complications were reported during short-term follow-up.

Conclusions: Presbyopia-correcting pIOLs show promising safety and efficacy, offering a reversible, lens-preserving option with favorable visual outcomes and high patient satisfaction. Nonetheless, current evidence is limited to small, short-term, largely industry-sponsored studies. Independent, long-term trials are needed to confirm safety and establish their role in presbyopia management.

Abstract No.: 202207

Pioneering Presbyopia Correction in Bo'ao Medical Pilot Zone: Early Outcomes With an Intracorneal Microlens

First Author: Wei **CHEN**

Co-Author(s): Siqi **DAI**, Vladimir **FEINGOLD**, Mimi **LIU**, Meng **QI**

Purpose: To evaluate the safety and efficacy of Presbia Flexivue Microlens for presbyopia correction in patients treated in Bo'ao Medical Pilot Zone, Hainan, China.

Methods: This prospective case series included 20 presbyopic patients who underwent implantation of the Flexivue intracorneal microlens beginning in January 2024. All procedures were performed in the Bo'ao Medical Pilot Zone, which offers unique regulations enabling early clinical adoption of internationally approved medical devices. The microlens was implanted in the non-dominant eye using an enhanced monovision mechanism termed "Smart Monovision". Primary assessments included uncorrected and best-corrected near and distance visual acuity (UCNVA, BCNVA, UCDVA, BCDVA), measured both monocularly and binocularly. The maximum follow-up to date was 20 months.

Results: At the latest follow-up, average binocular UCNVA improved by 4–5 lines. Monocular UCDVA in the treated eye decreased by ~ 2 lines, while binocular UCDVA showed a negligible change. No loss was observed in BCDVA or BCNVA. The procedure demonstrated a favourable safety profile with no serious adverse events. Patient satisfaction was very high, with the majority reporting functional improvement in near vision and willingness to recommend the treatment.

Conclusions: The introduction of Flexivue in the Bo'ao Medical Pilot Zone demonstrated promising safety and efficacy for presbyopia correction in Chinese presbyopic patients, with high levels of patient satisfaction and willingness to recommend the treatment.

Abstract No.: 205302

Reprogramming of Human Corneal Stromal Cells From SMILE-Derived Lenticules Into Stem-Like Cells by Conditioned Medium and 3D Spheroid Culture

First Author: Yuexi **CHEN**

Co-Author(s): Jiansu **CHEN**, Zheng **WANG**

Purpose: To create a novel three-dimensional (3D) cell culture system based on a polydimethylsiloxane (PDMS) microwell platform composed of many V-bottom microcavities for generating human corneal stromal cell spheroids and further promoting the plasticity and stemness of human corneal stromal cells (hCSCs).

Methods: In the study, we isolated hCSCs from SMILE-derived lenticules and maintained their physiological phenotype by culturing them in a medium supplemented with human corneal stromal extract (hCSE). Then, we conducted a novel three-dimensional (3D) cell culture system based on a 3D-printed PDMS microwell platform composed of many V-bottom microcavities for generating 3D-CSCs. The 3D-CSCs were cultured in the PDMS microwell platform with induced pluripotent stem cells conditioned medium (iPS-CM) for two weeks. Finally, we evaluated the stemness of cells cultured on this platform.

Results: Using a PDMS microwell platform through 3D printing technology, we successfully generated 3D corneal stromal cell spheroids (3D-CSC) with uniform size and stable structure, achieving a mean diameter of $230.38 \pm 22.12 \mu\text{m}$. These spheroids exhibited significantly increased expression of key pluripotency factors, including OCT4, NESTIN, NANOG, SOX2, KLF4, and PAX6. RNA sequencing and proteomics analyses revealed that 3D-CSCs exhibited superior proliferation, differentiation, cell adhesion, migration, and neurogenesis compared to traditional monolayer cultures, underscoring the role of biophysical cues in promoting hCSCs stemness.

Conclusions: The 3D-printed derived PDMS microwell platform could efficiently fabricate the human corneal stromal cell spheroids and enhance the stemness of cells, providing valuable insights into corneal tissue engineering and regenerative medicine, particularly for treating corneal opacities and diseases.

Abstract No.: 203342

Safety of Implanting Large-Size ICLs in High Myopia Patients With Shallow Anterior Chamber Depth (ACD < 3 mm) and Small Corneal Diameter (WTW ≤ 11.2 mm)

First Author: Wenjie **LIU**

Co-Author(s): Jiewei **LIU**

Purpose: To evaluate the clinical safety of implanting relatively large implantable collamer lenses (ICL 12.6 mm) in high myopia patients with shallow anterior chamber depth (ACD < 3 mm) and small white-to-white corneal diameter (WTW ≤ 11.2 mm).

Methods: This retrospective study included 231 patients meeting the anatomical criteria, divided into two groups: 127 eyes received a 12.1 mm ICL, and 98 eyes received a 12.6 mm ICL. Preoperative anatomical parameters (ACD, WTW, lens thickness), intraoperative sulcus-to-sulcus (STS) distances, and postoperative safety indicators (safety index, efficacy index, intraocular pressure [IOP], corneal endothelial cell density, vault, anterior subcapsular opacity, etc.) were compared between the two groups. Statistical significance was defined as $p < 0.05$.

Results: The safety indices (postoperative CDVA / preoperative CDVA) were 1.19 ± 0.15 and 1.20 ± 0.16 in the 12.1 mm and 12.6 mm groups, respectively. The efficacy indices (postoperative UDVA / preoperative CDVA) were 1.11 ± 0.20 and 1.13 ± 0.19 , respectively. The 12.6 mm group showed significantly greater horizontal STS (11.23 ± 0.35 mm vs. 10.84 ± 0.44 mm) and vertical STS (11.82 ± 0.41 mm vs. 11.42 ± 0.35 mm) than the 12.1 mm group (both $p < 0.01$). The STS-WTW difference was also significantly higher (0.20 ± 0.32 vs. -0.06 ± 0.44 , $p = 0.035$). Vault: The 12.6 mm group had a significantly higher postoperative vault ($340.89 \pm 40.12 \mu\text{m}$ vs. $320.12 \pm 35.65 \mu\text{m}$, $p = 0.012$), and a lower proportion of cases with vault < 250 μm (14.29% vs. 23.62%). Other safety indicators: All patients had normal postoperative IOP (10–21 mmHg), endothelial cell density > 2300 cells/ mm^2 , and anterior chamber angle (TIA > 23°). No cases showed anterior subcapsular opacities, endothelial cell loss > 30%, or elevated IOP.

Conclusions: For high myopia patients with ACD < 3 mm and WTW ≤ 11.2 mm, selection of ICL size based on STS measurements and ciliary sulcus morphology allows safe implantation of both 12.1 mm and 12.6 mm ICLs. Larger ICLs do not increase the risk of elevated IOP, endothelial loss, or lens-related complications, and provide vaults within the safe range.

Abstract No.: 200159

SmartSight Lenticule Extraction for High Myopic Astigmatism (>2.00 D) Utilizing the SCHWIND ATOS Femtosecond Laser

First Author: Thuy DINH THI PHUONG

Purpose: To assess the effects of correcting high astigmatism in SmartSight lenticule extraction procedures for myopic astigmatism with an advanced femtosecond laser platform.

Methods: A total of 120 eyes from 60 patients undergoing consecutive treatment for myopic astigmatism with a preoperative cylinder exceeding 2.00 diopters (D) were assessed at the 6-month postoperative visit. Patients had a mean age of 25.8 ± 5.4 years, with an average spherical equivalent of -6.07 ± 2.32 D and a mean refractive astigmatism of 2.45 ± 0.31 D.

Results: At 6 months, astigmatism was 0.22 ± 0.19 D. Uncorrected distance visual acuities were 0.05 ± 0.13 logMAR. Differences between postoperative UDVA and preoperative CDVA were $+0.39 \pm 0.67$ lines better than preoperatively ($P < 0.005$).

Conclusions: The six-month evaluation confirms that SmartSight is a reliable and efficient approach for managing myopic astigmatism, including cases with high preoperative astigmatism.

Abstract No.: 201799

Systematic Review of Higher-Order Aberrations Following Ray-Tracing-Guided Myopic LASIK Using the InnovEyes Sightmap Platform

First Author: Yuen Tsing Adeline HO

Co-Author(s): Au CHI LIK

Purpose: Ray-tracing systems have gained popularity in refractive surgery due to their ability to personalize corneal ablation profiles. With the launch of InnovEyes Sightmap platform, the additional benefit of it on refractive outcomes remains a topic of great interest among LASIK surgeons.

Methods: A comprehensive search over PubMed, MEDLINE, EMBASE, Scopus, and Web of Science was conducted on 1 April 2025 to identify studies reporting outcomes in patients undergoing myopic LASIK with the InnovEyes Sightmap platform. The keyword "Wavelight plus" was also searched. Studies reporting pre- and post-LASIK Higher-Order Aberrations (HOA) were included. Publications using modified platforms or without post-operative 3-month outcomes were excluded.

Results: A total of 106 papers were yielded from the literature search. After excluding irrelevant publications, 4 studies with 904 eyes from 577 patients were included in the analysis. Pre-operative uncorrected distance visual acuity (DVA) was 0.925

logMAR; spherical equivalent was -3.69 D, with -0.87 D cylinder, which decreased to -0.21 D post-operatively. Average ablation depth was $97.5\mu\text{m}$. At 3 months after LASIK, HOA increased from $0.217\mu\text{m}$ to $0.264\mu\text{m}$, whereas spherical aberration halved from $0.071\mu\text{m}$ to $0.035\mu\text{m}$. All studies reported outcomes on coma, a couple of them reported separately the vertical (mean $-0.033\mu\text{m}$ to post-LASIK $-0.106\mu\text{m}$) and horizontal coma ($-0.006\mu\text{m}$ to $-0.022\mu\text{m}$). Interestingly, post-LASIK corrected DVA 0.059 was worse than uncorrected DVA -0.104 .

Conclusions: The ray-tracing platform reviewed appears reliable with good post-operative outcomes. HOA, spherical aberration, and coma may explain the poorer corrected DVA than uncorrected.

Abstract No.: 206777

The Role of Patient Personality Traits in Laser Refractive Surgery

First Author: Emma PARYANI

Co-Author(s): Kendrick SHIH

Purpose: Guiding a patient to make an informed decision on laser refractive surgery is a rewarding challenge for the ophthalmologist. Apart from the patient's refractive error, dry eye status, cornea parameters and occupation, a better understanding of patients' personality traits may improve consultation experiences. In this study, we aim to investigate the personality traits of patients undergoing refractive surgery and compare them to age-and education-matched individuals who opt against it.

Methods: 175 subjects were asked to provide demographic details and undergo a 44-item Big Five Inventory Questionnaire. In the end, 168 completed questionnaires were analysed (93 refractive surgery patients, 68 controls). A single surgeon at the Hong Kong Sanatorium and Hospital conducted the preoperative consultation to all 100 patients before making the final decision for refractive surgery. Continuous variables were presented as mean $\pm$ SD. Student's T test was used to compare personality trait scores between groups (Refractive Surgery vs No Refractive Surgery, LASIK vs SMILE). Chi Squared test was used to compare demographics.

Results: Differences in personality traits were found between subjects undergoing and those not interested in laser refractive surgery. In aspects of extraversion, agreeableness, conscientiousness and openness, the two groups performed similarly except for neuroticism, which was significantly higher in the refractive surgery group ($p < 0.05$). Comparing between LASIK (78 subjects) and SMILE (15 subjects) groups, neuroticism was higher in the SMILE group ($p 0.08$). Regarding occupation, the group undergoing refractive surgery was significantly more likely to be in service or retail occupations compared to age and occupation matched controls ($p < 0.05$).

Conclusions: Refractive surgeons should consider the higher levels of neuroticism trait in patients when setting expectations preoperatively and managing postoperative outcomes. Further studies investigating the impact of personality traits on patient satisfaction with postoperative outcome and association with postoperative complications like corneal neuropathic pain should be considered.

Abstract No.: 204695

Three-Month Outcomes After SMILE PRO Surgery for High Astigmatism Correction With the Visumax 800

First Author: Lan **HUONG THI TRAN**

Co-Author(s): Hong-son **CUNG**, Thanh **NGOC TRAN**

Purpose: To evaluate outcomes after small incision lenticule extraction (SMILE PRO) surgery using the VISUMAX 800 for correcting high astigmatism.

Methods: This prospective study was conducted on patients with high astigmatism treated with SMILE PRO surgery using the VISUMAX 800 at Hong Son Eye Hospital, Viet Nam, from November 2024 to July 2025 (IRB: HMUIRB1649). Patients with astigmatism from – 2.0 diopters (D) to – 5.0 D, spherical equivalent up to – 12.50 D, a preoperative corrected distance visual acuity (CDVA) of 20/25 or better, and ages ranging from 18 to 40 years old were included in the study. Monocular uncorrected distance visual acuity (UDVA), CDVA, refraction, and vector analysis were evaluated at 3 3-month postoperatively. Intraoperative and postoperative complications were also recorded.

Results: Eighty eyes from 80 patients (53.75% women, mean age of 23.73 ± 5.09 years) were analyzed 3 months after surgery. The mean preoperative spherical equivalent refraction (SEQ) was -7.05 ± 1.89 D. The postop SEQ was within ± 0.50 D in 85% and ± 1.00 D in 100% of eyes. UDVA was 20/25 or better in 97.5 % and was 20/32 or better in 100% of eyes. The astigmatism was within ± 0.50 D in 68.8% and ± 1.00 D in 95% of eyes. One eye lost one line of CDVA. Efficacy index was 0.97, and safety index was 0.99. No eye had suction loss during the operation, and no other complications had been observed during and after the surgery.

Conclusions: The study indicated that SMILE PRO surgery with the VISUMAX 800 was safe and effective for correcting high astigmatism.

Retina (Medical)

Abstract No.: 205842

A Pilot Study of the Mechanism of X-Linked Congenital Retinoschisis on a Retinal Organoid Platform

First Author: Shibo **TANG**

Co-Author(s): Jiansu **CHEN**, Zekai **CUI**, Shengru **MAO**, Xihao **SUN**

Purpose: To define how the disease-causing RS1 R102W mutation alters retinal organoid (RO) development, intercellular signaling, and neuronal function.

Methods: The iPSCs were reprogrammed from urine cells of XLRS patients and controls. Isogenic R102W mutation $\rightarrow$ iso-mutant $\rightarrow$ iPSCs cell line and R102W corrected iPSCs cell line were established by CRISPR/Cas9 system. iPSCs cell lines from above were differentiated into retinal organoids with the 3D differentiation method. Developmental states were profiled by immunostaining and single-cell RNA sequencing (scRNA-seq) at day 50. (MEA) recordings at day 90 (D90). Intercellular signaling and adhesion networks were analyzed across major retinal cell types.

Results: At D50, R102W, and iso-mutant ROs showed reduced CHX10 expression, indicating impaired RPC maintenance. scRNA-seq revealed increased RPCs and photoreceptor precursors (PR-Ps) but reduced RGCs and AC/HCs, with downregulation of CRX and NRL despite higher PR-P abundance, suggesting incomplete photoreceptor differentiation. Intercellular signaling analyses showed weakened neurotrophin and NCAM/JAM-mediated adhesion, reduced expression of adhesion genes (LAMB2, CDH2, JAM2/3, COL9), and loss of COL9-dependent AC/HC–PR-P interactions. Aberrant ECM activity was reflected by FN1 enrichment in RPCs and PR-Ps. At D90, MEA recordings revealed impaired spontaneous activity in R102W ROs, with fewer spikes per burst and lower peak firing rates, while burst duration and interburst intervals were unchanged, indicating reduced burst efficiency.

Conclusions: Our findings demonstrate that the RS1 R102W mutation disturbs retinal cell fate specification and disrupts intercellular communication networks during organoid development, ultimately leading to impaired neuronal activity. These results highlight a critical role of RS1 in coordinating retinal differentiation and synaptic function in XLRS.

Abstract No.: 201759

Acute and Continuous Exposure of PM2.5: Diverse Outer Blood–Retinal Barrier Damages and Disease Susceptibilities

First Author: Yuzhou **GU**

Co-Author(s): Qiuli **FU**, Ke **YAO**

Purpose: The association between air pollution and retinal diseases such as age-related macular degeneration (AMD) has been demonstrated, but the pathogenic correlation is unknown. Damage to the outer blood–retinal barrier (oBRB), which consists of the retinal pigment epithelium (RPE) and choriocapillaris, is crucial in fundus diseases. This study aims to describe the effects of airborne fine particulate matter (PM2.5) on the oBRB and disease susceptibilities.

Methods: A PM2.5-exposed mouse model was established through the administration of eye drops containing PM2.5. OCTA, TEM, and immunofluorescence staining were applied to study the oBRB changes. A co-culture model of ARPE-19 cells with stretching vascular endothelial cells was established to identify the role of choroidal vasodilatation in PM2.5-associated RPE damage.

Results: Acute exposure to PM2.5 resulted in choroidal vasodilatation, RPE tight junctions impairment, and ultimately an increased risk of retinal edema in mice. These manifestations are similar to the pachychoroid disease represented by central serous chorioretinopathy (CSC). After continuous exposure, the damage to the RPE was gradually repaired, but AMD-related early retinal degenerative changes appeared under continuous choroidal inflammation.

Conclusions: This study is the first to identify and describe the effects of air pollution exposure on the oBRB. Choroidal vasodilatation and damage to the RPE occurred after acute PM2.5 exposure, with an increasing risk of retinal edema. After continuous exposure, the RPE was repaired to some extent, but early retinal degenerative changes were observed. These findings further elucidate the association of air pollution with retinal diseases such as CSC and AMD.

Abstract No.: 205019

Aflibercept 8 mg in Treatment-Naïve Macular Edema Secondary to Retinal Vein Occlusion: Primary Endpoint Results From Phase 3 QUASAR Study

First Author: Andrew **CHANG**

Co-Author(s): Timothy Yuk Yau **LAI**

Purpose: To evaluate the efficacy and safety of intravitreal aflibercept 8-mg administered every 8 weeks, after 3 (8q8/3) or 5 initial monthly injections (8q8/5) versus 2-mg every 4 weeks (2q4), in patients with treatment-naïve macular edema secondary

to retinal vein occlusion (RVO) through Week 36 of QUASAR.

Methods: In the on-going 64-week QUASAR (NCT05850520), patients were randomized 1:1:1 to receive 8q8/3, 8q8/5, or 2q4. Dosing intervals could be adjusted by 4 weeks based on predefined criteria (minimum interval: 4 weeks). The primary objective was to determine if 8q8 provides non-inferior best-corrected visual acuity (BCVA) change compared to 2q4 (non-inferiority margin: 4 letters), with BCVA change from baseline at Week 36 as the primary endpoint.

Results: A total of 892 patients (8q8/3: n=293; 8q8/5: n=298; 2q4: n=301) were treated. The primary endpoint was met: aflibercept 8-mg showed non-inferior BCVA gains versus 2-mg. The least squares (LS) mean difference in BCVA versus 2q4 at Week 36 was 8q8/3: -0.1 (-2.0, 1.9) letters; 8q8/5: +0.8 (-1.1, 2.7) letters, (both p<0.0001). Patients receiving 8-mg had fewer injections (8q8/3: 6.0; 8q8/5: 6.7; 2q4: 8.5) over 36 weeks, with majority patients (8q8/3: 88.5%; 8q8/5: 93.4%) maintained 8-week interval. The safety profile of 8-mg was consistent with that of 2-mg.

Conclusions: Aflibercept 8-mg met the primary endpoint in macular edema secondary to RVO, demonstrating non-inferiority in BCVA gains compared with 2-mg, with fewer injections and no new safety signals observed through Week 36.

Abstract No.: 204100

Aflibercept 8mg for the Treatment of Diabetic Macular Edema in the Chinese Population: the PHOTONic Study

First Author: Nicholas **FUNG**

Co-Author(s): Wenbin **WEI**

Purpose: PHOTON was a global pivotal study of aflibercept 8mg for the treatment of diabetic macular edema (DME). The PHOTONic (PHOTON in China) study aims to investigate the efficacy and safety of aflibercept 8mg in a Chinese population with DME. Here we report the study design and objective.

Methods: PHOTONic (NCT06422507) is an ongoing phase 3, multi-center, randomized, double-masked, active-controlled, 60-week study in Chinese patients with center-involving DME. The primary objective is to determine whether aflibercept 8mg at 16-week intervals provides non-inferior best-corrected visual acuity (BCVA) gains compared to aflibercept 2mg dosed every 8 weeks in Chinese patients.

Results: From May 2024 to January 2025, 525 Chinese patients were screened from 51 sites in Mainland China and Hong Kong. At baseline, 333 eligible patients were randomised 1:1 to aflibercept 2mg every 8 weeks (2q8) after 5 initial monthly doses or 8mg every 16 weeks (8q16) after 3 initial monthly doses. From Week 16, patients in the 8q16 arm can have their dosing intervals shortened if they meet visual and anatomical criteria,

indicating worsening DME. The primary endpoint is the change from baseline in BCVA by ETDRS letter score at Week 48. Additional secondary and exploratory functional, anatomic, and safety-related endpoints are assessed.

Conclusions: PHOTONiC will generate valuable data on clinical outcomes with aflibercept 8 mg in Chinese patients with DME. Outcome data are expected in 2026.

Abstract No.: 200681

Alterations of the Vitreoretinal Interface in Retinal Vein Occlusion (RVO) Patients Post-Anti-VEGF Treatment

First Author: Zhengwei **ZHANG**

Purpose: To investigate the characteristics of vitreoretinal interface (VRI) changes and factors influencing therapeutic outcomes in retinal vein occlusion (RVO) patients undergoing anti-vascular endothelial growth factor (VEGF) therapy.

Methods: This study enrolled RVO patients treated with anti-VEGF agents from January 2020 to June 2024. Optical coherence tomography (OCT) evaluated pre- and post-treatment VRI changes, including posterior vitreous detachment (PVD) status, epiretinal membrane (ERM) incidence/location.

Results: The study included 200 RVO patients (106 central RVO, 94 branch RVO), aged 18–86 years, receiving 4–17 anti-VEGF injections over 3–17 months of follow-up. Baseline assessment revealed five eyes (2.5%) exhibited macular epiretinal membrane (ERM) and one eye (0.5%) had ERM. Initial PVD status distribution was: complete PVD in 64 cases (32%), partial PVD in 47 (23.5%), and no PVD in 39 (19.5%). Among 194 eyes without VRI abnormalities, 84 (43%) developed new ERM. Anti-VEGF agents showed differential effects on ERM formation ($P < 0.05$). Treatment significantly promoted PVD progression ($P < 0.01$), with 78% exhibiting PVD progress. Patients with baseline absent/partial PVD demonstrated higher ERM rates (58% and 52%, respectively) versus complete PVD (12%, $P < 0.01$). In BRVO cases, 92/94 (97.9%) showed ERM location correlated with occlusion quadrant ($P = 0.01$). Age ≥ 50 years and female were identified as independent ERM risk factors.

Conclusions: Anti-VEGF therapy modulates VRI via PVD progression, with ERM development linked to injection parameters, drug selection, lesion location, and baseline PVD status, warranting VRI monitoring for treatment optimization.

Abstract No.: 201294

An Analysis of Time-to-Photodynamic Therapy: Subretinal Fluid Duration and Treatment Outcomes in Central Serous Chorioretinopathy

First Author: Ryoh **FUNATSU**

Co-Author(s): Hiroki **IMATSUJI**, Naohisa **MIHARA**, Shoki **MIYAKE**, Koki **OKAMURA**, Taiji **SAKAMOTO**, Takato **SAKONO**, Hideki **SHIHHARA**, Shozo **SONODA**, Hiroto **TERASAKI**

Purpose: To evaluate the effect of prolonged serous retinal detachment (SRD) during the waiting period for photodynamic therapy (PDT) on clinical outcomes in patients with central serous chorioretinopathy (CSC).

Methods: This retrospective case series included consecutive patients with CSC who underwent PDT. We excluded patients whose SRD resolved spontaneously while PDT waiting period. We measured best-corrected visual acuity (BCVA) and retinal layer thickness at baseline and on the day of PDT. We evaluated the relationships between the duration of this period and the outcomes and the differences in these parameters during the waiting period. Primary outcomes were associations of the time-to-PDT with 12-month BCVA, SRD remission at 12 months, and changes in retinal layer thickness during the waiting period.

Results: 94 patients (94 eyes) with CSC were included, with a mean age of 57.6 ± 12.2 years, a mean BCVA of 0.18 ± 0.24 logMAR (Snellen: 20/30), and a mean waiting period of 50.8 ± 50.2 days. The outer nuclear layer (ONL) thinned significantly during the waiting period (mean reduction = $1.9 \pm 4.4 \mu\text{m}$, $P = 3.4 \times 10^{-5}$), and waiting times were positively associated with the amount of thinning (Crude: $\beta = -0.04$, $P = 3.4 \times 10^{-6}$; Adjusted: $\beta = -0.04$, $P = 1.3 \times 10^{-6}$). However, the waiting duration was not significantly associated with 12-month treatment outcomes.

Conclusions: While a one- to two-month waiting period does not appear to compromise the efficacy of PDT for patients with CSC, significant ONL thinning occurs during this time.

Abstract No.: 206474

Aqueous Humor Proteomics Reveals Commonalities and Specificities Between Neovascular AMD and Pathologic Myopia CNV

First Author: Hanqing **ZHAO**

Co-Author(s): Li **DONG**, Wenbin **WEI**

Purpose: Neovascular age-related macular degeneration (nAMD) and pathologic myopia-associated choroidal neovascularization (pmCNV) both present with choroidal neovascularization as a common pathological endpoint, yet differ markedly in pathogenesis, prognosis, and response to anti-VEGF

therapy. Current understanding of their molecular similarities and differences remains limited. This study applied aqueous humor (AH) proteomic profiling to systematically identify shared and unique molecular features in nAMD and pmCNV, thereby clarifying their distinct pathophysiological mechanisms.

Methods: We collected aqueous humor samples from 67 participants who were categorized into four groups: nAMD (n = 20), pmCNV (n = 19), pathologic myopia without CNV (n = 8), and normal controls (n = 20). We performed proteomic analysis using liquid chromatography–tandem mass spectrometry (LC–MS/MS) and analyzed differential protein expression with the limma package, adjusting for age and gender as covariates. We validated key differentially expressed proteins using public datasets.

Results: The global protein expression profiles of nAMD and pmCNV correlated weakly ($r = 0.227$). We prioritized proteins based on rank abundance curves and p-value ranking, and ultimately identified 33 characteristic disease-associated proteins. We validated key proteins, including ENO1, using an independent public dataset.

Conclusions: This study identifies distinct molecular signatures between nAMD and pmCNV, showing that despite similar clinical phenotypes, each disease follows different molecular pathways. These disease-specific proteins offer new insights into their pathology and potential targets for precision diagnosis and therapy.

Abstract No.: 204912

Assessment of Retinal Lesions in Diabetic Retinopathy Using Two Wide-Field Fundus Imaging Systems

First Author: Nivedita MURALI

Co-Author(s): Naresh Babu KANNAN, Kim RAMASAMY

Purpose: To compare the ability of two wide-field fundus imaging systems to detect retinal lesions in diabetic retinopathy (DR).

Methods: This comparative study included 193 eyes with DR. Patients with clear media were included. A single image centered on the fovea was obtained using two imaging systems: Clarus and Eidon with an ultrawidefield (UWF) module. Each image was analysed and graded by two retina fellows blinded to the clinical grade. DR lesions were counted using both cameras and compared.

Results: DR grades using Eidon and Clarus images showed 90.2% and 86.5% similarity to clinical grading, respectively. 25.9% eyes were graded as severe non-proliferative diabetic retinopathy (NPDR) on Eidon but moderate NPDR on Clarus images. This is attributed to more number of intraretinal microvascular abnormalities (IRMA) identified on Eidon images. On assessment of individual DR lesions, more number of

NVD, NVE and IRMA were seen on Eidon images in 5.4%, 19.5% and 20.5% eyes respectively.

Conclusions: We conclude that Eidon's confocal technology provides superior contrast and sharper images compared to Clarus, making it more effective for detecting fine lesions in DR.

Abstract No.: 205568

Association Between Intravitreal Anti-VEGF Injections and Long-Term Dementia Risk: A 10-Year Real-World Study

First Author: Cheng-jui TSAI

Co-Author(s): Cheng-kuo CHENG

Purpose: Vascular endothelial growth factor (VEGF) has dual roles in neuroprotection and neurodegeneration, influencing angiogenesis, neurogenesis, and blood–brain barrier integrity. Most real-world studies on intravitreal anti-VEGF therapy have been limited to short-term follow-up of no more than five years, leaving the long-term cognitive implications uncertain.

Methods: Patients who received intravitreal anti-VEGF injections between January 2005 and December 2015 were identified from the TriNetX network and matched to controls undergoing visual field or optical coherence tomography examinations using propensity scores matching across 65 covariates. Kaplan-Meier analyses were performed to estimate 10-year risks of all-cause and subtype-specific dementia. Dementia risk was further compared between patients with a higher number of injections (>5) and those with a lower number (≤ 5).

Results: After matching, 11,812 patients were included in both the anti-VEGF and control groups. Intravitreal anti-VEGF injection was not associated with increased risk of all-cause dementia (HR: 0.95, $p=0.16$) or any dementia subtypes, and was associated with lower risk of mild cognitive impairment (HR: 0.815, $p=0.001$). No significant differences were observed between patients with a higher and lower number of injections for all-cause dementia or most subtypes, whereas the risk of vascular dementia was significantly lower among those receiving >5 injections (HR: 0.69, $p=0.03$).

Conclusions: Intravitreal anti-VEGF therapy was not associated with an increased long-term risk of dementia. A lower risk of mild cognitive impairment was observed in the treatment group, while a reduced risk of vascular dementia was noted among patients receiving more injections. These associations warrant further investigation to confirm causality and elucidate underlying mechanisms.

Abstract No.: 203175**Association Between Lipid Metabolism 1 Abnormalities and Early Retinal Microvascular Changes in Diabetic Patients***First Author: Li SU*

Purpose: Dyslipidemia is common in diabetic patients and may exacerbate retinal microvascular damage via multiple pathways. This study aimed to explore the associations between lipid metabolism parameters and retinal vascular perfusion density, as well as choroidal morphological indices, in diabetic patients without diabetic retinopathy (DR). It also analyzed how hyperlipidemia impacts retinal microvascular structure and function.

Methods: This cross-sectional study recruited 191 type 2 diabetes patients without DR from the National Metabolic Management Center (May 2021–March 2022) of Shanghai General Hospital. Participants underwent comprehensive eye exams and optical coherence tomography angiography (OCTA). Conventional (total cholesterol, triglycerides, LDL-C, HDL-C) and novel (sdLDL, free fatty acids, apolipoproteins) lipid biomarkers were measured. Partial correlation and propensity score matching evaluated parameter associations, while multivariate linear regression identified independent risk factors.

Results: Analysis showed sdLDL negatively correlated with superficial capillary plexus (SCP) perfusion and vessel length density ($r = -0.260$ to -0.321 , $P < 0.05$), outperforming conventional LDL-C. Apolipoprotein A1 (ApoA1) positively correlated with SCP parameters ($r = 0.233$ – 0.296 , $P < 0.01$), indicating protective effects. Deep capillary plexus changes were milder. Hyperlipidemic patients had lower SCP perfusion and vessel density, especially in the inner-ring ($P < 0.0001$), and reduced macular thickness. Multivariate regression confirmed sdLDL as a risk factor and ApoA1 as protective.

Conclusions: This study first clarified lipid–retinal microvascular 23 correlations in DR-free diabetic patients. sdLDL negatively impacted perfusion, while ApoA1 protected against damage. Hyperlipidemia altered SCP structure and macular thickness, highlighting lipid management's role in preventing diabetic retinal microvascular injury.

Abstract No.: 200643**Association Between Serum Vitamin D Levels and Diabetic Macular Edema: A Cross-Sectional Study***First Author: Drishti KAUSHAL**Co-Author(s): Sakshi JAIN, Vinod KASHYAP, Anerudh MATHUR*

Purpose: To assess the relationship between serum vitamin D levels and diabetic macular edema (DME).

Methods: A clinic-based, cross-sectional study was conducted at the Department of Ophthalmology, Indira Gandhi Medical College (IGMC), Shimla, from May 2023 to May 2024. A total of 100 subjects with Type 2 Diabetes Mellitus were enrolled and stratified into groups with and without diabetic retinopathy (DR). Those with DR were further classified based on the presence and type of diabetic macular edema using optical coherence tomography (OCT). Exclusion criteria included Type 1 diabetes, intake of medications affecting vitamin D metabolism, and systemic conditions that alter vitamin D levels. All participants underwent dilated fundus examination and testing for HbA1c, serum creatinine, and 25-hydroxy-vitamin D (25(OH)D) levels.

Results: There was no significant difference in age, sex, or multivitamin use between the two groups. Patients with DR had significantly lower 25(OH)D levels compared to those without DR (48% with values <20 ng/ml vs. 14%, $p < 0.001$). Among patients with DME, those with advanced OCT features such as vitreomacular traction (VMT) and taut posterior hyaloid membrane (TPHM) were exclusively vitamin D deficient. Fisher's exact test confirmed a significant association between vitamin D deficiency and DME severity.

Conclusions: This study demonstrates a significant association between low serum 25(OH)D levels and the presence and severity of DME, suggesting that vitamin D may play a role in the pathogenesis and progression of diabetic retinal disease.

Abstract No.: 204520**Association of Early Macular Leakage Resolution With Extended Dosing Intervals in Patients With Retinal Vein Occlusion: A Post-Hoc Analysis of the BALATON/COMINO Trials***First Author: Hemal MEHTA**Co-Author(s): Nicholas DAGINCOURT, Carl DANZIG, Christiana DINAH, Liliana Paris PEREIRA, Joern SCHWEITZER*

Purpose: In BALATON/COMINO (NCT04740905/ NCT04740931), a greater proportion of patients with RVO (retinal vein occlusion)-related macular edema achieved absence of ML (macular leakage) with faricimab vs. aflibercept @W24 (Week-24). We examined the association between ML-area @W24 and extended-dosing intervals and BCVA (best-corrected visual acuity) gain @W68.

Methods: Between day1–W20, patients were randomized to faricimab-6.0mg or aflibercept-2.0mg Q4W (every-4-weeks). At W24–W72, all patients received faricimab Q4W–Q16W per a modified treat-and-extend regimen. The association between ML-area subgroups @W24: $\leq 1\text{mm}^2$ (ML-resolution, $n=502/989$) vs. $\geq 10\text{mm}^2$ (high-ML, $n=143/989$) and the percentage

of patients on extended dosing ($\geq$ Q12W) or BCVA change from baseline at W68 was evaluated.

Results: At W68, 59.0% and 37.8% patients with W24 ML-areas $\leq 1\text{mm}^2$ and $\geq 10\text{mm}^2$, respectively, achieved $\geq$ Q12W dosing (nominal $P=0.0001$). In multivariable modelling, patients with W24 ML-area $\leq 1\text{mm}^2$ were >2 -fold more likely to achieve $\geq$ Q12W dosing @W68 compared with W24 ML-area $\geq 10\text{mm}^2$ (odds ratio [95% confidence-interval]: 2.5[1.6–3.9]; nominal $P<0.0001$). Patients in the $\leq 1\text{mm}^2$ subgroup gained an average of 3.8 letters (95% confidence interval: 1.2–6.3) more than those in $\geq 10\text{mm}^2$ subgroup (Least square mean [standard error] BCVA change from baseline @W68: 18.8[0.6] vs. 15.0[1.1] letters; nominal $P=0.0036$).

Conclusions: Early ML resolution may be associated with extended dosing intervals and greater vision gains @W68. As more patients achieved ML absence with faricimab vs. aflibercept @W24, faricimab treatment may achieve extended dosing in RVO by promoting vascular stability beyond vascular endothelial growth factor inhibition.

Abstract No.: 205855

Associations of Microbiota-Friendly Diet With Risk of Diabetic Retinopathy in NHANES: Mediating Role of Oxidative Stress and Inflammation

First Author: Yuan Yue **CUI**

Co-Author(s): Jing **JIN**, Wei **WANG**, Dandan **XIE**

Purpose: Growing evidence implicates gut microbiota dysbiosis in the pathogenesis of diabetic retinopathy (DR). This study aimed to investigate the associations between the dietary index for gut microbiota (DI-GM), a novel metric reflecting gut microbiota composition and diversity, and DR risk, as well as to examine the mediating role of inflammatory and oxidative stress biomarkers.

Methods: This cross-sectional study analyzed 4,003 diabetic individuals (mean age 59 years, 51.21% men) from the 1999-2018 National Health and Nutrition Examination Survey. DI-GM was derived from self-reported 24-hour dietary recalls. Mediation analysis was used to investigate the role of inflammation (neutrophils, lymphocytes, and alkaline phosphatase) and oxidative stress (gamma-glutamyl transferase, uric acid, and total bilirubin) biomarkers in the effects of DI-GM on DR prevalence. Binary logistic regression analysis was adopted to explore the association of DI-GM and DR prevalence.

Results: The prevalence of DR was 19.64%. Multivariate-adjusted odds ratios (95% confidence intervals) for the associations between DI-GM and DR prevalence were 0.73 (0.68-0.79). Restricted cubic spline curves showed a non-linear inverse relationship between DI-GM and DR prevalence. Subgroup analysis indicated that the association between DI-GM and DR

prevalence was more pronounced in participants with a body mass index $> 25 \text{ kg/m}^2$. Alkaline phosphatase and total bilirubin mediated 10.27% and 9.45% of the effects of DI-GM scores on DR prevalence.

Conclusions: Adherence to a microbiota-friendly diet was associated with a lower DR prevalence, especially among individuals with overweight or obesity. Alkaline phosphatase and total bilirubin may be associated with the gut microbiota-retina interactions in DR.

Abstract No.: 204629

Automated Quantification of Retinal Fluid in Patients With Diabetic Macular Edema: Analysis of Faricimab vs Aflibercept in YOSEMITE/RHINE

First Author: Ka Ho **SZETO**

Co-Author(s): Thomas **ALBRECHT**, Kara **GIBSON**, Nancy **HOLEKAMP**, Gavin S. **TAN**, Ming **YANG**

Purpose: This YOSEMITE/RHINE (NCT03622580/ NCT03622593) post-hoc analysis quantifies changes in retinal fluid volume, IRF (intraretinal fluid), and SRF (subretinal fluid) with faricimab using novel ROSA (retinal OCT [optical coherence tomography] segmentation algorithm) in patients with DME (diabetic macular edema).

Methods: Patients (pooled $N=1,891$) were randomized 1:1:1 to faricimab-6.0mg Q8W (every-8-weeks; $n=631$) or via T&E (treat-and-extend)-based regimen (Q4W–Q16W; $n=632$), or aflibercept-2.0mg Q8W ($n=627$). YOSEMITE/RHINE-patients with baseline Spectralis OCT images and fluid volume measurement (faricimab-Q8W: $n=504$; faricimab-T&E: $n=506$; aflibercept-Q8W: $n=492$) are analyzed. Fluid volume (3-mm central-subfield; baseline-W100) was quantified using novel artificial intelligence/machine learning-based ROSA with R2 scores characterizing performance: IRF:0.94; SRF:0.88.

Results: Mean (standard-error) baseline SRF and IRF volumes were 38.8 (5.6), 43.7 (5.9), and 42.7 (5.3), and 249.5 (9.5), 240.4 (9.3), and 261.1 (9.5) nL for faricimab-Q8W, faricimab-T&E, and aflibercept-Q8W, respectively. Adjusted mean (95%CI [confidence interval]) SRF changes from baseline at year-2 were comparable for faricimab-Q8W (-40.4 [-41.9, -38.9] nL), faricimab-T&E (-40.3 [-41.7, -38.8] nL), and aflibercept-Q8W (-38.6 [-40.1, -37.1] nL). Corresponding IRF changes were greater for faricimab-Q8W (-212.0 [-221.6, -202.4] nL) and faricimab-T&E (-212.1 [-221.5, -202.8] nL) vs aflibercept-Q8W (-184.1 [-193.8, -174.3] nL); differences vs aflibercept: -27.9 nL (-41.6, -14.2; $P<0.0001$) for faricimab-Q8W; -28.1 nL (-41.6, -14.5; $P<0.0001$) for faricimab-T&E. At Week-12, adjusted mean(95%CI) IRF changes from baseline were greater for faricimab-Q8W (-158.3 [-168.3, -148.2] nL) and faricimab-T&E (-168.8 [-178.8, -158.8] nL) vs aflibercept-Q8W (-143.6 [-153.8, -133.4] nL). Differences vs aflibercept: -14.7 nL (-29.0, -0.4;

P=0.0446) for faricimab-Q8W; -25.2 nL (-39.5, -10.9; P=0.0006) for faricimab-T&E.

Conclusions: Quantitative OCT assessment demonstrated that IRF volume reductions were greater with faricimab vs aflibercept as early as Week-12 and through year-2 in DME patients, supporting faricimab's potential to improve DME disease control beyond vascular endothelial growth factor-inhibition alone.

Abstract No.: 202955

Avacincaptad Pegol Reduces Progression of Ellipsoid Zone Loss and Degradation in Eyes With the Highest Baseline Ellipsoid Zone Burden

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Purpose: Ellipsoid zone (EZ) integrity, or photoreceptor health, is a potential biomarker for geographic atrophy (GA) progression rate. The impact of avacincaptad pegol (ACP), a US FDA-approved therapy for GA, was assessed on the progression of EZ integrity over 12 months in eyes with the highest baseline EZ burden (based on the fourth-quartile EZ burden cutoff with sham: >39.3% for total EZ attenuation; >61.6% for partial EZ attenuation).

Methods: GATHER1/GATHER2 evaluated the efficacy and safety of ACP 2mg vs sham in GA. In this pooled post-hoc analysis, SD-OCT was used to assess EZ integrity in the study eye. EZ features were measured as a percentage of the macular area with EZ-to-RPE thickness ≤ 20 μ m (partial EZ attenuation) and 0 μ m (total EZ attenuation). Mean growth rates at months 6 and 12 were assessed for each parameter to determine progression of EZ loss/degradation.

Results: In eyes with the highest baseline total EZ attenuation, the mean total EZ attenuation growth rate with ACP and sham, respectively, was 4.1% vs 5.4% at month 6 and 7.7% vs 9.4% at month 12. In eyes with the highest baseline partial EZ attenuation, the mean partial EZ attenuation growth rate with ACP and sham, respectively, was 0.5% vs 3.6% at month 6 and 2.1% vs 6.3% at month 12.

Conclusions: In eyes with the highest baseline EZ burden, ACP reduced EZ loss/degradation vs sham over 12 months. ACP showed a more pronounced reduction in partial EZ attenuation vs sham, suggesting a more optimal intervention window, particularly in eyes with partially preserved photoreceptor structure.

Abstract No.: 202502

Baseline and Early Treatment Response Variables of Faricimab Durability in Treatment-Naïve Neovascular Age-Related Macular Degeneration

First Author: Ji Hun **SONG**

Co-Author(s): Adrian Hock Chaun **KOH**, Marie Joan **LOY**, Philippe **MARGARON**, Colin **TAN**, Ming **YANG**

Purpose: In TENAYA/LUCERNE (NCT03823287/ NCT03823300), 80% treatment-naïve nAMD (Neovascular Age-related Macular Degeneration) patients achieved $\geq$ Q12W (every-12-weeks) and >60% achieved Q16W faricimab dosing at week-112. This post-hoc analysis evaluated the association of baseline characteristics and early treatment-response variables with always-extended ($\geq$ Q12W) and potential Q20W faricimab dosing.

Methods: Patients received faricimab-6.0mg up to Q16W after four Q4W doses. Following assessments at weeks-20/24, patients received fixed dosing up to Q16W until week-60 and then a T&E (treat-and-extend) dosing. Univariate and multivariable analyses evaluated the association of baseline characteristics and early treatment-response variables with $\geq$ Q12W dosing from weeks-20/24 to week-112 and patient eligibility for potential Q20W extension during T&E phase.

Results: Odds ratio (95% confidence interval) of faricimab-treated patients on $\geq$ Q12W dosing during maintenance period (n=310) increased with lower baseline CST (central subfield thickness) (100- μ m decrease; 1.9 [1.2,2.8]), lower baseline maximum PED (pigment epithelial detachment) thickness (100- μ m decrease; 1.4 [1.2,1.6]), and smaller baseline choroidal neovascularisation lesion-size (5-mm² decrease; 1.3 [1.0,1.6]). Odds also increased for greater change in CST from baseline (additional 100- μ m improvement; 1.7 [1.1,2.7]) and SRF (subretinal fluid) absence at week-12 (2.5 [1.4,4.3]). Odds for potential Q20W extension during T&E-phase (n=591) increased with baseline presence of intraretinal fluid (1.5 [1.1,2.1]), lower baseline maximum PED thickness (100- μ m decrease; 1.3 [1.2,1.5]) and SRF absence at week-12 (2.4 [1.4,4.1]).

Conclusions: These findings suggest favorable baseline characteristics (lower CST, smaller PED, smaller lesion size) and early treatment response (greater CST reduction, SRF absence at week-12) are associated with extended durability of faricimab in treatment-naïve nAMD patients, including potential Q20W extension.

Abstract No.: 202298
Bilateral Serous Retinal Detachment After Cardiopulmonary Resuscitation

First Author: Magdalena **FUTYMA ZIAJA**

Co-Author(s): Grzegorz **BEDNARCZYK**, Piotr **FUTYMA**, Łukasz **ZARĘBSKI**

Purpose: To describe a rare case of bilateral serous retinal detachment following cardiopulmonary resuscitation (CPR).

Methods: An 81-year-old female underwent balloon angioplasty of the right superficial femoral artery. During the procedure, the patient experienced sudden cardiac arrest and required immediate CPR. Following successful resuscitation, she was diagnosed with hypoxic encephalopathy. Three days post-event, the patient reported bilateral visual disturbances. B-scan ultrasound and OCT revealed new-onset bilateral serous retinal detachment, absent in preoperative baseline scans. Central retinal thickness (CRT) increased from 206/216 μm (right/left eye) preoperatively to 1500/1041 μm on day 3. Then, CRT decreased to 233/271 μm on day 8, with almost complete resolution by day 15 (200/261 μm). Visual acuity decreased to 0.1/0.5 on day 3, improved to 0.7/0.9 on day 8, and stabilized at 0.7/1.0 by day 15.

Results: Despite significant visual deterioration in the early phase, the patient showed substantial recovery of visual function without surgical intervention. Treatment consisted of topical dexamethasone and nepafenac.

Conclusions: This is the first documented case of bilateral serous retinal detachment following cardiopulmonary resuscitation. Prompt recognition is essential in patients with post-resuscitation visual symptoms.

Abstract No.: 200876
Bispecific Peptide Binds to VEGFR2 and Integrin $\alpha\text{v}\beta 3$, Forming an Artificial Extracellular Matrix for Anti-Ocular Neoangiogenesis

First Author: Yuhong **YE**

Co-Author(s): Hao **CHEN**, Da **LONG**, Ye **ZHANG**, Pan **ZHAO**

Purpose: This study aimed to develop a bispecific peptide (BsPt) capable of targeting both VEGFR2 and integrin $\alpha\text{v}\beta 3$ for the treatment of retinal and choroidal neovascularization (RNV/CNV).

Methods: Two BsPts with identical targets but different molecular structures were designed and synthesized: palmitic acid-K-FFVLK(KHVDSDH)-ATWLPPR (PF(K)A) and palmitic acid-K(KHVDSDH)-FFVLK-ATWLPPR (P(K)FA). Their binding affinity, fibrillogenesis, and cytotoxicity were evaluated in vitro using rat retinal microvascular endothelial cells (rMECs) and MCF-7 cells. The in vivo efficacy and safety of the selected BsPt, PF(K)A,

were assessed in mouse models of oxygen-induced retinopathy (OIR) and laser-induced CNV. Additionally, the gene expression profile of rMECs treated with PF(K)A was analyzed using RNA sequencing to investigate the underlying mechanisms of its anti-angiogenic and anti-leakage effects.

Results: BsPt binds to both receptors on endothelial cells (ECs) and forms nanofibrous networks on their surfaces, resulting in potent NV inhibition. In vitro, BsPt suppressed retinal EC migration and tube formation. Intravitreal BsPt injection outperformed aflibercept in mouse models of OIR and laser-induced CNV. RNA sequencing revealed that BsPt-induced nanofibers upregulated extracellular matrix (ECM) and cell adhesion genes, which may contribute to anti-angiogenesis and anti-leakage effects.

Conclusions: BsPt targeting VEGFR2 and integrin $\alpha\text{v}\beta 3$, particularly PF(K)A, exhibits enhanced therapeutic potential for treating RNV and CNV. This novel approach holds promise for the development of more effective treatments for ocular neovascular diseases.

Abstract No.: 203350
Brolucizumab Efficacy and Safety Single-Arm Descriptive Trial in Patients With Persistent Diabetic Macular Edema (BEST Study)

First Author: Honghua **YU**

Co-Author(s): Dan **CAO**, Yunyan **HU**, Ziyi **HUANG**, Jing **LI**, Anyi **LIANG**, Chenxiao **SHEN**, Chunwen **ZHENG**

Purpose: To evaluate the efficacy and safety of brolucizumab in patients with pDME (persistent diabetic macular edema) (BEST study, NCT06498050).

Methods: The BEST study is a 28-week, prospective, single-arm, open-label clinical trial involving 52 Chinese subjects with pDME, defined as CST (central subfield thickness) $\geq 320 \mu\text{m}$ despite ≥ 3 anti-vascular endothelial growth factor injections within 20 weeks, and baseline BCVA (best-corrected visual acuity) 23-78 letters. Study eyes receive brolucizumab 6mg injections every 6 weeks (at week 0, 6, 12, 18, and 24) or switch to a 12-week interval (at week 0, 6, 12, and 24) if no disease activity at week 18.

Results: Of the 52 patients enrolled, 50 (96.2%) and 49 (94.2%) completed the 18-week and 28-week visits, respectively. At week 28, 61.2% of eyes achieved CST $< 300 \mu\text{m}$, and 89.8% achieved a ≥ 5 -letter gain in BCVA. Mean baseline CST was $510.9 \pm 18.4 \mu\text{m}$, and BCVA was 58.4 ± 2.0 letters. At week 28, the adjusted mean change from baseline for CST was $-199.5 \mu\text{m}$ (95% CI, -221.9 to -177.2 ; $P < 0.0001$) and $+13.0$ letters for BCVA (95% CI, 10.7 – 15.3 ; $P < 0.0001$). At week 18, 90.0% of subjects had no disease activity and were extended to 12-week dosing intervals. Intraocular inflammation (IOI) occurred in 1 eye (1.9%) and resolved rapidly with topical steroid treatment.

Conclusions: Brolucizumab 6mg administered every 6 weeks achieved clinically significant anatomical and visual improvement in patients with pDME.

Abstract No.: 204470

Carotid Revascularization and Circle of Willis in Ocular Ischemic Syndrome: Association With Neovascular Glaucoma and Visual Prognosis

First Author: Jialin **WANG**

Co-Author(s): Xueru **CHENG**

Purpose: Ocular ischemic syndrome (OIS) and subsequent neovascular glaucoma (NVG) lead to irreversible visual impairment. This study aimed to investigate the association of carotid artery revascularization and the collateral circulation types via the circle of Willis (CoW) with NVG and visual prognosis in patients with OIS.

Methods: This retrospective cohort study included 22 patients with OIS, with a median follow-up of 12 months. The collateral circulation patterns via the CoW were classified into five types. The association of the carotid artery revascularization, collateral circulation types via the CoW, and morphological characteristics of the CoW with the presence of NVG and visual outcomes was assessed.

Results: The median time interval from baseline to visual decline during follow-ups in patients with carotid artery revascularization was longer than that in patients without carotid artery revascularization (13 months vs. 9.5 months, $P=0.041$). Lacking collateral inflow via the CoW to the hemisphere ipsilateral to OIS was associated with NVG (OR, 11.000; $P=0.022$). The diameters of the C6 and C7 segments of the internal carotid artery, the A1 segment of the anterior cerebral artery, and the ophthalmic artery in OIS eyes were smaller than those in the contralateral eyes.

Conclusions: Early carotid artery revascularization should be considered in patients with OIS, with or without NVG, as it may contribute to an improved visual prognosis. Patients without collateral inflow via the CoW to the hemisphere ipsilateral to OIS may have a higher risk of NVG.

Abstract No.: 206303

Causal Effects of Gut Microbiota and Associated Metabolites on Retinal Diseases and Visual Impairment: A Mendelian Randomization Study

First Author: Chuyao **YU**

Co-Author(s): Wen-bin **WEI**

Purpose: Previous observational study findings have indicated a vital association between gut microbiota features and retinal diseases based on the “gut-retina”

axis. However, whether their relationships underlie causal effects remains to be established.

Methods: Based on GWAS data of 211 gut microbiota taxa and 28 gut-related metabolites/pathways as exposures, a two-sample Mendelian randomization analysis was conducted to assess their causal effects on multiple retinal conditions—including diabetic retinopathy, early AMD, retinal detachment/breaks, retinal vascular occlusion, choroid/retinal disorders, and visual impairment. Causal relationships were evaluated using IVW, MR-Egger, weighted median, simple mode, and weighted mode methods.

Results: Through MR analysis of 211 microbes and six clinical phenotypes, 35 gut microbiome taxa and 3 associated metabolites were identified as linked to various outcomes. Cochrane’s Q test showed no significant heterogeneity among instrumental variables, and no horizontal pleiotropy was detected by MR-Egger and MR-PRESSO tests. After Bonferroni correction, Genus id.2041 (OR = 0.874, 95% CI: 0.816–0.936, $p=1.10e-04$, IVW) demonstrated a robust causal association with disorders of the choroid and retina, and was nominally correlated with multiple other retinal diseases. Seven exposure–outcome associations remained significant after adjusting for BMI or alcohol intake frequency in multivariable MR analyses. Reverse MR analysis indicated no significant causal effects of outcomes on gut microbiota, with no heterogeneity or horizontal pleiotropy detected.

Conclusions: We confirmed a potential causal relationship between some gut microbiota features and retinal diseases, thus providing new insights into the gut microbiota-mediated mechanism of retinopathy and indicating vital biomarkers for potential diagnostic, therapeutic and prevention strategies.

Abstract No.: 201785

Central Retinal Thickness as a Biomarker in Parkinson’s Disease: A Meta-Analysis of Spectral-Domain Optical Coherence Tomography Studies in Asian Populations

First Author: Michelle **TYRAYOH**

Co-Author(s): Vivian **ANGELINA HARSONO**, Franciscus **ASSISI TIMMY BUDI YUDHANTARA**, Hendrawan **CHANDRA KUSUMA**, Mia **PURNAMA**

Purpose: Parkinson’s disease (PD) involves retinal changes measurable by spectral-domain optical coherence tomography (SD-OCT). This meta-analysis evaluated whether central retinal thickness (CRT) differs between Asian PD patients and healthy controls, considering rising PD prevalence and potential genetic/anatomical differences.

Methods: Following PRISMA 2020, major databases were searched up to March 2025. Quality was assessed using the Newcastle–Ottawa Scale. Pooled mean differences (MD) with 95% confidence intervals (CI)

were calculated. Subgroup analyses were conducted to differentiate results obtained using Cirrus HD-OCT (Cirrus) and Spectralis SD-OCT (Heidelberg).

Results: Fifteen predominantly good-quality cross-sectional studies involving 1,884 eyes were included. Macular thickness was lower in PD patients (Cirrus MD $-5.0\ \mu\text{m}$, 95% CI -7.4 to -2.7 ; Heidelberg MD $-5.5\ \mu\text{m}$, 95% CI -6.7 to -4.2), particularly in the central macular region. Retinal nerve fiber layer (RNFL) thickness was lower in PD patients (Cirrus MD $-4.1\ \mu\text{m}$, 95% CI -5.5 to -2.7 ; Heidelberg MD $-2.9\ \mu\text{m}$, 95% CI -4.1 to -1.7), especially in the superior and inferior quadrants. Macular volume was significantly lower on Cirrus (MD $-0.2\ \text{mm}^3$, 95% CI -0.3 to -0.1). Ganglion cell–inner plexiform layer (GC-IPL) on Cirrus was borderline significant (MD $-4.1\ \mu\text{m}$, 95% CI -8.2 to 0.0).

Conclusions: In Asian populations, OCT reveals central macular thickness and superior/inferior RNFL thickness differences between PD patients and controls. Macular volume differences were detected with Cirrus. OCT parameters may provide potential non-invasive biomarkers for PD.

Abstract No.: 206231

Characterization of Collateral Circulation After Anti-VEGF Treatment for Retinal Vein Occlusion

First Author: Yuntao **HU**

Co-Author(s): Renyan **WANG**

Purpose: This is a retrospective study on the effects of anti-VEGF therapy and systemic factors on the formation of collateral circulation in patients with retinal vein occlusion (RVO).

Methods: Among 157 patients clinically diagnosed with RVO (157 eyes), 87 had branch retinal vein occlusion (BRVO), and 70 had central retinal vein occlusion (CRVO). 62.07% of BRVO cases developed collateral circulation with an average establishment time of 172 days, while only 18.57% of CRVO cases developed collateral circulation with an average establishment time of 333 days.

Results: Different anti-VEGF therapy regimens did not significantly affect the formation of collateral circulation in BRVO patients ($P=0.90$), whereas a significant difference was observed in CRVO patients ($P<0.0001$), with fewer patients establishing collateral circulation after receiving anti-VEGF therapy. Diabetes and hypertension did not show a statistically significant effect on collateral circulation formation in either BRVO or CRVO patients.

Conclusions: Collateral circulation is an important prognostic factor for RVO. Collateral circulation is usually beneficial to RVO results. In this study, we did not find that anti-VEGF affected the formation of collateral circulation in RVO patients.

Abstract No.: 209326

Choriocapillary Flow Deficit Ratio and Subretinal Drusenoid Deposit Area as Indicators of Atrophy Development in Dry Age-Related Macular Degeneration

First Author: Liang **ZHOU**

Co-Author(s): Steve **BAILEY**, Yukun **GUO**, Yali **JIA**, Jie **WANG**

Purpose: To evaluate the predictive value and temporal dynamics of choriocapillaris (CC) and retinal vascular and structural metrics for the development of complete retinal pigment epithelium and outer retinal atrophy (cRORA) in eyes with intermediate age-related macular degeneration (iAMD).

Methods: Retrospective longitudinal observational study. Twenty-nine eyes with iAMD underwent serial $3 \times 3\ \text{mm}$ spectral-domain OCT angiography (SD-OCTA; Avanti or Solix, Optovue Inc.; 70–120 kHz A-scan rate) centered on the fovea. Quantitative OCTA metrics including CC flow deficit ratio, nonperfusion area (NPA) in the superficial (SVC), intermediate (ICP), and deep (DCP) capillary plexuses were computed using automated algorithms. Automated quantitative OCT metrics included subretinal drusenoid deposit (SDD) area and volume, and drusen volume. Univariable and multivariable Cox regression analyses identified metrics as predictors for cRORA; receiver operating characteristic (ROC) and Kaplan–Meier analyses determined optimal thresholds and cumulative incidence. Intraclass correlation coefficients (ICCs) assessed repeatability.

Results: Among 29 eyes with iAMD, 11 developed cRORA within 24 months, while 18 remained free of atrophy. Of all vascular and structural methods, only greater baseline CC flow deficit ratio and larger SDD area were independently associated with increased risk of cRORA within 24 months (HR = 1.11, 95% CI 1.01–1.23, $p = 0.035$; HR = 1.03, 95% CI 1.01–1.05, $p = 0.001$, respectively). ROC analyses identified optimal thresholds of 0.073 for CC flow deficit ratio (AUC = 0.99) and 0.262 mm^2 for SDD area (AUC = 0.92). Longitudinal analysis showed progressive CC impairment and a gradual SDD decline preceding atrophy onset. The NPA of the DCP increased at the time of cRORA (Figure 1). All OCTA-derived quantitative metrics demonstrated excellent repeatability (intraclass correlation coefficient > 0.89 ; $p < 0.001$). Figure 2 illustrates a representative case that developed cRORA during follow-up.

Conclusions: Baseline CC flow deficits and SDD area are independent risk factors for predicting development of cRORA in eyes with iAMD. CC flow deficits and SDD progressively declined prior to cRORA, while an increase of DCP NPA was associated with cRORA. OCT/OCTA-derived metrics have potential to become important biomarkers for risk stratification and therapeutic evaluation.

Abstract No.: 200839

Clinical Characteristics and Prognostic Factors Affecting Clinical Outcomes in Cytomegalovirus Retinitis Following Allogeneic Hematopoietic Stem Cell Transplantation

First Author: Qiaozhu **ZENG**

Co-Author(s): Jing **HOU**, Heng **MIAO**, Yuou **YAO**

Purpose: This study aimed to evaluate the clinical characteristics and identify the prognostic factors affecting visual outcomes, retinal detachment, and recurrence in cytomegalovirus retinitis (CMVR) patients following allogeneic hematopoietic stem cell transplantation (allo-HSCT).

Methods: A retrospective analysis of 54 CMVR patients (84 eyes) who underwent allo-HSCT between 2015 and 2024 was conducted. Ophthalmologic and systemic evaluations were performed. The visual outcomes were classified as improvement, stabilization, and deterioration. Logistic regression and LASSO regression models were used to identify the prognostic factors.

Results: Improved or stabilized visual outcomes were found in 22 eyes, while 62 eyes suffered from deterioration. Larger lesion areas were independently associated with poorer visual outcomes (OR 0.989, $p = 0.002$). Eight (9.5%) eyes had rhegmatogenous retinal detachment, and thirteen (15.5%) eyes suffered from recurrence. Retinal detachment was significantly predicted by higher baseline aqueous CMV DNA load (OR 5.087, $p = 0.026$). Macula involvement (OR 5.322, $p = 0.032$) and more intravitreal injections (IVs) (OR 1.263, $p = 0.008$) were independent risk factors for recurrence. No systemic factors were found to be associated with the clinical outcome of eyes with CMVR.

Conclusions: Ocular characteristics, rather than systemic factors, were more useful to predict the clinical outcome of eyes with CMVR. Routine ophthalmic screening and early intervention are essential to improving outcomes in this vulnerable population.

Abstract No.: 202000

Clinical Characteristics in Childhood Versus Adult-Onset Unilateral Coats Disease: A Global Collaborative Study

First Author: Chung-ting **WANG**

Co-Author(s): Andrew S.h. **TSAI**, Wei-chi **WU**

Purpose: To compare clinical features and outcomes of childhood- versus adult-onset Coats disease.

Methods: International, multicenter, non-comparative retrospective case series. Clinical data were collected from 19 international ophthalmic centers. Patients diagnosed at ≤ 18 years old were classified as childhood-onset, and those diagnosed after 18 years

old as adult-onset. Demographics, presenting features, clinical characteristics, and visual outcomes were compared.

Results: A total of 687 eyes from 687 patients were analyzed. Early-stage disease (stage 1–2) was significantly more common in adult-onset cases (92.2% vs. 51.8%, $p < 0.001$). Both groups showed male predominance, though the proportion of females was higher in adult-onset disease (22.5% vs. 11.7%, $p = 0.001$). Childhood-onset cases had significantly worse presenting and final visual acuity. Adult-onset patients more frequently presented with decreased vision and floaters, whereas strabismus and leukocoria were more common in childhood-onset disease. Subfoveal nodules were more frequent in childhood-onset cases (40.7% vs. 13.7%, $p < 0.001$). Childhood-onset disease was associated with extensive exudation (52.4% vs. 40.3%, $p = 0.007$), while exudates confined within the arcade were more common in adult-onset eyes (23.9% vs. 17.9%, $p = 0.001$). Among those with extramacular exudation, involvement of a single quadrant was more frequent in adult-onset cases (39.0% vs. 27.8%, $p = 0.011$).

Conclusions: Adult-onset Coats disease tends to present with less aggressive features, fewer subfoveal nodules, and more limited exudation, resulting in better visual outcomes. Despite overall male predominance, a higher proportion of female patients was observed in adult-onset disease.

Abstract No.: 204700

Clinical Characteristics of the Vascular Changes in Pediatric Patients With Congenital Retinoschisis

First Author: Jing **MA**

Co-Author(s): Hai **LU**

Purpose: To investigate the clinical characteristics of abnormal vascular changes in the fundus of pediatric patients with congenital X-linked retinoschisis (XLRS).

Methods: This retrospective case series study included pediatric patients (age ≤ 18 years) diagnosed with XLRS at Beijing Tongren Hospital, Capital Medical University, between December 2017 and November 2024. All eyes underwent wideangle fundus photography, with some patients additionally receiving fundus fluorescein angiography (FFA). The prevalence and patterns of vascular abnormalities were analyzed, along with their correlations with clinical outcomes.

Results: A total of 112 pediatric cases (218 eyes) were included. All patients were male, with a median age of 5.00 years (range: 9 months to 17 years). Abnormal vascular changes were detected in 139 eyes (63.8%) on fundus photography, including vascular sheathing (35.8%), tortuosity (32.6%), bridging vessels (29.4%), exudation (9.2%), and neovascularization (3.2%). Among 85 FFAevaluated eyes (44 patients), 96.5%

exhibited abnormalities, including nonperfusion areas (96.5%, 82/85), extramacular leakage (94.1%, 80/85), and neovascularization (15.3%, 13/85). Vascular anomalies were observed in both schitic and nonschitic peripheral retina in 78.8% (67/85) of eyes, exclusively in schitic areas in 17.6% (15/85), and in nonschitic regions in 1.2% (1/85). One eye with exudative retinal detachment secondary to massive subretinal exudation achieved complete resolution following antiVEGF therapy. Eyes with abnormal vascular changes demonstrated significantly higher rates of peripheral retinoschisis, vitreous hemorrhage, retinal detachment and tractional retinal detachment compared to unaffected eyes (all $P < 0.05$). Worse median visual acuity was observed in eyes with peripheral retinoschisis, vitreous hemorrhage, retinal detachment, abnormal vascular changes, vascular sheathing, tortuous vessels compared to unaffected eyes (all $P < 0.05$).

Conclusions: Pediatric XLRS patients exhibit diverse fundus vascular abnormalities. Eyes with vascular abnormalities demonstrate significantly higher complication rates and worse visual acuity.

Abstract No.: 206862

Clinical Characteristics, Imaging Features, and Outcomes of Retinal Arterial Macroaneurysms: A Retrospective Study at a Tertiary center of Taiwan

First Author: Yu Hsuan **YEN**
Co-Author(s): Kuan Jen **CHEN**

Purpose: Retinal arterial macroaneurysms (RAM) are focal dilatations of retinal arterioles, often near the superior temporal artery bifurcations. They may impair vision through hemorrhage, exudation, or macular edema. However, standardized management guidelines and epidemiologic data, especially in Taiwan, remain limited. This study evaluates the clinical features, imaging, management, and outcomes of RAM in a Taiwanese tertiary center.

Methods: This retrospective study reviewed approximately 120 RAM patients at Linkou Chang Gung Memorial Hospital between 2004 and 2025. Data included demographics, systemic/ocular history, symptoms, imaging (OCT, FA, fundus photos), treatments (observation, laser, anti-VEGF, pneumatic displacement, vitrectomy), and visual/anatomical outcomes. Analyses used descriptive statistics and multivariate regression.

Results: Patients were mostly female, mean age 75, with high hypertension prevalence. RAM commonly occurred at second or third superior temporal branches, often hemorrhagic and macula-involving. Treatment distribution among preliminary cases was: Observation: 50%, Anti-VEGF injections: 15%, Pneumatic displacement: 25% and Pars plana vitrectomy (TPPV): 10%. Anatomical and functional

improvements were noted, especially in cases treated with anti-VEGF or surgery. Representative imaging highlighted ILM detachment and sub-ILM hemorrhages with notable visual recovery in some cases.

Conclusions: This first large-scale Taiwanese RAM study highlights its clinical and imaging spectrum. RAM may indicate systemic vascular disease and is frequently underdiagnosed. Although no standard treatment exists, anti-VEGF use is rising with favorable outcomes in selected cases. Prospective studies are needed for evidence-based protocols.

Abstract No.: 201156

Clinical-Grade Artificial Intelligence for Diabetic Retinopathy Grading and Lesion Detection With UK NHS-Validated Standards for High-Volume Triage in Remote and Virtual Eye Care

First Author: Pradipta **CHOWDHURY**
Co-Author(s): Prakash Kumar **CHOWDHURY**, Anureet **KAUR**

Purpose: To develop a clinical-grade deep learning system that integrates NHS-standard diabetic retinopathy (DR) severity classification with granular lesion-level detection, optimized for high-volume triage and clinician-assistive workflows in remote and virtual ophthalmic care.

Methods: We designed a dual-branch convolutional neural network based on the DenseNet-201. The severity branch was trained on 63,077 fundus photographs labeled by NHS diabetic retinopathy grading standards: R0 (no retinopathy), R1 (mild non-proliferative), R2 (moderate to severe non-proliferative), and R3 (proliferative retinopathy), alongside M0 (no maculopathy) and M1 (presence of maculopathy). The second dataset included 18,533 fundus images with lesion-level annotations for ten diabetic retinopathy pathologies: microaneurysms, retinal hemorrhages, cotton wool spots, hard exudates, intraretinal microvascular abnormalities (IRMA), neovascularization at the disc (NVD), neovascularization elsewhere (NVE), venous beading, vitreous hemorrhage, and tractional retinal detachment (TRD). Severity classification used focal loss with softmax, while lesion detection applied sigmoid outputs with binary cross-entropy. Image augmentation, class weighting, and Grad-CAM validation were incorporated.

Results: The severity model achieved 94.2% accuracy, sensitivity 93.3%, specificity 92.6%, F1-score 92.9%, and macro-AUC 0.976. Detection was strongest for proliferative DR with maculopathy (AUC 96.9%), weakest for R2-M0 (AUC 91.4%). The lesion model achieved a mean AUC of 0.981, the highest for exudates (98.8%) and microaneurysms (98.4%), the lowest for IRMA (93.8%) and TRD (92.2%). Grad-CAM

heatmaps aligned with annotated lesions in 92.5% of cases, confirming model interpretability.

Conclusions: This dual-branch AI enables precise Diabetic Retinopathy grading, lesion detection, scalable screening, clinician support, and smartphone deployment.

Abstract No.: 205024

Comparable Ocular Safety Profiles Shown With Aflibercept 8 mg and 2 mg: A CANDELA, PHOTON, PULSAR, and QUASAR Trial Pooled Safety Analysis

First Author: Voraporn CHAIKITMONGKOL

Purpose: To compare the ocular safety of aflibercept 8 mg and 2 mg across the Phase 2 and 3 trials.

Methods: Patients were randomly assigned to aflibercept 8 mg or 2 mg in the CANDELA and PULSAR nAMD, PHOTON DME, and QUASAR RVO studies. Safety data to Week 96 were pooled for analysis.

Results: Overall, 2665 patients (8 mg: n=1808; 2 mg: n=857) were treated and evaluated. Study eye ocular treatment-emergent adverse events (TEAEs) were reported in 42.7% (8 mg) and 40.6% (2 mg) of patients: most commonly cataract, reduced visual acuity, increased intraocular pressure (IOP), and conjunctival hemorrhage. Similar rates of IOP-related TEAEs in the study eye (such as IOP increase and ocular hypertension) were observed across the studies (8 mg: 4.5%; 2 mg: 3.4%). No clinically relevant difference in pre- to post-injection IOP change was observed between aflibercept 8 mg and 2 mg groups. Rates of intraocular inflammation (8 mg: 1.1%; 2 mg: 1.5%) and endophthalmitis (8 mg: <0.1%; 2 mg: 0.5%) were low and similar, with no occlusive retinal vasculitis cases reported.

Conclusions: The ocular safety profile of aflibercept 8 mg was consistent with that of 2 mg to Week 96 across all indications.

Abstract No.: 202497

Comparative Efficacy of Faricimab for the Treatment of Diabetic Macular Edema at 1 and 2 Years: A Systematic Literature Review and Network Meta-Analysis

First Author: Colin TAN

Co-Author(s): Mark BARAKAT, Christian BUEHRER, Kara GIBSON, Nancy HOLEKAMP, Jakob SIEDLECKI

Purpose: Faricimab, a dual angiopoietin-2/VEGF (vascular endothelial growth factor)-A bispecific antibody, improves disease control and extends treatment durability in DME (diabetic macular edema). This systematic literature review and Bayesian NMA (network meta-analysis) of RCTs (randomized controlled trials) compared the efficacy and safety of faricimab per a personalized T&E (treat-and-extend)

regimen (Q4W [every-4-weeks]–Q16W) with other DME therapies.

Methods: Faricimab-6mg (T&E/Q8W) data from YOSEMITE [NCT03622580] / RHINE [NCT03622593] RCTs were used. Comparators included aflibercept-2mg Q4W/Q8W/PRN (pro-re-nata), aflibercept-8mg Q12W/Q16W, bevacizumab-1.25mg PRN, brolucizumab-6mg Q4W/Q12W, ranibizumab-0.3/0.5mg T&E/PRN/Q4W, dexamethasone-0.7mg PRN, and laser photocoagulation PRN. Outcomes were change in BCVA (best-corrected visual acuity; ETDRS [Early Treatment Diabetic Retinopathy Study] letters) and CST (central subfield thickness) through 12- and 24-months, and ≥15-ETDRS letter gainers and ≥1 ocular AE (adverse event) at 12-months.

Results: The NMA included 24 RCTs. Faricimab-T&E showed comparable/favorable mean BCVA and CST changes through 12 months vs aflibercept-8mg Q12W and Q16W (mean differences [95%CrI, credible interval]: -1.1 [-4.0,1.7], -1.9 [-4.8,1.0] ETDRS letters; and 32.6 [0.8,64.3], 39.7 [7.2,71.6]μm, respectively). Similar results were observed through 24 months. Aflibercept-8mg Q16W had lower (OR [odds ratio] [95%CrI]: 0.35 [0.16,0.75]), while other anti-VEGF treatments had similar ≥15-ETDRS letter gainers at 12-months vs faricimab-T&E. Occurrence of ≥1 ocular AE at 12-months was similar for all treatments vs faricimab-T&E except bevacizumab (OR[95% CrI]: 4.4 [1.6,13.0] and dexamethasone (4.2 [2.3,7.8]).

Conclusions: These data highlight faricimab's (T&E up to Q16W) potential to provide greater and durable DME disease control vs anti-VEGF alone.

Abstract No.: 201305

Comparative Efficacy of Large Language Models (Google Gemini and ChatGPT 4.0) in Screening Patients for Diabetic Retinopathy

First Author: Ahana SEN

Co-Author(s): Bhagyashree, Rohan BASAK, Sarang GOKHALE, Ankeet PANDA, Rupak ROY

Purpose: To study the comparative efficacy of 2 publicly accessible Large Language Models (LLMs), namely Google Gemini & Chat GPT 4.0, in diabetic retinopathy (DR) screening.

Methods: Fundus photos of 151 eyes of patients with a diagnosis of diabetic retinopathy and 50 control eyes with normal fundus findings were uploaded to Gemini and ChatGPT. Specific questions regarding the presence of DR and its referability were asked for each image, and the responses were recorded, analysed, and evaluated against the grading of the same images by a retina fellowship-trained human grader.

Results: A total of 201 images were randomly selected, of which 151(75.1%) had diabetic retinopathy and 50(24.8%) were control eyes with normal fundus findings. The responses were recorded and compared

with the answers of the human grader. Sensitivity and specificity of the LLMs in detecting DR were 84.40% and 95.10% for Chat GPT and 88.70% and 59.30% for Gemini. For referability of the eye, sensitivity and specificity were 86.40% and 82.60% for ChatGPT and 91.60% and 56.30% for Gemini.

Conclusions: This is the first study to explore the utility and efficacy of LLM in DR screening. Use of LLMs can have a huge impact on health care benefits, like screening of diabetic patients in remote areas where trained eye care personnel may not be available.

Abstract No.: 201055

Comparison of Intraocular Inflammation Associated With High-Dose Intravitreal Anti-Vascular Endothelial Growth Factor Agents: A Real-World Disproportionality Analysis

First Author: Du JIANTONG

Purpose: The safety profiles of high-dose intravitreal anti-vascular endothelial growth factor (VEGF) agents remain incompletely characterized. This study aimed to compare ocular adverse events, especially intraocular inflammation associated with brolocizumab, faricimab, and 8 mg aflibercept.

Methods: Adverse event reports for high-dose anti-VEGF agents were extracted from the FDA Adverse Event Reporting System (FAERS) database. After data standardization, quantitative signal detection analyses were performed using multiple pharmacovigilance tools. Clinical characteristics and time-to-onset profiles of adverse events were also assessed.

Results: Among 8,470 reports where high-dose anti-VEGF agents were designated as primary suspects, intraocular inflammation was the primary adverse reaction. The strongest signals were: retinal vasculitis with brolocizumab (retinal perivascular sheathing; reporting odds ratio (ROR)=7,451.51 [95% CI:4,528.22-12,261.99]), vitritis with faricimab (ROR=655.54 [95% CI:548.85-782.95]), and anterior chamber inflammation with 8 mg aflibercept (anterior chamber cells: ROR=1,749.13 [95% CI: 1,149.34-2,661.92]). SMQ analysis confirmed a descending gradient of inflammatory signal strength: brolocizumab exhibited the strongest signals, followed by aflibercept 8 mg, then faricimab.

Conclusions: Intraocular inflammation profiles differ significantly among high-dose anti-VEGF agents. Comprehensive evaluation of individual patients' risk factors is recommended to guide clinical decision-making.

Abstract No.: 205679

Comparison of Three-Dimensional Choroidal Contour in Patients With Neovascular Age-Related Macular Degeneration and Their Fellow Eyes

First Author: Sumit RANDHIR SINGH

Co-Author(s): Jay CHHABLANI, Kiran KUMAR

VUPPARABOINA, Elham SADEGHI, Jose-alain SAHEL

Purpose: To compare the 3-dimensional choroidal contour map of patients with neovascular age-related macular degeneration (nAMD) and their fellow eyes.

Methods: This cross-sectional study included 30 patients with nAMD in one eye and early/intermediate AMD in the fellow eye. Wide-field (12*12mm) swept source optical coherence tomography (SS-OCT) volumetric scans were obtained. Choroidal inner and outer boundaries (CIB, COB) were delineated based on our previously reported deep-learning model. Best-fit spherical radius (R, mm) was calculated for CIB and COB and compared in both groups using paired t-tests. The regional variation of RCIB and RCOB in different sectors (superior, inferior, nasal, temporal, and central) was compared. P values ≤ 0.05 were considered statistically significant.

Results: Mean ($\pm$ SD) RCIB was 32.8 ± 8.6 mm and 32.5 ± 9.4 mm in nAMD group and their fellow eyes, respectively ($p=0.80$). Similarly, mean ($\pm$ SD) RCOB was 31.3 ± 7.0 mm in nAMD group with no statistically significant variation in their fellow eyes (early/intermediate AMD: 31.5 ± 9.0 mm, $p=0.88$). Comparison of RCIB (nAMD: 15.0 ± 9.1 mm; fellow eye: 15.2 ± 10.4 mm; $p=0.91$) and RCOB (nAMD: 13.6 ± 8.1 mm; fellow eye: 12.2 ± 9.0 mm; $p=0.48$) in the central sector where AMD lesions were located was not significant. Intragroup sectoral comparisons of RCIB and RCOB in both groups were statistically significant (all p values < 0.01).

Conclusions: RCIB and RCOB exhibited significant regional variations across different sectors in both eyes, including nAMD and fellow eyes. However, the comparison of RCIB and RCOB between the two groups was not significantly different.

Abstract No.: 200272

Congenital Hypertrophy of the Retinal Pigment Epithelium: Clinical Spectrum and Imaging Characteristics From a Retrospective Fundus Photography Cohort

First Author: Sashwanthi MOHAN

Purpose: To describe the clinical and imaging characteristics of congenital hypertrophy of the retinal pigment epithelium (CHRPE) identified through retrospective analysis of fundus photographs over a 2-year period.

Methods: A retrospective chart review was conducted using electronic medical records of patients diagnosed with retinal and choroidal disorders, identified via relevant ICD-10 codes. Fundus photographs of 65 patients were reviewed, and 21 patients (23 eyes) were found to have lesions consistent with CHRPE. Data collected included demographics, laterality, number and morphology of lesions, and fundus autofluorescence (FAF) imaging findings, where available.

Results: Twenty-three eyes from 21 patients were analyzed. The mean patient age was 32.4 years (range: 6–74), with a slight female predominance. Most lesions were solitary and unilateral. Grouped CHRPEs were counted as single lesions. In total, 25 individual CHRPE lesions were included in the analysis. Over half of the lesions were located in the mid-periphery and were round in shape. FAF imaging, available in 14 eyes, revealed predominantly hypoautofluorescent patterns. One patient had bilateral multifocal CHRPE, fulfilling criteria for referral for systemic screening to rule out familial adenomatous polyposis (FAP).

Conclusions: CHRPE is most commonly seen as a solitary, benign, and unilateral lesion. However, meticulous clinical evaluation and imaging are essential to distinguish it from simulating lesions such as choroidal nevi and to identify atypical presentations. Bilateral multifocal CHRPE warrants further systemic evaluation for syndromic associations, such as Gardner syndrome. This study highlights the utility of fundus photography in the detection and documentation of CHRPE.

Abstract No.: 200463

Crocini in Patients With Central Serous Chorioretinopathy: A Pilot Randomized Clinical Trial

First Author: Mojtaba **HEYDARI**

Co-Author(s): Mohammad Karim **JOHARI**

Purpose: To evaluate the efficacy and safety of crocin in patients with central serous chorioretinopathy in a randomized clinical trial.

Methods: In this pilot randomized, double-blind, placebo-controlled trial, 40 individuals diagnosed with CSCR were randomized to receive either crocin supplementation (n=20) or placebo (n=20) for six months. Evaluations included changes in visual acuity (using ETDRS scores), retinal structure via optical coherence tomography (OCT), and monitoring for any adverse effects. Measurements were taken at baseline and after the intervention period.

Results: Baseline characteristics such as age, weight, BMI, and gender were similar between the two groups ($p > 0.05$). Participants receiving crocin demonstrated significantly greater improvement in mean ETDRS letter score compared to those receiving placebo (4.27 ± 3.63

vs. 0.57 ± 7.23 ; $p = 0.024$). Additionally, improvements of ≥ 10 , ≥ 5 , and ≥ 1 ETDRS letters were observed in 20%, 40%, and 80% of the crocin group, compared to 7%, 21%, and 29% in the placebo group ($p = 0.316$, $p = 0.280$, and $p = 0.005$, respectively). Although reductions in subretinal fluid, central macular thickness, and choroidal thickness were greater in the crocin group, the differences were not statistically significant ($p > 0.05$). No adverse effects were reported in either group during the study.

Conclusions: This preliminary trial suggests that crocin supplementation may enhance visual outcomes in CSCR patients. However, its effect on retinal anatomy remains inconclusive and warrants further investigation in larger trials.

Abstract No.: 202652

Cuticular Drusen in Asian Neovascular Age-Related Macular Degeneration: Clinical Features and Polypoidal Choroidal Vasculopathy Association

First Author: Chenxi **ZHANG**

Co-Author(s): Hiok Hong **CHAN**, Chui Ming Gemmy **CHEUNG**, Beau J **FENNER**, Noa **GILEAD**, Zehua **JIANG**, Anna C S **TAN**, Kelvin Yi Chong **TEO**

Purpose: To characterize the clinical features of cuticular drusen (CD) in Asian patients with neovascular age-related macular degeneration (nAMD), and to evaluate its association with polypoidal choroidal vasculopathy (PCV) and the risk of macular neovascularization (MNV).

Methods: Baseline multimodal images from a prospective Asian nAMD cohort were analyzed. Patients were classified into cuticular drusen (CD), soft drusen (SD), or no drusen (ND) groups based on multimodal imaging. Clinical and imaging features were compared. MNV lesions were subtyped as PCV or typical nAMD. For eyes without MNV at baseline, the 5-year cumulative incidence of MNV was estimated using Kaplan–Meier analysis.

Results: A total of 104 patients (173 eyes) were included: 16 with CD (21 eyes), 43 with SD (62 eyes), and 45 with ND (90 eyes). CD patients had a mean age of 75.5 ± 9.1 years and a balanced gender distribution (50% male), comparable in age to SD (75.6 ± 6.9 years) but older than ND (66.2 ± 7.4 years; $p < 0.001$). CD eyes had shorter axial length than ND ($p = 0.004$) and commonly coexisted with large drusen (66.7%) and subretinal drusenoid deposits (33.3%). MNV was present in 52.3% of CD eyes, with 54.5% classified as PCV, which was intermediate to SD (25.0%) and ND (74.5%). Among CD eyes without baseline MNV, the 5-year incidence was 11.1%, also intermediate to ND (0.0%) and SD (38.2%).

Conclusions: In this Asian nAMD cohort, patients with CD were older with a more balanced gender

distribution. Its notable association with PCV and MNV risk highlights the need for continued monitoring and further investigation.

Abstract No.: 201815

Deep Phenotyping of Eyes Shut Homolog-Associated Retinopathy Based on Visual Impairment Patterns

First Author: Daiki SAKAI

Co-Author(s): Yasuhiko HIRAMI, Yasuo KURIMOTO, Akiko MAEDA, Akishi ONISHI, Masayo TAKAHASHI, Satoshi YOKOTA

Purpose: This study aimed to classify and characterize the phenotypes of eyes shut homolog (EYS)-associated retinopathy based on visual impairment patterns.

Methods: This retrospective, single-center, cross-sectional study was conducted in 154 patients diagnosed with EYS-related retinopathy who underwent genetic testing between December 2017 and July 2023. Phenotyping was performed only in patients who underwent Goldmann perimetry and Humphrey visual field 10-2 testing. Phenotypes were categorized as early, pericentral, typical, and advanced based on peripheral visual field preservation, central visual field impairment, and macular impairment. Genetic and ophthalmological characteristics were compared between the pericentral and typical types.

Results: A total of 39 eyes from 39 patients with EYS-associated retinopathy (average age: 48.2 ± 11.9 years, 21 women) were analyzed. Ten pathogenic variants were identified, with the three major variants (p.G843E, p.S1653fs, and p.Y2935X) accounting for a combined allele frequency of 83.3%. The phenotypes were classified as early (n=3), pericentral (n=18), typical (n=9), and advanced (n=9). No significant differences were observed between the pericentral and typical types in terms of the presence of major variants or biallelic null variants. Age and age at onset also did not differ significantly. However, macular impairment was significantly more frequent in the pericentral type (61.8%) than in the typical type (11.1%) ($P = 0.014$).

Conclusions: The pericentral type is considered a common phenotype of EYS-associated retinopathy, although its correlation with the genotype remains unclear. Despite preserved peripheral vision, careful monitoring is warranted due to the risk of macular impairment.

Abstract No.: 200148

Diabetic Retinopathy (DR) Nomogram Construction Based on Optical Coherence Tomography Angiography Parameters: A Preliminary Exploration of DR Prediction

First Author: Zijong LI

Purpose: To construct a diabetic retinopathy (DR) prediction nomogram based on optical coherence tomography angiography (OCTA) parameters.

Methods: In this retrospective study, patients with type 2 diabetes mellitus who completed DR screening were enrolled and divided into training and validation sets. Fifteen parameters, including OCTA parameters, axial length (AL), age, and sex, were selected via least absolute shrinkage and selection operator (LASSO) in the training set. The chosen parameters were used to construct the model. Model performance was evaluated for both the training and validation sets via receiver operating characteristic (ROC) curves, calibration curves, and decision curve analysis (DCA). A corresponding nomogram was created.

Results: A total of 464 eyes from 464 patients were divided into a training set (324, 69.83%) and a validation set (140, 30.17%). The superficial parafoveal capillary density (CD), deep parafoveal CD, foveal CD in the 300 μm -wide area surrounding the foveal avascular zone (FD-300 area), AL, and patient ages were included in the final model. The area under the curve of the model was 0.825 in the training set and 0.831 in the validation set. The calibration curves showed good alignment between the actual and predicted outcomes in both datasets. DCA demonstrated that the nomogram was clinically useful.

Conclusions: A model with good performance for predicting DR via OCTA parameters was developed. The superficial parafoveal CD, deep parafoveal CD, and FD-300 area were important predictive parameters in this model. The corresponding nomogram may serve as a convenient tool for early DR risk prediction.

Abstract No.: 207635

Distribution Characteristics of Choroidal Thickness in Normal Population

First Author: Xinyuan ZHANG

Purpose: To characterize the distribution characteristics of choroidal thickness in healthy normal subjects and to define the diagnostic cut-off value for pachy choroid.

Methods: This cross-sectional study enrolled 446 eyes of 230 healthy subjects for the choroidal thickness distribution analysis. 149 eyes of 113 patients with CSC, 95 eyes of 81 patients with PCV, 70 eyes of 60 patients with neovascular AMD (nAMD), along with 382 eyes of 199 normal subjects matched for refractive error, age, and gender, were selected for likelihood ratio analysis. Routine eye examinations were performed in all

subjects. Swept-source optical coherence tomography (SS-OCT) of 9 mm×9 mm scanning mode was used to measure the subfoveal choroidal thickness (SFCT).

Results: Age and diopter were strongly correlated with SFCT ($P<0.001$). The diagnostic value range of pachychoroid in the 20-39 years group, 40-59 years group, 60-79 years group, and ≥ 80 years group was 320-330 μm , 330-340 μm , 250-275 μm , and 200-225 μm , respectively. The percentages of eyes with pachychoroid in the 20-39 years group, 40-59 years group, and ≥ 60 years group were 14.71% (10/68), 24.48% (47/192), and 28.89% (55/184), respectively. The proportion of pachychoroid in the ≥ 60 years group was significantly higher than that of the 20-39 years group, showing a statistically significant difference ($P=0.011$).

Conclusions: Age and diopter are the independent influencing factors of SFCT. We established the range of cut-off values for pachy choroid in different age groups when controlling for other factors, including diopters and gender.

Abstract No.: 206710

Drusen and Subretinal Drusenoid Deposits in a Korean Cohort: Five-Year Longitudinal Changes

First Author: Seungyeon **LEE**

Co-Author(s): Jaehwan **CHOI**, Dongkyu **KIM**, Kiyoun **KIM**, Seungyoung **YU**

Purpose: To investigate longitudinal changes in macular drusen and subretinal drusenoid deposits (SDDs) in Korean patients and their association with late age-related macular degeneration (AMD).

Methods: A total of 272 eyes from 172 patients with drusen or SDDs were retrospectively analyzed using en face swept-source OCT. Drusen volume was measured with an automated RPE elevation map. Sixty-four eyes from 40 patients were followed for five years, assessing visual acuity, choroidal thickness, drusen volume, and SDD distribution.

Results: Among 169 eyes with SDDs, groups included SDD-only, SDD with drusen, and large drusen-only. Over 80% of SDD patients were female. SDDs predominantly involved the superior macula, with trizonal distribution in 95%. Over five years, drusen volume increased (0.075 to 0.143 mm^3) but showed an undulating growth with regression in 20%. SDDs were mainly associated with geographic atrophy, while drusen-only eyes more often developed neovascular AMD. Loss of SDD distribution occurred in nearly half of SDD cases and was frequently followed by late AMD progression.

Conclusions: Drusen and SDD changes in Korean patients parallel findings in Caucasians. Drusen generally enlarge but may regress, while SDDs are strongly predisposed to GA. Disappearance of SDDs may signal imminent progression to late AMD.

Abstract No.: 200336

Dual-Model Translational Framework for Individualized Anti-VEGF Therapy in Diabetic Macular Edema: Bridging Biology and Precision Care

First Author: Aik Kah **TAN**

Purpose: To personalize anti-VEGF therapy in diabetic macular edema (DME), I developed a dual-model framework: a mechanistic model (Model 1) capturing biological treatment response, and an empirical model (Model 2) predicting individualized injection intervals using systemic biomarkers.

Methods: Model 1 employs differential equations to describe VEGF accumulation and anti-VEGF response. Model 2 estimates safe injection intervals (Imodel) from HbA1c, systolic blood pressure (BP), and glycemic variability (GV). Validation used DRCR.net Protocol H data (bevacizumab-treated eyes). Imodel predictions were compared against clinical reinjection thresholds: $>10\%$ increase in central subfield thickness or >5 -letter vision loss. Sensitivity analyses assessed parameter influence.

Results: Among 97 evaluable eyes, Model 2 achieved a safety rate of 63.6%, with a mean deviation of 4.7 ± 13.1 weeks. In a targeted-use subgroup ($n=49$) with poor systemic control (GV suppressed), safety rose to 77.6%, with a tighter deviation (5.0 ± 9.6 weeks). In the post-loading group (2 injections + 1 laser), model predictions closely matched clinical decisions (mean deviation: -0.1 weeks, SD: 5.6). HbA1c exerted $36\times$ more influence on interval prediction than BP. Model 1 supports this by linking poor glycemic control to VEGF rebound and earlier fluid recurrence.

Conclusions: This dual-model framework—linking biological mechanisms to data-driven personalization—offers both scientific transparency and real-world utility. It enables safe interval extension in DME and is designed for future integration with continuous glucose monitoring and explainable AI systems. By bridging theory and application, it advances precision retinal care.

Abstract No.: 200977

Dynamic Frailty Trajectories and Risk of Age-Related Macular Degeneration: A Prospective Cohort Study in UK Biobank

First Author: Yu **PENG**

Co-Author(s): Li Jia **CHEN**, Calvin Cp **PANG**, Jason Cs **YAM**, Yuzhou **ZHANG**

Purpose: To evaluate the longitudinal associations between dynamic frailty trajectories, including aggravation, maintenance, and alleviation, with incident age-related macular degeneration (AMD) risk.

Methods: We included 462,573 UK Biobank participants without baseline AMD and with baseline

frailty phenotype (FP) data for baseline assessment. A subset of 53,059 individuals, AMD-free at final assessment and with ≥ 1 follow-up FP assessment, comprised the trajectory cohort. Participants were categorized as nonfrail, prefrail, or frail based on their FP scores. Annualized frailty progression (Δ FP/year) was estimated via linear regression. Cox models assessed hazard ratios (HRs) and 95% confidence intervals (CIs) for AMD.

Results: Prefrail (HR:1.14; 95% CI:1.10–1.18) and frail (HR:1.36; 95% CI: 1.26–1.47) individuals had significantly higher AMD risks compared to nonfrail participants at baseline assessment. In the frailty trajectory analysis with a median follow-up duration of 3.3 years, 852 incident AMD cases (1.6%) were recorded. Each 1-point FP increase conferred 28% higher AMD risk (HR:1.28; 95%CI:1.18–1.38), while each 0.1-point/year Δ FP increase independently elevated risk by 15% (HR:1.15; 95%CI:1.10–1.21). Compared to stable nonfrail, prefrailty aggravation showed highest AMD risk (HR:2.26; 95%CI:1.51–3.37), followed by frailty alleviation (HR:1.73; 95%CI:0.98–3.04) and frailty maintenance (HR:1.72; 95%CI:0.86–3.41).

Conclusions: Progressive frailty trajectories, independent of baseline status, are associated with increased incident AMD risk. Early interventions targeting frailty progression may mitigate AMD risk in aging populations.

Abstract No.: 203079

Early Changes of Retinal Inner and Outer Layer Thickness Across Myopia Severity: Implications for Early Detection

First Author: Michael **HARTONO**

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Purpose: To evaluate structural alterations of retinal layers across different degrees of myopia.

Methods: Spectral-domain optical coherence tomography (OCT) scans of 104 eyes classified as emmetropia, mild, moderate, or high myopia were segmented to measure central and regional thickness of the retinal nerve fiber layer (RNFL), ganglion cell–inner plexiform layer (GC-IPL), inner retinal (from inner limiting membrane [ILM] to outer plexiform layer [OPL]), and outer retinal layer (from OPL to retinal pigment epithelium [RPE]) using Adobe Photoshop® ruler tool with vertical correction; validation studies confirmed no significant difference compared with the built-in OCT caliper (Zeiss Cirrus™ HD-OCT 5000). Statistical analysis included ANOVA, Kruskal–Wallis and Spearman correlations with spherical equivalent (SE).

Results: Central retinal thickness increased with myopia severity ($p<0.001$), characterized by inner layer thickening ($r=0.375$, $p<0.001$) and outer layer thinning

($r=-0.324$, $p<0.001$). RNFL correlated positively with SE in central and perifoveal regions ($r=0.20-0.36$, $p<0.05$), with changes already noted in mild and moderate myopia. GC-IPL consistently thinned with increasing myopia, most prominent in the outer temporal region ($r=-0.617$, $p<0.001$). The outer layer showed widespread thinning in superior, inferior, nasal, and temporal regions ($r=-0.27$ to -0.45 , all $p<0.01$). Non-significant findings included the inferior and nasal inner layer and inner temporal RNFL.

Conclusions: Myopia is associated with early, region-specific retinal alterations: central inner retinal thickening, perifoveal outer retinal, and GC-IPL thinning. Recognition of these early changes underscores the utility of OCT as a monitoring tool for timely detection, enabling preventive strategies against pathologic progression and long-term visual complications.

Abstract No.: 204501

Early Detection of Retinal Changes in Children With Diabetes Without Retinopathy Using Optical Coherence Tomography and Optical Coherence Tomography Angiography

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Purpose: To detect early retinal structural and microvascular changes in children and adolescents with diabetes mellitus (DM) without diabetic retinopathy (DR) using spectral-domain optical coherence tomography (SD-OCT) and optical coherence tomography angiography (OCTA), and to evaluate associations with glycemic control and disease duration.

Methods: This study is a single-center, cross-sectional observational study conducted at a tertiary referral center. Three hundred participants aged 8–18 years were enrolled, comprising 150 patients with type 1 or type 2 diabetes mellitus and 150 age- and sex-matched healthy controls. All participants underwent comprehensive ophthalmic evaluations, which included ultra-widefield fundus photography, SD-OCT, and OCTA. Laboratory assessments included serum creatinine and serial HbA1c measurements, from which a time-weighted average HbA1c was calculated. The quantitative imaging parameters were recorded and analyzed.

Results: 149 individuals with diabetes and 150 healthy controls were enrolled in the analysis. Within

the diabetic group, 148 patients showed no clinical evidence of diabetic retinopathy. Parafoveal retinal thickness in the superior ($p=0.02$), temporal ($p=0.04$), and nasal ($p=0.02$) quadrants was significantly reduced in the diabetes group. FD-300 was also lower in the diabetic group ($48.60 \pm 3.59\%$ vs $49.76 \pm 3.91\%$, $p=0.01$). Subgroup analysis revealed greater FD-300 reduction ($p<0.01$) in those with diabetes duration exceeding 5 years. Furthermore, longer duration of diabetes was associated with reduced FD-300 values ($r=-0.22$, $p=0.007$).

Conclusions: This study identified retinal alterations in pediatric diabetes patients, including reduced parafoveal thickness and FD-300. The correlation between decreased FD-300 values and longer diabetes duration highlights its utility as a non-invasive biomarker for subclinical retinal involvement that precedes the development of clinical diabetic retinopathy.

Abstract No.: 205447

Early Versus Delayed Pegcetacoplan Treatment for GA Secondary to AMD: 48 Month Results From OAKS, DERBY, and GALE Open-Label Extension

First Author: Gemmy **CHEUNG**

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Purpose: To report the efficacy and safety of continuous pegcetacoplan in geographic atrophy (GA) patients, focusing on early versus delayed treatment.

Methods: After completing the 24-month phase 3 OAKS and DERBY studies, patients could enroll in the GALE open-label extension study. Patients in the "Early Treatment" group continued the same pegcetacoplan monthly (PM) or every-other-month (PEOM) regimen in GALE. The "Delayed Treatment" group comprised of the sham patients from OAKS/DERBY that crossed over to receive active pegcetacoplan treatment at the same intervals (PM or PEOM).

Results: In this study, 83% of patients who completed OAKS/DERBY entered GALE. In the first 24 months of GALE, pegcetacoplan reduced GA growth vs projected sham by 36% (PM) and 30% (PEOM) in nonsubfoveal (NSF) GA, and by 28% (PM) and 28% (PEOM) in the overall population (NSF + subfoveal). At Month 48, Early Treatment had better outcomes with 3.16 mm² of retinal tissue preservation compared to 1.11 mm² with Delayed Treatment in NSF GA. The safety profile in the first 24 months of GALE was consistent with OAKS/DERBY, with no study events of retinal vasculitis. Based on real-world and clinical data of an estimated >702,000 injections administered through June 2025, retinal vasculitis appears to be a first-injection phenomenon with an estimated post-marketing rate of ~1/4,000 per first injection in the United States.

Conclusions: Long-term efficacy and safety of pegcetacoplan were demonstrated in GA patients, with results supporting earlier treatment.

Abstract No.: 204124

Effectiveness and Safety of Faricimab in Neovascular Age-Related Macular Degeneration and Diabetic Macular Edema Eyes Beyond Year-1: UK FARWIDE-nAMD and FARWIDE-DME Study Results

First Author: Kenneth **FONG**

Co-Author(s): Parul **DAYAL**, Christine **KIIRE**, Praveen J. **PATEL**, Ian **PEARCE**, Gabriella **DE SALVO**

Purpose: FARWIDE-nAMD and FARWIDE-DME retrospectively evaluate faricimab's durability, safety, and VA (visual-acuity) in nAMD (neovascular age-related macular degeneration) and DME (diabetic macular edema) eyes, respectively, in the United Kingdom. Follow-up data (≥ 18 months) are reported. Updated data will be presented.

Methods: Treatment-naïve eyes had no prior anti-VEGF (vascular endothelial growth factor) treatment. Previously-treated eyes switched from another anti-VEGF treatment to faricimab. Baseline characteristics, VA (ETDRS [Early Treatment Diabetic Retinopathy Study] letters), injection frequency, and safety were analyzed.

Results: Eighteen-month nAMD and DME cohorts included 1,404 (1,667 eyes; treatment-naïve=332, previously-treated=1,335) and 305 (416 eyes; treatment-naïve=122, previously-treated=294) patients, respectively. Previously-treated nAMD (84%) and DME (87%) eyes switched to faricimab from aflibercept-2.0mg. In treatment-naïve nAMD eyes, median (Q1, Q3) VA was 61 (47,70) and 65 (46,76) ETDRS letters at baseline and 18-months, respectively. In treatment-naïve DME eyes, median (Q1,Q3) VA change from baseline to 18-months was +5 (-1,9) letters. In previously-treated nAMD and DME eyes, median VA remained stable. Mean (standard deviation) injections were: 4.8 (0.5), 2.2 (1.0), 1.9 (1.1) in treatment-naïve, and 4.4 (0.9), 3.0 (1.1), 2.8 (1.2) in previously-treated nAMD eyes; 4.4 (1.0), 1.8 (1.2), 1.3 (1.1) in treatment-naïve and 4.3 (1.1), 2.5 (1.3), 2.2 (1.5) in previously-treated DME eyes in months 1–6, 7–12, 13–18, respectively. Overall intraocular inflammation and presumed infectious endophthalmitis rates were consistent with faricimab phase-3 trials.

Conclusions: In both trials, faricimab treatment over 18 months led to improved VA in treatment-naïve eyes, stable VA in previously-treated eyes, greater treatment interval extensions, and consistent safety, supporting faricimab's real-world effectiveness, durability, and safety.

Abstract No.: 201615
Efficacy of Faricimab Secondary to Anti-Vascular Endothelial Growth Factor Agents in Patients With Neovascular Age-Related Macular Degeneration: A Systematic Review and Meta-Analysis

First Author: Adrian **CHAN**

Co-Author(s): Eric **JIN**, George **THOMAS**

Purpose: This study examines the efficacy and safety of faricimab as a secondary treatment for nAMD patients previously treated with anti-VEGF agents.

Methods: A literature search was performed on PubMed, EMBASE, and Cochrane Library up to 24 October 2024. Cohort and observational studies reporting functional and anatomical outcomes in nAMD patients switched to faricimab were included. Meta-analysis with a common and random-effect model was performed using the “metagen” package in R version 3.2.1.

Results: Twenty studies (1,007 eyes) with a baseline central macular thickness (CMT) of 342.07 (± 110.14) μm were included in the final analysis. Switching to faricimab led to significant reductions in CMT at 3 months (Mean difference = -47.08 μm , 95% Confidence Interval (CI) = (-66.01, -28.15), $p=0.009$) and 6 months post-switch (Mean difference = -44.68 μm , 95% CI = (-67.17, -22.20), $p=0.002$). Pigment epithelium detachment (PED) height was also reduced at 3 months (Mean difference = -31.71 μm , 95% CI = (-45.12, -18.30), $p=0.036$) and 6 months post-switch (Mean difference = -34.85 μm , 95% CI = (-50.19, -19.51), $p=0.011$). However, no significant improvements in best corrected visual acuity (BCVA) were observed at 3 months ($p=0.407$), 6 months ($p=0.920$) or ≥ 12 months ($p=0.261$) post-switch. Treatment intervals were significantly extended (Mean difference = 1.87 weeks, 95% CI = (0.41, 33.3), $p=0.019$), with a low incidence of serious adverse events.

Conclusions: In conclusion, faricimab demonstrates favorable structural benefits, stable functional outcomes and extended treatment intervals as a second-line treatment for nAMD in patients with prior anti-VEGF therapy.

Abstract No.: 201252
Efficacy of the Faricimab Loading Regimen in Treatment-Naïve Neovascular Age-Related Macular Degeneration: A Real-World Study From China

First Author: Sheng **LI**

Co-Author(s): Xiaonan **FU**, Dingxi **LIU**, Zijong **ZHANG**

Purpose: To evaluate the 12-week real-world outcomes of three monthly intravitreal faricimab injections in treatment-naïve nAMD

Methods: Prospective single-center cohort (Dalian Third People’s Hospital, Jan–Apr 2025). Inclusion: treatment-naïve nAMD verified by OCT-A or FFA and completion of three consecutive monthly faricimab injections. Evaluations at baseline and every 4 weeks included BCVA (logMAR), CST, SRF/IRF presence, and, when applicable, PED height/area. All adverse events were recorded.

Results: Twenty-three eyes of 23 patients (mean age 71.2 ± 9.1 years) completed follow-up. • BCVA improved from 0.75 ± 0.35 to 0.58 ± 0.37 logMAR ($P < 0.001$). • CST decreased from 568.6 ± 322.2 to 313.9 ± 153.5 μm ($P < 0.001$). • SRF resolved in all 14 affected eyes (100%). • IRF resolved in 6/8 eyes (75%); one eye worsened. • Among 18 eyes with baseline PED, mean height fell from 398 ± 328 to 152 ± 162 μm and area from 0.73 ± 1.03 to 0.30 ± 0.42 mm^2 (both $P < 0.05$); 5 eyes achieved complete flattening. No endophthalmitis, retinal vasculitis, or other serious adverse events occurred.

Conclusions: Three monthly faricimab injections significantly improved vision and reduced exudation in treatment-naïve nAMD eyes with an acceptable short-term safety profile. A longer follow-up is needed.

Abstract No.: 201026
Enhancing RB1 Gene Mutation Detection in Retinoblastoma: A Comprehensive Study Using Long-Read Sequencing and Its Correlation With Clinical Features

First Author: Li **CAO**

Co-Author(s): Jiyun **YANG**

Purpose: This study aims to investigate the characteristics of RB1 gene mutations, evaluate their associations with clinical features, and develop and validate a long-read sequencing methodology to enhance the detection rate of RB1 gene mutations.

Methods: From October 2016 to February 2024, 57 Chinese RB patients and their relatives were recruited for the study. Targeted NGS was performed on blood samples of all 57 probands to identify RB1 gene mutations. A novel long-read sequencing methodology was developed to improve the detection of deep intronic mutations, promoter regions, and regulatory elements. This methodology was applied to 46 samples and compared to conventional NGS to assess its effectiveness in improving mutation detection.

Results: In the analysis of 57 RB patients, 28 (49.1%) had RB1 gene mutations. Mutation frequency was higher in younger patients (75% in 0-12 months vs. 16% in older patients). Bilateral RB patients had higher mutation rates (90%) compared to unilateral patients (27%). Long-read sequencing of 46 samples identified 28 pathogenic variants, including 19 SNVs and 9 CNVs, with 8 CNVs affecting RB1 and 1 affecting TP53. This sequencing method confirmed NGS results and

detected five additional mutations not found by NGS, demonstrating its superiority in identifying complex mutations.

Conclusions: Bilateral RB and patients diagnosed within 12 months had significantly higher RB1 mutation rates than unilateral RB and those diagnosed after 12 months. Long-read sequencing outperformed NGS in detecting rare RB1 mutations and improved the mutation detection rate. This method identified more diverse genotypic variations than NGS, enhancing the genetic diagnosis of RB.

Abstract No.: 201964

Epidermal Growth Factor Receptor Promotes Diabetic Retinal Fibrogenesis Through a YAP-CCN2-Dependent Mechanism

First Author: Zhang Wei **ZHANG**

Purpose: This study investigated whether epidermal growth factor receptor (EGFR) activity in retinal vascular endothelial cells (RVECs) contributes to the activation of retinal Müller cells (rMCs) and the development of retinal fibrosis in DR.

Methods: Diabetic mice were treated with the EGFR kinase inhibitor erlotinib, and the effects on extracellular matrix (ECM) deposition and retinal fibrosis were assessed. The role of conditioned medium from primary cultured RVECs in activating a human Müller cell line (hMCs) was evaluated to explore paracrine signaling. The involvement of the profibrotic factor connective tissue growth factor (CCN2) in EGFR-dependent retinal fibrosis and the activation of Yes-associated protein (YAP) were also examined.

Results: Erlotinib treatment significantly reduced ECM accumulation and diabetic retinal fibrosis. Conditioned medium from diabetic RVECs enhanced hMC activation in vitro, supporting a paracrine mechanism. Specific gene deletion of CCN2 in retinal endothelial cells markedly suppressed rMC activation and ECM deposition in diabetic mice. We demonstrated that YAP regulates CCN2 expression, and both genetic deletion and pharmacological inhibition of YAP attenuated retinal fibrosis and inhibited rMC activation. Further analysis revealed that EGFR modulates YAP activity in diabetic retinas through a RhoA/Rock-dependent pathway.

Conclusions: This study reveals that RVECs promote rMC activation and retinal fibrosis via EGFR-dependent paracrine signaling. The EGFR-YAP-CCN2 axis represents a promising therapeutic target for mitigating diabetic retinal fibrogenesis.

Abstract No.: 201962

Epidermal Growth Factor Receptor Promotes Diabetic Retinal Fibrosis by Regulating YAP Signaling Through Modulation of SAV1 Degradation

First Author: Zhang Wei **ZHANG**

Purpose: The epidermal growth factor receptor (EGFR) and Yes-associated protein (YAP) signaling pathways are key regulators of fibrosis, yet the intracellular mechanisms linking these pathways remain poorly understood. This study aimed to elucidate the role of EGFR and YAP signaling in retinal Müller cell-mediated diabetic retinal fibrosis, both in vivo and in vitro.

Methods: Human retinal Müller cells (MIO-M1) were transfected in vitro with either a Flag-tagged EGFR plasmid or EGFR-targeting siRNA. The involvement of EGFR in the SAV1-Herc4 interaction and subsequent SAV1 degradation was evaluated using Western blotting and co-immunoprecipitation (Co-IP). In vivo, streptozotocin (STZ)-induced diabetic mice were treated with either intraperitoneal Erlotinib (an EGFR inhibitor) or intravitreal anti-EGFR antibody. Retinal fibrosis was assessed through histopathological analysis and evaluation of YAP signaling activity.

Results: EGFR was found to suppress the Hippo pathway by promoting SAV1 degradation via enhancing the interaction between SAV1 and the E3 ubiquitin ligase Herc4. This suppression led to YAP activation, its nuclear translocation, and the subsequent transcription of downstream Hippo target genes, thereby promoting diabetic retinal fibrosis. Pharmacological inhibition of EGFR activated the YAP signaling pathway and significantly reduced fibrotic changes in the retinas of diabetic mice. Furthermore, intravitreal administration of an anti-EGFR antibody effectively attenuated diabetic retinal fibrosis, with early initiation and repeated dosing showing enhanced therapeutic efficacy.

Conclusions: Our findings indicate that EGFR promotes diabetic retinal fibrosis in Müller cells by inhibiting the Hippo pathway through SAV1 degradation.

Abstract No.: 206491

Eye-Brain Connection: Unveiling the Transient Brain Neurochemical and Behavioral Shifts After Retinal Ischemia-Reperfusion Injury

First Author: Lei **DU**

Co-Author(s): Rong **HUANG**, Guojing **LU**, Xuan **XIAO**

Purpose: Retinal ischemia-reperfusion injury (RIRI) is a significant pathological process involved in many blinding eye diseases that has also been linked with mood disorders. Herein, we investigated whether RIRI could induce transient brain neurochemical and behavioral alterations.

Methods: RIRI was induced in C57BL/6J mice and evaluated at one and seven days post-injury. Mood-related behaviors were measured using open-field, elevated plus-maze, and forced swimming tests. Retinal damage and apoptosis were analyzed using H&E and TUNEL staining. Brain metabolites from six regions were quantified using $[1-^{13}\text{C}]$ glucose infusion and ^1H - $[^{13}\text{C}]$ -nuclear magnetic resonance (NMR) spectroscopy.

Results: Retinal damage and ganglion cell apoptosis were observed at day 1, worsening by day 7. At day 1, mice displayed anxiety- and depression-like behaviors, including reduced center time ($\downarrow 29.34\%$), fewer open-arm entries ($\downarrow 67.65\%$), and increased immobility ($\uparrow 23.44\%$) (all $P < 0.01$). Neurochemically analyses of the brain revealed reductions in glutamine (Gln)/glutamate (Glu)- γ -aminobutyric acid (GABA) and tricarboxylic acid (TCA) cycle metabolites, with significant decreases observed in the frontal cortex, including Glu₄ ($\downarrow 28.12\%$), Gln₄ ($\downarrow 68.58\%$), GABA₂ ($\downarrow 39.55\%$), aspartate₃ ($\downarrow 54.99\%$), and succinate ($\downarrow 33.36\%$), and in the temporal cortex, including Glx (Gln+Glu)₃ ($\downarrow 16.93\%$), GABA₃ ($\downarrow 41.57\%$), and succinate ($\downarrow 17.52\%$) (all $P < 0.05$). By day 7, most parameters returned to baseline, except for increased Gln₄ in the parietal cortex and GABA₄ in the temporal cortex ($P = 0.001$).

Conclusions: Collectively, our findings revealed transient, synchronized changes in mood and Gln/Glu-GABA and TCA cycle metabolites following RIRI, providing compelling evidence of the eye-brain connection and highlighting the need for timely emotional health management in RIRI-related disorders.

Abstract No.: 204555

Faricimab for Polypoidal Choroidal Vasculopathy: One-Year Ethnically Chinese Subgroup Results From Phase-3b/4 SALWEEN Trial

First Author: Ming **ZHANG**

Co-Author(s): Ruobing **BAI**, Gemmy **CHEUNG**, Timothy Y.y. **LAI**, Philippe **MARGARON**, Anh **NGUYEN DUC**

Purpose: Faricimab, a dual angiopoietin-2/vascular endothelial growth factor-A inhibitor and the first bispecific intraocular antibody, showed rapid/robust disease improvement in Asian PCV (polypoidal choroidal vasculopathy) patients in the SALWEEN (ISRCTN69073386) trial. One-year efficacy, safety, and durability of faricimab in the SALWEEN ethnically Chinese cohort is reported here.

Methods: Ethnically Chinese patients with macular PCV in the SALWEEN trial ($n=49$) received four initial Q4W (every-4-week) doses of faricimab-6.0mg, followed by Q8W/Q12W/Q16W based on W20(week-20)/W24 disease activity assessments. At W44/W48 through W104, patients followed a treat-and-extend-regimen (Q8W–Q20W). The primary endpoint was the change

from baseline in BCVA (best-corrected visual acuity) over W40–W48.

Results: Mean (SD [standard deviation]) baseline ocular characteristics were: BCVA: 63.1(12.6) letters; CST (central subfield thickness): 440.0(198.3) μm . Adjusted mean (95%CI [confidence interval]) changes from baseline in BCVA and CST averaged over W40/W44/W48 were +8.1 (+5.2, +11.1) letters and -117.7 (-159.5, -75.9) μm , respectively. At W48, 75.0% patients had no intraretinal/subretinal fluid (baseline:16.3%). Among patients' eyes with baseline polypoidal lesions confirmed by the central reading center and examined at W48, 59.4% (19/32) had complete closure of polypoidal lesions, and 87.5% had inactive polypoidal lesions. Treatment interval of $\geq$ Q12W was achieved in 87.2% patients at W20/W24/W28 (70.2% of those achieved Q16W) and 76.1% patients at W44/W48 (54.3% of those achieved Q20W). Faricimab is well tolerated through W48 with no new safety concerns.

Conclusions: One-year results from the SALWEEN ethnically Chinese cohort are similar to the SALWEEN one-year primary results and elucidate faricimab's long-term efficacy, safety, and durability in this patient subgroup with PCV.

Abstract No.: 202402

Faricimab for Polypoidal Choroidal Vasculopathy: One-Year Results From the Phase-3b/4 SALWEEN Trial

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Purpose: Faricimab, a dual Ang-2/VEGF-A (angiopoietin-2/vascular endothelial growth factor-A) inhibitor, is the first bispecific antibody for intraocular use. W16 (Week-16) results from phase-3b/4, multicenter, open-label SALWEEN(ISRCTN69073386) trial in Asian patients with PCV (polypoidal choroidal vasculopathy) showed rapid/robust disease improvement with faricimab. One-year efficacy, safety, and durability of faricimab in this population will be updated.

Methods: Patients with macular PCV ($N=135$) received four initial Q4W (every-4-week) doses of faricimab 6.0mg, followed by Q8W/Q12W/Q16W based on W20/W24 disease activity assessments. At W44/W48 through W104, patients followed treat-and-extend-based regimens (Q8W–Q20W). Primary endpoint is change from baseline in BCVA (best-corrected visual acuity) over W40–W48.

Results: Mean (SD[standard deviation]) patient age is 68.6 (8.3) years; 63% (85/135) are male. Mean (SD) baseline ocular characteristics are: BCVA: 64.4 (11.3) letters; CST (central subfield thickness): 417.0 (155.2) μm ; polypoidal lesion area: 0.25 (0.26) mm^2 ; total lesion area: 8.1 (6.8) mm^2 . At W16, adjusted mean

(95%CI[confidence interval]) changes from baseline in BCVA and CST were +7.7 (+6.3,+9.1) letters and -142.2 (-157.7,-126.7) μm , respectively. At W16, 80.3% (95%CI:73.8–87.1) patients had no intraretinal/subretinal fluid. Among patient eyes with baseline polypoidal lesions confirmed by the central reading center and examined at W16, 51.0%(51/100) had complete closure of polypoidal lesions, and 86.0% had inactive polypoidal lesions. Faricimab is well tolerated through W16 with no new safety concerns. One-year results, including BCVA-, CST-changes, regressed/inactive polypoidal lesions, treatment durability (Q4W/Q8W/Q12W/Q16W/Q20W interval assignments), and safety will be presented.

Conclusions: One-year results from SALWEEN will elucidate long-term efficacy, safety, and durability of dual Ang-2/VEGF-A inhibition with faricimab in Asian patients with PCV.

Abstract No.: 204527

Four-Year Outcomes of Faricimab in Neovascular Age-Related Macular Degeneration: Safety and Efficacy From the AVONELLE-X Long-Term Extension Trial

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Purpose: We present findings from the two-year, phase-3 AVONELLE-X (NCT04777201) long-term extension trial, evaluating faricimab's long-term safety (primary objective) and efficacy (exploratory objective) in nAMD (neovascular age-related macular degeneration) patients who completed the TENAYA(NCT03823287) / LUCERNE(NCT03823300) trials without treatment discontinuation.

Methods: TENAYA/LUCERNE patients received faricimab-6mg up to Q16W (every-16-weeks) or aflibercept-2mg Q8W. All AVONELLE-X patients received faricimab-6mg up to Q16W using a protocol-defined T&E (treat-and-extend) regimen based on TENAYA/LUCERNE-algorithm. AVONELLE-X had the first 12 weeks of masked monthly visits, followed by open-label study visits required only when faricimab was due, at intervals determined by the T&E-algorithm.

Results: Overall, 1,029/1,188 (86.6%; faricimab-T&E, n=524; faricimab-T&E [prior-aflibercept], n=505) eligible patients enrolled in AVONELLE-X and 868(84.4%) completed AVONELLE-X. Faricimab was well tolerated; only 2.1% discontinued due to AEs (adverse events). AEs were consistent with faricimab's known safety profile; intraocular inflammation occurred in 2.0%, with no cases of retinal vasculitis or retinal occlusive vasculitis. Best-corrected visual acuity remained stable over 2 years, with 75% patients who had $\geq 20/40$ vision at week-48 in TENAYA/LUCERNE maintaining it at the end of AVONELLE-X. Central subfield thickness improvements from TENAYA/

LUCERNE were maintained for an additional 2 years in AVONELLE-X. At the end of 4 years, 78.2% patients were on $\geq$ Q12W faricimab dosing and 63.9% were on Q16W dosing.

Conclusions: AVONELLE-X is the largest nAMD extension study to date. This first report on long-term results with faricimab up to Q16W in nAMD patients confirms its safety, efficacy, and durability over 4 years.

Abstract No.: 204121

Greater Anatomical Improvements With Faricimab vs Aflibercept 8 Weeks After Injections: A TENAYA/LUCERNE Post-Hoc Analysis

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Co-Author(s): Varun CHAUDHARY, Nicholas DAGINCOURT, Avni FINN, Philippe MARGARON, Shriji PATEL

Purpose: TENAYA/LUCERNE (NCT03823287/ NCT03823300) post-hoc analysis evaluated anatomic outcomes for faricimab vs aflibercept at longer duration after dosing, specifically 8 weeks after each injection during the maintenance phase in treatment-naïve nAMD (neovascular age-related macular degeneration) patients.

Methods: Treatment-naïve nAMD patients (pooled N=1,329) were randomized to faricimab 6.0mg (n=665; Q8W [every-8-weeks] up to Q16W after four initial Q4W doses) or aflibercept 2.0mg (n=664; Q8W after three initial Q4W doses) through a two-year maintenance phase. Changes from baseline in CST (central subfield thickness), maximum PED (pigment epithelial detachment) thickness, and proportion of patients with retinal fluid resolution were compared 8 weeks post-injections#4–#9. All P-values are nominal.

Results: Faricimab-treated patients had greater anatomic improvements at 8 weeks post-injections vs aflibercept-treated patients. Adjusted least square mean changes in CST (95% CI [confidence interval]) were: injection#4 – faricimab (n=621): -176.4 (-183.9,-168.9) vs aflibercept (n=571): -154.2(-161.8,-146.6) μm , $P<0.0001$; injection#9 – faricimab (n=503):-187.6 (-195.6,-179.7) vs aflibercept (n=526): -170.9 (-178.9,-163.0) μm , $P=0.0037$. Adjusted least square mean changes in corresponding maximum PED thickness (95%CI) were: injection#4 – faricimab (n=614): -74.2 (-82.2, -66.2) vs aflibercept (n=568): -57.4 (-65.6,-49.3) μm , $P=0.0038$; injection#9 – faricimab (n=311): -80.2 (-89.4,-71.1) vs aflibercept (n=275): -62.2 (-71.4,-53.1) μm , $P=0.0061$. A higher proportion (95% CI) of faricimab-treated patients had subretinal and intraretinal fluid absence 8 weeks post-injections vs aflibercept-treated patients: injection#4 – faricimab (n=626): 63.4% (59.7%,67.1%) vs aflibercept (n=572): 46.6% (42.6%,50.6%), $P<0.0001$; injection#9 – faricimab (n=502): 64.6% (60.5%,68.6%) vs aflibercept (n=527): 50.3% (46.1%,54.5%), $P<0.0001$.

Conclusions: Faricimab demonstrated greater improvements in CST, maximum PED thickness, and fluid resolution vs aflibercept 8 weeks post-injections during the maintenance phase in TENAYA/LUCERNE, when most faricimab-treated patients were on extended ($\geq$ Q12W) dosing.

Abstract No.: 205932

Herpesvirus-Associated Occlusive Vasculitis Without Retinitis (HOVR)- an Underrecognized Presentation of Viral Uveitis

First Author: Rishika RATHORE

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Purpose: To describe the clinical features, diagnostic findings, and treatment outcomes of Herpesvirus-associated Occlusive Vasculitis Without Retinitis (HOVR).

Methods: Retrospective case series of 7 patients (12 eyes) with occlusive vasculitis due to HSV, VZV, or CMV. All underwent ultrawide-field fundus photography and fluorescein angiography at presentation. Diagnostic evaluation included PCR from ocular fluids, serum antibody testing, and confocal microscopy when indicated. Treatment consisted of systemic antivirals, oral corticosteroids, and aspirin. Laser photocoagulation was performed for capillary non-perfusion as required.

Results: Seven patients (5 bilateral, 2 unilateral) presented with vision ranging from perception of light to 6/24. Three were immunocompromised (2 HIV, 1 lymphoma). Ocular pain and floaters occurred in two patients each. Prior herpetic disease included anterior uveitis (n=2) and herpes zoster ophthalmicus (n=1). Mean IOP was 18 mmHg (12–30); two required antiglaucoma therapy. Aqueous PCR was positive in five patients (1 HSV, 1 VZV, 3 CMV). Of PCR-negative cases, one had CMV IgG seropositivity, and another had prior herpetic keratouveitis. Confocal microscopy demonstrated CMV-like owl-eye nuclei in one patient. All received systemic antivirals, corticosteroids, and aspirin. Ten eyes required laser for non-perfusion, and one developed neovascularization needing scatter laser. On follow-up, inflammation was controlled in all.

Conclusions: HOVR is a distinct manifestation of herpetic uveitis without retinitis. Recognition and prompt systemic antiviral and corticosteroid therapy can achieve inflammation control and preserve vision, with Fundus fluorescein angiography playing a crucial role.

Abstract No.: 201772

High-Resolution Fluorescein Angiography Generated From Color Fundus Photography Using Deep Learning to Enhance Diabetic Retinopathy Diagnosis and Assessment of Anti-VEGF Therapy

First Author: Rui HUA

Co-Author(s): Xue BAI

Purpose: We developed a deep learning algorithm for high-resolution late Fluorescein angiography (FA) image generation from color fundus photography (CFP) and integrated it with Qwen2.5-Max for comprehensive diabetic retinopathy (DR) management. Additionally, we developed a weakly supervised method to detect fluorescein leakage without manual annotation to evaluate the prognosis of anti-VEGF therapy.

Methods: The Pix2PixHD architecture, enhanced with CBAM and 1/8 downsampling, was trained using a GAN framework. A diagnostic model for proliferative DR (PDR) and diabetic macular edema (DME) was developed, improving accuracy and reliability. The Swin Transformer extended ViT with a hierarchical CNN-like structure for multi-scale feature detection. Integrating SAEM into deep learning models improved image analysis and classification. An anti-VEGF treatment (Faricimab) cohort of DR patients was established.

Results: For CFP-to-FA translation, our 1024×1024-pixel model with CBAM achieved high Vision Transformer (30.08), SSIM (0.8306), and low FID (195.28). For PDR vs NPDR classification, the Swin-Transformer-CBAM-SAEM-Augmix (STCSA) model achieved Accuracy: 0.9710, Specificity: 0.9786, Sensitivity: 0.9285, Precision: 0.9717, F1 score: 0.9712. For DME vs non-DME, it reached Accuracy: 0.8633, Specificity: 0.8434, Sensitivity: 0.8816, Precision: 0.8634, F1 score: 0.8631. Using Qwen2.5-Max, we efficiently obtain image descriptions, diagnoses, and treatment suggestions. Finally, intravitreal administration of Faricimab effectively reduces fluorescein leakage.

Conclusions: Our study optimized Pix2PixHD for efficient CFP-to-FA conversion, offering a non-invasive alternative to traditional FA exams. Furthermore, dual-pathway drug demonstrated superior efficacy in treating retinal edema in DR patients.

Abstract No.: 201010

How Does the Diagnosis of Inherited Retinal Disease Influence Reproductive Decision-Making in Singapore?

First Author: Joanna NG

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Purpose: This cross-sectional study aims to assess factors associated with increased understanding and acceptance of patients with inherited retinal disease

(IRD) towards genetic testing, especially in the context of reproductive interventions.

Methods: This cross-sectional study enrolled adults diagnosed with IRD at the Singapore National Eye Centre (SNEC) and its satellite clinics. Participants completed structured questionnaires to assess understanding of genetic testing, attitudes toward genetic and reproductive interventions, and support for financial subsidies. Statistical analyses involved multivariate logistic regression adjusting for age, gender, ethnicity, family history of IRD, clinical phenotype, and visual acuity. Additionally, we employed stratified analysis to identify factors associated with increased understanding and acceptance.

Results: Of the 216 participants recruited (median age 57.5 years; 85.6% Chinese), retinitis pigmentosa was the most common phenotype (59.7%). Most participants expressed favorable views toward genetic testing (62.5%) and reproductive interventions (56.5% for pre-implantation genetic testing, 58.8% for prenatal testing), although 25.9% reported minimal understanding. Better understanding was independently associated with positive attitudes toward testing and support for its availability and subsidy. Support for PGT and PNT was higher amongst younger, Chinese participants and those with a family history of IRD.

Conclusions: Broadly speaking, Singaporean patients were supportive of genetic testing in all settings, including that of reproductive intervention. Future efforts to increase accessibility, such as implementing telemedicine, expanding genetic counseling services, and providing financial subsidies, could translate this support into meaningful clinical and public health benefits.

Abstract No.: 204406

Hypofluorescent ICGA Spots: Prevalence, Characteristics and Associated Features in Age-Related Macular Degeneration

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Purpose: To investigate the clinical, structural, and metabolic characteristics associated with late-phase hypofluorescent spots ("Hypospots") on indocyanine green angiography (ICGA) in fellow eyes of unilateral neovascular age-related macular degeneration (nAMD) patients.

Methods: We analyzed fellow eyes of patients with unilateral nAMD enrolled in the Asian AMD Phenotyping Study. Based on multimodal images (color fundus photography [CFP], fluorescein angiography, ICGA, optical coherence tomography [OCT], and

OCT angiography [OCTA]), eyes were classified as Homogenous, Hypospots (hypofluorescent spots $\geq 100 \mu\text{m}$ without corresponding OCT or CFP changes), or Drusen/Reticular Pseudodrusen (RPD). Ocular (visual acuity, intraocular pressure, axial length, subfoveal choroidal thickness, choroidal vascular hyperpermeability, choriocapillaris density) and systemic (demographics, smoking, comorbidities, serum lipids) data were collected. Intergroup comparisons and multivariate logistic regression were performed to identify systemic and ocular factors associated with hypospots, and incident nAMD during follow-up was evaluated.

Results: Of 267 patients screened, 142 eyes were included (mean age 70.8 ± 8.2 years; 70.4% male; 90.1% Chinese), comprising 49 Homogenous (34.5%), 46 Hypospots (32.4%), and 47 Drusen/RPD (33.1%). In the Hypospots group, 52.2% of spots were within the central 3 mm and 47.8% beyond; sizes ranged 100–500 μm , visible from 10–20 minutes on late-phase ICGA. Compared to the Homogenous group, Hypospots had lower total cholesterol (4.31 vs 4.56 mmol/L, $p = 0.039$), lower triglycerides (1.28 vs 1.61 mmol/L, $p < 0.001$), shorter axial length (23.52 vs 24.32 mm, $p = 0.047$), greater choroidal thickness (262.3 vs 227.8 μm , $p = 0.080$), and similar choriocapillaris density (62.7% vs 61.9%, $p = 0.337$), with incident nAMD rates of 0.0% vs 4.1% ($p = 0.94$). Compared to Drusen/RPD group, Hypospots were younger (68.4 vs 75.5 years, $p < 0.001$), had lower cholesterol (4.31 vs 4.84 mmol/L, $p = 0.028$), higher use of lipid-lowering medication (56.5% vs 29.2%, $p = 0.009$), better visual acuity (0.17 vs 0.29 logMAR, $p = 0.012$), greater choroidal thickness (262.3 vs 183.0 μm , $p = 0.006$), higher choriocapillaris density (62.7% vs 58.7%, $p = 0.008$), more frequent polypoidal choroidal vasculopathy (PCV) subtype (78.3% vs 29.2%, $p < 0.001$), and lower incidence of nAMD (0.0% vs 22.9%, $p < 0.001$).

Conclusions: Late-phase ICGA hypofluorescent spots were common in fellow eyes of unilateral nAMD and were associated with systemic lipid alterations and PCV, with OCTA confirming they reflect impaired Bruch's membrane-retinal pigment epithelium (BrM-RPE) transport rather than perfusion defects.

Abstract No.: 202500

Identification and Characterisation of TBX1 as a Novel Candidate Gene for Familial Exudative Vitreoretinopathy

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Purpose: Familial exudative vitreoretinopathy (FEVR) is a rare retinal disease with genetic heterogeneity, with known genes accounting for only about 50% of cases. We investigated TBX1 as a novel candidate gene for FEVR and characterized its role in disease pathogenesis.

Methods: Whole-exome sequencing and fundus examinations were performed on 791 FEVR families. In human retinal vascular endothelial cells (HRVECs), lentiviral transfection was transfected to knock down or overexpress TBX1, followed by tube formation and wound closure assays to assess angiogenesis and migration. Transcriptomic changes were analysed by RNA sequencing, with TFBSPred used to predict TBX1 binding sites, and validation performed by real-time PCR and Western blot. Endothelial cell-specific conditional knockout mice (TBX1^{fl/fl} Pdgfr^β-iCre-ER) were generated using the Cre-loxP recombination system and induced with tamoxifen.

Results: Four TBX1 variants (c.928G>A, c.929G>C, c.964C>T, and c.1352A>C) were identified in six FEVR families, all maternally inherited except in Family 1. Clinical features included exudative retinal detachment, retinal folds, peripheral avascular area, and anterior segment abnormalities with onset ranging from 10 months to 9 years. In HRVECs, TBX1 overexpression suppressed wound closure and upregulated HIF3A and VEGFC, whereas knockdown produced opposite effects. The c.928G>A variant further enhanced these changes. TBX1 expression positively correlated with HIF3A and VEGFC protein levels. In vivo, endothelial-specific TBX1 knockout reduced superficial retinal vessel area and tip cell number at postnatal day 3.

Conclusions: TBX1 regulates vascular network formation in HRVECs and contributes to FEVR pathology. The c.928G>A mutation, acting through the TBX1–HIF3A–VEGFC axis, may represent a key pathogenic mechanism.

Abstract No.: 202163

Identifying Microvascular and Neural Parameters Related to Systemic Profiles in Early Type 2 Diabetes With SS-OCTA

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Purpose: To investigate retinal microvascular and neural changes with swept-source optical coherence tomography angiography (SS-OCTA) in type 2 diabetes (T2DM) with no diabetic retinopathy (NDR), and evaluate their relationships with certain systemic characteristics.

Methods: A total of 113 NDR patients and 61 healthy controls were enrolled in this observational cross-sectional study. Three scan modes, including 6.0-mm macular OCTA, ganglion cell complex (GCC) scan mode, and optic disc OCTA, were performed for all subjects. Relevant OCTA parameters were compared between the two groups, and their discriminative power was determined with receiver operating characteristic (ROC) curves. Correlation and multiple linear regression analysis were performed between OCTA parameters and T2DM-related systemic markers, especially corrected homeostasis model assessment of β-cell

function and insulin resistance (HOMA2-B and HOMA2-IR).

Results: Compared with healthy controls, retinal neural and microvascular parameters were statistically decreased in NDR patients except GCC thickness, and the indicator of radial peripapillary capillaries (RPC) had the highest AUC value (AUC=0.74, P<0.001). C-peptide-related indicators correlated with certain OCTA parameters. Furthermore, multivariate regression analysis determined an independent association between HOMA2-B and OCTA neural and microvascular changes (including GCC and foveal superficial capillaries plexus vessel density), and between HOMA2-IR and RPC density (STD β=-0.29, P=0.001) and RNFL thickness (STD β=-0.24, P=0.009) after adjusting for potential confounders.

Conclusions: Peripapillary parameters, especially RPC, could be a more sensitive and reliable marker of early diabetes. Quantitative analysis demonstrated that OCTA microvascular and neural alterations were affected by T2DM intrinsic mechanisms of decreased β-cell function and insulin resistance.

Abstract No.: 203715

Imaging Characteristics and Longitudinal Follow-Up of Inner Choroidal Fibrosis in Chronic Central Serous Chorioretinopathy

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Purpose: To study Inner Choroidal Fibrosis (ICF) in eyes with chronic central serous chorioretinopathy (CSC) and report long-term changes.

Methods: Records of CSC patients were reviewed to identify eyes with ICF. ICF was divided into morphological types: Type 1 ICF represented hyper-reflective accumulations in the inner choroid without any well-defined margin, while Type 2 ICF represented those with a demarcation line. Clinical and multimodal imaging features were assessed longitudinally.

Results: A total of 39 eyes of 24 patients were identified with ICF. A mean of 1.07 lesions was identified per eye, of which 69% involved the fovea. The patients were followed up for a median period of follow up of 53.4 months. The mean BCVA reduced from (0.68±0.47 logMAR, 20/96) to (0.79 ± 0.45 logMAR, 20/125). Mean BCVA at time of presentation (0.84 logMAR, 20/138 vs 0.52 logMAR, 20/66; p=0.01), as well as at last follow-up (0.89 logMAR, 20/155 vs 0.67 logMAR, 20/94; p=0.07), was worse in eyes with Type 2 ICF as compared to Type 1 ICF. At the last follow-up, complete resolution of CSC was only seen in 5 eyes (12.8% eyes). There was a non-significant decrease in SFCT (456 microns vs 444 microns, p=0.8) and an increase in hypo-fluorescence area on indocyanine green angiography of 4.26 sq. mm over the follow-up

period. Higher duration of follow-up and persistent fluid were associated with an increase in size in ICF on multivariate regression analysis.

Conclusions: ICF in complex CSC was associated with persistent fluid and poor response to therapy.

Abstract No.: 202253

Impact of PDS (Port Delivery Platform With Ranibizumab) in Study Eyes vs Anti-VEGF (Vascular Endothelial Growth Factor) in Fellow-Eyes on Efficacy and Safety Outcomes in Bilateral DME (Diabetic Macular Edema) in Pagoda

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Purpose: This post-hoc analysis of Pagoda trial (NCT04108156) in bilateral DME patients randomized to PDS arm compared the efficacy and safety of PDS-100 mg/mL Q24W (every-24-weeks) vs intravitreal anti-VEGF injection in FEs (fellow-eyes) through W112 (week-112).

Methods: Pagoda trial investigated PDS-Q24W vs ranibizumab-0.5mg. This subanalysis comprised PDS-SEs (PDS-treated study-eyes) patients with FE-DME at baseline treated with ≥ 1 intravenous anti-VEGF treatment in FEs (IVT-FE). SEs were anti-VEGF treatment-naïve or had ≥ 6 -month washout; FEs had variable anti-VEGF treatment before study-baseline. Study visits were Q4W; IVT-FE received treatment per the investigator's discretion.

Results: A total of 241 patients from PDS-arm met analysis criteria. Mean (Standard deviation) anti-VEGF injections in IVT-FE through W112 was 12.2 (7.8). In PDS-SE vs IVT-FE, mean best-corrected visual-acuity and central subfield thickness at baseline and W112 were 64.2 vs 69.5 and 74.3 vs 75.2 ETDRS letters, and 497.8 vs 399.1 and 274.5 vs 331.0 μm , respectively. At W112, ≥ 2 -step DRSS (Diabetic Retinopathy Severity Scale) improvement and worsening were 50.2 vs 31.7% and 0.4 vs 4.0% in PDS-SE vs IVT-FE, respectively. Ocular adverse events (endophthalmitis, retinal detachment, vitreous hemorrhage) occurred similarly across PDS-SE and IVT-FE (0.4 vs 0.4%; 0.4 vs 0.8%; 10.0 vs 7.5%, respectively).

Conclusions: In this subanalysis, PDS-SEs and IVT-FEs had similar vision outcomes at W112; however, PDS-treated eyes demonstrated better anatomic control despite unrestricted anti-VEGF availability to FEs. FEs had meaningfully greater DRSS worsening, with similar adverse events in both groups over 2 years.

Abstract No.: 201449

Impact of the Optimization of Surgical Procedure on the Incidence of Endophthalmitis and Associated Patient Outcomes in Port Delivery Platform With Ranibizumab Trials

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Co-Author(s): Margaret **CHANG**, Nauman **CHAUDHRY**, Philip **JAYCOCK**, Natasha **SINGH**

Purpose: This retrospective analysis examined the impact of surgical improvements on endophthalmitis incidence and patient outcomes over time in patients receiving PDS (Port Delivery Platform with Ranibizumab) in six clinical trials in the PDS development program from 2016–2024.

Methods: PDS trials include: nAMD (neovascular age-related macular degeneration) – Ladder (NCT02510794), Archway (NCT03677934), Portal (NCT03683251), and Belvedere (NCT04853251); DME (diabetic macular edema) – Pagoda (NCT04108156); DR (diabetic retinopathy) – Pavilion (NCT04503551). Key surgical procedure updates from June 2020 included: traction suture emphasis, atraumatic conjunctiva and Tenon's capsule handling during peritomy and closure, and strict adherence to 3.5mm scleral incision length. Endophthalmitis incidence, vision, and treatment outcomes in all PDS-implanted patients at CCOD (clinical-cutoff-date; Ladder/Archway/Portal:31-January-2024; Belvedere:20-December-2024; Pagoda/Pavilion:15-March-2024) were summarized by implantation before vs after June 2020. Most post-June-2020 implants were in DME/DR studies.

Results: Over 8 years (May 2016 to 2024 CCODs), 1344 patients had received PDS implants (pre-June 2020: n=457, mean follow-up: 4.68 years; post-June 2020: n=887, mean follow-up: 2.45 years). Endophthalmitis was reported in 22 patients (overall incidence: 1.6%) across indications. Endophthalmitis incidence was 2.6% (n=12/457) in patients implanted pre-June-2020, while it was 1.1% (n=10/887) in patients implanted post-June-2020. Before vs after June 2020, outcomes were: lost <5-ETDRS (Early Treatment Diabetic Retinopathy Study) letters or maintained $\geq 20/40$ Snellen: 7/12 vs 7/10; lost ≥ 15 -ETDRS letters: 5/12 vs 1/10; continued PDS-refills: 3/12 vs 8/10.

Conclusions: Overall endophthalmitis incidence in the PDS program over an eight-year period was 1.6%. Implementation of key updates in the PDS development program may be associated with lower endophthalmitis incidence and improved outcomes in endophthalmitis-affected patients.

Abstract No.: 207034

In Vivo Imaging of Cone Photoreceptors in the Human Retina Using a Modified Scanning Ophthalmoscope

First Author: Xinyuan ZHANG

Purpose: This study aimed to evaluate the ability of a modified scanning laser ophthalmoscope (SLO) to visualize the cone photoreceptor mosaic at the central 600 microns of the human retina, providing high-resolution in vivo imaging for assessing retinal health.

Methods: A modified SLO was developed, incorporating ocular aberration correction and enhanced resolution capabilities. A series of 80 images, each with a signal threshold of 400, was captured at 780 nm from five locations within the retina, ranging from 300° nasal to 300° temporal, in 30 healthy volunteers and 20 patients with known retinal conditions. The images were registered with color fundus photos, and cone density and spacing (diameter) within a 60 x 60 µm region of interest were analyzed. These findings were compared to standard data from adaptive optics (AO)-SLO imaging.

Results: The modified SLO provided high-resolution images of the cone mosaic, surpassing conventional imaging techniques. In healthy subjects, the cone density at the foveal center was found to be around 25,000-40,000 cones, aligning with previous histological studies and AO-SLO data. In patients with retinal conditions, cone density variations and irregularities in cone arrangement were clearly detected, which correlated with clinical diagnoses.

Conclusions: The modified SLO, by reducing equipment costs while maintaining high imaging quality, successfully enabled in vivo visualization of cone photoreceptors at the cellular level. This technique offers significant potential for diagnosing and monitoring retinal diseases by providing detailed assessments of cone density and arrangement. The improved imaging capabilities could advance clinical research and enhance patient care in retinal disease management.

Abstract No.: 206894

Injection Frequency Based on Baseline Anatomic Lesion Type in Subfoveal Neovascular Age-Related Macular Degeneration: A HARBOR Post Hoc Analysis

First Author: Vicente Lorenzo CABAUG

Co-Author(s): Steven BLOTNER, Quan HOANG, Jesse JUNG

Purpose: To compare injection frequency across Consensus on Neovascular Age-Related Macular Degeneration Nomenclature (CONAN) lesion types in response to ranibizumab for neovascular age-related macular degeneration (nAMD).

Methods: This post hoc analysis of the Phase III, double-masked, multicentre, randomised, active treatment-controlled HARBOR trial evaluated patients in the pro re nata (PRN) ranibizumab arm. Patients were categorised as Type 1 (T1, n=166), Type 2/mixed 1/2 (T2, n=164), or any Type 3 (T3, n=87). High injection burden was defined as ≥7 injections at Month 12 and 16–24 injections at Month 24. Injection burden was compared across lesion subtypes using chi-square tests, and associations between baseline optical coherence tomography (OCT) features and injection burden were assessed using Spearman's rho correlation.

Results: At Month 12, both T1 and T2 had a significantly higher proportion of eyes with high injection burden compared with T3 (p=0.0005 and p=0.0098), with no difference between T1 and T2 (p=0.34). In T2, haemorrhage correlated with lower burden (r=-0.19, p=0.016), and subretinal fluid (SRF) correlated with higher burden (r=0.19, p=0.024). At Month 24, T1 and T2 again showed higher burden than T3 (p=0.0008 and p=0.033). Pigment epithelial detachment (PED) correlated with higher burden in T1 (r=0.19, p=0.016) and T3 (r=0.24, p=0.024). In T2, haemorrhage showed lower burden (r=-0.21, p=0.007) and SRF correlated with higher burden (0.20, p=0.018).

Conclusions: T3 consistently demonstrated the lowest injection burden at 12 and 24 months. Baseline OCT features, particularly haemorrhage correlating with fewer injections, whereas SRF and PED associate with increased burden, may guide individualized strategies in nAMD.

Abstract No.: 205266

Interventions to Improve Intravitreal Anti-VEGF Adherence and Retinal-Care Attendance: A Systematic Review

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Purpose: To identify evidence-based strategies that improve adherence to intravitreal anti-VEGF therapy (IVT) visits and associated medical appointments in chronic macular diseases.

Methods: A systematic review was conducted and reported per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines; eligibility followed Population, Intervention, Comparison, Outcomes, and Study design (PICOS). Studies evaluating interventions to enhance IVT adherence and/or associated medical appointments versus usual care were screened. Data on design, intervention, and adherence outcomes were extracted and synthesized qualitatively. Study quality was assessed with the Mixed Methods Appraisal Tool (MMAT, 2018). Study outcomes included IVT adherence/persistence and visit adherence/attendance.

Results: Six studies met the inclusion criteria, with three being randomized controlled trials. Two studies evaluated IVT adherence/persistence: a comprehensive patient-support program that significantly improved 24-month persistence versus usual care and resulted in about two additional injections over 24 months; and a home hyperacuity monitoring app that increased on-time attendance to scheduled injection visits versus matched controls. Four studies evaluated visit adherence/attendance. These comprised SMS reminders, brief point-of-care education seminars, education plus personalized telephone outreach, and a self-monitoring journal. These studies reported increased visit adherence of 14.9% to 28.9% post-intervention (all $P < 0.05$). Overall methodological quality was good (MMAT 2018 mean $\sim 4.3/5$).

Conclusions: Limited, but consistent evidence, suggests that multifaceted, patient-centred strategies, i.e., combining education, digital home-monitoring, and proactive communication, can improve IVT adherence/persistence and retinal care attendance compared to usual care. Larger, well-designed randomized trials using standardized adherence endpoints are needed, including trials that personalize support with patient-reported outcome measures to target individual barriers and enablers.

Abstract No.: 202710

Long-Term Efficacy and Safety of Port Delivery Platform With Ranibizumab in Patients With Neovascular Age-Related Macular Degeneration: Results From the Ladder- and Archway-to-Portal Trials

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Purpose: Ladder and Archway investigated the PDS (Port Delivery Platform with Ranibizumab) in patients with nAMD (Neovascular Age-related Macular Degeneration). We report follow-up data up to 5 and 7 years.

Methods: Patients were randomised to PDS (Ladder [NCT02510794]: 10, 40, or 100mg/mL refilled pro re nata; Archway [NCT03677934]: 100mg/mL refilled Q24W [every-24-weeks]) or monthly IVT (intravitreal) ranibizumab 0.5mg. On primary study completion, patients were eligible to enter the Portal trial (NCT03683251) to receive PDS 100mg/mL Q24W (PDS Q24W and IVT-to-PDS [IVT-PDS] cohorts). Baseline is defined as day-0 of the primary study.

Results: In the Ladder-to-Portal 100mg/mL cohort (PDS Q24W, $n=59$; IVT-PDS, $n=41$), mean BCVAs (best-corrected visual acuities) at baseline and W320 (week-320) were 70.4 and 63.2 letters for PDS Q24W; 70.6 and 68.4 letters for IVT-PDS. Mean CSTs (central subfield thicknesses) at baseline and W320 were 315.6 and 308.6 μ m for PDS Q24W; 325.8 and 301.7 μ m for

IVT-PDS. In the Archway-to-Portal cohort (PDS Q24W, $n=220$; IVT-PDS, $n=132$), mean BCVAs at baseline and W240 were 74.4 and 67.6 letters for PDS Q24W; 76.3 and 68.6 letters for IVT-PDS. Mean CSTs at baseline and W240 were 308.8 and 306.4 μ m for PDS Q24W; 300.6 and 289.3 μ m for IVT-PDS. PDS treatment was generally well-tolerated over the respective study periods.

Conclusions: Continuous anti-vascular endothelial growth factor treatment via the PDS resulted in maintenance of visual and anatomical long-term outcomes for up to 5 and 7 years in nAMD patients and was generally well-tolerated.

Abstract No.: 205082

Macular Atrophy as a Key Determinant of Three-Year Outcomes in Type 1,2,3 Macular Neovascularization: Bilateral Visual and Fellow-Eye Findings

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Purpose: To compare 36-month macular atrophy (MA) incidence in either eye among patients with unilateral type 3 macular neovascularization (MNV) versus unilateral MNV of other subtypes.

Methods: Prospective cohort of 72 patients (144 eyes) with treatment-naïve unilateral MNV: 24 Type 3, 24 Type 1, and 24 Type 2. Fellow eyes without MNV at baseline were followed for 36 months. Baseline visual acuity (VA; ETDRS letters), central retinal thickness (CRT; μ m), and intravitreal injection (IVT) numbers were recorded. The primary endpoint was MA incidence in the MNV and fellow eyes.

Results: At baseline, Type 3 had lower presenting VA and thicker CRT versus Type 1; fellow-eye VA was similar across groups. At year 1, VA improved in all subtypes but remained lower in Type 3; by year 3, VA converged across groups. CRT decreased in all groups with no between-group differences. IVT burden was comparable. MA incidence was higher in Type 3 than in Type 1 and Type 2 in both MNV eyes (96% vs 46% vs 4%) and fellow eyes (58.3% vs 4.2% vs 4.2%) (all $p < 0.001$). No macular fibrosis occurred in Type 3; 50% of Type 2 developed fibrosis by year 3. Incident fellow-eye MNV occurred in 33%, 21%, and 17% in Type 3, Type 1, and Type 2, respectively. At 36 months, fellow-eye VA was lower in Type 3 (57.9 vs 66.1 and 72.9 letters, $p=0.015$).

Conclusions: Type 3 MNV confers a high bilateral risk of MA and worse fellow-eye vision at 36 months versus other subtypes, supporting vigilant bilateral monitoring and MA-focused follow-up and counselling. In selected patients, emerging complement inhibitors for geographic atrophy may be considered for MA management, but randomized trials specific to Type 3 MNV are needed.

Abstract No.: 202944

Maintenance of Driving Eligibility in Patients With Geographic Atrophy From the GATHER1 and GATHER2 Clinical Trials: A Post Hoc Analysis

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Purpose: Geographic atrophy (GA) may affect vision, limiting independence. To be eligible to drive, individuals must meet vision criteria. Avacincaptad pegol (ACP) is approved for GA secondary to age-related macular degeneration by the US FDA. This post hoc analysis explored progression to loss of driving eligibility among patients in the GATHER trials.

Methods: GATHER1 and GATHER2 were multicenter, randomized, double-masked, sham-controlled trials with treatment periods of 18 and 24 months, respectively, in patients with non-center-point-involving GA. The proportion of patients who progressed to restrictions or loss of driving eligibility defined as BCVA ≤ 65 letters ($\leq 20/50$) or ≤ 60 letters ($\leq 20/63$) at any post-baseline visit or at 2 consecutive post-baseline visits over 24 months was evaluated in patients eligible to drive at baseline (≥ 75 letters [$\geq 20/32$] or ≥ 70 letters [$\geq 20/40$]) in the pooled GATHER studies.

Results: Among ACP 2mg- and sham-treated patients with baseline BCVA ≥ 75 letters, 12.3% (15/122) vs 20.4% (28/137), respectively, had BCVA ≤ 65 letters at any post-baseline visit; 4.9% (6/122) vs 11.7% (16/137), respectively, had BCVA ≤ 65 letters at 2 consecutive post-baseline visits. Among ACP 2mg- and sham-treated patients with baseline BCVA ≥ 70 letters, 25.0% (47/188) vs 23.7% (51/215), respectively, had BCVA ≤ 60 letters at any post-baseline visit; 21.3% (40/188) vs 25.6% (55/215), respectively, had BCVA ≤ 60 letters at 2 consecutive post-baseline visits.

Conclusions: In this analysis of the pooled GATHER studies, a lower proportion of patients treated with ACP 2mg vs sham progressed to restrictions or loss of driving eligibility, defined as BCVA ≤ 65 letters.

Abstract No.: 205466

Mechanistic Study of PIEZO Mechano-Ion Channel Proteins by Mediating the Wnt/MAPK Signalling Pathway in Myopic Tractional Macular Degeneration

*First Author: Fanwen **JIANG***

*Co-Author(s): Zhuping **XU***

Purpose: Myopic traction maculopathy (MTM), a subtype of myopic macular degeneration, has been linked to dysregulation in the Wnt and Myopic traction maculopathy (MTM) pathogenesis involves Wnt and MAPK signaling pathways. Piezo mechanosensitive

ion channels, which respond to mechanical stress and regulate cellular functions, may contribute to MTM through these pathways. This study examines Piezo expression in human MTM tissues and its functional impact on Müller cells.

Methods: Vitreous and inner limiting membrane (ILM) samples from MTM and idiopathic macular hole (iMH) patients underwent proteomic analysis and immunofluorescence. Mouse retinal sections and human MIO-M1 Müller cells were treated with Piezo agonist Yoda1 or antagonist GsMTx4, and assessed via immunofluorescence, CCK-8, calcium imaging, and Western blot for Wnt/ β -catenin and MAPK/ERK1/2 signaling.

Results: Piezo1 and Piezo2 were expressed throughout the mouse retina. Significantly higher Piezo1 and Piezo2 protein levels were detected in the ILM of MTM patients compared to iMH controls ($P=0.0076$; $P=0.0394$). Proteomics identified differential expression of ALB, SOD1, PXDN, and CDH2, suggesting pathway alterations. In MIO-M1 cells, GsMTx4 enhanced viability and proliferation, while Yoda1 suppressed both. Correspondingly, Yoda1 decreased β -catenin and ERK1/2 expression, whereas GsMTx4 increased their levels.

Conclusions: Piezo channel proteins are expressed in the mouse retina, human ILM, and MIO-M1 cells, with elevated expression in MTM ILM. Activation of Piezo channels promotes calcium influx, inhibits Müller cell proliferation and migration, and suppresses Wnt/ β -catenin and ERK1/2-MAPK signaling. These findings indicate that Piezo-mediated mechanotransduction contributes to MTM pathogenesis by regulating key signaling pathways in response to retinal traction.

Abstract No.: 204254

Mendelian Randomization Analysis of the Causal Associations Between Matrix Metalloproteinases and Age-Related Macular Degeneration

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Purpose: Age-related macular degeneration (AMD) is a leading cause of blindness in older adults. AMD is associated with extracellular matrix (ECM) dysregulation involving matrix metalloproteinases (MMPs) and tissue inhibitors of metalloproteinases (TIMPs). This study investigated the causal relationships between MMP/TIMP levels and AMD.

Methods: We analyzed data from genome-wide association studies (GWAS) on AMD (FinnGen R10 database) and 18 serum MMPs/TIMPs traits (MMP1-3, 7-10, 12-14, 16, 17, 19, 20, TIMP1-4) (GWAS Catalog database). The primary analysis was based on the inverse variance weighted (IVW) method, with confirmation using the MR-Egger, weighted median,

and weighted mode methods. Sensitivity analyses included MR-Egger, MR-PRESO, Cochran's Q, and the leave-one-out method.

Results: MMP12 was causally associated with an increased AMD risk (IVW: OR 1.14, 95% CI: 1.06-1.23, $P < 0.01$). MMP13 was causally associated with AMD pathogenesis (IVW: OR 0.92, 95% CI: 0.85-1.00, $P = 0.04$). Exposure analyses confirmed robust results for MMP12 and MMP13 without evidence of pleiotropy or outliers. The other MMPs and TIMPs did not show conclusive causal associations with AMD.

Conclusions: This Mendelian randomization study provides strong evidence that MMP12 is a risk factor for AMD while MMP13 is protective, enhancing the understanding of ECM regulation in disease progression and suggesting potential therapeutic targets in ECM homeostasis.

Abstract No.: 206330

Metabolomic Evidence of Altered Energy and Redox Pathways in Central Serous Chorioretinopathy

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Purpose: Central serous chorioretinopathy (CSCR) is the fourth leading cause of retinal disease, predominantly affecting middle-aged men and often associated with corticosteroid exposure. Its pathophysiology remains incompletely understood, with conflicting data regarding endogenous glucocorticoid excess. We aimed to identify systemic metabolomic signatures associated with CSCR and explore their relationship with corticosteroid-related pathways.

Methods: We conducted an untargeted serum metabolomic analysis using UHPLC-MS in 60 men with active CSCR (30 acute/recurrent, 30 chronic/complex) and 60 age-matched healthy male controls. Metabolites were processed through standardized workflows with quality controls, annotation against in-house and public databases, and pathway enrichment analysis.

Results: Out of 2,196 robust metabolite features, 722 differed significantly between CSCR and controls (592 downregulated, 130 upregulated). CSCR sera exhibited: (i) decreased medium- and long-chain acylcarnitines, suggesting incomplete fatty acid β -oxidation and possible mitochondrial dysfunction; (ii) downregulation of sphingosine-1-phosphate, kynurenine, glutamic acid, and glutathione metabolism, indicating impaired antioxidant defense; and (iii) marked upregulation of primary fatty acid amides (oleamide, linoleamide, palmitoleamide), implicating sleep and vascular regulation pathways. Pathway analysis revealed alterations in amino acid metabolism (histidine,

tryptophan, phenylalanine, arginine/proline) and aminoacyl-tRNA biosynthesis. These findings do not support systemic glucocorticoid excess in CSCR patients

Conclusions: CSCR is associated with a distinct systemic metabolomic signature characterized by impaired energy and redox metabolism and elevated fatty acid amides. These results suggest inadequate glucocorticoid pathway activation rather than excess, highlighting new avenues for understanding disease mechanisms and potential biomarkers. Validation in independent cohorts is warranted.

Abstract No.: 200205

Multi-Omics Integration With Machine Learning Identified Early Diabetic Retinopathy, Diabetic Macula Edema and Anti-VEGF Treatment Response

First Author: Yuhui **PANG**

Co-Author(s): Hui **CHEN**

Purpose: Identify optimal metabolic features and pathways across diabetic retinopathy (DR) stages, develop risk models to differentiate diabetic macular edema (DME), and predict anti-vascular endothelial growth factor (anti-VEGF) therapy response.

Methods: We analyzed 108 aqueous humor samples from 78 type 2 diabetes mellitus patients and 30 healthy controls. Ultra-high-performance liquid chromatography-high-resolution-mass-spectrometry detected lipidomics and metabolomics profiles. DME patients received ≥ 3 anti-VEGF treatments, categorized into strong and weak response groups. Machine learning (ML) screened prospective metabolic features, developing prediction models.

Results: Key metabolic features identified in the metabolomics and lipidomics datasets included n-acetyl isoleucine (odds ratio [OR] = 1.635), cis-aconitic acid (OR = 3.296), and ophthalmic acid (OR = 0.836) for DR. For early-DR, n-acetyl isoleucine (OR = 1.791) and decaethylene glycol (PEG-10) (OR = 0.170) were identified as key markers. L-kynurenine (OR = 0.875), niacinamide (OR = 0.843), and linoleoyl ethanolamine (OR = 0.941) were identified as significant indicators for DME. Trigonelline (OR = 1.441) and 4-methylcatechol-2-sulfate (OR = 1.121) emerged as predictors for strong response to anti-VEGF. Predictive models achieved R^2 values of 99.9%, 97.7%, 93.9%, and 98.4% for DR, early-DR, DME, and strong response groups in the calibration set, respectively, and validated well with R^2 values of 96.3%, 96.8%, 79.9%, and 96.3%.

Conclusions: This research used ML to identify differential metabolic features from metabolomics and lipidomics datasets in DR patients. It implies that metabolic indicators can effectively predict early disease progression and potential weak responders to anti-VEGF therapy in DME eyes.

Abstract No.: 204845

Neurovascular Parameters of the Retina and Choroid Among Adults With Long COVID-19 Syndrome

First Author: Saritra RAJ

Co-Author(s): Mimiwati ZAHARI

Purpose: We aim to investigate the retinochoroidal parameters among individuals with Long Covid-19 syndrome (persistence of symptoms for 12 weeks and beyond) and thenceforth to correlate findings with neurology.

Methods: In this cross-sectional study, 30 eyes from 60 individuals with Long Covid-19 were tested against age and gender matched 30 eyes from 60 controls who have recovered from Covid-19. The retinal nerve fibre layers (peripapillary and macula), ganglion cell layer, and choroidal thickness were measured using Spectral Domain Optical Coherence Tomography (SD-OCT). Vessel and perfusion densities of the radial peripapillary capillary plexus (RPCP), macula superficial (SCP), and deep capillary plexuses (DCP), and also the choriocapillaries (CC) were assessed using Optical Coherence Tomography Angiography (OCTA). Results were compared between the two groups and also correlated with the presence of cognitive impairment symptoms within the Long Covid-19 group.

Results: Individuals in the Long Covid-19 group displayed a significant reduction in the thicknesses of the retinal nerve fibre layer (peripapillary and macula), ganglion cell layer, and choroid. Vessel and perfusion densities of the superficial and deep retinal capillary plexuses, radial peripapillary capillary plexus, and the choriocapillaries ($p < 0.05$) were also significantly reduced in the Long Covid-19 group. Within the Long Covid-19 group, there were also some significant associations seen with cognitive impairment, whereby the ganglion cell layer appears thicker, and vessel densities appear reduced compared to those without cognitive impairment ($p < 0.05$).

Conclusions: Patients with Long Covid-19 syndrome showed significant reductions in the retinochoroidal neurovascular thicknesses and densities compared to those infected with Covid-19 infection for less than 3 months' duration. There were also significant changes in those Long Covid-19 participants with cognitive impairment. This study suggests that the presence of Long Covid-19 syndrome has the tendency to lead to visual abnormalities.

Abstract No.: 202732

Non-Viral Gene Delivery via Electroporation for Inherited Retinal Diseases Using the Sleeping Beauty Transposon System

First Author: Jiao ZHANG

Purpose: Inherited retinal diseases (IRDs) represent a leading cause of irreversible blindness worldwide,

with limited treatment options available. Gene therapy holds significant promise, but viral vector delivery systems face challenges, including immunogenicity and limited cargo capacity. This study aimed to develop a non-viral gene delivery platform using the Sleeping Beauty (SB) transposon system for electroporation-based transfection of degenerating rd10 retinas, with potential applications in combined retinal prosthesis-gene therapy strategies.

Methods: The SB100X transposase and Venus transposon plasmids (1:16 ratio) were electroporated into rd10 retinas at varying degeneration stages and wild-type controls. Transfection efficiency was evaluated via fluorescence microscopy and immunohistochemistry. Retinal integrity was assessed using FITC-dextran electroporation, histology, and TUNEL apoptosis assays.

Results: Highest transfection efficiency occurred in advanced degeneration stages (P61 and older), exclusively targeting Müller cells. A 31% reduction in plasmid size increased transfection efficiency by 1.5-fold. Electroporation preserved retinal laminar structure, with apoptosis rates in the inner nuclear layer (INL) reduced by half compared to wild-type controls.

Conclusions: This study establishes electroporation-mediated SB transposon delivery as a viable non-viral strategy for targeting late-stage degenerated retinas. The Müller cell-specific transfection pattern suggests potential for neuroprotective factor secretion, while preserved tissue integrity supports compatibility with prosthetic implantation. These findings provide critical preclinical evidence for combined electrogene-prosthetic therapy in IRDs, addressing both genetic correction and neural circuit preservation. Future work will focus on therapeutic transgene delivery and in vivo functional validation.

Abstract No.: 202284

One-Year Prospective Single-Arm Clinical Trial of Switching to Faricimab in Previously Treated Neovascular Age-Related Macular Degeneration With Inadequate Response: The FURGGHORN Study

First Author: Andrew CHANG

Co-Author(s): Geoffrey BROADHEAD, Gemmy CHEUNG, Thomas HONG, Hemal MEHTA, Long PHAN

Purpose: To prospectively examine the effect of switching to faricimab therapy in previously-treated neovascular age-related macular degeneration (nAMD).

Methods: FURGGHORN (ACTRN12623000215628) was a phase IV, prospective, single-arm, open-label, multi-center, investigator-initiated clinical trial. Currently-treated patients showing nAMD disease activity were switched to receive four doses of faricimab 6mg/0.05mL given 4-weekly. From week 12, treatment

intervals in all patients were extended to 8-weekly and modified at subsequent visits according to a treat-and-extend protocol. Changes from baseline in best-corrected visual acuity (BCVA) and central subfield thickness (CST), as well as the proportions of retinal fluid, treatment intervals, and the incidence of adverse events through to week 52, were examined.

Results: One hundred and two eligible eyes, with a mean age of 76 years, were recruited across 12 sites. Baseline BCVA was 72 letters, and baseline CST was 384 μm . Seventy-three eyes switched from aflibercept 2mg, and 29 switched from ranibizumab. At week 52 after switching to faricimab, mean BCVA change was +0.9 letters ($P=0.069$), mean CST change was -75.1 μm ($P<0.001$), and 53% percent of eyes showed absence of both intraretinal and subretinal fluid. Last assigned treatment intervals were 4-weekly, 8-weekly, 12-weekly, and 16-weekly in 43%, 18%, 18% and 21% of eyes, respectively. Anterior chamber inflammation occurred in one eye with no cases of vasculitis or occlusive retinitis.

Conclusions: Switching to faricimab in eyes with disease activity led to improved anatomic outcomes with maintained visual function, allowing extended dosing intervals under a flexible treatment regimen.

Abstract No.: 204277

Optic Nerve Infiltration in the Context of Leukemia

First Author: Wenbo LIU

Co-Author(s): Yumeng LI, Xuan SHI, Wenzhou XIAO

Purpose: To report a rare case series of isolated optic nerve infiltration as the initial manifestation of leukemia relapse, a condition typically associated with a poor prognosis.

Methods: A retrospective analysis was conducted on patients with relapsed leukemia who presented with isolated optic nerve infiltration at Peking University People's Hospital between 2018 and 2024.

Results: Three male patients with a history of acute leukemia showed no definitive evidence of systemic relapse in cerebrospinal fluid (CSF) or bone marrow tests at the initial onset of ocular symptoms. Leukemia patients with optic disc infiltration commonly present with optic disc edema; however, more characteristic findings in these cases include a more fluffy and white swollen optic disc, creamy infiltration, tortuosity of the retinal vessels, aggravated dot and blot hemorrhages. A critical finding was the rapid progression to severe vascular complications, such as central retinal artery occlusion (CRAO) and neovascular glaucoma, which ultimately resulted in no light perception (NLP) in all affected eyes.

Conclusions: Isolated optic nerve infiltration can be the sole and initial sign of leukemia relapse. Its clinical presentation often mimics other conditions, leading

to diagnostic delays. A high index of suspicion, close collaboration with hematologists, and prompt initiation of treatment based on clinical judgment, even in the absence of initial laboratory evidence and radiographic evidence, are crucial to preventing irreversible vision loss.

Abstract No.: 207440

Optical Coherence Tomography Angiography in Smokers Without Systemic Disease: Early Retinal Vasculopathy Before Fundus Changes

First Author: Sri Satviki POSINA

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Purpose: To evaluate early retinal microvascular alterations in systemically healthy smokers using optical coherence tomography angiography (OCTA) and determine its utility in detecting preclinical vasculopathy.

Methods: This hospital-based cross-sectional observational study included 60 participants aged 18–50 years, comprising 30 chronic smokers and 30 age-matched healthy non-smokers. All subjects had best-corrected visual acuity (BCVA) $\geq 6/9$, no systemic or ocular disease, and high-quality OCTA scans (signal strength index ≥ 7). OCTA parameters analyzed included vessel density (VD) and perfusion density (PD) of the superficial and deep capillary plexuses, and foveal avascular zone (FAZ) metrics (area, perimeter, and circularity index).

Results: The deep capillary plexus VD was significantly reduced in smokers ($41.2\% \pm 3.8$) compared with controls ($45.6\% \pm 4.1$, $p < 0.001$). Superficial VD also showed a moderate reduction ($48.5\% \pm 3.2$ vs $50.7\% \pm 3.0$, $p = 0.03$). The FAZ area was larger in smokers ($0.33 \pm 0.07 \text{ mm}^2$) than in controls ($0.27 \pm 0.05 \text{ mm}^2$, $p = 0.01$), while the FAZ circularity index was reduced, indicating early ischemic remodeling. A moderate inverse correlation was observed between pack-years and deep plexus VD ($r = -0.54$).

Conclusions: OCTA detects early retinal microvascular compromise in smokers, even in the absence of systemic disease or fundus changes. Reduced deep plexus vessel density and enlarged FAZ area may serve as sensitive biomarkers of subclinical vasculopathy, potentially preceding clinically detectable retinopathy.

Abstract No.: 203448

Overdose Photodynamic Therapy in the Management of Circumscribed Choroidal Hemangioma

First Author: Iat Fan LAI

Purpose: To evaluate the efficacy and safety of overdose photodynamic therapy (PDT) in the

management of circumscribed choroidal hemangioma (CCH).

Methods: A prospective study was conducted on 10 patients (10 eyes) with symptomatic CCH who underwent overdose PDT treatment. Verteporfin was administered intravenously at an overdose of 8 mg/m², followed by laser application at 689 nm with a fluence of 50 J/cm². Patients were monitored for tumor thickness, visual acuity, and complications over a mean follow-up period of 12 months.

Results: PDT resulted in a significant reduction in tumor thickness, with a mean decrease of 1.8 mm ($p < 0.01$). Visual acuity improved by ≥ 2 lines in 80% of patients, remained stable in 20%, and showed no decline. Subretinal fluid resolved completely in 90% of cases within 3 months. No severe adverse events were reported; mild transient visual disturbances were noted in 20% of patients.

Conclusions: Overdose PDT is an effective and safe treatment for circumscribed choroidal hemangioma, leading to significant tumor regression and functional visual improvement with minimal complications. It represents a valuable therapeutic option for preserving vision in affected patients.

Abstract No.: 206328

Overtreatment in Diabetic Macular Oedema: Real-World Consequences of Ambiguous Central Retinal Thickness Definition

First Author: Konstantina **THEODOSAKI**

Co-Author(s): Dominik **FISCHER**, Claire **RUAN**

Purpose: To evaluate the impact of ambiguity in National Institute for Health and Care Excellence (NICE) guidance over different definitions of central retinal thickness (CRT); interpreted as either central subfield thickness (CST) vs central maximum thickness (CMT); on treatment eligibility, outcomes, complications, and cost of care in diabetic macular oedema (DMO) management.

Methods: Single-centre retrospective cohort of 100 consecutively treated DMO eyes receiving aflibercept or faricimab (2022–2024). Exclusion criteria: prior anti-VEGF or non-DMO indications. OCT CST (1mm subfield mean) and CMT (single point maximum) and BCVA were recorded at baseline, 6, and 12 months. Data on treatment burden, including injections, clinic visits, complications, and costs, were extracted. Eyes were stratified into: Group A (CST ≥ 400 μ m and/or ≥ 5 -letter loss) and Group B (CMT ≥ 400 μ m with CST < 400 μ m). The primary outcome was overtreatment proportion (Group B among treated eyes), with secondary outcomes being BCVA gain, complication rate, and costs.

Results: Of 100 eyes, 63 (63%) were in Group A and 37 (37%) in Group B. Optimal response at 6 months was significantly higher in Group A (80.95% vs 51.35%,

$p=0.0038$). Mean BCVA gain was +7 vs 0 ETDRS letters at 12 months ($p<0.005$). Despite significantly lower baseline BCVA in Group A (67.0 vs 75.0, $p=0.0001$), final BCVA at 12 months was comparable (74.3 vs 75.0). Group B accounted for 38% of injections and 35% of appointments, had double the complication rate (2/63 vs 4/37) (including one tractional retinal detachment), and incurred ~£190k in potentially avoidable costs in 6 months.

Conclusions: Ambiguity in CRT ≥ 400 μ m definition caused 37% overtreatment when using CMT instead of CST to initiate treatment. This was linked to inferior response, negligible vision gain, increased complications, and substantial avoidable costs. The refined guideline clarification to CST is expected to reduce overtreatment without compromising outcomes. Despite starting with significantly worse baseline vision, Group A achieved equivalent outcomes at 12 months, supporting the use of CST as a measure of the structural criterium of CRT ≥ 400 μ m.

Abstract No.: 204395

PULSAR Extension: Aflibercept 8 mg Outcomes at 156 Weeks in Choroidal Neovascularization and Polypoidal Choroidal Vasculopathy

First Author: Chui Ming Gemmy **CHEUNG**

Co-Author(s): Youxin **CHEN**

Purpose: To evaluate aflibercept 8 mg outcomes over 156 weeks in neovascular age-related macular degeneration (nAMD) patients, grouped by choroidal neovascularization (CNV) type or polypoidal choroidal vasculopathy (PCV) in PULSAR Extension.

Methods: In PULSAR (NCT04423718), patients were randomized 1:1:1 to aflibercept 8 mg every 12 (8q12) or 16 weeks (8q16), or 2 mg every 8 weeks (2q8), post 3 monthly injections. At W96, patients could enter a 1-year extension through W156. The 2q8 group switched to 8 mg at 12-week intervals (2mg->8mg); 8q12/8q16 groups continued 8 mg at last-assigned intervals (8mg group). Dosing intervals were adjusted from W100 (8–24 weeks) per disease activity. Outcomes, by baseline CNV type or ICGA-confirmed PCV, included best-corrected visual acuity (BCVA) and central subfield retinal thickness (CRT) at W156.

Results: Of 625 patients, 58.4%, 20.0%, 19.8% and 20.3% had CNV in Type 1, Type 2, Mixed, and ICGA-confirmed PCV, respectively. In 2mg->8mg, improvement of BCVA letters from baseline to W156 were Type 1: 64.1 to 68.6; Type 2: 50.3 to 56.5; Mixed: 56.4 to 64.5; PCV: 58.7 to 69.2. In 8mg, these BCVA letter improvements were Type 1: 64.2 to 68.3; Type 2: 54.9 to 58.1; Mixed: 57.1 to 59.0; PCV: 56.8 to 61.9. CRT decreased across CNV types. In 8mg group, 38.7–52.2% of patients had last-assigned dosing interval ≥ 20 -week.

Conclusions: Aflibercept 8 mg sustained BCVA and CRT improvements through 156 weeks support extended dosing in nAMD regardless of CNV type and the presence of PCV.

Abstract No.: 204150

PULSAR Extension: Comparable Outcomes With Reduced Treatment Burden in nAMD Patients Switching From Aflibercept 2 mg to 8 mg

First Author: Gavin TAN

Co-Author(s): Sergio LEAL, Andrea SCHULZE, Xin ZHANG, Sandrine ZWEIFEL

Purpose: To evaluate long-term outcomes in neovascular age-related macular degeneration (nAMD) patients switching from aflibercept 2 mg to 8 mg through 156 weeks in the PULSAR Extension.

Methods: In the Phase 3 PULSAR trial (NCT04423718), treatment-naïve nAMD patients were randomized to receive aflibercept 8 mg every 12 (8q12) or 16 weeks (8q16), or aflibercept 2 mg every 8 weeks (2q8), each after three monthly doses. Patients completing the 96-week main phase could enter a 1-year open-label extension. Those in the 2q8 arm switched to aflibercept 8 mg at Week 96 with a 12-week dosing interval (2mg→8mg group), while 8q12 and 8q16 groups continued their assigned intervals. From Week 100, dosing intervals could be adjusted (8–24 weeks) based on disease activity. Analyses were exploratory.

Results: For the 2mg→8mg group (n=208), the mean best-corrected visual acuity (BCVA) was 66.9 letters at Week 96, 66.7 at Week 100, and 65.1 at Week 156. Mean central retinal thickness (CRT) was 285.2 µm, 263.6 µm, and 274.8 µm, respectively. The proportion without intraretinal and subretinal fluid was 61.8% at Week 96, 74.9% at Week 100, and 64.4% at Week 156. Patients received a mean of 12.8 injections (baseline to Week 96) and 4.7 injections (Week 96–156). No new safety signals were observed.

Conclusions: Switching to aflibercept 8 mg maintained BCVA and CRT, improved fluid control at Week 100, and reduced injection frequency through Week 156, without new safety concerns.

Abstract No.: 204812

Pain Control After Intravitreal Injections: Comparison of Topical Nepafenac 0.3%, Tetracaine 2% and Tetracaine 0.5%

First Author: Andrea SILITONGA

Purpose: Pain after intravitreal injections (IVI) can affect patients' experience and compliance. We prospectively evaluated topical nepafenac 0.3% or tetracaine 2% to reduce ocular discomfort after IVI and compare it to the commonly used topical anesthetic tetracaine 0.5%.

Methods: A cross-sectional study. Participants were randomized to receive either a single drop of tetracaine 0.5% (control group), nepafenac 0.3%, or topical tetracaine 2%. Pain was assessed using the Numeric Pain Rating Scale that ranged from 0 to 10 (horizontal pain scale).

Results: There are 49 patients in the control group (tetracaine 0.5%), 44 patients in the nepafenac 0.3% group and 55 patients in the tetracaine 2% group. Numeric Pain Rating Scale scores at 6 and 12 hours after IVI were lower in the tetracaine 2% group (1.582 ± 0.357 and 0.545 ± 0.262 , respectively) compared to the control group (1.653 ± 0.378 and 0.816 ± 0.278 , respectively) and nepafenac. Although the tetracaine group reported lower pain scores compared to the control and nepafenac group, the difference was not statistically significant (6 hours, p-value = 0.859; 12 hours, p-value = 0.377).

Conclusions: Tetracaine 0.5%, Nepafenac 0.3% and Tetracaine 2% were effective in reducing pain up to 12 hours after IVI. Tetracaine 2% was associated with lower pain scores compared to tetracaine 0.5% and nepafenac 0.3% but not statistically significant. Additional studies are needed to determine the most effective and cost-efficient method to reduce pain after IVI.

Abstract No.: 201898

Persistent Avascular Retina in Retinopathy of Prematurity - Ultra Wide Field Imaging Features and Long-Term Sequelae

First Author: Simar Rajan SINGH

Co-Author(s): Rishika RATHORE

Purpose: To describe the presentation, ultra-wide field (UWF) imaging features, and long-term sequelae in eyes with persistent avascular retina (PAR) secondary to retinopathy of prematurity (ROP).

Methods: This cross-sectional study included patients greater than three years of age with a history of prematurity presenting to a tertiary care centre and diagnosed with PAR (>2DD) secondary to ROP. All patients underwent ophthalmic examination and UWF fundus photography. UWF fluorescein angiography (UWF-FA) was performed to delineate PAR. Family screening was done for all to rule out FEVR.

Results: The study included 58 eyes of 31 patients with a mean age of 9 years (range 3 – 30 years). Thirteen (41.9%) patients presented with low vision incidentally detected at school, 8 (25.8%) had a sudden decrease in vision due to rhegmatogenous retinal detachment, and 7 (22.5%) were detected on fundus screening prior to refractive surgery. Only 12 (38.7%) had previously been screened for ROP, and 4 had received anti-VEGF injection without any subsequent laser treatment. Fundus findings included vitreous veils (62%), straightening of arcades (62%), vascular tortuosity

(51.7%), lattice (55.1%), epiretinal membrane (13.8%), tractional retinal detachment (10.3%) and vitreous hemorrhage (5.1%). UWF-FA done in 54 (93.1%) eyes demonstrated >6 clock hours of PAR in 82% eyes. Laser of PAR was done in 40 eyes, and surgery for retinal detachment in 8 eyes.

Conclusions: Spontaneously regressed ROP can be associated with PAR, which can lead to long-term sequelae. Timely screening and treatment of PAR may help in preventing vision loss in these eyes.

Abstract No.: 201621

Persistent Diffuse Photoreceptor Disorganization

First Author: Miaoling LI

Purpose: To characterize persistent diffuse photoreceptor disorganization (PDPD), a newly recognized retinal disorder, and establish diagnostic criteria differentiating it from similar outer retinopathies.

Methods: This retrospective observational case series included 14 patients (21 eyes) with subacute vision loss, unremarkable fundus, and persistent diffuse photoreceptor disorganization on OCT, from 2020-2025. Medical records, multimodal imaging (OCT, fundus autofluorescence [FAF], fluorescein angiography [FA], indocyanine green angiography [ICGA]), and visual function (electroretinography [ERG], visual field) findings were analyzed.

Results: Patients (mean age 30.7 years) presented with subacute vision loss (mean BCVA 0.9 LogMAR, range, 2.0-0.2). Seven patients (50%) had bilateral involvement. Infectious uveitis and known retinal dystrophy mutations (via whole-exome sequencing) were excluded. Fundus, FAF, and ICGA were largely unremarkable. OCT revealed blurred/rough ellipsoid zone (EZ) and absent interdigitation zone (IZ) in the posterior pole of all eyes (including fovea in 100%, periphery in 92.9%). The RPE layer was preserved. Outer retina thickness was significantly thinner in involved eyes compared to fellow eyes (118.3 vs. 147.6 μm , $p=0.008$). FA showed peripheral venous leakage in 75% of eyes. Full-field ERG indicated reduced amplitudes (normal latency, scotopic/photopic), and visual fields showed significant defects. Eleven patients received immunosuppressive therapies. Over 17 months, OCT abnormalities persisted, outer retina thickness slowly decreased, and visual acuity remained stable with no significant improvement.

Conclusions: PDPD is characterized by subacute, diffuse, and persistent photoreceptor disorganization with largely unremarkable fundus, distinct from other outer retinopathies. Visual prognosis is generally poor, necessitating further research into pathogenesis and treatment.

Abstract No.: 201618

Persistent Placoid Maculopathy (PPM): Lichen-Like Lesions Growing Between Retinal Pigment Epithelium and Bruch's Membrane

First Author: Miaoling LI

Purpose: To report the novel imaging findings in PPM from the first case series of Asian subjects.

Methods: Patients with PPM from 2013 to 2023 were included retrospectively. Medical records and multimodal images from each visit were analyzed.

Results: Twenty-one eyes of 16 patients were included. The mean age was 61 years old. PPM lesions were unremarkable on CFP, autofluorescence, and FA. Hypofluorescent spots with a lichen-like appearance presented in all phases of ICGA, which were most prominent in the late phase and presented in a fused (71%) or clustered (29%) pattern. The hypofluorescence correlated with the lesions between the RPE and Bruch's membrane (BM) with moderate reflectivity on OCT, and the thickness ranged from slit-like to mound-like. The intensity of hypofluorescence sometimes varied in the same eye and correlated with the thickness of sub-RPE lesions on OCT. No abnormal blood flow signals were detected in either the sub-RPE space or choriocapillaris slab of OCTA across the PPM lesions. Ten eyes of 7 patients were followed up (median, 26 months). During follow-up, the lichen-like lesions spread and migrated slowly without changing the plane patterns of the first visit and were limited to sub-RPE growth. Ten eyes (9 eyes in the fused pattern, 1 eye in the clustered pattern) had secondary CNV.

Conclusions: PPM lesions were located in the sub-RPE space. Spreading and migration between the RPE and BM may account for their unique lichen-like appearance and progression pattern.

Abstract No.: 205167

Phase I Safety and Efficacy Topline Results of Subretinal Gene Therapy FT-002 for X-Linked Retinitis Pigmentosa

First Author: Ruifang SUI

Co-Author(s): Rongping DAI, Xiaoxu HAN, Xinyan LI, Weihong YU, Xuan ZOU

Purpose: To investigate the safety and efficacy of FT-002, a novel rAAV (Recombinant Adeno-associated Virus) vector containing codon-optimized hRPGORF15 (Human Retinitis Pigmentosa GTPase Regulator ORF15) gene developed by Frontera Therapeutics, in participants with RPGR-associated XLRP (X-linked Retinitis Pigmentosa).

Methods: In an open-label, dose escalation Phase I study (CTR20222868), male participants at 18~45 years of age with RPGR-associated XLRP were enrolled to receive FT-002 at a dose of 1.0×10^{11} or 2.0×10^{11} vg/

eye via unilaterally subretinal injection. The safety and efficacy of FT-002 were evaluated within 52 weeks.

Results: Six participants were enrolled in Phase I with follow-up for 52 weeks. FT-002 demonstrated a good safety profile, with no DLT (Dose-Limiting Toxicity) or FT-002-related SAE (Serious Adverse Event). At Week 52, the BCVA (Best Corrected Visual Acuity) of participants who received FT-002 at 2.0×10^{11} vg/eye improved by an average of 8.3 letters from baseline, with 2/3 (66.7%) achieving a gain of ≥ 5 letters. Additionally, the National Eye Institute Visual Function Questionnaire (NEI VFQ-25) scores showed a mean improvement of 14.139 points from baseline. Moreover, OCT (optical coherence tomography) revealed an increase in EZ (ellipsoid zone) width of 0.022 mm compared to baseline, marking the first reported reversal of EZ width reduction, which suggests slowed disease progression in XLRP.

Conclusions: FT-002 is safe and holds great promise to be an effective treatment for participants with RPGR-associated XLRP.

Abstract No.: 208340

Prediction of the Risk for Developing Diabetic Retinopathy Based on Blood Molecules and Retinal Features

First Author: Huiqian **KONG**

Co-Author(s): Jiahui **CAO**, Chunran **LAI**, Honghua **YU**, Xiayin **ZHANG**

Purpose: Diabetic retinopathy (DR) has rapidly become the leading blinding eye disease threatening the working population. We aimed to explore molecular biomarkers and retinal features and build prediction models of DR.

Methods: Participants from UK Biobank were recruited from 2006 to 2010, and prospectively followed up until 2021. We divided the enrolled population according to the full-course DR into 5 groups: no diabetes mellitus (no DM), prediabetes (pre DM), diabetes mellitus (DM), non-proliferating diabetic retinopathy (NPDR), and proliferating diabetic retinopathy (PDR). The molecular biomarkers evaluated at baseline includes 7 lipids and 8 proteins, while the retinal features were measured by Optical coherence tomography (OCT). The associations between molecular biomarkers and retinal features were performed by correlation analysis. A predictive model of DR was constructed using both retinal features and molecular biomarkers.

Results: The study included 3,953 participants (2095 [53.0%] female), with a mean age (SD) of 47.3 (5.8) years. Apo A, Apo B, HDL, and LDL were associated with retinal nerve fiber layer (RNFL), ganglion cell layer (GCL), and inner nuclear layer (INL) in full-course DR (all r range from 0.5 to 1 0.5, $p < 0.05$). Protein biomarkers, including albumin, total protein, and creatine, showed significant correlation with GCL and RNFL in pre DM, DM, NPDR, and PDR groups compared to the no DM

group (all $p < 0.05$). The Area Under Curve (AUC) of the DR prediction model based on the combination of molecular biomarkers and retinal features is 0.790 (95%CI:0.711-0.847), $p < 0.01$, which is higher than the prediction models based on molecular biomarkers or retinal features alone.

Conclusions: Molecular biomarkers were associated with retinal features during the full-course DR. DR prediction model based on the combination of molecular biomarkers and retinal features presented a higher AUC, suggesting a possible strategy for early diagnosis of DR.

Abstract No.: 202049

Predictors of Diabetic Macular Oedema Development in Type 2 Diabetes: The Importance of Glycaemic Control and Systemic Inflammation

First Author: Linh **DO**

Co-Author(s): Charisse **KUO**, Stuti **MISRA**, Odunayo **MUGISHO**, Rinki **MURPHY**, Rachael **NIEDERER**

Purpose: To investigate predictors of diabetic macular oedema (DMO) in patients with type 2 diabetes mellitus (T2DM), focusing on hyperglycaemia, glycaemic variability, and systemic inflammation.

Methods: This is a retrospective, hospital-based longitudinal study. Of 603 charts reviewed, 125 patients with T2DM without DMO were included and followed from 2012 to 2022. Hyperglycaemia and glycaemic variability were recorded using HbA1c measurements, adjusted standard deviation (SD), and coefficient of variation (CV). White blood cell (WBC) counts, metabolic comorbidities, and medication use were tested as predictors of DMO development using univariate Cox proportional hazards followed by multivariate regression and Kaplan–Meier curves.

Results: Among 125 patients (49.6% male; mean diabetes duration 13.42 ± 7.81 years), DMO developed in 42 (33.6%) over a mean follow-up of 4.97 ± 3.04 years. Predictors of DMO development were mild or moderate DR at baseline, higher HbA1c ($p = 0.005$, HR = 1.045), lower neutrophil counts ($p = 0.024$, HR = 0.396), but not HbA1c variability (adjusted SD: $p = 0.646$; CV: $p = 0.982$). Only dipeptidyl peptidase-4 (DPP-4) inhibitor use reduced risk ($p = 0.004$), whereas other metabolic medications and comorbidities were not associated.

Conclusions: Higher HbA1c levels and lower neutrophil counts are associated with increased risk of DMO in T2DM, highlighting the role of glycaemic control and systemic inflammation. These findings pave the way for future therapeutics targeting systemic immune response in DMO prevention.

Abstract No.: 202499

Predictors of Extended Treatment Interval in DME Diabetic Macular Edema Patients Treated With Faricimab in the Phase-3 YOSEMITE/RHINE Trials

First Author: Anna TAN

Co-Author(s): Aude AMBRESIN, Bianca S. GERENDAS, Kara GIBSON, Ming YANG

Purpose: This YOSEMITE/RHINE post-hoc analysis evaluated baseline characteristics and treatment response as treatment interval predictors in faricimab-treated DME (diabetic macular edema) patients.

Methods: In YOSEMITE/RHINE(NCT03622580/ NCT03622593), 1891 patients were randomized 1:1:1 to faricimab-6.0mg per personalized T&E (treat-and-extend) interval, faricimab-6.0mg Q8W (every-8-weeks), or aflibercept-2.0mg Q8W doses through week-100. In faricimab-T&E arm, treatment intervals were adjusted (Q4W-Q16W) based on pre-specified CST (central subfield thickness) and BCVA (best-corrected visual-acuity) criteria. Twenty-one baseline characteristics and nine treatment responses (week-16 and year-1) were evaluated as treatment interval predictors at year-1 and year-2 by univariate/ multivariable analyses. All P values are nominal.

Results: Every 50-µm decrease in baseline-CST had greater odds of achieving Q16W vs shorter intervals at year-1 (Q16W vs Q4W: OR [odds ratio]=2.95; Q16W vs Q8W: OR=1.73; Q16W vs Q12W: OR=1.75, all P<0.0001) and year-2 (Q16W vs Q4W: OR=1.74, P<0.0001). Every 50-µm CST-decrease from baseline to week-16 increased the odds of achieving Q16W vs shorter intervals at year-1 (Q16W vs Q4W: OR=2.13; Q16W vs Q8W: OR=1.27; Q16W vs Q12W: OR=1.30, all P<0.05) and year-2 (Q16W vs Q4W: OR=1.75, P<0.0001). Anti-vascular endothelial growth factor treatment-naïve patients at baseline had greater odds of achieving Q16W interval at year-1 (Q16W vs Q4W: OR=2.56; Q16W vs Q8W: OR=2.17, both P<0.01). Additional volumetric fluid data will be presented.

Conclusions: Select baseline characteristics and early treatment response were associated with extended treatment intervals at year-1/year-2 among faricimab-treated DME patients, suggesting earlier disease control with faricimab may improve long-term durability and outcomes.

Abstract No.: 206365

Preoperative Educational Video Viewing Is Associated With a Reduced Incidence of Subconjunctival Hemorrhage Following Intravitreal Anti-VEGF Injection

First Author: Fang ZHENG

Co-Author(s): Xiaoyun FANG

Purpose: To assess whether preoperative viewing of an educational procedural video reduces the incidence and severity of subconjunctival hemorrhage (SCH) following intravitreal anti-VEGF injections (IVI), and improves patient experience.

Methods: In this surgeon-blind randomized controlled trial (NCT07002372), treatment-naïve patients scheduled for their first IVI were prospectively enrolled and randomized to either an intervention group (video viewing) or a control group (no video). All participants completed the State-Trait Anxiety Inventory-State (STAI-S) before and after the injection. SCH incidence and area were assessed via standardized post-injection photographs analyzed using ImageJ software. Additional outcomes included patient-reported pain and satisfaction scores, heart rate, procedure time, and physician-rated patient cooperation.

Results: A total of 108 patients were enrolled; 103 completed the study. Baseline demographics were similar between groups. SCH occurred in 21/51 (41.2%) patients in the intervention group versus 36/52 (69.2%) in the control group, though SCH area did not differ significantly. Logistic regression analysis revealed that the use of anticoagulant medication was positively associated with the occurrence of SCH, whereas watching an educational video prior to IVI was negatively associated with SCH. Anxiety scores decreased post-procedure in both groups. In the intervention group, anxiety decreased modestly after video viewing. Patients rated the video as helpful for understanding (8.75/10), calming nerves (8.44/10), and improving cooperation (8.55/10). No significant differences were observed in pain scores, heart rate, procedure time, or surgeon-rated cooperation.

Conclusions: Preoperative procedure video viewing is a simple, low-cost, and convenient approach to enhance both patient experience and the safety of IVI.

Abstract No.: 208620

Prevalence of Psychiatric Disorders in Chinese Patients With Age-Related Macular Degeneration

First Author: Raymond Lai-man WONG

Co-Author(s): Wing Yi Chilli LAU, Fiona LUK, Shaheeda MOHAMED, Simon Ka-ho SZETO, Carolyn Ka-wing WONG

Purpose: To determine the prevalence of psychiatric disorders in Chinese patients with age-related macular degeneration (AMD), identify clinical correlates,

and assess the effectiveness of the 12-item General Health Questionnaire (GHQ-12) and Hospital Anxiety and Depression Scale (HADS) in detecting psychiatric morbidity.

Methods: This cross-sectional study recruited consecutive Chinese AMD patients attending an ophthalmology clinic over six months. Data collected included demographics, medical and psychiatric history, ophthalmological details, and subjective visual disability. GHQ-12 and HADS scores were obtained. All subjects underwent the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID) to identify psychiatric disorders.

Results: Among 132 recruited subjects, point prevalences of psychiatric morbidity and depressive disorder were 17.4% and 12.9%, respectively. Visual disability was significantly correlated with both current psychiatric disorder and current depressive disorder. Receiving Comprehensive Social Security Allowance (CSSA) and poor visual acuity were possible correlates of current depressive disorder. The GHQ-12, using 4-point Likert scoring at a cutoff of 10/11, provided optimal sensitivity and specificity for detecting psychiatric morbidity. HADS-D and HADS-A at cutoffs 2/3 and 3/4, respectively, demonstrated good psychometric properties for screening depressive and anxiety disorders.

Conclusions: Psychiatric morbidity and depressive disorders are common among Chinese AMD patients. Identifying significant correlating factors and establishing optimal cutoff thresholds for GHQ-12 and HADS can assist ophthalmologists in early detection of psychiatric morbidity and facilitate timely referral to psychiatric services.

Abstract No.: 201781

Proteome Profiling in Vitreous Reveals the Targets and Potential Signaling Pathways of Angiopoietin-2

First Author: Yan **SHAO**

Purpose: To investigate the intraocular role of Ang-2 by preoperative intravitreal injection of faricimab in patients with proliferative diabetic retinopathy (PDR) and to clarify the molecular mechanisms underlying the therapeutic effects of faricimab.

Methods: Patients with vitreous hemorrhage secondary to PDR received preoperative intravitreal injection of faricimab (dual Ang-2/VEGF inhibitor) or aflibercept (VEGF inhibitor). Vitreous humor samples were collected during vitrectomy and subjected to label-free LC-MS/MS proteomic profiling. Differentially expressed proteins were identified, followed by gene set enrichment analysis (GSEA), and protein-protein interaction (PPI) network construction. Key targets were further validated by quantitative assays.

Results: A total of 351 vitreous proteins were identified, among which 42 were differentially expressed between the two groups. Faricimab markedly reduced Ang-2 levels (~1500-fold) and significantly downregulated TIE2-associated signaling proteins, including KDR (VEGFR2), HMGB1, and F2, while upregulating immune-regulatory proteins such as C1QC and RAB10. Enrichment analysis revealed Ang-2/TIE2 involvement in angiogenesis, extracellular matrix organization, oxidative stress response, and inflammation. GSEA further demonstrated modulation of mTOR, VEGF, Ras, and KEAP1-NFE2L2 signaling cascades. PPI network analysis highlighted F2, APOH, and KDR as central hubs. Validation confirmed suppression of KDR and P4HB in the faricimab group. Faricimab downregulated fibrosis- and inflammation-related proteins including LTBP3, COL6A1, CCL14, and HMGB2.

Conclusions: This study provides the proteomic evidence in human PDR that Ang-2/TIE2 signaling serves as a regulator of intraocular cytokine networks. These findings enrich and clarify the understanding of Ang-2/TIE2 signaling in real-world disease conditions, with implications for improved clinical outcomes in PDR.

Abstract No.: 200620

Real-Life Short-Term Experience of Switching From Other Anti-VEGF Therapy to Faricimab in Patients With Refractory Macular Edema Secondary to Retinal Vein Occlusion in China

First Author: Sun **YAOYAO**

Co-Author(s): Qi **HUIJUN**

Purpose: This retrospective, case series study is to evaluate real-world outcomes of faricimab in Chinese patients with persistent macular edema secondary to retinal vein occlusion (RVO).

Methods: This retrospective study analyzed the outcomes after the injections of faricimab in both persistent macular edema secondary to central RVO (CRVO) and branch RVO (BRVO). All patients would be treated with injections of faricimab under the pro re nata (PRN) regimen. Best corrected visual acuity (BCVA), central macular thickness (CMT), intraretinal fluid (IRF), and subretinal fluid were described and analyzed.

Results: Fifty-two eyes of 52 patients met the criteria and were enrolled in the study. Prior to enrollment, patients received an average of 9.16 ± 4.26 anti-VEGF injections, with 18 patients (34.62%) receiving an average of 3.23 ± 1.42 sustained-dexamethasone intravitreal implant. After the switch, patients received an average of 2.97 ± 0.74 injections, with a mean follow-up duration of 25.65 ± 11.87 weeks after IVF. After the third injection, BCVA was significantly improved from 40.13 letters to 46.75 letters, and CMT was significantly decreased from $547.4 \mu\text{m}$ to $216.4 \mu\text{m}$. Of the patients experiencing SRF or IRF at baseline, 78.85% had complete fluid resolution by the end of the follow-

up period. 73.08% of all the patients extended the treatment interval to 12 weeks or longer. No significant systemic and ocular adverse events were observed during the follow-up period.

Conclusions: This study demonstrates that faricimab significantly improves visual acuity and reduces CMT in previously treated RVO-ME patients, with a favorable safety profile.

Abstract No.: 207123

Real-World Comparison of Bevacizumab Innovator (Avastin) and Bevacizumab Biosimilar (Bevatas) for Retinal Vascular Diseases in a Private Eye Hospital of Western Nepal

First Author: Roshija **KHANAL RIJAL**

Co-Author(s): Amrit **BANSTOLA**

Purpose: To compare treatment frequency, visual and anatomical outcomes, and safety of Avastin versus its Bevatas, in retinal vascular diseases, and to evaluate the role of biosimilars as cost-effective alternatives in a low- and middle-income country like Nepal.

Methods: A retrospective review was performed on 269 eyes with diabetic macular edema, retinal vein occlusion with macular edema, or neovascular AMD treated with intravitreal Avastin (n=174) or Bevatas (n=95) between January 2023 and December 2024 at a tertiary center in Nepal. Outcomes included best-corrected visual acuity (BCVA), central retinal thickness (CRT), injection frequency, and ocular/systemic safety at 12 months.

Results: Baseline characteristics were comparable between groups. At 12 months, mean BCVA gain was +7.8 letters with Avastin and +7.2 letters with Bevatas (p=0.48). Mean CRT reduction was -122 µm vs -120 µm (p=0.82). The average number of injections was 6.4 vs 6.1 (p=0.09). Rates of ≥2-line VA improvement were 62.6% and 60.0%, respectively. Safety outcomes were similar, though mild ocular inflammation occurred slightly more often with Bevatas (3.3% vs 1.3%, NS). No systemic adverse events were observed.

Conclusions: Avastin and Bevatas demonstrated equivalent efficacy, treatment burden, and safety in retinal vascular diseases. In an LMIC setting such as Nepal, Bevatas represents a cost-effective and practical alternative to innovator Avastin, supporting its role in expanding access to anti-VEGF therapy.

Abstract No.: 201824

Real-World Effectiveness of Faricimab in Chinese Patients With Neovascular Age-Related Macular Degeneration: 3-Month Results From the Farseeing Study

First Author: Chenjin **JIN**

Co-Author(s): Xiaorong **LI**, Kun **LIU**, Xinjun **REN**, Xun **XU**

Purpose: The Farseeing study (NCT06439576) is a non-interventional real-world study conducted in 50 sites in China, collecting primary data of approximately 1000 patients with neovascular age-related macular Degeneration (nAMD), diabetic macular edema (DME), or macular edema secondary to retinal vein occlusion (RVO) to assess the effectiveness and safety of faricimab. Here, we report the first interim analysis in nAMD patients.

Methods: This interim analysis included data from April 2024 to January 2025 and included nAMD and polypoidal choroidal vasculopathy (PCV) patients from 22 sites. Management was as per usual care, with no mandated scheduled visits or imaging protocol requirements. Visual acuity (VA), central subfield thickness (CST), and the proportion of eyes with retinal fluid were evaluated at baseline and 3 months. Incidence of safety events was collected with any duration of follow-up. Descriptive analyses were performed.

Results: A total of 79 nAMD patients (87 eyes) were included in this analysis. Mean VA (standard deviation [SD]) change from baseline to month 3 was +2.4 (12.7) letters in switched eyes with nAMD, the mean CST (SD) change was -56.01 (138.31) µm, and the investigator-determined subretinal fluid (SRF) and intraretinal fluid (IRF) decreased. Similar results were observed in switched eyes with PCV.

Conclusions: The results of the cohort of nAMD patients in the Farseeing study will show the real-world effectiveness and safety of faricimab in the treatment of nAMD patients in China, and the relevant data of PCV patients will also provide a treatment reference for this high-incidence subtype.

Abstract No.: 203464

Real-World Efficacy and Safety of Aflibercept 8mg in Australian Patients With Neovascular Age-Related Macular Degeneration: 6-Month Outcomes From the CUREOS Research Network

First Author: Hemal **MEHTA**

Co-Author(s): Geoffrey **BROADHEAD**, Andrew **CHANG**, John **CHANG**, Thomas **HONG**, Long **PHAN**

Purpose: To study the effectiveness of high-dose aflibercept 8mg (HDA) for neovascular age-related macular degeneration (nAMD) in routine clinical practice.

Methods: Multi-centre retrospective audit of nAMD eyes commencing HDA therapy in Australia. Data was collected over a 6-month period, which included: demographics, treatment history, visual acuity (VA), and adverse events (AEs). Optical coherence tomography images were graded for anatomic outcomes, including central subfield thickness (CST) and retinal fluid status.

Results: Of 208 eyes, 44 (21%) were treatment-naïve, and 164 (79%) were previously-treated (switched). Switched eyes received a mean of 4.5 injections in the preceding six months, with aflibercept 2mg in 83% and faricimab in 14% of eyes prior to HDA. In naïve eyes, mean VA and CST changes were +7.8 letters ($p=0.001$) and $-107.1 \mu\text{m}$ ($p<0.001$) after three injections. In active eyes at switch, mean VA change was +1.3 letters ($p=0.074$) and mean CST change was $-24.7 \mu\text{m}$ ($p=0.020$) after three injections. In inactive eyes at switch, mean VA change was -0.5 letters ($p=0.746$) and mean CST change was $+0.3 \mu\text{m}$ ($p=0.728$) after three injections. Six months from switching, 64% of eyes were treated at extended intervals, 2 weeks or more than prior to HDL, with no eyes requiring reduced treatment intervals. There were no serious treatment-related adverse events identified.

Conclusions: In this Australian population, HDA demonstrated favourable visual and anatomic outcomes in nAMD with no new safety signals beyond the clinical trials. Extended treatment intervals were observed in previously-treated eyes, including those switched with active disease.

Abstract No.: 202777

Real-World Evidence on First-Line Treatment Versus Switching to Faricimab for Hyperpermeable Diabetic Macular Edema During Loading Phase

First Author: He-nan LIU

Purpose: Hyperpermeable diabetic macular edema (DME), characterized by intraretinal and subretinal fluid with hyperreflective foci and/or hard exudates, as a remarkable subtype of DME, had a poor response to single-pathway anti-VEGF agents, which was defined as a reduction in central subfield thickness (CST) of $<10\%$ and a gain of <5 ETDRS letters in best-corrected visual acuity (BCVA). The purpose of the investigation is to identify the dual-pathway anti-VEGF agent faricimab as a preferred administration for patients with hyperpermeable DME.

Methods: This is real-world evidence of a retrospective cohort study. The consecutive patients with hyperpermeable DME enrolled in the study were classified into three groups based on the timing of intravitreal faricimab: first-line group, included those eyes who received faricimab as a first-line therapeutic regimen; early-switch group, included those eyes who initially received conventional single-pathway anti-VEGF agents; after exhibiting a poor response

to treatment at 4 weeks, they switched to faricimab immediately; standard-switch group, included those eyes that initially received conventional single-pathway anti-VEGF agents; after exhibiting a poor response to treatment at 12 weeks, they switched to faricimab immediately. All patients were followed up for 52 weeks. The changes in CST and the number of ETDRS letters for BCVA were compared among the groups before and after treatment or switching therapy.

Results: The analysis included 79 eyes, 26 (32.9%), 28 (35.4%), and 25 (31.6%) in first-line, early-switch, and standard-switch groups, respectively. Intragroup comparison. In the first-line group, CST was significantly decreased, and BCVA was significantly improved compared with baseline ($P<0.05$) at 4, 12, 24, and 52 weeks. In the early-switch group: CST was significantly decreased, and BCVA was significantly improved compared with pre-switch values ($P<0.05$) after switching to faricimab at 12, 24, and 52 weeks. In the standard-switch group: CST was significantly decreased, and BCVA was significantly improved compared with pre-switch values ($P<0.05$) after switching to faricimab at 24 and 52 weeks. Intergroup comparison. At 24 weeks and 52 weeks, compared with the standard-switch group, both the first-line group and the early-switch group showed significantly higher Δ CST ($P<0.05$) and Δ ETDRS ($P<0.05$).

Conclusions: For patients with hyperpermeable DME, faricimab should be initiated as early as possible to achieve significant improvements in macular edema and visual function.

Abstract No.: 204123

Real-World Faricimab Outcomes in Neovascular Age-Related Macular Degeneration and Diabetic Macular Edema: The VOYAGER Study

First Author: Voraporn CHAKITMONGKOL

Co-Author(s): Gloria C. CHI, Amanda DOWNEY, Robyn GUYMER, David KARDATZKE, Jörn SCHWEITZER

Purpose: VOYAGER (NCT05476926) is a global, real-world, prospective, five-year observational study in $>5,000$ patients initiating faricimab for nAMD (neovascular age-related macular degeneration), DME (diabetic macular edema), or retinal vein occlusion. Six-month nAMD and DME data are reported; one-year data will be presented.

Methods: Data on VA (visual acuity, ETDRS [Early Treatment Diabetic Retinopathy Study] letters), CST (central subfield thickness), SRF (subretinal fluid), IRF (intraretinal fluid), and safety were analyzed at baseline/month-6/year-1 in treatment-naïve and PT (previously-treated) eyes receiving faricimab from 2022–2024.

Results: nAMD 6-month cohort included 443 (482 eyes) treatment-naïve and 300 (339 eyes) PT patients.

Mean (SD [standard deviation]) VA changes from baseline were +3.6(14.0) and -0.1(10.7) ETDRS letters in treatment-naïve and PT eyes, respectively. Corresponding mean(SD) CST changes were -93.3(123.0) and -26.9(84.5)µm. DME 6-month cohort included 144(187 eyes) treatment-naïve and 101(129 eyes) PT patients. Mean(SD) VA changes were +6.7(14.3) and +0.5(11.8) ETDRS letters in treatment-naïve and PT eyes, respectively. Corresponding mean(SD) CST changes were -126.7(132.8) and -56.2(132.4)µm. SRF and IRF rates were lower at month-6 vs baseline in treatment-naïve and PT nAMD (SRF:30.2% vs 75.8%, 38.4% vs 60.9%; IRF:22.5% vs 52.3%, 29.4% vs 40.8%) and DME (SRF:3.1% vs 28.6%, 17.4% vs 22.4%; IRF:71.0% vs 89.9%, 70.6% vs 70.5%) eyes. Mean(SD) injections for treatment-naïve and PT eyes were 4.2(1.4), 4.2(1.5) for nAMD and 4.0(1.6), 4.0(1.7) for DME. Safety was consistent with faricimab phase-3 trials.

Conclusions: At month-6, VOYAGER study showed clinical benefits of faricimab in real-world nAMD and DME patients, supporting its real-world effectiveness and safety.

Abstract No.: 201407

Real-World Outcomes and Aqueous Humor Cytokine Analysis After Switch to Faricimab in Eyes With Treatment-Resistant Neovascular Age-Related Macular Degeneration

First Author: Han **ZHANG**

Co-Author(s): Jun **LI**

Purpose: To evaluate the short-term functional, anatomic outcomes, and changes in aqueous humor cytokine levels of patients with treatment-resistant neovascular age-related macular degeneration (nAMD) who were converted from aflibercept and/or ranibizumab to faricimab.

Methods: Only eyes treated with at least 3 consecutive injections of aflibercept/ranibizumab spaced 4-6 weeks apart prior to conversion and with at least 2 faricimab injections afterward were considered for inclusion. Best-corrected visual acuity (BCVA; in logarithm of the minimum angle of resolution) and central retinal thickness (CRT) were analyzed before and after the switch. Aqueous humor was collected before and after the switch, and angiopoietin-2 (Ang-2), placental growth factor (PlGF), vascular endothelial growth factor (VEGF)-A, monocyte chemoattractant protein (MCP)-1, and interleukin (IL)-6 levels were measured.

Results: Twenty-seven eyes of 29 patients were included. The mean logMAR visual acuity improved by the second visit after conversion compared to the pre-switch visit ($P = 0.083$). The average CRT significantly improved by the second visit following conversion ($P < 0.001$). Significantly decreased concentrations of VEGF-A and Ang-2 were observed after conversion.

Conclusions: Conversion to faricimab for treatment-resistant nAMD resulted in significant anatomic improvements. Faricimab treatment influenced the concentrations of various cytokines in the aqueous humor.

Abstract No.: 201056

Real-World Short-Term Efficacy Observation of Faricimab in the Treatment of Refractory Wet Macular Degeneration

First Author: Du **JIANTONG**

Co-Author(s): Li **JUN**

Purpose: This study aims to evaluate the short-term efficacy of switching to Faricimab in the treatment of refractory nAMD.

Methods: This is a retrospective study that included previously treated refractory nAMD patients who received 2-5 injections of Faricimab. Baseline data were collected from April 2024 to October 2024, and follow-up data were gathered until April 2025.

Results: This study included 26 participants (31 eyes) with an average age of 73.4 ± 7.7 years, of whom 53.8% were male. At baseline, all patients had previously undergone multiple anti-VEGF treatments, averaging 9.5 ± 5.4 sessions, yet still exhibited visual impairment and anatomical abnormalities, with a mean CST of 433.5 ± 195.5 µm. Over a follow-up period of at least six months, patients received an average of 3.2 ± 1.2 faricimab injections per eye, resulting in 77.4% of affected eyes showing visual improvement, with BCVA increasing by an average of 10.5 ± 11.8 letters. CST decreased by an average of 118.4 ± 139.0 µm, and the proportion of completely dry macular retinal areas increased from 32.3% to 77.4%, achieving 67.7% after the first faricimab injection. Additionally, the study found that in eyes with thicker choroid (submacular choroidal thickness exceeding 225 µm), baseline choroidal vascular index (CVI) was significantly correlated with anatomical outcomes: eyes with lower baseline CVI experienced greater CST reduction following faricimab treatment ($p = 0.001$).

Conclusions: Faricimab can provide significant visual improvement and anatomical enhancement for patients with refractory nAMD, while baseline CVI has certain predictive value for the treatment outcomes in patients with thicker choroid.

Abstract No.: 206411

Reassessing the Antioxidant Paradox: High Dietary PUFA and Vitamin E Linked to Increased Neovascular AMD Risk – a Case-Control Study

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Purpose: The role of dietary nutrients in age-related macular degeneration (AMD) is complex, with an ongoing debate regarding high-dose antioxidant supplementation. This case-control study aimed to evaluate the association between nutritional intake and the risk of neovascular AMD (nAMD).

Methods: A total of 52 treatment-naïve patients with neovascular AMD (nAMD) and 50 control subjects were recruited from ophthalmology clinics at tertiary hospitals. Diagnosis was confirmed by a retinal specialist following a comprehensive assessment, including slit-lamp examination, dilated non-stereoscopic colour fundus photography, and spectral-domain optical coherence tomography (OCT). Dietary data were collected using both a semiquantitative food-frequency questionnaire and a 24-hour recall. The association between nutrient intakes and AMD risk was determined through multivariable-adjusted logistic regression analysis, employing Firth's penalised likelihood method to account for the modest sample size.

Results: Analysis of 24-hour recall data revealed significantly higher intakes of protein ($p = 0.007$), fat ($p = 0.015$), polyunsaturated fatty acids (PUFAs) ($p < 0.001$), and vitamin E ($p = 0.004$) in nAMD patients compared to controls. In the multivariable-adjusted logistic regression analysis using Firth's penalised likelihood method, the highest tertile of PUFA intake was associated with a 7.2-fold increase in the odds of nAMD (95% CI 2.3–23.1, $p = 0.001$), while the highest tertile of vitamin E intake was associated with a 4.3-fold increase (95% CI 1.3–14.0, $p = 0.02$), both compared to the lowest tertile.

Conclusions: This study suggests that a higher dietary intake of PUFA and vitamin E is associated with increased odds of nAMD. These findings challenge conventional views on the role of antioxidant nutrients. While requiring validation in prospective studies, these results emphasise the need for personalised nutritional approaches in AMD management rather than universal supplementation strategies.

Abstract No.: 202790

Redefining Inherited Retinal Disease: Modifier-Driven Variability in EYS- and USH2A-Associated Retinitis Pigmentosa

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Purpose: Inherited retinal diseases (IRDs) are traditionally viewed as Mendelian disorders with predictable genotype–phenotype correlations. We tested this assumption in two of the most common IRD genes, EYS and USH2A, by asking whether matched genotypes truly yield matched disease expression.

Methods: We prospectively enrolled patients with biallelic EYS- or USH2A-associated retinitis pigmentosa at the Singapore National Eye Centre (2021–2025). Genetic diagnoses were established by whole-exome sequencing. Disease severity was quantified using OCT-derived ellipsoid zone width and a novel principal component analysis (PCA)-based severity score that integrates both structural loss and progression rate to define a continuous disease trajectory.

Results: We analysed 78 individuals ($n = 30$ EYS; $n = 47$ USH2A) from 70 families. Despite matched pathogenic alleles among groups, we observed striking variability in age of onset, EZ width, and progression. In several genotypes, younger individuals were more severely affected than older carriers, and siblings with the same variants diverged markedly in severity. PCA-derived severity scores demonstrated broad dispersion across nearly all genotype-defined groups, indicating that primary alleles explain only a fraction of disease variation. Certain variants (e.g., large EYS deletions) are consistently associated with severe disease, but most genotypes showed unpredictable trajectories.

Conclusions: Our findings challenge the concept of recessive IRDs as monogenic diseases. Instead, they emerge as genetically primed conditions, profoundly shaped by as-yet-unidentified modifiers. This paradigm shift has wide-ranging implications: genetic testing alone cannot provide a prognosis, trial design must account for hidden variability, and the search for modifiers represents a transformative frontier for predictive medicine and targeted therapy across IRDs.

Abstract No.: 202431

Redefining Treatment in Neovascular Age Macular Degeneration: A Systematic Review and Meta-Analysis of Ranibizumab Biosimilars' Safety and Efficacy

First Author: Zahra **ZHAFIRA**

Purpose: This review aimed to evaluate ranibizumab biosimilars (RB) safety and efficacy in neovascular age macular degeneration (nAMD) management.

Methods: We conducted a systematic review and meta-analysis based on PRISMA criteria. Data of RCTs in MEDLINE, Scopus, and ScienceDirect from inception to August 17, 2025, were sought and computed using RevMan 5.4. Efficacy was assessed using mean differences (MD) via the generic inverse variance and inverse variance methods, while safety outcomes were analyzed using Mantel–Haenszel risk ratios (RR) with 95% CIs. Risk of Bias was assessed using RoB 2 for the randomized clinical trials.

Results: A total of 3085 patients (RB group: 1538; control group: 1547) from 5 RCTs suggest that no significant difference in mean BCVA change at 8 and 52 weeks (MD=−0.19, 95%CI=−1.79–1.42, $p=0.82$; MD=−0.96, 95% CI −2.33–0.40, $p=0.17$). Mean lesion area change at 24 weeks was also comparable (MD=−0.07, 95%CI=−0.41–0.27, $p=0.70$). In contrast, RB demonstrated a significant reduction in CNV leakage area at both 24 and 52 weeks (MD −0.10, 95%CI −0.15–−0.05, $p < 0.0001$; MD −0.40, 95%CI −0.45–−0.35, $p < 0.00001$), supporting their anatomical efficacy. Safety analyses revealed no significant differences in the incidence of treatment-emergent adverse events, serious ocular or non-ocular events, or anti-drug antibody development, indicating a favorable and comparable safety profile.

Conclusions: Ranibizumab biosimilars show comparable efficacy and safety, reinforcing their value as cost-effective options to expand access to sustained anti-VEGF therapy.

Abstract No.: 202065

Resveratrol Attenuates Diabetic RGCs Degeneration Through TRIM23-Dependent VDAC1 Ubiquitination and Mitophagy

First Author: Ruohong **WANG**

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Purpose: Voltage-dependent anion channel 1 (VDAC1) plays a key role in mitochondrial quality control; however, its function in RGCs degeneration under diabetic conditions remains poorly understood. This study aims to investigate the role of VDAC1 in DR and explore its potential therapeutic target.

Methods: We examined VDAC1 expression in human donor retinal tissues, diabetic mice, and high-glucose-treated SH-SY5Y cells. Using virtual screening and molecular docking, we identified RSV as a potential VDAC1 inhibitor, which was further validated by surface plasmon resonance (SPR) binding assays and RSV-based pull-down experiments. VDAC1-knockdown SH-SY5Y cells were established. The effects of RSV were assessed by RGC survival and mitochondrial quality control. Potential interactors of VDAC1 were profiled by mass spectrometry. TRIM23-VDAC1 interaction along with ubiquitination modifications were confirmed by co-immunoprecipitation. Combination therapy involving RSV and AAV-SNCG-mediated TRIM23

overexpression was applied in both DR and acute ocular hypertension (AOH) models.

Results: VDAC1 was upregulated in RGCs under diabetic conditions. Knockdown of VDAC1 attenuated high-glucose-induced apoptosis. RSV bound to the S102, F103, and K113 pocket of VDAC1 with moderate affinity, enhanced VDAC1 ubiquitination, improved mitochondrial membrane potential, reduced reactive oxygen species (ROS), and facilitated P62/LC3-mediated mitophagy. Mechanistically, RSV promotes the contact of TRIM23 with VDAC1. This molecular engagement is mediated by the RING domain of TRIM23 and the N-terminal (N1-25) peptide of VDAC1, culminating in K27-linked ubiquitination of VDAC1. Combined treatment with RSV and RGCs-targeted TRIM23 overexpression reduced RGCs loss in both DR and AOH models.

Conclusions: Our study identifies VDAC1 as a key target in the degeneration of diabetic RGCs and demonstrates that RSV promotes TRIM23-dependent VDAC1 ubiquitination and mitophagy.

Abstract No.: 207317

Retinal and Choroidal Microvascular Changes in HIV: OCTA Evaluation With CD4 Correlation

First Author: Srishti **KHULLAR**

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Purpose: Subclinical microvascular changes in the retina and choroid may occur in HIV-positive individuals even without overt retinopathy. We aimed to evaluate retinal and choroidal microvascular alterations in HIV-positive participants using OCTA, and to explore their correlation with CD4 T-cell counts.

Methods: In this cross-sectional study, 50 HIV-positive individuals on stable antiretroviral therapy (undetectable viral load) and 50 age- and sex-matched healthy controls underwent macular OCTA imaging. Vessel density (VD) and vessel length density (VLD) were computed in segmented retinal (NFLVP, SVP, ICP, DCP) and choroidal layers, along with the foveal avascular zone (FAZ). HIV-positive participants were stratified by CD4 count (< 350 vs. ≥ 350 cells/mm³) to assess immune-status associations.

Results: Compared to controls, HIV-positive individuals demonstrated significantly reduced VD in the superficial vascular plexus (SVP) ($30.95 \pm 8.64\%$ vs. $34.98 \pm 4.70\%$, $p < 0.01$) and significantly elevated choroidal VLD (8.77 ± 0.75 mm/mm² vs. 8.01 ± 1.69 mm/mm², $p < 0.01$). Other retinal layers showed trends toward lower VD/VLD, though not reaching statistical significance. The superficial FAZ area was marginally larger in HIV subjects ($p = 0.08$). Within the HIV cohort, participants with CD4 < 350 cells/mm³ exhibited lower SVP VD (trend, $p = 0.067$) and significantly higher choroidal VLD ($p = 0.032$) than those with CD4 ≥ 350 .

Correlations between CD4 count and OCTA metrics were weak and not statistically significant ($r = 0.21$ for SVP VD, $r = -0.24$ for choroidal VLD).

Conclusions: OCTA reveals early subclinical microvascular alterations in HIV-positive individuals, especially in those with lower CD4 counts. The pattern of reduced superficial VD and increased choroidal VLD suggests vascular remodeling or compensatory changes in immune-compromised states. These findings support the potential of CD4 count as a biomarker for ocular microvascular health in HIV, and underscore the utility of OCTA in detecting vascular dysfunction before overt retinopathy develops.

Abstract No.: 202450

Risk of Retinal Artery Occlusion Progression in Paracentral Acute Middle Maculopathy Without Retinal Vascular Disease

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Purpose: Paracentral acute macular degeneration (PAMM) shows distinct en face OCT patterns that may reflect disease severity and progression risk. We aimed to classify these morphological patterns and evaluate their clinical significance.

Methods: We retrospectively reviewed 14 cases of PAMM diagnosed between January 2017 and October 2024. En face OCT patterns were classified and correlated with visual outcomes, lesion extent, and progression to retinal artery occlusion (RAO). Cases with a history of retinal vascular disease were excluded.

Results: The median age was 73 years (IQR, 61.75-79), and 10 patients (71.4%) were male. Median interval from symptom onset to presentation was 3 days (IQR, 0.5-8.5). Progression to complete RAO within 24 hours occurred in 2 patients (14.3%). Three distinct en face patterns were identified: perivenular fern-like ($n=5$), globular ($n=3$), and mixed patterns ($n=6$). Five cases (35.7%) demonstrated diffuse lesion distribution, while 9 cases (64.3%) showed sectoral involvement. The two cases progressing to RAO shared poor initial visual acuity and diffuse patterns. Initial visual acuity was significantly worse in diffuse patterns, often involving the macula, than in sectoral patterns (0.52 vs -0.02 , $p=0.025$). Both CRAO cases within 24 hours exhibited diffuse perivenular fern-like patterns, suggesting this morphology may predict higher ischemic progression risk.

Conclusions: En face OCT pattern classification in PAMM provides valuable prognostic information. PAMM with diffuse involvement indicates increased risk for progression to severe retinal ischemia. Such cases may warrant closer monitoring and early intervention.

Abstract No.: 200305

Role of Insulin-Like Growth Factor-1 (IGF-1) & Postnatal Growth Failure in ROP In Babies Weighing <1500 Grams

First Author: Amit Kumar **DEB**

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Purpose: Low postnatal serum IGF-1 levels and slow postnatal weight gain are associated with severe ROP in many Western studies. However, similar studies in the Indian cohort of preterm babies are limited. The objective of this study was to determine the role of IGF-1 and postnatal growth failure (PNGF) in predicting ROP in babies <1500 grams in a south Indian cohort.

Methods: A total of 329 preterm neonates were screened for ROP. Babies screened for ROP were categorized based on the highest ROP stage in either eye. Weekly serial birth weight was estimated & growth was monitored using growth charts; growth failure was diagnosed based on the Z score. Blood samples for IGF-1 were collected between 30 and 33 weeks for each baby.

Results: The median IGF-1 levels were lower in the babies with any stage ROP (18.82 ng/ml) than in no ROP (28.81 ng/ml) ($p=0.002$). On logistic regression analysis, PNGF was independently associated with ROP development with an odds ratio of 2.07 (CI 1.04-4.11). The area under the curve of the receiver operating characteristic for both IGF-1 levels and postnatal weight gain was >0.5 , implying good diagnostic accuracy in predicting ROP.

Conclusions: The current study results show that low IGF-1 and PNGF are additional important risk factors for ROP development. This study is the first to estimate serum IGF-1 levels in preterm babies to establish ROP risk in an Indian cohort.

Abstract No.: 200408

Role of Triggering Receptor Expressed on Myeloid Cells-1 (TREM-1) in the Prognostic Evaluation in Bacterial Endophthalmitis

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Purpose: Infectious endophthalmitis is a sight-threatening intraocular infection requiring rapid and accurate diagnosis, particularly in culture-negative cases. This study explores the potential of soluble Triggering Receptor Expressed on Myeloid Cells-1 (sTREM-1) and sTREM-2 as biomarkers through transcriptomic and protein analysis.

Methods: Transcriptomic profiling of C57BL/6 mice with *Pseudomonas aeruginosa* endophthalmitis identified immune-related gene expression changes at 24h post-infection (p.i). Following this, ELISA-based quantification of sTREM-1 and sTREM-2 was conducted

on 62 vitreous samples, including 30 culture-positive, 17 culture-negative, and 15 non-infectious cases. ROC analysis was used to assess the diagnostic performance of these biomarkers and correlated with clinical severity.

Results: Transcriptomic analysis revealed significant enrichment of immune pathways, including ILs and T-cell receptor signalling. Notably, Trem1 was highly upregulated, while Trem2 was downregulated, suggesting differential immune activation. ELISA analysis demonstrated that sTREM-1 levels were significantly elevated in bacterial endophthalmitis ($p < 0.001$; cutoff >446.72 pg/mL), with strong correlations to disease severity. In contrast, sTREM-2 levels were markedly suppressed across infected groups. ROC analysis showed sTREM-1 had high sensitivity ($>90\%$) and specificity ($>90\%$) for differentiating infection, including culture-negative cases, while sTREM-2 alone had limited diagnostic power.

Conclusions: Our findings establish sTREM-1 as a promising biomarker for bacterial endophthalmitis, particularly in culture-negative cases, while sTREM-2 appears to play a regulatory role in inflammation. The strong correlation between sTREM-1 levels and disease severity highlights its potential as both a diagnostic and prognostic marker.

Abstract No.: 204145

SPECTRUM: Early Data From a Global Real-World Study of Aflibercept 8 mg in Neovascular Age-Related Macular Degeneration

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Purpose: To present early results from the global Phase 4 SPECTRUM study of aflibercept 8 mg in patients with neovascular age-related macular degeneration (nAMD).

Methods: SPECTRUM (NCT06075147) is an ongoing, 24-month, prospective observational study. In the treatment-naïve (TN) and previously treated (PT) nAMD cohorts, patients aged ≥ 50 years who have been prescribed aflibercept 8 mg by their physician are eligible for enrollment. Data are collected during routine visits. All analyses are exploratory.

Results: In the TN nAMD Week 8 analysis (first ~ 100 patients with a visit and visual acuity [VA] assessment at Week 8), the mean change (observed cases) from baseline (BL) in VA was $+3.2$ letters ($n=114$; BL, 60.1 letters), and the mean central retinal thickness (CRT) change was -115 μm ($n=72$; BL, 367 μm). In the PT nAMD Month 6 analysis (first 150 patients to complete Month 6), the mean change (last observation carried forward) from BL in VA was -0.7 letters ($n=148$; BL,

63.0 letters), and the mean CRT change was -31 μm ($n=115$; BL, 320 μm).

Conclusions: These interim SPECTRUM analyses provide early insights into real-world outcomes in patients with nAMD.

Abstract No.: 208387

Seasonal Variations of Central Retinal Artery Occlusion

First Author: Chi Lik AU

Purpose: To systematically review the existing literature on seasonal variations in the incidence of central retinal artery occlusion (CRAO) and present the primary data of seasonal variations in Hong Kong from the HORA study.

Methods: A comprehensive literature search was performed across databases, including PubMed, Google Scholar, and relevant ophthalmic journals, for studies published up to October 2025 examining seasonal or monthly patterns in CRAO incidence. Keywords included «central retinal artery occlusion,» «CRAO,» «seasonal variations,» «incidence by season,» and «environmental factors.» Studies were included if they reported on CRAO specifically; those focused solely on retinal vein occlusion or general stroke without CRAO data were excluded. Data extraction focused on study design, sample size, incidence patterns, statistical analyses, and correlations with weather or pollution variables

Results: The review identified limited but high-quality evidence on seasonal variations in CRAO, with one major retrospective study dominating the findings. In a 15-year analysis of 432 CRAO cases from a German tertiary center, significant monthly ($p=0.025$) and seasonal ($p=0.008$) variations were observed, with peak incidence in February (adjusted cumulative incidence: 50.61) and winter (131.51), and lowest in June (23.34) and summer (84.37). Winter incidence was 1.55 times higher than summer. Weak to moderate inverse correlations were found with temperature (Spearman's $\rho \approx -0.15$ for average, minimum, and maximum temperatures; $p < 0.05$) and positive correlations with air pollutants, including NO_2 ($p < 0.01$) and $\text{PM}_{2.5}$ ($p \approx 0.05$), but not PM_{10} , O_3 , precipitation, or atmospheric pressure. Annual CRAO cases remained stable (21–40/year), with no long-term trends. Older literature primarily addressed general CRAO epidemiology or retinal vein occlusion, with no pre-2023 studies directly reporting significant seasonal patterns in CRAO incidence. Related stroke literature suggests analogous winter peaks in cerebral ischemic events, potentially extending to CRAO as a retinal stroke equivalent.

Conclusions: Current evidence indicates that CRAO incidence exhibits pronounced seasonal variation, peaking in winter and correlating with colder

temperatures and elevated air pollution levels. These findings underscore the need for heightened clinical awareness during high-risk seasons and further prospective, multi-center studies

Abstract No.: 207422

Seeing the Invisible: OCTA Reveals Subclinical Ischemia and Predicts Visual Outcomes in Diabetic Eyes Without Retinopathy Undergoing Cataract Surgery

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Purpose: To uncover hidden retinal microvascular alterations using optical coherence tomography angiography (OCTA) in diabetic eyes without clinical retinopathy undergoing cataract surgery, and to determine whether these preoperative biomarkers predict postoperative vision.

Methods: This prospective study enrolled 194 type-2 diabetic eyes (>5 years duration) with visually significant cataract but no fundus signs of retinopathy. All underwent standardized small-incision cataract surgery or phacoemulsification. Pre- and 30-day postoperative OCTA 3×3 mm scans quantified superficial/deep plexus vessel density (VD) and foveal avascular zone (FAZ) area. Best-corrected visual acuity (BCVA, logMAR) was measured. Paired t-tests compared vascular parameters; Pearson correlation assessed associations between baseline OCTA metrics and postoperative BCVA.

Results: OCTA revealed silent microvascular rarefaction preoperatively, invisible on clinical examination. Following surgery, VD showed a robust increase in both plexuses (mean gain +5.6%, $p < 0.01$) and FAZ area contracted significantly (mean -0.04 mm^2 , $p < 0.05$). Baseline FAZ was a strong negative predictor of BCVA improvement ($r = -0.52$, $p < 0.001$), and lower deep plexus VD correlated with limited visual gain ($r = -0.48$, $p < 0.01$). Eyes with healthier preoperative microvasculature achieved near-normal visual acuity despite identical surgical technique.

Conclusions: OCTA not only detects the undetectable but also forecasts who will see best after surgery — offering a paradigm shift in preoperative counseling and individualized surgical planning for diabetics without retinopathy. Routine OCTA integration could transform visual prognostication and elevate pre- and postoperative care standards.

Abstract No.: 203385

Senescence-Induced Endothelial-to-Mesenchymal Transition Accelerates the Subretinal Fibrosis in Neovascular Age-Related Macular Degeneration

First Author: Yinhao WANG

Purpose: Subretinal fibrosis remains a severe vision loss in neovascular age-related macular degeneration (nAMD). Cellular senescence and endothelial-to-mesenchymal transition (EndMT) have been implicated in nAMD pathogenesis. We tend to explore the association between senescence and EndMT in subretinal fibrosis.

Methods: We analyzed single-cell RNA sequencing data to investigate the role of senescent choriocapillary endothelial cells (CapECs) in subretinal fibrosis. In vitro assays were performed to validate the link between senescence and EndMT. We utilized Brown-Norway rats and INK-ATTAC mice with laser-induced subretinal fibrosis to evaluate the therapeutic effects of senolytic treatment (dasatinib plus quercetin, D+Q) or selective clearance of p16INK4A-positive cells. Additionally, young (2–3 months) and old (18 months) C57BL/6J mice were compared to assess the influence of aging on EndMT and fibrosis.

Results: CapECs in nAMD exhibited elevated SenMayo GSVA scores, and upregulated differentially expressed genes (DEGs) were enriched in senescence and mesenchymal transition pathways. A higher proportion of senescence-like CapECs (17.68%) was observed in nAMD, which also showed increased mesenchymal scores and TGFB1 expression. Senescent endothelial cells in laser-induced fibrotic models and bleomycin/doxorubicin-treated human umbilical vein endothelial cells underwent enhanced EndMT. Early intervention with D+Q or removal of p16INK4A-positive cells markedly reduced subretinal fibrosis and restored retinal function. Furthermore, endothelial cells from old mice exhibited heightened EndMT and more severe subretinal fibrosis compared to those from young mice.

Conclusions: Our study demonstrates that accumulation of senescent endothelial cells promotes subretinal fibrosis via EndMT in nAMD. Targeting these cells represents a promising therapeutic strategy for mitigating fibrosis-associated vision loss.

Abstract No.: 203398

Serum Pro-Brain Natriuretic Peptide Levels Correlate With Retinal Photoreceptor Ellipsoid Zone Disruption in Proliferative Diabetic Retinopathy

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Purpose: Serum pro-brain natriuretic peptide (BNP) is a 32-amino-acid polypeptide hormone that has receptors

in the human retina, suggesting a role in maintaining the structural integrity of the retina. Correlation between serum pro-BNP levels and ellipsoid zone (EZ) integrity was evaluated in proliferative diabetic retinopathy (PDR).

Methods: A tertiary care center-based, cross-sectional, prospective study investigated 108 consecutive subjects aged between 40 and 65 years: controls, no diabetic retinopathy (NoDR), non-proliferative diabetic retinopathy (NPDR), and proliferative diabetic retinopathy (PDR) (n=27 each). Same-day analysis of blood samples for BNP levels was done on the Roche Elecsys cobas e 411 machine. EZ was evaluated on spectral-domain optical coherence tomography (SD-OCT). The caliper function was used to measure the EZ defect. Pearson correlation analysis was performed.

Results: Mean serum pro-BNP levels for controls, NoDR, NPDR, and PDR were 14.07 ± 11.51 , 27.35 ± 11.81 , 280.44 ± 106.13 , and 122.33 ± 43.66 pg/ml, respectively. Mean central subfield thickness (CST) for controls, NoDR, NPDR, and PDR were 248.65 ± 35.95 , 259.25 ± 50.04 , 329.70 ± 65.78 , and 394.60 ± 150.22 microns, respectively. Mean best corrected visual acuity (BCVA) for controls, NoDR, NPDR, and PDR were 0.31 ± 0.18 , 0.37 ± 0.13 , 0.68 ± 0.49 , and 1.19 ± 0.43 , respectively. EZ integrity was maintained in controls and NoDR groups. Mean EZ defect values in NPDR and PDR groups were 779.50 ± 121.50 and 1914.40 ± 291.15 μ m, respectively ($p < 0.001$). Serum pro-BNP levels had a significant negative correlation with EZ defect significant ($r = -0.417$, $p < 0.05$).

Conclusions: This novel research highlights that serum pro-BNP levels correlate significantly with EZ integrity and BCVA in PDR, playing a key role in its preservation.

Abstract No.: 205029

Short-Term Efficacy of Switching to Faricimab in Patients With Conbercept-Resistant Wet Age-Related Macular Degeneration

First Author: Sanhua XU

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Purpose: To evaluate the changes in the NEI-VFQ-25 score, visual and structural outcomes of faricimab in patients with conbercept-refractory wet age-related macular degeneration (wAMD).

Methods: To evaluate the changes in the NEI-VFQ-25 score, visual and structural outcomes of faricimab in patients with conbercept-refractory wet age-related macular degeneration (wAMD).

Results: In relation to the baseline (B0), the NEI-VFQ-25 score for general health and vision status, difficulty level during activities, reflections of the vision problems, and total mean scores increased significantly at B1, B2, and B3 ($P < 0.05$). Compared with the baseline (B0), the patients' BCVA and CMT showed significant improvements at B1, B2, and B3 (P

< 0.05), while the maximum PED height significantly improved at B3 ($P < 0.05$). BCVA (logMAR), CMT, and maximum PED height decreased from B0 to B3, and the IOP fluctuated within the normal range. Notably, the preoperative PED of 9 eyes was completely resolved at B3. A strong positive correlation was observed between CMT and maximum PED height at B0, B1, B2, and B3. Additionally, BCVA exhibited a strong positive correlation at different time points. No intraoperative or postoperative complications were reported among the 14 eyes.

Conclusions: Switching from conbercept to faricimab has a significant anatomical effect in eyes with wAMD, and treatments appear to be effective short-term treatment options. There is a trend towards greater visual improvements and reductions in CMT with faricimab.

Abstract No.: 206307

Sliding Conjunctival Seal for Intravitreal Injections

First Author: George LIU

Co-Author(s): Christopher LIU

Purpose: Feasibility study of implementing a sliding conjunctival seal to provide immediate protection to the scleral entry site for intravitreal injections. Repeated injections for wet macular degeneration and macular oedema require different methods to reduce the risk of infectious endophthalmitis (Povidone Iodine, injector wearing mask, not talking, clean technique, clean room, eye shield, patient not wearing mask; topical antibiotic no longer used). We propose a sliding conjunctival seal to further mitigate the risk of infection. A literature search of "intravitreal injections" AND "endophthalmitis" yielded no relevant results associated with conjunctival seals.

Methods: Retrospective review of 300 injections. 1. Mark 3.5 or 4 mm (pseudophakic/phakic eyes) with callipers before injection; 2. Slide or displace the conjunctiva sideways or towards the cornea by 2 to 3 mm; 3. Inject intravitreal solution adjacent to the calliper mark, thus avoiding injection through thin compressed sclera; 4. Allow conjunctiva to slide back so conjunctival and scleral entry sites are no longer aligned, thus providing an immediate physical seal against microbial entry.

Results: Technique achieved in 288 injections. In some eyes, there was conjunctival immobility. No cases of endophthalmitis were recorded. See the video with sound for illustration.

Conclusions: A sliding conjunctival seal may be a good method to guard against post-injection microbial entry in intravitreal injections. Care should be taken not to inject through the calliper mark as the sclera there would have been indented, compressed, thinned, and less able to close following injection. There should be

a reduction of post-injection endophthalmitis. A large-scale study is required to demonstrate efficacy.

Abstract No.: 206172

Small Intracellular Vesicles Outperform Small Extracellular Vesicles in Uptake, Drug Delivery, and Retinal Neuroprotection

First Author: Xiaomin ZHANG

Co-Author(s): Hui ZHANG

Purpose: Small extracellular vesicles (sEVs) have been widely studied for their therapeutic potential, but intracellular vesicles (sIVs), naturally present within cells, remain largely unexplored. This study aimed to establish isolation protocols for sIVs, characterize their molecular and functional properties, and evaluate their therapeutic potential compared with sEVs.

Methods: We developed standardized methods to isolate sIVs from multiple cell types. Their size, yield, and uptake efficiency were analyzed using in vitro and in vivo models. Multi-omics profiling, including proteomics, miRNA analysis, and lipidomics, was performed to identify molecular signatures. Therapeutic efficacy was assessed in a mouse model of retinal degeneration, and drug-loading studies were conducted to test the delivery efficiency of lipophilic compounds.

Results: Compared with sEVs, sIVs were smaller, yielded higher quantities, and showed enhanced uptake. Proteomic analysis revealed enrichment of endoplasmic reticulum and Golgi-associated proteins, while miRNA signatures highlighted links to intracellular membrane systems. Lipidomics indicated elevated phosphatidylcholine and phosphatidylethanolamine levels. Umbilical cord MSC-derived sIVs reduced endoplasmic reticulum stress and delivered neuroprotective factors in retinal degeneration. sIVs also demonstrated superior drug-loading capacity and efficient retinal delivery of lipophilic molecules.

Conclusions: sIVs exhibit distinct molecular profiles, enhanced bioactivity, and strong therapeutic potential compared with sEVs. Their ability to carry neuroprotective factors and improve drug delivery positions them as promising candidates for future therapeutic applications.

Abstract No.: 207055

Spectral-Domain OCT Features of Vision-Threatening Rhino-Orbito-Cerebral Mucormycosis

First Author: Ankur SINGH

Co-Author(s): Preeti DIWAKER

Purpose: To characterise vitreoretinal changes on spectral-domain OCT (SD-OCT) in vision-threatening rhino-orbito-cerebral mucormycosis (ROCM) and correlate in vivo imaging with histopathology.

Methods: Consecutive eyes with vision-threatening ROCM underwent examination, serial colour fundus photography, and SD-OCT at baseline and follow-ups. Central macular and inner, outer, and total retinal thickness were measured 1 mm nasal to the fovea. Two masked graders assessed layer integrity, reflectivity, hyperreflective foci, vitreous inflammation, posterior hyaloid changes, and outer-retinal “optically empty” spaces. In exenterated eyes, histopathology evaluated necrosis, lamellar disruption, inflammatory infiltrate, mucor hyphae, and vascular invasion.

Results: Fifteen eyes showed diffuse retinal whitening and boxcarring. Baseline SD-OCT demonstrated inner-retinal thickening with hyperreflectivity, loss of inner-retinal/outer-plexiform lamination, increased outer-retinal thickness, external limiting membrane disruption, and vitreous cells/haze. Early follow-up revealed reduced inner-retinal thickness with persistent hyperreflectivity; outer-retinal ill-defined, optically empty necrotic spaces and hyperreflective foci appeared, with widespread ELM/photoreceptor disruption. By last follow-up, all eyes exhibited further retinal thinning with collapse of necrotic spaces, posterior hyaloid thickening/partial detachment, inner-retinal fibrous scarring, and chorioretinal scarring with RPE hyperplasia. Quantitatively, macular and inner, outer, and total retinal thickness decreased over time ($p < 0.05$), with the greatest decrease in the inner retina. Histopathology confirmed choroidal/retinal necrosis, lamellar disorganisation, neutrophilic infiltrate, mucor hyphae, and thrombotic angioinvasion.

Conclusions: SD-OCT reveals a characteristic ischaemic signature in ROCM—diffuse inner-retinal hyperreflectivity with lamination loss and early vitreous inflammation—evolving to thinning, scarring, and RPE change. Combined with histopathology, findings implicate early retinal infarction from thrombotic angioinvasion with subsequent inflammatory remodelling, supporting SD-OCT for early recognition and prognostication.

Abstract No.: 201634

Study on the Efficacy of Faricimab in the Treatment of Refractory Wet Age-Related Macular Degeneration

First Author: Wei

Purpose: Evaluate the efficacy of intravitreal injection of Faricimab in the treatment of refractory nAMD patients.

Methods: Twenty patients with refractory nAMD who had previously undergone multiple ineffective treatments with VEGF were selected for intravitreal injection of Faricimab once at the ophthalmology department of Nanjing University of Chinese Medicine Affiliated Hospital from April 27, 2024, to May 31, 2024. The BCVA, macular retinal thickness, CST, CCT, and outer retinal thickness were evaluated before

treatment (T1), 1 week after treatment (T2), 1 month after treatment (T3), 2 months after treatment (T4), and 3 months after treatment (T5). The height and area of the highest point of PED, as well as the area of neovascularization (NA).

Results: Twenty eyes received treatment compared with before treatment, showed statistical significance one week after treatment; At the first month after treatment, BCVA ($P<0.001$), PED height ($P=0.043<0.05$), and NA ($P=0.023<0.05$) showed statistical significance; At the second month after treatment, BCVA ($P<0.001$), CST ($P=0.015<0.05$), MRT ($P=0.024<0.05$), and NA ($P=0.03<0.05$) showed statistical significance; At the third month, BCVA ($P<0.001$) and CST ($P=0.01<0.05$) PED height ($P<0.001$), PED area ($P=0.023<0.05$). It has statistical significance during the follow-up period; all patients did not experience ocular or systemic complications.

Conclusions: Faricimab provides a new treatment option in refractory nAMD patients.

Abstract No.: 204935

Study on the Relationship Between Continuous Glucose Monitoring Metrics and Retinal and Choroidal Blood Flow Density in a Normoglycemic Population

First Author: Yinchun **SHEN**

Co-Author(s): Yan **JIANG**, Kun **LIU**

Purpose: To evaluate the association between continuous glucose monitoring (CGM)-derived glucose variability indicators and OCTA parameters in normoglycemic individuals.

Methods: A total of 218 individuals at high risk for T2DM diagnosed with normal glucose tolerance (NGT) according to OGTT results were divided into the normal glucose fluctuation (NGF) group and the abnormal glucose fluctuation (AGF) group according to the mean amplitude of glycemic excursions (MAGE). The differences of FAZ, blood flow density in the retina and choroid, retinal thickness, choroidal thickness, RNFL thickness and GCL thickness between the two groups were analyzed. Generalized linear model analysis was utilized to identify risk factors.

Results: Compared with NGT participants with NGF, those with AGF had reduced blood flow density in the parafoveal nasal ($P=0.002$) and parafoveal superior ($P=0.025$) superficial layer and in the central deep layer ($P=0.047$). In the choroid, the volume of large vessels (CVV) and the volume area ratio of large vessels (CVV/a) in the central ($P=0.013$, $P=0.012$), parafoveal temporal ($P=0.048$, $P=0.049$), and parafoveal nasal ($P=0.010$, $P=0.011$) sides were decreased in the AGF group. In populations with AGF, parafoveal temporal ($P=0.003$) and parafoveal superior ($P=0.005$) retinal thickness; central macular ($P=0.011$), central (0.010), parafoveal superior ($P=0.045$) and parafoveal nasal ($P=0.006$)

choroidal thickness; parafoveal temporal RNFL thickness ($P=0.025$) and parafoveal temporal ($P=0.002$), parafoveal superior ($P<0.001$) and parafoveal inferior ($P<0.001$) GCL thickness were all decreased. In NGT individuals, MAGE, LAGE, family history of diabetes, SBP and HbA1c were identified as possible risk factors to predict the development of disease.

Conclusions: The research discovered that greater glucose variability is associated with decreased blood flow density, and taking proactive steps to address glucose variability early could alleviate the global burden of diabetes and its related complications.

Abstract No.: 207167

Subclinical Retinal Dysfunction in Type 2 Diabetes: Insights From Multifocal Electroretinography and Optical Coherence Tomography

First Author: Ankur **SINGH**

Co-Author(s): Shivansh **BANSAL**

Purpose: To evaluate whether multifocal electroretinography (mfERG)—alone and combined with spectral-domain optical coherence tomography (SD-OCT)—detects subclinical functional and structural retinal changes in type 2 diabetes mellitus (T2DM) without clinically evident retinopathy, and to explore associations with HbA1c.

Methods: Prospective observational study including 64 T2DM eyes without retinopathy and 64 matched healthy controls. mfERG assessed N1/P1 implicit times (IT) and P1 amplitudes across standardized retinal regions. SD-OCT measured foveal, parafoveal, and perifoveal thickness (10 ETDRS regions), including inner/outer/total retina 1 mm nasal to fovea. Multivariable regression adjusted for age, sex, and HbA1c.

Results: Compared with controls, T2DM eyes showed delayed IT for N1 and P1 in temporal regions ($P<0.05$) and reduced P1 amplitude ($P<0.01$). SD-OCT demonstrated thinner retina at the fovea (213.8 ± 19.8 vs 220.0 ± 18.8 μm ; $P<0.05$), temporal parafovea (320.9 ± 13.7 vs 324.0 ± 12.8 μm ; $P<0.05$), and temporal perifovea (276.4 ± 29.7 vs 284.8 ± 14.7 μm ; $P<0.05$). On regression, HbA1c $> 8.5\%$ independently correlated with reduced temporal perifoveal thickness ($P<0.01$), after adjusting for age and sex.

Conclusions: mfERG—alone and with SD-OCT—identifies subclinical retinal dysfunction and thinning in T2DM without clinical retinopathy, with a temporal predilection and thickness loss associated with poor glycaemic control. These biomarkers may support earlier risk stratification and prompt metabolic optimization to delay or prevent diabetic retinopathy progression.

Abstract No.: 204684**Sustained Hydrogel-Delivered Anti-Galectin-3 Therapy Disrupts Pathological Angiogenesis in Diabetic Retinopathy***First Author: Ziyi ZHOU**Co-Author(s): Tianfang CHANG, Guorui DOU, Yusheng WANG, Tianhao YUAN*

Purpose: Pathological angiogenesis is a hallmark of vision-threatening diabetic retinopathy (DR). This study aims to elucidate the role of microglia-derived Galectin-3 (Gal3) in promoting abnormal vessel growth and to develop a novel hydrogel targeting microglial Gal3 and endothelial Notch signal as a combined therapeutic strategy with anti-VEGF towards DR.

Methods: Using single-cell RNA sequencing of human fibrovascular membranes and murine OIR models, we identified Gal3 from activated microglia as a key mediator of pathological angiogenesis through competitive binding to Jag1 and inhibition of Notch signaling. We further engineered a sustained-release photocurable hydrogel for intravitreal delivery of a Gal3-neutralizing antibody, evaluating its effects on vascular pathology.

Results: Gal3 was significantly upregulated in activated retinal microglia under ischemic conditions. Mechanistically, secreted Gal3 bound to the Notch ligand Jag1 on endothelial cells, competitively inhibiting Notch signaling—a critical pathway for maintaining vascular quiescence. This disruption enhanced endothelial glycolytic metabolism and increased proliferation, leading to excessive angiogenesis. Intravitreal delivery of anti-Gal3 via hydrogel effectively restored Notch signaling, suppressed endothelial activation, and markedly reduced pathological neovascularization and vaso-oblivation in OIR mice, with sustained drug release and therapeutic effect beyond one week.

Conclusions: Our findings establish microglial Gal3 as a potent promotor of retinal angiogenesis through glycosylation-dependent interference with Jag1-Notch signaling in DR. The hydrogel-based anti-Gal3 delivery system offers a promising translational strategy, synergizing with anti-VEGF therapies to address refractory neovascularization and restore vascular homeostasis.

Abstract No.: 204599**Switching to Faricimab or High-Dose Aflibercept for Neovascular AMD: Impact on Injection Interval in a Real-World Cohort***First Author: Zachary ANGUS**Co-Author(s): Zhi LEE, Sukhpal SINGH SANDHU, Robyn TROUTBECK, Sanjeeva WICKREMasinghe*

Purpose: To compare changes in injection interval (primary outcome), best-corrected visual acuity (BCVA) and central subfield thickness (CST) (secondary

outcomes) in neovascular age-related macular degeneration (nAMD) patients switched to faricimab or 8mg high-dose aflibercept (HDA) from alternative anti-VEGF agents. Both agents have shown promise in extending treatment intervals, but real-world comparative data in previously treated eyes are limited.

Methods: This was a multi-centre retrospective observational cohort study. Eligible eyes had a diagnosis of nAMD and at least three anti-VEGF injections, both pre- and post-switch. Fifty-eight eyes of 50 patients switched to faricimab, and 42 eyes of 38 patients switched to HDA. Injection intervals were compared by averaging the final three intervals pre- and post-switch.

Results: Patients in the HDA and faricimab group were initially treated with 2 mg aflibercept (83% vs 91%), faricimab (14% vs 0%), ranibizumab (2% vs 7%), or brolucizumab (0% vs 2%) ($p = 0.017$, Chi-Squared Test). Both cohorts achieved similar significant extension of treatment intervals: faricimab $+1.21 \pm 1.81$ weeks ($p < 0.001^*$) and HDA $+1.20 \pm 2.34$ ($p = 0.002^*$) weeks. CST decreased similarly with both agents: faricimab $-24 \pm 94\mu\text{m}$ ($p = 0.005^*$) and HDA $-25 \pm 47\mu\text{m}$ ($p = 0.001^*$). BCVA significantly improved in the HDA cohort by $+3.2 \pm 7.5$ letters ($p = 0.014^*$), whereas a non-significant decline was observed in the faricimab cohort -1.9 ± 7.2 letters ($p = 0.078^*$). The faricimab group had significantly longer follow-up pre-switch (4.1 ± 2.5 years vs 3.1 ± 3.0 years, $p = 0.009^*$) and post-switch (1.1 ± 0.2 vs 0.8 ± 0.2 years, $p < 0.001^*$). * Wilcoxon Signed-Rank Test ^ Welch's T-Test

Conclusions: Switching to faricimab or high-dose aflibercept was associated with similar modest but statistically significant extension of injection intervals and improved anatomical outcomes in previously treated nAMD patients. High-dose aflibercept was additionally associated with improved BCVA. These findings support their role in reducing treatment burden, though prospective studies with longer follow-up are warranted.

Abstract No.: 205207**Targeted Micronutrient Supplementation in Managing Vitreous Floaters: Clinical Data and Practitioner Insights***First Author: Franziska WEIGLEIN**Co-Author(s): Thomas KAERCHER, John NOLAN, Warren ROCHE, Ulrich WELGE-LÜSSEN*

Purpose: Floaters are a common cause of visual disturbance. Non-invasive treatment options are limited. Here we summarize clinical evidence on the effectiveness of a targeted micronutrient complex (VitroCap®), which contains L-lysine, citrus extract, vitamin C, grape seed extract, and zinc, and conducted a survey with eye care professionals in Germany and Austria regarding its practical use.

Methods: Five clinical studies were evaluated: two observational trials (Kaercher 2013, Sobol 2018), two case-control studies (Marchenko 2015, Varganova 2019) – supplementation for 3 months, and one randomized, double-blind, placebo-controlled trial (FLIES, Ankamah 2021) – supplementation for 6 months. More than 500 patients were treated overall across these studies. Outcomes included subjective visual disturbance, quality of life, and objective floater area measured by OCT. A post-hoc effect size analysis quantified benefits in FLIES. Additionally, 96 eye care professionals participated in a survey on clinical experience with the micronutrient complex.

Results: Across studies, 65–88% of patients reported improvement. In FLIES, visual disturbance scores decreased significantly (3.90 ± 1.56 to 2.10 ± 0.79 ; $p < 0.001$), with OCT showing an 18% reduction in floater area ($p < 0.001$). Effect size analysis demonstrated medium-to-large benefits. Among professionals surveyed, 83.1% rated the complex as helpful or extremely helpful; 96.9% reported no side effects. A therapy duration of six months was commonly recommended.

Conclusions: Clinical evidence and practitioner experience support targeted micronutrient supplementation as an effective, safe, and non-invasive option for managing vitreous floaters.

Abstract No.: 206239

The Differential Expression and Domination of VEGFA121 in Proliferative Diabetic Retinopathy, Retinal Vein Occlusion, and Wet Age-Related Macular Degeneration: A Comparative Analysis of Vitreous VEGFA Isoforms

First Author: Raka Kurnia **RAMADHAN**

Co-Author(s): Dewi Kartikawati **PARAMITA**, Supanji **SUPANJI**

Purpose: To identify, quantify, and correlate the expression of VEGFA121, VEGFA165, and VEGFA189 protein isoforms in the vitreous of patients with proliferative diabetic retinopathy (PDR), retinal vein occlusion (RVO), and wet age-related macular degeneration (wet AMD), and to compare their expression with a non-angiogenic control group.

Methods: This cross-sectional study analyzed 22 vitreous samples, obtained through vitrectomy procedures, from patients with PDR ($n=8$), RVO ($n=3$), wet AMD ($n=4$), and rhegmatogenous retinal detachment as a non-angiogenic control ($n=7$). The three VEGFA isoforms were detected using Western blotting with a polyclonal anti-VEGFA antibody specific to all three isoforms, followed by densitometric analysis using ImageJ for expression quantification. Data were analyzed using one-way ANOVA, fold change analysis, and Pearson correlation tests.

Results: VEGFA121 and VEGFA165 isoforms were identified in all groups, while VEGFA189 was not detected. VEGFA121 and VEGFA165 expression was significantly higher in all disease groups compared to controls ($p < 0.05$), with no significant differences between angiogenic retinal disease groups. VEGFA121 was the predominant isoform in PDR, RVO, and wet AMD. A strong positive correlation between VEGFA121 and VEGFA165 was found only in the PDR group ($p=0.025$).

Conclusions: VEGFA121 and VEGFA165 are differentially expressed in angiogenic retinal disease compared to non-angiogenic controls, with VEGFA121 being the dominant isoform. A positive correlation was found only between VEGFA121 and VEGFA165 expression in PDR patients. These findings may provide a basis for developing more isoform-specific anti-VEGF therapies.

Abstract No.: 203563

The Effects of Different Anti-VEGF Drugs on Choroidal Neovascularization-Related Macular Atrophy in Pathological Myopia

First Author: Yu **MAO**

Co-Author(s): Yue **QI**

Purpose: To observe the efficacy of intravitreal injection of different anti-VEGF drugs on choroidal neovascularization (CNV)-related macular atrophy in pathological myopia.

Methods: This retrospective study included patients with CNV-related macular atrophy associated with pathological myopia who were treated in our hospital from January 2018 to July 2023. The patients were divided into two groups: group A (Ranibizumab, 18 eyes) and group B (Conbercept, 20 eyes). Both groups received 3+PRN regimen. The changes in area of CNV-related macular atrophy, BCVA, refractive error, and axial length before and 1 year after treatment were compared.

Results: Before treatment, there were no significant differences in the area of CNV-related macular atrophy, BCVA, refractive error, and axial length between the two groups ($P > 0.05$). After 1 year of treatment, both groups showed significant improvement in the BCVA (LogMAR). However, there was no significant difference between the two groups (0.77 ± 0.40 vs. 0.60 ± 0.46). In group A, the area of CNV-related macular atrophy increased from 7.21 ± 5.88 mm² to 14.93 ± 9.93 mm² after 1 year's treatment, showing a statistically significant difference ($p < 0.001$). While in group B, the atrophic lesion area was 5.63 ± 4.16 mm² to 7.73 ± 5.82 mm², with no significant difference ($P=0.198$). The expansion of the atrophic lesion area was smaller in group B than that in group A (group A 7.72 ± 6.24 mm² vs. group B 2.10 ± 1.90 mm²), and the difference was statistically significant ($P < 0.001$).

Conclusions: Compared with small molecule monoclonal antibody-based anti-VEGF drugs, fusion protein-based anti-VEGF drugs may have a better impact on the occurrence and development of PM-CNV-related macular atrophy.

Abstract No.: 205109

The Mongolian Medicine GuRiGuMu-13 Mitigates Ferroptosis in Retinal Ganglion Cells in Glaucoma via Activation of the NRF2/HO-1 Pathway

First Author: Minggao QIN

Co-Author(s): Qiuli ZHANG

Purpose: This study aims to analyze the targets of active substances in rat serum containing GRGM-13 and their relationship with ferroptosis pathways, and to further explore the mechanism of GRGM-13 in preventing RGC ferroptosis using in vitro and in vivo glaucoma models.

Methods: To analyze active ingredients from rat serum containing GRGM-13, UPLC-Q-TOF-MS/MS technology was utilized. Network pharmacology and bioinformatics methods were used to identify drug targets related to ferroptosis in glaucoma. HE staining and immunofluorescence were used to evaluate the in vivo effects of GRGM-13. The evaluation of cell ferroptosis in vitro involved a series of ferroptosis-related markers, including intracellular Fe²⁺ levels, lipid ROS, GSH levels, MDA levels, and the expression levels of related proteins. The role of the Nrf-2/HO-1 pathway was validated using Nrf-2 inhibitors or Si-Nrf2, and lipid metabolism differences were analyzed using UPLC-Q-TOF-MS/MS.

Results: In the rat serum with GRGM-13, 49 active components and 885 active substance targets were identified. After cross-matching glaucoma DEGs with ferroptosis-related genes, 80 glaucoma-related ferroptosis genes were identified, primarily involving key targets such as NFE2L2 and HMOX-1. In vivo and in vitro experiments showed that GRGM-13 inhibited ferroptosis in glaucoma and RGCs and activated the NRF2/HO-1 pathway. GRGM-13 affected lipid metabolism in RGCs, with the main pathways including alpha-linolenic acid, linoleic acid, and lysophosphatidylcholine.

Conclusions: This study confirmed the protective effect of GRGM-13 against ferroptosis in the optic nerve in glaucoma through activating the Nrf-2/HO-1 pathway. Our findings offer improved theoretical insights for using GRGM-13 in glaucoma treatment.

Abstract No.: 201873

To Study the Correlation of Corneal Hysteresis and Ocular Blood Flow in Retinal Vein Occlusion

First Author: Priya SHARMA

Co-Author(s): Mohd SHADAB

Purpose: To study the correlation of corneal hysteresis and ocular blood flow in retinal vein occlusion and to evaluate its potential risk in patients with retinal vein occlusion.

Methods: This cross-sectional study included 44 cases of retinal vein occlusion (22 BRVO and 22 CRVO) and 22 age- and gender-matched controls. Corneal hysteresis was analyzed using the Ocular Response Analyser (ORA), and colour Doppler imaging (CDI) was used to assess ocular blood flow in the central retinal artery, central retinal vein, and superior ophthalmic artery.

Results: The mean corneal hysteresis was lower in cases compared to controls. Statistically significant correlations were found between corneal hysteresis and superior ophthalmic artery peak systolic velocity, superior ophthalmic artery end-diastolic velocity, and superior ophthalmic vein resistive index. The correlation coefficients were -0.253 ($p = 0.040$), -0.295 ($p = 0.020$), and 0.317 ($p = 0.015$), respectively.

Conclusions: This study demonstrates a correlation between corneal hysteresis and ocular blood flow in retinal vein occlusion. The lower value of corneal hysteresis on ORA or the higher value of resistive index in ocular blood vessels on CDI can be considered as a risk factor for developing retinal vein occlusion disease. This study provides new insights into the pathophysiology of retinal vein occlusion and may help in the early detection and management of the disease.

Abstract No.: 204083

Transforming Geographic Atrophy Care: A Systematic Review and Meta-Analysis on Pegcetacoplan's Efficacy and Safety

First Author: Zahra ZHAFIRA

Co-Author(s): Ari DJATIKUSUMO, Anindita SHAQIENA

Purpose: This study aimed to assess the efficacy and safety of pegcetacoplan in advancing the management of geographic atrophy (GA).

Methods: This study was reported based on PRISMA criteria. The literature search was conducted in databases such as MEDLINE, Scopus, and ScienceDirect. RevMan 5.4 was used to provide pooled estimates for mean differences and risk ratios with 95% confidence intervals. A random effect model was used based on the heterogeneity level. Risk of Bias was assessed for each study using RoB 2 for the RCT.

Results: Pegcetacoplan significantly reduced the progression of GA lesion area compared with control (MD =1.18, 95%CI:0.1-2.26, $p=0.03$). A small but

significant increase of treatment-emergent adverse events (TEAEs) occurred in the pegcetacoplan group (RR=1.42, 95%CI:1.21–1.67, $p=0.02$). Significant increase specifically occurs in ocular TEAEs (RR=1.39, 95%CI:1.22-1.59, $p<0.00001$), while non-ocular TEAEs showed no significant difference (RR=1.09, 95%CI:0.99-1.19, $p=0.08$). Notably, patients receiving pegcetacoplan had a higher risk of developing new-onset exudative AMD (RR=3.60, 95% CI:1.92-6.77, $p<0.0001$).

Conclusions: Pegcetacoplan has been proven to be effective in slowing GA progression, though its use is tempered by increased ocular adverse events, particularly new-onset exudative AMD, warranting its need for continued evaluation.

Abstract No.: 206332

Twelve-Month Efficacy of Photobiomodulation in Early and Intermediate Dry Age-Related Macular Degeneration

First Author: Kelvin **TEO YI CHONG**

Co-Author(s): Enrico **BORRELLI**, Adriano **CARNEVALI**, Giulia **COCO**, Sibel **DEMIREL**, Giuseppe **GIANACCARE**, Murat **HASANREISOĞLU**, Claudio **IOVINO**

Purpose: To assess the anatomical and functional efficacy and safety of photobiomodulation (PBM) in early/intermediate dry age-related macular degeneration (dAMD) over 12 months in a European multicenter, randomized, double-masked, sham-controlled trial.

Methods: A total of 138 eyes from 78 classified only as AREDS 2–3 dAMD patients were randomized 1:1 to PBM or sham using the eye-light® device. PBM included two cycles of yellow (~590 nm) and red (~625 nm) light, twice weekly. Sham received a demo mode delivering <30% of PBM energy. Patients underwent BCVA (ETDRS), fundus imaging, and SD-OCT to measure mean drusen volume (MDV) at baseline, 6, and 12 months. Adverse events and tolerability were recorded. Multilevel mixed-effects regression analyzed treatment-time interactions, adjusting for age, sex, and AREDS category.

Results: At 12 months, MDV decreased in PBM ($-0.03 \pm 0.05 \text{ mm}^3$) versus an increase in sham ($+0.02 \pm 0.04 \text{ mm}^3$; $p<0.001$). BCVA improved in PBM ($+1.31 \pm 6.7$ letters) and declined in sham (-2.62 ± 7.1 letters), with a between-group difference of +3.75 letters ($p=0.0001$). Four sham eyes developed macular neovascularization versus none in PBM ($p=0.044$). Adverse events were mild, including transient warmth (18.1%) and dry eye-like symptoms (8.7%), with no retinal phototoxicity.

Conclusions: PBM significantly reduces mean drusen volume and improves visual function in early/intermediate dAMD, with excellent safety, supporting its role as a promising non-invasive therapeutic option.

Abstract No.: 207063

Twelve-Month Real-World Outcomes of Aflibercept 8mg in Diabetic Macular Edema: A Swiss Retina Research Network Report

First Author: Tahm **SPITZNAGEL**

Co-Author(s): Aude **AMBRESIN**, Justus **GARWEG**, Katja **HATZ**, Gabor Mark **SOMFAI**, Sandrine **ZWEIFEL**

Purpose: We aimed to evaluate the effectiveness and safety of intravitreal Aflibercept 8mg (Afl8) in patients with treatment-naïve and pretreated diabetic macular edema (DME) in a real-world setting.

Methods: In this retrospective study, we included patients in 13 Swiss Centers, receiving Afl8 for one year. Primary outcomes were changes in visual acuity (VA), center point retinal thickness (CRT), central subfield thickness (CST), treatment intervals, and adverse events (AEs). Secondary outcomes included injection number, fluid persistence, and treatment adherence.

Results: We enrolled 156 eyes (124 patients) with DME, including 42 (26.9%) treatment-naïve and 114 (73.1%) pretreated eyes. VA improved from 72.9 to 77.7 ETDRS letters in naïve eyes ($p=0.006$), and from 73.9 to 75.4 letters ($p=0.094$) in pretreated eyes. CST decreased in both groups (naïve: $448.9 \mu\text{m}$ to $320.0 \mu\text{m}$, $p<0.001$; pretreated: $336.6 \mu\text{m}$ to $310.2 \mu\text{m}$, $p=0.047$). At 12 months, 27% of naïve and 38.1% of pretreated eyes were fluid-free. Mean treatment interval reached 15.3 weeks in naïve eyes and extended from 7.6 to 13.0 weeks in pretreated eyes ($p<0.001$). No AEs occurred in naïve eyes; pretreated eyes showed three cases of non-infectious intraocular inflammation (1.9%), two acute IOP rises, and one vitreous hemorrhage.

Conclusions: Aflibercept 8 mg showed significant visual gains in treatment-naïve and modest improvements in pretreated eyes. Safety was favorable, with only rare cases of mild inflammation. Taken together, Aflibercept 8 represents a promising approach to improve outcomes while lowering treatment burden.

Abstract No.: 205811

UWF-SS-OCTA Imaging and ImageJ-Based Geometric Analysis of Choroidal Features Across Clinical Stages of Diabetic Retinopathy

First Author: Zhenping **LI**

Co-Author(s): Yuqing **LAN**

Purpose: To investigate changes in choroidal and retinal parameters across different clinical stages of DR and their associations with DR progression and visual acuity.

Methods: A cross-sectional study. This study included five groups: NDR, mild non-proliferative DR (mNPDR), severe non-proliferative DR (sNPDR), proliferative DR (PDR), and a healthy control group. Choroidal and retinal parameters were compared among the five groups, and their associations with DR staging and

visual acuity were explored. UWF-SS-OCTA images were analyzed using ImageJ software to obtain choroidal and retinal vascular geometric parameters such as fractal dimension, diameter, and tortuosity. For five-group comparisons, Welch's ANOVA analysis of variance was used, followed by Games-Howell post hoc tests. Correlation analyses were performed using generalized linear mixed models (GLMM) and ordinal logistic regression analysis.

Results: This section included 250 NDR eyes, 228 mNPDR eyes, 199 sNPDR eyes, 225 PDR eyes, and 268 healthy control eyes. Compared to the control, NDR, and mNPDR groups, sNPDR and PDR groups exhibited significantly reduced choriocapillaris density ($47.75 \pm 1.76\%$, $48.41 \pm 1.05\%$, $47.7 \pm 1.51\%$, $46.23 \pm 2.06\%$, $45.41 \pm 2.71\%$), LMCV vascular density ($54.4 \pm 4.84\%$, $54.84 \pm 4.32\%$, $54.46 \pm 4.19\%$, $53.13 \pm 5.56\%$, $51.63 \pm 5.9\%$), CVI ($41.84 \pm 3.23\%$, $41.36 \pm 3\%$, $40.85 \pm 2.77\%$, $39.78 \pm 3.73\%$, $38.8 \pm 3.72\%$) (all $P < 0.05$), SCP fractal dimension (1.8354 ± 0.0245 vs 1.8298 ± 0.0216 vs 1.8199 ± 0.0201 vs 1.8107 ± 0.0275 vs 1.8134 ± 0.0371) (all $P < 0.05$). The LMCV diameter initially decreased and then increased across the five groups ($150.90 \pm 8.75 \mu\text{m}$, $149.03 \pm 8.79 \mu\text{m}$, $149.75 \pm 8.83 \mu\text{m}$, $153.14 \pm 9.43 \mu\text{m}$, $156.93 \pm 8.84 \mu\text{m}$, $P < 0.001$). The intergroup differences in LMCV fractal dimension and LMCV tortuosity were not statistically significant. Multivariate ordinal logistic regression analysis indicated that DR severity was negatively correlated with CVI ($\beta = -0.157$, $P < 0.001$), while multivariate GLMM analysis showed that LogMAR visual acuity was negatively correlated with CVI ($\beta = -0.037$, $P < 0.001$).

Conclusions: As DR progresses, choroidal perfusion progressively declines, and the choroidal vascular network is gradually disrupted, possibly due to choroidal vascular occlusion. Choroidal vascular dilation in sNPDR and PDR may mirror changes in retinal vasculature. Choroidal perfusion decline may play a role in DR progression.

Abstract No.: 208548

Unveiling Safety Signatures of Aflibercept: A Multimethod Pharmacovigilance Analysis of the FDA Adverse Event Reporting System Database

First Author: Junhong LI

Co-Author(s): Binbin DAI, Bin ZHAO

Purpose: Aflibercept, a key anti-VEGF therapy for neovascular eye diseases, lacks a large-scale real-world safety evaluation. This study uses the FDA Adverse Event Reporting System (FAERS) to comprehensively analyze and characterize aflibercept's safety profile beyond clinical trials.

Methods: We analyzed all adverse event (AE) reports associated with aflibercept from January 2013 to December 2022. To ensure robust and reliable signal detection, we implemented a multi-method approach

employing four distinct disproportionality algorithms: Reporting Odds Ratio (ROR), Proportional Reporting Ratio (PRR), Bayesian Confidence Propagation Neural Network (BCPNN), and Multi-item Gamma Poisson Shrinker (MGPS). Signals were comprehensively assessed at both the System Organ Class (SOC) and Preferred Term (PT) levels.

Results: From the FAERS database, 17,310 aflibercept-related adverse event reports were identified. The most frequent System Organ Classes were general disorders and administration site conditions, eye disorders, nervous system disorders, injury/procedural complications, and infections. Major Preferred Terms included endophthalmitis, retinal pigment epithelial tear, lens extraction, intraocular lens implant, vitreous haze/opacities, blurred vision, and vitreous hemorrhage. Severe outcomes were notable, with death (42.4%), hospitalization (8.0%), and disability (6.4%) most reported, occurring more often in females and those aged > 60 years.

Conclusions: This large-scale pharmacovigilance investigation provides a refined and updated safety profile for aflibercept. Our findings extend beyond the established risks, revealing significant signals in system organ classes not currently emphasized in the prescribing information. This evidence calls for heightened clinical vigilance regarding potential systemic and neurological adverse events and underscores the necessity for further prospective studies to validate these associations and optimize patient risk management strategies.

Abstract No.: 201248

Update on Faricimab for Diabetic Macular Edema: New Clinical Features of Eyes in the RHONE-X Long-Term Extension Study

First Author: Toshinori MURATA

Co-Author(s): Kara GIBSON, Cheryl JONES, Ian PEARCE, Veeral SHETH, Dawn A. SIM

Purpose: Faricimab has demonstrated vision gains, anatomic improvements, and extended durability in DME (diabetic macular edema), with a comparable safety profile to aflibercept. We present updated findings from the phase-3 RHONE-X trial (NCT04432831) evaluating faricimab's long-term safety (primary objective) and efficacy (exploratory) in DME patients who completed the two-year, phase-3 YOSEMITE/RHINE trials.

Methods: Patients receiving faricimab-6.0mg Q8W (every-8-weeks), personalized T&E (treat-and-extend)-dosing, or aflibercept-2.0mg Q8W in parent trials received faricimab-6.0mg up to Q16W T&E (per pre-specified vision and anatomic criteria) for an additional 2 years in RHONE-X. The first 16 weeks had masked monthly visits, followed by T&E-interval-based study visits.

Results: Of the 1,474 patients, 81.7% completed RHONE-X. Robust vision gains/improved central subfield thickness from parent trials were maintained. After 4 years of faricimab treatment, >90% patients achieved DME absence, regardless of original treatment. First DME absence (90th-percentile) was reached 12–15 months earlier, with fewer injections with faricimab vs. aflibercept in parent trials. At parent trial end, fewer faricimab-Q8W (-10.3%; nominal $P=0.0026$) and T&E (-7.8%; nominal $P=0.0251$) patients had hard exudates vs. aflibercept. By the RHONE-X end, the differences in hard exudates were similar (nominal $P>0.55$). After 4-years, 80% patients had extended $\geq$ Q12W and >50% qualified for Q20W dosing. Volumetric analysis will be presented.

Conclusions: RHONE-X, the largest DME extension study, maintained faricimab's efficacy and durability from parent trials. Aflibercept-treated patients during parent trials demonstrated further reduction in hard exudates after faricimab-T&E in RHONE-X, suggesting improved vascular stability and disease control with faricimab.

Abstract No.: 206952

Visceral Adiposity Indices (AIP, LAP, CVAI) Surpass Traditional Lipids in Diabetic Kidney Disease Prediction: Divergent Associations With Retinopathy

First Author: Yanchun **ZHANG**

Co-Author(s): Yuemeng **SUN**, Li **ZHANG**

Purpose: To analyze the associations between visceral adiposity indices and the risk of diabetic kidney disease (DKD) and diabetic retinopathy (DR), and to compare their predictive utility against traditional lipids in community-based type 2 diabetes (T2DM).

Methods: This cross-sectional study enrolled 1,467 T2DM patients from 14 Chinese community centers. Visceral adiposity was evaluated by Atherogenic Index of Plasma (AIP), Lipid Accumulation Product (LAP), and Chinese Visceral Adiposity Index (CVAI). Dose-response relationship was modeled via restricted cubic splines (RCS) analysis. Diagnostic performance was compared using DeLong's test. Subgroup interactions were tested for age, sex, BMI, and hypertension status.

Results: Among 1,467 T2DM patients, DKD prevalence was 61.6% ($n=904$) and DR prevalence 33.1% ($n=485$). Patients with DKD had significantly higher AIP, LAP, and CVAI versus non-DKD patients (all $p<0.01$), whereas no associations existed with DR. AIP, LAP, and CVAI increased progressively with KDIGO stages ($p<0.01$). RCS revealed linear association between DKD and AIP (OR=1.036 per 0.1-unit increase; $p<0.001$), while nonlinear associations with LAP (threshold: 42.34; $p=0.001$) and CVAI (threshold: 130.73; $p=0.012$). For diagnostic performance, CVAI provided optimized specificity versus conventional lipids, while LAP showed balanced sensitivity and specificity. CVAI predicted

DKD exclusively in females (OR=2.05, 95%CI:1.52-2.76; $p<0.001$), hypertensives (OR=1.86, 95%CI:1.34-2.57; $p<0.001$), and older adults (OR=1.66, 95%CI:1.25-2.21; $p<0.001$), with significant interactions for sex ($p=0.008$) and hypertension ($p=0.047$).

Conclusions: Visceral adiposity indices (AIP, LAP, CVAI) outperformed traditional lipids in DKD risk stratification. CVAI demonstrated age-, sex-, and hypertension-specific predictive advantages but showed no associations with DR risk.

Abstract No.: 201602

Visual and Anatomical Improvements Over 12 Weeks With OCS-01 Eye Drops in Patients With Diabetic Macular Edema From the Phase 2/3 DIAMOND-Stage 1 Trial

First Author: Timothy **LAI**

Co-Author(s): David S. **BOYER**, Arshad M. **KHANANI**, Sabri **MARKABI**, Quan Dong **NGUYEN**

Purpose: To evaluate the efficacy and safety of OCS-01, a special formulation of dexamethasone eye drop, for treating diabetic macular edema (DME) in Stage 1 of the DIAMOND study.

Methods: DIAMOND is a prospective Phase 2/3, 2-stage, double-masked, randomized, multi-center trial. A total of 148 patients were randomized, with 100 patients having OCS-01 and 48 patients having a vehicle. Primary and secondary endpoints included mean change in best-corrected visual acuity (BCVA) ETDRS letter score at Week 6 compared to baseline, mean change in central subfield thickness (CST) at Weeks 6 and 12, and the proportion of patients with a ≥ 3 -line BCVA gain at Weeks 6 and 12.

Results: Early improvement in mean BCVA was observed with OCS-01 versus vehicle at Week 6 (7.2 vs 3.1 letters, $p=0.007$), and Week 12 (7.6 vs 3.7 letters, $p=0.016$). A higher proportion of patients in the OCS-01 group achieved a ≥ 3 -line BCVA gain at Week 6 (25.3% vs 9.8%, $p=0.025$) and Week 12 (27.4% vs 7.5% $p=0.009$). A significant reduction in mean CST was observed in OCS-01 vs Vehicle at Week 6 (-63.5 vs +5.4 μm , $p<0.001$), and persisted at Week 12 (-61.6 vs -16.0 μm , $p=0.004$). OCS-01 was well-tolerated with no unexpected adverse events, and none of the SAEs reported were deemed to be related to the study drug.

Conclusions: The results from these analyses show OCS-01 met its primary and secondary endpoints with significance.

Retina (Surgical)

Abstract No.: 205520

27-Gauge MIVS-Assisted Scleral Fixation of Intraocular Lens: An AS-OCT Guided Study

First Author: Manasi TRIPATHI

Co-Author(s): Ashish MARKAN

Purpose: To evaluate the outcomes of 27-gauge microincision vitrectomy surgery (MIVS)-assisted scleral fixation of intraocular lenses (SFIOL) using anterior segment optical coherence tomography (AS-OCT).

Methods: This retrospective study included 36 patients undergoing 27G MIVS-assisted SFIOL implantation. Preoperative data, including best-corrected visual acuity (BCVA), intraocular pressure (IOP), endothelial cell count, and surgical indications, were recorded. Postoperatively, BCVA, IOP, and endothelial cell count were assessed at 3 months. Additionally, postoperative ASOCT was performed to assess IOL tilt, decentration, and distance of the IOL from the posterior iris surface. Surgical complications were documented.

Results: The mean IOL tilt was 3.58 ± 0.57 degrees, IOL decentration was 0.22 ± 0.47 mm, and IOL to posterior iris distance was 0.76 ± 0.66 mm. At three months, BCVA significantly improved from 0.85 ± 0.53 log MAR to 0.38 ± 0.38 log MAR ($p = 0.03$). Hyperopic shift (MRSE: $+1.14 \pm 0.62$ D) correlated strongly with increased distance of IOL from the posterior iris surface. Complications included early postoperative IOL tilt ($n=4$, requiring refixation), vitreous hemorrhage ($n=3$, resolving spontaneously), and choroidal detachment ($n=2$, resolving with corticosteroids).

Conclusions: The 27G MIVS-assisted SFIOL technique demonstrates favorable outcomes with minimal IOL tilt and decentration. The technique offers a safe and effective alternative for scleral fixation, optimizing surgical efficiency and patient outcomes.

Abstract No.: 205502

A Minimal Air-Fluid Exchange Technique for Office-Based Management of Post-Vitrectomy Vitreous Hemorrhage

First Author: Xuhui YU

Co-Author(s): Jun CHEN

Purpose: Post-operative vitreous hemorrhage may occur after pars plana vitrectomy (PPV). In-office air-liquid exchange may be an option for these patients.

Methods: A modified two-needle method of air-fluid exchange in the office is introduced. A 29-gauge needle is inserted 3.5-mm posterior to the limbus at 6 o'clock. A second 29-gauge needle with a 5mL syringe filled with sterile air is inserted 3.5-mm posterior to the limbus in the superotemporal quadrant or superonasal quadrant. The plunger of the air-filled syringe is pushed

while the liquid of the vitreous cavity flows out of the 6 o'clock needle drop by drop, and the flow rate of the fluid changes with the injection pressure.

Results: The method approximates the conditions of air-fluid exchange in vitrectomy, and the air injection and liquid outflow are balanced by pressure naturally.

Conclusions: The modified two-needle method is an easy, safe, and effective in-office air-fluid exchange for the treatment of Post-Vitrectomy Vitreous Hemorrhage.

Abstract No.: 201834

A Novel Surgical Approach for Macular Schisis Associated With Optic Disc Pit

First Author: Zhao Jie CHU

Co-Author(s): Hong Fang YONG

Purpose: Report on modified surgical technique for the treatment of optic disc pit.

Methods: Case Report with Surgical Video. Modified vitrectomy with fovea-sparing ILM peeling and wet biologic amniotic membrane packing for optic disc pit-associated maculopathy. Case Presentation: A 25-year-old female presented to the outpatient clinic with a 1-year history of blurred vision in the left eye. Best-corrected visual acuity (BCVA) was 0.2 in the affected eye. Fundus examination revealed an inferotemporal optic disc pit in the left eye, while optical coherence tomography (OCT) demonstrated macular edema and schisis. Surgical Intervention: The patient underwent 25G vitrectomy combined with fovea-sparing internal limiting membrane (ILM) peeling, followed by optic disc packing with wet biologic amniotic membrane and air tamponade.

Results: At the 6-month postoperative follow-up, optical coherence tomography (OCT) revealed a hyperreflective filling material within the optic disc pit, indicating successful graft placement. Macular edema had resolved significantly, and best-corrected visual acuity (BCVA) improved to 0.3 in the left eye.

Conclusions: The wet-state biologic amniotic membrane serves as a standardized graft material with high safety profile and excellent surgical maneuverability, while selective ILM peeling preserves foveal integrity. The combination of wet biologic amniotic membrane grafting and fovea-sparing ILM peeling represents a promising modification to macular schisis associated with optic disc pit.

Abstract No.: 204955

Advantages of Robotic Assistance Over a Manual Approach in Retinal Intravascular Injection

First Author: Weihong YU

Co-Author(s): Junqi CHEN, Zhangwanyu WEI

Purpose: To compare the success rate and stability of robot-assisted versus manual retinal intravascular injection.

Methods: We performed retinal intravascular injections in ex vivo (15 porcine eyes per group) and in vivo (6 porcine eyes per group) models. Surgeons executed the procedure using a master-slave robotic system (experimental group) or manually (control group). We recorded the success rate, instrument stability duration, total procedure time, and intraoperative complications.

Results: In the in vivo experiment, the success rate was significantly higher in the robotic group compared to the manual group ($p = 0.047$). No significant difference in success rate was observed between the two groups in the ex vivo experiment. The robotic group demonstrated greater needle tip stability and maintained a longer stable injection duration than the manual group.

Conclusions: Robot-assisted retinal intravascular injections demonstrated a higher success rate and greater stability, enabling a prolonged duration of stable injection.

Abstract No.: 206133

Alteration of Tear Metabolomics and Proteomics Profiling in Infants With Retinopathy of Prematurity

First Author: Zixin FAN

Co-Author(s): Xiaofeng LU, Peiling WEI, Shuo YANG, Guoming ZHANG

Purpose: The purpose of this study was to investigate the characteristics of metabolomic and proteomic profiles in the tears from infants with retinopathy of prematurity (ROP) and further define noninvasive biomarkers.

Methods: This prospective study included 94 eyes from 47 premature infants. Tear samples from 23 infants with ROP (15 treatment-requiring ones [ROP (t)] and 8 non-treatment-requiring ones [ROP (nt)]) and 24 infants without ROP were collected with Schirmer strips after topical anesthesia. Detailed fundus examination upon pupil dilation was conducted, with data on demographics and birth history recorded. Untargeted tear metabolomic analysis based on ultra-performance liquid chromatography-mass spectrometry and proteomic analysis based on data-independent acquisition mass spectrometry were performed.

Results: Adjusted by sex, postmenstrual age, gestational age, and birth weight, among 145 metabolites quantified, 3,5-di-tert-butyl-4-hydroxybenzaldehyde, caffeine, and trehalose were identified to be upregulated in the tears from infants with ROP when compared to those from premature infants with non-ROP, whereas uric acid, dihomoy-linolenic acid, nootkatone, pyridoxal, ornithine, 6-keto-prostaglandin F1 alpha, adenosine, and tetrahydrocortisol were downregulated (all adjusted false discovery rate [FDR adj] < 0.05). Nine and one dysregulated metabolites were further found in the ROP (t) and ROP (nt) subgroups, respectively. The dysregulated tear metabolites were fundamentally related to vitamin B6, purine, caffeine, arginine, and starch and sucrose metabolism pathways. Besides, 94 differentially expressed proteins in tear fluid were identified between infants with ROP and premature infants with non-ROP, including 29 downregulated proteins and 65 upregulated proteins. These proteins were associated with inflammation, retinal homeostasis, coagulation, and angiogenesis. The 6-keto-prostaglandin F1 alpha obtained the best performance in classifying premature infants with and without ROP (area under the curve [AUC] of 0.893 [range = 0.800–0.986], $P < 0.001$).

Conclusions: Dysregulated tear metabolites and proteins in ROP might be noninvasive biomarkers that potentially serve as complementary screening tools.

Abstract No.: 206552

Anatomical and Functional Outcomes of Conventional Scleral Buckling, Segmental Buckling, and Radial Buckling for Uncomplicated Retinal Detachments

First Author: Aarush

Co-Author(s): Rohan CHAWLA, Avneet KAUR, Vinod KUMAR

Purpose: To compare anatomical and visual results of conventional scleral buckle (with encircage), segmental circumferential buckling, and radial buckling for uncomplicated retinal detachments.

Methods: This retrospective interventional case-control study included patients who underwent conventional scleral buckling (CB), segmental buckling (SB) and radial buckling (RB) for retinal detachments with proliferative vitreoretinopathy (PVR) grade $< C$. Patients who completed a minimum follow up period of 12 months were enrolled with follow-up examinations scheduled on the first post-operative day and 1, 3, 6 and 12 months after surgery. Anatomical success was defined as retinal reattachment at 12 months without additional procedures. Metamorphopsia and aniseikonia were assessed with M-CHARTs and the New Aniseikonia Test, respectively.

Results: A total of 139 eyes were enrolled, including 75 in group CB, 46 in group SB, and 18 in group RB.

Single operation success rates at 12 months were 67/75 eyes (89.3%) in the CB group, 42/46 eyes (91.3%) in the SB group, and 15/18 eyes (83.3%) in the RB group. There was no significant difference in the final best corrected visual acuity (BCVA) between the three groups; however, eyes with macula-on detachments displayed a trend towards better visual gain. Refractive error shift was noted to be maximum in CB group [Mean change in spherical equivalent (Δ SE): -1.875 ± 2.97 D], followed by SB group (Mean Δ SE: -1.09 ± 0.91 D) and least in RB group (Mean Δ SE: -0.625 ± 0.59 D, $p < 0.001$). No significant differences were noted regarding metamorphopsia and aniseikonia in the three groups. However, eyes that underwent external drainage of subretinal fluid displayed worse metamorphopsia and aniseikonia scores ($p < 0.05$).

Conclusions: Scleral buckling has an exceptional success rate for managing uncomplicated retinal detachments, irrespective of the different techniques in our study. However, conventional buckling with encirclage is associated with a pronounced myopic shift. Vision gain post-surgery is a direct function of the preoperative macular status, whereas external drainage of SRF is associated with retinal displacement leading to metamorphopsia and aniseikonia.

Abstract No.: 202001

Application of Foldable Capsular Buckle in the Treatment of Rhegmatogenous Retinal Detachment

First Author: Hua **YAN**

Purpose: Rhegmatogenous retinal detachment (RRD) is a blinding eye disease caused by retinal break formation, which leads to fluid accumulation in the subretinal space and subsequent separation of retinal layers. Current primary treatment methods include scleral buckling (SB), pars plana vitrectomy (PPV), and pneumatic retinopexy (PR). Although PPV is widely used, it often carries complications such as cataract and disrupted intraocular oxygen metabolism due to intraocular tamponade. This study evaluates the foldable capsular buckle (FCB), a novel external surgical device, as a treatment for RRD.

Methods: The FCB is constructed from medical silicone and consists of a capsule, drainage tube, and valve. Preoperative break localization was performed using a three-dimensional constructive method. The folded capsule was inserted via a small incision and inflated with saline to create an indentation ridge supporting the retinal break. A multicenter clinical trial across 22 centers in China, since July 2019, has included nearly 200 patients with RRD.

Results: The FCB effectively supported breaks within 3-disc diameters, including cases challenging for conventional external surgery. This technique provides a minimally invasive external alternative for large-break RRD cases that would otherwise require PPV,

proving particularly suitable for children, young adults, pregnant women, highly myopic patients, and those with inferior, nasal, or horseshoe-shaped breaks.

Conclusions: The FCB technique provides a minimally invasive external alternative to PPV for certain RRD cases, expands the indications for external surgery, improves visual prognosis, and reduces complications. It demonstrates broad clinical application potential.

Abstract No.: 205633

Case-Control Study on Risk Factors for Developing Early Choroidal Detachment After Diabetic Vitrectomy

First Author: Umesh **CHANDRA BEHERA**

Purpose: We aimed to elucidate the associations of early postoperative choroidal detachment (PCD) occurrences with attributable preoperative and intraoperative factors after diabetic vitrectomy.

Methods: All consecutive eyes undergoing 23G transconjunctival pars plana vitrectomy for proliferative complications of diabetes were included. The eyes that developed PCD within two weeks of surgery were compared with eyes without PCD for risk identification.

Results: Ninety-two eyes satisfied the inclusion/exclusion criteria. The mean age and duration of diabetes in the study subjects were 54.6 ± 9.7 years and 11.8 ± 6.6 years, respectively. PCD was noted in 32.61% of eyes; most resolved spontaneously by 2 weeks (93%). The odds of PCD were higher in older subjects (> 70 years), longer diabetes duration (> 10 years), and intraoperative lasers (> 500 spots). The odds of PCD increased proportionally with the number of laser spots ($p = 0.006$).

Conclusions: Postoperative choroidal detachment in diabetic vitrectomy may be noted in approximately one-third of the eyes but typically resolves spontaneously. Limiting the number of endo laser spots may reduce their occurrence.

Abstract No.: 204163

Changes in Fixation Stability and Location After Internal Limiting Membrane Surgical Technique for Macular Hole Repair: A Prospective Study

First Author: Jin **MA**

Co-Author(s): Yuanjie **QIAN**, Renchun **WANG**

Purpose: This study aimed to evaluate the impact of the internal limiting membrane (ILM) surgical technique on postoperative fixation stability and the spatial relocation of the preferred retinal locus (PRL), particularly focusing on the PRL-to-foveal center distance. Additionally, the study examined the relationship between PRL displacement, preoperative fixation patterns, and macular hole (MH) diameter.

Methods: In this prospective interventional study, 126 patients (105 eyes) with idiopathic MH underwent 25G pars plana vitrectomy (PPV) with the ILM surgical technique of simple ILM peeling, ILM flap inverting, and filling technique. Based on preoperative optical coherence tomography (OCT) measurements, patients were stratified into three groups: Group A (<300 μ m, 36 eyes), Group B (300–600 μ m, 44 eyes), and Group C (>600 μ m, 46 eyes). High-resolution OCT and MP-3 microperimetry were conducted preoperatively and at 1, 3, 6, 9, and 12 months postoperatively to evaluate PRL displacement. Secondary outcomes included fixation stability (BCEA 1-SD, 2-SD, 3-SD), macular sensitivity, and MH closure configuration. Statistical analysis included the Shapiro–Wilk test, Friedman test, Wilcoxon signed-rank test, and Spearman correlation.

Results: By 12 months postoperatively, all groups demonstrated a significant reduction in PRL–foveal center distance ($p < 0.05$), reflecting a centripetal PRL shift. Fixation stability improved significantly ($p < 0.05$), while macular sensitivity, initially reduced at 1 month, gradually recovered. PRL centripetal shift showed a significant positive correlation with both preoperative fixation pattern and MH diameter ($p < 0.001$).

Conclusions: ILM flap techniques facilitate anatomical MH closure and significantly enhance fixation function, as evidenced by improved fixation stability and centripetal PRL realignment. The trend of PRL movement toward the horizontal papillomacular bundle was significant. These results highlight the value of fixation metrics as functional indicators in postoperative evaluation and support the refinement of surgical approaches and outcome assessments in MH repair.

Abstract No.: 208395

Characterization of Retinotomy and Bleb Formation in Subretinal Gene Therapy for Inherited Retinal Disease and Age-Related Macular Degeneration

First Author: Xiaodong **SUN**

Purpose: Consistent delivery is critical to gene therapy potency. We evaluated an optimized subretinal injection protocol across multiple centers and surgeons in LCA and nAMD, and discussed the rationale for key delivery parameter selection.

Methods: Retrospective review of subretinal injection in thirteen patients from a single-center investigator-initiated trial (IIT) to develop an optimal protocol (including retinotomy selection, bleb monitoring, IOP and reflux management). This protocol was then implemented in registered trials by surgeons across multiple centers to evaluate delivery performance in gene therapy for LCA and nAMD. Surgical procedure–related adverse events and technical performance metrics were used to evaluate

delivery performance. Retinotomy selection and bleb propagation were visualized for further reference.

Results: Under the optimized protocol, 203 injections in 64 patients with LCA and nAMD achieved rapid, targeted delivery. Surgical time decreased by 26.2%, and single-bleb formation time by 88.9%. Common TEAEs were conjunctival hyperemia (64.1%) and transient IOP decrease (40.6%). One moderate retinal detachment resolved with treatment. Most events resolved spontaneously. With intraoperative IOP lowering, single injections achieved high bleb success (98.8% LCA; 94.1% nAMD). For LCA, 4–5 retinotomies (15–20 psi) are recommended; for nAMD, 2–3 (30–35 psi), with MI-OCT monitoring to prevent macular detachment.

Conclusions: By optimizing retinotomy selection, monitoring bleb bias, and managing IOP and reflux, our surgical procedures accelerated surgical speed, maintained delivery consistency, and achieved a low burden of procedure related adverse events comparing with international scale. Discussion of the key features of the optimal procedure provides practical reference for refining a broadly applicable multicenter protocol in the future.

Abstract No.: 207289

Chronic Myeloid Leukaemia Mimicking As Retinal Vascular Occlusions and Neovascular Glaucoma

First Author: Nikita **CHAUDHARY**

Co-Author(s): Vishal **SANJAY JADHAV**

Purpose: We present a cohort of case series of treating naïve Chronic Myeloid Leukaemia masquerading as Central retinal vein occlusion and neovascular glaucoma.

Methods: Three patients presenting with an acute onset of visual loss, two of them were diagnosed initially to have Central retinal vein occlusion, and one as neovascular glaucoma, are described.

Results: Initial fundus examination of 2 patients revealed bilateral extensive retinal haemorrhages, cotton wool spots, vascular sheathing, and macular edema, suggestive of central retinal vein occlusion. While another patient presented with high intraocular pressures (IOP), haem admixed hypopyon, neovascularisation at the iris, retinal haemorrhages, and was diagnosed to have neovascular glaucoma. Diligent fundus examination in all 3 cases, however, revealed the presence of Roth spots. Subsequent investigations identified marked leucocytosis on peripheral blood smear and Philadelphia chromosome (BCR-ABL) detection. Treatment with imatinib and intravitreal ranibizumab and dexamethasone implant resulted in the resolution of the leucocytosis, significant improvement in the retinal haemorrhages and macular edema, as well as control of IOP in respective patients.

Conclusions: This case series emphasizes the importance of keeping masquerades as a differential for retinal vascular occlusions and highlights the importance of comprehensive systemic workup to ensure accurate systemic diagnosis and appropriate life-saving management.

Abstract No.: 200604

Clinical Characteristics and Prognostic Factors Influencing Visual Outcomes in Intraocular Foreign Bodies: A 10-Year Multiethnic Tricenter Retrospective Study

First Author: Derrick Jun Quan CHUAH

Co-Author(s): Azhan AZMAN, Shahidatul Adha MOHAMAD, Maizan YAAKUB

Purpose: Intraocular foreign bodies (IOFB) represent a significant subset of ocular trauma; however, current local data remains limited. This study aimed to provide an update on the clinical characteristics and prognostic factors influencing visual outcomes following vitrectomy for IOFB removal in Malaysia.

Methods: Medical records of 186 patients, out of 355 cases of IOFB removal at three Malaysian public vitreoretinal centers between 2014 and 2023, were selected and retrospectively reviewed.

Results: Most patients were male (98.4%) and of Malay ethnicity (53.2%), with a mean age of 35.8 ± 13.9 years. Hammering and nails were the most common injury mechanism (45.2%). Most IOFBs were metallic (81.7%), with a mean size of 4.2 ± 2.8 mm, entering via the cornea (61.3%) and lodging in the retina (61.3%), predominantly extramacular (57.0%). Secondary clinical features included cataract (75.8%), retinal tear (54.8%), vitreous hemorrhage (40.3%), and endophthalmitis (32.3%). Primary vitrectomy within 3 days of injury was performed in 28.5% patients, while the remainder underwent primary wound repair pre-vitrectomy. At presentation, 75.9% had visual acuity (VA) worse than 6/60; postoperatively, 54.8% regained VA better than 6/60. Poor final VA was significantly associated with poor presenting VA, macular involvement, preoperative retinal detachment, and postoperative complications, for example, glaucoma and retinal detachment (all $p < 0.05$).

Conclusions: IOFB imposes a substantial clinical burden in Malaysia. Identifying high-risk prognostic features and ensuring timely intervention are crucial to improve visual outcomes. Strengthened workplace safety protocols remain essential to reduce the incidence of IOFBs and their long-term visual impact.

Abstract No.: 202438

Clinical Efficacy Observation of Intravitreal Injection of Tissue Plasminogen Activator Combined With Anti-VEGF in the Treatment of Acute Submacular Hemorrhage Secondary to Neovascular Age-Related Macular Degeneration

First Author: Jianing WANG

Co-Author(s): Xiaobing YU, Yue ZHANG, Zhaoxia ZHENG

Purpose: To observe the efficacy and safety of intravitreal injection of tissue plasminogen activator (tPA) combined with anti-VEGF in the treatment of acute submacular hemorrhage (SMH) secondary to nAMD.

Methods: Retrospective clinical study. Patients diagnosed with acute SMH secondary to nAMD. They were divided into two groups: Patients in group A received intravitreal injections of anti-VEGF drugs, and patients in group B received intravitreal injections of tPA 0.1ml/100ug combined with anti-VEGF drugs. All patients were followed up in the ophthalmology clinic at 1 month, 3 months, and 6 months after treatment. BCVA, macular central retinal thickness (CRT), and macular central retinal volume of the patients at each follow-up were recorded.

Results: A total of 38 patients were included in this study. Both groups' BCVA were higher than before treatment, but only group B had a statistically significant ($P=0.046$). The CRT and retinal volume of both groups of patients decreased significantly ($P < 0.001$). However, the degree of subretinal hemorrhage reduction in group A after treatment was less than that in group B, the reduction rate was lower, and the decline trend was also slower.

Conclusions: Intravitreal injection of tPA combined with anti-VEGF therapy is a more rapid, simple, safe, and effective treatment for acute SMH secondary to nAMD. It can improve visual function in patients with nAMD secondary to acute SMH and is more effective in achieving the displacement of subfoveal blood accumulation in the macula.

Abstract No.: 210124

Clinical Performance of Nanopore Targeted Sequencing for Diagnosing Endophthalmitis

First Author: Dalan JING

Purpose: Rapid identification of pathogenic bacteria in the vitreous and/or aqueous humor of patients with acute clinical diagnosis of endophthalmitis via nanopore sequencing technology.

Methods: We recruited a total of 12 patients (12 eyes) who were diagnosed with endophthalmitis at an ophthalmic outpatient clinic from January 2022 to October 2022. Clinical evaluation is conducted in the order of consultation, symptom evaluation, physical

sign evaluation, and ophthalmic special examination, all of which are completed by the same experienced clinical physician. Finally, 19 aqueous humor and/or vitreous samples were obtained via anterior chamber wash, vitreous tap, and vitrectomy. The samples were separated for cultivation, biochemical drug sensitivity identification, and targeted nanopore sequencing (NTS), and the results of nanopore sequencing were validated via Sanger sequencing.

Results: In patients with endophthalmitis, NTS can identify infected pathogens within 8–12 hours. Six samples (31.6%) were subjected to culture-based diagnosis, while NTS revealed the presence of pathogenic microorganisms in 19 samples (100%), of which bacteria and fungi were detected in three samples. A total of 19 samples were subjected to Sanger sequencing, of which 16 (84.2%) tested positive, including 6 culture-positive samples and 10 culture-negative samples, of which 5 (26.3%) were positive for two bacterial genera. In culture-positive cases, there is a high-quality match between culture and targeted nanopore sequencing.

Conclusions: NTS can quickly detect pathogenic bacteria in samples from patients with endophthalmitis. Moreover, the use of vitreous and/or aqueous humor for the NTS has potential. NTS is a promising diagnostic platform for endophthalmitis, especially for mixed infections and culture-negative cases.

Abstract No.: 206444

Clinical Profile and Surgical Outcomes of Acute Postoperative Candida Cluster Endophthalmitis

First Author: Naresh Babu **KANNAN**

Co-Author(s): Vignesh **ELAMURUGAN**, Veerasasari Jawahar **SATYA BABU**, Muthukrishnan **VALLINAYAGAM**

Purpose: To study the clinical profile and surgical outcomes of Candida pelliculosa cluster endophthalmitis following cataract surgery in twelve eyes.

Methods: A cluster of twelve eyes of ten patients with endophthalmitis, after uncomplicated phacoemulsification with IOL implantation, was referred. Core vitrectomy with intraocular lens (IOL) explantation and intravitreal injection of Vancomycin, Ceftazidime, and Voriconazole was done. The explanted IOL-bag complex and vitreous samples were sent for microbiology. Minimum follow-up was three months.

Results: The mean interval from surgery to presentation was 28.03 days. Presenting symptoms were mild pain, redness and minimal visual diminution. Mean presenting best corrected visual acuity (BCVA) was 20/40 (0.3 LogMAR). Mild congestion and keratic precipitates in all. Three eyes had infiltrates in the corneal tunnel. Fluffy capsular plaque, IOL deposits, and severe vitritis in all eyes, with a string of pearls in

two eyes. There was no retinitis. Silicone oil was not used as a tamponade. Explanted IOL-bag complexes were culture positive for Candida pelliculosa. IOLs used were monofocal from the same manufacturer. All other consumables were culture-negative. Mean post-operative BCVA was 20/60 (0.48 LogMAR), which was unaltered at three months. No statistically significant difference was found between initial presenting BCVA and final BCVA ($p=0.718$).

Conclusions: Candidal postoperative endophthalmitis presents with a relatively delayed onset with innocuous signs. Presentation with deceptively good baseline visual acuity should not cause dismissal of the diagnosis, and a high index of suspicion must be maintained. Prompt vitrectomy with explantation of the IOL provides excellent visual rehabilitation.

Abstract No.: 205603

Clinical Study on the Efficacy of Anti-VEGF Therapy Combined With Triamcinolone Injection for Diabetic Macular Edema

First Author: Bo **QIN**

Co-Author(s): Deshuang **LI**, Dongcheng **LIU**

Purpose: To investigate the efficacy and safety of anti-VEGF therapy combined with intravitreal triamcinolone injection in patients with diabetic macular edema.

Methods: Prospective study. Sixty-seven patients (67 eyes) with DME were enrolled and randomly assigned to either the aflibercept group or the aflibercept plus TA group using a random number table. Patients received monthly intravitreal aflibercept injections or aflibercept combined with intrafascial triamcinolone (TA) injections for 3 consecutive months. The following parameters were observed and compared between groups before treatment and after each treatment: best-corrected visual acuity (BCVA), central macular thickness (CMT), length of retinal inner layer disorganization (DRIL), height of subretinal fluid (SRF), number of hyperreflective foci (HRF), area of foveal avascular zone (FAZ), superficial vascular density (SVD), and deep vascular density (DVD).

Results: (1) Visual acuity improved significantly in both the aflibercept group and the aflibercept plus TA group compared to baseline. Comparison between the two groups showed no statistical significance after the first treatment ($P = 0.17$), statistical significance after the second treatment ($P < 0.05$), and marked statistical significance after the third treatment ($P < 0.01$). (2) Mean choroidal thickness (CMT) decreased significantly in both the aflibercept group and the aflibercept plus TA group compared to baseline. Intergroup comparisons showed significant differences after the first and second treatments ($P < 0.01$), but no significant difference after the third treatment ($P = 0.73$).

Conclusions: (1) After treatment, the apixaban plus TA group demonstrated superior outcomes compared to the apixaban group in terms of BCVA improvement, DRIL reduction, SRF reduction height, and HRF reduction count. (2) Although no statistically significant difference in CMT thickness was observed between groups after the final treatment, the aflibercept plus TA group achieved a more rapid reduction in CMT thickness in DME patients at an earlier stage. This facilitated better restoration of retinal interlayered structures and yielded superior retinal anatomical benefits.

Abstract No.: 202301

Clinical Characteristics of Familial Exudative Vitreoretinopathy in a Large Cohort of Southwest China

First Author: Yiliu YANG

Co-Author(s): Fang LU

Purpose: To establish a clinical database for familial exudative vitreoretinopathy (FEVR) in Southwest China and analyze its clinical characteristics.

Methods: A retrospective study was conducted using clinical data from FEVR patients admitted to our hospital over the past 10 years. Disease staging and distinctive clinical features were analyzed.

Results: A total of 592 eyes from 296 patients were included. Males outnumbered females by approximately 2:1. Stage 1 and 2 eyes all showed increased retinal vascular branching. Notably, 35.6% of stage 1 and 44.4% of stage 2 eyes exhibited tortuous anastomotic vessels, most frequently in the temporal retina ($P < 0.05$). In stage 3 eyes, the mean macular-to-disc distance was 4.5 (4.0, 5.0) disc diameters. Across all stages, 5.1% of patients had monocular involvement, 21.6% showed an interocular difference ≥ 3 stages, and 21.6% had bilateral advanced disease (stage 4–5). Visual impairment and blindness increased significantly in stages 3–5 ($P < 0.05$). Surgical intervention was performed in 49.5% of stage 3, 58.6% of stage 4, and 78.7% of stage 5 eyes. Additionally, 17.2%, 19.8%, and 33.3% of eyes in stages 3, 4, and 5 underwent two or more treatments, respectively.

Conclusions: FEVR is not rare in Southwest China. Advanced stages severely affect vision. While most early-to-mid stage patients stabilize with treatment, stage 5 often requires multiple surgeries with limited functional improvement.

Abstract No.: 204112

Comparative Efficacy of Subretinal Versus Intravitreal T-PA Injection in the Surgical Management of Submacular Hemorrhage

First Author: Xiang MA

Co-Author(s): Cong MA, Naiwen ZHANG

Purpose: To evaluate the clinical outcomes of pars plana vitrectomy (PPV) with subretinal t-PA injection compared to intravitreal t-PA injection in patients with submacular hemorrhage (SMH).

Methods: A retrospective study was conducted. Group A underwent PPV, internal limiting membrane (ILM) peeling, subretinal t-PA injection (38/41G), intravitreal gas tamponade, and anti-VEGF therapy. Group B received intravitreal t-PA injection, gas tamponade, and anti-VEGF therapy. Best-corrected visual acuity (BCVA) and central subfield thickness (CST) were compared at 4–6 months postoperatively.

Results: Both groups achieved significant displacement of hemorrhage. However, Group A demonstrated superior outcomes in BCVA improvement at 5 and 6 months, as well as significantly reduced CST values at 4–6 months. Subretinal t-PA injection reduced the frequency of postoperative anti-VEGF treatments. In a subset followed for 6 months, baseline BCVA (16.36 ± 9.19 letters) improved to 64.91 ± 13.64 , and baseline CST ($656.95 \pm 98.60 \mu\text{m}$) decreased to $261.82 \pm 15.89 \mu\text{m}$.

Conclusions: Both intravitreal and subretinal t-PA effectively displace submacular hemorrhage, but PPV with subretinal t-PA provides better visual and anatomical outcomes with reduced need for anti-VEGF therapy. Surgical strategy should be individualized based on hemorrhage onset, extent, and severity, with optimal timing at 7–10 days post-hemorrhage. Careful postoperative monitoring remains essential.

Abstract No.: 203949

Corneal Stromal Lenticule Transplantation for Covering Macular Hole During Vitrectomy

First Author: Wenting DING

Co-Author(s): Yongping HU, Di LI, Xiaoxiao QIAN, Yile XU

Purpose: To describe an innovative surgical technique for pathologic myopia and macular holes accompanied by retinal detachment using allogeneic corneal stromal lenticule transplantation combined with pars plana vitrectomy.

Methods: The allogeneic corneal stromal lenticule was harvested through small incision lenticule extraction (SMILE) and stored at -30°C in advance. After pars plana vitrectomy, an allogeneic corneal stromal lenticule was thawed, trimmed into approximately $60 \mu\text{m}$ thick and $100 \mu\text{m}$ larger than the macular hole and transferred to cover the macular hole through the

troc. Autologous whole blood was dripped to seal the corneal stromal lenticule. The vitreous cavity was then filled with perfluoropropane (C3F8) or sterile air.

Results: The technique was performed on three eyes of three patients. The mean postoperative follow-up period was 77.3±50.0d. Postoperatively, the macular hole of all eyes was restored. All patients' visual acuities also improved. No complications occurred during the follow-up period.

Conclusions: The innovative corneal stromal lenticule transplantation technique provides convenient operations, less surgical invasion, effective results, and reliable safety for macular hole repair during follow-up time.

Abstract No.: 203111

Delayed Closure of Idiopathic Macular Hole Following Vitrectomy and Superior Internal Limiting Membrane Flap Coverage

First Author: Yanhua CHU

Purpose: To investigate the clinical characteristics of delayed closure of idiopathic macular holes following vitrectomy with superior internal limiting membrane coverage and gas tamponade.

Methods: A retrospective analysis was conducted on 85 cases of idiopathic macular hole treated with vitrectomy combined with inferior ILM peeling and superior ILM flap coverage, along with air tamponade at our institution from October 2022 to November 2024. Delayed closure was defined as hole closure occurring only after complete gas absorption. Visual acuity changes were defined as an improvement of ≥2 lines on the Snellen chart. Comparative analysis of clinical characteristics was performed between the study groups.

Results: The hole closure rate was 100%. Delayed closure occurred in 9 cases (10.59%), with a mean disease duration of 12.97 weeks, postoperative best-corrected visual acuity (logMAR) of 0.48±0.17, and hole closure time ranging from 21 to 67 days (mean 38.4 days). No significant differences were observed in the macular hole index and drawbridge index between the two groups. ILM wrinkling was observed in 7 cases (77.78%) in the delayed closure group, compared to 40.74% in the non-delayed closure group.

Conclusions: ILM wrinkling may serve as the primary cause of delayed closure in IMH, independent of the size and configuration of the MH.

Abstract No.: 205570

Dissociated Optic Fibre Layer (DONFL): Diagnostic Methods and Correlation With Surgical Techniques

First Author: Yui Yan Veronica LI

Co-Author(s): Sunny AU

Purpose: DONFL is a structural change seen as retinal dimpling on fundus photos or arcuate macular striae on ophthalmoscopy. It has been postulated to be due to the traction of ILM peeling in vitreoretinal surgeries, causing damage to Muller cells, or resulting from the macular healing and reorganization processes. Primary endpoint: To understand how various surgical techniques correlate with the incidence of DONFL. Secondary endpoint: To understand current diagnostic methods for DONFL.

Methods: A literature review was conducted via PubMed on 23/9/2025 with keywords 'DONFL diagnosis', 'DONFL imaging', 'DONFL surgery', 'DONFL ERM', and 'DONFL macular hole'. For the primary endpoint, studies with primary data on the incidence of DONFL and the comparison between surgical techniques were extracted. For the secondary endpoints, we included studies which mention the diagnostic method used for DONFL. Case reports were excluded.

Results: Optical Coherence Tomography (OCT) was used in 13 studies (n=1076) of which Spectral-domain OCT was most common (n=605). Fundus photographs were used in 10 studies (n=460). A combination of OCT and fundus photographs was used in 3 studies (n=387). Adaptive optics scanning laser ophthalmoscope (AO-SLO) was used in 1 study (n=17). ILM peeling correlated with DONFL incidence (OR=111, p<0.001, n=482). The correlation with the ILM peeling technique, such as the forceps pinch-peel technique, diamond dusted membrane scraper or a combined technique, was not statistically significant (p>0.05). The use of conventional microscopy correlated with DONFL incidence compared to three-dimensional heads-up vitrectomy (OR=1.98, p<0.05, n=534). The use of intravitreal gas tamponade correlated with DONFL incidence (OR=2.33, p=0.038, n=296). The correlation with combined phacovitrectomy (OR=1.50 p=0.16, n=830), the use of Indocyanine green (OR=2.4; p=0.052, n=296) and a perfluorocarbon bubble (Adjusted OR=0.119, p=0.07, n=296) were statistically insignificant.

Conclusions: ILM peeling and the use of intravitreal gas tamponade correlate strongly with the incidence of DONFL. Three-dimensional heads-up vitrectomy correlates negatively with the incidence of DONFL. OCT remains the most common imaging modality for DONFL.

Abstract No.: 205805
Effects of Inner Limiting Membrane (ILM) Peel on Central Retinal Thickness Following Vitrectomy Surgery for Diabetic Eye Disease: A 12-Month Retrospective Case Series Review

First Author: Ker Yin **TOH**

Co-Author(s): Maheshwar **BAKTHAVATSALU**, Siddharth **SUBRAMANI**, Tun Hang **YEO**

Purpose: To evaluate differences in central retinal thickness 12 months after vitrectomy for diabetic eye disease, comparing patients who underwent inner limiting membrane (ILM) peeling with those who did not.

Methods: Retrospective case review.

Results: Records of 23 patients (13 male, 10 female; mean age 54.7 years) were reviewed, divided into ILM peel (n=8) and no peel (n=15) groups. Patients lacking optical coherence tomography (OCT) within 4 months pre-op or 11–14 months post-op, or with confounding factors such as macular oedema, vitreomacular traction, epiretinal membrane, and fovea involving tractional detachments, were excluded. In the ILM peel group, mean retinal thicknesses were 174 μ m (minimum), 199 μ m (average), and 249 μ m (maximum) preoperatively, and 182 μ m, 201 μ m, and 239 μ m at 1 year, respectively. These changes were not statistically significant ($p = 0.233, 0.123, 0.199$). In the no ILM peel group, preoperative retinal thicknesses were 219 μ m (minimum), 230 μ m (average), and 256 μ m (maximum), compared with 217 μ m, 235 μ m, and 253 μ m at 1 year. These changes were not statistically significant ($p = 0.432, 0.345, 0.276$). Preoperative measurements showed no significant group differences in minimal ($t = 1.56, p = 0.146$), average ($t = 1.74, p = 0.090$), or maximum thickness ($t = 1.92, p = 0.061$). Postoperatively, no significant differences were found in minimal ($t = 0.16, p = 0.878$), average ($t = 0.25, p = 0.803$), or maximum thickness ($t = 0.47, p = 0.636$).

Conclusions: Combining ILM peel during diabetic vitrectomy surgery does not significantly affect the central retinal thickness at 1 year. Further larger studies with visual outcome analyses will be beneficial.

Abstract No.: 202692
Efficacy of Intraoperative OCT-Guided 41G Microneedle Drainage for Drusenoid PED

First Author: Shuai **SHENG**

Purpose: To assess intraoperative OCT-guided 41-gauge retinal microneedle drainage for drusenoid pigment epithelial detachment (PED).

Methods: Thirty eyes with confirmed drusenoid PED (excluding other types via OCTA/angiography) were randomized: Group A (15 eyes) underwent vitrectomy with intraoperative OCT-guided subretinal fluid aspiration using a 41G needle at the PED edge. Group B

(15 eyes) received intravitreal anti-VEGF injections only. Preoperative assessments included BCVA (Snellen), central retinal thickness (CRT), foveal PED height/width (OCT), and PED area (SLO). Outcomes (complete/partial/no resolution based on foveal PED height change) were compared at 6 months, along with BCVA, CRT, and PED dimensions.

Results: Groups had similar baseline characteristics. At 6 months, Group A showed significantly higher complete PED resolution (9 eyes vs. 2 eyes in B) and lower no resolution (1 eye vs. 6 eyes). Differences were statistically significant.

Conclusions: Intraoperative OCT-guided 41G microneedle drainage effectively resolves drusenoid PED, improving BCVA and reducing CRT/PED parameters, potentially mitigating long-term vision loss. Real-time OCT guidance enhances safety, offering a promising new treatment.

Abstract No.: 202192
Efficacy of Vitrectomy Combined With Intravitreal Conbercept for Treatment of Vitreous Hemorrhage in Proliferative Diabetic Retinopathy: A Prospective Cohort Study Based on QILIN I Study

First Author: Mengyu **LIAO**

Co-Author(s): Hua **YAN**

Purpose: To evaluate the efficacy of intravitreal conbercept (IVC) combined with pars plana vitrectomy (PPV) in patients with vitreous hemorrhage (VH) due to proliferative diabetic retinopathy (PDR) in real-world practice.

Methods: This prospective, observational, multicenter cohort study enrolled 561 patients with VH due to PDR from 26 hospitals between August 2022 and June 2024. Participants were assigned to: (1) preoperative IVC (0.5 mg conbercept 3–7 days before PPV), (2) intraoperative IVC (0.5 mg conbercept at PPV completion), or (3) PPV alone as control. The primary outcome was the incidence of early postoperative VH (POVH, 7–30 days). Secondary outcomes included late POVH (30–180 days), best-corrected visual acuity (BCVA), and POVH severity.

Results: Of 425 enrolled participants (425 eyes), 406 completed the 30-day visit, and 341 completed the 180-day visit. Early POVH incidence was 24.0% (preoperative IVC) vs 23.2% (intraoperative IVC), compared to 37.6% (control; $p=0.016$ and $p=0.012$, respectively). Late POVH incidence was 11.9% (preoperative IVC) vs 17.5% (intraoperative IVC), compared to 17.8% (control; $p=0.4109, 0.4661$, respectively). Early POVH was less severe in both IVC groups versus control ($p=0.0067, 0.0304$); late POVH severity was comparable ($p=0.4860, 0.8353$). Mean BCVA improved in all groups without significant intergroup differences.

Conclusions: This QILIN study, with the largest participants to date, demonstrates that preoperative or intraoperative IVC effectively reduces early POVH incidence, rather than late POVH. IVC combined with PPV is effective in managing VH due to PDR. Preoperative IVC may be preferable for patients with more severe baseline cases.

Abstract No.: 202600

Evaluation of Intraocular Pressure Control During Vitrectomy With a Newly Developed Surgical Platform

First Author: Iori **WADA**

Co-Author(s): Yuichiro **ISHIDA**, Motohiro **KAMEI**, Naomichi **OHATA**, Kotaro **TSUBOI**

Purpose: The newly developed UNITY VCS system incorporates an independent irrigation/infusion pump capable of real-time monitoring, enabling stabilization of intraocular pressure (IOP) during fluctuations caused by leakage or infusion changes. This study aimed to evaluate the effectiveness of its IOP control function during vitrectomy.

Methods: Porcine eye models underwent 25- and 27-gauge core vitrectomy. IOP fluctuations with and without IOP control were recorded using an integrated pressure monitoring device. Surgical settings included cut rates of 20,000 and 30,000 cuts/min and a vacuum of 700 mmHg. In addition, comparisons were performed with a widely used vitrectomy platform, the Constellation vision system, under identical conditions.

Results: The IOP control group demonstrated significantly smaller IOP fluctuation amplitudes compared with the no-control group (4.6 ± 2.9 mmHg vs. 13.9 ± 9.5 mmHg, $p = 0.0019$). Recovery time to baseline IOP was also significantly shorter (3.9 ± 3.4 s vs. 16.0 ± 12.8 s, $p = 0.021$). Furthermore, compared with the established platform, the new system exhibited significantly smaller IOP fluctuations (4.6 ± 2.9 mmHg vs. 14.6 ± 0.3 mmHg, $p = 0.0018$). No significant differences were observed between 25- and 27-gauge settings or between cut rates of 20,000 and 30,000 cuts/min.

Conclusions: The IOP control function of the UNITY VCS system effectively minimized intraoperative IOP fluctuations and allowed rapid recovery to baseline values. Compared with an established vitrectomy platform, this system provided superior stability and suggests potential advantages for improving surgical safety and reliability.

Abstract No.: 206396

Evaluation of Prone vs Supine Positioning in Fresh Rhegmatogenous Retinal Detachment Treated With Pars Plana Vitrectomy and Gas

First Author: Vinod **KUMAR**

Co-Author(s): Anushka **AGARWALLA**, Rohan **CHAWLA**, Rajpal **VOHRA**

Purpose: To compare Supine versus Prone positioning in fresh rhegmatogenous retinal detachments (RRDs) treated with vitrectomy and gas tamponade.

Methods: This was a prospective randomized controlled trial of 72 eyes with fresh RRD who underwent 25-gauge vitrectomy. 37 eyes were allotted the supine position, and 35 were allotted the prone position. Cases were evaluated for single surgery reattachment rates, best corrected visual acuity (BCVA), intraocular pressure (IOP), cataract formation, and any complications. The patients were followed up for a period of 3 months.

Results: Both groups had similar demographics, and no significant difference was found between the two groups in terms of the extent of retinal detachment, position, and number of breaks. The anatomical success after single surgery was 97.3% in the Supine group and 94.3% in the Prone group ($p=0.609$). The BCVA at the end of 3 months was 0.44 ± 0.27 in the Supine group and 0.35 ± 0.27 in the Prone group ($p=0.119$) with a significant increase in BCVA preoperatively from 0.11 ± 0.22 and 0.13 ± 0.22 in the Supine and Prone groups, respectively ($p < 0.001$). The IOP in the two groups was comparable at each follow-up. The rates of cataract formation were also similar in the two groups - 60% and 53.8% in the Supine and Prone groups, respectively ($p=1.00$). Complications such as spikes in IOP, epiretinal membrane formation, cystoid macular oedema etc were similar in both groups.

Conclusions: Rates of retinal reattachment were comparable in both groups, showing that supine position is equally safe and effective for adequate tamponade.

Abstract No.: 203887

Fibrin Glue Assisted Vitrectomy for Inferior Retinal Detachment With Inferior Break: A Case Series

First Author: Kiet Phang **LING**

Co-Author(s): Chin Sern **CHAN**, Choon Teng **CHAN**, Wee Min **TEH**, Wilson Jun Jie **WONG**

Purpose: Inferior rhegmatogenous retinal detachment (RRD) presents a significant surgical challenge. Achieving a lasting tamponade of inferior breaks often requires prolonged postoperative positioning with silicone oil or gas, which delays visual recovery and increases morbidity. This case series explores the use of fibrin glue as an adjuvant to air tamponade in

managing inferior RRD, aiming to circumvent the need for prolonged tamponade.

Methods: We included 9 eyes of 9 patients who had inferior retinal detachment during the period of December 2023 to June 2025. All 9 patients were treated with 25-gauge pars plana vitrectomy and the application of fibrin glue (Artiss, Baxter) into the break under air after laser photocoagulation.

Results: The median age of patients was 45.2 (range, 15-70) years, and the median duration of symptoms was 14 (range, 3-90) days. Air tamponade was used in 4 eyes (44.4%), and 6 patients (66.7%) did not require head posturing post-operatively. 8 out of 9 patients achieved primary anatomical success, and 1 patient required a second surgery at 2 weeks. All 9 (100%) showed a clear improvement in visual acuity. 2 out of 4 phakic eyes developed cataract, and 1 patient developed epiretinal membrane.

Conclusions: The adjunctive use of fibrin glue to secure inferior retinal breaks appears to be a safe and highly effective technique, allowing for the use of short-acting air tamponade instead of prolonged gas or silicone oil. This technique facilitates rapid visual rehabilitation, and it represents a promising option for complex inferior retinal detachments, though larger comparative studies are warranted.

Abstract No.: 206166

Foldable Capsule Body Scleral Buckling Technique Under Indirect Ophthalmoscopy: a Novel Technique for Treating Relatively Posterior Retinal Breaks

First Author: Hong WU

Co-Author(s): Yan CHENG, Xinyu LIU, Zaoxia LIU, Xiaomeng ZHANG

Purpose: To describe a foldable capsule body (FCB) scleral buckling technique under indirect ophthalmoscopy for treating rhegmatogenous retinal detachment (RRD) with relatively posteriorly located breaks. It overcomes the limitation of conventional scleral buckling, which cannot address posterior pole breaks and solely relies on pars plana vitrectomy (PPV), thereby offering a more precise, minimally invasive, and refractive-function-preserving alternative for such RRDs.

Methods: The novel technique was conducted on 2 cases (2 eyes) diagnosed with RRD. During surgery, the FCB was inserted into a pre-set scleral tunnel. Under indirect ophthalmoscopy, the balloon position and inflation were adjusted to ensure the hole was positioned on the balloon buckle. Postoperative laser photocoagulation was applied around the breaks. The balloon was removed after retinal reattachment was achieved.

Results: Postoperative retinal reattachment was observed in 2 eyes. During follow-up, the visual acuity

improved, with no changes in refractive status and visual function.

Conclusions: This novel technique represents a breakthrough in the treatment of posterior pole hole-related RRD compared to conventional scleral buckling, addressing challenges previously manageable only by PPV. It allows precise intraoperative localization of retinal breaks and improves the primary surgical success rate. Moreover, it is minimally invasive, straightforward to perform, and eliminates the requirements for scleral cryotherapy or subretinal fluid drainage. Importantly, the surgery has minimal impact on visual function and refractive status. It offers a more accurate and practical alternative for patients with posteriorly located retinal breaks who are unsuitable for conventional scleral buckling.

Abstract No.: 202605

Gene Therapy for Bietti Crystalline Corneoretinal Dystrophy: A Phase 1/2 Clinical Trial

First Author: Xiaorong LI

Purpose: We report the initial findings from the first phase 1/2 clinical trial (NCT05832684) evaluating the safety and efficacy of ZVS101e in BCD patients.

Methods: In this phase 1/2, open-label, single-arm study, eleven patients with BCD were enrolled and assigned to phase 1 (dose-escalation, low: 7.5×10^{10} vg/eye, n=3; medium: 1.5×10^{11} vg/eye, n=3; high: 2.2×10^{11} vg/eye, n=1) and phase 2 (dose-expansion, low dose, n=4) to receive a single subretinal injection of ZVS101e in the worse eye. Oral prednisone was given from 3 days before the subretinal injection and continued for 12 days. Safety was assessed by monitoring adverse events and dose-limiting toxicity. Efficacy was evaluated using best-corrected visual acuity (BCVA), visual function questionnaire (VFQ-25), optical coherence tomography (OCT), and multi-luminance mobility testing (MLMT).

Results: Over 365 days of follow-up, ZVS101e showed a favourable safety profile, with no dose-limiting toxicities or drug-related serious adverse events. The mean change in BCVA from baseline was -0.28, -0.08, and 0 LogMAR for the low, medium, and high dose groups, respectively (equivalent to improvements of 14, 4, and 0 letters). In the low-dose group, 50% (3/6) of participants had a visual acuity improvement of ≥ 15 letters, with a maximum improvement of 34 letters. Functional assessments, including the multi-luminance mobility test (MLMT) and the Visual Function Questionnaire-25 (VFQ-25), along with retinal structure, demonstrated consistent improvements.

Conclusions: These results highlight ZVS101e's therapeutic potential for BCD, supporting further clinical development.

Abstract No.: 201928

Immediate Sequential Bilateral Vitreoretinal Surgery for Management of Advanced Retinopathy of Prematurity

First Author: Simar Rajan SINGH

Co-Author(s): Deeksha KATOCH, Manu SHARMA

Purpose: To determine the safety and efficacy of immediate sequential bilateral vitreoretinal surgery (ISBVS) in advanced Retinopathy of prematurity (ROP).

Methods: This retrospective, interventional study included infants who underwent ISBVS under general anaesthesia for advanced ROP at a tertiary care institute in Northern India between June 2021 and January 2025, with a minimum follow-up of 3 months. Three-port vitrectomy was done. Both eyes were operated on in the same anaesthesia session. Outcomes in terms of systemic / ocular complications and anatomical success were noted.

Results: Fifty-five eyes of 28 babies underwent ISBVS during this period. There were 19 (67.86%) males with a mean birth weight of 1188±441.625 grams and a mean period of gestation of 29.69±2.516 weeks. Sixteen (29.09%) eyes had stage 4A, 36 (65.45%) eyes had stage 4B, 2 (3.64%) eyes had stage 5, and 1(1.81%) had Vitreous haemorrhage. Lens-sparing vitrectomy was performed in 50(90.91%) eyes and lensectomy-vitrectomy in the remaining 5 (9.09%) eyes. Laser photocoagulation was done in all the eyes before surgery, except for stage 5 ROP. Two babies had anaesthesia-related complications, and the procedure was abandoned after surgery on one eye in one baby due to systemic instability. No case of endophthalmitis was noticed. Post-operative ocular complications included hypotony in 2 (3.64%) eyes, choroidals in 1(1.81%), loose blood in 7(12.73%), re-surgery in 4 (7.27%) eyes.

Conclusions: ISBVS is a safe and effective option for treating advanced ROP, which warrants urgent bilateral management without the increased risks of repeated anaesthesia sessions.

Abstract No.: 204111

Impact of Subretinal Balanced Salt Solution Injection on the Removal of Foveal Hard Exudates and Fluid in Patients With Refractory Diabetic Macular Edema

First Author: Xiang MA

Co-Author(s): Cong MA, Naiwen ZHANG

Purpose: To assess anatomical and functional outcomes of subretinal balanced salt solution (BSS) injection during vitrectomy for the removal of foveal hard exudates in refractory diabetic macular edema (DME).

Methods: A retrospective study of 6 patients (7 eyes) with refractory DME treated between March 2021

and May 2023. All underwent vitrectomy with internal limiting membrane peeling, gas/air tamponade, and subretinal BSS injection via 38G cannula. Follow-up was ≥6 months. Outcomes included best-corrected visual acuity (BCVA), central retinal thickness (CRT), and submacular hard exudate area.

Results: Patients were all female, with a mean age of 64.2 years, and had prior panretinal photocoagulation and cataract surgery. Significant clearance of foveal hard exudates was observed at 1, 3, and 6 months postoperatively. At final follow-up, 85.7% of eyes showed BCVA improvement ≥3 lines, with mean LogMAR VA improving from 0.97 ± 0.23 to 0.51 ± 0.31. Mean CRT changed from 189 ± 53 µm to 218 ± 53 µm. No recurrence of hard exudates or macular edema was detected.

Conclusions: Subretinal BSS injection during vitrectomy is a safe and effective adjunct for clearing foveal hard exudates in refractory DME, leading to visual improvement and stable anatomical outcomes. This approach may be considered in persistent DME with extensive exudates.

Abstract No.: 207287

Individualized Treatment Approach for Acute NAION: Visual Outcomes of 27-Gauge Microincision Vitrectomy Surgery in Patients With Peripapillary Wrinkles

First Author: Shuo SUN

Co-Author(s): Xiaorong LI

Purpose: To assess the potential therapeutic efficacy of 27-gauge microincision vitrectomy surgery (MIVS) in patients with acute NAION presenting with peripapillary wrinkles (PPWs).

Methods: In this prospective, nonrandomized, controlled study, acute NAION patients within 1 month of onset were classified based on swept-source optical coherence tomography (SS-OCT) findings into two groups: those with PPWs (n=33) and those without PPWs (n=13). Within the PPWs group, 21 patients underwent 27-gauge MIVS, while 12 received drug treatment. All 12 patients without PPWs received drug treatment. Visual outcomes were evaluated at 1 week, 2 weeks, and 1 month. Peripapillary vascular density was additionally assessed using optical coherence tomography angiography (OCTA). Safety was evaluated by adaptive optics scanning laser ophthalmoscopy (AOSLO).

Results: At the end of follow-up, 18 patients with PPWs who underwent MIVS, 12 with PPWs who received drug treatment, and 12 without PPWs who received drug treatment completed the study. Patients with PPWs undergoing MIVS showed significantly greater improvements in BCVA, MD, and VFI at all follow-up intervals compared with those receiving drug therapy alone. Moreover, patients without PPWs

treated with drugs achieved significant visual gains at 1 month, outperforming the PPWs+drug group. At 1 month, OCTA revealed a significant recovery of peripapillary vascular density in the PPWs+MIVS group compared with others. AOSLO assessments revealed no postoperative structural damage to photoreceptors or retinal nerve fiber layers.

Conclusions: Our findings suggest that 27-gauge MIVS could provide both visual and vascular benefits in acute NAION patients with PPWs, while medical therapy may be more effective in those without PPWs.

Abstract No.: 201665

Innovation in Action: First Sutureless Buckling–Vitreotomy for Retinal Detachment in PNG

First Author: Muhammad IMRAN

Purpose: To study the surgical outcome of sutureless scleral buckling with vitrectomy in patients with advanced combined detachment.

Methods: A patient presented with vasculitis-induced combined retinal detachments for 5 years. The patient had a funnel configuration detachment due to anterior proliferation. There was peripheral anterior PVR, which reflected the indication for advanced vitrectomy. We decided to perform the scleral buckling by the tunnel technique. We applied band, performed vitrectomy, and also did some peripheral retinotomies to cut the subretinal fibrotic bands.

Results: On the next day follow-up, the retina was flat. Her corrected vision was counting fingers, and she was able to walk independently.

Conclusions: If we modify the technique and use a sutureless technique for scleral buckling, then it would be the optimal management and of course a more time-saving technique

Abstract No.: 204439

Internal Limiting Membrane Flap Versus Conventional Peeling for Idiopathic Full-Thickness Macular Holes: A Registry Analysis of 2990 Eyes

First Author: Zi JIN

Co-Author(s): Fred K. CHEN, Rohan ESSEX, Adrian T. FUNG, Mohammad A. HONARDOOST, Ee Lin ONG

Purpose: The internal limiting membrane (ILM) flap technique was introduced to treat large (>400 μ m) full-thickness macular holes (FTMHs). Controversy exists regarding the benefits of the ILM flap compared to conventional peeling. To address this, we used a binational registry database to assess the anatomical and functional outcomes of the ILM flap in idiopathic FTMHs.

Methods: A retrospective cohort study was performed using the Australian and New Zealand Society of Retinal Specialists (ANZSRS) Registry between October 2006 and November 2023. Patients underwent either ILM flap (ILM-F) or conventional ILM peeling (ILM-P). The outcome measures were hole closure rate and best corrected visual acuity (BCVA) change at 3 months. Propensity score weighting and multivariable regression analysis were performed to adjust for baseline characteristics and covariates (surgeon grade, lens status, and follow-up duration).

Results: A total of 2990 eyes from 2905 patients were included (mean age 69 ± 9 years). 119 eyes underwent ILM-F and 2871 underwent ILM-P. The median hole size was 300 μ m (IQR, 200–422 μ m). On weighted multivariable regression analysis, ILM-F showed higher odds of hole closure compared to ILM-P (OR = 2.97, 95% CI: 1.08 – 8.20, $p = 0.04$). No significant difference in BCVA gain was observed at 3 months ($p = 0.08$). The effects of ILM-F compared to ILM-P were consistent across hole size groupings: small/medium (≤ 400 μ m), large (401–550 μ m), and X-large + (>550 μ m).

Conclusions: Although ILM-F was more effective than ILM-P in achieving FTMH closure, it provides no additional visual acuity benefit.

Abstract No.: 208169

Intraoperative Fluorescein Angiography-Guided Optimization of Preoperative Anti-VEGF Timing in Proliferative Diabetic Retinopathy: A Randomized Controlled Trial

First Author: Ruolan LING

Co-Author(s): Jie LI, Siyu QUAN, Xi WANG, Jie ZHONG

Purpose: To assess the optimal preoperative time of intravitreal injection of anti-VEGF agents for proliferative diabetic retinopathy (PDR).

Methods: This study was exploratory in nature. Patients were randomly assigned to three groups based on the timing of preoperative intravitreal anti-VEGF therapy: Group A (3 days preoperatively), Group B (7 days preoperatively), and Group C (14 days preoperatively). Intraoperative fluorescein angiography (IOFA) was used to observe the number and size of retinal neovascularization. Subsequently, participants were managed at the clinician's discretion and scheduled for a 3-month follow-up visit.

Results: A comparative analysis of intraoperatively observed neovascularization (NV) demonstrated significant differences in both NV count and size across the groups. Group A exhibited a mean NV count of 2.30 ± 1.72 and an NV size of 2.92 ± 3.33 Papillary Diameter (PD), whereas Group B showed markedly reduced values (0.95 ± 1.10 for count and 0.72 ± 0.81 PD for size), and Group C similarly displayed lower measurements (1.05 ± 1.47 for count and 1.00 ± 1.73 PD for size). Compared to Group A, Group B achieved

a 58.7% reduction in NV count ($p = 0.005$) and a 75.3% reduction in NV size ($p = 0.003$), while Group C demonstrated a 54.3% decrease in NV count ($p = 0.009$) and a 65.8% decrease in NV size ($p = 0.008$). However, no statistically significant differences were observed between Group B and Group C in either NV count ($p = 0.828$) or NV size ($p = 0.687$).

Conclusions: Quantitative analysis demonstrated that intravitreal injections administered at 7-day and 14-day preoperative intervals achieved significantly greater regression in both neovascularization number and size compared to the 3-day protocol.

Abstract No.: 206454

Intravitreal tPA for Sub-Internal Limiting Membrane Hemorrhage in Pediatric Acute Myelocytic Leukemia: A Novel Therapeutic Strategy

First Author: Aoxiang **WANG**

Co-Author(s): Yu **TIAN**

Purpose: This study aimed to evaluate the safety and efficacy of intravitreal tissue plasminogen activator (tPA) for sub-internal limiting membrane (sub-ILM) hemorrhage in pediatric acute myelocytic leukemia (AML) patients and explore its potential as a minimally invasive alternative to traditional pars plana vitrectomy.

Methods: A retrospective case series included 3 pediatric AML patients (4 eyes) with sub-ILM hemorrhage confirmed by optical coherence tomography (OCT) and fundus examination, all presenting with visual acuity $\leq 20/200$ and leukemic retinopathy. Intravitreal tPA (20 μg in 0.1 mL sterile solution) was administered under topical anesthesia, with 1–2 injections per eye (mean 1.25). Post-injection management included supine positioning and prophylactic antibiotics.

Results: Follow-up from January to December 2024 (median 5 months) showed all 4 eyes achieved significant visual recovery: best-corrected visual acuity improved from finger counting/hand motion to $\geq 20/30$ within 1 month. Near-complete hemorrhage resolution occurred in 3 eyes after 1 injection, with 1 eye resolving after a second injection. OCT confirmed sub-ILM fluid resolution and retinal architectural restoration. No intraocular or systemic complications were observed.

Conclusions: Intravitreal tPA is a safe and effective minimally invasive treatment for pediatric AML-related sub-ILM hemorrhage, enabling rapid visual recovery without general anesthesia. This approach may serve as a first-line alternative to invasive procedures, though larger prospective studies are needed to confirm long-term outcomes.

Abstract No.: 206262

LUMIDENT: Do It Yourself Construction and Real-World Efficacy in Relation to Scleral Thickness

First Author: Prithvi **CHANDRAKANTH**

Co-Author(s): Shishir **VERGHESE**

Purpose: To evaluate the efficacy of Lumi-Indent, a novel do-it-yourself scleral indenter with integrated illumination, compared to conventional methods in enhancing examination quality and user satisfaction during retinal evaluations.

Methods: A prospective, randomised study over 10 months in a tertiary eye hospital involving 100 patients during vitreoretinal surgery. Lumi-Indent was created by inserting an endoilluminator (light source) into a disposable hypodermic needle cap, secured with sterile tape. The Lumi-Indent was used for scleral indentation at all quadrants to check for visibility of peripheral retina (score 1–4). Scleral Thickness Was Measured At All 4 Scleral quadrants using ASOCT at the Superior/Inferior/Nasal/Temporal areas and was compared to the transilluminated area. The results were compared, and analyses were done using SPSS and Microsoft Excel

Results: The results indicated 62.7%-normal scleral thickness, 11.4%-increased thickness, and 26%-less than normal thickness. Among cases, normal thickness Scores 1 to 4 were distributed 12%, 25%, 33%, and 30%, respectively. In increased scleral thickness -6%, 18%, 35%, 41%, reduced scleral thickness -23%, 38%, 21%, 18%. Quadrant-wise analysis: superior sclera scored 24%, 32%, 41%, 3%; temporal quadrant -15%, 34%, 39%, 12%; inferior quadrant -12%, 27%, 34%, 27%; nasal quadrant -19%, 36%, 38%, 7%. According to the above statistics, the order of scleral transillumination was found to be Superior>Nasal>Temporal>Inferior. Pre-op assessment with AS-OCT can be done to predict if scleral transillumination can be performed efficiently during VR surgery.

Conclusions: This pioneering clinical study using LUMIDENT is the first to compare scleral thickness with transillumination intensity during retinal examination. Lumident can be used by the surgeon as an illuminated scleral indenter without the help of an assistant for peripheral base shaving and for endolaser easily in cases with lower scleral thickness, which can be assessed preoperatively using ASOCT.

Abstract No.: 204280

Long-Term Outcomes Beyond 5 Years of Lens Capsular Flap Transplantation in the Management of Refractory Macular Hole

First Author: Mingyang **WANG**

Co-Author(s): Shipeng **GUO**, Dian **JIAO**, Jie **PENG**, Peiquan **ZHAO**

Purpose: To evaluate the visual and anatomical outcomes over five years following lens capsular flap

transplantation (LCFT) for the treatment of refractory macular hole (MH).

Methods: This retrospective series included 19 eyes with refractory MHs treated with LCFT between 2015 and 2019, followed for more than 5 years. Assessments included best-corrected visual acuity (BCVA), optical coherence tomography (OCT), fundus photography, and macular integrity assessment (MAIA) microperimetry. Lens Capsular Flap (LCF) thickness was measured in cases with clear delineation.

Results: Mean follow-up was 89.0 ± 13.5 months. At the last follow-up, 17 eyes (89.5%) achieved complete MH closure, one partial closure, and one MH recurrence. Median MH diameter was $1102 \mu\text{m}$. Mean logMAR BCVA improved significantly from 1.85 preoperatively to 1.32 at the last follow-up ($P=0.007$) and remained stable compared with 18 months postoperatively ($P=0.74$). OCT revealed subfoveal LCF structure in all patients and demonstrated gradual integration of the lens capsular flap (LCF) with surrounding tissue, with thickness remaining stable over time ($P = 0.308$). Five eyes developed hyperreflective subretinal scars, but BCVA was not significantly different from eyes without scarring. No immune rejection or ocular inflammation occurred. Eleven patients completed MAIA microperimetry, whereas only 2 eyes were able to complete the test preoperatively. Microperimetry revealed lower sensitivity in LCFT-treated regions but preserved function in the surrounding retina, with paracentral fixation commonly adopted.

Conclusions: LCFT provides durable MH closure and sustained visual improvement over 5 years. Subretinal LCF remains stable, with preserved peripheral retinal function despite localized scarring, supporting LCFT as a long-term effective treatment for refractory MH.

Abstract No.: 201412

Longitudinal Multi-Omics Profiling of Aqueous Humor Deciphers the Dual Therapeutic and Pro-Fibrotic Effects of Anti-VEGF Therapy in PDR.

First Author: Huang YUJUAN

Purpose: Preoperative anti-vascular endothelial growth factor (VEGF) therapy in proliferative diabetic retinopathy (PDR) can paradoxically worsen fibrovascular contraction, a significant clinical challenge. Since the molecular drivers are poorly understood, the dual molecular effects of anti-VEGF therapy were systematically investigated in this study.

Methods: Paired aqueous humor samples were prospectively collected from 25 PDR patients, categorized as either vitreous hemorrhage (VH; $n=13$) or VH with tractional retinal detachment (VH+TRD; $n=12$). An intersection analysis was performed to identify molecules significantly altered in both baseline (VH+TRD vs. VH) and post-treatment comparisons.

Results: Enrichment analysis implicated extracellular matrix and TGF- β pathways at baseline, and VEGF and inflammatory pathways post-treatment. Thirty-eight significant molecules were identified. Three «aggravation-type» molecules exhibited changes that worsened pathological dysregulation: CAST (upregulated, $P=0.030$), GALNS (downregulated, $P=0.046$), and 3-Hydroxypropanoic acid (downregulated, $P<0.001$). The remaining 35 molecules demonstrated an «improvement-type» pattern.

Conclusions: This study identifies distinct proteo-metabolomic signatures underlying the dual effects of preoperative anti-VEGF. The aggravation-type molecules, particularly CAST, GALNS, and 3-Hydroxypropanoic acid, provide a mechanistic basis for adverse fibrotic responses and potential biomarkers for risk stratification.

Abstract No.: 204516

Lyophilized Human Amniotic Membrane Covering for Macular Hole Retinal Detachment in High Myopia: A Randomized Clinical Trial

First Author: Wei LIN

Co-Author(s): Xiaoyan LIN, Yong WEI

Purpose: To evaluate the efficacy and safety of lyophilized human amniotic membrane (LhAM) covering for macular hole retinal detachment (MHRD) associated with high myopia.

Methods: This prospective randomized controlled trial enrolled 40 patients (40 eyes) with MHRD secondary to high myopia. Participants were randomly assigned to receive either LhAM covering (LhAM group, $n=20$) or internal limiting membrane peeling (ILM group, $n=20$). The AM group received C3F8 gas tamponade, while the ILM group received silicone oil tamponade. The outcomes included retinal reattachment rate, macular hole closure rate, visual improvement, and complications.

Results: Ultimately, 37 patients completed follow-up and were included in the efficacy analysis (18 eyes in the LhAM group and 19 eyes in the ILM group). The macular hole closure rate was significantly higher in the LhAM group compared to the ILM group (88.9% vs. 31.6%, $P < 0.001$). Both groups achieved high rates of retinal reattachment (94.4% in the LhAM group vs. 94.7% in the ILM group, $P = 1.00$). At 6 months postoperatively, there was no significant difference in BCVA between the groups (LhAM group: 1.49 ± 0.43 LogMAR vs. ILM group: 1.57 ± 0.38 LogMAR, $P = 0.54$). The incidence of elevated intraocular pressure was 5.6% (1/18) in the LhAM group and 36.8% (7/19) in the ILM group ($P = 0.042$).

Conclusions: For eyes with MHRD due to high myopia, LhAM patching resulted in a significantly higher macular hole closure rate and a lower risk of

postoperative ocular hypertension compared to ILM peeling with silicone oil tamponade. It is a promising technique that eliminates the need for secondary surgery to remove silicone oil.

Abstract No.: 208668

Macular Buckling Combined With Inverted Internal Limiting Membrane Flap Technique and Air Tamponade in the Treatment of Macular Hole Retinal Detachment in High Myopia

First Author: Qi ZHANG

Purpose: The study aims to assess the efficacy of integrating macular buckling (MB) with pars plana vitrectomy (PPV), the inverted internal limiting membrane (ILM) flap technique, and air tamponade in treating macular hole retinal detachment (MHRD) in patients with high myopia.

Methods: This retrospective study included sixty-two eyes from sixty-two consecutive patients diagnosed with highly myopic MHRD. The participants were categorized into two groups: the PPV group (n=34) and the combination group (n=28). Best-corrected visual acuity (BCVA), axial length (AL), progression of myopic maculopathy (MM), rates of macular hole (MH) closure, and retinal reattachment were assessed and compared.

Results: The mean follow-up duration was 14.13±2.57 months. The combination group demonstrated a significantly higher rate of MH closure compared to the PPV group (79.41% vs. 100%, P=0.011). Retinal reattachment was successfully achieved in 100% of eyes in the combination group following the initial surgery, in contrast to 70.59% in the PPV group (P=0.002). The combination group demonstrated a significantly greater improvement in BCVA compared to the PPV group (P<0.001). The mean MM stage in the PPV group increased from 2.12±0.69 to 2.38±0.92 (P=0.031). The combination group exhibited no significant progression of MM postoperatively.

Conclusions: The integration of MB with the inverted ILM flap technique and air tamponade seems to enhance both MH closure and retinal reattachment rates, along with notable improvements in BCVA among patients with highly myopic MHRD.

Abstract No.: 201895

Macular Hole Closure by Internal Limiting Membrane Flap Without Gas Tamponade Versus Conventional Surgery

First Author: Ka Ho SZETO

Co-Author(s): Vivian HUI, Julia LAM, Mohamed SHAHEEDA, Chi Wai TSANG, Ken TSANG, Amy YU

Purpose: To compare the effectiveness and safety of the novel internal limiting membrane (ILM) flap with

no gas tamponade technique and conventional surgery in repairing macular hole (MH).

Methods: Retrospective study of consecutive patients with OCT-confirmed full-thickness MH who underwent MH repair surgery by either conventional surgery or the ILM flap with no gas tamponade technique at the Hong Kong Eye Hospital from November 1, 2021, to July 31, 2024.

Results: Ninety-three eyes from 93 patients were included in the study, of which 51 eyes underwent MH repair with conventional surgery, and 42 underwent the ILM flap with no gas tamponade technique. The MH closure rates were comparably high in both groups (94.1% vs. 95.2%; P = 0.812). Visual acuity was significantly better in the no gas tamponade group at postoperative week 1 (1.48 vs. 0.84; P < 0.001) and month 1 (0.87 vs. 0.73; P = 0.048). There were no significant differences in VA by postoperative months 3 (0.54 vs. 0.49; P = 0.281) and 6 (0.41 vs. 0.47; P = 0.991). In multivariate analysis, the rate of foveal gliosis was lower in the no gas tamponade group (20.0% vs. 4.9%; P = 0.043).

Conclusions: The ILM flap with no gas tamponade technique could achieve a high MH closure rate comparable to conventional surgery. This novel technique was associated with significantly better vision in the first month of the postoperative period, as well as a lower rate of foveal gliosis. These results demonstrated the feasibility of repairing MH without gas tamponade and warrant further prospective study.

Abstract No.: 201620

Macular Hole Retinal Detachment Repair Without Gas Tamponade – a Proof-of-Concept Case Series

First Author: Vivian HUI

Co-Author(s): Julia T.w. LAM, Shaheeda MOHAMED, Simon K.h. SZETO, Chi Wai TSANG, Ken K. TSANG, Amy H.y. YU

Purpose: To describe a surgical technique for macular hole retinal detachment repair in highly myopic eyes using a temporal internal limiting membrane (ILM) flap without the need for gas tamponade.

Methods: A retrospective single-centre case series from August 2024 to August 2025. Patients with myopic macular hole (MH) with retinal detachment who underwent pars plana vitrectomy with a temporal ILM flap without gas tamponade were included. Main outcome measures include anatomical closure of MH, retinal attachment, visual improvement, and rate of post-op complications.

Results: Six eyes were included. Mean spherical equivalent and axial length were 12.4D (range: -6.5D to -17.25D) and 30.21mm (range: 28.95 mm to 30.72 mm), respectively. Complete anatomical closure of MH and retinal attachment was achieved in all eyes. 16.6%,

60%, 100% and 100% of eyes achieved improvement in visual acuity at week 1, 1-month, 3-month, and 6-month, respectively. One eye developed vitreous hemorrhage, which resolved spontaneously. None of the cases had a reopening of the MH or redetachment.

Conclusions: This novel surgical technique provides proof of concept that gas tamponade may not always be necessary in the surgical repair of macular hole retinal detachment in highly myopic eyes.

Abstract No.: 206305

Management of Aphakia in the Absence of Capsular Support: Outcomes in a Scottish Patient Cohort With the Carlevale (Soleko) IOL

First Author: Juan Lyn **ANG**

Co-Author(s): Manjit **MEHAT**

Purpose: To report the clinical outcomes of the use of a specially designed scleral fixated intraocular lens, the Carlevale intraocular lens (Carlevale IOL, Soleko, Italy) for the correction of aphakia in the absence of capsular support of variable etiology.

Methods: This is a single-centre retrospective case series study. A prospectively maintained database of patients undergoing Carlevale (Soleko) lens fixation at a tertiary centre from December 2020 to December 2024 was analysed. Procedures were performed by four consultant vitreo-retinal surgeons (MM, HB, AK and CG). Descriptive statistical analysis was performed on patient demographics, indication for surgery, surgical technique, complications, and pre- and post-operative best corrected visual acuity (BCVA) and intra-ocular pressure (IOP). Paired-samples t-test assessed mean difference between pre- and post-operative best corrected visual acuity BCVA and IOP.

Results: Forty-five eyes from 43 individual patients (15 females, 28 males) with mean age 73.6 (± 14.7) with a mean follow-up of 15 months were included in the analysis. The most common indication was dislocated IOL (22.4%, n=21), followed by subluxed IOL and aphakia (each 22.2%, n=10) then subluxed crystalline lens (6.7%, n=3). One patient had decompensating cornea secondary to anterior chamber IOL (2.2%, n=1). Mean pre-operative BCVA was logMar 1.30 (± 0.70), with mean post-op BCVA 0.55 (± 0.57). There was a statistically significant improvement in BCVA (0.76 ± 0.83 , $p < 0.001$). There was a drop in IOP (2.8 ± 7.9 , $p = 0.041$). In four cases, there was haptic rupture requiring use of further IOL(s). 7 eyes required a further surgical procedure(s).

Conclusions: Carlevale (soleko) lens fixation represents a safe and reliable method to manage aphakia without capsular support, demonstrating a statistically significant improvement in BVCA.

Abstract No.: 201103

Microbiological Analysis of Vitreous Sample in Endophthalmitis Patients at a Tertiary Eye Care Hospital in Bangladesh

First Author: Shah Md Rajibul **ISLAM**

Co-Author(s): Quazi Sazzad **IFTEKHAR**, Mominul **ISLAM**, Omar **JAFARULLAH**, Lutfullahil **KHABIR**

Purpose: This study was planned to determine the microbiological organisms of endophthalmitis patients (vitreous sample) attending a tertiary eye care hospital.

Methods: A prospective longitudinal study was undertaken from July 2022- December 2022. All patients underwent a thorough history, clinical examination, and appropriate investigations. After a clinical diagnosis of endophthalmitis was reached, pars plana vitrectomy was performed, and vitreous tap was sent for microbiological analysis. The microbiological reports were collected, and the patients were monitored on follow-up.

Results: Out of 223 patients with endophthalmitis, the majority, 100 (44.8%), were aged 50 years or older. Most were male, 134 (60.1%). The male-to-female ratio was 1.5:1. 89 (39.9%) were culture positive and included bacteria 61 (27.4%), fungus 26 (11.7%), and both 2 (0.9%). The most common bacteria identified were *Pseudomonas* sp. 20 (31.7%), followed by *Staphylococcus aureus* 13 (20.6%), *Staphylococcus epidermidis* 11 (17.5%), and *Bacillus* 10 (15.9%). The commonest fungi identified were *Candida* 12 (42.9%) and *Fusarium* 9 (32.1%). *Staphylococcus pneumoniae* was significantly higher in those less than 18 years (14.3%). *Pseudomonas* sp. was significantly higher in female patients (46.2% vs 21.6%). *Candida* was significantly higher in the age group 19-50 (83.3%).

Conclusions: The study concluded that total culture positivity was 39.9%, which included bacterial (27.4%), fungal (11.7%), and mixed organisms (0.9%). The most common bacterial organisms identified were *Pseudomonas* sp., *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Bacillus* in postoperative endophthalmitis. The most common fungal organisms identified were *Candida* and *Fusarium* in postoperative endophthalmitis.

Abstract No.: 200189

Near-Real Surgical Specimens (NRSS): A Novel Platform for Standardized Assessment of Suprachoroidal Drug Delivery

First Author: David **ALMEIDA**

Co-Author(s): Vinit **MAHAJAN**

Purpose: This study presents Near-Real Surgical Specimens (NRSS), an engineered platform replicating the biomechanical properties of human ocular tissue for standardized evaluation of SC drug delivery.

Methods: NRSS ocular models were fabricated with biomimetic materials calibrated to human tissue characteristics. Suprachoroidal injections (100 μ L) were performed using a standardized protocol and compared to published cadaveric data. Real-time imaging enabled visualization of injection dynamics. Quantitative metrics, including coverage, reproducibility, and tissue-device interactions, were assessed. Pathology-specific NRSS variants (high myopia and hypertensive choroidopathy) were evaluated to determine the effect of disease states on SC distribution.

Results: NRSS models exhibited SC coverage of 35.1% $\pm$ 2.4%, consistent with cadaveric data (33.3% $\pm$ 5.9%) but with significantly reduced variability (coefficient of variation: 6.8% vs. 17.7%). Injections displayed the known circumferential-before-posterior spread pattern. Real-time visualization revealed temporal distribution dynamics and center-of-mass migration.

Conclusions: The NRSS platform enables standardized, reproducible assessment of SC drug delivery and overcomes key limitations of cadaveric models. Its real-time imaging and customizability for disease states offer novel insights for therapeutic optimization, device development, and surgical training.

Abstract No.: 201679

Optical Coherence Tomography Angiography Analysis of Macular Perfusion After Rhegmatogenous Retinal Detachment Repair: A Systematic Review and Meta-Analysis

First Author: Amer **AWAN**

Co-Author(s): Abdullah **AHMED**, Fiza **SHAHEEN**

Purpose: To systematically evaluate and synthesize evidence regarding macular perfusion changes following rhegmatogenous retinal detachment (RRD) repair using optical coherence tomography angiography (OCTA).

Methods: A comprehensive search of major databases was conducted from the inception to November 2024. Studies comparing OCTA parameters between RRD eyes post-repair and control eyes were included. The analysis included foveal avascular zone (FAZ) area, foveal vascular density (FVD), parafoveal vascular density (PFVD), perfusion density in choriocapillaris (CC), and best-corrected visual acuity (BCVA). Data were analyzed separately for macula-ON and macula-OFF groups.

Results: Twenty studies comprising 686 RRD eyes (231 macula-ON, 455 macula-OFF) and 686 control eyes were analyzed. In macula-OFF cases, FAZ area remained significantly enlarged post-repair in both superficial capillary plexus (SCP) (0.06 mm², 95% CI: 0.02-0.09) and deep capillary plexus (DCP) (0.12 mm², 95% CI: 0.04-0.19). FVD showed no significant differences in either group. PFVD demonstrated a significant reduction in DCP for both macula-ON (-1.38%, 95%

CI: -2.72 to -0.05) and macula-OFF (-2.82%, 95% CI: -5.02 to -0.63) groups. CC perfusion density showed a significant reduction post-repair (-2.39%, 95% CI: -4.56 to -0.22). Postoperative BCVA improved significantly in macula-OFF cases (0.79 logMAR, 95% CI: 0.37 to 1.21) but showed no significant change in macula-ON cases.

Conclusions: The enlarged FAZ area, reduced PFVD, and CC perfusion density suggest lasting changes in the retinal microvasculature post-repair. It demonstrates persistent alterations in macular perfusion parameters following RRD repair, particularly in macula-OFF cases.

Abstract No.: 200470

Outcomes of Diabetic Vitrectomy and Factors Affecting the Outcomes: A Prospective Observational Study

First Author: Amit Kumar **DEB**

Co-Author(s): Sandip **SARKAR**

Purpose: Limited literature is available on predictors of diabetic vitrectomy. Most available studies are retrospective. Hence, we conducted this prospective study to evaluate the short-term outcomes (6 months) of diabetic vitrectomy and assess the predictors.

Methods: Eyes undergoing diabetic vitrectomy were classified under the following 5 categories: Non-clearing VH (group I), Non-clearing VH with minimal TRD (group II), Progressive FVP c EMTRD (group III), MTRD (group IV), Combined TRD/RRD (CRD) (group V). Intra-op findings were documented for each case along with a review of the surgical video. Post-operatively, patients were followed up for 6 months.

Results: A total of 76 patients were recruited. Primary anatomical success: 69/76 (90.78%). Final success: 74/76 (97.36%). Mean Log MAR BCVA: 1.07 $\pm$ 0.66. Vision at 6 months: 6/60 or better=40/76, Less than 6/60=36/76, 6/24 or better=27/76. On multinomial logistic regression analysis, non-usage of pre-op anti-VEGF agents, silicone oil tamponade, > 2 quadrants of TRD, and residual retinal traction after surgery maintained significant association with poor visual outcomes, with an Odds ratio > 2 or higher for each parameter.

Conclusions: Pre-op laser and use of anti-VEGF agents were associated with good outcomes in diabetic vitrectomies, while > 2 quadrants of TRD, disc pallor, and iatrogenic breaks were associated with poor outcomes.

Abstract No.: 200791**Outcomes of Early Vitrectomy in Vitreous Haemorrhage (VH) Secondary to Proliferative Diabetic Retinopathy (PDR) – a Prospective Study***First Author: Manjot KAUR**Co-Author(s): Dr Madhu KUMAR*

Purpose: To evaluate the visual outcomes, to assess the incidence of rebleeding and to analyse the impact of vitrectomy on the progression of PDR (NVE and FVP leading to TRD).

Methods: After obtaining informed consent and approval from the ethics and scientific committees, fifty diabetic patients aged over 18 years, with visual acuity ranging from PL to ETDRS logMAR 0.3 (equivalent to Snellen's 20/40, 6/12) due to VH secondary to PDR were enrolled. Preoperative variables included age, gender, duration of diabetes, HbA1c levels, visual acuities, and IOP at initial and follow-up visits. Patients underwent pars plana vitrectomy (PPV) within two weeks of presentation, and intraoperative complications were documented. Postoperative follow-up visits at 1 (± 1) week, 4 (± 4) weeks, 12 (± 4) weeks, and 24 (± 4) weeks to monitor postoperative complications in the study eye, along with the progression rate of DR in the contralateral eye according to the ETDRS classification.

Results: The mean HbA1c level was 8.66% (± 1.45). Post-operative complications were minimal, with a 2% incidence of complications at 1(± 1) week and 8% incidence at 12(± 4) weeks. The incidence of rebleeding at 4(± 4) weeks was 2% and at 12(± 4) weeks was 8%.

Conclusions: In the MIVS era, the complication rate of small-gauge 3-port pars plana vitrectomy has significantly reduced. A single surgical sitting of vitrectomy helps prevent blindness, decreases time spent with reduced VA, and is a non-inferior treatment modality as compared to delayed vitrectomy, and also reduces follow-up visits for additional PRP.

Abstract No.: 204917**Outcomes of Vitreoretinal Surgery for Complications and Macula-Threatening Bullous Retinoschisis in X-Linked Retinoschisis***First Author: Licong LIANG**Co-Author(s): Fang LU, Kaiqin SHE*

Purpose: To evaluate the outcomes of vitreoretinal surgery in patients with X-linked retinoschisis (XLRS) complicated by vitreous hemorrhage (VH), retinal detachment (RD), macular hole, or macula-threatening bullous schisis.

Methods: This retrospective study included 29 XLRS patients (35 eyes) who underwent vitreoretinal surgery at West China Hospital of Sichuan University from 2015

to 2024. All patients underwent pars plana vitrectomy. C3F8 gas or silicone oil (SO) intraocular tamponade was used in different situations. The postoperative rate of retinal reattachment and the best corrected visual acuity (BCVA, LogMAR) were evaluated.

Results: The median age at surgery was 4 years (range, 7 months–10 years). Genetic testing in 28 patients identified 25 RS1 variants, predominantly missense mutations (72%). Complications included RD in 14 eyes (40%), VH in 8 eyes (22.9%), bullous schisis in 12 eyes (34.3%), and macular hole in 1 eye (3%). Among eyes with RD, final retinal reattachment was achieved in 78.6% (11/14). Two eyes developed silicone oil dependence, and one eye developed secondary glaucoma. The retinoschisis cavity may recur or resolve postoperatively. In eyes with macula-threatening bullous schisis, vitrectomy with viscoelastic or C3F8 tamponade preserved a clear central visual axis in 83.3% (10/12), although two eyes developed secondary rhegmatogenous RD. Mean BCVA improved from 1.6 ± 0.7 to 1.3 ± 0.4 logMAR ($P = 0.034$).

Conclusions: Vitreoretinal surgery provides favorable anatomic restoration and modest visual improvement in XLRS eyes with complications or macula-threatening bullous schisis, supporting timely surgical intervention when the macula is at risk.

Abstract No.: 205419**Preoperative Intravitreal Viscoelastic Injection for Surgical Optimization in Rhegmatogenous Retinal Detachment With Choroidal Detachment***First Author: Devesh KUMAWAT**Co-Author(s): Ritweez SAHU, Pradeep VENKATESH, Saurabh VERMA*

Purpose: To evaluate the safety and efficacy of a modified protocol- combining preoperative intravitreal viscoelastic injection (PIVOT) with standard anti-inflammatory therapy, in facilitating vitrectomy in eyes with rhegmatogenous retinal detachment with choroidal detachment (RRD-CD).

Methods: In an ambispective Institute Ethics Committee-approved study, ten eyes of ten patients with RRD-CD (CD reaching till the equator in ≥ 1 quadrant) were managed at a tertiary eye-care center between December 2024 and June 2025. 1% sodium hyaluronate (Healon™ PRO) was injected intravitreally until IOP became digitally normal, one day post-baseline, and at a median of one day (range: 1-4days) before vitrectomy, along with preoperative topical difluprednate, cycloplegics, and oral corticosteroids (if not contraindicated). Outcome measures were intraocular pressure (IOP), cumulative CD height (on B-scan ultrasonography), injection-related adverse events, and intraoperative complications. Data were analyzed using the paired t-test, the Wilcoxon test, and the Pearson correlation.

Results: The mean age of patients was 50.6 ± 11.4 years. Mean IOP increased significantly from 4.75 ± 2.05 mmHg at baseline to 10.0 ± 3.34 mmHg on the day of surgery ($p=0.001$). Cumulative CD reduced significantly from 15.82 ± 4.88 mm to 5.49 ± 6.01 mm ($p=0.003$), with complete resolution in 4 cases. No injection-related adverse events were observed. Port placement with a standard 25G system was uneventful in 9/10 eyes. Vitrectomy could be safely completed in all eyes. Adequate oil fill could be achieved in all eyes.

Conclusions: PIVOT combined with anti-inflammatory treatment may be a safe and effective strategy in managing RRD-CD. It improves IOP, reduces CD, and optimizes intraoperative conditions without delaying surgery. Larger studies with control groups are advised to validate these findings.

Abstract No.: 200465

Prevalence and Risk Factors Associated With Progression and Regression of Type 2 Prethreshold Retinopathy of Prematurity

First Author: Mojtaba HEYDARI

Co-Author(s): Mohammadkarim JOHARI

Purpose: To investigate the frequency and risk factors associated with the progression and regression of type 2 retinopathy of prematurity (ROP) among preterm infants in southern Iran.

Methods: In a retrospective cohort, a total of 1,214 infants underwent ROP screening at the Poostchi ROP Clinic between March 2021 and April 2022; 62 infants with type 2 prethreshold ROP were classified into the finally regressed and progressed groups. Clinical characteristics and risk factors associated with the risk of regression and progression were assessed.

Results: Among the final cohort, 43 infants experienced spontaneous regression of ROP, while 19 progressed to type 1 ROP. No significant differences were observed in birth weight or gestational age between the two groups. Male gender was more prevalent among those progressing to type 1 ROP (28% vs 58%, $p=0.024$). Univariate analysis identified longer duration of mechanical ventilation (6.74 ± 4.27 vs 11.24 ± 7.02 , $p=0.047$), higher oxygen consumption (11.85 ± 8.89 vs 19.89 ± 9.39 , $p=0.042$), and history of sepsis (9.50% vs 26.40%, $p=0.047$) as significant predictors of ROP progression. Infants with lower gestational age ($p=0.041$), longer NICU admission ($p=0.014$), and prolonged mechanical ventilation ($p=0.035$) exhibited delayed regression of ROP. Conversely, shorter durations until progression to treatment were noted in infants with prolonged NICU admission ($p=0.021$) and higher oxygen consumption ($p=0.048$).

Conclusions: Tailored screening strategies considering factors such as mechanical ventilation, oxygen consumption, gestational age, and weight gain are crucial for optimizing outcomes in patients with ROP.

Abstract No.: 202488

Prophylactic Buckling in Retinal Capillary Hemangioblastoma (RCH): Early Intervention to Prevent Progression and Complications

First Author: Shivayan SRIVASTAVA

Co-Author(s): Shorya AZAD

Purpose: To report a case of retinal capillary hemangioblastoma (RCH), a condition associated with von Hippel-Lindau (VHL) disease, highlighting the importance of early detection and timely intervention.

Methods: A 29-year-old female presented with a history of diminution of vision in the right eye (RE) for 3 years. The patient had a history of laser treatment in the RE. Systemic history was unremarkable. Visual Acuity (VA) in the RE was no light perception, and 6/9 in the LE. Examination revealed total hyphema in the RE, and B scan ultrasound was suggestive of a disorganized globe. Fundus examination of the LE showed multiple small orange-reddish lesions with dilated feeder and draining vessels, consistent with RCH. The diagnosis was confirmed, and a comprehensive systemic workup for VHL was carried out, which revealed a simple renal cyst and multiple pancreatic cysts. Laser photocoagulation was performed for all RCHs in the LE.

Results: At 1-month follow-up, traction was noted associated with one of the RCHs. Due to the traction and exudation over the lesion, prophylactic scleral buckling with cryotherapy was performed in the LE. Postoperative day 1 (POD1) assessment revealed increased exudation and a decrease in BCVA, and a course of steroids was given. At the 1-week follow-up, subretinal fluid (SRF) had resolved with maintained BCVA.

Conclusions: This case underscores the early onset of RCH and its association with VHL disease. It emphasizes the importance of early detection and timely intervention to prevent further visual deterioration in patients, particularly those with pre-existing vision loss in the other eye.

Abstract No.: 205355

Real-World Outcomes of Faricimab in AMD, DMO, and RVO: Functional, Anatomical, and Retreatment Analyses

First Author: Nishant Vijay RADKE

Co-Author(s): Ya CHAN, Miaoli LIN, Jiaying LIU, Snehal Nishant RADKE

Purpose: To evaluate the real-world effectiveness of faricimab across neovascular AMD, diabetic macular edema (DMO), and retinal vein occlusion (RVO), focusing on anatomical, functional, and retreatment outcomes

Methods: This retrospective study included 53 eyes (AMD/PCV $n=19$, DMO/DR $n=16$, RVO $n=18$). Visual acuity (VA, logMAR) and central retinal thickness (CRT,

microns) were analyzed using ANCOVA and ordinary least squares (OLS) regression, adjusting for baseline values, age, sex, and prior treatment status. Pairwise comparisons between disease groups were performed using Tukey HSD when the global test was significant. Time to first retreatment was assessed with Kaplan–Meier analysis and Cox proportional hazards modeling. In addition, inter-injection intervals (Tx1–Tx2 and Tx2–Tx3) were analyzed for differences across disease groups using the Kruskal–Wallis test, followed by pairwise Mann–Whitney U tests with Holm correction where appropriate.

Results: OLS regression demonstrated baseline CRT as the strongest predictor of Δ CRT ($p < 0.001$), and baseline BCVA as the strongest predictor of Δ BCVA ($p = 0.001$). Prior treatment status predicted Δ CRT ($p = 0.007$) but not Δ BCVA ($p = 0.057$). ANCOVA revealed no significant differences in Δ CRT between disease groups ($F = 1.38$, $p = 0.263$), while Δ BCVA differed significantly ($F = 4.32$, $p = 0.019$), with RVO patients showing greater functional gains than AMD/PCV (Tukey $p = 0.023$). Kaplan–Meier curves indicated shorter time to retreatment for DMO/DR patients; Cox modeling confirmed this, with DMO/DR patients more likely to require earlier injections than AMD/PCV ($HR = 2.18$, $p = 0.047$). Kruskal–Wallis testing of inter-injection intervals showed no difference for Tx1–Tx2 ($p = 0.584$) but a significant group effect for Tx2–Tx3 ($p = 0.037$), with DMO eyes having shorter intervals than RVO (Mann–Whitney U, Holm-corrected $p = 0.009$).

Conclusions: Faricimab improves both anatomical and functional outcomes across retinal diseases, with the largest functional gains in RVO. Baseline factors and prior treatment influence response, and retreatment intervals vary by disease, highlighting the need for individualized dosing strategies in real-world practice.

Abstract No.: 207260

Relentless Infectious Necrotizing Scleritis Secondary to Phthiriasis Palpebrarum

First Author: Nikita **CHAUDHARY**

Co-Author(s): Vishal **SANJAY JADHAV**

Purpose: To discuss clinical diagnosis and treatment of a case of relentless infectious necrotizing scleritis secondary to Phthiriasis palpebrarum.

Methods: A case of painful red eye diagnosed as diffuse nodular scleritis was approached and investigated with progressive and persistent scleral thinning and inflammation.

Results: The patient developed severe necrotizing scleritis, characterized by marked scleral thinning and uveal tissue exposure. Systemic investigations for infective, autoimmune disorders were largely inconclusive, suggesting a localized reaction rather than a systemic process. Eventually, a detailed ophthalmological examination revealed a lice in the

sclera in the advanced stages of the disease. The lice were meticulously removed, histopathologically proven as Phthiriasis palpebrarum, and the site was thoroughly irrigated. Treatment with systemic antibiotics and removal of the causative agent led to resolution of the inflammation, although residual scleral thinning persisted.

Conclusions: This case highlights that incidental lice infestation within the sclera, though rare, can trigger refractory necrotizing scleritis.

Abstract No.: 202697

Retinal Vascular Reconstruction for Branch Retinal Vein Occlusion

First Author: Shuai **SHENG**

Purpose: To evaluate the feasibility and efficacy of retinal vascular reconstruction (RVR) for treating branch retinal vein occlusion (BRVO).

Methods: Ten patients diagnosed with BRVO by clinical and imaging examinations were enrolled. Five patients received anti-VEGF therapy (intravitreal injections), while the other five underwent RVR. Treatment outcomes and macular edema recurrence were compared between the groups.

Results: In the RVR group ($n = 5$), significant improvement was observed in 4 patients (3 complete resolution, 1 partial resolution) with no macular edema recurrence. In the anti-VEGF group ($n = 5$), improvement occurred in 2 patients (1 complete resolution, 1 partial resolution) with no recurrence. A statistically significant difference in treatment efficacy was found between the groups ($P < 0.05$).

Conclusions: Retinal vascular reconstruction is a safe and effective treatment for BRVO, demonstrating significantly better outcomes than anti-VEGF therapy in this pilot study. This approach holds promise for clinical application but requires further validation with larger sample sizes to confirm long-term efficacy and safety.

Abstract No.: 205571

Saudi Arabian Retinopathy of Prematurity Telemedicine Program: 6-Year Results

First Author: Saleh **AL AMRO**

Co-Author(s): Sami **ALGHAMDI**, Sulaiman **ALSULAIMAN**

Purpose: To report the 6-year results of the Saudi Arabian retinopathy of prematurity telemedicine program (SAROP), which was established with the goal of eradicating ROP blindness in the Kingdom of Saudi Arabia (KSA).

Methods: Premature infants with a birth weight (BW) of 1500 g or less and/or gestational age (GA) of 32 weeks or less were screened for ROP using digital wide-angle fundus cameras placed in all 32 level 3 neonatal intensive care units (NICU), Ministry of Health, covering every part of this large country (2.2 million square

kilometres area). Fundus photos were uploaded to the SAROP server, which were then evaluated and reported by retina specialists. Detailed reports were electronically sent back to referring NICUs with management plan.

Results: In 6 years, a total of 6,238 premature infants were screened. ROP was found in 1,683 infants (27%). Stage 3 was seen in 477 infants (28%). Among the participants, 407 infants (24%) received treatment; the majority received anti-vascular endothelial growth factor (VEGF) intravitreal injections, while a few received laser ablative treatment. 26 infants received retreatment. No infants developed advanced ROP.

Conclusions: SAROP is a large ROP telemedicine program. The prevalence of ROP in KSA is 27% in infants of 1500 g or less BW. Treatment was needed in 24% of infants with ROP. No cases of ROP blindness were seen in NICUs participating in SAROP over 6 years.

Abstract No.: 206309

Selective Micropulse Individual Retinal Therapy for the Treatment of Central Serous Chorioretinopathy Based on the Navigation Technology

First Author: Pavel **VOLODIN**

Co-Author(s): Elena **IVANOVA**

Purpose: To evaluate the results of selective micropulse individual retinal therapy (SMIRT) for the treatment of central serous chorioretinopathy (CSCR) based on the navigation technology and with the selection of parameters by autofluorescence testing.

Methods: This study has been conducted on 61 patients (61 eyes) aged 36 to 58 years with acute CSCR and transparent optical media. The patients were divided into 2 groups. In group 1 (31 eyes), CSCR was treated using the SMIRT technology on a Navilas 577s laser system. Micropulse mode (50-100 μ s, 2.4-4.7%, 10 ms, 100 μ m, 0.4-1.9 W) was used for treatment, in which, according to computer modelling, selective destruction of the retinal pigment epithelium occurs with minimal damage to the chorioretinal complex. The parameters were selected for each patient by preliminary testing and evaluation of the results according to shortwave autofluorescence data (488 nm). Laser applications were applied close to each other, completely covering the points of leakage according to fluorescence angiography. Group 2 (30 eyes) was a control group; laser treatment was not performed. Follow-up observations were performed at 1, 3, 6, 12, and 24 months.

Results: Complete resorption of subretinal fluid was determined in all cases in group 1 and in 10 eyes (33.3%) in the control group in 1 1-year follow-up. In group 1, best-corrected visual acuity (BCVA) increased from 0.85 ± 0.02 to 0.98 ± 0.02 ($P < 10^{-8}$), and retinal sensitivity increased from 24.34 ± 0.33 dB to 29.15 ± 0.17

dB ($P < 6 \cdot 10^{-6}$) in 1 year. In group 2 (control) BCVA decreased from 0.84 ± 0.02 to 0.77 ± 0.03 and retinal sensitivity increased insignificantly from 25.09 ± 0.32 dB to 25.32 ± 0.72 dB in 1 year.

Conclusions: The navigation treatment of CSCR using the SMIRT technology with the selection of parameters by AF testing can be used for points of leakage in the fovea.

Abstract No.: 202573

Subretinal Injection of RRG001, an AAV8-Based Anti-VEGF Gene Therapy at the End of Vitrectomy for Unstable Proliferative Diabetic Retinopathy: An IIT Trial

First Author: Xiaorong **LI**

Purpose: This study evaluates RRG001, a novel AAV8-based gene therapy engineered for sustained intraocular anti-VEGF expression with a single subretinal injection, administered adjunctively during vitrectomy in PDR patients requiring further anti-VEGF therapy

Methods: In this single-center, open-label trial (NCT06412224), six patients with PDR were recruited to receive a single subretinal injection of RRG001 in one eye (study eye) at one of two dose levels immediately following standard PPV. Of the six participants, one was vitrectomy-naïve and characterized by extensive neovascularization in the retina and optic disc, along with the presence of an epiretinal membrane; two had persistent macular edema after prior vitrectomy; and three had recurrent PVH. Participants were followed for 24 weeks to assess preliminary safety and tolerability. Key efficacy endpoints included visual acuity, disease progression, and the need for rescue therapy

Results: RRG001 was well tolerated. No treatment-related serious adverse events (SAEs), deaths, or clinically significant intraocular inflammation occurred. All patients showed improved visual acuity postoperatively, which was sustained through Week 24. The three patients with baseline «hand motion» vision achieved gains of ≥ 52 ETDRS letters. No disease progression was detected, and no rescue therapy was required in any patient during the study. Central retinal thickness (CRT) in eyes with baseline macular edema markedly decreased and remained stable following PPV and RRG001 injection.

Conclusions: The combination of PPV and a single subretinal injection of RRG001 exhibited a favorable safety profile and promising preliminary efficacy, supporting further investigation in larger, controlled trials.

Abstract No.: 200499**The 1-Step vs. 2-Step Subretinal Injection Trial (1,2-SIT): A RCT Comparing Drug Reflux Following Subretinal Injection***First Author: Matthew **SIMUNOVIC****Co-Author(s): Rhuen **CHOW**, Zeid **MADANAT**, Khin Thida **OO**, Perach **OSAADON**, Zak **PRIME**, Emily **SHAO**, Lay Khoon **TOO**, Tun **YEO*****Purpose:** To compare sub-retinal drug retention following 1- or 2-step sub-retinal injection (SRI).**Methods:** Patients with sub-macular hemorrhage from age-related macular degeneration were randomised to undergo SRI of tissue plasminogen activator (50µg/0.1mL) with sodium fluorescein (NaFl, 10µg/0.1mL) as an optical label either as a 1-step (n=6) procedure, in which the drug defines the sub-retinal space, or as a 2-step (n=6) procedure, in which balanced salt solution first defines the sub-retinal space, following vitrectomy. Patients underwent 20% sulfurhexafluoride and bevacizumab injection at the end of surgery. Fluorophotometry on the intraocular fluid was used to estimate drug reflux. Patients received monthly anti-VEGF treatment; the final follow-up was at 12 weeks. The primary outcome was drug reflux. Secondary outcomes included surgery duration, change in VA, final VA, final foveal thickness, and change in foveal thickness. This approach's applicability to gene- and cell therapy was assessed by quantitative PCR to determine AAV yields, and its effects on retinal progenitor cells (RPCs) were evaluated using a viability assay.**Results:** Reflux was 4.8±3.1% (mean±SEM) for 1-step SRI and 3.9±0.9% for 2-step SRI (no significant difference in means; P=0.0155 for difference in variance). There was no significant difference in any of the secondary outcomes. NaFl did not affect AAV titers or RPC viability.**Conclusions:** NaFl can track subretinal therapeutics quantitatively, and 2-step SRI is preferable to 1-step SRI to ensure consistency in drug delivery.**Abstract No.: 204109****The Administration of T-PA via the Central Retinal Artery Using a 48G Needle With Acupuncture Therapy for CRAO***First Author: Xiang **MA****Co-Author(s): Cong **MA**, Naiwen **ZHANG*****Purpose:** To evaluate the safety and efficacy of intra-arterial tissue plasminogen activator (t-PA) delivered via a 48G microneedle, combined with standardized acupuncture, in treating acute central retinal artery occlusion (CRAO).**Methods:** Forty-one patients (41 eyes) were prospectively assigned to t-PA alone (n=5), acupuncture alone (n=27), or combined therapy (n=9). Acupuncture

targeted 15 peri-ocular and distal points daily for 4 weeks (extendable to 3 months). Outcomes included best-corrected visual acuity (BCVA, logMAR), visual evoked potential (VEP) P100 latency/amplitude, and central retinal artery peak systolic (PSV) and end-diastolic velocities (EDV) at baseline, 1 month, and 6 months.

Results: Baseline BCVA was hand-motion or worse across groups. At 6 months, combined therapy achieved a mean BCVA of 0.40 ± 0.08, significantly surpassing t-PA (0.25 ± 0.07) and acupuncture (0.18 ± 0.05) alone (P < 0.001). P100 latency improved from 152 ± 18 ms to 113 ± 12 ms with amplitude rising to 7.8 ± 1.6 µV, exceeding single-therapy gains (P < 0.05). Combined therapy also yielded marked hemodynamic improvements: PSV increased from 5.6 ± 1.4 to 12.3 ± 2.5 cm/s and EDV from 1.8 ± 0.6 to 4.5 ± 1.1 cm/s (P < 0.001). Safety outcomes were favorable, with no severe complications; transient ocular hypertension (<5%) resolved with topical treatment.**Conclusions:** Microneedle-guided intra-arterial t-PA with acupuncture accelerates reperfusion, enhances visual and electrophysiological recovery, and maintains excellent safety. This integrative approach may represent a promising therapeutic option for CRAO.**Abstract No.: 204729****The Concept of Temporary Myopic Traction Maculopathy Resolution: A Case Series and Long-Term Follow-Up of 12 Patients***First Author: Ka Hin Gabriel **LI****Co-Author(s): Veronika **MATELLO**, Barbara **PAROLINI**, Tommaso **PELLEGRINO*****Purpose:** To describe the long-term natural progression of 12 highly myopic eyes with myopic traction maculopathy (MTM) that initially demonstrated apparent improvement, followed by recurrence.**Methods:** A series of 400 eyes were referred for macular buckle treatment to our centre from January 2008 to June 2025. Long-term data were available for 286. Among them, 12 patients who had optical coherence tomography (OCT) proof of prior spontaneous or post-vitrectomy improvement of MTM were retrospectively reviewed. OCT findings and visual outcomes were retrieved and analysed.**Results:** All 12 eyes of 12 patients showed proof of MTM recurrence after spontaneous (9 eyes) or post-vitrectomy (3 eyes) improvement. The mean best-corrected visual acuity (BCVA) at MTM improvement and recurrence were 0.346 ± 0.36 logMAR and 0.855 ± 0.34 logMAR, respectively. The average time interval from MTM improvement to recurrence was 27.44 ± 37.5 months for the treatment-naïve group and 84 ± 25.92 months for the vitrectomy group.**Conclusions:** Spontaneous or post-vitrectomy improvement of MTM only represents a temporary

relieve. Recurrence can be observed in the long-term and is likely driven by the progressive nature of posterior staphyloma with persistent perpendicular traction. This highlights the importance of long-term OCT monitoring for patients with MTM, more specifically at least 2 years to judge the effect of spontaneous modification of the vitreoretinal interface or at least 7 years to judge the efficacy of any treatment. Vitrectomy only temporarily relieves the perpendicular traction exerted by the vitreous whereas treating the staphyloma can permanently halt the progression of MTM.

Abstract No.: 203176

The Effect of Vitreous Surgery for Familial Exudative Vitreoretinopathy

First Author: Zhao XIQUAN

Purpose: To retrospectively analyze the clinical effect of vitreous surgery for the treatment of stage IV familial exudative vitreoretinopathy.

Methods: Retrospective analysis of 27 cases (32 eyes) of clinical diagnosis of stage IV FEVR undergoing vitreous surgery. A total of 17 eyes were found to have retinal tears and iatrogenic tears, and 5 eyes had elevated retinal protrusions that required external scleral drainage of subretinal fluid. Patients with retinal holes should undergo drainage of subretinal fluid from the retinal hole, reattachment of the retina, and laser photocoagulation to seal the hole and non-vascular areas of the retina. 13 eyes were filled with gas, and 19 eyes were filled with silicone oil. All patients were observed for more than 6 months after surgery.

Results: In 17 eyes with stage IV disease without retinal tears or iatrogenic tears, the retina was well reattached after surgery. Of the 15 eyes with retinal tears (including iatrogenic), 9 had good retinal reattachment, and 6 were silicone oil-dependent.

Conclusions: The prognosis of vitreous surgery for patients with FEVR stage IV without retinal breaks is good, while the prognosis for patients with retinal breaks and iatrogenic retinal breaks during surgery is poor. During FEVR vitrectomy, it is essential to minimize the occurrence of iatrogenic holes.

Abstract No.: 201518

The GLOW Study: Real-World Use of the "Glowport"—Illuminated Vitrectomy Cannulas

First Author: Shishir VERGHESE

Co-Author(s): Prithvi CHANDRAKANTH

Purpose: To evaluate the real-world clinical impact and surgical utility of the Glowport, an illuminated vitrectomy trocar cannula, by assessing procedural efficiency, surgeon experience, and device performance through a comprehensive scoring system during routine vitreoretinal surgeries.

Methods: This multicenter, retrospective study included 508 eyes undergoing three-port pars plana vitrectomy (PPV) performed by seven vitreoretinal surgeons over a one-year period. The Glowport—a novel, 3D-printed phosphorescent ring fitted onto standard vitrectomy cannulas—was used selectively to enhance trocar visibility during instrument exchanges under mesopic (low-light) conditions. Objective efficiency was measured as time to task completion, with comparisons made between cases performed with and without the Glowport. Subjective surgeon feedback on visualization, ergonomics, and workflow integration was collected via standardized questionnaires. Safety outcomes and adverse events were closely monitored. The device's performance was further assessed using the Retina Surgery Adapted Quality Score (AQS), a weighted scoring system based on visualization, safety, ergonomics, durability, and cost-benefit considerations.

Results: Glowport-assisted surgeries showed a significant reduction in instrument exchange time (mean 4.2 vs. 11.4 seconds, $P < 0.05$), greatly improving procedural efficiency. Surgeons unanimously reported superior visibility, increased confidence, and reduced intraoperative challenges, with no device-related complications. The AQS scores confirmed outstanding visualization, safety, and cost-effectiveness, as well as reliable glow retention and sterilization durability.

Conclusions: Glowport's innovative, cost-effective design transforms vitrectomy workflow under low-light conditions and earned strong surgeon endorsement. Its exceptional safety, performance, and high AQS scores position Glowport as a significant advance for retinal surgery.

Abstract No.: 205556

The Impact of Preoperative Choroidal Detachment on Short-Term Surgical Outcomes in Highly Myopic Macular Hole Retinal Detachment

First Author: Yi CAI

Co-Author(s): Enzhong JIN, Heng MIAO, Xuan SHI

Purpose: To evaluate the impact of choroidal detachment on short-term surgical outcomes in highly myopic macular hole retinal detachment (MHRD) and to discern the risk factors associated with macular hole (MH) closure.

Methods: A retrospective analysis was carried out on 104 highly myopic MHRD eyes that underwent vitrectomy and intraocular tamponade. Patients were stratified according to the presence or absence of preoperative choroidal detachment. Demographic data, preoperative ocular parameters, and postoperative outcomes were compared. Logistic regression analysis was employed to identify risk factors for MH closure.

Results: No significant differences were observed in age or disease duration between groups. Preoperative

visual acuity was inferior in the choroidal detachment group (2.19 ± 0.70 LogMAR vs. 1.78 ± 0.60 LogMAR, $P = 0.013$), and preoperative intraocular pressure (IOP) was significantly lower (9.05 ± 3.73 mmHg vs. 13.18 ± 4.15 mmHg, $P < 0.001$). Postoperatively, the choroidal detachment group demonstrated worse vision outcome (1.52 ± 0.49 LogMAR vs. 1.22 ± 0.38 LogMAR, $P = 0.004$) and a substantially higher rate of rescue therapy (28.6% vs. 3.6%, $P = 0.002$). The rate of MH closure was comparable between groups (41.0% vs. 42.9%, $P = 1.000$). Logistic regression identified advanced age ($\beta = 0.099$, $P = 0.001$) and lower preoperative IOP ($\beta = -0.132$, $P = 0.031$) as favorable factors for MH closure.

Conclusions: Choroidal detachment exerts an adverse impact on postoperative visual acuity and is associated with a significantly higher rate of rescue surgical intervention. Younger age and higher preoperative intraocular pressure (IOP) may impede MH closure.

Abstract No.: 201172

The Natural History of Symptomatic Epiretinal Membranes

First Author: Tsun Tat Victor **CHAN**

Co-Author(s): Mary **HO**, Andrew Chun-yue **MAK**, Alvin **YOUNG**

Purpose: Idiopathic epiretinal membrane (ERM) has a low progression rate in subjects with good visual acuity (VA). However, the natural history of symptomatic ERM (e.g. significant metamorphopsia or reduced vision) remains unclear. This study aims to evaluate the natural history of symptomatic ERM and identify predictors of visual decline.

Methods: We identified consecutive subjects with symptomatic ERM awaiting surgery. Only one eye from each subject was included. Visual decline was defined as a decrease in VA of ≥ 0.3 LogMAR units from the baseline. Optical coherence tomography (OCT) scans were evaluated for central macular thickness, Govetto's ERM staging, and qualitative characteristics. Independent t-tests were used to compare continuous variables. The associations between OCT features and visual decline were assessed using logistic regression.

Results: After excluding 79 patients, 309 eyes with symptomatic ERM were evaluated, including 62 eyes in stage 1, 99 eyes in stage 2, 103 eyes in stage 3 and 45 eyes in stage 4. At presentation, mean VA was 0.41 ± 0.24 for stage 1, 0.42 ± 0.26 for stage 2, 0.49 ± 0.28 for stage 3, and 0.72 ± 0.33 for stage 4. The VA showed no significant difference from ERM stage 1 to stage 3, until the development of DRIL. After a mean follow-up of 43.4 months, 104 eyes (33.7%) experienced visual decline, at a mean rate of 0.16 ± 0.15 LogMAR per year. Among 189 eyes with follow-up OCT scans, ERM staging progressed in 31 eyes. We did not identify any OCT features predictive of visual decline.

Conclusions: There was a significant rate of progression in symptomatic ERM, which might require closer monitoring or earlier intervention.

Abstract No.: 205031

The Significance of Baseline Foveal Ectopia in Primary Idiopathic Epiretinal Membrane

First Author: Stephanie **WU**

Co-Author(s): Paul **BASSETT**, Christopher **GO**, Cherlin **LEE**, Teresa **SANDINHA**, David **STEEL**, Yalin **ZHENG**

Purpose: To investigate the extent, direction, association and prognostic value of foveal ectopia in patients with unilateral idiopathic epiretinal membranes (iERMs), as assessed relative to the fellow unaffected eye.

Methods: Two-centre retrospective, consecutive case series of unilateral ERMs who underwent standardised vitrectomy and membrane peel. Foveal location in the operative eye was assessed with respect to the fellow normal eye pre- and post-operatively using optical coherence tomography and scanning laser ophthalmoscope images. The extent of macular pucker was graded using the Govetto grading scheme. Multivariate linear regression was used to analyse variables associated with baseline and postoperative visual acuity (VA).

Results: 167 eyes of 167 patients were included. The mean age was 68.3 years. The mean pre-operative VA was 0.51 logMAR and the mean central macula thickness (CMT) was 465.5 μ m. 41% were male, and 72% were phakic at baseline. Pre-operatively, the fovea was displaced more temporally (122.64 μ m) and inferiorly (8.70 μ m) compared to the fellow eye. Pre-op foveal position and CMT were significantly correlated with pre-op VA, whilst pre-operative VA, pre-op foveal position, iERM stage, and CMT were all significantly associated with post-operative VA. A 100 μ m increase in CMT was also significantly associated with a 12% increase in post-foveal displacement.

Conclusions: Baseline foveal ectopia was associated with both baseline and postoperative visual acuity independent of other measures. Further investigation of its utility as a novel biomarker of surgical outcome should be considered.

Abstract No.: 204883

The Silent Shift: Macular Thickness Alterations After Uncomplicated Phacoemulsification — Insights From a Prospective Cohort Study

First Author: Divya GOYAL

Co-Author(s): Nitika BERI, Pramod SAHU, Ankur SINGH, Tavishi SINGHAL, G.k. DAS

Purpose: To study changes in macular thickness after uncomplicated phacoemulsification surgery using optical coherence tomography.

Methods: A total of 120 patients aged 50–70 years without pre-existing systemic or ocular disease, following complete ophthalmological examination, were included in the study. OCT measured preoperative macular thickness in patients undergoing uneventful phacoemulsification with posterior chamber IOL implantation. Operative time (OT), effective phacoemulsification time (EPT), and phacoemulsification energy (PE) were recorded. Post-surgery macular thickness & postoperative BCVA were recorded on the 1st postoperative day, 1st month, 3rd month, and 6th month.

Results: In this study of 120 patients, mean age was 60.77 ± 6.88 years; central macular thickness increased from $241.43 \pm 19.87 \mu\text{m}$ preoperatively to $258.55 \pm 15.95 \mu\text{m}$ on POD1, $257.02 \pm 19.70 \mu\text{m}$ at 1 month, $257.60 \pm 14.95 \mu\text{m}$ at 3 months, and $255.03 \pm 19.21 \mu\text{m}$ at 6 months (all $p < 0.001$). Significant increases were also observed in the superior quadrant at 1 month ($p=0.03$), nasal quadrant at 1 month ($p=0.03$), and temporal quadrant at 3 months ($p=0.03$). Central macular thickening at 6 months was positively correlated with operative time ($r = 0.263$, $p = 0.004$), phaco time ($r = 0.290$, $p = 0.001$) & phaco energy ($r = 0.336$, $p < 0.001$).

Conclusions: Shortened surgical time, reduced ultrasound energy, and the use of femtosecond laser-assisted cataract surgery, which requires minimal ultrasound energy, are key strategies to lower the risk of pseudophakic cystoid macular edema following uncomplicated phacoemulsification.

Abstract No.: 203454

Visual and Structural Changes Following Subtenon Stem Cell Therapy in a Patient With Dry Age-Related Macular Degeneration: A Case Report

First Author: Shahzoda JURAKHONOVA

Purpose: Dry age-related macular degeneration (AMD) remains a major cause of irreversible vision loss, with no approved therapies capable of restoring photoreceptor function. Regenerative treatments, such as stem cell therapy, are under investigation for their potential to slow progression and support

retinal recovery. This case highlights partial visual and anatomical improvement following sub-Tenon stem cell therapy in a patient with intermediate-stage dry AMD.

Methods: A 51-year-old woman with Charcot-Marie-Tooth disease and amblyopia presented with progressive visual decline over two years. Optical coherence tomography (OCT) of the left eye revealed multiple drusen, perifoveolar thinning, and disruption of the ellipsoid zone and retinal pigment epithelium, consistent with intermediate-stage dry AMD. Best-corrected visual acuity (BCVA) was 0.4 (OS) and 0.3 (OD). In July 2024, she underwent pyramidal Alloplant therapy (subcutaneous implantation of allogenic biomaterial) at an external center. Four months later, in November 2024, she received a sub-Tenon injection of placenta-derived mesenchymal stem cells (2.5 mL) in the left eye. Daily supplementation with OcuVit Forte and omega-3 was prescribed post-treatment.

Results: At 7-month follow-up, BCVA improved to 0.7 (OS). OCT showed localized thickening in perifoveolar areas and a stable foveal structure. Visual field testing demonstrated increased sensitivity in the left eye. No complications were observed. The right eye remained anatomically stable but functionally limited due to amblyopia and early lenticular changes.

Conclusions: This case suggests that sub-Tenon stem cell therapy may contribute to localized visual and structural improvement in intermediate-stage dry AMD. Controlled studies are needed to evaluate its long-term safety and therapeutic potential.

Abstract No.: 205596

Vitrectomy Combined With Dexamethasone Sustained-Release Implant Injection for Residual Macular Edema Following Surgery for Macular Epiretinal Membrane

First Author: Bo QIN

Co-Author(s): Yijie LU

Purpose: To investigate the efficacy and safety of using a sustained-release dexamethasone implant during surgery, combined with 25G vitrectomy and pre-retinal membrane peeling, in patients with idiopathic macular epiretinal membrane.

Methods: A retrospective analysis was conducted on patients with idiopathic macular pucker. Some patients underwent 25G-puncture vitrectomy and internal limiting membrane peeling (the “control group”), while the remaining patients received 25G-puncture vitrectomy and internal limiting membrane peeling combined with dexamethasone implant (the “DEX group”). Best-corrected visual acuity was assessed using Snellen visual acuity ratios. Anatomical outcomes (macular center thickness and total macular volume) were analyzed via spectral-domain optical coherence tomography.

Results: (1) Macular epiretinal membrane: Preoperative OCT and multifocal ERG can predict prognostic markers for macular epiretinal membrane surgery. (2) After 6 months of follow-up, best-corrected visual acuity significantly improved in both groups, and macular thickness significantly decreased in both groups. Finally, at the last follow-up, total macular volume significantly decreased in both groups, showing similar trends.

Conclusions: The long-acting dexamethasone sustained-release implant used during macular epiretinal membrane surgery is a potent anti-inflammatory agent demonstrating significant efficacy in the eyes of patients following vitrectomy.

Translational Research in Ophthalmology

Abstract No.: 200971

A Mosquito Proboscis-Inspired Cambered Microneedle Patch for Ophthalmic Regional Anaesthesia

First Author: Sun XUEQUAN

Purpose: Considering the certain limitations (e.g., pain, the requirement of skilled professionals, or slow passive diffusion) of conventional delivery methods of local anesthetics, developing alternative strategies that offer minimally invasive yet therapeutically effective delivery systems is of great concern for ophthalmic regional anesthesia.

Methods: In this study, a rapidly dissolving cambered microneedle (MNs) patch, composed of poly(vinylpyrrolidone) (PVP) and hyaluronic acid (HA) and served as a delivery system for lidocaine(Lido) in local anesthesia, was developed taking inspiration from the mosquito proboscis's ability to extract blood unnoticed. The lidocaine-containing MNs patch (MNs@Lido) consisted of 25 microneedles with a four-pronged cone structure (height: 500 μ m, base width: 275 μ m), arranged in a concentric circle pattern on the patch, and displays excellent dissolubility for effective drug delivery of Lido.

Results: After confirming good cytocompatibility, MNs@Lido was found to possess adequate rigidity to penetrate the cornea without causing any subsequent injury, and the created corneal pinhole channels completely self-healed within 24 h. Interestingly, MNs@Lido exhibited effective analgesic effects for local anesthesia on both heel skin and eyeball, with the sustained anesthetic effect lasting for at least 30 min.

Conclusions: These findings indicate that the mosquito proboscis-inspired cambered MNs patch provides rapid and painless local anesthesia, overcoming the limitations of conventional delivery methods of local

anesthetics, thus opening up new possibilities in the treatment of ophthalmic diseases.

Abstract No.: 205124

A Novel Fixation Ring Integrated Suprachoroidal Space Micro-Shunt Implantation System for Glaucoma

First Author: Chan ZHAO

Purpose: To develop a novel ab externo suprachoroidal space (SCS) micro-shunt implantation system for glaucoma.

Methods: We engineered an ab externo SCS micro-shunt implantation system following viscoelastic expansion of the SCS with our novel resistance-sensing injector. Two delivery paradigms with 4 different micro-shunt designs were incrementally developed and tested in a steroid-induced ocular hypertension rabbit model: (i) wire-guided insertion of polyethersulfone (PES) tubes (smooth and retention-ring variants) and (ii) in-situ release of nickel–titanium (NiTi) micro-shunts (helical tube design and straight tube with integrated fixation ring design).

Results: In rabbits, wire-guided smooth PES tubes showed satisfactory IOP reduction but a 28% dislocation rate. The wire-guided retention-ring PES variant reduced dislocation to 16.7%, but it led to increased malposition. The in-situ release approach using the helical NiTi prototype disappointingly showed low implantation success (20%). Encouragingly, the straight NiTi tube with an integrated fixation ring demonstrated stable placement, accurate positioning, and effective IOP control. Version 2 (outer diameter 0.2 mm; distal segment 0.5/1.0/2.0/2.5 mm) achieved 100% implantation success with 0% dislocation and no corneal touch or hypotony during 4-week follow-up; the 1.0-mm and 2.5-mm distal segments variants provided the most consistent efficacy, with 83.3% (15/18) achieving $\geq 20\%$ IOP reduction. Finite-element and benchtop tests demonstrated more efficient outflow compared to straight tube without fixation ring.

Conclusions: Our novel fixation ring integrated NiTi micro-shunt implantation system enables safe, rapid, sutureless, and multi-mechanistic IOP control and suggests potential for durable outcomes.

Abstract No.: 206092

Anti-Adhesive Tough Silk/Hydrogel Composites for Symblepharon Treatment

First Author: Renjian HU

Co-Author(s): Xiuming JIN

Purpose: In this work, we developed a novel anti-adhesion composite from fabric-reinforced double network hydrogels for the treatment of symblepharon after alkali burn, which realized the combination

of stable mechanical strength and good tissue anti-adhesive ability.

Methods: In this study, based on the radical polymerization of double network hydrogel and strong interaction with enhanced silk fiber, we present here a specific composite for the treatment of symblepharon. Tensile tests were performed to verify its mechanical properties. Owing to the enhancement of the silk fiber, the composite is tough enough to sustain the surgery process. Cell adhesive and toxicity tests showed that the composite with a super-hydrophilic surface endowed it with reliable cell isolation towards target sites and great biocompatibility. Besides, the conjunctival alkali burn model of rabbits was employed to evaluate the anti-adhesion efficacy of the composite. The composite graft showed good anti-tissue adhesion properties.

Results: In summary, we developed a novel anti-adhesion composite from fabric-reinforced double network hydrogels for the treatment of symblepharon after alkali burn, which realized the combination of stable mechanical strength and good tissue anti-adhesive ability. Our composites could effectively prevent the formation of symblepharon, which shows a great potential for wider clinical treatments of relieving tissue adhesion.

Conclusions: The composite is easily handled, biocompatible, conducive to mass production, and most importantly, tissue anti-adhesion to satisfy the clinical requirements for anti-adhesion graft materials. Therefore, our composite material exhibits great potential to be used as an anti-adhesion material not only in ocular surface disease but also in more extensive tissues.

Abstract No.: 208277

Associations of Polymorphisms in FCGR2B, FRMD4B and VPS13B With Immunoglobulin G4- Related Ophthalmic Disease: A Territory-Wide Cross-Sectional Study

First Author: Kenneth Ka Hei LAI

Co-Author(s): Guy Lj CHEN, Kelvin CHONG, Pancy Os TAM, Clement THAM, Yuyao WANG, Alvin L YOUNG

Purpose: The aim is to study the genetic susceptibility of immunoglobulin G4-related ophthalmic disease (IgG4-ROD) by evaluating associations between IgG4-ROD and selected single-nucleotide polymorphisms (SNPs) previously reported in IgG4-related disease (IgG4-RD).

Methods: Cross-sectional, case-control genetic association study. Ninety-four biopsy-proven IgG4-ROD patients and 529 age-, sex-, and ethnically matched healthy controls were recruited from the Hong Kong IgG4-ROD territory-wide cohort. Eighteen candidate SNPs across 14 genes previously associated with IgG4-

RD were selected from the literature and genotyped in all participants using TaqMan assays.

Results: Three SNPs demonstrated associations with IgG4-ROD. The strongest association was observed for rs1340976 in FCGR2B, which conferred a protective effect (OR = 0.40; 95% CI = 0.28–0.57; $P = 5.30 \times 10^{-7}$) and remained significant in both males and females after multiple testing correction. In contrast, rs9831516 in FRMD4B (OR = 0.69; 95% CI = 0.49–0.96; $P = 0.0302$) and rs10955197 in VPS13B (OR = 1.34; 95% CI = 1.025–1.77; $P = 0.0325$) showed nominal significance and were limited to males.

Conclusions: This study identifies FCGR2B as a genetic locus associated with susceptibility to IgG4-ROD, supporting a role for B cell regulation in pathogenesis. While FRMD4B and VPS13B showed nominal associations. The absence of associations with other IgG4-RD loci highlights potential genetic heterogeneity between organ-specific manifestations.

Abstract No.: 204893

Augmented Reality-Based Pathway-Specific Dichoptic Therapy Compared With Conventional Occlusion in Adult Amblyopia

First Author: Yulian ZHOU

Co-Author(s): Xinyan DUAN, Yige GAO, Shuyang GUO, Yazhu QIAN, Wen WEN, Peng ZHANG, Chen ZHAO

Purpose: Dichoptic training has shown promising performance in restoring visual function in amblyopes beyond the critical period in the laboratory. However, the treatment outcome is variable and indeterminate in actual clinical and neuroscientific practice. In this study, we introduced a novel dichoptic therapy for adult amblyopia that leverages an augmented-reality (AR) technique to selectively enhance parvocellular pathway function, based on neural deficits of amblyopia in monocular processing and binocular interactions revealed in our previous work.

Methods: This single-center prospective nonrandomized study enrolled adults with unilateral amblyopia assigned to two parallel groups, who received home-based treatment (patching or AR-based dichoptic training) for 2 hours per day over a 24-week period. Visual functions were assessed at baseline and week 1/4/12/24 after treatment, including best-corrected visual acuity at distance and near, uncrowded/crowded VA with single tumbling E target, contrast sensitivity, binocular rivalry, and phase combination, using visual psychophysical methods.

Results: We enrolled 27 patients in the training group and 21 patients in the patching group in this study. During 24 weeks of home-based dichoptic training with wearable AR glasses, participants demonstrated high at-home treatment adherence (78.7%±22.3% cumulative time of prescribed totals), with marked improvements in monocular visual functions of

the amblyopic eye, binocular functions, and neural activities biased to the parvocellular pathway. Compared to conventional occlusion therapy, this pathway-specific, AR-based dichoptic therapy generally enables more rapid and pronounced functional gains.

Conclusions: AR-based pathway-specific dichoptic therapy targeting the selective deficits in the parvocellular pathway represents a promising therapeutic strategy for improving visual outcomes in adults with amblyopia.

Abstract No.: 202669

Bacterial-Synthetic Biomimetic Cornea for Scarless Regeneration of Large-Scale Corneal Defects

First Author: Liyin **WANG**

Co-Author(s): Jing **ZHAO**, Xingtao **ZHOU**

Purpose: Corneal transplantation faces challenges such as donor shortage and the difficulty in matching the physicochemical and biocompatible properties of artificial corneal materials with those of the human cornea. This study aimed to develop a novel bioengineered cornea using bacterial nanocellulose (BC) to address these limitations.

Methods: Dialdehyde bacterial nanocellulose (DBC) was synthesized using a bacterial synthesis system combined with aldehyde modification. Surface modification with human lenticule microparticles (L) and Celastrol (Cel) yielded a custom-sized bacterial-engineered bio-cornea (DBC@L-Cel). The transmittance and mechanical properties were assessed subsequently. In vitro, the effects of DBC@L-Cel on the major cellular components of the cornea were investigated through immunofluorescence, flow cytometry, and transcriptome sequencing of corneal epithelial cells and stromal cells. In vivo, a rabbit model with a large-diameter corneal defect was treated with DBC@L-Cel to evaluate its efficacy in promoting corneal regeneration.

Results: DBC@L-Cel exhibited a high light transmittance of 91.91% and mechanical properties comparable to those of the human cornea. In vitro, modification with L and sustained release of Cel reduced stromal fibrosis by inhibiting the AGE/RAGE pathway and promoted epithelial proliferation and adhesion by upregulating the Wnt/ β -catenin pathway. In a rabbit model of large-area corneal defect, transplantation of DBC@L-Cel significantly enhanced the repair and regeneration of both the corneal stroma and epithelium, enabling rapid and scarless reconstruction of damaged corneal tissue.

Conclusions: These findings show that DBC@L-Cel is a potential alternative material for corneal transplantation to achieve rapid scar-free corneal regeneration.

Abstract No.: 200310

Bioengineered Intravitreal Stem Cell Factor Enables Long-Lasting Neurovascular Repair in Chronic Retinal Ischemia

First Author: Xi **CHEN**

Purpose: Retinal ischemia underlies vision loss in diseases such as ocular ischemic syndrome, diabetic retinopathy, glaucoma, and vascular occlusions. Effective neurovascular-targeted therapies remain lacking. We investigated a bioengineered intravitreal formulation of stem cell factor (SCF) to protect retinal structure and function in a chronic ischemia model by modulating the neurovascular unit (NVU).

Methods: Recombinant SCF was incorporated into a thermosensitive hydrogel (SCF-HG), forming a sustained-release depot after intravitreal injection. SCF-HG retained >90% bioactivity over four weeks in vitreous-mimetic conditions. Brown Norway rats underwent bilateral common carotid artery occlusion, followed by a single intravitreal injection of SCF-HG (200 ng SCF) or hydrogel control. Retinal function (ERG, light/dark box, optokinetic tracking), structure (ONL thickness, Brn3a⁺ RGCs, synaptic markers), and NVU integrity (CD31 angiography, GFAP/Iba1 staining) were evaluated over 28 days. Bulk RNA-seq and qRT-PCR analyzed Wnt pathway activation.

Results: SCF-HG sustained therapeutic SCF levels in vivo. Treated eyes preserved ONL thickness (+35%, $p < 0.001$) and Brn3a⁺ RGCs (+60%, $p < 0.001$), enhanced synaptic density (+45%, $p < 0.01$), and maintained interneuron populations. Functional improvements included 2.3-fold higher ERG amplitudes, 50% reduction in light avoidance, and 32% gain in spatial acuity. NVU integrity improved with 42% vascular recovery and 52% reduction in glial activation. Transcriptomics revealed activation of the Wnt7a/b-Lrp5-Lgr5 axis.

Conclusions: The SCF-HG platform enables sustained intravitreal delivery and restores neurovascular function in chronic retinal ischemia. This bioengineered therapeutic holds translational potential for ischemic retinal disease treatment.

Abstract No.: 202394

Cis- and Trans-Regulatory Factors Independently Shape Phenotypic Heterogeneity of Retinitis Pigmentosa

First Author: Cong **CUI**

Co-Author(s): Ayaka **DAN**, Dexin **MENG**, Shigeru **SATO**, Takumi **TATENO**, Motokazu **TSUJIKAWA**

Purpose: Retinitis pigmentosa (RP) shows striking clinical heterogeneity even among patients carrying identical pathogenic mutations, but the genetic basis of this variability remains poorly defined. Although modifier effects have long been hypothesized, direct in vivo validation has been lacking. Using a transgenic zebrafish model carrying the human rhodopsin S334X

mutation, we aimed to dissect cis- and trans-regulatory contributions to RP phenotypic variation and provide mechanistic insights into disease heterogeneity.

Methods: Rod photoreceptor survival was quantified in multiple generations of S334X transgenic zebrafish. Whole-genome sequencing, PCR genotyping, RT-qPCR, and luciferase assays were performed to characterize potential cis-regulatory variants. Segregation analysis and statistical modeling were applied to evaluate trans-acting modifiers.

Results: Two distinct mechanisms modulating RP severity were identified. A benign subline displayed markedly attenuated degeneration fully linked to the S334X allele. Targeted sequencing revealed a unique 3-bp insertion upstream of the transgene, acting as a cis-regulatory variant that significantly reduced rhodopsin expression, confirmed by RT-qPCR and luciferase assays. Unexpected segregation of severe-like phenotypes within this benign line followed a Mendelian 1:1 ratio, independent of the transgene, strongly suggesting a dominant trans-acting modifier. Both cis and trans effects were validated across generations, demonstrating stable inheritance and independent contributions.

Conclusions: This study provides the first in vivo evidence that cis- and trans-regulatory elements can independently and cooperatively shape RP phenotypes in a shared genetic background. These findings highlight the importance of genetic modifiers in clinical heterogeneity and suggest new avenues for personalized management of RP.

Abstract No.: 205826

Correlations of Th1, Th17, and Tfh Cells With Clinical Activity Scores of Thyroid Eye Disease and Euthyroid Graves' Ophthalmopathy Patients

First Author: Tsz Chun Jason **WONG**

Co-Author(s): Hemlata **BISNAUTHSING**, Kam Lung Kelvin **CHONG**, Wai Kit **CHU**

Purpose: Thyroid Eye Disease (TED) is an autoimmune orbital disease. Many immune cells, especially T cells, have been reported to be integral in TED pathogenesis. In this study, we investigated the relationship between various T cell populations and Clinical Activity Score (CAS) in Thyroid Eye Disease (TED) patients, alongside those with Euthyroid Graves' Ophthalmopathy (EGO).

Methods: T helper (Th) 1 cells, Th17 cells, and follicular helper T (Tfh) cells were measured in peripheral blood mononuclear cells (PBMC) of a Chinese cohort of TED and EGO patients. Cell abundance was measured using flow cytometry. CAS was evaluated based on the clinical activity of TED, based on the European Group of Graves Orbitopathy (EUGOGO) classification. Correlations between cell types and CAS were measured by Pearson and a paired t-test.

Results: Twenty patients were recruited in both TED (11, age=48.54±8.73 years) and EGO (9, age=45.22±13.93 years) groups. The abundance of Tfh cells (15.89±2.11%) was significantly higher ($p<0.01$) than Th1 and Th17 cells (6.4 ±0.67%; 1.4±0.25%) in TED. Similarly, Tfh cells (14.38±2.85%) were also significantly more abundant than Th1 and Th17 cells in EGO (6.52±0.76%; 1.66±0.27%). There was no significant correlation between various T cell populations and CAS in both TED (Th1: $r=0.22$, $p<0.74$, Th17: $r=-0.40$, $p<0.11$, Tfh: $r=-0.31$, $p<0.82$) and EGO (Th1: $r=-0.04$, $p<0.46$, Th17: 0.58, $p<0.93$, Tfh: $r=0.39$, $p<0.83$).

Conclusions: There is noticeable elevation of Tfh cells in both TED and EGO groups; however, there is no correlation between various T cell populations and CAS scores.

Abstract No.: 204204

Corvis ST-Derived Biomechanical Markers Predict Early Corneal Endothelial Abnormalities

First Author: Chengjie **FENG**

Co-Author(s): Miaomiao **CHI**, Shaofeng **GU**, Jing **HONG**

Purpose: Early detection and mechanism exploration of idiopathic endothelial compromise remains challenging, while corneal biomechanics offers a novel approach to identify high-risk eyes before irreversible decompensation occurs. This study aimed to investigate the association between corneal biomechanical parameters and endothelial status, identify potential biomechanical markers for early endothelial abnormalities, and explore the biomechanical manifestations of idiopathic endothelial impairment.

Methods: Corvis ST-derived biomechanical parameters and specular microscopy-based endothelial metrics: endothelial cell density (ECD), hexagonality (HEX), and coefficient of variation in cell size (CV) were assessed. Stratified correlation analysis across central corneal thickness (CCT) subgroups and least absolute shrinkage and selection operator (LASSO) logistic regression were applied to explore biomechanical-endothelial coupling and develop a predictive model.

Results: Stiffness parameter at first applanation (SSI), radius of curvature at highest concavity (HCR), length of flattened cornea at second applanation (A2L), time from start until first applanation (A1T), and corrected tomographic biomechanical index (ctBI) differed significantly between normal and abnormal endothelial groups. Stratified analysis revealed the strongest biomechanical-endothelial correlations in mid-range CCT (530–570 μm). A2L was identified as an independent protective factor for endothelium (OR: 0.202, 95%CI: 0.051–0.731, $p=0.018$). Both the biomechanically derived DASC (A2L, DA, SSI, and CCT) model (AUC: 0.711, 95%CI: 0.614–0.808) and the

cTBI score (AUC: 0.683, 95%CI: 0.565–0.800), which was initially developed for keratoconus screening, demonstrated significant discriminative capacity for detecting endothelial abnormalities.

Conclusions: Corneal biomechanics reflect early endothelial alterations. A2L, cTBI, and the DASC model may serve as potential tools for noninvasive risk stratification in elderly patients.

Abstract No.: 204307

Cytosolic Nuclear DNA Drives AMD Progression via 2'3'-cGAMP-Mediated STING Activation and Paracrine Senescence

First Author: Shuo **SUN**

Co-Author(s): Xiaorong **LI**, Haijiang **LIN**

Purpose: To investigate the role of cytosolic nuclear DNA (nDNA) in retinal pigment epithelium (RPE) cells in age-related macular degeneration (AMD), focusing on STING pathway activation and 2'3'-cGAMP-mediated paracrine senescence and inflammation.

Methods: Cytosolic nDNA accumulation was examined in macular RPE cells from AMD donors and controls. DNASE2A-deficient RPE cells were generated using CRISPR/Cas9 to model impaired DNA degradation. Senescence-associated β -galactosidase staining, cytokine assays, and transcriptomic profiling were used to assess cellular responses. STING knockdown determined its role in mediating the senescence-associated secretory phenotype (SASP). Extracellular and intracellular 2'3'-cGAMP levels were quantified, and its uptake via volume-regulated anion channels (VRACs) was tested. Conditioned medium from DNASE2A^{-/-} RPE cells was applied to ARPE-19 cells and macrophages to evaluate paracrine effects. In vivo, conditional Dnase2a^{-/-} mice and subretinal injection of 2'3'-cGAMP in C57BL/6 mice were used to assess retinal structure and function.

Results: AMD macular RPE cells showed increased cytosolic nDNA and elevated 2'3'-cGAMP. DNASE2A deficiency induced nDNA accumulation, RPE senescence, and SASP cytokine secretion, which were reversed by STING knockdown. Conditioned medium from DNASE2A^{-/-} cells promoted senescence and inflammation in RPE and macrophages via STING activation. Chronic exposure to 2'3'-cGAMP induced dose-dependent RPE senescence and SASP, attenuated by VRAC inhibition. In vivo, Dnase2a^{-/-} mice and 2'3'-cGAMP administration caused AMD-like retinal lesions, microglial activation, and complement deposition.

Conclusions: Cytosolic nDNA drives AMD pathogenesis through 2'3'-cGAMP-mediated STING activation, inducing senescence and inflammatory responses in RPE and immune cells. Modulating STING signaling or extracellular 2'3'-cGAMP uptake may offer novel therapeutic strategies.

Abstract No.: 201837

Engineer Circular ADAR-Recruiting RNA Base Editor as a Potential Treatment for Inherited Retinal Diseases

First Author: Liuhui **HUANG**

Co-Author(s): Satheesh **KUMAR**, Guei-sheung **LIU**

Purpose: Approximately 70% of inherited retinal disease (IRD) variants are point mutations that can cause vision loss. We aim to demonstrate precise correction of these variants using a circular guide RNA that recruits the ADAR enzymes.

Methods: A circular ADAR-recruiting RNA (cadRNA) with 200-nt complementary targeting sequences, flanked by autocatalytic ribozymes and containing a central A:C mismatch, was engineered to correct G>A variants. To enhance editing efficiency and enable single-AAV packaging, cadRNA was co-delivered with truncated ADAR1 and validated in HEK293 cells. On- and off-target editing events were quantified by deep sequencing and RNA-seq. Protein restoration was evaluated by flow cytometry (mCherry reporter) or Western blot. RNA-binding protein (RBP) motifs within guide-target regions were annotated using RBPMAP.

Results: Editing efficacy was first validated using a mutant mCherry reporter and benchmarked against CRISPR-Cas13 and the CRISPR-Cas-inspired RNA targeting system (CIRTS). CadRNA achieved 27.7% RNA editing and 33.6% protein rescue, outperforming CIRTS (12.6%; 17.8%) but below CRISPR-Cas13 (69.2%; 51.8%). For pathogenic RPE65 variants, cadRNA reached up to 24.7% editing efficacy with protein recovery. Moreover, cadRNA co-delivered with ADAR1 or truncated ADAR1 improved editing efficiency (3.3-29.7 fold, up to 52.8%), including sites refractory to CRISPR-Cas13 editor. Notably, editing efficiency inversely correlated with RBP motifs on the cadRNA binding region. Extending this approach to a large IRD gene, 45.2% correction of a common human USH2A (c.11864G>A) variant was achieved.

Conclusions: The engineered cadRNA base editor represents a promising strategy for correcting clinically relevant IRD variants.

Abstract No.: 202002

Experimental Research of Human Pluripotent Stem Cells Derived Endothelial Cells (hPSC-ECs) to Repair Choroidal Ischemia

First Author: Yuntao **HU**

Co-Author(s): Meng Da **LI**

Purpose: Choroidal atrophy is a common pathological change closely related to the development of dry age-related macular degeneration (AMD) and pathological myopia. We hope to develop a method to repair choroidal ischemia through stem cell transplantation.

Methods: We induced endothelial cells (EC) from hPSC and established a rat model of choroidal ischemia (CI). hPSC-ECs were transplanted into suprachoroidal space in the CI rats.

Results: We found that hPSC-ECs through the MESP1+ mesodermal progenitor stage express CECs-specific markers and can integrate into choriocapillaris. In a rat model of CI, transplantation of hPSC-ECs into the suprachoroidal space increased choroid thickness and vasculature density. Remarkably, EC transplantation improved the visual function of CI rats.

Conclusions: This work demonstrated that hPSC-ECs could be used to repair choroidal ischemia in the animal model, which may lead to a new therapy to alleviate choroidal atrophy implicated in dry AMD, pathological myopia, and other fundus diseases.

Abstract No.: 200616

First-in-Human iPS Cell Therapy: Ten-Year Follow-Up After Autologous iPS Cell-Derived Retinal Pigment Epithelium Sheet Transplantation for Neovascular Age-Related Macular Degeneration

First Author: Yasuo **KURIMOTO**

Co-Author(s): Masashi **FUJIHARA**, Yasuhiko **HIRAMI**, Michiko **MANDAI**, Daiki **SAKAI**, Sunao **SUGITA**, Seiji **TAKAGI**, Masayo **TAKAHASHI**, Midori **YAMAMOTO**

Purpose: Current treatments for neovascular age-related macular degeneration (nAMD) primarily target pathological neovascularization. However, because retinal pigment epithelium (RPE) deterioration plays a critical role in the disease's pathogenesis, restoring RPE function could provide a curative therapy. We report the 10-year clinical outcomes of the first-in-human autologous induced pluripotent stem (iPS) cell-derived RPE sheet transplantation for nAMD.

Methods: Autologous iPS cells were generated from the patient's skin and differentiated into RPE cells to produce an RPE sheet. Following surgical removal of macular neovascularization (MNV), the RPE sheet was transplanted subretinally. Safety was the primary endpoint, including tumorigenicity, graft failure, or other serious adverse events. Efficacy was evaluated by visual and anatomical outcomes.

Results: The transplanted RPE sheet remained stably engrafted for over 10 years. No tumor formation, graft failure, immune rejection, or other serious adverse events were observed. No recurrence of MNV occurred without any additional anti-vascular endothelial growth factor therapy. The preoperative best-corrected visual acuity of 0.09 was largely maintained. Imaging indicated preservation of photoreceptors and choriocapillaris adjacent to the graft.

Conclusions: This case marks the first-in-human application of iPS cell-derived tissue in a clinical setting, not only for nAMD but also across all medical fields.

The favorable long-term safety and anatomical findings provide strong evidence supporting the feasibility of iPS cell-based regenerative therapy for nAMD and reinforce its broader potential in regenerative medicine.

Abstract No.: 205346

Functional Engraftment of Genome-Edited Retinal Organoid Sheets in a Macaque Model of Macular Degeneration

First Author: Michiko **MANDAI**

Co-Author(s): Ryutaro **AKIBA**, Yingbin **FU**, Akihiro **KAWAI**, Yasuo **KURIMOTO**, Atsuta **OZAKI**

Purpose: The goal of this study was to investigate the functional synaptic integration potential of ON-bipolar cell (BC)-deficient retinal organoids (ROs) derived from human embryonic stem cells (hESC) following transplantation in a macaque model of macular degeneration.

Methods: Islet-1^{-/-} Crx::Venus reporter KhES-1 ROs, which lack ON-BCs, were transplanted into photoreceptor-ablated macular degeneration model of macaque eyes (n=4) in comparison with Islet-1^{+/+} ROs (n=2). Focal electroretinogram (ERG) was conducted during follow-up. After one year, immunohistochemistry (IHC) was performed to assess graft survival, cone ratio, host BC dendrite extension, and host-graft synaptic connectivity. Host-graft synapses were also confirmed by electron microscopy (EM).

Results: Focal ERG showed a significant increase in b-wave in 2 of 4 eyes with Islet-1^{-/-} ROs. All ROs consistently developed PRs with cone ratios of 80±17% and 77±21% in Islet-1^{+/+} and Islet-1^{-/-} grafts, respectively, with the absence of ON-BCs in Islet-1^{-/-} grafts. IHC revealed synaptic contacts between multiple host BC subtypes and CRX::Venus-positive PRs in Islet-1^{-/-} grafts. PKCα, EAAT2, and SCGN-positive host BCs extended dendrites over the graft compared to non-grafted areas. EM confirmed frequent triad synapses in grafted cone pedicles and host ON- and OFF-BC contacting graft PR synapse.

Conclusions: RO transplantation in a macaque model of macular degeneration developed a high ratio of cone PRs. Retracted host BCs regrew dendrites and formed functional synapses with grafted cone PRs, demonstrating plasticity and rewiring potential in primate macula.

Abstract No.: 205232**Generation of Vascularized Retinal Organoids Containing Microglia Based on a V-Bottom Microwell System***First Author: Jiansu CHEN**Co-Author(s): Hon Fai CHAN, Hang CHEN, Yuqin LIANG, Xihao SUN*

Purpose: Retinal organoids (ROs) offer a biomimetic in vitro model for investigating human retinal development and disease. However, current ROs face several limitations, such as the absence of vascular networks and microglial cells (MGs).

Methods: Here, we developed a vascularized retinal organoids (vROs) model by co-culturing vascular organoids (VOs) with ROs in a V-bottom polydimethylsiloxane (PDMS) microwell platform. Through co-culturing for 30 to 120 days, we observed the presence of tubular blood vessels at the center of vROs.

Results: Transcriptomic analysis revealed that the vROs were associated with angiogenesis and immune response. The RT-qPCR validated that the expression levels of genes involved in angiogenesis (TIE1, ANGPT1, ANGPT2, and ECSCR), immune response (C1QC, CD22, TLR2, TLR4, and IRF8), and microglia (AIF1, TMEM119, SPI1, and CSF1R) were significantly higher in the vROs than the ROs. Additionally, we treated VOs lipopolysaccharide (LPS) and the qPCR results showed that LPS stimulation caused a significant increase in the expression of the inflammatory cytokines TNF- α and IL-8 and MG marker AIF1. Interestingly, the expression levels of TNF- α and IL-8 were reduced in PLX5622 (CSF1R inhibitor to deplete MGs) treated VOs. Furthermore, we observed that MGs in VOs migrated and integrated into the vROs as VOs and ROs fused, with the vROs exhibiting responsiveness to inflammatory stimuli. The vROs expressed tight junction protein claudin-5 and displayed similar characteristics to the inner blood-retinal barrier (iBRB).

Conclusions: These vRO models, which incorporate vascular structures and MGs, provide a novel avenue for retinal vascular disease research and hold promise for future clinical applications.

Abstract No.: 204679**Harnessing Apoptotic Vesicles From SHED to Target PD1/PDL1 Immune Checkpoint for Metabolic and Vascular Repair in Ischemic Retinopathy***First Author: Guorui DOU**Co-Author(s): Tianfang CHANG, Yutong JING, Bei LI, Ziyi ZHOU*

Purpose: To evaluate the therapeutic potential of apoptotic vesicles (apoVs) derived from stem cells of human exfoliated deciduous teeth (SHED) in ischemic retinopathy, with a focus on clinical translation and

the novel role of the PD1/PDL1 immune checkpoint in regulating endothelial metabolism and vascular remodeling.

Methods: SHED-apoVs were isolated, characterized, and administered via intravitreal injection in a murine oxygen-induced retinopathy (OIR) model. Retinal vascular changes, neovascularization, avascular area, and visual function were assessed in vivo. In vitro, human umbilical vein endothelial cells (HUVECs) under hypoxia were treated with apoVs, with or without PD1/PDL1 blockade using neutralizing antibodies or shRNA knockdown. Endothelial glycolysis was measured via extracellular acidification rate (ECAR), lactate production, and 2-NBDG uptake.

Results: SHED-apoVs were efficiently internalized by endothelial cells, significantly reducing pathological neovascularization and non-perfusion area in OIR retinas. They promoted deep vascular plexus regeneration and improved electrophysiological function. Mechanistically, apoVs carried PD1, which bound to hypoxia-upregulated PDL1 on endothelial cells, inhibiting anaerobic glycolysis and suppressing angiogenic activation. Blockade of PD1/PDL1 reversed these metabolic and anti-angiogenic effects.

Conclusions: This study highlights SHED-apoVs as a novel, cell-free therapeutic strategy for ischemic retinopathy, leveraging the PD1/PDL1 immune checkpoint to modulate endothelial metabolism and restore vascular integrity. Its translational potential is underscored by bilateral efficacy, dose-dependent response, and absence of systemic toxicity, offering a promising alternative to anti-VEGF therapies.

Abstract No.: 205499**Human Induced Pleuripotent Stem Cells for Corneal Epithelial Formation and Immunobiology of HSV-1 Infective Keratitis***First Author: Bakiah SHAHARUDDIN**Co-Author(s): Komathi SELVARAJAH, Jun Jie TAN, Muhammad Amir YUNUS, Nor Effa Syazuli ZULKAFI*

Purpose: The absence of pertinent human models has constrained our comprehension of HSV-1 pathogenesis in ocular tissues, notwithstanding substantial study efforts. This study presents a novel employment of corneal epithelial-like cells (CECs) from human induced pluripotent stem cells (hiPSCs) to examine HSV-1 infectivity, replication dynamics, and the interactions between virus particles and host cells.

Methods: A stepwise differentiation method modulated by Bone Morphogenetic Protein (BMP) signaling pathway and employed small-molecules, specifically the RBE cocktail, followed by maturation on collagen IV-coated substrates.

Results: This strategy effectively led to hiPSC lineage specification, as evidenced by the strong expression of key biomarkers such as $\Delta Np63$ ($72.37\% \pm 10$) and

PAX6 (72.07% $\pm$ 2), ABCG2 (86.24% $\pm$ 8) and ABCB5 (80.85% $\pm$ 8), and CK3 (67.97% $\pm$ 10) and C12 (87.96% $\pm$ 9). The findings highlight the critical function of the viral immediate-early gene product, infectious cell protein-4 (ICP4), in promoting HSV-1 proliferation and cytopathogenicity within corneal epithelial cells. This model is also useful to demonstrate immunological responses in conjunction with HSV-1 replication, demonstrating increased levels of pro-inflammatory cytokines such as TNF-alpha and antimicrobial peptides Beta Defensin 1 and Beta Defensin 2.

Conclusions: BMP-modulated and RBE-mediated differentiation of hiPSCs on collagen IV-coated plates provides the most effective and scalable method for deriving CECs. This optimized differentiation system positions hiPSC as a platform for studying HSV-1 pathogenesis, immune mechanisms, and potential therapeutic interventions in herpetic keratitis.

Abstract No.: 204179

Human Retinal Organoids Restore Visual Function After Transplantation Into the Transected Optic Nerve

First Author: Yu **GONG**

Co-Author(s): Jiawen **LI**, Weihua **YU**

Purpose: Functional restoration of the adult mammalian vision remains unattainable following complete transection of the optic nerve. In this study, we addressed this challenge by transplanting human retinal organoids into the transection cavity of the optic nerve in adult rats.

Methods: Human retinal organoids were heterotopically transplanted into the intrathecal cavity of rats subjected to complete optic nerve transection. Functional recovery was assessed by optic nerve potentials (ONPs) and visual evoked potentials (VEPs), direct pupillary light reflex (PLR), optokinetic response (OKR), and visual guided behavioral tests at one and three months post-transplantation. Neuroanatomical integration was examined by optical coherence tomography (OCT), anterograde neural tracing, and tissue clearing-based 3D reconstruction.

Results: At one month post-transplantation, 67.5% of animals receiving hROs transplantation exhibited significant recovery of PLR and VEP amplitudes compared with transected controls, along with improved visual discrimination behaviors. These functional improvements were sustained for at least three months. Transplanted hROs survived in the intrathecal cavity and extended human axon-like fibers across the transection site toward central targets. Electrophysiological and neuroanatomical analyses confirmed the functional reconnection of the transected optic nerve, demonstrating reestablished neural pathways from the transplanted retinal organoids to central visual targets.

Conclusions: Our study provides proof-of-concept that heterotopic transplantation of human retinal organoids can repair complete optic nerve transection and restore visual function in adult mammals. The findings highlight a novel and translationally promising therapeutic strategy for severe optic nerve injuries.

Abstract No.: 204895

Hybrid Cell Membrane Coated Nanoparticles for Targeted Therapy of Early Diabetic Retinopathy

First Author: Fan **YANG**

Co-Author(s): Haijun **GONG**, Shurong **GUO**, Yuqing **LAN**, Qihang **ZHOU**

Purpose: Diabetic retinopathy (DR), a complication of diabetes mellitus, requires effective and early intervention to prevent progression. This study evaluated a biomimetic nanoparticle platform for targeted, noninvasive treatment of early DR.

Methods: Hybrid nanoparticles were created by coating poly(lactic-co-glycolic acid) cores with fused membranes from red blood cells (RBCs) and retinal endothelial cells (ECs). The membrane-to-core ratio was optimized to preserve CD47 (immune evasion) and vascular endothelial cadherin (endothelial targeting). Endothelial cell migration and targeting were assessed in vitro. Streptozotocin-induced diabetic rats received intravenous treatment, followed by evaluation of retinal accumulation, vascular leakage, inflammatory markers, and systemic safety.

Results: Nanoparticles demonstrated stability, retained membrane proteins, and showed enhanced endothelial targeting. In diabetic rats, treatment resulted in selective retinal accumulation, decreased vascular endothelial growth factor expression, reduced leakage, and fewer acellular capillaries. Transcriptomic analysis indicated restoration of lysosomal function, lipid metabolism, and tumor necrosis factor-related inflammatory pathways. Systemic lipid profiles were improved without hematological or hepatic toxicity.

Conclusions: Hybrid RBC-EC membrane-coated nanoparticles provided targeted delivery, vascular protection, and favorable safety. This platform represents a promising noninvasive therapeutic approach for early DR.

Abstract No.: 206063

Implementation of an Automated Visual Acuity Test in a Public Hospital in Singapore – a Preliminary Analysis

First Author: Rubin **YONG**

Co-Author(s): David **CHEN**, Victor **KOH**, Zhi Wei **LIM**

Purpose: To evaluate productivity gains from using the self-administered Automated Visual Acuity Test (AVAT)

device for visual acuity (VA) testing in a tertiary hospital ophthalmology outpatient clinic in Singapore.

Methods: The AVAT device was implemented in an ophthalmology outpatient clinic, within the same space allocated for conventional VA testing. A preliminary retrospective analysis evaluated real-world clinical performance pre- and post-deployment (April–June 2024 vs 2025). Data from electronic health records, including the total number of patients requiring VA testing, AVAT utilization rate, VA waiting time, patient experience survey (PES) scores for VA waiting time, and overall clinic satisfaction, were evaluated.

Results: The pre-deployment period (April–June 2024) recorded 8,072 VA tests, while 9,006 tests were conducted post-deployment (April–June 2025). Following implementation, AVAT replaced 39.6% ($\pm 0.21\%$) of daily VA tests, previously performed in manual Snellen chart lanes. The median waiting time for VA testing significantly improved from 8 minutes (IQR 3–19) to 6 minutes (IQR 2–15), representing a 25% reduction (Mann–Whitney U, $Z = -15.2$, $p < 0.0001$). The PES score for waiting time improved by 6.4% (from 43.2% to 49.6%), while overall clinic satisfaction increased by 4.7% (from 83.7% to 88.4%).

Conclusions: In high-volume ophthalmology outpatient clinics, VA testing is an essential functional test and a common bottleneck in the patient journey. AVAT reduces VA waiting time without requiring additional space. With current utilization at 40%, increased adoption could yield further efficiency gains, streamline workflow, increase capacity to accommodate higher patient volumes, and enhance patient experience.

Abstract No.: 204547

In Vitro Cytotoxicity and In Vivo Evaluation of Therapeutic Effect of Kelulut Honey Eyedrop for Dry Eye Therapy

First Author: Shahidatul Adha **MOHAMAD**

Co-Author(s): Nur Karyatee **KASSIM**, Norsuhana **OMAR**, Tuan Nadrah Naim T **ISMAIL** @ T **MANAH**, Kannan **THIRUMULU PONNURAJ**

Purpose: This study evaluates the therapeutic potential of Kelulut honey (KH), derived from Malaysian stingless bees (*Trigona* spp.), as a sustainable and locally sourced alternative for dry eye management. Building on the global precedent set by Manuka honey-based formulations (Optimel), KH offers a unique bioactive profile and ecological advantage.

Methods: In vitro testing was performed using human conjunctival epithelial cells (HConEPiC). KH samples with native pH ranging from 2 to 5 were tested at concentrations from 0.25 to 10 mg/mL, following ISO 10993-5 standards. KH eyedrops (KHED) were subsequently formulated based on the concentration-dependent viability results for further in vivo evaluation involving 18 male New Zealand White rabbits with

induced dry eyes. Subjects are randomized into six groups: negative control, positive control (Hyaluronan Eyedrop), and KHED formulations (0.625%, 12.5%, 25%, 50%). Clinical assessments include Schirmer test, tear break-up time (TBUT), corneal fluorescein staining, and conjunctival impression cytology (CIC). Post-treatment evaluations will include histopathological analysis of the enucleated eyes.

Results: KH concentrations up to 10 mg/mL maintained cell viability above 70% with no cytotoxic reactivity. Mild cytotoxicity at higher concentrations is likely due to the natural high acidity of honey. Ongoing formulation adjustments aim to buffer pH and improve ocular biocompatibility, enhancing patient comfort and therapeutic tolerability.

Conclusions: This study represents a translational initiative to advance KH from laboratory validation toward a clinically viable and safe ophthalmic formulation for dry eye therapy. Preliminary in vivo findings will be presented at APAO 2026.

Abstract No.: 207461

JAK Inhibitor Eye Drops for the Treatment of Non-Infectious Anterior Uveitis: A Randomized, Double-Masked, Active-Controlled, Phase 2 Clinical Trial of VVN461 in China

First Author: Liu **YANG**

Co-Author(s): Hong **DAI**, Lei **FENG**, Bing **JIANG**, Dan **LIANG**, Yanyun **SHI**, Yuqin **WANG**, Meifen **ZHANG**, Xiaomin **ZHANG**, Yihua **ZHU**

Purpose: To evaluate the efficacy and safety of 0.5% and 1.0% VVN461 Solution (JAK1/TYK2 inhibitor) in patients with non-infectious anterior uveitis (NIAU).

Methods: In this phase 2, multicenter, randomized, double-masked study, 83 patients with NIAU were randomized to receive either 0.5% VVN461 ($n=27$) or 1.0% VVN461 ($n=29$) or 1.0% prednisolone acetate (PA) eye drops ($n=27$), 6 times/day (Q2h) for 7 days; QID for 7 days; BID for 7 days; and QD for 7 days. The primary outcome was that the anterior chamber cell grade improved by at least 2 grades from baseline on day 14.

Results: Success rates were 92.6% of 0.5% VVN461, 96.6% of 1.0% VVN461, and 77.8% in PA (within the 90% confidence non-inferiority margin of 17.5%). No safety events of concern were observed.

Conclusions: VVN461 showed a clinically meaningful anti-inflammatory effect, at least as good as the standard of care (PA), in both VVN461 treatment groups. There were no meaningful safety issues with VVN461.

Abstract No.: 208523

LNP Screening for mRNA Delivery in Ocular Disease

First Author: Hao TIAN

Co-Author(s): Kam LEONG

Purpose: To identify lipid nanoparticle (LNP) formulations suitable for ocular mRNA delivery with potential applications in gene therapy.

Methods: Cre mRNA-loaded LNPs were constructed and delivered to mCherry-stop-EGFP reporter retinal pigment epithelial (RPE) cells. Gene expression and editing efficiency were quantified based on the fluorescence conversion ratio. By incorporating different helper lipids and adjusting the component ratios within the formulations, the particle size and surface charge of LNPs were modulated. In vitro screening was then performed to determine the formulations with the highest delivery efficiency in RPE cells.

Results: Screening of 105 formulations revealed that LNPs with an mRNA-to-lipid mass ratio of 20:1–40:1 achieved optimal delivery efficiency. The highest transfection efficiency was observed when the molar ratio of cationic lipids accounted for 5–10% of total lipids, anionic lipids for 10–20%, and neutral lipids for 20–30%. The most effective formulations exhibited particle sizes around 200 nm and zeta potentials ranging from –10 mV to +10 mV. Cationic and neutral lipid-based LNPs showed slightly higher delivery efficiency, while anionic and neutral lipid-based LNPs demonstrated better biocompatibility and lower cytotoxicity.

Conclusions: Our study identified different LNP formulations with optimal in vitro delivery efficiency, providing a valuable foundation for subsequent in vivo screening and therapeutic applications of mRNA-based ocular gene therapy.

Abstract No.: 200188

Liquid Biopsy Proteomics: Revolutionizing Ophthalmic Clinical Trial Design and Drug Development

First Author: David ALMEIDA

Co-Author(s): Vinit MAHAJAN

Purpose: To demonstrate how liquid biopsy proteomics can provide rapid molecular feedback on therapeutic targets and disease pathways, challenging traditional imaging-based trial endpoints in ophthalmology.

Methods: Aqueous humor (AH) liquid biopsies underwent high-resolution proteomic profiling, analyzing approximately 6,000 proteins per sample. This data was integrated with tissue single-cell transcriptomics to determine the cellular origin of identified proteins. The methodology facilitated comprehensive pathway analysis, biomarker discovery,

and evaluation for drug repurposing, including screening against 169 FDA-approved cancer drugs.

Results: Liquid biopsies of AH revealed immunosuppressive proteins, the levels of which changed during intraocular inflammation, and also identified cell-type-specific markers. In diabetic retinopathy, angiogenesis protein profiles were found to be dependent on disease stage. Notably, proteomic biomarkers showed a correlation with clinical trial outcomes in uveal melanoma, where low or absent drug targets were associated with trial failure.

Conclusions: Liquid biopsy proteomics presents a transformative strategy for ophthalmic clinical trials and drug development. It allows for comprehensive pathway analysis from approximately 6,000 proteins per sample, safe and repeatable sampling for longitudinal patient monitoring, and rapid molecular feedback for timely go/no-go decisions. Implementation of this approach could lead to reduced trial costs through improved patient stratification and earlier endpoint detection, while also offering mechanistic insights not available through current methodologies.

Abstract No.: 202222

Molecular Modeling and In Silico Study of the Catalytic Domain of PknB From Ocular Mycobacterium tuberculosis

First Author: Deepak CHOUDHURY

Co-Author(s): Nikita DASH

Purpose: To discover small molecule inhibitors targeting the catalytic domain of PknB, essential for bacterial growth and survival.

Methods: An in silico structure-based drug discovery approach was used to identify potential inhibitors of PknB from Mycobacterium tuberculosis. A total of 646 compounds were retrieved from PubChem. Molecular docking was performed (Lamarckian Genetic Algorithm), focusing on the active site at Val95 (coordinates: 62.467, 4.815, -32.164) via AutoGrid. Each ligand underwent 10 docking runs. Top hits were selected based on binding energy and analyzed for hydrogen bonding and ADMET properties. A molecular dynamics simulation was done for the top molecule using the Gromacs software.

Results: Thirty-four compounds showed strong binding affinity, favorable H-bond interactions, and promising ADMET profiles, suggesting good drug-likeness.

Conclusions: The identified PknB inhibitors may serve as promising anti-tubercular drug candidates, potentially disrupting bacterial growth and survival, offering a novel therapeutic approach against ocular drug-resistant Mycobacterium tuberculosis infections.

Abstract No.: 200781**Monocellular-Pore 3D Printed Scaffolds for Retinal Pigment Epithelial Cell Therapy: Clinical Translation and Impact***First Author: Zengping LIU**Co-Author(s): Dejian HUANG, Gopal LINGAM, Hang LIU, Xinyi SU*

Purpose: Retinal degenerative diseases, such as age-related macular degeneration (AMD), currently lack curative therapies, with retinal pigment epithelial (RPE) cell transplantation emerging as a promising strategy for restoring vision. This study evaluates the clinical translational potential and impact of monocellular-pore 3D-printed scaffolds for RPE cell delivery, comparing them with commercial track-etched polyethylene terephthalate (PET) membranes used in clinical trials.

Methods: Human embryonic stem cell-derived RPE (hESC-RPE) sheets were cultivated on 3D-printed polycaprolactone (PCL) scaffolds engineered with single-cell-sized pores (~10 μ m) and compared with PET membranes. Functional assessments included protein expression, barrier function, permeability, and phagocytosis assays. Safety and biocompatibility were further evaluated via subretinal implantation in porcine (2 months) and rabbit (1 year) models using imaging, electroretinography, and histopathology.

Results: PCL scaffolds with cell-sized pores demonstrated superior RPE monolayer integrity, maturation, and function, with transepithelial electrical resistance and phagocytosis comparable to PET membranes. PCL scaffolds provided enhanced permeability, supporting nutrient exchange post-transplantation. In vivo studies revealed stable retinal structure and function, with no adverse effects or inflammation over extended follow-up. Surgical integration was successful, and scaffold degradation did not impact retinal health.

Conclusions: Monocellular-pore 3D printed PCL scaffolds offer a clinically translatable, biocompatible alternative to current non-biodegradable implants for RPE cell delivery. These findings support their potential to improve outcomes in cell-based retinal therapies and lay the foundation for advancing regenerative strategies in ophthalmology.

Abstract No.: 200210**Multiwalled Mesoporous Silica Constructs "Sunflower-Like" Structures to Promote Stem Cell Migration and Differentiation for Repairing Ectopia Lentis***First Author: Yan LIU**Co-Author(s): Tianhui CHEN, Yongxiang JIANG*

Purpose: Ectopia lentis (EL) is a blinding ocular disorder caused by abnormalities in the zonular fibers. Current surgical interventions are technically challenging and associated with significant complications. This study

aims to explore a novel repair strategy based on stem cells and functionalized nanomaterials to address the limitations of existing therapeutic approaches.

Methods: RNA-seq and Olink proteomics were performed on EL patient ocular tissues/aqueous humor. An amino-modified multiwalled mesoporous silica nanocarrier (mCNT@SiO₂-NH₂) was synthesized. Human BMSCs were adsorbed onto mCNT@SiO₂-NH₂, forming a «sunflower-like» structure (nanocarrier core, radial BMSCs). BMSCs in this structure underwent directional induction using LEC conditioned medium. The nanocarrier's mechanism was probed via multi-omics (RNA-seq, ATAC-seq, scRNA-seq). The mCNT@SiO₂-NH₂/BMSC co-culture was transplanted into rat EL models. Zonular architecture was assessed histologically.

Results: EL patient analyses revealed significantly suppressed extracellular matrix-related gene/protein expression. mCNT@SiO₂-NH₂ co-culture significantly enhanced BMSC expression of zonule-specific proteins FBN1 and MFAP2 post-induction. Multi-omics indicated mCNT@SiO₂-NH₂ activated perinuclear actin cap (F-actin), pMLC, and Nesprin-1, mediating mechanotransduction that drove YAP nuclear translocation and transcriptional activity. Transplantation effectively reconstructed damaged zonular architecture in rats, confirmed histologically.

Conclusions: This study reveals a novel mechanism by which the porous nanomaterial mCNT@SiO₂-NH₂ reprograms BMSC fate via the cytoskeleton-nucleus mechanocoupling pathway (pMLC/F-actin/Nesprin-1/YAP). It successfully achieves BMSC differentiation into zonule-like cells, providing an innovative strategy for stem cell-based therapy to repair complex ocular diseases, such as ectopia lentis.

Abstract No.: 203426**Optic Nerve Sheath Diameter and Retinal Artery Hemodynamics by Color Doppler Ultrasound for Noninvasive Intracranial Pressure Monitoring in Acute Cerebral Hemorrhage***First Author: Zhixin GUAN**Co-Author(s): Li SHOUQING, Liu SHU*

Purpose: To investigate the correlation between optic nerve sheath morphological parameters and central retinal artery hemodynamic parameters with Intracranial Pressure (ICP), this study aims to construct a multiparameter integrated diagnostic model for ICP assessment. Through implementing multidisciplinary collaborative diagnosis and treatment protocols, we further strive to enhance early detection rates of intracranial hypertension in clinical practice.

Methods: In a prospective study, 40 patients with acute cerebral hemorrhage were enrolled, all of whom underwent implantation of intracerebroventricular ICP

transducers for direct intracranial pressure monitoring. Color Doppler ultrasound was utilized to measure optic nerve sheath morphological parameters and central retinal artery hemodynamic parameters in these patients. Statistical analyses were performed using SPSS 27.0 to establish a multiparameter joint diagnostic model.

Results: Intracranial pressure (ICP) demonstrated a strong positive correlation with ONSD ($r = 0.680$, $P < 0.05$) and moderate negative correlations with central retinal artery hemodynamic parameters, including peak systolic velocity ($r = -0.493$) and end-diastolic velocity ($r = -0.422$) (both $P < 0.05$). For detecting elevated ICP (> 15 mmHg), $ONSD \geq 4.45$ mm yielded 79.5% sensitivity and 69.4% specificity. The multiparameter predictive model integrating ONSD and CRA flow metrics achieved superior diagnostic performance, with an overall accuracy of 81.3%, sensitivity of 72.2%, specificity of 93.2%, and Youden's index of 0.654 at a probability threshold of 68.4%.

Conclusions: Color Doppler ultrasound can be used for bedside monitoring of ICP with the advantages of being noninvasive, simple, and reproducible. When the optic nerve sheath diameter is ≥ 4.45 mm, and the predictive probability of the multiparameter combined diagnostic model is $\geq 68.4\%$, the patient should be highly suspected of having elevated ICP.

Abstract No.: 202153

Postprandial C-Peptide to Glucose Ratio as a Promising Systemic Marker of Diabetic Retinopathy in Type 2 Diabetes

First Author: Zhaoxia **ZHENG**
Co-Author(s): Xiaobing **YU**

Purpose: To assess the association between C-peptide-related parameters and diabetic retinopathy (DR) in type 2 diabetes mellitus (T2DM), and find a superior parameter in predicting DR.

Methods: A total of 1,078 T2DM patients were included in this cross-sectional study. Fasting and postprandial C-peptide (FCP and PCP), delta CP, FCP or PCP to glucose ratio (FCGR and PCGR), homeostasis model assessment of β -cell function (HOMA-B), and insulin resistance (HOMA-IR) were compared among different stages of DR. Odds ratios (ORs) of these indices for the presence and severity of DR were estimated after adjusting for confounding factors. Multivariate logistic analysis was performed to evaluate the association between PCGR and DR according to PCGR quartiles. Receiver Operating Characteristics (ROC) curves were generated to determine the discriminative power of DR.

Results: Among C-peptide-related indices, PCGR showed the most significant association with mild and moderate non-proliferative DR (NPDR) (per SD increase, $OR=0.44$, $P<0.001$), and vision-threatening DR (VTDR)

($OR=0.09$, $P<0.001$). When grouped by PCGR quartiles, patients in the lower quartile showed a higher risk of developing DR. PCGR was negatively associated with DR and VTDR independent of confounders (P for trend <0.001). PCGR had high predictive abilities of DR and VTDR ($AUC=0.76$ and 0.83), and also increased the AUC values of the standard model.

Conclusions: Compared with IR, DR was more associated with impaired β -cell function. PCGR could be a promising systemic marker for determining T2DM patients at high risk of developing DR, especially VTDR.

Abstract No.: 200248

Reprogramming of iPSCs to NPCEC-Like Cells by Biomimetic Scaffolds for Zonular Fiber Reconstruction

First Author: Tianhui **CHEN**
Co-Author(s): Yongxiang **JIANG**

Purpose: Ectopia lentis (EL), characterized by impaired zonular fibers originating from non-pigmented ciliary epithelial cells (NPCEC), presents significant surgical challenges and risks of visual impairment. Current treatment via cataract surgery results in loss of lens accommodation and fails to address the fundamental challenge of in situ zonular ligament repair. This study aimed to elucidate EL pathogenesis and develop a regenerative therapeutic strategy targeting zonular restoration.

Methods: Ocular tissues and aqueous humour from EL patients underwent RNA sequencing and Olink high-throughput proteomic analysis. Based on pathogenic insights, we developed biomimetic scaffolds mimicking natural radial zonular fiber microstructure. These scaffolds were utilized to reprogram and directionally differentiate human induced pluripotent stem cells (iPSC) into NPCEC-like cells. The therapeutic efficacy of a single injection of these induced NPCEC-like cells was evaluated in a rabbit EL model, focusing on zonular fiber structural and mechanical restoration.

Results: Transcriptomic and proteomic profiling revealed significant downregulation of key pathogenic genes (FBN1, MFAP2) and upregulation of secretory proteins (IL-12, MMP-1) in EL. While FBN1 and MFAP2 showed high expression in NPCECs, donor scarcity limits NPCEC transplantation. We successfully generated NPCEC-like cells from iPSCs using the novel biomimetic scaffolds. Crucially, a single injection of these cells into the rabbit EL model demonstrated significant restoration and enhancement of mechanical properties within the zonular fiber structures.

Conclusions: Biomimetic scaffold-directed iPSC differentiation yielded NPCEC-like cells, whose single injection restored zonular mechanics in vivo. This iPSC-based regeneration offers a potential alternative to cataract surgery, preserving lens accommodation in EL.

Abstract No.: 205491**Restoration of Conjunctival Lymphatic Vessels With Retinoic Acid following Mitomycin-C–Induced Suppression in a Rat Model***First Author: Hitisha MITTAL**Co-Author(s): Sushmita KAUSHIK, Ritambhara NADA, Surinder S PANDAV, Nusrat SHAFIQ, Faisal T T*

Purpose: To investigate the effect of Mitomycin-C on conjunctival lymphatics and the potential of Retinoic Acid (ec23) to stimulate lymphangiogenesis in rats.

Methods: Twenty-five Sprague-Dawley rats were divided into five groups (n = 5 per group). Right eyes received subconjunctival injections of balanced salt solution, 0.01% Mitomycin-C, 100 nM ec23, 0.01% Mitomycin-C with 100 nM ec23, or 0.1% dimethyl sulfoxide; left eyes served as controls. Eyes were enucleated on postoperative day 14. Conjunctival tissues were stained with Masson trichrome, CD31 (vascular endothelial marker), and D2-40 (lymphatic endothelial marker) to assess fibrosis, vascular, and lymphatic density. Data are expressed as mean $\pm$ standard deviation and compared using the Mann-Whitney U test.

Results: Mitomycin-C significantly reduced conjunctival lymphatic and vascular density ($p = 0.009$). Ec23 alone ($p = 0.008$) or combined with Mitomycin-C ($p = 0.016$) significantly increased lymphatic channel density.

Conclusions: Both conjunctival blood vessels and lymphatic channels contribute to fluid drainage. Mitomycin-C impairs lymphatic development, whereas ec23 promotes lymphangiogenesis at 100 nM. Combining Mitomycin-C and Retinoic Acid may enhance bleb drainage following trabeculectomy, improving postoperative intraocular pressure control.

Abstract No.: 202702**Results From First 100 Participants of the DRMS-India: Variations in Gut Microbiome of People With Diabetic Retinopathy in Asia***First Author: Brijesh TAKKAR**Co-Author(s): Taraprasad DAS, Ankita MADDHESHIYA, Souvik MUKHERJEE*

Purpose: The Diabetic Retinopathy Microbiome Study (DRMS-India) compares variations in gut microbiome in DR in Asia. We present the results of the first 100 participants and compare these with other reports from the Asian region.

Methods: DRMS is an India-wide study involving 17 independent sites and 548 enrolled participants. We recruited healthy people 30 years or older (HC-control) and people with DM with/without DR (cases) in a case-control design. The first-pass morning gut samples were collected and processed for metagenomics sequencing after DNA extraction. Details on lifestyle, dietary, and systemic risk factors of DR were noted.

The microbiome data were analysed for abundance ($>0.5\%$), the alpha (Shanon, Gini, and Richness indices), and the beta diversity (NMDS plot based on Bray-Curtis dissimilarity. Results from the first 100 participants are presented (HC - 26, DM - 33, and DR - 41).

Results: We detected higher alpha diversity in the DR group as compared to that reported from South Central China previously. Beta diversity plots from all studies (DRMS, Southcentral China, Central China, South India) consistently demonstrated gut dysbiosis in DR. At the phyla level, reverse proportions of Actinobacteria (less in DRMS-India than China) and the Firmicutes/Bacteroides ratio (higher in DRMS-India than China). At the general level, Bifidobacterium reduced consistently in the DR group while Ruminococcus increased (DRMS and China). Segatella copri, the commonest species seen in all the groups DRMS cohort, was not reported from China.

Conclusions: There is heterogeneity in gut microbiota data reported across Asia, with a need to consolidate and form a consortium for future preventive therapy.

Abstract No.: 200580**Subconjunctival Injection of Liposomal Tacrolimus (LipoTac) for the Treatment of Allergic Conjunctivitis: Pre-Clinical and Phase I Studies***First Author: Shayne TAN**Co-Author(s): Yu-chi LIU, Jodhbir MEHTA, Tina WONG, Jyh Haur WOO*

Purpose: To develop and evaluate the safety and efficacy of liposomal tacrolimus (LipoTac) in the treatment of vernal keratoconjunctivitis (VKC).

Methods: In-vitro drug-release profiles, 2-year stability, and efficacy tests using a VKC animal model were conducted. Conjunctival tacrolimus levels were compared between 9 rabbits who underwent a single 0.3ml subconjunctival injection of LipoTac and rabbits that received tacrolimus eye drops. 80 mice were randomly allocated into 4 groups (negative control, positive control, LipoTac, and blank liposome injections (LipoBlank)), examined weekly, with immunohistochemical examinations at week 4. Subsequently, a phase 1 clinical trial was conducted on 4 patients with VKC. The patients were followed up for 8 weeks with subjective and objective outcome measures, including the Allergic Conjunctivitis Symptom (ACS) questionnaire, Ocular Symptom Score (OSS), VKC clinical grading, and best corrected visual acuity (BCVA).

Results: In vivo and in vitro testing showed a higher concentration of tacrolimus in the LipoTac group compared to the eye drop group at all time points. The expressions of pro-allergic cytokines IL-4, IL-13, TGF- β 1, and CD40L were all lower in the LipoTac group compared to the positive controls in the mice's eyes.

2-year stability tests showed that there was the least tacrolimus degradation at pH 6.5. First-in-man studies showed significant improvements in OSS and ACS scores, with no change in BCVA. There were no serious adverse events, with undetectable tacrolimus serum levels at all time points.

Conclusions: LipoTac is a safe and effective treatment option for sustained delivery of tacrolimus to treat VKC.

Abstract No.: 208355

Subretinal LX102 Gene Therapy for Neovascular Age-Related Macular Degeneration (nAMD): Preliminary Results of a Randomized, Active-Controlled Phase 2 Trial

First Author: Xiaodong SUN

Purpose: LX102 gene therapy is developed by recombining the AAV2 capsid and the gene coding for VEGF trap. The purpose of this study was to assess the efficacy and safety of 2 higher doses from phase 1 trial compared with Aflibercept (2mg) in participants with nAMD up to 52 weeks.

Methods: In this open-label, randomized, active-controlled phase 2 trial, participants with active CNV secondary to nAMD were assigned (2:2:1) to receive medium-dose (5×10^{10} VG/eye) or high-dose (1.25×10^{11} VG/eye) LX102, or Aflibercept (2 mg). LX102 groups received two Aflibercept injections 4 weeks apart, followed by subretinal LX102. Eyes were monitored for rescue injections based on BCVA, OCT, and fundus findings.

Results: From Dec 21, 2023, to Aug 14, 2024, 49 participants received treatment (19 medium-dose, 19 high-dose, 11 control). Up to Apr 2, 2025, all subjects have been followed up for 24~52 weeks after LX102 administration. LX102 was well tolerated, with no vasculitis, retinitis, choroiditis, vascular occlusion, or endophthalmitis reported. No LX102-related adverse events or rescue injections occurred. By Apr 2, 2025, all were followed for 24–52 weeks. At Week 24, mean BCVA changes in pseudophakic eyes were +2.8 (medium-dose), +9.8 (high-dose), and +5.1 letters (control).

Conclusions: Safety results from phase 2 dose expansion trial evaluating subretinal LX102 injection in nAMD participants were consistent with observations from phase 1 trial, with no clinically determined ocular inflammation in 5×10^{10} VG/eye group. And efficacy results support LX102 gene therapy as a potential treatment option to reduce the burden of frequent anti-VEGF treatments and maintain long-term visual outcomes.

Abstract No.: 202809

Suprachoroidal TA: A Gamechanger for Refractory Macular Edema

First Author: Arjun AURORA

Co-Author(s): Ajay AURORA

Purpose: To evaluate the safety and efficacy of suprachoroidal injection of centrifuged preservative-free Triamcinolone Acetonide (cPFTA) with novel Suprachoroidal Injection Device (SCID) in patients with macular edema due to pathologies including DME, retinal vein occlusion, non-infectious uveitis, and evaluate the long-term efficacy after repeat injections.

Methods: SCITA (Suprachoroidal Injection of Triamcinolone) 0.1ml of cPFTA was given in 60 eyes of 56 patients with a 30G needle using novel-SCID. The angulation of the base plate to the scleral entry was a critical determinant of the correct plane of injection. BCVA, IOP, and CST(SD-OCT) were measured on days (D) 1,7,30,60,90.

Results: SCITA was pain-free, well-tolerated, and there was no retinal/choroidal injury. In 4 eyes, the injection became intravitreal, with patients requiring antiglaucoma medications. Mean baseline CST ($488 \mu\text{m}$) decreased to $240 \mu\text{m}$ at D7; maintained at $230 \mu\text{m}$ (D30) & $262 \mu\text{m}$ (D90). Edema resolution occurred in 66% at D30 & 57% eyes were edema-free at D90. BCVA improved 1 line in 60% & 3 lines in 37% at D30. No eye had increased IOP if there was no intravitreal injection of TA. In two eyes the effect lasted for 7 months.

Conclusions: SCITA using the novel SCID is cheap, safe, effective, and well-tolerated. It requires a learning curve, and angulation of the baseplate to the sclera is critical. Repeated SCITA injections are effective and safe. cPFTA increases the duration of efficacy of TA and can be an alternative to intravitreal injection of Ozurdex.

Abstract No.: 203369

Therapeutic Modulation of the Vitreoretinal Fibrosis Microenvironment Using Engineered Macrophage-Derived Extracellular Vesicles

First Author: Yingjie WANG

Co-Author(s): Yong TAO

Purpose: Vitreoretinal fibrosis is a hallmark pathological feature of proliferative vitreoretinopathy (PVR), which relies on invasive intraocular surgery, retinal detachment, and ocular trauma in the clinic. Accordingly, there is a high demand for developing new and effective pharmacological treatments for such a difficult-to-treat disease.

Methods: Upon initial data mining for depicting the key features of the vitreoretinal fibrosis microenvironment in both PVR patients and model mice, including elevated transforming growth factor $\beta 1$ (TGF $\beta 1$) and M2 macrophage enrichment, we herein designed and

engineered extracellular vesicles that conferred potent anti-fibrotic efficacy against PVR. These extracellular vesicles were derived from M1 macrophages (M1evs) and were conjugated with a TGF β 1 antibody (aT) through an MMP-cleavable linker (cl).

Results: Upon intravitreal injection into the PVR model mice, we observed aT-cl-M1ev (ACE) selectively accumulated in the PVR lesions and aT was cleavably released. By neutralizing TGF β 1 and inhibiting M2 macrophage polarization, the microenvironment was effectively modulated and vitreoretinal fibrosis was diminished. Further incorporating a platelet-derived growth factor receptor antibody via a cl linker, we developed aTP-cl-M1ev (ACEPlus) to treat PVR at an advanced stage and observed a potent benefit in preventing retinal detachment progression, which, notably, was validated with an innovative, patient-derived PVR membrane xenograft model.

Conclusions: Our study thus demonstrated that therapeutic modulation of the vitreoretinal fibrosis microenvironment with the ACE platform was an efficacious alternative to surgical interventions for PVR.

Abstract No.: 204630

Topical Application of Everolimus Attenuates Lens-Induced Myopia Through mTORC1 Suppression

First Author: Rui-heng **ZHANG**

Co-Author(s): Wenbin **WEI**

Purpose: The mechanistic target of rapamycin complex 1 (mTORC1) signaling has been reported to regulate lens-induced myopia (LIM) in guinea pigs. To address the challenge of delivering lipophilic mTORC1 inhibitors to the posterior eye segment, we developed a novel topical ophthalmic formulation of everolimus, a second-generation rapamycin derivative available only orally, and evaluated its anti-myopic efficacy, ocular pharmacokinetics, and safety.

Methods: Vehicle formulations were optimized for delivering everolimus to the RPE-choroid complex. The efficacy of different concentrations of everolimus eye drops was tested in three-week-old male pigmented guinea pigs that underwent LIM. We examined mTORC1 signaling activation, axial elongation, refractive changes, and fundus morphology. Pharmacokinetics was assessed in guinea pigs and New Zealand white rabbits. Ocular safety was evaluated through slit-lamp and fundus examinations, intraocular pressure measurements, and histological analysis.

Results: The optimized formulation of everolimus eye drops (0.001%, 0.01%, and 0.1% w/v) significantly attenuated axial elongation by 0.10 ± 0.03 mm ($P=0.054$), 0.11 ± 0.02 mm ($P=0.001$), and 0.14 ± 0.03 mm ($P=0.001$), respectively. The everolimus eye drops also attenuated fundus tessellation, choroidal thinning, and mTORC1 activation. Peak everolimus concentrations in the RPE-

choroid complex of guinea pigs ranged from 5.6 to 103 ng/g, with a Tmax of 1 hour. In rabbits, 0.005%–0.01% everolimus eye drops achieved concentrations in the RPE–choroid complex comparable to the therapeutic levels in guinea pigs. No corneal, lenticular, retinal toxicity, or intraocular pressure alterations were observed.

Conclusions: This novel ophthalmic formulation effectively delivered everolimus to the posterior segment and inhibited myopia progression, supporting its clinical potential for myopia control.

Abstract No.: 204108

Transplantation of hESC-RPE Cells via Injectable Microfluidic-Templated Microgels for Retinal Regeneration

First Author: Xiang **MA**

Co-Author(s): Ying **WEI**

Purpose: Retinal pigment epithelial (RPE) cells are specialized neural cells essential for vision. Human embryonic stem cell-derived RPE (hESC-RPE) cells show great promise as a therapeutic source for treating retinal degenerative diseases. However, their clinical application is limited by poor transplantation efficiency and low cell viability, largely due to shear stress during delivery and immune clearance by the host.

Methods: To address these limitations, we developed a novel cell delivery platform using microfluidic-templated microgel carriers to enhance the loading and delivery of hESC-RPE cells. These microcarriers, termed Fib@GHMS, consist of a gelatin-methacryloyl/hyaluronic acid-methacryloyl (GelMA/HAMA) core encased in a fibrin shell. Fabricated in a high-throughput and uniform manner, Fib@GHMS enabled robust adhesion and proliferation of hESC-RPE cells and allowed direct subretinal injection via a minimally invasive granular gel format.

Results: Electroretinogram (ERG) analysis revealed significantly enhanced B-wave amplitudes in Royal College of Surgeons (RCS) rats receiving hESC-RPE-loaded Fib@GHMS, indicating improved visual function. Histological evaluation at 8 weeks post-transplantation demonstrated higher retention of transplanted cells, preservation of photoreceptors, and maintenance of the inner nuclear layer compared to control groups.

Conclusions: Our Fib@GHMS-based delivery system significantly improves the therapeutic performance of hESC-RPE cell transplantation, offering a promising strategy for retinal regeneration. This minimally invasive, biomaterial-assisted approach may open new avenues for clinical translation in the treatment of retinal degenerative diseases.

Abstract No.: 202564

Virus-Inspired Nanozymes for Two-Dimensional Biomimetic Penetration and Long-Acting Ferroptosis Inhibition in Treating Dry Eye Disease

First Author: Qingdong BAO

Co-Author(s): Qinghua LI

Purpose: Dry eye disease (DED) has become a global health concern impacting approximately 1.487 billion individuals, yet it remains unresolved. Ferroptosis, a form of non-apoptotic corneal epithelial cell death, has recently emerged as a significant focus in the therapeutic management of DED. However, owing to the corneal epithelial barrier and oxidative stress-inflammation crosstalk, no therapeutic strategy can precisely and sustainably inhibit ferroptosis in DED.

Methods: This study pioneers a transformative paradigm in DED therapy by ingeniously fusing a virus-like hollow mesoporous cerium oxide nanozyme (vHMCe) core-loaded with cyclosporin A (CsA) and surface-functionalized with rabies virus glycoprotein 29 (RVG29) to achieve long-acting ferroptosis inhibition in DED treatment. Structurally, CsA@vHMCe-RVG mimics the roughness and irregularity of viral surfaces, endowing spike-assisted adhesion to corneal epithelial cells.

Results: Functionally, RVG interacts with nicotinic acetylcholine receptors (nAChRs), triggering receptor-mediated transmembrane transport for efficient internalization. The cerium valence cycle and CsA can synergistically block oxidative stress-inflammation interactions to achieve long-acting ferroptosis inhibition in DED. CsA@vHMCe-RVG attains scavenging rates of 95% and 90% for intracellular reactive oxygen species and ferroptosis levels in corneal epithelial cells under continuous hydrogen peroxide stimulation four times.

Conclusions: The integration of biomimetic transmembrane effects and ferroptosis inhibition offers an innovative strategy with significant clinical application potential for DED treatment.

Visual Sciences

Abstract No.: 205113

A Microglia-Dependent Pathological Engram of Amblyopia

First Author: Yixiao FU

Co-Author(s): Yiru HUANG, Minbin YU

Purpose: To investigate microglial alterations in the primary visual cortex (V1) and their role in amblyopia pathogenesis using single-nucleus RNA sequencing

(snRNA-seq) and experimental validation in a long-term monocular deprivation (LTMD) mouse model.

Methods: LTMD spanning the critical period was conducted in mice from postnatal day 19 (P19) to P33. SnRNA-seq was performed on the contralateral V1 at P60. Microglia were depleted in mice using PLX5622. Immunohistochemistry and flow cytometry were used to identify pathological changes of microglia in V1. Two-photon calcium imaging was used to evaluate the tuning properties of excitatory neurons in V1. Optomotor response testing was used to evaluate the visual acuity.

Results: SnRNA-seq identified different classes of neurons and glial cells. Differential gene expression analysis of microglia revealed that LTMD-upregulated genes were enriched for synaptic pruning and inflammation processes, while downregulated genes were involved in synaptic transmission. A microglia subpopulation highly expressing triggering receptor expressed on myeloid cells 2 (TREM2) and synaptic pruning genes increased after LTMD. Immunohistochemistry and flow cytometry confirmed reduced excitatory synapses and increased TREM2 expression in microglia with a more activated state after LTMD. The depletion of microglia during LTMD not only partially rescued synapse density and visual acuity but also restored ocular dominance index with direction selectivity of excitatory neurons in V1.

Conclusions: LTMD leads to an increased TREM2 expression in microglia in the contralateral V1, which may contribute to amblyopia development via excessive synaptic pruning. The microglial elimination partially reverses visual functional deficits caused by LTMD, highlighting the pathogenic role of microglia in amblyopia.

Abstract No.: 206909

A Systematic Review on Alteration of Ocular Surface Microbiome (OSM) Related to Pandemic – COVID-19 and Beyond

First Author: Yan Hei Yannis CHAN

Co-Author(s): Kelvin KI CHONG, Kenneth Kh LAI, Calvin Cp PANG, Clement Cy THAM, Kin Yip YIN

Purpose: The COVID-19 pandemic significantly impacted ocular health, especially disruptions in OSM. This review examines how COVID-19 affects OSM through direct viral effects, post-COVID symptoms and pandemic-induced behavioural changes.

Methods: Five studies were reviewed from PubMed and Web of Science using the keywords: "ocular surface microbiome" and "COVID-19", etc.

Results: SARS-CoV-2 alters OSM significantly ($p < 0.05$), especially the dominant phyla listed below (Spörri et al. 2024), with changes persisting post-recovery. Proteobacteria levels decreased in acute (47.46%) and recovered (48.88%) COVID-19 groups compared

to healthy controls (73.59%), while Actinobacteria, Bacteroidota, and Firmicutes increased significantly. Functional profiling showed heightened membrane transport and prokaryotic activities in the acute-COVID-19 group, while the recovery group exhibited increased cell growth/death and fatty-acid metabolism. These may contribute to ocular diseases like conjunctivitis and dry eye. (Lin et al. 2024) Post-COVID symptoms are linked to microbiome disruption. SARS-CoV-2 may alter the ocular microenvironment, leading to papillary or follicular conjunctival changes, MGD, and evaporative dry eye. (Wan et al, 2022) Behavioural changes also impact OSM. Humans touch their faces 9.5 to 162 times per hour, with one-third involving the eyes, which helps maintain microbiome diversity. Yet mask use reduces spontaneous face-touching frequency and contributes to microbiome dysbiosis. Besides, mask-associated dry eye (MADE) destabilises the tear film and alters microbial homeostasis. (Burgos-Blasco et al, 2022) (Spencer et al, 2021)

Conclusions: This review highlights microbiome changes linked to COVID-19 and pandemic-induced behaviours. Small sample sizes and methodological variability call for standardized, longitudinal studies to elucidate the OSM's role in post-pandemic ocular health.

Abstract No.: 200369

Activation Patterns for Sensory Regions, Laterality, Balance, and Visual Space in Early- and Late-Blind Brains Following Visual-to-Audio Sensory Substitution Training

First Author: Giles **HAMILTON-FLETCHER**

Co-Author(s): Kevin **CHAN**, Matthew **MURPHY**, Amy **NAU**, Patrick **PASZKOWSKI**

Purpose: Sensory substitution devices (SSDs) can translate visual images into patterns of sound. These SSD signals can activate the visual cortex in trained early/late-blind users, but their basic neural processing and 'visual' representation of SSD sounds in the brain remain largely undetermined.

Methods: We trained 6 early-blind (4F, age=60.5±3.1) and 9 late blind (3F, age=60.0±10.1) to interpret SSD soundscapes of horizontal and vertical travelling bars, similar to retinotopic mapping stimuli, and obtained structural and functional brain images using a 3T MRI scanner. We used NORDIC de-noising for functional images alongside standard BrainVoyager preprocessing pipelines and population-receptive field (pRF) analyses. We extracted voxels and their pRF-values (X, Y, RF-size) that represent substituted 'visual'-space, for voxels both exceeding $R>0.2$ and within primary, secondary, and tertiary visual/auditory cortices.

Results: Relative to the late-blind, early-blind participants had significantly more active voxels in the right visual cortex ($p<0.001$, $M=67.2\pm10.5$; $M=24.7\pm21.8$) but not left visual cortex (NS) or left/

right auditory cortices (NS; NS). The ratio of visual: auditory cortex activation was significantly higher ($p=0.036$) for early blind ($M=0.46\pm0.19$) than late blind ($M=0.27\pm0.12$), with a more right-hemisphere lateralized ratio ($p=0.028$; $M=1.58\pm1.11$) than the late-blind ($M=0.74\pm0.29$). Early-blind represented more unique pRF locations ('visual'-space) for voxels in the bilateral visual cortices ($p=0.036$, $M=17.5\pm4.91\%$) than the late-blind ($M=10.9\pm5.66\%$), which was significant for the right visual cortex ($p<0.001$; $M=11.8\pm2.6\%$; $M=4.3\pm1.6\%$) but not the left visual cortex (NS).

Conclusions: Our findings reveal significant differences in cortical activation between early and late-blind participants during SSD learning in specific areas, from visual: auditory cortex balance, to hemispheric laterality, and their representations of substituted visual space.

Abstract No.: 204586

Activation or Overexpression of TASK-3 Protects Retinal Ganglion Cells and Visual Function After Injury

First Author: Jiali **ZHANG**

Co-Author(s): Ruotian **JIANG**, Longqian **LIU**, Yuncheng **LUO**, Xiangyi **WEN**

Purpose: Retinal ganglion cells (RGCs) are located in the innermost layer of the retina, and their axons form the optic nerve, projecting visual signals to the visual cortex center of the brain. Previous studies have shown that the TASK-3 channel is involved in regulating the excitability of RGCs. This study explores whether activating or overexpressing TASK-3 can protect the number of RGCs and rescue visual function after injury.

Methods: RGC injury was performed by optic nerve crush (ONC) surgery. The TASK-3 specific agonist CHET3 was applied on the surface of the eye once a day for one week. TASK-3 activation was tested using patch-clamp electrophysiology. The adeno-associated virus (AAV) approach was used to overexpress TASK-3 in RGCs one week after ONC. RGCs were counted under a fluorescent microscope. Visual function was assessed by the visual cliff test, the visual water maze, and the flash visual evoked potential (f-VEP). The pupillary light reflex (PLR) was used to detect the non-image-forming functions. The quantification of TASK-3 was evaluated by RNAscope.

Results: The CHET3-treated mice retained more RGCs after ONC than the control one, with improved depth perception, visual acuity, contrast sensitivity, and higher f-VEP amplitude. Overexpressing TASK-3 specifically in the RGCs of ONC mice significantly restored visual acuity and contrast sensitivity and enhanced PLR constriction under dim light.

Conclusions: Activating TASK-3 can protect the RGCs from cell death and visual function loss in ONC mice.

Overexpressing TASK-3 specifically in RGCs after ONC injury can restore the image-forming and nonimage-forming behaviors.

Abstract No.: 206753

Acute Effects of Daily Red Wine Consumption on Retinal and Cerebral Blood Flow in Healthy Young Adults and an Animal Model

First Author: Xiaofeng **ZHU**

Co-Author(s): Yi **XU**

Purpose: Acute effects of a daily dose of red wine may cause deterioration of visual function; however, there is limited information on healthy individuals. This study aims to investigate the acute effects of daily red wine consumption on visual function and retinal microvasculature in healthy young adults through a randomized self-controlled design, and to explore the molecular mechanisms using an animal model.

Methods: In a study of healthy young adults, 27 adults with follow-up at baseline, 0.5 h, and 2 h after consuming 300 mL of either red wine or water underwent blood biochemistry, visual function, morphology, and blood flow of retinal and choroidal vasculatures, and cerebral blood flow (CBF) evaluation.

Results: Acute red wine consumption caused abnormal changes in retinal function (mERG) that preceded changes in vision. Macular vessel diameter index (VDI) increased significantly at 0.5 h, but decreased significantly at 2 h, despite increased regional CBF following red wine consumption, which was consistent with increased choroidal thickness and decreased retinal thickness. Animal experiments conducted on Brown Norway rats demonstrated a significant decrease in retinal VDI and vessel area density (VAD) associated with increased ROS production following red wine administration, as well as decreased eNOS and increased ET-1 levels in the retina.

Conclusions: Consequently, red wine consumption caused abnormal changes in retinal function and microvascular constriction in healthy young adults, and an animal model suggested that the underlying mechanism may involve the regulation of eNOS and ET-1 levels in the retina. These findings imply the potential detrimental effects of drinking habits on individuals with retinal ischemic diseases.

Abstract No.: 201064

Altitude-Induced Color Vision Impairment: A Novel Rapid Hue-Discrimination Assay for Acute Hypoxic Exposure

First Author: Yuchen **WANG**

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Purpose: To quantify and track acute changes in hue discrimination under simulated high-altitude (3,500–4,500 m) low-pressure hypoxia, and to validate

a new rapid, software-based test that overcomes the portability and time limits of the Farnsworth-Munsell 100-Hue test.

Methods: Fourteen healthy adults with normal color vision in a hypobaric chamber. Eight sequential conditions (ground → 3,500 m → 4,000 m → ... → ground) were tested. Custom “Rapid Hue-Discrimination System” (Toward Pi Ltd.) running on a 14-inch calibrated 120 Hz display. 7 wavelength bands (400–700 nm) tested; minimum hue difference (MHD) resolvable recorded (1 nm precision).

Results: Red light showed the poorest and most variable discrimination (MHD 28.7 → 22.4 nm). Forty minutes of altitude acclimatization significantly improved cyan and purple discrimination (MHD reduced by 20–35 %) but slightly worsened orange and yellow, while other bands remained stable. The overall wavelength-MHD curve preserved the classic pattern with troughs at ~500 nm and ~600 nm and peaks near 550 nm and after 620 nm. The normalized score explained 81 % of MHD variance. Testing time dropped from 25 s per hue on first exposure to 8–10 s thereafter, yielding a total test duration of ~5 min and confirming the tool’s efficiency and robustness.

Conclusions: Acute hypoxia selectively degrades red-light discrimination, while short acclimatization benefits cyan and purple hues. The software-based assay delivers clinically relevant metrics (MHD + score) within ~5 min, feasible for cockpit, alpine, or space environments.

Abstract No.: 206980

Associations Between Low-to-Moderate Alcohol Consumption on Night Vision Performance: A Systematic Review

First Author: Stephany Wing Lam **TAI**

Co-Author(s): Chloe Hei Ching **CHEUNG**, Kelvin KI **CHONG**, Kenneth Ka Hei **LAI**, Calvin Cp **PANG**, Clement Cy **THAM**

Purpose: To investigate how alcohol consumption impairs critical night vision parameters on humans and increases the risk of accidents in low-light conditions.

Methods: A search in PubMed, ScienceDirect, and Ovid Medline identified 14 studies (1959–2023) involving 1,182 subjects across 7 countries, according to PRISMA guidelines. Studies included acute alcohol administration (12 studies) and chronic vs non-alcoholic consumption (2 studies). Participants aged 18–88 with normal or corrected-to-normal visual acuity. Blood alcohol concentrations (BAC) ranged from 0.011%–0.08%; while breath alcohol concentrations ranged from sub-legal limit (0.25mg/L)–0.40mg/L. Testing environments included photopic, mesopic, dark room, and low-illumination conditions. Visual functions tested include contrast sensitivity (10 studies), dark adaptation (3 studies), visual disturbance (3 studies),

glare effects (2 studies), and retinal straylight (3 studies).

Results: Twelve studies consistently report that alcohol intake significantly impairs night vision parameters. Contrast sensitivity was reduced post-alcohol at concentrations as low as BAC 0.043%. Another study found reductions at 4 cpd and angular frequencies 1, 24, 48 cycles/360° ($P<0.05$). In two studies, visual disturbance indices correlated with alcohol ($r^2=0.372$, $P<0.001$) and ($\rho=-0.467$, $P=0.004$). Alcohol affected dark adaptation and glare recovery, with chronic alcoholic drivers exhibiting doubled recovery time versus controls. Retinal straylight increased significantly post-alcohol, contributing to disability glare ($P<0.05$). Retinal-image quality also deteriorated alongside increased objective scatter indices ($P<0.05$).

Conclusions: Alcohol consumption significantly impairs multiple night vision functions even at sub-legal concentrations, affecting performance in outdoor activities, emergency situations, and navigation tasks requiring optimal low-light vision. Future research should establish standardized assessment protocols and investigate protective interventions for alcohol-related visual impairment.

Abstract No.: 201555

Brain Care and Incidence of Age-Related Eye Diseases: A Prospective Study

First Author: Jun YU

Co-Author(s): Li Jia CHEN, Chi Pui PANG, Clement C. THAM, Jason C. YAM, Yuzhou ZHANG

Purpose: The brain care score (BCS) is a novel systemic composite index capturing modifiable determinants of brain care. In this study, we aimed to evaluate the associations of BCS with the incidence of age-related eye diseases and to examine the modifying effects of age and genetic susceptibility.

Methods: In this prospective cohort study, we included 382,221 UK Biobank participants aged 40–69 years without cataract, glaucoma, or age-related macular degeneration (AMD) at baseline. BCS (0–19 points) was derived from physical, lifestyle, and social-emotional factors. Multivariable Cox regression estimated hazard ratios (HRs) for incident cataract, glaucoma, and AMD. Gene–BCS interactions were assessed using polygenic risk scores (PRSs).

Results: Over a median follow-up of 13.37 years, there were 44,033 cataract, 9,280 glaucoma, and 6,754 AMD events. Compared with the lowest BCS quintile, the highest quintile had reduced risks of cataract ($HR=0.89$), glaucoma ($HR=0.92$), and AMD ($HR=0.90$; all P -trend <0.01). Per 5-point BCS increase, protective effects were greater in participants aged 40–50 years, with 22% and 28% lower risks for cataract and glaucoma. Higher BCS partly offset cataract genetic risk

(P interaction <0.001). The joint lowest BCS–highest PRS category conferred the highest risks for each outcome.

Conclusions: Higher BCS is associated with lower risks of cataract, glaucoma, and AMD, particularly in middle-aged individuals and those with high genetic risk. Early improvement of BCS in primary care may help reduce the burden of these eye conditions.

Abstract No.: 204279

Brain-Formed Estrogen Is Required to Stimulate Retina Regeneration in Zebrafish

First Author: Zulvikar Syambani ULHAQ

Purpose: To demonstrate the cellular localization and potential function of AroB in the zebrafish eye.

Methods: Adult male zebrafish were exposed to 17β -estradiol, subjected to retinal injury, and received intravitreal injections of drugs or AroB morpholinos. Proliferating and apoptotic cells were labeled with EdU, BrdU, and TUNEL. Retinal sections underwent immunohistochemistry for key markers, and labeled cells were quantified.

Results: We successfully identified that AroB is not exclusively expressed in Müller glial (MG) cells, but also in interneuronal cells, photoreceptor cells, and lens epithelial cells. Furthermore, the addition of estradiol (E2) increased AroB expression and altered its distribution, resulting in a positive signal located in ganglion cells. We also demonstrated that E2 acts as a neuroprotective and neuroregenerative agent by decreasing the number of apoptotic cells and increasing the number of proliferating cells in the injured retina. In addition, we provide evidence that AroB is involved in stimulating MG cell activation in response to retinal injury.

Conclusions: Altogether, our findings strongly suggest that E2 produced in the eye by AroB, along with its downstream signaling through genomic pathways, mediates the robust regenerative capacity of the zebrafish retina following injury.

Abstract No.: 206258

Cortical Rehabilitation in Neuro-Adaptation Failures Improves Functional Visual Ability After Multifocal Implants: A Randomized Controlled Trial

First Author: Lionel Raj DANIEL RAJ PONNIAH

Purpose: Photoc phenomena, neuro-adaptation failures are major concerns after MFIOs. This study evaluated a patient-specific, visual perceptual learning(VPL) therapy regimen using Gabor patches (grey level gratings, specific for receptive visual fields) for improving vision & contrast sensitivity function(CSF) in patients not satisfied after MF-IOL implantations.

Methods: A prospective, controlled-randomized study. Adults (50-70 yrs) with uneventful MFIOLs, over 24 weeks post-surgery, BCVA worse than 20/40 with sub-optimal Contrast(CSF), complaining about vision quality, were randomized in a 2:1 ratio into Treatment(G1), in which computer-based perceptual therapy using Gabor patches amidst co-linear flankers was employed & Control(G2) arms. The study had 2 phases (screening + treatment). Mid-training (Post 20 sessions), Post 40 training sessions, Post-therapy follow-up by 6 months were evaluated for improvements in BCVA distance & near (ETDRS) & CSF at spatial frequencies of 3, 6,12,18 CPD with FACT sine wave grating, using Friedman tests for repeated measures.

Results: Thirty cases were randomized into a 2:1 ratio into treatment and control arms. Subgroup consisted of 16 Trifocals (PanOptix) and 14 Bifocals (Tecnis). The average improvement after VPL therapy is 2.1 LogMar lines in the Treatment arm ($p<0.0001$), whereas no significant improvements were observed among the controls. Tests for repeated measures showed that 83% subjects improved in Contrast Sensitivity from baseline by over 50% (at spatial freq. of 3,6,12 & 18 CPD) in the Treatment Group(G1, all $p<0.0001$), whereas no significant improvements were observed amongst the controls.

Conclusions: Sequential, post-operative, patient-specific, cortical stimulation improved vision & CSF in patients with dissatisfied Multi Focal-IOL subjects & acts as proof of concept of improving neural connections at cortical levels. The key to optimizing vision following MF-IOLs lies in training the brain to improve neuroadaptation processes. Phaco surgeons could consider this no-side-effect postoperative visual physiotherapy measure after all MF-IOL implantations.

Abstract No.: 204412

Design and Validation of a Transformer-Based Multitask Framework for Forecasting Glaucoma and Time to Disease Onset

First Author: Lijie **PAN**

Co-Author(s): Pheng-ann **HENG**, Hanruo **LIU**, Ningli **WANG**, Xi **WANG**, Jian **WU**, Xikai **YANG**

Purpose: To offer a promising solution for glaucoma detection through the analysis of sequential fundus photography using artificial intelligence (AI).

Methods: In this study, we developed a transformer-based multitask framework designed to predict the onset of glaucoma and estimate the time interval to glaucoma onset. The model utilizes a long-term follow-up dataset and integrates both spatial and temporal information to identify early signs of glaucoma progression. Model performance was assessed using various metrics, including the area under the ROC curve (AUC), accuracy, sensitivity, specificity, and F1 score for glaucoma prediction, as well as RMSE, MAE,

R^2 , and Pearson correlation coefficient (PCC) for time-to-onset prediction.

Results: The transformer-based multitask model demonstrated outstanding performance, achieving an AUC of 0.996, accuracy of 99.2%, sensitivity of 98.0%, and specificity of 99.3%, significantly outperforming other models as well as human ophthalmologists in glaucoma prediction. For the time interval prediction task, the model achieved an RMSE of 2.4384, MAE of 1.6996, R^2 of 0.8466, and PCC of 0.9485, indicating high accuracy in estimating the time to glaucoma onset.

Conclusions: The results highlight the potential of the transformer-based multitask model as a highly accurate tool for both glaucoma prediction and the estimation of the time to disease onset. This AI framework holds significant promise as a complementary tool in clinical practice, offering advancements in glaucoma screening and management, particularly in underserved populations.

Abstract No.: 207300

Development of a Standardized Thai Continuous-Text Reading Chart for Clinical and Research Use

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Purpose: To develop and validate standardized Thai continuous-text reading charts for assessing near visual acuity and reading performance in Thai-speaking individuals.

Methods: Fifty-nine Thai participants (20–35 years) with normal vision were enrolled. Sentences were created at a Grade 4 level, each with seven words and 7–9 syllables, paired into 15–17 syllables. Sentences were grammatically reviewed and calibrated using the x-height of the TH SarabunPSK font. Only sentences with corrected words per minute (CWPM) within the mean ± 1 SD were included. Two charts, each with 13 sentence pairs in logarithmic print sizes, were produced. Reading assessments were conducted at 40 cm under standardized luminance. Reliability was assessed using Cronbach's alpha, and inter-rater correlation was measured with Pearson's r .

Results: Of 38 candidate pairs, 26 met the inclusion criteria, yielding a mean reading speed of 239.1 ± 7.6 wpm (95% CI, 236.0–242.2). Cronbach's alpha showed excellent internal consistency (0.975 for 38 pairs; 0.967 for 26 pairs). Test-retest after one week confirmed repeatability (244.5 ± 15.1 wpm). Preliminary comparisons with the English Radner chart showed comparable maximum reading speed and critical print size, further supporting the external validity of the

Thai charts and their alignment with international standards.

Conclusions: The Thai continuous-text reading charts provide a reliable, reproducible, and valid tool for assessing reading performance. With careful linguistic and typographic design, they ensure consistency and cultural relevance. The inclusion of multiple acuity notations (M-units, logMAR, Snellen) enhances international comparability, making the charts applicable in both clinical practice and research, including low-vision rehabilitation and intraocular lens evaluation.

Abstract No.: 206224

Disease and Lifestyle Influences on the Ocular Surface Microbiome: A Systematic Review

First Author: Kin Yip **YIN**

Co-Author(s): Yan Hei Yannis **CHAN**, Kelvin Kl **CHONG**, Kenneth Kh **LAI**, Calvin Cp **PANG**, Clement Cy **THAM**

Purpose: To investigate the disease and lifestyle factors that produce a significant influence on the core Ocular Surface Microbiome (OSM), which comprises seven genera: *Corynebacterium*, *Staphylococcus*, *Acinetobacter*, *Streptococcus*, *Pseudomonas*, *Cutibacterium* and *Bacillus* (Ling et al., 2025).

Methods: This review included 70 studies with 32 pathological and 7 lifestyle factors from PUBMED and Web of Science using keywords “Disease,” “Ocular Surface Microbiome,” and other sources to summarize alterations to the core OSM genera caused by different disease and lifestyle factors.

Results: Twenty-nine out of 32 disease factors (90.6%) and 3 out of 7 lifestyle factors (42.9%) display different degrees of impact on the composition of the core OSM. Notably, for disease factors, dry eye disease, bacterial keratitis, and Steven-Johnson Syndrome significantly increase/decrease ($p < 0.05$) the relative abundance of 6 out of 7 genera in the core OSM. For lifestyle factors, wearing contact lenses is observed to alter the abundance of 5 out of 7 genera significantly in the core OSM. These factors, which produce alterations in multiple genera, are considered to have relatively greater effects on the core OSM. Conflicting results were observed between studies on the same diseases, which might be attributed to differences in methodology.

Conclusions: Although impactful factors have been identified, common limitations, including small sample sizes, hinder the generalizability of these studies. Larger-scale studies with standardized protocols are required in the future to further explore this topic.

Abstract No.: 203571

Dynamic Longitudinal Evaluation of Retinal Optical Coherence Tomography Angiography and Electrophysiology in Acute Hypoxia Exposure

First Author: Xinli **YU**

Co-Author(s): Li **DING**, Deteng **HUANG**, Xuemin **LI**, Yicong **PENG**

Purpose: The purpose of this study was to assess changes in retinal function and structure during acute dynamic hypoxic exposure at high altitude and to identify critical altitude and sensitivity indices for changes in retinal function and structure.

Methods: In this longitudinal study, 21 healthy volunteers were recruited, and their OCTA and ERG were collected at ground level (altitude 1), 3500 m (altitude 2), 4000 m (altitude 3), 4500 m (altitude 4), and back to ground level (altitude 5). Generalized estimating equation analysis was used to compare the differences in OCTA and ERGs at different altitudes. Pearson correlation analysis was used to analyze the correlation between ERGs and OCTA.

Results: Optical coherence tomography angiography (OCTA) revealed that superficial vascular density (SVD) in the inferior and temporal regions of the retina (12–18 mm) significantly increased at 4,000 meters ($P < 0.05$). Both SVD and superficial small vessel density (SSVD) significantly increased (3–18 mm) at 4,500 meters ($P < 0.05$). Concurrent electrophysiological retinal electroretinography (ERG) revealed that at 4,500 meters, the amplitude of the photopic negative response (PhNR) b-wave and photopic flash b-wave significantly decreased ($P < 0.001$). Crucially, superficial perfusion area (3–12 mm) showed a significant positive correlation with the amplitude of light-adapted flash ERG and oscillatory potentials (OPs) ($P < 0.001$), particularly in the upper and lower regions.

Conclusions: These results suggest that altered neurologic function is associated with altered retinal microcirculation and could provide new insights into the progression and determination of HAR. In addition, the density of blood vessels in the inner retinal layer was the first to increase significantly at altitudes above 4000 m, further validating the utility of OCTA as a sensitive biomarker for early HAR detection.

Abstract No.: 205405

Early Processing on Occipital Visual Cortex for Exogenous Attention Based on Eye of Origin Contrast

First Author: Chen **WU**

Co-Author(s): Zhikuan **YANG**, Jinyou **ZOU**

Purpose: Exogenous attentional effects driven by eye-of-origin contrast are demonstrated when attention is captured by a singleton presented to one eye among distractors presented to the other. This phenomenon

has been proposed as a hallmark of the V1 Saliency Hypothesis. We investigated its neural basis using electroencephalogram (EEG) recordings in healthy adults and further examined whether exogenous attention is impaired in patients with intermittent exotropia (IXT).

Methods: We combined electrophysiological and behavioral approaches to examine exogenous attention. Thirty healthy adults underwent EEG recordings while passively viewing arrays of bar stimuli in which a singleton could differ in eye of origin (E), orientation (O), both features (EO), or be absent (uniform baseline, U). Event-related potentials (ERPs) evoked by the singleton were compared with the baseline to identify early attention-related responses. In parallel, we evaluated behavioral performance by assessing visual search accuracy in twenty-five patients with IXT and matched healthy controls.

Results: The attentional effects emerged at 60–90ms post-stimulus, with clear polarity reversals regarding the vertical locations of the stimulus: a significant increase in voltage relative to the baseline condition for the singletons in the lower visual field (E: $t=5.45$, O: $t=7.66$, EO: $t=6.90$; $p < 0.001$) while a significant decrease in voltage relative to the baseline condition for the singletons in the upper visual field (E: $t=-6.13$, O: $t=-3.55$, EO: $t=-4.59$; $p < 0.001$). In behavioral performance, patients with IXT showed no reduction in accuracy under the E condition. In contrast, under the O and EO conditions, IXT patients demonstrated both reduced accuracy and longer reaction times compared with controls.

Conclusions: An early occipital response associated with the exogenous attention by eye of origin, with similar patterns and latency as the response for exogenous attention by orientation, supporting the V1 Saliency Hypothesis. Patients with IXT showed specific attention deficits related to binocular, but not monocular, feature representation. These deficits are likely caused by impairments to V1 binocular neurons in IXT.

Abstract No.: 206223

Effect of Compound Treatment on Lens Gradient Refractive Index

First Author: Kehao **WANG**

Co-Author(s): Masato **HOSHINO**, Barbara **PIERSCIONEK**, Yutian **PU**

Purpose: The eye lens has a gradient distribution of refractive index (GRIN) to help form sharp images on the retina. Distortions to the GRIN can be caused by age-related lens disorders. Studies have shown that pharmaceutical agents can restore the elasticity or transparency of the lens, presenting a promising strategy for treating presbyopia and cataract. This study investigates the effect of these compounds on the lens's optical properties.

Methods: 25-hydroxycholesterol, lipoic acid, and lanosterol were applied both as eye drops to aged C57BL/6J mice and dissolved in medium to incubate enucleated porcine lenses. For the two eyes from the same mouse, one was treated with the compound and the other used as the control. Eye drops were given every 2 days for a total duration of 6 weeks, while lens incubation lasted for 48 hours. All treated lens samples were measured using the synchrotron radiation based Talbot-Interferometer at SPring8 Japan to obtain the three-dimensional distribution of refractive indices.

Results: GRIN profiles were reconstructed using MatLab and different compounds were found to act on lens optical properties in different regions: 25-hydroxycholesterol reduced the local irregularities and sharpen the peripheral steepness of the GRIN profile, lipoic acid increased the width of the central flat region while decrease the thickness of the peripheral region of the GRIN, lanosterol reduced both the width of the central flat region and the peripheral steepness.

Conclusions: Compound treatments can change the lens internal refractive index distribution, reduce the structural discontinuities that cause light scatter and alters the lens optical refractive power.

Abstract No.: 200560

Evaluation of Stereopsis and Fusion in Patients With Vestibular Vertigo

First Author: Muhammad Adri **MOHAMED SHAFIT**

Co-Author(s): Ismail **SHATRIAH**

Purpose: Normal binocular vision is important to retain the visual image on the retina during the vestibulo-ocular reflex, affecting postural stability. Thus, the presence of binocular vision dysfunction in vertigo warrants an evaluation. This study is to compare the means of stereopsis and fusional vergence between patients with vestibular vertigo and control subjects.

Methods: A comparative cross-sectional study was conducted in the Ophthalmology Clinic, Hospital Universiti Sains Malaysia, Kelantan, from January 2019 til February 2021 among patients with vestibular vertigo and the control group. Fifty-seven patients were included in this study, with 57 controls who are in the same age range of 30 to 60 years old. Both groups were evaluated for stereopsis and fusion vergence amplitude once they fulfilled the required criteria. The far and near stereopsis were tested using the M&S Smart System II PC-Plus and the Titmus Test, respectively. Fusional vergence was measured using a prism bar.

Results: Parametric analysis of stereopsis revealed a statistically significant difference in mean stereopsis at near ($p < 0.05$) and an insignificant difference in mean stereopsis at far ($p > 0.05$) between vestibular vertigo patients and the control group. Independent t-test

showed a statistically significant difference in mean fusional vergence measurement ($p>0.05$) between these two groups, which consists of near and far negative and positive fusional vergence for break and recovery point.

Conclusions: There was a statistically significant difference in mean near stereopsis and fusional vergence between patients with vestibular vertigo and the control group. However, there was no significant difference in the mean for far stereopsis.

Abstract No.: 201978

Factors Mediating Alterations in Dynamic Visual Acuity and Color Vision Under Short-Term High-Altitude Exposure

First Author: Jiaying **XIE**

Co-Author(s): Li **DING**, Xuemin **LI**, Ziyuan **LIU**, Yuchen **WANG**

Purpose: To investigate factors mediating alterations in dynamic visual acuity (DVA) and color vision during short-term high-altitude exposure.

Methods: Participants underwent visual function test, including DVA test and color vision test, as well as ocular examinations including optical biometry, IOP, and refractive measurements, ocular surface evaluation, and electrophysiology test at the ground, 3,500m, 4,000m, 4,500m, and at the end of the experiment in a high-altitude complex environment simulation chamber. Correlation analysis, and multilevel mediation analysis combined with a mixed-effects model were constructed to ascertain the factors mediating alterations in visual function among different altitudes.

Results: Correlation analysis showed that DVA and color vision were significantly correlated with several ocular parameters under different settings. Multilevel mediation analysis indicated that for DVA, LLT, TMH, and photopic flash ERG b-wave were identified as significant mediators, with increased LLT, increased TMH and decreased photopic flash ERG b-wave amplitude mediated DVA declined (increased LogMAR). Concerning color vision, IOP, TBUT, TMH, photopic flash ERG a-wave, and photopic flash ERG b-wave were determined as significant mediators, with reduced IOP, TBUT, TMH, and photopic flash ERG a- and b-wave amplitude (absolute value) mediated color vision deterioration (increased nanometer).

Conclusions: LLT, TMH, and photopic flash ERG b-wave were factors mediating alterations in DVA under short-term high-altitude hypoxic exposure. IOP, TBUT, TMH, photopic flash ERG a-wave, and photopic flash ERG b-wave were factors mediating alterations in color vision under short-term high-altitude hypoxic exposure.

Abstract No.: 203582

HOTAIR Interaction With WTAP Promotes PCO Formation via m6A-Dependent THBS1 Expression

First Author: Xi **CHEN**

Co-Author(s): Chenshuang **LI**, Hong **YAN**, Siqi **ZHANG**

Purpose: To explore the role of long non-coding RNAs (lncRNAs) and N6-methyladenosine (m6A) in posterior capsule opacification (PCO) and their underlying mechanisms.

Methods: The localization of lncRNAs and proteins was analyzed using fluorescence in situ hybridization and immunofluorescence staining. RNA m6A quantification, RNA immunoprecipitation, co-immunoprecipitation, MeRIP-seq, MeRIP-qPCR, western blotting, wound-healing, and Transwell assays were applied to elucidate the underlying mechanisms.

Results: The levels of lncRNA HOX transcript antisense intergenic RNA (HOTAIR) and m6A methylation increased significantly during epithelial-mesenchymal transition (EMT) in lens epithelial cells (LECs). HOTAIR promoted EMT and m6A methyltransferase activity but had no effect on methyltransferase activity and was not modified by m6A. Nevertheless, HOTAIR interacted with WT1-associated protein (WTAP), a key m6A writer protein, facilitating WTAP-mediated recruitment of METTL3-METTL14 heterodimers and enhancing m6A modification. The HOTAIR/WTAP complex elevated m6A levels, thrombospondin 1 (THBS1) expression, and EMT in LECs.

Conclusions: lncRNA HOTAIR enhances the assembly of the WTAP/METTL3/METTL14 complex and promotes EMT in LECs by upregulating m6A modification and THBS1 expression. Targeting the HOTAIR/WTAP/THBS1 pathway may prevent or treat PCO.

Abstract No.: 208209

Intraocular Iron Injection Induces Oxidative Stress, Geographic Atrophy-Like Features and Disease-Related Macroglia Activation

First Author: Yingrui **LIU**

Co-Author(s): Ming-ming **YANG**

Purpose: Iron accumulation has been implicated in the pathogenesis of age-related retinal diseases, including age-related macular degeneration (AMD). This study aims to explore the chronic features and mechanisms associated with iron-induced retinal damage in a mouse model.

Methods: Mice were given intravitreal (IVT) ferric ammonium citrate (FAC). Retinal features were analyzed through autofluorescence (AF), bisretinoid quantification, and localization of carboxyethyl pyrrole (CEP), an oxidized adduct associated with AMD. Additionally, quantitative PCR was used to measure

antioxidant and inflammatory responses in the retinal pigment epithelium (RPE) and neural retina.

Results: IVT FAC injection led to progressive RPE death resembling human geographic atrophy. Green AF appeared in photoreceptors, followed by gold AF in rod outer segments, RPE, and subretinal myeloid cells. The green AF signature suggested flavin adenine dinucleotide, while gold AF correlated with increased bisretinoid all-trans-retinal dimers. CEP accumulation was observed sequentially in photoreceptors, RPE, and myeloid cells. RNA-seq revealed upregulation of disease-related microglia (DAM)-specific genes. TREM2 gene deletion inhibited the activation of DAM and phagocytosis of lipid deposits, further exacerbating retinal degeneration.

Conclusions: The findings provide new mechanistic insights into the potential toxicity of retinal iron accumulation in AMD. The mouse model offers a valuable tool for testing therapeutic interventions such as antioxidants, iron chelators, and anti-inflammatory treatments.

Abstract No.: 208215

Iron Chelator Deferiprone Restores Iron Homeostasis and Inhibits Retinal Neovascularization in Experimental Neovascular Age-Related Macular Degeneration

First Author: Yuan **XU**

Co-Author(s): Qian **CHEN**, Xiaodong **CHEN**, Shiya **HUANG**, Shiyang **LI**, Xiang **LIN**, Zuguo **LIU**, Xin **WANG**, Mingyan **WEI**, Shengmei **ZHOU**, Rongrong **ZONG**

Purpose: Retinal neovascularization is a significant feature of advanced age-related macular degeneration (AMD) and a major cause of blindness in patients with AMD. However, the underlying mechanism of this pathological neovascularization remains unknown. Iron metabolism has been implicated in various biological processes. This study was conducted to investigate the effects of iron metabolism on retinal neovascularization in neovascular AMD (nAMD).

Methods: C57BL/6J and very low-density lipoprotein receptor (VLDLR) knockout (Vldlr^{-/-}) mice, a murine model of nAMD, were used in this study. Bulk-RNA sequencing was used to identify differentially expressed genes. Western blot analysis was performed to test the expression of proteins. Iron chelator deferiprone (DFP) was administered to the mice by oral gavage. Fundus fluorescein angiography was used to evaluate retinal vascular leakage. Immunofluorescence staining was used to detect macrophages and iron-related proteins.

Results: RNA sequencing (RNA-seq) results showed altered transferrin expression in the retina and RPE of Vldlr^{-/-} mice. Disrupted iron homeostasis was observed in the retina and RPE of Vldlr^{-/-} mice. DFP mitigated iron overload and significantly reduced retinal

neovascularization and vascular leakage. In addition, DFP suppressed the inflammation in Vldlr^{-/-} retinas. The reduced signals of macrophages were observed at sites of neovascularization in the retina and RPE of Vldlr^{-/-} mice after DFP treatment. Further, the IL-6/JAK2/STAT3 signaling pathway was activated in the retina and RPE of Vldlr^{-/-} mice and reversed by DFP treatment.

Conclusions: Disrupted iron metabolism may contribute to retinal neovascularization in nAMD. Restoring iron homeostasis by DFP could be a potential therapeutic approach for nAMD.

Abstract No.: 210252

Long-Term Phenotypic Characterization of an Adgrv1 Spontaneous Variation Mouse Model: Insights Into Visual and Auditory Dysfunction in Usher Syndrome Type 2

First Author: Lei **ZHANG**

Co-Author(s): Hai-yan **WANG**

Purpose: Usher syndrome (USH) represents the predominant form of syndromic retinitis pigmentosa (RP), characterized by retinal degeneration combined with auditory impairment. While pathogenic variants in ADGRV1 (alternatively designated USH2C) contribute to 5-19% of USH2 diagnoses, comprehensive longitudinal characterization of disease progression in animal models remains limited, especially regarding ocular manifestations.

Methods: This investigation employed a spontaneously generated Adgrv1-deficient mouse strain (Adgrv1^{-/-}) on a C57BL/6J genetic background. Multi-modal analyses encompassed morphological evaluation of sensory tissues, electron microscopic ultrastructural examination (scanning and transmission), molecular characterization through quantitative gene expression and protein localization studies, alongside physiological testing via electroretinography and auditory evoked potentials across developmental timepoints spanning P10 through P20mo.

Results: Cochlea: Hearing impairment manifested early (ABR thresholds elevated by P1mo), with outer hair cell stereocilia degeneration by P10 and spiral ganglion neuron loss by P11mo. Retina: Despite significant Adgrv1 mRNA/protein reduction from P10, retinal morphology remained intact. Ultrastructural disorganization of photoreceptor outer segments emerged at P11mo, followed by functional decline (reduced ERG b-wave amplitude) at P20mo. Specificity: No abnormalities were detected in other organs or hematological parameters.

Conclusions: This study delineates a Adgrv1^{-/-} model with early-onset auditory dysfunction and late-onset retinal degeneration, mirroring human USH2 progression. The delayed retinal phenotype suggests species-specific roles for ADGRV1 in

mechanotransduction, offering a unique tool to study USH2 pathogenesis and therapeutic interventions.

Abstract No.: 208205

METTL3 Governs Diabetic Retinal Vasculopathy Through a CRIP2–VEGF Axis

First Author: Tianyi LUO

Co-Author(s): Ming-ming YANG

Purpose: The epitranscriptomic control of DR vasculopathy remains undefined. CRIP2 has been identified as a transcriptional repressor of VEGF. Here, we dissect how METTL3, the dominant m6A writer, controls this CRIP2–VEGF module in DR.

Methods: Animal and cellular models of DR were generated by AAV- or lentivirus-mediated retinal/endothelial knockdown of METTL3 in streptozotocin-induced T2DM mice, db/db mice, and high-glucose/lactate-stimulated HUVECs. Mechanistic assays included qPCR screening of m6A writers/erasers, immunoblotting of METTL3–CRIP2–VEGF, global m6A dot-blot, dual-IF mapping of endothelial changes, and vascular phenotyping (Evans-blue permeability, H&E, trypsin-digest flat mounts).

Results: METTL3 was the only m6A writer down-regulated in T2DM retinas, coinciding with global m6A loss. High glucose suppressed METTL3 in HUVECs, whereas inflammatory or lactate stress alone elevated it, revealing metabolically driven suppression opposed by inflammatory induction. CRIP2 was reciprocally up-regulated when METTL3 was silenced in vitro and in T2DM retinas. Dual-IF confirmed endothelial co-localisation of METTL3 and its diabetes-induced reduction, paralleled by CRIP2 induction. Retinal Mettl3 knockdown in db/db mice amplified CRIP2 induction, increased microvascular density, and reduced leakage, corroborating the pathway.

Conclusions: Hyperglycaemia silences METTL3, relieving m6A-mediated repression of CRIP2 and thereby dampening VEGF signalling. METTL3 is therefore a negative regulator of DR vasculopathy, whereas CRIP2 represents the first m6A-dependent VEGF repressor.

Abstract No.: 206608

Mechanistic Role of SIRT4-Mediated Deacetylation of Complement Factor B in Age-Related Macular Degeneration

First Author: Cunzi LI

Co-Author(s): Ming-ming YANG

Purpose: To elucidate the role of silent information regulator 4 (SIRT4) in promoting age-related macular degeneration (AMD) by deacetylating complement factor B (CFB) and activating the alternative complement pathway, and to evaluate its potential as a therapeutic target.

Methods: Oxidative stress was induced in ARPE-19 cells with A2E plus blue light, and sodium iodate-induced retinal degeneration was established in wild-type, SIRT4 knockout, and CFB knockout mice. Functional assays included AAV9-SIRT4 overexpression and MSN-125 inhibition of BAX/BAK oligomerization. Molecular and structural changes were evaluated by qPCR, Western blot, Co-IP, HE/TUNEL staining, and electron microscopy.

Results: In both in vitro and in vivo AMD models, CFB expression was elevated, whereas its acetylation level was significantly reduced. Stepwise analysis demonstrated that SIRT4 mediated this deacetylation. Under oxidative stress, SIRT4 translocated from mitochondria to the cytoplasm and directly bound to CFB, as confirmed by co-immunoprecipitation. This interaction promoted deacetylation of CFB and enhanced alternative complement activation, with upregulation of C3, C5, and MAC. Functionally, SIRT4 knockout mice displayed attenuated retinal injury and reduced apoptosis, while SIRT4 overexpression exacerbated damage. Importantly, in CFB-deficient mice, SIRT4 overexpression did not cause further retinal injury, indicating that its pathogenic effect is CFB dependent. Inhibition of BAX/BAK oligomerization blocked SIRT4 cytoplasmic translocation.

Conclusions: SIRT4 promotes AMD progression by translocating to the cytoplasm, deacetylating CFB, and activating the alternative complement pathway. The SIRT4–CFB axis represents a novel mechanism of complement regulation and a promising therapeutic target for AMD.

Abstract No.: 203749

Mecobalamin Promotes Corneal Nerve Regeneration via Wdr81-Mediated Enhancement of Phagocytosis

First Author: Bining ZHANG

Co-Author(s): Shijiu CHEN, Weiyun SHI

Purpose: Corneal neurodegeneration is a key pathological basis for neurotrophic keratopathy (NK). Although recombinant human nerve growth factor (rhNGF) eye drops have been approved for NK treatment, their high cost and strict storage/use requirements limit clinical adoption. This study aims to evaluate the efficacy and mechanism of Mecobalamin (Mec) eye drops in corneal nerve repair and to explore their potential for clinical translation.

Methods: Trigeminal nerve branch transection, alkali burn, and herpes simplex keratitis mouse models were used to compare the effects of topical Mec and rhNGF on corneal nerve regeneration. Nerve repair was assessed via immunofluorescence, corneal nerve function tests, and electrophysiological evaluations. Further mechanistic studies were performed using transcriptomic sequencing, Western blotting, and immunostaining. In addition, a prospective clinical

study was conducted in 12 NK patients who received Mec eye drops for 60 days, with follow-up evaluations.

Results: Topical application of Mec significantly promoted corneal nerve morphological and functional recovery in all three mouse models of NK, with efficacy comparable to rhNGF. Mechanistically, Mec markedly upregulated Wdr81 expression in the trigeminal ganglion and activated non-canonical autophagy pathways, thereby accelerating myelin debris clearance and axonal regeneration. In the clinical study, all patients treated with Mec showed complete corneal epithelial healing within 60 days, with significant improvements in corneal sensitivity and visual acuity, and no adverse effects were observed.

Conclusions: Mecobalamin eye drops effectively promote corneal nerve regeneration, potentially through a Wdr81-mediated non-canonical autophagy pathway. As an approved, stable, and cost-effective drug, Mec demonstrates promising efficacy and translational potential for the treatment of NK.

Abstract No.: 202346

Microglia-Mediated Neuroinflammation Through Autophagy-Related Cell Death in Acute Optic Nerve Injury

First Author: Zijing **HUANG**

Co-Author(s): Shuping **KE**, Jiajian **LIANG**

Purpose: Optic neuropathy is a leading cause of blindness. Autophagy activation has been reported after optic nerve injury, but its role remains unclear. We investigated the involvement of autophagy in the early stages of injury and explored potential therapeutic strategies.

Methods: A mouse optic nerve crush model was established. Autophagy levels were assessed at different time points using electron microscopy and markers LC3 and Beclin-1. The relationship between autophagy and cell death was examined by Beclin-1 co-localization with TUNEL. Receptor-interacting protein 3 (RIP3) knockout mice were used to determine its regulatory role in microglial autophagy-related cell death. The neuroprotective effect of inhibiting this pathway was further evaluated with pharmacological inhibitors.

Results: Autophagy activation peaked one day after injury. Beclin-1 was expressed in retinal ganglion cells (RGCs), microglia, and astrocytes. Excessive autophagy induced cell death specifically in microglia, not in RGCs or astrocytes. RIP3 knockout reduced microglial autophagy-related cell death and attenuated retinal neuroinflammation. In addition, intravitreal injection of the RIP3 inhibitor GSK-872 or the autophagy inhibitor 3-MA decreased RGC loss and improved visual function.

Conclusions: Autophagy-related cell death represents a novel mechanism of microglial activity after optic

nerve injury. Targeting RIP3-mediated autophagy may provide a promising strategy for early intervention in optic neuropathies.

Abstract No.: 205389

Molecular Mechanisms Underlying Bis(2-Ethylhexyl) Phthalate-Induced Dry Age-Related Macular Degeneration: Insights From Network Toxicology, Machine Learning, and Single-Cell RNA Sequencing

First Author: Rui **NIU**

Co-Author(s): Xin **JIN**, Lifei **WANG**, Zhongyang **YAN**, Baoyue **ZHANG**

Purpose: Bis(2-ethylhexyl) phthalate (DEHP), a widely used plasticizer, can affect retinal photosensitivity through long-term exposure. Therefore, this study aimed to investigate the molecular mechanisms of DEHP-induced dry age-related macular degeneration (AMD).

Methods: Dry AMD-associated target genes were retrieved from the GeneCards and OMIM databases; DEHP-interacting targets were identified using the STITCH, SwissTargetPrediction, SuperPred, and SEA databases. Overlapping targets between the two datasets were screened via interaction analysis. Core targets were further identified using LASSO, RandomForest, and SVM machine learning analysis. Their expression patterns and affinity were validated using single-cell transcriptome datasets and molecular docking. These results were validated using PCR and immunofluorescence analysis in cells and animals, and fundus changes in animal models were observed using OCTA.

Results: MAPK14, MCL1, SCARB1, and CTSD were identified as core targets, indicating their important roles in lipids and atherosclerosis, lipid metabolism, and VEGF signaling. Single-cell RNA sequencing confirmed their significant expression in RPE, and molecular docking analysis revealed strong binding affinity between DEHP and these targets. Furthermore, compared with the control group, these core factors were significantly differentially expressed in the Nalo3 animal model and the DEHP animal and cell models ($P < 0.05$). The thickness of the retina and choroid of mice in the DEHP group decreased, the deep blood flow decreased, and DEHP interfered with the lipid metabolism of RPE cells.

Conclusions: DEHP disrupts RPE cell lipid metabolism through MAPK14, MCL1, SCARB1, and CTSD, damaging the retina and choroid and further inducing dry AMD. These findings deepen our understanding of the mechanism of DEHP-induced dry AMD and provide a theoretical basis for the development of potential therapeutic strategies and environmental toxicity assessments.

Abstract No.: 207332**New Compound Heterozygous PEX1 Variants in Heimler Syndrome***First Author: Xiaohu YAN*

Purpose: To report new pathologic variants and retinal and biochemical phenotypes in Heimler syndrome.

Methods: Exon sequencing was used to screen the pathologic variants in a patient with Heimler syndrome. The retinal characteristics and serum metabolome alterations were evaluated.

Results: A scanning laser ophthalmoscope showed that a large area of retinal choroidal atrophy was seen at the posterior pole of the retina, with scattered patchy subretinal pigmentation. Optical coherence tomography showed fovea atrophy accompanied by retinal retinoschisis in the right eye and macular retinoschisis and edema in the left eye. The electroretinogram showed obviously reduced amplitudes of a- and b-waves under photopic and scotopic conditions in both eyes. Visual field tests showed reduced central visual field in both eyes. Exon sequencing was used to identify new compound heterozygous variants, including c.2966T>C and c.1670+1G>T of the PEX1 gene. Non-targeted determination of total lipid metabolites and targeted determination of medium and long chain fatty acids in the serum of the patient and his healthy sibling were tested.

Conclusions: These data identified new compound heterozygous PEX1 variants and expanded our understanding of phenotypes in Heimler syndrome.

Abstract No.: 200143**RP1L1 Variants in Occult Macular Dystrophy: Clinical Signs and Molecular Causes***First Author: Yang PAN**Co-Author(s): Takeshi IWATA*

Purpose: Occult macular dystrophy is a hereditary retinopathy marked by progressive bilateral vision loss despite normal findings on fundus examination, fluorescein angiography, and full-field electroretinography. Its pathogenesis is not yet fully understood, and effective treatments are currently unavailable.

Methods: We performed whole-exome sequencing on 133 samples from 78 OMD pedigrees to identify pathogenic variants. To investigate the effects of the R45W mutation on protein synthesis and trafficking, we generated expression vectors for RP1L1 and R45W. Co-immunoprecipitation with an RP1 vector confirmed their interaction and the impact of R45W. Patient-derived iPSCs were differentiated into photoreceptor-like cells, and RNA-seq was performed to assess mutation effects.

Results: We identified the RP1L1 c.133C>T, p.Arg45Trp (R45W) mutation as the sole pathogenic variant in two families with dominantly inherited OMD. Additionally, five other potentially pathogenic RP1L1 variants were detected. Collectively, these six variants accounted for 33.33% of the pedigrees, with R45W being the most frequent (16.6%). The R45W mutation correlated with earlier disease onset, more severe clinical phenotypes, and abnormal intracellular localization rather than altered expression levels. Functional assays demonstrated that R45W disrupted the intracellular localization of RP1L1 and RP1, leading to reduced cell viability. In induced photoreceptor-like cells derived from OMD patients carrying the R45W mutation, we observed downregulation of the long noncoding RNA MEG3 and the PI3K/Akt pathway, along with upregulation of extracellular matrix organization.

Conclusions: These findings confirm the etiological role of RP1L1 in OMD and offer novel insights into its pathogenesis, potentially guiding future research and therapeutic development.

Abstract No.: 204860**Retinal Pigment Epithelium Dysfunction Induced by Mineralocorticoid Receptor Overexpression***First Author: Min ZHAO**Co-Author(s): Seiki ACHIEDO, Francine BEHAR-COHEN, Sebastien BLED, Frédéric JAISSE, Linxin ZHU*

Purpose: The retinal pigment epithelium (RPE) is essential for retinal homeostasis, and its dysfunction contributes to vision-threatening diseases such as age-related macular degeneration (AMD) and retinitis pigmentosa. RPE cells express the mineralocorticoid receptor (MR). While MR activation has been implicated in inflammation, oxidative stress, angiogenesis, and fibrosis in several blinding retinopathies, its specific role in RPE cells remains unclear. We investigated the effects of MR overexpression in the RPE.

Methods: We generated a transgenic mouse line overexpressing murine MR specifically in RPE cells (BestCreMROE). Retinal morphology (OCT) and function (ERG) were evaluated in BestCreMROE and control mice at 3, 6, and 12 months. Eyes were analyzed by histology and transmission electron microscopy (TEM). Flat-mounted RPE were examined by Phalloidin, Cre, and YAP immunofluorescence.

Results: BestCreMROE mice showed progressive pigmentary changes in the fundus with age. OCT revealed early irregularities in RPE reflectivity, and in aged mice, focal RPE loss with secondary retinal alterations. Aged BestCreMROE mice exhibited reduced ERG amplitudes of scotopic a/b waves and photopic b waves. Histology demonstrated pigment abnormalities, RPE disruption, and migration. TEM revealed rarefaction of RPE apical microvilli, degeneration of basal infolding, and loss of RPE polarization. Flat-

mounts showed hypertrophy and heterogeneity of RPE cells linked to MR overexpression. In these areas, YAP localized predominantly in the cytoplasm, whereas nuclear YAP was preserved in unaffected regions.

Conclusions: MR overexpression in RPE cells disrupts differentiation and polarization, leading to pathological changes that may contribute to retinal degenerative diseases.

Abstract No.: 207835

Short-Term Low-Level Red-Light Therapy for Presbyopia: A Double-Masked, Randomized Trial

First Author: Fan **SONG**

Co-Author(s): Yanxian **CHEN**, Mingguang **HE**, Jijing **LI**, Jian **ZHANG**, Ziwei **ZHAO**

Purpose: To determine whether repeated low-level red-light (RLRL) therapy alleviates asthenopic symptoms and enhances accommodative function in presbyopia over 31 days.

Methods: Double-masked, parallel-group randomized trial in adults with presbyopia and self-reported asthenopia. Participants were allocated 1:1 to RLRL or sham. The primary endpoint was the change in the Computer Vision Syndrome Questionnaire (CVS-Q) score at day 31. Key secondary endpoints included binocular accommodative amplitude (AA), Near Activity Visual Questionnaire (NAVQ) score, habitual near visual acuity, near-addition power, accommodative facility, positive/negative relative accommodation, binocular cross-cylinder response, and AC/A ratio. Continuous outcomes were evaluated with adjusted linear mixed-effects models.

Results: Sixty-four of 66 randomized participants (age 41–62 years) completed follow-up. At day 31, symptom burden decreased more with RLRL than sham (adjusted mean CVS-Q change -2.53 vs -0.78 ; between-group difference -1.75 points; 95% CI -3.10 to -0.39). RLRL also favored improvement in binocular AA (adjusted mean difference 1.09 D; 95% CI 0.37 to 1.82) and patient-reported near-vision difficulty (NAVQ, -8.07 points; 95% CI -14.17 to -1.97). The AA effect was larger among eyes with baseline amplitude >2.0 D (1.33 D; 95% CI 0.32 to 2.34). Other prespecified measures showed no between-group differences at assessed visits. No treatment-related adverse events were observed.

Conclusions: Across one month, RLRL reduced asthenopic symptoms and improved accommodative amplitude in presbyopia, with concurrent gains in near-vision patient-reported outcomes and an acceptable safety profile. Further trials with longer follow-up are warranted.

Abstract No.: 204823

The Efficacy of Individualized Visual Therapy in Children With Attention Deficit Hyperactivity Disorder

First Author: Ye **WU**

Co-Author(s): Longqian **LIU**

Purpose: This study conducts a 12-week vision therapy for children with both attention-deficit/hyperactivity disorder (ADHD) and visual dysfunctions, and analyzes the effectiveness of the vision therapy for improving clinical findings and core symptoms in these children.

Methods: A total of two groups of participants were included: an ADHD group (age: 8.35 ± 1.25 years) and a control group (age: 8.14 ± 1.33 years). The ADHD group underwent 12 weeks of vision therapy; the control group did not receive any therapy. Improvements in clinical findings, core symptoms, social functioning, and reading abilities were compared after 12 weeks of treatment.

Results: After vision therapy, the ADHD group exhibited significant improvements in clinical findings and visual symptoms (all $P < 0.05$). Scores on the Inattention, Hyperactivity/Impulsivity, and total score of the Swanson, Nolan, and Pelham-IV rating scales decreased significantly compared to baseline, with improvements significantly greater than those in the control group (all $P < 0.05$). The ADHD group also showed significant reductions in the School and learning and Social activities domains of the Weiss functional impairment rating scale, with improvements significantly greater than those in the control group (all $P < 0.001$). Moreover, the ADHD group showed significant improvement in reading fluency as compared to baseline ($P < 0.001$), and the improvement was significantly greater than that in the control group ($P = 0.036$).

Conclusions: Vision therapy is effective for improving clinical signs, core symptoms, social functioning, and reading abilities in children with ADHD.

Abstract No.: 200198

The Profile of Retinal Ganglion Cell Death and Cellular Senescence in Mice With Aging

First Author: Shuyi **ZHOU**

Co-Author(s): Xin **BIN**, Tsz Kin **NG**, Wenying **WANG**

Purpose: Older age is a risk factor for glaucoma, in which progressive retinal ganglion cell (RGC) loss leads to visual field defects, irreversible visual impairment, and even blindness. We recently identified the involvement of cellular senescence in RGC cell death post-optic nerve injury. Here, we further aimed to delineate the profile of RGC survival in mice with aging, a physiological process with increasing cellular senescence.

Methods: Longitudinal changes of RGC survival, cellular senescence status, and cell death marker expression were evaluated from 2- to 18-month-old mice. Retinal transcriptomes of young and old mice were also analyzed.

Results: The numbers of senescent cells in the ganglion cell layer (GCL) significantly and progressively increased starting at 8 months of age. Yet, a significant reduction of ganglion cell complex layer thickness began in the 10-month-old mice, and a significant reduction in the number of RGCs began in the 12-month-old mice as compared to the 2-month-old mice. Meanwhile, pyroptosis and ferroptosis markers, as well as cellular senescence-related cell cycle arrest proteins p15Ink4b, p16Ink4a, p21Cip1, and p53, were significantly and progressively increased in GCL. Comparing the 2- and 16-month-old mouse retinas, the differentially expressed genes were involved in the pathways of neurodegeneration, innate immunity, and mitochondrial ATP synthesis.

Conclusions: This study revealed the gradual increase in senescent cells as well as pyroptosis and ferroptosis with progressive RGC reduction in mice with aging. Cellular senescence and the related cell death pathways are potential targets for age-related RGC reduction.

Abstract No.: 202585

Unraveling the Gut-Eye Axis Through Cross-Trait Genomics and Multi-Omics Integration

First Author: Yuelan **GAO**

Co-Author(s): Li Jia **CHEN**, Clement C. **THAM**, Jianming **XU**, Jason C. **YAM**

Purpose: The gut-eye axis (GEA) may underlie comorbidity between gastrointestinal and ocular diseases. This study aims to explore their genetic pleiotropy and pathways regulated by environmental factors and gut microbiota.

Methods: This study integrated large-scale genome-wide association study (GWAS) summary data on five gastrointestinal and eight ocular diseases. Genetic correlations and pleiotropic loci were assessed. Functional and tissue-specific analyses were conducted with functional annotation (FUMA), gene-level analyses (MAGMA), transcriptome- and proteome-wide association studies (TWAS, PWAS). Gene-environment (G×E) interactions were evaluated using UK Biobank data. Bidirectional Mendelian randomization (MR) and mediation analyses assessed the causal and mediating roles of gut microbiota.

Results: Extensive genetic correlations were observed across 40 trait pairs, indicating shared heritability. Functional analyses revealed 366 pleiotropic loci and 603 genes, including 21 loci with shared causality, collectively implicating immune regulation and inflammatory pathways as central mechanisms

between gastrointestinal and ocular diseases. TWAS confirmed 154 pleiotropic genes from the 366 loci, and PWAS identified 11 at the protein level. GXE interactions revealed that 26 pleiotropic variants were modulated by 16 environmental exposures, suggesting lifestyle and psychosocial factors influence genetic risk in 13 gastrointestinal-ocular comorbidities. MR analysis identified five causal links from gastrointestinal to ocular diseases and six in the reverse direction. Mediation analysis indicated that the gut microbiota-related polyamine biosynthesis pathway partially mediates the effect of gastroesophageal reflux disease on diabetic retinopathy.

Conclusions: This study systematically dissects the genetic pleiotropy and environmental networks of the GEA, highlighting key roles for immune-related genes and gut microbiota in gastrointestinal-ocular comorbidity.

Abstract No.: 205237

Visual Perceptual Function Improvement in Patients With Diabetic Retinopathy Trained by Visual Perceptual Learning: A Preliminary Clinical Trial

First Author: Lixia **FENG**

Co-Author(s): Kexin **CAO**

Purpose: Diabetic retinopathy (DR) is a prevalent complication of diabetes, characterized by retinal vascular damage and neurodegeneration, which may ultimately result in blindness. Despite conventional treatments, many patients with DR continue to experience visual impairments. This study aims to evaluate the effectiveness of visual perceptual learning (VPL) in enhancing visual perceptual function in DR patients following conventional treatment.

Methods: Eligible participants were randomly assigned to either the VPL group or the control group, with the VPL group undergoing three months of VPL. Visual function was assessed through grating acuity (GA), first-order motion stimulus (1stM), second-order stationary stimulus (2ndS), second-order motion stimulus (2ndM) perception sensitivity and psychological questionnaires.

Results: The VPL group showed improvements in GA, 1stM, and 2ndS compared to controls. Learning progressed rapidly at first and then slowed, revealing greater enhancement in first-order than second-order tasks, and stronger gains in contrast-modulated versus motion-modulated stimuli. Multivariate analyses identified educational level, hypertension, diabetic tractional retinal detachment (DTRD), foveal avascular zone (FAZ) area and FAZ acicularity index (AI) as predictors of VPL efficacy.

Conclusions: The results suggest that VPL may serve as a potentially effective visual rehabilitation therapy.

Abstract No.: 205170**Visual-Related Sensory Integration Deficits in Autistic Children Without Intellectual Disability: A Pilot Study***First Author: Runting MA**Co-Author(s): Shuli SHEN, Qihao SUN, Mengyi WANG, Xin WANG, Xiao YANG*

Purpose: To explore the visual function and high-level perception in autistic children without intellectual disability (ID) and typically developing (TD) children.

Methods: A cross-sectional pilot study. 5 autistic children without ID (8.43 ± 2.07 years, 100% male) and 7 TD children (10.00 ± 1.41 years, 40% male) were included. All autistic children had a prior clinical diagnosis by the Childhood Autism Rating Scale (CARS). Cognitive ability was assessed via the Chinese version of Wechsler Intelligence Scale for Children, fourth edition (WISC-IV), and all participants had a Full-Scale Intelligence Quotient (FSIQ) above 70. Basic visual function (i.e., accommodation, strabismus, and phoria) and high-level visual perception through Sanet Vision Investigator (SVI) were tested.

Results: For basic visual function, there was no significant difference between the two groups (all $p > 0.05$). However, performance in high-level perception revealed that autistic children showed backwardness in hand-eye coordination. Specifically, autistic children exhibited longer duration in the saccades test assessing visual-auditory integration (autistic: 31.50 ± 3.10 s vs. TD: 26.00 ± 1.60 s, $p = 0.010$), as well as slower reaction times in the go/no-go task (autistic: 2.04 ± 0.16 s vs. TD: 1.50 ± 0.19 s, $p = 0.003$). In addition, the reaction time in the Visual Spatial Memory program also showed a marginal significance (autistic: 2.38 ± 1.31 s vs. TD: 0.98 ± 0.43 s, $p = 0.058$). Within the autistic group, the reaction time of Visual Spatial Memory was correlated with FSIQ ($r = -0.951$, $p = 0.049$) and scores of CARS ($r = 0.990$, $p = 0.010$), respectively.

Conclusions: Autistic children without ID may have deficits in vision-related perception and multisensory integration, while basic visual functions may be intact. The severity of autistic symptoms may be associated with these perceptual impairments. Future studies with a larger sample are valuable.

POSTERS

AI, Digital Innovation and Virtual Health

Abstract No.: 203928

Panel No.: ADV-0060

AI Oculomics as a Biomarker to Predict Long-Term Stroke Functional Outcome

First Author: Kanae **FUKUTSU**

Co-Author(s): Deidre Anne **DE SILVA**, Yao **JIE**, Zengxiang **LI**, Daniel **TING**, Fung Peng **WOON**

Purpose: To evaluate whether long-term functional outcomes after ischemic stroke can be predicted from admission clinical data and fundus photographs.

Methods: In a prospective cohort of ischemic stroke admissions (2005–2007), routine clinical assessments and in-hospital fundus photography were obtained. Functional outcome (modified Rankin Scale, mRS) was assessed at 6 months and at two long-term follow-ups (median 29 and 86 months). The primary endpoint was time to first unfavorable outcome (mRS ≥ 3); others were censored at last follow-up. Variable selection used L1-penalized Cox regression (LASSO) with cross-validation, and performance was evaluated in a held-out test set.

Results: We included 612 patients. Of 215 candidate variables, LASSO retained 33 predictors. On the test set, the model achieved a C-index of 0.691 and time-dependent AUCs of 0.71–0.76 at 1–7 years. Key clinical predictors included diabetes (HR 1.36, 95% CI 1.01–1.83) and prior ischemic stroke (HR 1.95, 95% CI 1.06–3.58). A retinal imaging feature, drusen, also independently predicted unfavorable outcome (HR 1.46, 95% CI 1.03–2.07).

Conclusions: Admission clinical information combined with retinal image-derived features enabled the prediction of unfavorable functional outcomes up to 7 years after ischemic stroke. These findings suggest that ocular factors may have an additional contribution to functional prognostication, over and above standard vascular risk factors.

Abstract No.: 206318

Panel No.: ADV-0075

AI-Orchestrated Workflow for Refractive Surgery and Keratoconus Diagnosis: A Three AI-Agent System for Comprehensive Patient Assessment

First Author: Hatem **ALI**

Purpose: To improve diagnostic accuracy in keratoconus and refractive surgery planning using an AI-orchestrated, multi-AI-agent workflow that integrates multimodal imaging and patient history. Task-specific agents with LLM coordination enhance risk stratification, diagnostic certainty, and individualized treatment planning.

Methods: A retrospective study of 50 keratoconus and refractive surgery cases was conducted using a three-agent, AI-orchestrated workflow. Agents included: (1) General Ophthalmology (patient history, risk factors), (2) Imaging (Pentacam, AS-OCT, epithelial mapping, PTA), and (3) Anterior Segment specialist (diagnosis and surgical planning). Multiple LLMs coordinated task execution. Outcomes were measured as diagnostic accuracy, risk stratification consistency, surgical recommendation reliability, and model variability, benchmarked against general-purpose AI models.

Results: General Ophthalmology Agent: Accuracy of patient history: 84% (LLM range: $\pm 6\%$) Risk factor consistency: 78% (Some misunderstood steroid-induced IOP risk) Pentacam & AS-OCT Agent: Imaging accuracy: 87% (LLM variability: $\pm 5\%$) Detection of keratoconus: 92% (Enhanced in structured models) PTA accuracy: 81% (Borderline values resulted in variation) Anterior Segment Specialist Agent: Agreement on diagnosis: 89% (LLM variability: $\pm 7\%$) Surgery recommendation: 76% (Variability in borderline LASIK cases) Total: 85% accuracy, LLM variation: $\pm 9\%$, best time: 11.2s, worst time: 22.4s. Results emphasize LLM variation, indicating varying models for different agents.

Conclusions: An orchestrated, multi-agent AI workflow enhances diagnostic accuracy and clinical safety in refractive surgery and keratoconus. Task-specific agents consistently outperformed general models for risk stratification and decision-making. Future steps include multicenter validation and EMR integration.

Abstract No.: 207838

Panel No.: ADV-0096

AI-Powered Virtual Eye: Perspective, Challenges and Opportunities

First Author: Yue WU

Co-Author(s): Mingguang HE, Danli SHI

Purpose: The eye, with rich imaging landscape and well-characterized anatomy, serves as an ideal organ for computational modeling. Traditional mechanistic approaches have advanced our understanding of ocular biomechanics, optics, and pharmacokinetics, but remain limited in scale and data integration. Recent breakthroughs in artificial intelligence (AI), imaging, and multi-omics enable a next-generation “virtual eye”, a high-fidelity multiscale digital twin. This work aims to synthesize current progress in computational and AI-based eye modeling and to outline a roadmap for developing an AI-powered virtual eye that unifies mechanistic and data-driven intelligence.

Methods: We systematically reviewed studies on ocular computational models. Literature identified through the database was analyzed thematically to trace the conceptual evolution from mechanistic models to AI-powered systems.

Results: Three major stages were identified: simulation-based mechanistic models grounded in physics and anatomy; data-driven deep learning models learning latent representations from multimodal inputs; and a universal, hierarchical framework of interconnected foundation models integrating multi-scale and multimodal processes. The envisioned virtual eye features multimodal fusion, cross-scale representation, dynamic feedback loops, and real-time adaptability. Potential applications include surgery simulation, personalized treatment, and in silico experimentation. However, several challenges, such as limited interpretability, data processing, ethical and privacy concerns, and the absence of standardized evaluation frameworks, remain to be addressed.

Conclusions: The AI-powered virtual eye represents a transformative paradigm toward precision ophthalmology. By coupling first-principles physics with large-scale data-driven learning, it could serve as both a clinical decision-support system and an in silico laboratory. Achieving this vision will require sustained interdisciplinary collaboration across ophthalmology, bioinformatics, artificial intelligence, and ethics.

Abstract No.: 208327

Panel No.: ADV-0097

Accessible AI for Ophthalmic Care: A Low-Cost Foundation Model Ensemble Pipeline for Eye Disease Prognosis

First Author: Ka Hei NG

Co-Author(s): Hongyang JIANG, Tsz Yu LEE

Purpose: To develop and validate a cost-effective, data-efficient artificial intelligence pipeline that predicts the progression of multiple ophthalmic diseases by leveraging frozen, pretrained ophthalmic foundation models.

Methods: The proposed, disease-agnostic pipeline accepts either color fundus photographs (CFP) or optical coherence tomography (OCT) volumes. Each image is embedded by a frozen foundation model (RETFound or VisionFM), yielding low-dimensional feature vectors. These embeddings are refined through a lightweight multi-head self-attention layer and a supervised contrastive encoder, followed by classification with a compact head (multilayer perceptron). Models built atop each foundation model backbone are ensembled by weighted score averaging. Performance was assessed on two public longitudinal datasets: Harvard-GDP (glaucoma; n=500 eyes) and GRAPE (glaucoma; n=263 eyes). Primary evaluation metrics include area under the receiver operating characteristic curve (AUROC) and area under the precision-recall curve (AUPRC).

Results: Our model demonstrates comparable to improved performance over previously published methods. The weighted average ensemble achieved state-of-the-art AUROCs of 0.943 on HarvardGDP (MD endpoint) and 0.854 on GRAPE (PLR3 endpoint), exceeding both single-backbone baselines and prior fully finetuned models. Notably, the trainable portion comprised only 7–9M parameters versus 302M (RETFound) or 84M (VisionFM) for full model finetuning, significantly reducing computational cost and memory demand.

Conclusions: We present a generalizable, low-cost, data-efficient ensemble pipeline that utilizes frozen ophthalmic foundation models to deliver high-accuracy ocular disease prognostics with minimal training overhead. By lowering compute requirements and carbon footprint, the approach makes personalized, AI-driven eye care more accessible in routine clinical settings.

Abstract No.: 203684**Panel No.: ADV-0059**

An Automated Framework Using Large Language Models for Objective Cataract Surgery Skill Assessment

*First Author: Zhongsheng LYU**Co-Author(s): Longhao CAO, Dawei LI, Xuemin LI, Weiqiang QIU, Chen WU*

Purpose: The evaluation of cataract surgery skills in trainees is hindered by its reliance on subjective, time-intensive assessments from senior surgeons. To address this, we developed and validated an automated framework using a multimodal large language model (LLM) to objectively score surgical performance from video. We designed a framework called AI-CAT, which is capable of providing standardized, criteria-based feedback and pinpointing specific procedural deficiencies.

Methods: We established a detailed scoring rubric for the capsulorhexis stage, covering critical domains such as flap initiation, instrument exchange, and capsulorhexis geometry. The assessment was automated using Gemini 2.5 Pro employing a Chain-of-Thought (CoT) prompting strategy. We validated AI-CAT's efficacy by measuring its error detection rate, correlation with expert scores, instrument recognition accuracy, and the fidelity of its qualitative feedback.

Results: From an analysis of 39 high-definition surgical videos, AI-CAT demonstrated high precision, achieving a 99.47% error detection rate and a 97.32% instrument recognition rate. Notably, it identified subtle operative errors beyond the typical threshold of human perception, and its scores showed a strong correlation ($r = 0.94$) with expert assessments. The qualitative feedback was confirmed by surgical experts to be highly accurate and clinically relevant.

Conclusions: This study demonstrates that AI-CAT can objectively and accurately evaluate a critical stage of cataract surgery. This technology offers a scalable solution for standardizing surgical training, reducing the burden on senior surgeons, and providing trainees with precise, actionable feedback, thereby enhancing the educational process.

Abstract No.: 204619**Panel No.: ADV-0062**

An Explainable Artificial Intelligence-Based Approach for Anomaly Detection on Corneal In Vivo Confocal Microscopy Images

*First Author: Ningning TANG**Co-Author(s): Daizai LEI, Fan XU*

Purpose: In vivo confocal microscopy (IVCM) enables detailed assessment of corneal microstructures. However, the multilayered architecture of the cornea makes it difficult to reliably distinguish disease-related changes from normal variability. Current anomaly

detection methods often lack robustness across diverse manifestations. To overcome these limitations, we developed a Transformer-driven framework for detecting abnormalities in IVCM images without reliance on predefined disease labels.

Methods: We constructed an anomaly detection model for identifying disease-related alterations in IVCM images, consisting of three key components: EfficientNet, a multi-scale feature fusion module, and a Transformer encoder. A total of 7,063 images from 95 eyes were analyzed. The model was trained using only normal IVCM images across four corneal layers: epithelium, sub-basal nerve plexus, stroma, and endothelium. During inference, anomaly scores were computed to distinguish pathological from normal images. Explainable anomaly maps were also produced to highlight morphological deviations.

Results: The proposed method achieved areas under the receiver operating characteristic curve (AUCs) of 0.933 on internal validation and 0.917 on an external test dataset. Anomaly scores showed significant separation between normal and pathological images ($p < 0.001$). Visualization confirmed that highlighted regions corresponded to structural abnormalities, suggesting potential imaging biomarkers.

Conclusions: The proposed framework demonstrates high accuracy and interpretability for detecting corneal abnormalities in IVCM images. It reduces annotation burden, improves screening efficiency, and offers a scalable solution for intelligent diagnosis of corneal diseases.

Abstract No.: 206213**Panel No.: ADV-0072**

Antibody-Mediated Immune Responses to Infectious Diseases Causally Associated With Five Ophthalmic Diseases: A Mendelian Randomization Study

*First Author: Liduo PAN**Co-Author(s): Jian DENG, Hui GUO, Yonghao LI, Xiaoyi YU*

Purpose: This study aimed to assess the potential causal relationship between antibody-mediated immune responses to infectious agents and five ocular conditions: chronic iridocyclitis, scleritis, wet age-related macular degeneration (AMD), diabetic retinopathy (DR), and glaucoma.

Methods: We conducted a two-sample Mendelian randomisation analysis utilising GWAS data to assess the causative impacts of antibody-mediated immune responses to 46 pathogens on five ocular disorders, utilising SNPs as instrumental variables. The primary studies included inverse variance weighting, supplemented by sensitivity approaches (MR-Egger, weighted median) and reverse Mendelian

randomisation to evaluate robustness and bidirectionality.

Results: IVW analysis indicated significant associations between specific antibody responses and ocular diseases. Chronic iridocyclitis risk correlated with anti-polyomavirus 2 IgG seropositivity and Epstein-Barr virus (EBV) ZEBRA antibody levels. In wet age AMD, DR, and glaucoma, anti-polyomavirus 2 IgG seropositivity was recognized as a risk factor, whereas EBV EBNA-1 antibody levels exhibited a protective effect. The risk of scleritis was associated with Varicella zoster virus (VZV) glycoproteins E and I antibody levels, while the EBV EBNA-1 antibody demonstrated a protective effect. Moreover, VZV glycoproteins E and I antibody levels were identified as risk factors for wet AMD and DR. Anti-Merkel cell polyomavirus IgG seropositivity and EBV VCA p18 antibody were associated with wet AMD as risk and protective factors, respectively.

Conclusions: This study provides novel evidence for a causal role of immune responses to persistent or reactivated pathogens in a range of ophthalmic diseases.

Abstract No.: 201750

Panel No.: ADV-0048

Application of Automated Grating Visual Acuity Testing in Children Aged 3 to 24 Months

First Author: Yuqing LI

Co-Author(s): Guangqiang WU

Purpose: This study aims to evaluate the effectiveness of automated grating visual acuity testing in children aged 3 to 24 months, measure visual acuity levels in infants and young children across different age groups, establish reference ranges, and explore the clinical value of fully automated assessment technology in pediatric vision screening.

Methods: A prospective clinical study was conducted from June to December 2024, performing automated grating visual acuity tests on infants aged 3 to 24 months. The study included 1,215 infants, of whom 1,066 successfully completed the test and provided valid data, yielding a completion rate of 87.74%. Test data were statistically analyzed by age groups (≤ 2 months, 2–4 months, 4–6 months, etc.), including calculations of mean visual acuity, standard deviation, and percentiles (3rd, 10th, 25th, 50th, 75th, 90th, and 97th percentiles).

Results: The completion rate of automated grating visual acuity testing was 87.74%, indicating high feasibility of this method in the infant population. Significant differences in visual acuity were observed among different age groups ($P < 0.01$), with visual acuity levels gradually improving with increasing age. The study established reference ranges for visual acuity across various age groups (expressed in Snellen

equivalents), including percentile distributions, providing an important basis for clinical assessment.

Conclusions: This study provides reliable reference ranges for vision screening in children aged 3 to 24 months, supporting the clinical promotion and application of automated grating visual acuity testing. Future research could further expand sample sizes and regional scope to optimize reference standards and validate long-term application effects.

Abstract No.: 202175

Panel No.: ADV-0049

Application of Complex Giant Systems in Ocular Diseases

First Author: Li XUEMIN

Co-Author(s): Li DING, Yi DING, Xinli YU

Purpose: Multiple ocular diseases may result in vision reduction or blindness, often involving a complex interaction of vascular, neural, muscular, and environmental factors. Common clinical single-perspective symptomatic treatment not only delivers limited therapeutic efficacy but also neglects a holistic assessment of disease progression. Therefore, we propose an integrated framework for diagnosis, treatment, and evaluation based on the complex giant system of the eye.

Methods: This study employed biomechanics, haemodynamics, and neuroinformatics to develop a lifespan micro-scale whole-eye viscoelasticity model, a body-head-neck-eye circulation model, and the nerve conduction study. It established a complex, giant systemic model of the body, head, neck, and eye, and explored its applications in various scenarios.

Results: Research indicates that the accommodative function of the eyeball varies with age. Within the Amalric triangular sign syndrome fundus blood flow model, choroidal blood flow velocities generally decrease from normal to pathological regions (1.02×10^{-4} m/s, 1.61×10^{-4} m/s, and 1.08×10^{-5} m/s). Furthermore, studies show that most electroencephalographic channels diminish with increasing altitude, with signal amplitude correlating with the complexity of visual stimulus tasks.

Conclusions: This model not only investigates the multidimensional factors involved in the pathogenesis of multiple ocular diseases but also enables early warning of disease progression and prediction of treatment efficacy.

Abstract No.: 200404
Panel No.: ADV-0033

Artificial Intelligence Model for Detecting Pathologic Myopia and Segmenting Lesions on Fundus Images

First Author: Hieu LE THAI MINH

Co-Author(s): Trung TRAN DINH, Nguyen TRAN DINH KHOI

Purpose: With the rising prevalence of myopia and its associated complications, access to retinal specialists for lesion screening remains limited in many regions. Therefore, this study aims to develop an AI model for the detection of pathological myopia (PM), guided by the META-PM definitions and lesion segmentation on fundus images.

Methods: A dataset of 1,542 myopic fundus images, graded according to the META-PM classification (5 categories) and segmented for lesions (chorioretinal atrophy, retinal hemorrhage, and "Plus" lesions). Fundus images showing myopic maculopathy of Grade ≥ 2 or with at least one "Plus" lesion were classified as PM, while images graded as Grade 0 or Grade 1 without any Plus lesions were classified as non-PM. This dataset was used to train two deep learning models based on CNN architectures: MobileNetV2 (grading) and MANet (lesion segmentation). After training, the models were evaluated by experts on an independent set of 116 fundus images.

Results: The model achieved a sensitivity of 93.06% and a specificity of 90.91% in detecting PM. Kappa coefficient of 0.82. For lesion detection, the sensitivity was 91.9% and the specificity was 88.2%, with an mAP@0.5 of 0.731, a Dice coefficient of 0.84, and an IoU of 0.70. The average analysis time per image was 6.06 seconds, which was 1.38 seconds faster than that of ophthalmologists ($p < 0.001$; 95% CI: 1.05–1.71).

Conclusions: The proposed AI model has the potential to serve as an efficient screening tool for pathological myopia, while also supporting ophthalmologists and healthcare workers in the comprehensive management of myopia.

Abstract No.: 200405
Panel No.: ADV-0034

Artificial Intelligence Model for Detection, Grading and Lesion Segmentation of Diabetic Retinopathy on Fundus Images

First Author: Hieu LE THAI MINH

Co-Author(s): Trung TRAN DINH, Nguyen TRAN DINH KHOI

Purpose: To develop an artificial intelligence (AI) model capable of detecting diabetic retinopathy (DR), grading disease severity based on the international classification scale, and segmenting lesions on fundus images.

Methods: The dataset of over 3,700 fundus images was classified into five severity levels of diabetic retinopathy (No DR, Mild NPDR, Moderate NPDR, Severe NPDR, and PDR) and segmented with lesions including hard exudates, soft exudates, microaneurysms, and hemorrhages by the research team. The labeled and preprocessed data were then used to train two deep learning models with CNN architectures: MobileNetV2 (for disease detection and grading) and YOLOv8m (for lesion detection and localization). After training, the models were evaluated on 267 patients (516 images) and compared with ophthalmology specialists to assess performance.

Results: The model achieved a sensitivity of 92.1% and a specificity of 89.3% in detecting referable diabetic retinopathy. The agreement in disease grading reached a Cohen's Kappa of 0.75. For lesion segmentation, the model obtained an F1-score of 80.1% and a mAP@0.5 of 0.768. Among the lesions, hard exudates were detected with the highest accuracy (mAP@0.5 = 0.800), whereas microaneurysms had the lowest detection performance (mAP@0.5 = 0.612). The total evaluation time for all 516 fundus images was 136 minutes with the AI model, compared to 175 minutes by ophthalmologists ($p < 0.001$).

Conclusions: The developed AI model demonstrates high effectiveness in detecting, grading, and segmenting diabetic retinopathy lesions on fundus images. The system shows potential for application in DR screening programs.

Abstract No.: 204115
Panel No.: ADV-0061

Artificial Intelligence-Based Myopia Prediction in Children and Adolescents

First Author: Ying WU

Co-Author(s): Caixia CHAI, Mingxuan LIU, Zhengyuan LIU, Qiyuan TIAN, Lijun ZHANG, Yitong ZHANG

Purpose: To develop and compare multiple machine learning and deep learning models for myopia prediction in children and adolescents, and evaluate the performance of different algorithms in early myopia identification.

Methods: This large-scale cross-sectional study included 65,201 children and adolescents aged 3-18 years from vision screening data. Collected features included bilateral uncorrected and corrected visual acuity, spherical and cylindrical power, corneal curvature, and demographic information like age, gender, and grade level. Nine traditional machine learning algorithms and two deep learning methods (FT-Transformer, TabNet) were used for prediction modeling.

Results: On the test set, the FT-Transformer deep learning model achieved the best performance with 85.32% accuracy, an 87.29% F1-score, and a

93.08% AUC. The top traditional machine learning model, XGBoost, achieved 78.02% accuracy. Feature importance analysis revealed that binocular visual acuity difference, grade level, average visual acuity, corneal astigmatism, and corneal curvature were the most important predictive factors.

Conclusions: Machine learning and deep learning models, especially the FT-Transformer, demonstrate excellent performance in myopia prediction based on large-scale screening data. Key predictive features include binocular visual acuity difference, grade level, visual acuity indicators, and corneal parameters. These models can provide powerful technical support for early myopia screening and precision intervention in children and adolescents.

Abstract No.: 206996
Panel No.: ADV-0093

Automated Detection and Quantification of Intraretinal Microvascular Abnormality (IRMA) on Widefield Swept-Source OCT Angiography (WF SS-OCTA) in Diabetic Retinopathy: Development of Customized AI Deep Learning Model II in the DRIVE Study

First Author: Wenting ZHOU

Co-Author(s): Charmayne Xinyi ANG, Colin Ming Hui GOH, Peiqi LO, Wei Hing SEAH, Gloria Wenjun SONG, Lingyi ZHUANG

Purpose: To evaluate a customized deep-learning algorithm (Model II) for automated intraretinal microvascular abnormality (IRMA) segmentation on widefield swept-source OCT angiography (WF SS-OCTA) and to correlate findings with diabetic retinopathy (DR) severity.

Methods: Sixty-five eyes were imaged with 12 × 12 mm, 1024 × 1024-pixel SS-OCTA. Two independent graders produced pixel-level IRMA annotations; discrepancies were adjudicated by a retinal specialist, yielding 678 references. A multi-scale U-Net with squeeze-and-excitation attention was trained using heavy augmentation and five-fold cross-validation. Confidence-guided preprocessing excluded motion blur and projection artifacts. Pixel-level performance was measured by the F1 score and object-level accuracy, using intersection-over-union (IoU) ≥ 50%.

Results: Model II achieved a pixel-level F1 of 0.51, exceeding published benchmarks (0.29–0.48). Object-level F1 reached 0.71 at IoU ≥ 50 %. Median IRMA counts climbed from 3.3 ± 0.6 in mild and 7.3 ± 3.0 in moderate NPDR to 12.1 ± 11.0 in severe NPDR and 10.7 ± 14.1 in PDR (p < 0.001 overall), yet showed no significant difference between severe NPDR and PDR (p = 0.05), implying replacement of IRMAs by neovascularization or diffuse ischemia.

Conclusions: This CNN-U-Net framework delivers the first widefield benchmark for automated IRMA

segmentation on SS-OCTA. Offering clinically relevant accuracy and resilience to image-quality variations, it reduces manual workload and supports objective DR grading. Integrated with Model I for non-perfusion analysis, it forms a comprehensive, scalable pipeline for biomarker-based decision support and longitudinal DR monitoring across diverse hardware setups and routine workflows.

Abstract No.: 206251
Panel No.: ADV-0073

Benchmarking Performance and Reasoning Capabilities of Large Vision Language Models in Fundus Photos Interpretation

First Author: Wai Chak CHOY

Co-Author(s): Cindy Xinji CAI, Alvin Ty LIU, Sally Shin Yee ONG, Mira Menon SACHDEVA, Yang ZHANG, Ishrat AHMED

Purpose: Recently, there has been an expanding inventory of large language models with increasing ease for clinical applications. We aim to analyse their performance on interpreting fundus photos and detecting specific diagnoses, and investigate the prevalence of hallucinations.

Methods: Fifty images covering the 10 most retinal conditions were included in the study. Responses were generated by Gemini-1.5-flash, GPT-4-turbo, and GPT-4o and graded by 5 fellowship-trained retinal specialists independently for accuracy, relevant signs identification, prevalence of missing signs, irrelevant signs inclusion, and signs hallucinations. Mann-Whitney U test with multiple comparison adjustment was used to compare results from model pairs.

Results: Across all conditions, highest accuracy was noted for GPT-4o (accuracy=40.7%, CI=34.9%-46.6%), followed by GPT-4-turbo (accuracy=37.8%, CI=32.1%-43.6%) and Gemini-1.5-flash (accuracy=14.2%, CI=10.0%-18.3%). Missing signs for diagnosis were most frequently observed for Gemini-1.5-flash. (rate=86.2%, CI=82.1%-90.3%). GPT-4-turbo (rate=62.5%, CI=56.8%-68.3%) and GPT-4o (rate=63.3%, CI=57.5%-69.0%) showed a similar frequency in missing relevant signs. (P=1.0000) Identifying irrelevant signs was observed in 14.5% (CI=10.4%-18.7%), 13.1% (CI=9.1%-17.1%), and 8.7% (CI=5.4%-12.1%) of responses by Gemini-1.5-flash, GPT-4-Turbo, and GPT-4o, respectively. Signs of hallucination were observed in 89.8% (CI=86.2%-93.4%), 60.7% (CI=54.9%-66.5%), and 65.1% (CI=59.4%-70.8%) of responses from Gemini-1.5-flash, GPT-4-turbo, and GPT-4o, respectively. No statistically significant difference was found in hallucination rate comparing GPT-4-turbo and GPT-4o (P=0.710). Hallucination rate was statistically significantly higher comparing Gemini-1.5-flash to either GPT-4-turbo (P<0.0001).

Conclusions: The current study demonstrated the suboptimal performance of language models in

reaching accurate and grounded diagnoses from fundus images. Further enhancement, especially on the explainability of model responses, would be necessary prior to their safe incorporation into clinical practice.

Abstract No.: 201264

Panel No.: ADV-0042

Brain Activity in Different Brain Areas of Patients With Diabetic Vitreous Hemorrhage According to Voxel-Based Morphometry

First Author: Jinyu HU

Co-Author(s): Yi SHAO

Purpose: To elucidate the neuropathological mechanisms underlying diabetic vitreous hemorrhage (DVH) and its correlation with clinical characteristics.

Methods: Twenty-one individuals with DVH (male/female 12/9; mean age 52.29 ± 11.66 y) were selected, alongside 21 appropriately matched controls with diabetes mellitus (DM). Voxel-based morphometry (VBM) techniques were employed to identify aberrant functional regions in the brain. Receiver operating characteristic (ROC) curves were utilized for classification based on the average VBM values of the two groups, and Pearson correlation analysis was conducted to assess the relationship between average VBM values in distinct brain regions and clinical manifestations.

Results: Relative to the DM controls, DVH patients exhibited reduced VBM values in the right superior temporal pole, the right superior temporal gyrus, the right medial orbital frontal gyrus, and the left superior frontal gyrus. Furthermore, ROC curve analysis of these four brain regions in DVH patients demonstrated a high degree of accuracy, as indicated by the area under the curve. The average VBM value in each of these regions exhibited a negative correlation with both the duration of DVH and the score on the Hospital Anxiety and Depression Scale (HADS).

Conclusions: Pathological alterations in four distinct brain regions are observed in patients with DVH, potentially reflecting neuropathological changes associated with this condition.

Abstract No.: 206745

Panel No.: ADV-0085

Can Corneal Epithelial Mapping Predict Postoperative Visual Quality and Patient Satisfaction in Cataract Surgery?

First Author: Gaurav PANDE

Co-Author(s): Abha SHAH, Rohit SHETTY, Vibha SINGH

Purpose: To evaluate how preoperative corneal epithelial mapping impacts postoperative visual quality and patient-reported quality of life (QoL) in cataract surgery patients, using Artificial Intelligence (AI) to identify predictive markers.

Methods: A total of 250 patients underwent pre- and postoperative evaluation, including epithelial mapping (Placido Ocular Coherence Tomography and Ray-tracing based system) and tear biomarker analysis using the BioM Pathfinder kit. Based on epithelial status, Group 1 (n=169) had regular epithelium and Group 2 (n=81) had irregular epithelium. Postoperative assessments included Uncorrected Visual Acuity (UCVA), Patient-Reported Outcomes with LASIK (PROWL) scores, Optical Quality Analysis System (OQAS), and epithelial/corneal higher-order aberrations (HOAs). AI algorithms were applied to identify predictors of visual and QoL outcomes.

Results: UCVA gains were comparable across groups. However, Group 1 had significantly better visual quality and QoL scores (PROWL<80 in 162/169 patients), while Group 2 had poorer outcomes (PROWL>120 in 48/81). Corneal HOAs and inflammatory biomarkers were markedly elevated in Group 2 ($p<0.05$). AI identified epithelial irregularity as a key predictor of both reduced visual quality and lower QoL.

Conclusions: Corneal epithelial mapping and tear biomarkers serve as effective surrogate markers for predicting both visual outcomes and postoperative quality of life following cataract surgery. Preoperative epithelial mapping helps predict and optimize visual quality after cataract surgery.

Abstract No.: 205381

Panel No.: ADV-0068

CatCapt: A Novel Artificial Intelligence-Based Application to Enhance Cataract Screening Efficiency and Accessibility in Indonesia

First Author: Putry Adenia BAHAR

Co-Author(s): Sri ANDARINI, Hera Dwi NOVITA

Purpose: To evaluate the implementation of the CatCapt application: the novel artificial intelligence-based cataract screening in rural Indonesia using smartphone camera, focusing on its perceived efficiency and accessibility, as assessed through user acceptance variables of Perceived Usefulness (PU) and Perceived Ease of Use (PEU) from the modified Technology Acceptance Model (TAM).

Methods: A quasi-experimental study was conducted among rural health cadres assigned to three groups: roleplay, module-based learning, and video instruction. After training, cadres were instructed to apply CatCapt to the community, screening 448 eyes, and then completed a validated TAM-based questionnaire (Cronbach's alpha >0.6). Efficiency and acceptability were categorized into five levels (very low, low, moderate, high, and very high). Associations with demographic characteristics were analyzed using chi-square tests, and the correlation between PU and PEU was assessed with Spearman's test.

Results: Overall, 95.2% rated PU as very high, while 78.6% rated PEU as very high. No significant association between demographic characteristics and PEU. A strong positive correlation was observed between PU and PEU, indicating that greater perceived usefulness enhanced ease of use.

Conclusions: CatCapt was well accepted by health cadres and perceived as both efficient and accessible for community-based cataract screening to improve early detection and expand access to eye health services in underserved areas of Indonesia.

Abstract No.: 207837

Panel No.: ADV-0095

ChatMyopia: An AI Agent for Myopia-Related Consultation in Primary Eye Care Settings

First Author: Yue WU

Co-Author(s): Xiaolan CHEN, Mingguang HE, Danli SHI

Purpose: While Large language models have been used to provide tailored health information, they still face challenges in multi-task integration and interpretability, particularly for specialized areas such as myopia. Hence, we developed ChatMyopia, a patient-centered AI agent to handle both text-based and image-based myopic inquiries.

Methods: The tool module integrated two components: the image-classifying transformer model trained on 2769 myopic fundus photos, and an RAG-based knowledge base from a diversity of literature. Mistral: 123B was used as the brain to combine tools. We evaluated its performance in the myopic maculopathy classification task, single-choice question (SCQ) exams, and myopia-related question-answering. A randomized controlled study (n=70) was conducted to assess ChatMyopia's effectiveness in enhancing patient education and satisfaction in primary eye care clinics.

Results: ChatMyopia achieved high accuracy in myopic maculopathy grading (AUROC: 0.967, F1 score=0.828), performed comparably to specialists and better than general ECPs in SCQ assessments. In myopic question-answering, ChatMyopia showed equivalent performance to the ECP in terms of utility, relevance, safety, and harmfulness. Both ChatMyopia and the ECP outperformed GPT-4 in these four domains. In the randomized controlled trial, patients who interacted with ChatMyopia demonstrated higher satisfaction with the entire medical service than those who received traditional leaflets. ChatMyopia enhanced patient education and information quality in terms of accuracy, empathy, disease self-consciousness, and patient-ECP communication.

Conclusions: The AI agent can provide high-quality answers to myopia-related questions with improved scalability and interpretability, and serve as a valuable

supplement for patient-centered health information seeking in primary eye care settings.

Abstract No.: 206641

Panel No.: ADV-0084

Choroidal Vascular Fingerprints From Indocyanine Green Angiography Unveil Chorioretinal Disease State

First Author: Ruoyu CHEN

Co-Author(s): Mingguang HE, Xianwen SHANG, Danli SHI, Mayinuer YUSUFU, Ziwei ZHAO

Purpose: To develop an annotation-efficient deep learning algorithm for extracting multi-dimensional features of choroidal vasculature on indocyanine green angiography (ICGA) images via a human-in-the-loop (HITL) strategy and explore their relationship with multiple chorioretinal diseases.

Methods: The segmentation model was trained on a multi-source dataset that included both 55° ICGA and 200° ultra-widefield ICGA (UWF-ICGA) images, utilizing a HITL strategy. Choroidal vascular fingerprints were generated from the segmentation maps, quantifying diameter, density, complexity, tortuosity, and branching angle. Reliability was assessed using intraclass correlation coefficients (ICC), and normal ranges for each measurement were estimated. The study retrospectively included 243 eyes diagnosed with central serous chorioretinopathy (CSC), polypoidal choroidal vasculopathy (PCV), or pathological myopia (PM), as well as 151 normal control eyes, to investigate their association with choroidal vascular fingerprints. Multivariable logistic regression models were used for the analysis.

Results: The model achieved high segmentation accuracy, with the area under the receiver operating characteristic curve (AUC) being 0.975 (95% CI: 0.967–0.983) for 55° view ICGA images and 0.937 (95% CI: 0.914–0.960) for UWF-ICGA images. Twenty-six, twenty-eight, and twenty-nine multi-dimensional measurements were significantly associated with CSC, PCV, and PM, respectively (p value<0.05). The ICC values for 74 choroidal vascular measurements ranged from 0.71 (95% CI: 0.51-0.84) to 0.97 (95% CI: 0.95-0.99).

Conclusions: This study pioneeringly revealed choroidal vascular fingerprints and validated their associations with various chorioretinal diseases. These findings pave the way for future exploration of the pathological mechanisms underlying these conditions.

Abstract No.: 203054**Panel No.: ADV-0056**

Clinical Validation of Artificial Intelligence in Fundus Image Analysis: Real-World Application in Retinal Disease Screening and Diagnosis

*First Author: Ravi Naini KOSTI**Co-Author(s): Narasimha Rao VENKATA*

Purpose: To clinically validate the performance of AI-based fundus image analysis in screening and diagnosing common retinal diseases, and to assess its applicability in real-world ophthalmic practice.

Methods: This prospective clinical study included 100 patients undergoing routine retinal screening. Fundus photographs were analyzed using a deep learning-based AI platform trained to detect diabetic retinopathy (DR), age-related macular degeneration (AMD), and glaucomatous optic neuropathy. AI outputs were compared with diagnoses made by experienced retina specialists, which served as the reference standard. Diagnostic accuracy, sensitivity, specificity, and inter-observer agreement (Cohen's kappa) were evaluated.

Results: The AI system demonstrated an overall diagnostic accuracy of 91.6%, with a sensitivity of 97.0% and specificity of 91.4% for DR detection. For AMD and glaucoma, sensitivity and specificity ranged from 90.2% to 98.5%. The agreement between AI and human experts was substantial ($\kappa = 0.86$). The AI tool reduced evaluation time by 60% without compromising diagnostic reliability.

Conclusions: AI-based fundus image analysis shows high diagnostic accuracy and strong agreement with specialist evaluations in detecting major retinal diseases. Its integration into clinical workflows may enhance early detection, streamline patient triage, and improve access to retinal care, particularly in resource-limited settings.

Abstract No.: 205494**Panel No.: ADV-0069**

Clinical Validation of an Artificial Intelligence-Based Screening Tool for Diabetic Retinopathy at a General Hospital

*First Author: Linh Dieu PHAM**Co-Author(s): Ha Thi Thu HOANG, Anh Thi Lan NGUYEN*

Purpose: To evaluate the clinical effectiveness and feasibility of an artificial intelligence (AI)-based tool for diabetic retinopathy (DR) screening among patients with diabetes at a general hospital.

Methods: A cross-sectional descriptive study was conducted on 383 eyes of patients with diabetes who were examined at a general hospital between July 2022 and February 2024. Fundus photographs were obtained, uploaded, and analyzed using an AI-based

tool. Diagnostic performance was evaluated in terms of sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy, area under the curve (AUC), and kappa (κ) agreement with ophthalmologists' clinical examinations.

Results: Among 383 eyes, the prevalence of DR, referable DR, and vision-threatening DR was 39.7%, 25.9%, and 14.9%, respectively. For DR detection, the AI tool achieved a sensitivity of 80.3% and a specificity of 96.1% (AUC = 0.882, $\kappa = 0.782$). For referable DR, sensitivity and specificity were 76.8% and 98.2% (AUC = 0.875, $\kappa = 0.797$), and for vision-threatening DR, 71.9% and 98.8% (AUC = 0.854, $\kappa = 0.774$). Overall diagnostic accuracy was high, with kappa values indicating good agreement with ophthalmologists ($\kappa = 0.627$).

Conclusions: AI demonstrated high diagnostic performance for diabetic retinopathy screening, particularly with excellent specificity. However, its limited sensitivity in severe stages requires further improvement and validation.

Abstract No.: 202637**Panel No.: ADV-0053**

Cost-Effectiveness of an AI-Based 3D OCT Image Analysis for Diabetic Macular Edema Identification to Support Triaging

*First Author: Shuyi ZHANG**Co-Author(s): Carmen CHAN, Carol CHEUNG, Anran RAN, Ka Ho SZETO, Jiaying ZHOU*

Purpose: Diabetic macular edema (DME) triaging based on 2D fundus photographs (FPs) has a high false-positive referral rate. We aim to evaluate the cost-effectiveness of employing an AI infrastructure (i.e., AI-OCT system) for DME triaging based on 3D optical coherence tomography (OCT) as an "add-on" to reduce false-positive referrals to tertiary care.

Methods: A decision-analytic Markov model was constructed to compare the costs and effects of the standard practice (status quo) and employing an "add-on" AI-OCT system to the standard practice for DME triaging. It was based on a hypothetical cohort of 100,000 individuals with suspected DME from age 50 years through 30 1-year Markov cycles from the societal perspective. Relevant parameters were from existing literature. Costs were from the Hospital Authority in Hong Kong (HK) and converted to US dollars (USD) at 7.81 HK dollars per USD and with a 3.5% discount rate per year. The study outcomes included incremental cost-effectiveness ratio (ICER), incremental cost, incremental effectiveness, and quality-adjusted life year (QALY) gained. The analysis used a willingness-to-pay threshold of three times the local per capita gross domestic product (GDP).

Results: Over the next 30 years, mean per-person costs and QALYs were \$18,768 and 11.38 for the "add-on" AI system, compared to \$19,515 and 11.35 for the

standard practice, which could save \$74,700,000 and gain 3,000 QALYs, generating an ICER of -24, 900.

Conclusions: Add-on AI-OCT system to standard practice for DME triaging is cost-effective compared to standard practice, providing data on evidence-based healthcare implementation to move AI from “concept” to “real-world”.

Abstract No.: 206590

Panel No.: ADV-0082

Deep Learning Assisted Retinal Microvasculature Assessment and Cerebral Small Vessel Disease in Fabry Disease

First Author: Xuecong ZHOU

Co-Author(s): Chenying BAO, Yingsi LI, Yuan WU

Purpose: The aim of this study was to assess retinal microvascular parameters (RMPs) in Fabry disease (FD) using deep learning and to analyze the correlation with brain lesions related to cerebral small vessel disease (CSVD).

Methods: In this retrospective case-control study, fundus images from 27 FD patients and 27 age- and sex-matched healthy subjects were collected. RMPs, encompassing diameter, density, symmetry, bifurcation, and tortuosity, were quantified. Laboratory examination results, Mainz severity score index (MSSI) scores, and a brain magnetic resonance imaging scan for CSVD scores were extracted, and their relationships with RMPs were analyzed.

Results: Utilizing artificial intelligence-assisted analysis, compared with controls, FD patients exhibited reduced diameter, density, fractal dimension, and heightened arteriolar and venular asymmetry ratios, venular curvature tortuosity, and simple tortuosity in retinal microvascular networks. Gender-based differences in RMPs were observed among FD patients. Furthermore, RMPs were significantly associated with disease markers such as plasma globotriaosylsphingosine and α -galactosidase A activity, as well as MSSI scores. Notably, there was a significant negative correlation between the arteriolar asymmetry ratio and CSVD-related scores.

Conclusions: Fabry disease patients demonstrated increased vascular tortuosity and asymmetry, reduced density and diameter, and a simpler fractal dimension in retinal microvasculature. These microvascular characteristics may serve as preliminary indicators for assessing brain lesions and could represent potential novel biomarkers for CSVD, aiding in the monitoring of FD severity and progression.

Abstract No.: 206900

Panel No.: ADV-0090

Deep Learning Automated Diagnosis and Grading of Cataracts Using Colour Fundus Images: Internal and External Validation

First Author: Hao Qi MAK

Purpose: The Fundus Cataract-AI project aims to automate cataract diagnosis and grading using deep learning techniques applied to standard macula-centric fundus photos.

Methods: A dataset comprising 11,544 fundus images from Chinese patients, aged 50 and above, from a cross-sectional random population-based study was utilised. Subjects were assessed with visual acuity, best-corrected visual acuity (BCVA), automatic and subjective refraction, IOP, slit-lamp examination of the anterior segment, funduscopy examination of the posterior segment, and Fundus photography. The images were categorized into ‘normal’, ‘early cataract’, and ‘visually significant cataract’ by the ophthalmologist and BCVA. A ResNet152 convolutional neural network, pretrained via transfer learning, was employed. The main outcome was the area under the curve (AUC) with accuracy, sensitivity, and specificity. External validation was performed using a prospective database of 1,200 consecutive subjects, aged >50 with chronic visual impairment.

Results: Excluding images of patients who underwent cataract surgery and those with poor quality, 6,961 images were used. The distribution of ‘normal’, ‘early cataract’, and ‘visually significant cataract’ was 31.7%, 45.9% and 13.0% respectively. Internal validation demonstrated an AUC of 0.95 for normal vs rest, 0.93 for early cataract vs rest, and 0.92 for visually significant cataract vs rest. External validation demonstrated an AUC of 0.88, 0.84, and 0.96, respectively. Review of hot spots showed the optic disc and macula as areas of interest. 36.3% of subjects given a routine appointment at triage already had significant cataracts requiring surgery.

Conclusions: Machine learning can accurately assist in the diagnosis and grading of cataracts using fundus photos alone.

Abstract No.: 205025

Panel No.: ADV-0063

Deep Learning for Automated Diagnosis of Polypoidal Choroidal Vasculopathy Using Indocyanine Green Angiography

First Author: Hiu Ping LAI

Co-Author(s): Rose CHAN, Anthony LAI, Robert LAM, Noel WAT, Eva WONG

Purpose: Polypoidal choroidal vasculopathy (PCV) is an important subtype of neovascular age-related macular degeneration (nAMD). Indocyanine green angiography (ICGA) is considered the diagnostic gold standard but

requires expertise and significant resources. This study evaluated the performance of a deep learning model for automated PCV classification using ICGA.

Methods: We retrospectively collected 1,974 angiography sets (ICGA and fluorescein angiography, FA) from 1,460 eyes of 1,290 patients with nAMD at Caritas Medical Centre between 2010 and 2020. Diagnoses of PCV and choroidal neovascularization (AMD-CNV) were confirmed by three retina specialists using multimodal imaging and EVEREST criteria. A total of 19,740 ICGA images (830 PCV, 1,144 AMD-CNV sets) were de-identified, preprocessed, augmented, and used to train a convolutional neural network with patient-level randomization to avoid inter-eye overlap.

Results: The ICGA-based deep learning model achieved an overall accuracy of 84.6% (95% CI: 83.5–85.7). Sensitivity for PCV detection was 0.873 (95% CI: 0.863–0.883) and specificity was 0.813 (95% CI: 0.801–0.825). The precision (positive predictive value) was 0.848 (95% CI: 0.827–0.859), and the negative predictive value was 0.873 (95% CI: 0.863–0.883). The F1 score was 0.860 (95% CI: 0.850–0.871).

Conclusions: Deep learning applied to ICGA produced diagnostic metrics consistent with clinical applicability. This approach may support clinical decision-making, training, and telemedicine in the management of nAMD.

Abstract No.: 200390

Panel No.: ADV-0031

Deep Learning for Vision Screening in Resource-Limited Settings: Development of a Multi-Branch CNN for Refractive Error Detection Based on Smartphone Image

First Author: Muhammad SYAUQIE

Purpose: This study aimed to develop an automated deep learning-based prediction system to assess refractive error using photorefractive images of Indonesian people taken with a smartphone.

Methods: A multi-branch convolutional neural network (CNN) was developed and trained on a dataset of 2,139 corneal images from Indonesian people. The workflow for the Multi-branch CNN model begins with the acquisition of pupillary red reflex images using a smartphone. These images were preprocessed to ensure uniformity and standardized for optimal training performance. The model is designed as a multi-branch CNN with three branches. The architecture consists of convolutional layers (Conv2D) followed by ReLU activations and MaxPooling layers. The preprocessed images are fed into the selected CNN architecture—1-branch, 2-branch, or 3-branch—for feature extraction and classification. The classification output predicts one of the following four classes: “Not Applicable to Classified,” “Significant Hypermetropia,” “Insignificant Refractive Error,” and “Significant Myopia.” The

workflow culminates in model evaluation, where metrics such as accuracy, precision, recall, and F1-score are computed.

Results: The validation accuracy and loss of the one-branch, two-branch, and three-branch models are 0.9760 and 0.0800, 0.9688 and 0.1137, and 0.9866 and 0.0762, respectively. The 3-branch CNN architecture demonstrated superior performance, achieving an overall test accuracy of 91%, precision of 96%, recall of 98%, and F1-score of 91%, with an area under the curve (AUC) score of 0.9896.

Conclusions: The integration of CNN models with smartphone-based image acquisition systems offers a scalable and cost-effective refractive error screening solution.

Abstract No.: 202303

Panel No.: ADV-0050

Deep Learning-Based Prediction of Secondary Glaucoma Following Retinal Surgery: Toward Personalized Risk Stratification

First Author: Young In SHIN

Co-Author(s): Jin Wook JEOUNG

Purpose: To develop and evaluate deep learning models for predicting glaucoma occurrence after pars plana vitrectomy (PPV), using both laboratory and ophthalmic clinical data.

Methods: This retrospective cohort study analyzed patients who underwent PPV between 2018 and 2025, identified from a clinical data warehouse (CDW). Laboratory data (hematologic and biochemical parameters) and ophthalmic clinical data (preoperative intraocular pressure [IOP], lens status, central corneal thickness, anterior chamber depth, axial length, preoperative spherical equivalent, prior ocular surgery, combined cataract surgery, intravitreal injection counts, and postoperative IOP spikes) were collected. Patients were classified into glaucoma (n=110) and non-glaucoma (n=79) groups. Logistic regression (LR), support vector machine (SVM), random forest (RF), and extreme gradient boosting (XGB) models were trained with two input sets: (1) demographic + laboratory data and (2) demographic + laboratory + ophthalmic clinical data. Model performance was assessed by five-fold cross-validation using accuracy, sensitivity, specificity, F1 score, and area under the curve (AUC).

Results: Models trained on laboratory data alone demonstrated modest performance (AUC ~0.55–0.61). Inclusion of ophthalmic clinical variables markedly improved discrimination. Across folds, SVM and RF achieved the highest performance, with AUC up to 0.82 and F1 scores up to 0.80. Logistic regression models incorporating ophthalmic variables also yielded stable results (AUC 0.73–0.81). Key predictors included baseline IOP, use of antiglaucoma drops, and intraoperative tamponade use.

Conclusions: These findings support the feasibility of AI-assisted risk stratification in postoperative glaucoma surveillance and highlight the importance of combining systemic and ocular parameters for improved predictive accuracy.

Abstract No.: 203388

Panel No.: ADV-0057

Development and Evaluation of the Retrieval-Augmented Large Language Model for Lifestyle Guidance in Dry Eye Patients

First Author: Jiaxin YANG

Co-Author(s): Hongbo YIN

Purpose: We developed an implementation of large language models (LLMs) focused on dry eye disease (DED) lifestyle management based on GPT-O1 and DeepSeek, respectively. Furthermore, how these two LLMs can be used to generate personalized lifestyle guidance for dry eye patients and how their answers compared with those of GPT-O1, DeepSeek, and an ophthalmologist in the dry eye group were evaluated.

Methods: The development process consisted of three key stages: (1) construction of a curated knowledge base, (2) integration of Retrieval-Augmented Generation (RAG), and (3) enhancement through In-Context Learning (ICL) and Role-based Instruction Prompting. The LLM assessment provides both physician and user dimensions. Physicians assessed response quality in the following domains: incorrect or inappropriate content, omissions, and the likelihood and extent of possible harm. User evaluation focused on the fulfillment of user intent and the helpfulness of the content.

Results: A total of 500 responses were evaluated. The trained models, DED-GPT and DED-DeepSeek, showed significantly superior performance in completeness and helpfulness ($P < 0.05$). DED-GPT improved correctness and appropriateness from 70% of the baseline model to 85% ($P < 0.05$), while DED-DeepSeek increased from 64% to 78%. DED-GPT and DED-DeepSeek completely eliminated severe harm events. All response sources performed well in addressing the lay users' intent.

Conclusions: The study has proposed an at-home dry eye consultant with lifestyle guidance for DED patients, aiming to expand personalized education pathways for patients with DED.

Abstract No.: 201094

Panel No.: ADV-0039

Development of a Smartphone Application With Artificial Intelligence for Diagnostic Support of Anterior Segment Diseases

First Author: Yoshikazu ITO

Co-Author(s): Hiroki MAEHARA, Masahiro ODA, Tetsuro OSHIKA, Yuta UENO

Purpose: We developed an artificial intelligence (AI) model to support the diagnosis of anterior segment diseases using slit-lamp images (5,270 images). Based on the existing AI model, we also developed a smartphone application version, specifically designed to process anterior segment images captured by smartphones.

Methods: Smartphone images of the anterior segment (2,530 images) were obtained from a clinical study between September 2020 and September 2024. These images consisted of nine categories (normal condition, infectious keratitis, immunological keratitis, corneal scar, corneal deposit, bullous keratopathy, ocular surface tumor, cataract/intraocular lens opacity, and acute glaucoma attack). Transfer learning was applied to the existing AI model to create a version specifically adapted for smartphone images. Among these images, 860 images were analyzed with the AI model before and after transfer learning, and the classification accuracy of both the existing AI model and the smartphone-adapted AI model was compared on smartphone images to validate the precision of the smartphone version.

Results: The diagnostic accuracy for smartphone images was 67.0% for the existing AI model and 93.5% for the smartphone-adapted AI model. The smartphone-adapted AI model demonstrated significantly improved accuracy ($P = 0.0033$).

Conclusions: For the development of an application, the smartphone-adapted AI model improved diagnostic support accuracy through additional training.

Abstract No.: 200729

Panel No.: ADV-0038

Diagnosis of Forme Fruste Keratoconus Using Corvis ST Sequences With Digital Image Correlation and Machine Learning

First Author: Lanting YANG

Co-Author(s): Wang JUNJIE, Chen SHIHAO

Purpose: This study aimed to employ the incremental digital image correlation (DIC) method to obtain displacement and strain field data of the cornea from Corvis ST (CVS) sequences and assess the performance of embedding these biomechanical data with machine learning models to distinguish forme fruste keratoconus (FFKC) from normal corneas.

Methods: One hundred subjects were categorized into normal (N = 50) and FFKC (N = 50) groups. Image sequences depicting the horizontal cross-section of the human cornea under an air puff were captured using the Corvis ST tonometer. The high-speed evolution of full-field corneal displacement, strain, velocity, and strain rate was reconstructed utilizing the incremental DIC approach. These evolution data were input into two machine learning (ML) models, specifically Naïve Bayes (NB) and Random Forest (RF) models. The performance of the models in diagnosing FFKC from normal corneas was compared to existing CVS parameters.

Results: The results demonstrated that the proposed voting ensemble model yielded the highest performance with an AUC of 1.00, followed by the RF model with an AUC of 0.99. Radius and A2 Time emerged as the best-performing CVS parameters with AUC values of 0.948 and 0.938, respectively. Nonetheless, no existing Corvis ST parameters outperformed the ML models.

Conclusions: This study represents the first instance where displacement and strain data following incremental DIC analysis of Corvis ST images were integrated with machine learning models to effectively differentiate FFKC corneas from normal ones, achieving superior accuracy compared to existing CVS parameters.

Abstract No.: 202584

Panel No.: ADV-0052

Diagnostic Accuracy of Ret-InnoQ: A Portable, Smartphone-Based Fundus Camera for Detection of Vision-Threatening Diabetic Retinopathy

First Author: Anggraeni PUSPITA

Co-Author(s): Moh Eko PRAYOGO, M Bayu SASONGKO, Idhayu Anggit WIDHASARI, Felicia WIDYAPUTRI

Purpose: Standard tabletop fundus cameras, while effective, are costly and cumbersome, limiting their use in primary care and community settings. Ret-InnoQ, a portable smartphone-based fundus camera, offers a potential low-cost, mobile alternative. This study aimed to evaluate Ret-InnoQ's diagnostic performance against a standard tabletop fundus camera in detecting vision-threatening diabetic retinopathy (VTDR).

Methods: This cross-sectional diagnostic study recruited patients with type 2 diabetes in Yogyakarta. Following pupil dilation, macula-centered images of both eyes were captured using the Ret-InnoQ and the Topcon TRC-50DX, which served as the reference standard. Two independent graders classified each eye as referable (VTDR, defined as having severe non-proliferative DR, proliferative DR, or diabetic macular edema) or non-referable. Images with poor quality or those with other ocular pathologies were excluded from analysis.

Results: Of 1,024 retinal images, 110 were excluded due to other eye diseases and 112 for poor image quality, leaving 802 gradable images from 512 patients (mean age 58.5 years; 65.0% females). Exact agreement between Ret-InnoQ and the reference standard was observed in 721 images (89.9%), with substantial intermethod agreement ($\kappa = 0.79$). Ret-InnoQ achieved a sensitivity of 90.6% (95%CI: 86.7-93.7%), specificity of 89.5% (95%CI: 86.4-92.0%), and an area under the ROC curve (AUC) of 0.900 in detecting VTDR.

Conclusions: Ret-InnoQ demonstrated high diagnostic accuracy for detecting VTDR and identifying patients requiring referral. Its portability, affordability, and reliability support its potential as a scalable screening tool, particularly in primary care and low-resource settings.

Abstract No.: 208332

Panel No.: ADV-0098

Diagnostic Performance of Artificial Intelligence in Primary Angle Closure Disease Based on Anterior Segment Optical Coherence Tomography: A Systematic Review and Meta-Analysis

First Author: Kristen WONG

Co-Author(s): Sally CHAN, Carol CHEUNG, Annie LING, Ruyue SHEN, Clement THAM

Purpose: Anterior chamber angle closure can lead to primary angle closure glaucoma, a major cause of visual impairment. Deep learning is promising for disease detection from medical images. This review aims to summarize the performance of deep learning algorithms as an alternative in primary angle closure disease detection from anterior segment optical coherence tomography (AS-OCT) images.

Methods: A literature search was performed on PubMed, Embase, and Web of Science from database inception to August 1, 2024. We selected studies that developed deep learning models detecting angle closure, and extracted study characteristics. R software was used to generate forest plots using a random-effects model and summary receiver operating characteristic curves. Assessments of paper quality were conducted using QUADAS-2 tool and CLAIM checklist. This study was registered in PROSPERO (CRD42024569234).

Results: Our search yielded 19 and 12 studies eligible for qualitative and quantitative analysis, respectively. A pooled AUC of 0.98 (95% CI, 0.95-1.01) was obtained, with the lowest score from our sensitivity analysis achieving 0.92 (95% CI, 0.89-0.95). Though heterogeneity was low (Q-value = 20.80, I² value = 8.66%), the high corresponding P-value prompted an exploratory subgroup analysis into the potential impact of paper quality, publication year, and sample size on diagnostic accuracy.

Conclusions: The high pooled AUCs indicated the feasibility of AS-OCT as an alternative to angle closure detection. However, the predominantly Asian patient population and insufficient datasets constrained the impact of novel techniques. Suggestions for standardization and future technical directions are offered to improve future studies.

Abstract No.: 206890

Panel No.: ADV-0091

Effects of Hypnotic Use on Pupillary Light Reflex and Eye Tracking: A Systematic Review

First Author: Ming Chi CHOY

Co-Author(s): Kam Lung Kelvin CHONG, Ka Hei Kenneth LAI, Chi Pui Calvin PANG, Chee Yung Clement THAM, Yiu Man Hanson WONG

Purpose: This review aims to analyse the effects of hypnotic use on Pupillary Light Reflex (PLR) and Eye Tracking (ET) properties. While PLR and ET parameters provide insight into the conscious level, reliance, and cognitive state, they also offer understanding of the Autonomic Nervous System under hypnotic influence.

Methods: This systematic review was conducted in accordance with the PRISMA guidelines. A systematic search was performed using online databases including Scopus, Medline, PubMed, and Cochrane. Data extraction was conducted by two independent researchers using predefined structural tables.

Results: After screening 112 abstracts, 9 studies were selected. Hypnotic and sedative drugs cause miosis, particularly diphenhydramine. Miosis (decreased baseline pupil diameter) was evident even without a change in the amplitude of PLR, implying disturbance in sympathetic activity. Conventional hypnotic diazepam, however, was found not to significantly alter pupil diameter or PLR. In general, hypnotics blunted the PLR in proportion to the degree of sedation or depth of the hypnotic state. Concerning ET, hypnotics cause decreased blinking, a smaller degree, and shorter saccadic eye movements. Saccades were found to be reduced in both magnitude and frequency across hypnotizable individuals. Two articles suggested that these findings could be related to impaired cognitive control and attention.

Conclusions: Hypnotic has consistently been shown to cause miosis and blunted PLR. Mechanisms of a decelerated saccadic eye movement require further investigation. Future research should be conducted to investigate whether specific changes in pupil diameter, PLR, and ET parameters may be used to detect potential hypnotic misuse and guide rehabilitative treatment.

Abstract No.: 201776

Panel No.: ADV-0047

Embodied Artificial Intelligence in Ophthalmology

First Author: Xinyuan WU

Co-Author(s): Xiaolan CHEN, Mingguang HE, Danli SHI

Purpose: Embodied artificial intelligence (EAI) integrates perception, reasoning, memory, and action through physical interaction with the environment. In ophthalmology, where precision, multimodal imaging, and adaptive decision-making are essential, EAI offers new opportunities for screening, surgery, education, and research. This work aims to summarize the state of EAI in ophthalmology, highlight its unique advantages, and identify challenges for clinical integration.

Methods: We reviewed current developments in EAI, including multimodal sensing, memory-enabled continuous learning, large language model-based reasoning, and robotic control. Case studies and representative systems were analyzed across ophthalmic screening, surgical assistance, assistive navigation, education, and biomedical research. Challenges about data availability, algorithmic generalization, evaluation protocols, ethics, and regulation were also assessed.

Results: EAI systems demonstrate potential to enhance ophthalmic practice by enabling autonomous screening, intraoperative decision support, visually impaired navigation aids, immersive medical education, and automated research pipelines. Early studies show feasibility in robotic subretinal injection, AI-guided cataract surgery, and at-home retinal monitoring, achieving high accuracy and improved efficiency. However, real-world deployment remains limited due to technical constraints, insufficient evaluation standards, and unresolved ethical and legal concerns.

Conclusions: EAI has the potential to transform ophthalmology by providing real-time, adaptive, and personalized solutions. While still in early development, its integration across clinical care, education, and research could reduce clinician workload and expand access to high-quality eye care. Future work should focus on developing robust evaluation frameworks, addressing ethical and regulatory issues, and conducting multi-center validation to ensure safe and responsible adoption in practice.

Abstract No.: 206439**Panel No.: ADV-0081**

Evaluation of Artificial Intelligence Implementation in Primary Care: A Scoping Review

*First Author: Zehua JIANG**Co-Author(s): Chenyang PEI, Bin SHENG, Tien Yin WONG, Dian ZENG, Zihao ZOU*

Purpose: To systematically synthesize and map the existing evidence on the evaluation of artificial intelligence implementation in primary care, thereby informing future research, clinical practice, and policy development to advance its effective, safe, and sustainable integration.

Methods: PubMed, Web of Science, and the Cochrane Library were searched up to July 31, 2025, for studies on the evaluation of the AI implementation in primary care. Eligible English-language studies developed, implemented, or evaluated AI and reported performance or evaluation data. Screening and full-text review were done independently by multiple reviewers, with discrepancies resolved by consensus. Data were extracted using a standardized form and synthesized in tabular and narrative formats to map study characteristics, AI applications, evaluation methods, outcome measures, and reported findings.

Results: Of 4,184 abstracts, 732 underwent full-text review, and 154 studies were included. Most were conducted in the US (21.4%), UK (14.9%), China (14.3%), and the Netherlands (7.1%), with publications increasing after 2021. Machine learning (59.7%) and deep learning (27.3%) were the main approaches, primarily for prediction (40.3%) and diagnosis (21.4%). Key application areas were preventive care (37.7%), triage/initial diagnosis (35.7%), and chronic disease management (14.9%), targeting cardiovascular (12.3%), cancer (9.7%), metabolic (9.7%), and ophthalmologic (9.7%) conditions. Evaluations focused on technical performance (accuracy 69.5%, discrimination 40.9%), while operational, patient-centered, and system-level outcomes were rare, with most studies being observational (77.3%) and retrospective (51.9%), highlighting a strong focus on model performance over real-world impact.

Conclusions: AI evaluation in primary care mainly focuses on technical performance, highlighting the need for standardized frameworks capturing comprehensive outcomes.

Abstract No.: 201842**Panel No.: ADV-0045**

Evidence-Based Screening Criteria of ROP and Outcomes of ROP Treatment in Mongolia

First Author: Tsengelmaa CHULUUNBAT

Purpose: To investigate the outcomes of ROP screening, intravitreal VEGF and laser surgery in the treatment

of ROP and describe an evidence-based and specific process for identifying BW and GA screening guidelines in Mongolia utilizing telemedicine.

Methods: This was a retrospective of prematurity infants screened for ROP from 2012 September to January 2025 and a prospective cohort study of premature infants with treatment-requiring ROP who received intravitreal injections, laser surgery, and combined therapy from 2015 December 01 to January 31, 2017. Demographic factors, diagnosis, and clinical course were recorded in a de-identified manner using REDCap, a secure, web-based platform to collect image and demographic data. The IRB approved the study protocol, not requiring parental consent, due to the de-identified nature of the data, which was used for program monitoring purposes.

Results: A total of 19,161 premature infants with BW ≤ 2500 g and/or GA ≤ 36 weeks were screened for ROP during the study period. Among them, 691 (3.6%) required treatment. The 193 infants who received ROP screening had a mean GA of 30.09 ± 1.7 weeks and a mean BW of 1500.3 ± 125.42 g. The BW of infants in this study ranged from 750g to 2000g, and the GA at birth ranged from 25 to 35 weeks. The BW of infants in this study ranged from 750g to 2000g, and the GA at birth ranged from 25 to 35 weeks.

Conclusions: After treatment, resolution of ROP was noted in approximately 96 % of the patients who had treatment-requiring ROP.

Abstract No.: 206924**Panel No.: ADV-0088**

Eyes on the Patient: Evaluating Generative Artificial Intelligence for Clinic Letter Writing in Oculoplastic Surgery

*First Author: Victoria NGAI**Co-Author(s): Claire DANIEL, Piers DANIEL, Mohsan MALIK, Basil SURESH, Antonia VIEIRA VENDER*

Purpose: Clinic letters are essential for continuity of care and patient communication. They fail their purpose if they are not understandable to patients. Increasing clinical demands, however, limit the time clinicians can devote to writing clear, comprehensive letters. Medically trained secretaries offer an alternative by transcribing dictated records, albeit with costs and potential transcription errors. Large language models (LLMs) present a novel option, using prompt engineering to automate the transcription of medical records. Our aim was to evaluate the readability of oculoplastic clinic letters written by clinicians, secretaries, and an LLM tool.

Methods: Retrospective analysis of outpatient letters from a tertiary oculoplastic clinic from January to July 2025 (n=483). Letters were evaluated using validated readability tools: Flesch Reading Ease Score (FRES) and Flesch-Kincaid Grade Level (FKGL), and stratified by

authorship: clinician, secretary, or LLM consultation summary tool. Descriptive statistics and one-way ANOVA were used to compare groups.

Results: FRES did not differ between clinician (47.3) and LLM-generated letters (47.4), but both were less readable than secretary-authored letters (57.9, $p < 0.05$). All averages were below 70, the threshold for optimal readability. FKGL differed significantly across groups ($p < 0.05$), with clinicians averaging 11.3 (least readable), LLMs 10.5, and secretaries 9.4 (most readable)—equivalent to adolescents aged 14–16, which remains higher than the average reading level of 9–11-year-olds in the United Kingdom.

Conclusions: LLM-generated letters mirror clinician writing and may offer efficiency and cost advantages. However, letters still remain at too high a reading level for most patients. Further work in prompt engineering may contribute to improved accessibility of clinic letters.

Abstract No.: 206534
Panel No.: ADV-0079

From Detection to Prognosis: Real-World Experience With Machine Learning Models for Identification, Classification, and Progression of Corneal Infections

First Author: Poornima TANDRA
Co-Author(s): Tanmay GOKHALE, Jayang GURUNG, Vineet JOSHI, Naresh NELATURI, Satyam TRIPATHI

Purpose: To measure the impact of deploying Artificial Intelligence (AI)-driven models for the auto-annotation and classification of corneal conditions from slit-lamp images, specifically to (1) distinguish infection from corneal scar and oedema, (2) differentiate fungal and bacterial keratitis, and (3) assess disease progression across follow-up visits in a rural Indian setting.

Methods: Three deep learning models were trained on slit-lamp images of microbial keratitis and related lesions. Images underwent preprocessing, including segmentation and extraction of sharpness, texture, and colour features. Model 1 classified lesions as Infection, Scar, or Edema. Model 2 differentiated microbial infections into fungal, bacterial, or other causes. Model 3 was designed to assess disease progression across sequential follow-up visits. The models were tested on 10,000 prospectively collected real-world images, including smartphone-captured images from rural outreach clinics, to evaluate generalizability. Validation of Model 3 is ongoing.

Results: Model 1 achieved sensitivities of 85.5% for Infection, 85% for Edema, and 82% for Scar. Model 2 showed 87.1% accuracy, AUC of 0.947, and F1 score of 0.876 in classifying infection types. Performance on smartphone-captured images was comparable to internal validation.

Conclusions: AI models trained on slit-lamp images can effectively detect and classify corneal infections. Real-world validation, including smartphone-captured images, demonstrates robustness and highlights the potential to support clinical decision-making in resource-limited rural settings.

Abstract No.: 206119
Panel No.: ADV-0071

Generative AI-Based Chatbot to Triage Ophthalmic Emergencies in Tele-Ophthalmology

First Author: How Sheng Rubin YONG
Co-Author(s): Ziyu David CHEN, Naimah Binte ISMAIL, Dayna YONG

Purpose: To assess the accuracy and patient acceptance of a novel Generative AI-based (GenAI) chatbot for self-triage of acute ophthalmic symptoms.

Methods: A prospective study was conducted at a tertiary institute's ophthalmology clinic from October 2024 to July 2025. Patients presenting with acute ophthalmic symptoms were assessed by two ophthalmologists independently and stratified into high-risk (emergency), medium-risk (urgent), or low-risk (minor) categories based on the Community Minor & Urgent Eye Care Service (CUES) guidelines. Patients also engaged with the chatbot to generate triage recommendations. Agreement between the chatbot and ophthalmologists' gradings was analysed. Patients' acceptance of the chatbot was evaluated using a modified Website User Survey.

Results: A total of 132 eligible responses were analysed - 6 (4.55%) classified as emergency, 106 (80.30%) urgent, and 20 (15.15%) minor. 75.00% were accurately triaged, with the highest accuracy for urgent cases (81.13%), but only 50.00% for emergency and minor cases. Agreement between the clinician's gradings and chatbot recommendations was fair (Cohen's Kappa = 0.373, 95% confidence interval: 0.219-0.528). 19 (14.39%) patients were over-triaged by 1 class, 3 (2.27%) by 2 classes; 9 (6.82%) were under-triaged by 1 class, 2 (1.52%) by 2 classes. Patient feedback was positive, with 127 (96.21%) agreeing the chatbot is user-friendly, and 101 (76.52%) were willing to use it again before seeking in-person care by an ophthalmologist.

Conclusions: Using the chatbot, medium-risk cases had better triaging accuracy. While refinement is required to improve accuracy, positive patient feedback underscores the potential role of GenAI chatbots in enhancing the accessibility and scalability of tele-ophthalmology services.

Abstract No.: 205353

Panel No.: ADV-0067

Implementation of Fast and Precise Quality of Life (QoL) Computerized Adaptive Tests (CATs) in Retinal Eye Clinics at Three Healthcare Clusters in Singapore

First Author: Ryan E.k. **MAN**Co-Author(s): Amudha **ARAVINDHAN**, Beau J. **FENNER**, Eva K. **FENWICK**, Ecosse L. **LAMOUREUX**, Anna C.s. **TAN**

Purpose: This study evaluated the implementation of the RetCAT, a computerized adaptive patient-reported outcome measure assessing the impact of diabetic eye disease on five quality-of-life (QoL) domains in tertiary retinal eye clinics in Singapore.

Methods: This cross-sectional study commenced in Aug 2024 and is currently ongoing in retinal clinics at Singapore National Eye Centre (SNEC), Tan Tock Seng Hospital (TTSH), and National University Hospital (NUH). At SNEC, RetCAT was integrated into electronic medical records (EMR), allowing remote completion via WhatsApp or in-clinic on tablets prior to treatment/consultation. At TTSH and NUH, RetCAT could only be completed in-clinic as EMR integration was not feasible. Implementation outcomes included feasibility (response rates), and user acceptability and satisfaction assessed with validated questionnaires (score range: 0-5; higher is better). Semi-structured interviews explored patient barriers/facilitators to uptake, with transcripts analyzed thematically.

Results: To date, of the 422, 198, and 128 patients who were sent the RetCAT links at SNEC, NUH, and TTSH, respectively, response rates were 85.8% (39% remote, 62% in-clinic), 83.2%, and 90.2%. Patient acceptability (mean $\pm$ SD: 3.75 $\pm$ 0.44) and satisfaction (mean $\pm$ SD: 3.81 $\pm$ 0.56) scores were high. Key barriers included scam concerns, poor visual ability, and having limited RetCATTM information. Facilitators included staff assistance, having adequate time, and the perceived value of CAT data in treatment planning.

Conclusions: Our initial results suggest that implementation of RetCATTM is feasible and acceptable to patients in tertiary retinal clinics in Singapore. Efforts are underway to collect post-treatment QoL data, support doctor-patient result reviews, and gather stakeholders' feedback to optimize processes.

Abstract No.: 201718

Panel No.: ADV-0046

Innovation in Corneal Ulcer Diagnosis-Evaluating Multimodal ChatGPT-4 With Anterior Segment Images

First Author: Bharat **GURNANI**Co-Author(s): Prashant **GIREESH**, Tapesh **NAG**

Purpose: This study aimed to evaluate the diagnostic accuracy of ChatGPT-4, a large language model (LLM),

in identifying corneal ulcers using anterior segment images (ASIs) without prior training or fine-tuning.

Methods: The Anterior Segment Ocular Disease (ASOD) dataset was employed, comprising 300 testing images. ChatGPT-4 was tasked with classifying each image as either "Likely Corneal Ulcer" or "Likely Non-Corneal Ulcer." A confusion matrix was generated to visualize prediction outcomes, with emphasis on binary classification metrics including accuracy, sensitivity, specificity, precision, and F1 score.

Results: ChatGPT-4 achieved an overall diagnostic accuracy of 85% (95% CI: 81%–89%). Sensitivity was 60% (95% CI: 50%–70%), while specificity reached 90% (95% CI: 85%–95%). Precision was 55% (95% CI: 45%–65%), and the F1 score was 0.57. The model demonstrated consistently high performance in correctly excluding non-ulcer cases, thereby reducing false positives, while moderate sensitivity highlighted the challenge of detecting subtle or atypical ulcer presentations. Notably, the balanced trade-off between precision and specificity suggests clinical applicability in triage and screening workflows, particularly when rapid decision-making is critical.

Conclusions: ChatGPT-4 demonstrated promising diagnostic performance in classifying corneal ulcers from ASIs despite the absence of dedicated image-based training. This suggests that advanced LLMs may leverage intrinsic multimodal reasoning to achieve clinically useful results with minimal data preparation.

Abstract No.: 206430

Panel No.: ADV-0080

Machine-Learning Classification of Infrared Pupillometry in Cocaine and Methamphetamine Users

First Author: Andy Lm **AU**Co-Author(s): Kelvin Mh **CHEANG**, Kelvin Kl **CHONG**, Alice Mc **CHOY**, Marco Sy **MAN**, Hanson Ym **WONG**

Purpose: To investigate the characteristics of pupil light reflex (PLR) during infrared pupillometry in cocaine and methamphetamine users, compared to age- and sex-matched controls, and to assess the performance of machine learning algorithms in differentiating drug users and control subjects using PLR.

Methods: Eighteen drug users and 18 healthy controls were recruited. PLR parameters were collected via a commercially available hand-held pupillometer (NeuroLight, IDMed Corp, San Antonio, TX) and a 3-stage infrared pupillometry delivered by a virtual reality-head mount display (VIP) as we recently described. The primary PLR features were extracted by two trained observers masked to subjects' classification, including resting pupil diameters, relative constriction amplitude, and constriction time. Statistical analysis and 7 supervised machine learning classifiers were employed to analyse the extracted

features. The performance of each model was examined through cross-validation and was reported in terms of sensitivity, specificity, and area under the receiver operating characteristic curve (AUC).

Results: Cocaine and methamphetamine users have significantly smaller baseline pupil diameter, minimum pupil diameter, and more pupillary escape ($P < 0.05$). The best-performing machine learning model achieved an accuracy of 0.76 (sensitivity: 0.72, specificity: 0.83, AUC: 0.8025).

Conclusions: PLR parameters differ significantly between stimulant drug users and controls, with the paradoxically smaller pupil size possibly mediated by neuroadaptive changes or autonomic dysfunction in long-standing drug use. A larger sample size is necessary to minimize inter-subject variability. The limited sensitivity, despite good specificity, correlates with variability in drug history and measurement noise associated with VIP. Employing a machine learning approach suggests potential benefits for non-invasive PLR screening in clinical settings.

Abstract No.: 204973

Panel No.: ADV-0064

Multimodal, Multi-Disease Medical Imaging Foundation Model (MerMED-FM)

First Author: Chrystie QUEK

Co-Author(s): Rick Siow Mong GOH, Yong LIU, Daniel Shu Wei TING, Jun ZHOU, Yang ZHOU

Purpose: Current artificial intelligence models for medical imaging are predominantly single modality and disease. Attempts to create multimodal, multi-disease models have resulted in inconsistent accuracy and require large, labour-intensive, well-labelled datasets. To address these limitations, we developed MerMED-FM, a state-of-the-art multimodal, multi-specialty foundation model designed for robust cross-specialty diagnostic performance.

Methods: MerMED-FM was trained on 3.3 million images spanning ten specialties and seven modalities, including computed tomography (CT), chest X-rays (CXR), ultrasound (US), pathology, colour fundus photography (CFP), optical coherence tomography (OCT) and dermatology images. Training used a self-supervised learning framework and a dynamic memory module with First-In, First-Out mechanism.

Results: MerMED-FM was evaluated on 15 datasets (9 public, 6 private) for ocular disease diagnosis using OCT and CFP. It achieved AUROCs of 0.988 (OCT) and 0.894 (CFP). On OCT, MerMED-FM outperformed a leading ophthalmic model in detecting various retinal conditions, with higher AUROCs on OCTDL (0.991 vs 0.986, $p < 0.01$) and OCTID (0.998 vs 0.960, $p < 0.01$). On CFP, it achieved an AUROC of 0.957 for diagnosing glaucoma, exceeding the comparator (0.937, $p < 0.01$). Performance for diabetic retinopathy was more

variable. Beyond ophthalmology, MerMED-FM also showed strong, data-efficient performance on lung and systemic diseases using CT and CXR.

Conclusions: MerMED-FM is an unsupervised, multimodal, multi-disease foundation model with cross-specialty potential. By bridging siloed imaging domains, it offers a scalable approach to improving diagnostic accuracy, streamlining workflows, and enabling integrated, patient-centred care.

Abstract No.: 206440

Panel No.: ADV-0078

MyopiaGPT: A Specialized Retrieval-Augmented Generation System for Reliable Medical Information in Myopia

First Author: Yawen GUO

Co-Author(s): Edison FUNG, Tsz Tat HUNG, Christopher LEUNG, Ryan WONG, Xu YAN, Xiujuan ZHANG

Purpose: Current commercial language models pose significant clinical risks due to unreliable medical information generation stemming from training on unverified internet data rather than validated clinical sources. Additionally, these models struggle with domain-specific knowledge and raise privacy concerns in clinical settings. We developed MyopiaGPT, a specialized retrieval-augmented generation system addressing these limitations through innovative architecture incorporating peer-reviewed literature and advanced question-answer transformation.

Methods: MyopiaGPT was constructed using peer-reviewed publications (impact factor ≥ 2.5) from PubMed Central, generating 33,070 question-answer pairs with preserved metadata. Our system employs knowledge distillation of long-form text and leverages a score-based module for enhanced retrieval. The system implements impact factor-weighted retrieval during inference. We conducted a systematic evaluation against ChatGPT-4o, Gemini 1.5, ErnieBot 3.5, and conventional LLaMA RAG using 67 free-response clinical questions across six domains and 29 multiple-choice questions, assessing accuracy, comprehensiveness, citation reliability, and response consistency.

Results: MyopiaGPT achieved 100% accuracy in free-response questions, significantly outperforming ChatGPT-4o (94%), Gemini 1.5 (94%), ErnieBot 3.5 (85%), and LLaMA RAG (69%) (all $P < 0.05$). Citation accuracy reached 97.7% versus 0-55.9% for competitors, with zero fake citations compared to 27-82% for other models. In standardized multiple-choice assessments, MyopiaGPT demonstrated 86.2% accuracy versus 31.0-69.0% for other models. Comprehensiveness scores were significantly higher than conventional approaches. Performance remained remarkably consistent across different parameter scales (8B-405B), challenging traditional assumptions that larger models become less reliable.

Conclusions: MyopiaGPT establishes new benchmarks for medical AI applications through specialized RAG architecture, demonstrating superior accuracy, citation reliability, and consistency. The system eliminates manual knowledge base construction requirements while ensuring evidence-based responses. These findings contribute to developing reliable AI-assisted medical information systems and suggest promising approaches for specialized clinical AI that prioritize accuracy over general capabilities.

Abstract No.: 200550

Panel No.: ADV-0035

Noninvasive Early Prediction of Preeclampsia in Pregnancy Using Retinal Vascular Features

First Author: Yuxuan **WU**

Co-Author(s): Haotian **LIN**, Zhenjun **TU**, Xiaohang **WU**, Lanqin **ZHAO**

Purpose: Preeclampsia (PE), a severe hypertensive disorder during pregnancy, significantly contributes to maternal and neonatal mortality. Current prediction biomarkers are often invasive and expensive, hindering widespread application. This study introduces PROMPT (Preeclampsia Risk factor + Ophthalmic data + Mean arterial pressure Prediction Test), an AI-based model using retinal fundus photography as a non-invasive and low-cost screening approach.

Methods: A total of 1,812 pregnancies before 14 gestational weeks were analyzed, and their retinal parameters were extracted using a deep learning-based vessel segmentation and quantification system. Machine learning models were constructed using retinal parameters and metadata for PE and preterm PE prediction. The detection rates of adverse pregnancy outcomes were analyzed by different prediction models. Economic analyses were conducted to evaluate the cost-effectiveness of the PROMPT model compared with routine methods.

Results: The PROMPT achieved an AUC of 0.87 (0.83-0.90) for PE prediction and 0.91 (0.85-0.97) for preterm PE prediction via machine learning, significantly outperforming the baseline model ($p < 0.001$). It improved the detection of severe adverse pregnancy outcomes from 35% to 41%. Economically, PROMPT was estimated to avert 1,809 PE cases and saved over \$50 million per 100,000 screenings.

Conclusions: The study presents PROMPT as a non-invasive, convenient, and cost-effective tool for prenatal care in low- and middle-income countries.

Abstract No.: 203561

Panel No.: ADV-0058

Novel AI-Based Prediction of Ocular Dominance Using Only Standard Biometric Parameters

First Author: Naren **SHETTY**

Co-Author(s): Amulya **PUNATI**, Abhijit Sinha **ROY**, Tejal **SJ**

Purpose: To develop an AI-based model for determining ocular dominance using biometry parameters, eliminating the need for traditional dominance tests, with potential applications in monovision planning.

Methods: Motor dominance was assessed in 240 patients aged 20–40 years using the diamond test for dominance. Patients were categorized into Group 1 (right-eye dominant) and Group 2 (left-eye dominant). All subjects underwent biometry with the IOLMaster 700 (Carl Zeiss Meditech, Inc). Biometric parameters were compared between groups and used to train an AI model to predict ocular dominance.

Results: Among 240 patients, the neural network achieved the best performance (AUC 0.629, accuracy 62.5%), correctly classifying 61.7% of left-eye dominant and 63.3% of right-eye dominant cases. Key predictive parameters included white to white (WTW), Delta K, K2 (RE & LE), and Axial length, enabling ocular dominance prediction from biometry alone.

Conclusions: AI-driven analysis of biometric parameters offers a reliable, non-invasive alternative to conventional dominance tests, facilitating efficient and objective planning for monovision strategies in refractive and cataract surgery.

Abstract No.: 201667

Panel No.: ADV-0043

Optic Disc Laterality as a Novel Biomarker for Glaucoma Using Fundus Image-Based Deep Learning

First Author: Yuta **NARIYA**

Co-Author(s): Makoto **AIHARA**, Shuichiro **AOKI**

Purpose: To evaluate whether optic disc laterality asymmetry can serve as a novel biomarker for glaucoma detection and progression.

Methods: A total of 32,196 fundus images from 5,571 participants were analyzed. Optic discs were extracted, and the left eyes were horizontally flipped to standardize orientation. Laterality (right vs. left) was classified using a deep learning model with 5-fold cross-validation. "Laterality confidence" was defined as the predicted probability of the true label. Glaucoma was defined as self-reported or indicated by a clinical fundus interpretation suggesting suspicion or definite glaucoma. Longitudinal changes in laterality confidence were assessed using generalized estimating equations (GEE).

Results: Laterality classification achieved high accuracy overall, but performance was significantly reduced in glaucomatous eyes compared with non-glaucomatous eyes ($p < 0.001$, chi-square test). In the primary model, GEE analysis showed that laterality confidence declined significantly with age ($\beta = -0.0049$ per year, $p < 0.001$) and exhibited an additional reduction in glaucomatous eyes (interaction $\beta = -0.0031$, $p = 0.042$). Supplementary analyses, including sex, confirmed no significant sex-related differences in baseline values or longitudinal trajectories. Permutation testing further demonstrated that within-eye longitudinal changes were significantly smaller than expected by chance ($p < 0.001$), supporting the robustness of the metric.

Conclusions: Laterality confidence declined with aging and showed accelerated deterioration in glaucomatous eyes. These findings were consistent across sexes. This image-derived, label-independent metric may represent a novel biomarker for glaucoma detection and monitoring, enabling earlier identification of glaucomatous changes in population-based screening.

Abstract No.: 206903

Panel No.: ADV-0089

Optimal Protocol for Visual-Audio Stimulation: A Systematic Review

First Author: Ming Chi CHOY

Co-Author(s): Lok Man AU, Kam Lung Kelvin CHONG, Ka Hei Kenneth LAI, Chi Pui Calvin PANG, Chee Yung Clement THAM, Yiu Man Hanson WONG

Purpose: The purpose of this review is to collect and synthesize findings from published studies to identify an optimal protocol for visual-audio stimulation, based on the treatment protocol, effectiveness, safety, and the potential for personalized treatment for various neurodegenerative disorders.

Methods: This systematic review was performed in accordance with the PRISMA guideline. A search of the English literature was conducted independently by two researchers using the online databases, including Scopus, Medline, PubMed, and Cochrane, as well as citation searching. Findings from eligible articles were narratively synthesised and tabulated.

Results: Of the 3,210 articles screened, 29 studies were eligible for data extraction. 4 studies show that stimulation at 32-40 Hz amplifies the strongest and broadest gamma wave entrainment in the gamma band of the EEG. Among 14 studies, 12 showed a significant reduction in atrophy and preservation of myelin content among subjects in the intervention group. 7 studies yield significant results in improved performance on cognitive and memory tests. 10 studies examined the safety aspect, with 7 of them reporting no adverse events. 2 studies identified significant inter- and intra-individual variability. Analysis of the duration of stimulation reveals that single, short-duration

stimulation shows no significant difference in primary outcomes.

Conclusions: Visual-audio stimulation demonstrates promising benefits for brain stimulation at 40Hz. High inter-subject variability highlights the importance of developing subject-specific or tailored frequencies and wavelengths, and the potential for personalization. Further research is required to develop and validate reliable clinical measures and identify cost-effective interventions.

Abstract No.: 200632

Panel No.: ADV-0037

Outcomes of Artificial Intelligence (AI)-Enabled Melbourne Rapid Fields (MRF) Online Perimeter in Home Monitoring for Glaucoma

First Author: Yu Xiang George KONG

Co-Author(s): Phillip BEDGGOOD, Mo DIRANI, Selwyn PREA, Joyce TIANG, Algis VINGRYS

Purpose: To examine whether glaucoma patients can perform VF testing using their own computers with an AI-enabled web-browser version of MRF Online Perimeter.

Methods: Fifty-one glaucoma patients (98 eyes) were tasked with performing VF testing at home using MRF Online. Written and verbal instructions were provided to participants. The results were compared to previous outcomes on Humphrey Field Analyzer (HFA) SITA-Faster performed in the clinic. AI-Enabled Web-cam technology is used to ensure optimal testing conditions (viewing distance, background lighting) and gaze stability monitoring.

Results: Patient age ranged from 34 to 87 (average 64.61, SD 12.74). High concordance with HFA was found for Mean Deviation (MD) and Pattern Deviation (PD) with intraclass correlation coefficients (ICC) of 0.88 and 0.78, respectively. Bland-Altman analysis returned a bias of -0.69 dB for MD and 95% Limits of Agreement (LoA) of -7.51 dB to 6.12 dB. The PD found a bias of -0.40 dB and a 95% LoA of -5.27 dB to 4.48 dB. Test-retest found high concordance between repeated MRF tests, with ICC ranging from 0.88 to 0.95 for MD. Individual MRF Online results were less reliable outcomes than HFA (FP% rate, 10.18% vs 7.59%, $p = 0.05$), FL% rate (21.01% vs 15.65%, $p < 0.016$), and had longer testing time (4.19min vs 3.41 min, $p < 0.001$).

Conclusions: The AI-enabled MRF Online perimetry software enables patients to conduct reliable, longitudinal visual field testing from home using their personal computers, delivering outcomes comparable to standard Humphrey Field Analyzer (HFA) testing conducted in a clinic.

Abstract No.: 206460**Panel No.: ADV-0077**

Patient User Experience Using a Self-Administered Multi-Purpose Modular Booth for Cataract Monitoring

*First Author: Pamela LEONG**Co-Author(s): David CHEN, Rubin YONG*

Purpose: To evaluate the patient user experience of self-administering a multi-purpose modular booth ("Eye-Pod") for cataract monitoring.

Methods: A single visit prospective study enrolled 150 stable cataract patients. The Eye-Pod housed a portable slit-lamp, an internal visual acuity (VA) test, fundus camera, and portable tonometer. Participants self-administered all tests with minimal supervision. Usability was evaluated on two levels: 1) system-level usability of Eye-Pod using the 10-item questionnaire System Usability Scale (SUS, range 0–100; higher scores = better usability); and 2) individual device-level usability using the 3-item questionnaire After-Scenario Questionnaire (ASQ; range 1–7; 1 = best, 7 = worst).

Results: The mean age of participants was 67.0 ± 6.8 years. The SUS score for the Eye-Pod was 64.2 ± 17.2 , corresponding to an "OK" usability rating. Device-specific ASQ scores were: VA = 1.82 ± 1.08 , tonometer = 3.99 ± 1.71 , slit-lamp = 2.04 ± 1.08 , and fundus camera = 1.58 ± 0.94 . These results indicate excellent usability for the VA test and fundus camera, good usability for the slit-lamp, and fair to poor usability for the tonometer.

Conclusions: The Eye-Pod demonstrated acceptable usability, though design refinements could improve patient experience. The individual device results indicate that the slit-lamp device, the booth VA test, and the fundus camera were highly usable, while the tonometry device demonstrated room for improvement. These findings suggest that a modular self-administered booth is feasible for cataract follow-up.

Abstract No.: 200558**Panel No.: ADV-0036**

Prediction of Spherical Equivalent and Axial Length from Smartphone Anterior Segment Images Using Machine Learning Models

*First Author: Yuichi OKUMURA**Co-Author(s): Masakazu HIROTA, Akie INOMATA, Takenori INOMATA, Ken NAGINO, Shintaro NAKAO*

Purpose: This study aimed to evaluate the accuracy of machine learning models in predicting spherical equivalent (SE) and axial length (AL) using anterior segment images captured with a smartphone external camera.

Methods: A total of 1,226 eyes from 704 participants (mean age: 33.8 years, 73.0% female) were included.

Anterior segment images were captured using a single smartphone. SE and AL were measured using an autorefractor-keratometer and optical biometry, respectively. A convolutional neural network (CNN) model and a stacking ensemble model were developed. Model performance was evaluated using Pearson correlation, mean absolute error (MAE), and Bland–Altman analysis.

Results: The mean SE was -3.19 ± 3.59 D, and the mean AL was 24.76 ± 1.43 mm. The final model achieved a correlation coefficient of $r = 0.69$ with an MAE of 1.75 D for SE prediction. For AL prediction, the correlation coefficient was $r = 0.53$ with an MAE of 1.24 mm. Bland–Altman analysis for SE showed a bias of -0.18 D (Limits of agreement [LoA]: -4.52 to 4.17 D). For AL, the analysis showed a bias of 0.07 mm (LoA: -2.17 to 2.31 mm).

Conclusions: A stacking ensemble model enabled prediction of SE and AL using only smartphone-acquired anterior segment images. These findings suggesting a potential utility in remote eye care and telemedicine applications.

Abstract No.: 206768**Panel No.: ADV-0086**

ROP-Care: A System From Laser Scar Identification to Myopia Prediction for Children With Laser-Treated Retinopathy of Prematurity

*First Author: Duo YUAN**Co-Author(s): Zhenquan WU, Guoming ZHANG, Xinyu ZHAO*

Purpose: To develop ROPCare, an automated Artificial Intelligence (AI) system for identifying and quantifying laser scars in Scanning Laser Ophthalmoscopy (SLO) images of Retinopathy of Prematurity (ROP) patients, and to evaluate its predictive value for myopia risk.

Methods: This study included 532 ROP patients treated with laser photocoagulation (LP). Retinal images were captured by SLO. The system consisted of two AI models: one for the identification of images with laser scars, while another for the segmentation of laser scar areas. The AI-derived laser scar areas index (LAI) was calculated based on the segmented laser scar areas within the region of interest (ROI).

Results: The classification model achieved high accuracy in identifying images with laser scars (AUC=0.9958), while the segmentation model yielded excellent results (DSC=0.8633). The AI-derived LAI showed a significant correlation with spherical equivalent (SE), supporting its potential as a predictor for myopia.

Conclusions: ROP-Care exhibited excellent performance in automatically classifying and segmenting laser scar areas in ROP patients. The AI-derived LAI, a reliable indicator of the extent of laser scarring within the ROI,

reveals the risk and trajectory of developing myopia in school-age children, providing a valuable tool for early intervention in clinical follow-up.

Abstract No.: 207116
Panel No.: ADV-0092

Real-World Deep Learning-Based OCT Analysis of Chronic Central Serous Chorioretinopathy: A Swiss RetinAI Consortium Study

First Author: Tahm SPITZNAGEL

Co-Author(s): Chiara EANDI, Justus GARWEG, Gabriela GRIMALDI, Gabor Mark SOMFAI, Sandrine ZWEIFEL

Purpose: To assess structural changes in chronic central serous chorioretinopathy (cCSCR) using deep learning-based OCT segmentation and explore their association with visual acuity (VA).

Methods: This multicenter, retrospective study from six Swiss eye clinics employed the RetinAI Discovery® platform (Ikerian AG, Bern, Switzerland) to assess macular structure on OCT. The central 1mm (C1) and central 6-mm (C6) data were extracted. "Dry" was defined as intraretinal fluid (IRF) < 1 nL and subretinal fluid (SRF) < 1 nL; otherwise, as "not dry." Primary outcomes were dryness rates, change in SRF and VA (logMAR) from baseline (T0) to 1-year follow-up (T2). The secondary outcome was treatment patterns by dryness status at T2. Non-parametric tests were applied.

Results: At T0, 30% of eyes were dry in C1 (38/127) and 10% in C6 (13/126). At T2, dryness rates increased to 69% (67/97, C1) and 51% (49/96, C6), with 30 missing datasets in each analysis. Among «not dry» eyes at T2, SRF decreased significantly in C1 from 76.25 to 34.44 nL ($p < 0.001$) and in C6 from 267.93 to 86.63 nL ($p < 0.001$). VA remained stable in dry eyes for both C1 and C6 (median logMAR 0.00 at T0 and T2). In "not dry" eyes, VA improved from 0.2 (T0) to 0.1 (T2) in C1 ($p = 0.074$), while remaining 0.10 in C6. 22.9% of eyes that were dry in C6 at T2 had received photodynamic therapy (PDT) and 4.2% subthreshold micropulse lasertherapy (SML), whereas among not-dry eyes, 13.3% had undergone PDT and 17.0% SML.

Conclusions: This real-world multicenter study shows that deep learning-based OCT analysis captures disease dynamics in cCSCR, with higher dryness rates, significant SRF reduction, and stable or slightly improved VA. Notably, not-dry eyes at T2 received more often SML than dry eyes, that underwent more often PDT. These findings support AI-derived OCT metrics as practical endpoints for real-world monitoring.

Abstract No.: 205752
Panel No.: ADV-0070

Real-World Performance of a New Online Eye Symptom Triage Tool (Eye+dot) in an Emergency Eye Clinic

First Author: Fengyi LIU

Co-Author(s): Nimesha ALEX, Louise ALLEN, Jen O LIM

Purpose: Hospital emergency eyecare services are under pressure, with a high proportion of attenders suitable for community care. Eye+dot is an online branching-logic MCQ that collates ophthalmic history and suggests triage dispositions to support inexperienced triagers. This study evaluated its effectiveness in real-world emergency eye clinic (EEC) practice and assessed its usability and patients' acceptance.

Methods: This prospective, real-world study compared eye+dot and nurse triage, using ophthalmologist dispositions and clinical findings as the standard. Patients aged ≥ 13 with scheduled EEC appointments were invited by SMS to complete eye+dot. Age, test duration, and acceptability were recorded. The accuracy of urgency assignment and the identification of patients suitable for community optometry were analysed.

Results: A total of 282 patients (mean age 53.14, range 13-92) were included. Mean test duration was 5.6 +/- 2.4 mins; 80.4% of patients rated eye+dot good/excellent. For high-acuity symptomatology, sensitivity was 85.5% and 76.3% ($p = 0.19$), and specificity was 22.8% and 64.1% ($p < 0.001$) for nurse and eye+dot triage, respectively. Of 224 urgent nursing dispositions, 203 (90.6%) were down-rated (considered suitable for non-urgent assessment) by ophthalmologists and 93 (41.5%) by eye+dot. 256 (90.7%) of the 282 patients were considered suitable for community optometry by eye+dot. 145 (56.6%) of these 256 patients subsequently received only advice at their EEC visit, suggesting suitability for community eyecare.

Conclusions: Eye+dot automated triage has similar sensitivity but superior specificity to nursing triage for identifying high acuity symptomatology. This study suggests the potential to improve EEC scheduling and utilisation of community services.

Abstract No.: 200388
Panel No.: ADV-0032

Refractive Error Detection Using Smartphone-Based Photorefractive Imaging

First Author: Muhammad SYAUQIE

Purpose: To investigate the inherent properties of pupillary red reflexes captured by smartphone cameras for refractive error detection in the community.

Methods: All patients underwent complete ophthalmic examinations, including subjective and objective

refraction, before eye image capture. The red reflex images were captured in a dark room using an iPhone 6s without cycloplegia. Six hundred fifty-one images were acquired from 350 patients. Images were analyzed considering the pupillary red reflex diameter and pattern. The correlation between the spherical equivalent dioptric power and the red reflex pattern was also analyzed.

Results: High myopia (88.2%) predominantly appeared on the right side of the pupil, whereas low and high hyperopia (91.8% and 92.9%, respectively) predominantly appeared on the left side of the pupil. In low myopia and emmetropia, the red reflex fills the entire pupil (75.4% and 84.5% images, respectively). The left red reflex has a significant positive power (+1.361+1.925 Diopter), whereas the total and right red reflexes have a negative one (-1.174+1.325 and -5.977+3.655 Diopter, respectively). A significantly wider total red reflex diameter ratio was found to be 0.617+0.081 mm compared to the right and left individual red reflexes, which are 0.246+0.066 mm and 0.299+0.087 mm, respectively. Spearman's correlation analysis revealed a moderate correlation between crescent size and dioptric power, with a correlation coefficient of 0.615 and an R2 value of 0.314 ($p < 0.001$).

Conclusions: Red reflex pattern recognition using smartphones can help detect refractive errors in communities because each type of refractive error has distinctive red reflex features.

Abstract No.: 205335

Panel No.: ADV-0065

Retinal Image Generation With Diffusion Models: Realism and Prompt Adherence Evaluation

First Author: Jocelyn Hui Lin **GOH**

Co-Author(s): Ching-yu **CHENG**, Thaddaeus Wai Soon **LO**, Sahana **SRINIVASAN**, Yih Chung **THAM**

Purpose: To evaluate the realism of synthetic retinal images from three fine-tuned Stable Diffusion (SD) models.

Methods: A total of 2,883 retinal images from the Singapore Epidemiology of Eye Disease (SEED) study were used to fine-tune SD models v1.5, v2.0 and XL using Low-Rank Adaptation (LoRA). During inference, 1,117 synthetic images were generated from each model with text prompts derived from the SEED metadata (i.e. age, sex, ethnicity, diabetic retinopathy [DR] severity). Fréchet Inception Distance (FID) between synthetic and real images was calculated with latent features extracted by the RETFound model, where lower FID values indicate that the synthetic images are more closely aligned in feature distribution to the real images. Perceptual realism was evaluated through a visual Turing test, where 100 random synthetic images were assessed by three ophthalmologists within a 30-minute limit.

The ophthalmologists further graded another 100 images from SD XL model for prompt adherence (i.e. consistency between DR severity in the text prompts and DR features manifested on synthetic images), based on a 3-point Likert scale (poor, borderline, good).

Results: The FID score of synthetic images from the SD v2.0 model was 129.8 (95% Confidence Interval [CI]: 127.8 - 131.86), and 130.7 for the SD XL model (95% CI: 128.6 - 132.5). Both were significantly lower than the SD v1.5 model (FID: 158.5, 95% CI: 156.1 - 160.9, $p < 0.001$), suggesting that the images from SD v2.0 and XL exhibited a feature distribution closer to real images. In the visual Turing test, ophthalmologists perceived 35% to 54% of the images as real when they were in fact synthetic. Additionally, 63% of images from the SD XL model exhibited 'good' prompt adherence, indicating that a large proportion of synthetic images generally aligned well with the given conditional prompts.

Conclusions: Diffusion models can generate synthetic retinal images that may be indiscernible from real images to ophthalmologists. Further refinement is needed to improve prompt adherence and ensure overall reliability of these generative models.

Abstract No.: 208460

Panel No.: ADV-0099

Retinal Images as a Window to Myopia: A Deep Learning Pipeline for Myopia Diagnosis and Monitoring

First Author: Haohan **ZOU**

Co-Author(s): Yan **WANG**

Purpose: Here, we present a deep learning pipeline that leverages fundus retinal images to enable objective, non-invasive myopia diagnosis, comparison, and progression monitoring.

Methods: In this study, we developed a 3D spatial model (RIRMD) capable of explaining the elongation of the eye axis and the changes in the curvature of the fundus, addressing the issue of comparing time-series images. Furthermore, based on the images aligned using RIRMD, Myopic-Net was employed to determine the occurrence and progression of myopia by detecting retinal structure features. Using a hybrid regression-classification architecture, the spherical power (SE), cylindrical power, and axis position were predicted from a single fundus image, achieving a level consistent with cycloplegic refraction.

Results: RIRMD reliably compared longitudinal images with excellent registration accuracy (7.82 pixel error, AUC = 0.710). Myopic-Net achieved 87.3% identification accuracy and 86.2% precision in detecting myopia onset and progression on an independent test set. The hybrid model accurately predicted spherical power (MAE = 0.50 D), cylindrical power (MAE = 0.31

D), and axis (89% accuracy), consistent with cycloplegic refraction levels.

Conclusions: This pipeline transforms fundus images into a comprehensive tool for myopia care, from precise image alignment to automated progression detection and refractive error estimation. By eliminating the need for cycloplegia and subjective input, it enables efficient, child-friendly screening and longitudinal monitoring, with potential to advance myopia control strategies globally.

Abstract No.: 201012

Panel No.: ADV-0040

Review of Virtual Reality and Tablet-Based Portable Automated Perimetry Technology Versus Standard Automated Perimetry in Glaucoma

First Author: Natania Rae Xiangqin TAN

Co-Author(s): Victor KOH, Sze Chuan ONG, Dayna YONG, Rubin YONG

Purpose: To review clinical outcomes and patient preferences of Portable Automated Perimetry (PAP) Technology (Virtual Reality and Tablet-based), compared against Standard Automated Perimetry (SAP) in visual field (VF) testing for glaucoma.

Methods: A literature review was performed using the PRISMA approach to identify relevant randomised controlled trials and cohort studies involving adults with suspected or confirmed glaucoma that compared PAP against SAP using objective and/or subjective outcomes.

Results: In total, 36 studies were included. 28 studies reported good reliability and comparability of results. Fourteen studies reported the intraclass correlation coefficient for mean deviation (MD) with high agreement (median 0.94, range 0.86-0.96). Correlation coefficients for MD were variably reported using Pearson's correlation (median 0.89, range 0.62-0.95) and Spearman's correlation (median 0.871, range 0.80-0.94), in 12 and 10 studies, respectively. These findings demonstrate strong overall agreement. Most patients preferred PAP, enjoying comfort and ease of use. The majority of studies showed that 77.0% of tablet and 64.3% of VR-based PAP were faster to administer than SAP. Drawbacks of PAP included difficulties with blind spot localisation and reduced reliability in very early or late-stage glaucoma. Few patients reported discomfort with PAP, due to headset weight or motion sickness.

Conclusions: PAP is cost-efficient, widely-accessible, and a good complementary test for frequent VF monitoring, or an alternative in resource-limited underserved communities. Currently, PAP is unable to replace SAP, due to higher variability in quantitative results especially in peripheral fields, and lower accuracy in detecting glaucoma severity.

Abstract No.: 202771

Panel No.: ADV-0054

Revolutionizing Ophthalmology: A Comprehensive Analysis of AI-Driven Patents in Eye and Vision Care

First Author: Xinyu LIU

Co-Author(s): Sihan LI, Divine Joe Grace MARCELINO, Alice Rh RONG, Shisong RONG, Jinghan ZHANG

Purpose: This study aims to understand AI's application in this domain, facilitating effective technology translation for inventors and stakeholders. It examines inventions that utilize AI in eye and vision care, overviews their global distribution, identifies major development centers, and explores key patent features.

Methods: We developed a search strategy using patent classification codes and keywords to identify patents and patent applications employing AI in eye and vision care. Major patent databases, including USPTO, WIPO, EPO, CNIPA, DPMA, CIPO, IP Australia, JPO, and KIPO, were searched. Features including publication year, days-to-grant, legal status, invention purpose, processed data type, and targeted ophthalmology subspecialties were extracted from each invention. Data analysis involved descriptive statistics and Dunn's Test for statistical comparisons.

Results: We identified a total of 5,144 relevant patents or applications published between 1993 and 2024 from the databases. The volume of inventions started exceeding 100 per year in 2017 and 1,000 in 2023, although data for 2024 is incomplete. In the global distribution, the USA holds the highest number of granted patents (N=646), followed by China, Korea, Australia, and Canada. Conversely, China has the most patent applications (N=1,855), followed by the USA, Japan, Korea, European countries, Canada, and Australia. Among the active granted patents, the average days-to-grant was 953 ± 534 days. There were no significant differences in the days-to-grant across major jurisdictions, including the USA, China, Korea, Australia, and Japan ($P > 0.2$). Most inventions focus on diagnostics (78%), process image data (72%), and target the retina and vitreous sector in ophthalmology (60%).

Conclusions: The surge in AI-related inventions marks a transformative shift in eye and vision care. Further development of AI will advance research and make eye and vision care more accessible. Stakeholders should leverage these insights to drive innovation, meet global needs.

Abstract No.: 206265
Panel No.: ADV-0074

Small Deep Learning Models Outperform RETFound in Colour Fundus Classification Tasks

First Author: Rui SANTOS

Co-Author(s): David ISZTL, Gabor SOMFAI

Purpose: Often, large deep learning models are used for image classification tasks. Our research aims to demonstrate that smaller deep learning models may outperform larger ones for the classification of colour fundus images.

Methods: We evaluated the deep learning models ConvNextv2 (27M), Swin/Swin V2 (27M), DINOv2/ DINOv2 with registers (23M), ViT-base (86M), using both pretrained and de novo variants and compared with the RETfound-MAE model (ViT-large, 300M). The datasets used were: EyePacs, APTOS, Messidor for DR, Messidor-2 for DME, and Papila for glaucoma detection.

Results: For DR, SwinV2 was the best performer (pretrained: AUC = 0.9228, recall = 0.7048; no pretrain: AUC = 0.8402, recall = 0.5969), outperforming RETFound-MAE (AUC = 0.8887, recall = 0.6435). For glaucoma detection, SwinV2 was also the best performer overall (pretrained: AUC = 0.9786, recall = 0.9081; no pretrain: AUC = 0.8888, recall = 0.7629) and slightly better than RETFound (AUC = 0.9637, recall = 0.953). For DME, DINOv2, SwinV2, ConvNextV2 and RETfound all achieve the same levels of AUC and recall above 0.98. We have also documented that models such SwinV2 and ConvNextV2 take between 30-50% less time to train than their ViT counterparts.

Conclusions: Smaller deep learning models like SwinV2 and ConvNextV2 can match or outperform the larger RETFound model in classifying DR, DME, and glaucoma from colour fundus images. Further, pre-training on large datasets such as imagenet-1k significantly improves accuracy and recall, while smaller models also reduce training time. Thus, careful consideration is needed to choose a deep learning model for colour fundus image classification.

Abstract No.: 207138
Panel No.: ADV-0094

Smartphone Applications for Glaucoma Patients and the Visually Impaired

First Author: Megha G

Purpose: There is limited information in the literature about the scope and usability of Smartphone Applications (Apps) for glaucoma patients and those that help the visually impaired. Our responsibility as doctors should not stop at providing treatment for the disease, but also ensuring good compliance with medications and providing accessibility support.

Methods: Our study summarizes the various Smartphone apps that can help glaucoma patients and the visually impaired or blind users. The App Store (for iOS) and Google Play Store (for Android phones) were searched. The available apps can be broadly divided as 1) Eye drop reminders 2) Patient education 3) Testing apps 4) Apps for the visually disabled. Various apps that can be used by eye care professionals, but are not particular to glaucoma or visually impaired patients, were excluded.

Results: Among the total of 108 apps which met the inclusion criteria, there were 6 (5%) apps exclusively for eye drop reminder, 47 (44%) other pill reminder apps in which eye drops and doctor appointments can be entered. 4 (4%) apps for glaucoma education to patients and to help them bond with other glaucoma patients. Among the testing apps, most were for visual acuity screening (41; 38%) and 1 app (1%) for visual fields. 9 apps (8.3%) for the visually impaired.

Conclusions: Apps help patients manage their disease better as reminders, to manage appointments, also to have better knowledge of glaucoma and help blind in daily life. Knowledge about these accessibility features and apps can help us educate our patients better.

Abstract No.: 201645
Panel No.: ADV-0044

Smartphone-Based Offline AI for Multi-Disease Retinal Screening: Real-World Accuracy

First Author: Muskan MANGAL

Co-Author(s): Harsh JAIN, Aditya KELKAR, Jai KELKAR, Sabyasachi SENGUPTA

Purpose: To evaluate the diagnostic accuracy of a multi-disease offline artificial intelligence system (Medios-AI, MAI), integrated into a smartphone-based fundus camera, for simultaneous screening of diabetic retinopathy (DR), glaucoma, and age-related macular degeneration (AMD) in a real-world setting.

Methods: In this prospective cross-sectional study, 193 adults (371 eyes) aged ≥ 18 years with DR, glaucoma, AMD, or normal fundus were enrolled between May and December 2024. Dilated fundus imaging was performed using the Remidio Fundus on Phone (FoP) and Zeiss Clarus 500 cameras. The offline MAI algorithm generated disease-specific reports, which were compared to masked grading of Clarus images by two fellowship-trained ophthalmologists.

Results: MAI achieved a sensitivity of 99.3% (95% CI: 96–100), a specificity of 95.7% (95% CI: 92–98), and an AUROC of 0.99 for detecting any retinal disease. For glaucoma (n=109), sensitivity was 98.2% (95% CI: 94–100), specificity 99.0% (95% CI: 97–100), AUROC 0.99. For AMD (n=56), sensitivity was 88.9% (95% CI: 77–96), specificity 97.5% (95% CI: 95–99), AUROC 0.93. For DR (n=78), sensitivity was 84.6% (95% CI: 75–92),

specificity 99.0% (95% CI: 97–100), AUROC 0.92. Agreement on vertical cup-to-disc ratio between AI and graders ranged from –0.1 to +0.1, with intergrader ICC of 0.97 ($P < 0.001$ for all comparisons).

Conclusions: MAI demonstrated diagnostic accuracy for DR, glaucoma, and AMD using offline, smartphone-based platform, supporting point-of-care retinal screening in resource-limited settings.

Abstract No.: 201211

Panel No.: ADV-0041

The Use of Artificial Intelligence for Diagnosing Retinopathy of Prematurity – a Systematic Review

First Author: Adinda Mulya PERTIWI

Co-Author(s): Yeni Dwi LESTARI, Dian Estu YULIA

Purpose: Retinopathy of prematurity (ROP) is a major but preventable cause of childhood blindness. Screening in developing countries is challenging due to skilled staff shortages. Recent advances in artificial intelligence (AI) offer promising results. This study evaluates the diagnostic performance of AI models for ROP screening.

Methods: This systematic review followed PRISMA guidelines and included studies from Cochrane, MEDLINE, and ScienceDirect. Eligible studies were cross-sectional or cohort designs that compared AI diagnostic accuracy for ROP against a gold standard and reported relevant metrics. Studies were graded using the Oxford CEBM levels of evidence.

Results: Of 608 studies, 12 were included. i-ROP DL showed high sensitivity and specificity (AUC ~0.99), with ResNet-152 and EfficientNet-B0 also performing well. Despite variations in specificity and PPV, AI shows promise for ROP screening. i-ROP DL and ResNet-152 may need demographic adaptation. Though cost-effectiveness data are lacking, AI could reduce workload and improve diagnostic consistency.

Conclusions: AI shows high sensitivity, but variable specificity highlights the need for refinement. The review also underscores the importance of validation across diverse populations to ensure generalizability. AI integration in clinical practice can enhance early detection, standardize diagnoses, and alleviate the burden on healthcare professionals, particularly in low-resource settings.

Abstract No.: 206329

Panel No.: ADV-0076

The Use of Teleconsultation to Assess Paediatric Patients Seeking Urgent Ophthalmic Accident and Emergency (A&E) Assessment and Care

First Author: Karen WONG

Co-Author(s): Clare ROBERTS, Maria THEODOROU

Purpose: To determine and analyse the demographic and outcome of paediatric patients attending teleconsultation with acute concerns in an ophthalmic accident and emergency setting.

Methods: Electronic medical record (OpenEye) data for all paediatric patients (under 18 years of age) accessing the accident and emergency ophthalmic department at Moorfields Eye Hospital (London, UK) using a video consultation platform between July and August 2025 were analysed retrospectively. Patient's demographic, outcome, management, and any subsequent unplanned attendance were analysed.

Results: A total of 140 video consultations had taken place over a 2-month period. Patient age ranged between 1 month to 17 years (average 7.9 years); 20% of consultations had taken place during a public holiday; 30% had taken place out of hours during the working week, and 50% in hours. 65% were deemed not to require hospital A&E review and were managed with advice, including appropriate over-the-counter medication. Reattendance rate among patients who received advice only during initial assessment was 4%. 21% of patients required further ophthalmic assessment face-to-face and were invited to attend A&E; 2% were referred to a paediatrician for urgent review of a non-ophthalmic condition; 6% were directed to a general practitioner/allied professionals for non-urgent assessment/referral/treatment; 4% were directly referred to a subspecialty clinic, and 2% to a local eye unit. Average home-hospital distance ranged between 0.9-188 miles. (average 12.8 miles)

Conclusions: Teleconsultation and triage with paediatric patients in the A&E effectively reduced unnecessary face-to-face attendance, improved patients' and parents' experience by delivering prompt referral and/or advice. It also saves patients' travel time, cost, and potentially reduces carbon emissions.

Abstract No.: 202534
Panel No.: ADV-0051

Use of Artificial Intelligence to Estimate Blink Interval and a Possible Screening for Dry Eye Disease Screening From Portable Slit-Lamp Images

First Author: Eisuke SHIMIZU

Co-Author(s): Kazuki ASAI, Shunpei FUJIOKA, Takanobu INOUE, Shintaro NAKAYAMA, Hiroki NISHIMURA

Purpose: Diagnosis of dry eye disease (DED) requires symptoms together with objective signs, such as a reduced tear film breakup time (TFBUT). However, TFBUT measurement requires a slit-lamp microscope and trained ophthalmologists, limiting its utility for screening outside specialist settings. With the growing interest in ophthalmic artificial intelligence (AI), we focused on the blink interval (BI) obtainable from anterior-segment video. We developed an algorithm to estimate BI from anterior-segment videos and, drawing on the "Blink Test" concept described in the TFOS DEWS reports, evaluated whether AI-estimated BI can predict shortened TFBUT.

Methods: In this prospective observational study, we used blue-light-illuminated anterior segment videos acquired with the Smart Eye Camera at Yokohama Keiai Eye Clinic. The training dataset comprised 676 eyes from 338 participants. Frames were annotated for eyelid state (open/closed), and a machine-learning model was trained to classify eyelid state and derive BI. External validation was performed on an independent set of 101 eyes not used for training. Agreement between AI-estimated BI and BI, and associations with TFBUT, were assessed.

Results: The eyelid state classifier achieved an accuracy of 94.24%. AI-estimated BI showed very strong agreement with BI ($r=0.947$; 95%CI, 0.921–0.964; ICC=0.953; 95%CI, 0.931–0.968). AI-estimated BI was also correlated with TFBUT ($r=0.770$; 95%CI, 0.674–0.841). Using a prespecified Blink Test threshold of BI < 10s, AI-estimated BI closely reproduced BI ($r=0.855$; 95%CI, 0.789–0.901; $\kappa=0.854$; 95%CI, 0.751–0.958) and achieved high diagnostic performance against the BI (sensitivity 0.923 [95%CI, 0.869–0.977]; specificity 0.935 [95%CI, 0.874–0.997]; AUC 0.929 [95%CI, 0.879–0.979]). Relative to TFBUT as the reference, AI-estimated BI also demonstrated robust discrimination (sensitivity 0.804 [95%CI, 0.722–0.887]; specificity 0.945 [95%CI, 0.885–1.000]; AUC 0.875 [95%CI, 0.810–0.939]).

Conclusions: We developed and validated an AI system that infers eyelid state from anterior-segment video and estimates BI with high accuracy. AI-estimated BI closely matches conventional BI, suggesting utility for DED screening where slit-lamp assessment is impractical.

Abstract No.: 209732
Panel No.: ADV-0100

Using Deep Learning to Screen for Hypertension in OCTA Images to Reduce the Risk of Serious Complications

First Author: Yiheng DING

Co-Author(s): Hong ZHANG

Purpose: To discuss the feasibility of combining the deep learning method and optical coherence tomography angiography (OCTA) image findings for investigating the changes in ocular microvessels in hypertension.

Methods: Deep learning architecture Xception and Multi-Swin Transformer were used to screen hypertension with 422 OCTA images (252 from 136 hypertension subjects, 170 from 85 healthy subjects). Besides, the separability of OCTA images from high-dimensional feature angles was analyzed to better understand how deep learning models distinguish OCTA images with Class Activation Mapping.

Results: Under CNN Xception, the overall average accuracy of 5-fold cross-validation is 76.05%, and the sensitivity is 85.52%. As a contrast to Swin Transformer, the average accuracy of Single-model (macular), Single-model (optic disk), and Multi-model in the prediction of hypertension is 82.25%, 74.936% and 85.06%, respectively. Besides, the average sensitivity of the Multi-model is 88%. The high-dimensional features of OCTA images in the test set were displayed using an interpretable Class Activation Mapping method, which illustrates the differences in classification indicators and analyzes the possibility of related characteristics of hypertension classification.

Conclusions: The changes of hypertension on fundus vessels can be more accurately and efficiently observed by recognizing OCTA image features through deep learning. The results would contribute to screening for hypertension and reducing the risk of severe complications of hypertension.

Abstract No.: 202889
Panel No.: ADV-0055

Validating an Artificial Intelligence Prototype Portal for Glaucoma Detection From 3D Optical Coherence Tomography Scans in Real-World

First Author: Anran RAN

Co-Author(s): Carol Y. CHEUNG, Anni LING, Clement C. THAM, Bowen XU

Purpose: To prospectively validate an artificial intelligence (AI) prototype portal to detect glaucomatous optic neuropathy (GON) from 3D OCT volumetric scans in the real world.

Methods: We built an AI portal by integrating our established 3D AI model, an information management

system, a user interface, and a commercially available OCT device together. The AI portal is able to extract raw OCT volumetric images, then analyze image quality, detect GON, and generate AI reports in real-time. We recruited subjects at the Triage Unit of Hong Kong Eye Hospital prospectively. The inclusion criteria were: 1) subjects above 18 years old, and 2) referred by primary care settings due to glaucoma-related suspicious findings, or 3) referred by primary care settings for regular eye check-ups. All the eligible subjects underwent OCT imaging, and the AI portal analyzed their 3D OCT scans. Glaucoma specialists provided the reference standard for all the subjects.

Results: A total of 919 subjects were recruited and 167 of them were confirmed to have glaucoma. The AI infrastructure achieved an AUROC of 0.934, a sensitivity of 86.6%, a specificity of 88.3%, and an accuracy of 88.1% for GON assessment and an AUROC of 0.819, a sensitivity of 83.7%, a specificity of 78.3%, and an accuracy of 83.6% for image quality assessment. In addition, the AI portal only took an average of 1-2 minutes to analyze the 3D OCT scan and generate an AI report for both eyes.

Conclusions: The AI portal achieved stable performance prospectively, which provided real-world evidence for potential implementation.

Abstract No.: 206825

Panel No.: ADV-0087

Validation of an Augmented Reality-Based Farnsworth-Munsell 100 Hue Test Against the Manual Version in Normal and Color Vision Deficient Participants

First Author: Mingpu XU

Co-Author(s): Shaoying TAN, Fangyu XU

Purpose: The Farnsworth-Munsell 100 Hue Test (FM100) is widely recognized as the gold standard for assessing color discrimination, but it has practical limitations, including high cost, lengthy administration, and strict environmental requirements. Augmented Reality (AR) offers opportunities for portable and digitalized alternatives.

Methods: A Unity-based AR-FM100 was developed and compared with the manual FM100 under standardized conditions in age- and refraction-matched participants (n=52, 40 normal vs. 12 CVD). Based on the total error scores (TES) from both methods, agreement was assessed with correlation and Bland-Altman analyses, and diagnostic accuracy with ROC curves.

Results: The AR-FM100 yielded higher TES than the manual version ($z=-4.22$, $p < 0.001$), though the two methods showed moderate correlation (Spearman's $r = 0.68$, $p < 0.001$). Bland-Altman analysis confirmed a systematic bias with wide limits of agreement (Mean difference=26.72; 95% CI: -65.32, 118.77), reflecting substantial individual variability. Both tests

differentiated normal from CVD participants, but diagnostic accuracy was higher for the manual FM100 (AUC = 0.98 vs. 0.92).

Conclusions: The AR-FM100 showed strong correlation with the traditional FM100 but tends to overestimate TES and exhibits lower diagnostic accuracy. Although it is not yet a substitute for the manual FM100 as a gold-standard diagnostic tool, the AR-FM100 demonstrated potential as a portable, and automated screening method for color vision assessment. Further improvements in calibration and display rendering are required to minimize systematic bias and enhance its clinical applicability.

Abstract No.: 205339

Panel No.: ADV-0066

Vision Transformer-Based Oculomics: Predicting Biomarkers From Fundus Photographs

First Author: Laura GUTIERREZ

Co-Author(s): Kabilan ELANGO VAN, Daniel TING

Purpose: Oculomics leverages advanced retinal imaging and artificial intelligence to extract systemic information from the eye, offering a non-invasive approach for disease detection and risk prediction. This study aimed to use fundus photographs to predict continuous systemic biomarkers.

Methods: The dataset included 552 patients, each with four fundus views: left and right macula-centered, and left and right optic disc-centered. Target biomarkers were age, BMI, HDL, LDL, HbA1c, Hb, and Cr. A pure Vision Transformer architecture was implemented without a CNN backbone. Images were divided into 16×16 patches, embedded into 256-dimensional vectors with positional encoding and a class token. The model consisted of eight transformer blocks, followed by a regression head with batch normalization and dropout. Training was performed from scratch for 30 epochs. Data were split at the patient level (70% training, 10% validation, 20% testing), yielding 28 models across biomarker-view combinations.

Results: The right optic disc (R_OD) view emerged as the most informative, providing the best results in 12 of 21 evaluations (57%). R_OD achieved low prediction errors across several biomarkers, including BMI (MAE 3.05, MSE 14.57), HDL (MAE 0.24, MSE 0.095), LDL (MAE 0.671, MSE 0.803), and creatinine (MAE 30.44, MSE 15665.93). Age and HbA1c were moderately predicted (Age MAE 6.64, MSE 65.95; HbA1c MAE 0.787, MSE 1.14), while Hb showed the strongest performance with MAE 1.09 and MSE 2.09.

Conclusions: Our findings demonstrate the feasibility of predicting systemic biomarkers from fundus photographs using pure ViT models. The optic disc view suggests that prioritizing this imaging perspective may enhance oculomics prediction.

Abstract No.: 206646

Panel No.: ADV-0083

scAAVEVO Drives Precise Cross-Species AAV Capsid Evolution at Single-Cell Resolution

First Author: Zhong **LIU**Co-Author(s): Yingfeng **ZHENG**, Shurui **KE**

Purpose: To address the challenge of cell-type-specific targeting in ocular gene therapy, this study developed scAAVEVO, a generative model for designing recombinant AAV (rAAV) capsids with high specificity and efficiency at single-cell resolution.

Methods: The scAAVEVO model integrates single-cell transcriptomics and capsid protein sequences. Using a reinforcement learning framework guided by a Chain-of-Thought process, it iteratively generates and scores capsid variants. The model was pre-trained and fine-tuned with non-human primate and human single-cell data to enable cross-species prediction. The top-generated capsid, gRPEAAV, was experimentally validated for its targeting ability, safety, and therapeutic efficacy in rescuing blindness in an Rd12 mouse model.

Results: scAAVEVO successfully generated capsid sequences with enhanced predicted tropism. Experimentally, gRPEAAV demonstrated high efficiency in targeting retinal pigment epithelial (RPE) cells across species, coupled with lower dose-dependent toxicity and inflammation. As a therapeutic vector, it effectively delivered a base-editor (saKHHH-ABE8e) to correct a disease-causing point mutation and rescue vision in Rd12 mice. Crucially, its transduction was dependent on the RPE-specific receptor ITGB8, confirming a key model-derived insight.

Conclusions: The scAAVEVO platform represents a novel and powerful approach for accelerating the development of precise gene therapy vectors. It successfully generates functional, safe, and cross-species AAV capsids by leveraging single-cell data and AI-driven design, opening a new paradigm for targeted ocular gene delivery.

Academia, Research, Teaching and Education in Ophthalmology

Abstract No.: 202682

Panel No.: ART-0011

Agreement Between Retina Specialists, Optometrists, and Mid-Level Ophthalmic Personnel (MLOP) for Interpreting Macular OCT

First Author: Chitaranjan **MISHRA**Co-Author(s): Anup Kumar **SAH**, Jitendra Kumar **SAHOO**

Purpose: To find the agreement between retina specialists, optometrists, and MLOP in the interpretation of OCT images of common macular diseases.

Methods: Five Optometrists and five MLOPs underwent a structured OCT training module for 12 weeks, followed by an assessment examination on MCQs and open-ended questions. The accuracy of the candidates' responses was noted. The questions were asked on comprehensive OCT macula findings and different sub-headings of macular pathologies like macular holes, choroidal neo-vascular membranes (CNVM), diabetic macular edema (DME), cystoid macular edema (CME), polypoidal choroidal vasculopathy (PCV), vitreo-macular interface disorders (VMID), and OCT biomarkers. The responses (scores) of the optometrists (A) and MLOPs (B) were compared with those of the retina specialist (gold standard) (C), and the agreement was noted.

Results: The agreement was highest for comprehensive OCT macula findings; A+B Vrs C, A Vrs C, and B Vrs C were 94.66%, 96%, and 93% respectively. The agreement was lowest for CNVM findings; A+B Vrs C, A Vrs C, and B Vrs C were 60.50%, 64%, and 57% respectively. For the rest of the pathologies, the score was between. Overall diagnosis of all disease entities A+B Vrs C, A Vrs C, and B Vrs C were 94%, 94.66%, and 93.33%.

Conclusions: With a structured OCT training module, optometrists and MLOPs can help in the diagnosis and triage of macular diseases, which can be helpful for vitreo-retinal services in resource-limited settings. However, caution should be exercised in the interpretation of diseases like CNVM and PCV.

Abstract No.: 201065

Panel No.: ART-0004

Application of Mixed Reality for Ophthalmic Clinical Skills

First Author: Dayna YONG

Co-Author(s): Victor KOH, Ray MANOTOSH, Jaslyn OH, Clement TAN, Marcus TAN, Yih Chung THAM, Rubin YONG, Yew Sen YUEN

Purpose: We postulate that a hybrid ophthalmology curriculum incorporating EyelearnMR is non-inferior to traditional education alone. EyelearnMR is a Mixed reality (MR) simulation application designed to teach ocular examination using a wearable headset. We compared learning outcomes and obtained user feedback.

Methods: Single-blind cluster-randomised prospective study. Fourth-year medical students were randomly assigned to two groups: EyelearnMR and control arms. The former had an additional 2 hours of practice sessions with the EyelearnMR devices. A video assessment (on technique, examination, and pathology) was conducted for both groups - EyelearnMR during mid-posting and control at the end of posting. The control was allowed to experience the EyelearnMR modules at the end of the posting. Both groups completed the User Experience Questionnaire (UEQ).

Results: Fifty-four medical students were recruited from July 2023 to January 2024, 24 in the control arm and 30 in the EyelearnMR arm. The EyelearnMR group performed significantly better than the control (median score was 16 and 15, respectively, $P=0.032$, Mann-Whitney U test). The EyelearnMR group had 100% of the students scoring full marks for the technique portion, compared to 80.8% of the control students ($P=0.002$). There was no statistically significant difference between the groups for the examination and pathology portions. UEQ showed positive evaluation for attractiveness, efficiency, dependability, stimulation, and novelty.

Conclusions: Students exposed to EyelearnMR had significantly higher scores despite reduced clinical exposure time. EyelearnMR facilitates deliberate practice and experiential learning. It is an effective supplementary teaching tool in ophthalmic education and may confer additional learning benefits to a traditional clinical posting.

Abstract No.: 201409

Panel No.: ART-0005

Barriers to Learning Phacoemulsification Among Ophthalmology Residents in Peshawar, Pakistan: A Cross-Sectional Study

First Author: Shafiq TANVEER

Purpose: To assess the barriers to phacoemulsification training faced by ophthalmology residents in Khyber

Pakhtunkhwa, Pakistan, and identify the factors influencing their surgical performance and confidence in performing phacoemulsification.

Methods: A descriptive cross-sectional survey was conducted among 47 residents enrolled in the Fellowship of the College of Physicians and Surgeons (FCPS) ophthalmology program. Data were collected using a structured questionnaire covering demographics, surgical exposure, confidence levels, and perceived barriers, including mentorship, institutional support, access to simulation training, and anxiety levels. Statistical analysis was performed using SPSS version 25.

Results: A substantial proportion of residents had limited surgical exposure, with 47.8% assisting in and performing fewer than 20 phacoemulsification procedures. Confidence in performing surgical steps was low, particularly among second- and third-year residents. Key barriers identified included inadequate mentorship, lack of simulation-based training, and insufficient institutional support. Residents with greater surgical experience reported higher confidence and greater satisfaction with their training. Moderate anxiety levels were observed, with a higher prevalence among residents in private institutions.

Conclusions: This study highlights critical gaps in phacoemulsification training for ophthalmology residents in Khyber Pakhtunkhwa, Pakistan. Structured training programs, stronger mentorship, and integration of simulation-based training are essential to enhance residents' confidence, improve skill acquisition, and reduce anxiety. Addressing these barriers will strengthen surgical competency and improve patient care outcomes.

Abstract No.: 205147

Panel No.: ART-0017

Bibliometric Analysis and Systematic Review of the 100 Most Often Cited Articles in Ophthalmology of the Past 10 Years

First Author: Alicia Hoi Ying LIU

Co-Author(s): Li Jia CHEN, Jason C. YAM, Jun YU, Yu Zhou ZHANG

Purpose: To evaluate the trends and influence of the 100 most often cited articles in ophthalmology ("Ophthalmology-100") in the past decade.

Methods: We conducted a bibliometric analysis and systematic review (PROSPERO: 565231) of all scientific publications in ophthalmology published between 2013 and 2023 listed in the Web of Science Core Collection database. To assess the academic influence of the Ophthalmology-100 articles, we formed a control group composed of the first 100 ophthalmic articles ("Control-100") to calculate and compare the area under the curve (AUC) of the first- and second-layer citations. Applying a fragmented article title analysis,

we determined the major topics addressed by the articles.

Results: Ophthalmology-100 articles were published more often in non-ophthalmic journals (55%) versus ophthalmic journals (45%), with the journal “Ophthalmology” having published the most of the articles (17%), followed by “Progress in Retinal and Eye Research” (11%) and “Lancet” (9%). The most commonly addressed topics were diabetic retinopathy/DME (n=18), AMD (n=13), dry eye disease (n=6), glaucoma (n=6), genetic eye diseases (n=6), and myopia (n=3). Article types were systematic review and meta-analysis (AUC=185,056.5), systemic chronic disease and aging population (diabetic retinopathy/DME: AUC=395,262; AMD: AUC=247,777.5), use of AI (AUC=277,953.5), and the translational value of basic science research in ophthalmology (anti-VEGF: AUC=202,941.5; OCT-A: AUC=159,557).

Conclusions: This review captured the development of ophthalmic research in the past decade, quantified the academic influence of the top 100 articles, and identified major trends in ophthalmic research. It may serve as a guide to suggest future research directions and facilitate funding and policy decision-making.

Abstract No.: 200661

Panel No.: ART-0001

Bibliometric Analysis of Health Economics in Ophthalmology

First Author: Pasuta **THANMIKSAKUL**

Co-Author(s): Sunee **CHANSANGPETCH**, Mantapond **ITTARAT**

Purpose: To analyze global research trends and key topics in ophthalmic health economics.

Methods: A bibliometric analysis was performed on articles extracted from Scopus on June 20, 2024, using health economics and ophthalmology-related keywords. Data were analyzed using the R Bibliometrix library, with visualizations generated by VOSviewer.

Results: A total of 823 articles from 1962 to 2024 were identified, with a steady increase since the 1990s, surging post-2010s and peaking at nearly 70 articles in 2023. Network analyses revealed a predominant focus on cost evaluations of major eye diseases, with clustering by country, keyword usage, citation patterns, and authorship. The United States led in publication volume (153 articles), followed by the United Kingdom and India. “Cost-effectiveness” emerged as the most frequently associated term, with “glaucoma” and “diabetic retinopathy” as leading topics. Emerging themes included “telemedicine” and “artificial intelligence.” The most studied conditions were diabetic retinopathy and macular degeneration (52 articles), as well as glaucoma and intraocular pressure (48 articles), emphasizing strong economic evaluations in these areas.

Conclusions: The rise in publications reflects a growing recognition of the importance of health economics in ophthalmology. However, research remains concentrated on specific conditions and countries, highlighting a need for broader diversity and globally interconnected representative studies.

Abstract No.: 207458

Panel No.: ART-0026

Bilingual Evaluation of Advanced Large Language Models for Patient Education in Corneal Refractive Surgery

First Author: Tsung-hsien **TSAI**

Purpose: To evaluate the ability of six advanced large language models (LLMs) in providing accurate, comprehensive, and readable patient education on corneal refractive surgeries (LASIK, KLEx, and PRK) in both English and Chinese.

Methods: Twenty-six questions were compiled from authoritative ophthalmologic sources, covering four domains: (1) Procedure Basics and Eligibility; (2) Safety, Risks, and Long-Term Stability; (3) Recovery and Postoperative Experience; and (4) Practical Concerns. These questions were administered in both English and Chinese through fresh chat sessions with each LLM: ChatGPT-4o, Gemini Advanced 1.5 Pro, Claude 3.5 Sonnet, Tongyi Qwen 2.5, OpenAI o1, and DeepSeek-R1. Five performance metrics—accuracy, comprehensiveness, word count, readability, and reproducibility—were evaluated.

Results: OpenAI o1 and DeepSeek-R1 consistently achieved the highest scores for accuracy and comprehensiveness, significantly outperforming ChatGPT-4o, Gemini Advanced, Claude Sonnet, and Tongyi Qwen (Friedman $p < 0.001$). While overall accuracy and comprehensiveness were comparable between English and Chinese, responses in Chinese were significantly longer. Readability varied by model; Claude Sonnet produced the most readable English responses. Reproducibility analysis revealed only moderate consistency, indicating variability in outputs even for identical prompts.

Conclusions: Reasoning-augmented LLMs, particularly OpenAI o1 and DeepSeek-R1, demonstrate superior performance in delivering bilingual patient education for corneal refractive surgery, with high accuracy and comprehensiveness. However, variations in response length, readability, and reproducibility indicate that further refinement is necessary before these tools can be reliably integrated into clinical practice.

Abstract No.: 206180

Panel No.: ART-0024

Breaking Financial Barriers to Eye Health in Nepal: Evidence and Policy Pathways for Equitable Access

First Author: Namrata KARN

Co-Author(s): Anil GORKHALI, Sailesh MISHRA

Purpose: To analyze the barriers to access to eye care in Nepal related to finances and suggest evidence-based policy recommendations to enhance equity and decrease patient costs.

Methods: A survey of the health financing of Nepal, with key national breakdowns, assessed population coverage, service coverage, and out-of-pocket (OOP) expenditure to determine gaps in financial protection of eye care, in terms of insurance coverage, basic service provision financing, financing of assistive products, and household expenditure.

Results: In Nepal, overall health expenditure is less than 2% of the gross domestic product, and out-of-pocket (OOP) payments take nearly 54% of total health expenditure. The National Health Insurance Program insures only a projected 21% of the population, and most citizens are required to cover their own expenses. Over 40% of citizens do not have access to simple eye care, and expensive interventions like cataract surgery and long-term management of chronic eye conditions are normally borne by families. Such high costs leave a huge burden on the low-income earners. There is a fragmented financing system where there is little pooling of resources and inconsistent support of the essential assistive products that reinforces access inequity.

Conclusions: The system of financing eye health in Nepal leaves a high burden on the patients with out-of-pocket costs and service gaps. The inclusion of comprehensive eye care in the national insurance package, promoting risk pooling, and offering special subsidies to the most expensive interventions are crucial because they will guarantee equal and sustainable access and will help households to avoid economic strain.

Abstract No.: 203978

Panel No.: ART-0015

Combined Proteomics and Metabolomics Analyses Revealed Molecular Signatures Associated With Proliferative Diabetic Retinopathy

First Author: Yixin CUI

Co-Author(s): Qirui LI, Lingna RAO, Lu SHEN, Ling YUAN

Purpose: Diabetic retinopathy (DR) is a microvascular complication of diabetes, and its exact underlying mechanisms have not been fully elucidated. This study aimed to investigate the effects of key proteins and metabolites on the development of DR.

Methods: Undiluted vitreous fluid samples were collected from eight patients with proliferative diabetic retinopathy (PDR) and six non-diabetic idiopathic macular hole (iMH) controls. Integration of TMT-tagged quantitative proteomics and untargeted metabolomics analyses was combined with bioinformatics approaches (PCA, differential expression, PPI network, OPLS-DA, pathway enrichment). Key results were validated by ELISA and immunohistochemistry.

Results: Seven key proteins with six key metabolites were identified to be significantly dysregulated in the PDR. In the vitreous body and retinal nerve fiber layer of the DR group, CD5L expression was upregulated, while CLU was downregulated with SERPINF1 (PEDF). These molecules were co-enriched in pathways such as the "complement and coagulation cascade" and "prion disease," suggesting a common mechanism of abnormal vascular permeability, inflammatory response, and microthrombosis. Disturbances in creatine metabolism suggested AMPK-related energy dysregulation, and the interaction between CD5L and microglia emphasized its neuroinflammatory regulatory function.

Conclusions: This study reveals biomarkers and therapeutic targets, which provide new ideas for diagnosis and precise intervention.

Abstract No.: 205837

Panel No.: ART-0023

Comparing HelpMeSee and Eyesi Virtual Reality Simulators for Phacoemulsification Training: A Randomized Controlled Trial

First Author: Yuke PAN

Co-Author(s): Haowen LIN, Lixia LUO, Xuhua TAN

Purpose: To compare two virtual reality (VR) simulators for phacoemulsification training and to explore the impact of tactile feedback on training effectiveness.

Methods: Residents without any prior cataract surgery training or operative experience were enrolled in the randomized controlled trial. Participants were randomly assigned to train on two VR simulators with (TF group) or without tactile feedback (Control group), with the TF group receiving HelpMeSee simulator-based training and the Control group receiving Eyesi simulator-based training. The primary outcome was the total score of the modified ophthalmology surgical competency assessment rubric (OSCAR) for phacoemulsification in porcine eyes.

Results: A total of 36 participants were randomized into the TF group (18 [50%]) or the control group (18 [50%]). The participants in the TF group obtained higher scores on the modified OSCAR scale compared to the participants in the control group (23.26 points vs 19.78 points; $P = 0.007$). In subgroup analysis, the TF group showed superior performance in incision creation ($P = 0.04$) and nucleus manipulation ($P =$

0.003). No difference was observed between the two groups with respect to capsulorhexis. Furthermore, a higher level of training satisfaction was exhibited by the TF group.

Conclusions: The employment of a VR simulator with tactile feedback enhanced the effectiveness of phacoemulsification training and improved satisfaction with the learning process. These findings support the use of a VR simulator with tactile feedback for phacoemulsification training.

Abstract No.: 205833

Panel No.: ART-0021

Cost-Effectiveness Analysis of the Eyesi Cataract Surgery Simulator in Phacoemulsification Surgery by Ophthalmology Residents

First Author: Somporn **CHANTRA**

Co-Author(s): Usa **CHAIKLEDKAEW**, Parinee **KEMCHOKNATEE**, Pophum **LAWTONGKUM**, Pawin **PAKAYMASKUL**, Panida **YOOPETCH**

Purpose: To evaluate the cost-effectiveness of the Eyesi virtual reality cataract surgery simulator in residency training.

Methods: We compared third-year residents trained traditionally (2020–2022) versus those trained with Eyesi plus traditional methods (2023–2025). Forty-two residents (21 per group) contributed their first 41 independent phacoemulsification cases (1,722 eyes). Clinical outcomes included complication rates, surgical times, and postoperative visual acuity. The simulator's capital cost (8,000,000 THB $\approx$ 248,000 USD) was allocated across residents using a 10-year amortization model. Incremental cost-effectiveness ratios (ICERs) were calculated from a healthcare system perspective, and break-even analysis was performed.

Results: Simulator-trained residents had shorter surgical times (40:35 vs. 44:11 min, $p < 0.001$) and phacoemulsification times (3:27 vs. 3:55 min, $p < 0.001$). Posterior capsule rupture was reduced (5.92% vs. 8.94%, $p = 0.0216$). Early visual acuity was superior at Day 1 (0.81 vs. 0.97 logMAR, $p = 0.001$) and 1 month (0.36 vs. 0.48, $p = 0.001$), with no difference at 3 months. Mean direct medical cost per case, including complication-related expenses, was lower in the Eyesi group (414.40 THB $\approx$ 12.85 USD vs. 485.25 THB $\approx$ 15.05 USD, $p = 0.357$) under 10-year amortization. The ICER was 255,596 THB ($\approx$ 7,930 USD) per complication avoided. Subgroup analysis showed the greatest benefits in surgical efficiency and visual recovery during the first 20 cases, with outcomes converging thereafter. Breakeven analysis indicated ~ 70 years with internal residents alone.

Conclusions: The Eyesi simulator improved efficiency, reduced posterior capsule rupture, and enhanced early visual outcomes, particularly in early training. Although

high capital cost limits feasibility, fewer complications and extending the use of Eyesi across successive cohorts enhance cost-effectiveness, supporting its integration into residency programs.

Abstract No.: 201486

Panel No.: ART-0006

Developing a Smartphone-Based, Interactive, and Experiential-Learning Oriented Direct Ophthalmoscopy Training Module for Medical Students That Consists of Demonstration Videos, Simulation Practice, Self-Evaluating Instruments, and Innovative Assessment

First Author: Julian **CHAN**

Co-Author(s): Poemen **CHAN**, Yan Yu Julia **CHAN**

Purpose: Direct ophthalmoscopy (DO) is a valuable skill that is currently underutilised by medical practitioners, especially non-eye specialists. We aim to develop a DO module consisting of innovative demonstration videos, an application of a portable smartphone ophthalmoscope (PSO) and a smartphone hand-held ophthalmoscopy simulator (SOS) for self-evaluation and self-learning, including an interactive end-of-module assessment scheme.

Methods: Medical students underwent a DO workshop, taught either by the original DO (ODO group, consisting of a 1-hour lecture and hands-on DO practice session) or the new DO module (NDO group, which consists of 3 innovative teaching videos, hands-on DO practice, use of PSO and SOS). At the end of the module, 45 students had their fundus photo taken and were assessed for their DO skill by examining each other with one pupil dilated. The outcomes of objective assessments (based on the tutors' scores) and subjective assessments (via an anonymous Likert scale questionnaire) were compared between the 2 groups.

Results: Students taught using the new DO module achieved significantly higher mean scores (32.38 $\pm$ 4 vs 30 $\pm$ 2.68, $p = 0.03$) when compared to those taught using the old module. From the questionnaire, they felt more confident in their DO skills ($p < 0.01$) and more comfortable utilising the instrument in future practice ($p = 0.03$). Students from the new module also gave higher ratings for the course organisation, instructional methods, assignments and outcomes ($p < 0.01$).

Conclusions: A smartphone-based, interactive, and experiential learning-oriented DO training can potentially increase familiarity with the instrument and provide a better learning experience for medical students, and its implementation in the current curriculum should be considered.

Abstract No.: 201847

Panel No.: ART-0009

Effectiveness of "Finger-and-Fist" Model in Teaching Functional Anatomy of Extraocular Muscle: A Non-Randomized Controlled Trial

First Author: Liping LV

Co-Author(s): Hongxi WANG

Purpose: To evaluate the effectiveness of the «finger-and-fist» teaching model in teaching functional anatomy of extraocular muscles (EOMs), compared with traditional video-based instruction.

Methods: Non-randomized controlled trial. A total of 244 Year-1 medical students from Shantou University Medical College were allocated to two groups based on the class schedules of functional anatomy of EOMs. Participants in Group A (n=125) received conventional video instruction, which provided a 3-dimensional and dynamic demonstration of EOMs and ocular movement. While students in Group B (n=119) were taught using the «finger-and-fist» model, which allowed students to use their extended finger and clenched fist to represent the EOMs and eyeball, so that functional anatomy could be analyzed through demonstrating the vector orthogonal decomposition of muscular action. Knowledge acquisition was assessed through a multiple-choice quiz, while subjective perceptions of the teaching methodology were investigated via Questionnaire Star.

Results: Group B got significantly higher marks in knowledge acquisition than Group A (4.66 ± 1.86 vs. 4.18 ± 1.82 , $p = 0.045$). Subjective feedback showed that students in Group B reported greater confidence in their ability to retain knowledge long-term and were more satisfied with the teaching method.

Conclusions: The «Finger-and-fist» teaching method improved the comprehension and retention of complex oculomotor anatomy compared to passive video instruction. This method could be a valuable pedagogical tool in medical education.

Abstract No.: 201685

Panel No.: ART-0008

Enhancing Ophthalmology Education Through A Mobile Flipped Classroom: A New Teaching Method

First Author: Nader NASSIRI

Co-Author(s): Sara KAVOUSNEZHAD, Kourosh SHEIBANI, Maryam YADGARI

Purpose: Glaucoma is a major cause of irreversible blindness globally. Optical coherence tomography (OCT) aids early glaucoma diagnosis. Interpreting OCT scans requires familiarity with the technology and image analysis. This study aimed to evaluate the effects of a mobile flipped classroom model on learning outcomes and satisfaction for teaching optical coherence tomography (OCT) interpretation skills in glaucoma.

Methods: In this quasi-experimental pre/post-test study, ophthalmology residents participated in a 4-session mobile flipped classroom educational intervention (90 min/session) and were assessed on OCT interpretation. Learning was measured via pre-/post-tests designed by a panel. Satisfaction was assessed using a validated questionnaire.

Results: Twenty-two ophthalmology residents entered the present study. Mean participant age was $29.42 (\pm 2.09)$ years. Compared to pre-intervention, post-test scores showed significant improvement after the mobile flipped classroom ($p < 0.001$). Mean satisfaction score was 74.05 ± 16.09 , denoting high satisfaction among participants.

Conclusions: Implementing a mobile flipped classroom significantly improved OCT interpretation skills and was associated with high satisfaction ratings among ophthalmology residents. This model shows promise for enhancing clinical knowledge in graduate medical education.

Abstract No.: 200933

Panel No.: ART-0002

Evaluation of a Short Training Program to Improve Detection and Management of Retinoblastoma in Nepalese Children

First Author: Purnima RAJKARNIKAR STHAPIT

Co-Author(s): Suzanne CHAMBERS, Manish PAUDEL

Purpose: To evaluate the impact of a retinoblastoma screening training programme on primary health care workers' knowledge, confidence, and practice in Kathmandu, Nepal.

Methods: A half-day training program was conducted by trained ophthalmologists for primary health care workers on education on the importance of early identification of retinoblastoma, screening methods, and its management. Pre- and post-tests were done using the Knowledge and Attitudes to Retinoblastoma Scale (KARS). All participants were provided with the 'Arclight' device that detects the white eye reflex in the pupil, an early sign of retinoblastoma.

Results: The majority of 96 participants were female (90%) with a mean age of 36.7 years (± 10.5). Before the training programme, participants' knowledge about retinoblastoma averaged 85% and reached 100% post-training. Knowledge of the Arclight device and retinoblastoma treatment increased from an average of 58.7% to 68.9% post-training, with overall knowledge increasing from 70% to 84%. Confidence in detecting retinoblastoma increased from 65% before training to 95% post-training.

Conclusions: Primary health care workers are the first line of contact with children. Hence, improving their knowledge and confidence in retinoblastoma screening using a readily accessible device like Arclight has the potential to increase the rate of early detection of

retinoblastoma and reduce the burden of this cancer in low and middle-income countries.

Abstract No.: 207249

Panel No.: ART-0025

Gender Disparities in Vitreoretinal Subspecialty Training and Career Advancement: A Systematic Review

First Author: Sarah Kamiela JUFFRY

Co-Author(s): Kharisma Zatalini GIYANI, Dewi Alya WINARTO

Purpose: Some studies have reported on low female representation among the vitreoretinal (VR) subspecialty. Despite rising female trainees, significant inequities in academic advancement and leadership roles persisted. This review compared female VR trainees and specialists with their male counterparts.

Methods: A systematic search of PubMed, Scopus, ProQuest, Cochrane Library, and Google Scholar was conducted. Outcomes assessed were representation, career milestones, surgical case volume, and remuneration. Studies were appraised using the Joanna Briggs Institute (JBI) Critical Appraisal tool, and data were synthesized qualitatively.

Results: A total of 381 studies were initially obtained, with 10 articles meeting the inclusion criteria for qualitative assessment. Women are underrepresented among practicing VR specialists. While female fellow representation is increasing (32.8% in surgical retina), career advancement remains unequal. Women hold significantly fewer full professor ranks (18.3%-24%) and VR society presidencies (4.3% in ASRS). Female directors constitute only 16%-18.9% of surgical retina fellowship directorships. Women VR specialists receive lower surgical case volume and obtain significantly lower Medicare reimbursement (65% of males). Female academics also demonstrate lower scholarly productivity (publications, h-index). Inadequate mentorship is a recurrent barrier.

Conclusions: Substantial gender disparities persist in VR subspecialty training and careers despite rising female representation. Women continue to face barriers to equitable career advancement. Systemic inequities necessitate targeted interventions, including fostering mentorship, mitigating implicit bias, and ensuring equal surgical training opportunities, to achieve gender parity and strengthen VR workforce.

Abstract No.: 203358

Panel No.: ART-0013

Generation and Characterization of iPSC Lines (SPPHi005-A, SPPHi006-A, SPPHi007-a) From a CRB1-Mutation Associated Retinitis Pigmentosa Family

First Author: Xiao JIALING

Co-Author(s): Gong BO, Li HUAN, Wang LIANG, Guo XIAOXIN

Purpose: To generate and characterize human-induced pluripotent stem cell (hiPSC) lines carrying CRB1 mutations associated with autosomal recessive retinitis pigmentosa (RP), as well as a control line, for use in disease modeling and therapeutic research.

Methods: hiPSC lines SPPHi006-A and SPPHi007-A were derived from a consanguineous family affected by RP and carrying a homozygous or heterozygous CRB1 variant (c.1997T>A; p.V666D). An additional control line, SPPHi005-A, was generated from an unaffected family member without the CRB1 mutation. All hiPSC lines were examined for karyotype stability, morphology, expression of pluripotency markers, and differentiation potential into three germ layers.

Results: The CRB1-mutant and control hiPSC lines exhibited normal karyotypes, typical hiPSC morphology, robust expression of pluripotency markers, and successful differentiation into ectoderm, mesoderm, and endoderm lineages.

Conclusions: The established hiPSC lines provide a reliable in vitro platform to investigate CRB1-associated RP mechanisms and to develop and test potential therapeutic strategies.

Abstract No.: 201660

Panel No.: ART-0007

Improving Referral Letter Writing Skills Among Junior Ophthalmology Colleagues and Residents-in-Training Through Structured Teaching and Feedback

First Author: Channdarith KITH

Co-Author(s): Sreyla CHORK, Kossama CHUKMOL, Piseth KONG, Amarin MAR

Purpose: We aim to assess the referral-writing abilities of junior colleagues and trainee residents through a systematic educational method.

Methods: A two-session teaching module was created and delivered to junior colleagues. Each session featured a pre-test, an interactive lecture, and a post-test. The pre-test consists of 10 multiple-choice questions that assess foundational knowledge. The lecture combined concepts from Good Medical Practice coursework and UK Referral Guidelines, followed by a discussion. Participants had 15 minutes to write a letter of referral based on a specific clinical case in ophthalmology. Small group discussions encouraged

peer collaboration, while letter writing remained an individual task. Feedback was provided during a follow-up session based on “direct observation” and written submissions.

Results: Participants showed improved knowledge of referral structure, clinical terminology, and referral timing. Post-test results indicated a moderate improvement in knowledge acquisition. Referral letters exhibited enhanced clarity and relevance; yet, prevalent concerns encompassed linguistic inconsistencies and minor spelling errors. Students reacted favourably to peer and self-assessment elements, recognising them as essential for skill development.

Conclusions: Effective communication is critical for integrated, patient-centred eyecare (IPEC). Clinical communication has been hampered by inconsistent referral letter writing, which is exacerbated by a lack of a standardised national template for interprofessional collaboration and difficulties with multilingual documentation. In conclusion, “structured teaching” combined with immediate, constructive feedback greatly improved junior colleagues’ referral writing abilities. Incorporating peer and self-reflection encourages deeper learning and accountability. Future efforts should focus on developing a standardised national referral form to improve interprofessional communication and quality of patient care.

Abstract No.: 210269

Panel No.: ART-0030

Interaction Site Mapping Between Rhodopsin and TMEM138 and Its Role in Retinal Degeneration

First Author: Lijing XIE

Co-Author(s): Yingjie CAO, Jinming GUO

Purpose: Degeneration of the photoreceptor outer segment (OS) is a major cause of irreversible blindness. Proper rhodopsin (RHO) trafficking through the connecting cilium is essential for OS disc morphogenesis and renewal. TMEM138, a ciliary membrane protein, participates in RHO transport and localization. This study aimed to identify and validate the molecular interaction sites between RHO and TMEM138 to elucidate their roles in retinal degeneration.

Methods: Protein–protein docking was performed using HDock, integrating results with structural and clinical mutation databases. Plasmids encoding wild-type and mutant RHO and TMEM138 were constructed, and their interactions were examined by tandem affinity purification and structural visualization using PyMOL.

Results: HDock analysis identified 19 potential amino acid interaction pairs. Among 119 sporadic retinitis pigmentosa (RP) patients from the Chaoshan region, eight RHO and three TMEM138 mutation sites were

detected, with three overlapping HDock predictions in each protein. Integrating structural and mutational data, 12 candidate interaction pairs were prioritized.

Conclusions: Combining computational modeling, structural visualization, and genetic analysis effectively mapped the putative interaction sites between RHO and TMEM138. These findings provide novel insights into ciliary transport mechanisms and potential molecular targets for retinal degenerative disease therapy.

Abstract No.: 206363

Neutrophil-Mediated Antibiotic-Free Antifungal System for Fungal Corneal Blindness: Targeted and Synergistic Intervention to Pathogenic Fungi and Corneal Stromal Fibrosis

First Author: Jingguo LI

Co-Author(s): Zhanrong LI, Lei ZHU

Purpose: Fungal keratitis (FK) is a highly blinding ocular infection disease, accompanying invasive fungal infections and subsequent corneal stromal fibrosis (CFS). However, due to the ocular barriers and antibiotic resistance, the clinically available effective ophthalmic formulation is limited, exhibiting low utilization and lacks of multifunctionality, synchronization and controllability.

Methods: Here, we show a neutrophil (NE)-mediated antifungal drug delivery system that provided synergistic killing of pathogenic fungi and synchronously alleviated CFS for effective FK management.

Results: We also show that the NEs-based drug delivery system could bypass the corneal barrier and target the infection focus in mouse models. Wonderfully and exhilaratingly, the recruitment behavior could be observed 15 minutes after injection via the tail vein. Most notably, the NEs-based antibiotics-free antifungal system showed superior biocompatibility and great biosafety.

Conclusions: This proof-of-concept demonstration may be applicable more broadly to the design of drug delivery systems for the intervention of FK and other deep fungal diseases.

Abstract No.: 209947

Panel No.: ART-0029

Optimizing Trabeculectomy Wet-Lab Training: Factors Affecting Surgical Skill Acquisition

First Author: Canying LIU

Co-Author(s): Yiqing Li LI

Purpose: Given the growing need for ophthalmic surgical training and the challenges of fragmented training opportunities, this study developed and evaluated a structured wet-lab course for

trabeculectomy to help residents acquire and refine essential surgical skills.

Methods: Residents from Zhongshan Ophthalmic Center (ZOC) participated in this study. The training commenced with one pre-training online session, which was followed by a three-week self-directed practice phase and six one-hour offline classes. Residents recorded their surgical procedures after 3, 6, 9, 12, and 15 hours of cumulative practice which were then evaluated by glaucoma specialists. The final assessment was carried out after a minimum of 15 hours of practice.

Results: Training scores increased steadily with cumulative practice hours. After 3 hours of practice, the average score stood at 64.35 ± 9.00 . It climbed significantly to 78.58 ± 9.24 after 15 hours of practice ($P < 0.001$), and scores for most surgical steps improved remarkably. Bachelor's degree-holding residents achieved an average final score of 79.17 ± 8.90 , much lower than those with a master's (89.5 ± 4.24) or a doctorate (89.85 ± 3.87) ($P < 0.001$). Residents with more centralized practice schedules, as indicated by higher variance or wider range in daily and weekly practice times, achieved lower final scores ($P = 0.025$ for daily practice time; $P = 0.007$ for weekly practice time).

Conclusions: The three-week training program significantly improved residents' proficiency in trabeculectomy. The data emphasize that a practice duration of 12 - 15 hours is crucial for residents to develop competence in this surgical procedure, with further refinement needed in clinical settings. For surgical skill development, evenly distributed practice time is more effective than centralized sessions. Standardizing residents' practice frequency can be a key strategy to optimize future training results. This research validates the efficacy of the training model and provides actionable insights for standardizing ophthalmic surgical education. The teaching and evaluation methods employed in this study can be integrated into an online learning environment, facilitating the improvement of surgical capabilities in institutions equipped with wet-lab facilities.

Abstract No.: 208756

Panel No.: ART-0028

Protective Effects of TUDCA on Light-Damaged Cone Cells in Mice and the Underlying Mechanisms

First Author: Ling LI

Co-Author(s): Yingjie TONG, Ting WANG, Tongdan ZOU

Purpose: TUDCA is formed from ursodeoxycholic acid (UDCA), and many studies have shown that TUDCA can protect the retina, but the underlying mechanism remains undefined. Thus, this study aimed to explore the protective effect and underlying mechanism of TUDCA against light-induced retinal damage, providing

a new therapeutic target and basis for the prevention and treatment of light-induced retinal damage.

Methods: Light-sensitive 1-month-old Balb/c mice were irradiated for 12 h in a self-made 2000 Lux light chamber to establish a retinal light damage model. ERG was used to evaluate the therapeutic effect of TUDCA on visual function in light-damaged mice. Hematoxylin-eosin staining was used to assess the impact of TUDCA on the morphological structure of the retina. Western blot and immunohistochemical staining were used to explore the effect of TUDCA on the expression and localization of photoreceptor marker proteins in the retina, respectively.

Results: TUDCA can partially mitigate the visual function impairment induced by light damage. TUDCA might effectively protect photosensitive cells from light damage in mice through anti-apoptotic properties.

Conclusions: These results reveal that TUDCA's protective effect on the visual function of light-damaged retina is realized through its anti-apoptotic properties, and it mainly protects cone cells among photoreceptor cells.

Abstract No.: 205506

Panel No.: ART-0020

Seeing Beyond Colour: Addressing Colour Vision Deficiency in Medical Education

First Author: Maverick Wenhao WONG

Purpose: Colour vision deficiency (CVD) affects a significant proportion of medical students, yet its impact on clinical education remains largely unaddressed. In ophthalmology, where colour plays an essential role in interpreting imaging, recognising pathology, and navigating visual-rich assessments, students with CVD may be disproportionately disadvantaged. This abstract explores how medical education can be more inclusive to those with CVD, drawing on personal narrative, literature review, and design theory.

Methods: A reflective narrative approach was used to identify common challenges faced by students with CVD in ophthalmology training. These insights were supported by a targeted review of literature on accessibility in medical education. Recommendations were guided by the Universal Design for Learning (UDL) framework to ensure that proposed interventions benefit all learners, not only those with CVD.

Results: Students with CVD often rely on informal workarounds such as memorisation, peer confirmation, or associating structures with context. However, these adaptations are seldom acknowledged or supported institutionally. Common educational barriers include reliance on colour-dependent visuals in fundus photographs, OCT scans, and EMR interfaces, with limited alternative cues available. By integrating inclusive design strategies such as using text labels,

varied patterns, or adjustable filters; these barriers can be significantly reduced.

Conclusions: CVD should not be a silent disadvantage in ophthalmology and medical education. Thoughtful redesign of learning materials and assessments can improve clarity, fairness, and accessibility. This shift towards inclusivity can empower not only students with CVD, but also enhance educational experiences across the spectrum of learners.

Abstract No.: 203834

Panel No.: ART-0016

Targeting EPA-Rich Lipid Droplets Alleviates Bietti's Crystalline Dystrophy and Reveals Dietary Risks in Retinal Degeneration

First Author: Jiaqiu HUANG

Co-Author(s): Chen ZHAO

Purpose: Excessive lipid droplet (LD) accumulation in the retinal pigment epithelium (RPE) is implicated in blinding retinal degenerations like age-related macular degeneration (AMD) and Bietti's crystalline dystrophy (BCD). We investigated whether clearing LDs is a viable treatment strategy and explored pathogenic lipid species.

Methods: Using a Cyp4v3 knockout mouse model of BCD, we administered an LD-clearing compound (LD-ATTEC, C3) and evaluated its efficacy compared to gene therapy. Multi-omics analysis identified key pathogenic lipids. We also tested the impact of dietary fish oil (rich in EPA/DHA) in BCD and early AMD mouse models and correlated findings with human AMD risk.

Results: C3 treatment effectively rescued structural and functional visual deficits in BCD mice, achieving near wild-type levels and outperforming gene therapy. Multi-omics identified esters of eicosapentaenoic acid (EPA) as a core pathogenic driver. Dietary fish oil supplementation accelerated disease progression in both BCD and AMD mice and correlated with increased AMD risk in humans. C3 was also effective in patient-derived organoids and showed a favorable safety profile in non-human primates.

Conclusions: Our findings establish LD clearance as a novel therapeutic strategy for BCD and reveal unanticipated risks associated with EPA-containing supplements in retinal degenerative diseases and at-risk individuals.

Abstract No.: 205898

Panel No.: ART-0022

Targeting GPER Activates YAP Signaling to Ameliorate Epithelial Injury in Nasolacrimal Duct Obstruction

First Author: Xinyue YU

Co-Author(s): Xianming JIANG, Xuanwei LIANG

Purpose: Nasolacrimal duct obstruction (NLDO) is a prevalent cause of debilitating epiphora and ocular surface inflammation, with a striking female predominance suggestive of hormonal involvement. This study aims to investigate the role of the G protein-coupled estrogen receptor (GPER) in NLDO pathogenesis and its potential as a therapeutic target.

Methods: We analyzed serum hormones and tear inflammatory cytokines in NLDO patients. GPER expression was assessed in patient nasolacrimal duct tissues via immunofluorescence and Western blot. The functional role of GPER was investigated in vitro using patient-derived primary nasolacrimal duct epithelial cells and advanced air-liquid interface (ALI) organoid models subjected to MIF-induced injury, GPER overexpression/activation, and YAP1 inhibition. An injury-induced NLDO mouse model was used for in vivo validation.

Results: NLDO patients exhibited significantly reduced serum estrogen levels, decreased GPER expression in the nasolacrimal duct, and elevated tear levels of MIF, IL-6, and IL-8. In vitro, GPER activation protected epithelial cells from MIF-induced damage, promoting proliferation, reducing apoptosis and senescence, and restoring ciliogenesis in organoids. Mechanistically, GPER mediated these effects by promoting YAP1 nuclear translocation. Critically, intraperitoneal administration of the GPER agonist G-1 in mice with NLDO effectively promoted epithelial repair, reduced fibrosis and inflammatory cell infiltration, and improved functional outcomes.

Conclusions: Our study establishes impaired GPER signaling as a key driver of NLDO. By demonstrating that GPER agonism activates YAP1 to promote epithelial repair and suppress inflammation, we position it as a compelling non-surgical therapeutic strategy.

Abstract No.: 207463

Panel No.: ART-0027

Targeting Phospholipase D to Prevent High Glucose-Induced Oxidative Damage in ABC Retinal Pigment Epithelium Cells

First Author: Vicente BERMÚDEZ

Co-Author(s): Nicolas Guillermo BAZAN, Jorgelina CALANDRIA, María Sol ECHEVARRÍA, Melina Valeria MATEOS, Paula Estefanía TENCONI

Purpose: The retinal pigment epithelium (RPE) plays a critical role in maintaining neural retina and photoreceptor viability. Classical phospholipases

D (PLD1/2) hydrolyze phosphatidylcholine (PC) to generate phosphatidic acid (PA) and choline; PA is then dephosphorylated to diacylglycerol (DAG), both serving as key lipid messengers. Previously, we demonstrated that classical PLDs mediate the inflammatory response in RPE cells exposed to high glucose (HG) in ARPE-19 cells. In this study, we investigate whether PLD signaling modulates HG-induced oxidative stress (OS) in a novel RPE cell line, ABC cells. These cells exhibit a phenotype that more accurately reflects native human RPE cells compared to ARPE-19

Methods: ABC cells were maintained under high glucose (HG, 33 mM) or normal glucose (NG, 5.5 mM) conditions. Selective inhibitors targeting PLD1 (VU0359595), PLD2 (VU0285655-1), or NADPH oxidase (DPI) were applied. ROS levels, nuclear enlargement, and caspase-3/7 activation were subsequently assessed. Additionally, NADPH oxidase (NOX) gene expression was examined by RNA-seq in ABC and ARPE-19 cells.

Results: High glucose (HG) markedly elevated ROS, nuclear enlargement, and caspase-3/7 activation in ABC cells compared to normal glucose (NG); these effects were blocked by PLD and NOX inhibition. RNA-seq revealed increased NOX1/2/4 expression in ABC cells, whereas NOX5 and DUOX1/2 were predominant in ARPE-19.

Conclusions: Our findings show that PLD inhibition prevents oxidative stress (OS) induced by high glucose (HG) in RPE cells, likely through downregulation of NOX activity. Therefore, PLDs represent promising therapeutic targets to alleviate both OS and inflammation in degenerative retinal disorders.

Abstract No.: 201107

Panel No.: ART-0003

Targeting SLC7A11-Mediated Disulfidptosis to Induce Neovascular Regression in Proliferative Diabetic Retinopathy

First Author: Bowei YUAN

Co-Author(s): Jiayan LIU, Yamei LU, Zhihui XIAO, Tingting YANG

Purpose: Current treatments for proliferative diabetic retinopathy (PDR) do not address its core metabolic dysregulation. We hypothesized that the cystine transporter SLC7A11, which is upregulated in PDR neovasculation, creates a therapeutic vulnerability. This study aimed to exploit this dependency to selectively trigger disulfidptosis, a form of regulated cell death, in aberrant retinal vessels and induce disease regression.

Methods: The role of SLC7A11 was investigated using bioinformatics, patient-derived tissues, and functional assays in human retinal microvascular endothelial cells (HRMECs). Loss- and gain-of-function studies were performed using siRNA and lentiviral overexpression. A diabetic mouse model was used to assess the in vivo

therapeutic effect of localized glucose restriction via vitreous irrigation.

Results: SLC7A11 was significantly upregulated in the retinal endothelium of PDR patients and was essential for pro-angiogenic activities in vitro. Critically, SLC7A11 overexpression rendered HRMECs susceptible to disulfidptosis upon glucose deprivation. In a diabetic mouse model, vitreous irrigation with a glucose-free solution successfully induced the regression of neovascular membranes.

Conclusions: SLC7A11 promotes angiogenesis in PDR under hyperglycemia but creates a fatal susceptibility to disulfidptosis under glucose restriction. Exploiting this metabolic vulnerability presents a novel therapeutic paradigm for selectively eliminating pathological neovasculation in PDR.

Abstract No.: 205360

Panel No.: ART-0018

The Analysis of Adipogenesis and Inflammatory Response in Orbital Fibroblast From Adult and Pediatric Graves' Ophthalmopathy

First Author: Junghyo AHN

Purpose: This study is to elucidate the differences in clinical characteristics between pediatric and adult patients with Graves' ophthalmopathy based on cellular and molecular level differences by examining the inflammatory response and adipogenic differentiation in orbital fibroblasts harvested from pediatric and adult patients with Graves' ophthalmopathy in response to the proinflammatory cytokine (IL-1 β).

Methods: Orbital fat tissue was harvested from, healthy adults, healthy pediatric individuals, and adult patients with Graves' ophthalmopathy, and orbital fibroblasts were cultured from these samples. IL-1 β was administered at the early stage of adipogenic differentiation in orbital fibroblasts, followed by the exchange of adipogenic differentiation medium for 14 days. The expression levels of PGE2, COX-2, PPAR- γ , C/EBP- α , and C/EBP- β were measured on days 1, 3, 5, 10, and 14 during differentiation to assess the inflammatory response and adipogenic differentiation with Western Blotting and RT-PCR. Adipogenic differentiation was additionally confirmed with Oil-red O staining.

Results: Expression of PGE2, COX-2 was higher in healthy child and adult patients than in healthy adult, respectively. Expression of PGE2, COX-2 after IL-1 β was more enhanced in all groups.

Conclusions: Compared to adults, orbital fibroblasts in pediatric patients may exhibit a more active inflammatory response and adipogenic differentiation, and they may be more sensitive to inflammatory conditions, potentially leading to enhanced differentiation into adipocytes. When managing and

developing treatment strategies for pediatric and adult patients with Graves' ophthalmopathy, it will be necessary to adopt a personalized approach that takes into account the biological characteristics of each group.

Abstract No.: 203153

Panel No.: ART-0012

The Role and Mechanism of Sympathetic Nerve in Regulating the Function of Corneal Limbal Stem Cells in Diabetes

First Author: Zhang ZHENZHEN

Purpose: To investigate the role and mechanism of sympathetic overactivation in regulating the function of corneal limbal stem cells (LSCs).

Methods: Streptozotocin-induced type I diabetic mouse model was used in this study. The intervention of sympathetic nerves was investigated to study its effect on diabetic LSCs. In addition, we detected the predominantly expressed adrenergic receptors in LSCs by single-cell sequencing, magnetic bead sorting, and RT-PCR. Adb2-KO mice, Adb2-specific antagonists, and Shh inhibitors were used to study the downstream signaling pathways of NE-Adb2 regulation in diabetic LSCs. The molecular mechanism of the sympathetic nerve on diabetic corneal epithelial repair was investigated in vitro.

Results: A streptozotocin-induced type I diabetic mouse model was used in this study. The intervention of sympathetic nerves was investigated to study its effect on diabetic LSCs. In addition, we detected the predominantly expressed adrenergic receptors in LSCs by single-cell sequencing, magnetic bead sorting, and RT-PCR. Adb2-KO mice, Adb2-specific antagonists, and Shh inhibitors were used to study the downstream signaling pathways of NE-Adb2 regulation in diabetic LSCs. The molecular mechanism of sympathetic nerve on diabetic corneal epithelial repair was investigated in vitro.

Conclusions: Sympathetic overactivation caused the impairment of diabetic LSCs function and corneal epithelial regeneration through the NE-Adb2-Shh signaling pathway.

Abstract No.: 205377

Panel No.: ART-0019

Through Their Eyes: Experiencing Glaucomatous Visual Field With VR Headset, Apps & Glaucoma Goggles

First Author: John Davis AKKARA

Purpose: A novel approach to understanding glaucoma's impact by directly simulating its vision loss through various methods - Glaucoma Goggles, Simulator Apps & Virtual Reality Headset. This is useful to teach attendees & relatives of glaucoma patients.

Methods: Participants experience simulated visual field loss using: Glaucoma Goggles: Specially designed glasses mimic blurred peripheral vision loss of glaucoma. Interactive Apps: Utilized to create engaging simulations. Users navigate virtual & real environments while experiencing blind spots and tunnel vision, replicating progressive vision loss. Virtual Reality: Transports viewers into a world affected by glaucoma. Experience disorientation & difficulty navigating environments, emphasizing impact on daily life. Website: VisionMatters Website simulates what browsing the internet looks like for patients with glaucoma, ARMD, cataract, and more.

Results: Visual field loss was demonstrated to patients and attendees on the smartphone app, Glaucoma Goggles, and the Virtual Reality simulator. The app was the easiest to use to demonstrate and most convenient. Since everyone had a smartphone, the attendees could also install the free app to spread the knowledge to others in the family, potentially spreading widespread awareness. Glaucoma Goggles were low-tech and easy to understand, as they personally simulate visual field loss to the wearer Virtual Reality headset was a bit more cumbersome to use but provided the most immersive experience

Conclusions: Increases awareness of glaucoma symptoms, builds empathy & teaches the importance of early detection. By directly experiencing vision loss, individuals gain a deeper understanding of glaucoma, fostering early detection and promoting eye health advocacy. Field loss is difficult to understand, so a visual demonstration helps increase awareness and understanding of glaucoma and the importance of screening.

Abstract No.: 203586

Panel No.: ART-0014

Transcriptomic Profiling of Conjunctival Tissue in Allergic Conjunctivitis Reveals Immune Dysregulation and Metabolic Remodeling

First Author: Liang WANG

Co-Author(s): Renjie CHAI, Bo GONG, Huan LI, Jialing XIAO, Man YU

Purpose: Allergic conjunctivitis (AC) is a common ocular surface inflammatory disease, yet its molecular mechanisms remain incompletely understood. Identifying key genes and pathways involved in AC may provide new insights into potential diagnostic biomarkers and therapeutic targets.

Methods: We performed transcriptome sequencing of conjunctival tissues from three AC mice and three healthy controls. Differentially expressed genes (DEGs) were identified based on thresholds of $p < 0.05$ and $|\log_2 FC| > 1$. Functional enrichment analysis was conducted using Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG)

databases. Selected DEGs were further validated by quantitative real-time PCR (qPCR).

Results: A total of 428 DEGs were detected, including 286 upregulated and 142 downregulated genes in AC compared with controls. Volcano plot analysis revealed significant expression changes, with multiple immune- and metabolism-related genes prominently dysregulated. GO and KEGG enrichment analyses indicated that downregulated genes were mainly involved in cytokine–cytokine receptor interaction, NF- κ B signaling, and IL-17 signaling pathways, while upregulated genes were enriched in lipid metabolism, fatty acid biosynthesis, and immune response processes. qPCR validation confirmed that Aqp8 and IL20 were significantly upregulated in AC conjunctiva, suggesting their potential as novel biomarkers.

Conclusions: Our study provides a comprehensive transcriptomic landscape of conjunctival tissues in allergic conjunctivitis. The identified DEGs and enriched pathways highlight immune-inflammatory dysregulation and metabolic remodeling in AC. In particular, Aqp8 and IL20 may serve as candidate biomarkers and therapeutic targets for allergic conjunctivitis.

Abstract No.: 202662

Panel No.: ART-0010

Tubulin Hyperglutamylation Causes Retinal Degeneration by Impairing the Structural Integrity of Cilia and Protein Mistrafficking

First Author: Tongdan ZOU

Co-Author(s): Yingjie TONG, Haolin WANG, Ting WANG, Houbin ZHANG

Purpose: Tubulin polyglutamylation is dynamically regulated by glutamylation and deglutamylation. AGBL5 is a deglutamylase that specifically removes glutamate at the branching point. Mutations in AGBL5 in humans are associated with retinitis pigmentosa, but the underlying mechanism remains undefined. In this study, we generated Agbl5 knockout mice to further explore the role and potential mechanism of tubulin glutamylation homeostasis regulated by AGBL5 in the survival of retinal photoreceptors

Methods: Agbl5 mice were created using the CRISPR/CAS9 technique. The retinal function was tested by ERG. Retinal degeneration was measured by H&E and TUNEL assay. RNA-seq was used to analyze the gene expression in KO and control retinas. Transmission electron microscopy (TEM) was employed to clearly observe the internal scaffold structure of the connecting cilium (CC) in retinal photoreceptors and the disk membrane structure in the outer segment of photoreceptors.

Results: The Agbl5 mutant mouse displayed impaired rod and cone function and developed progressive retinal degeneration. Tubulin hyperglutamylation

altered the structure of the axoneme by destabilizing the Y-links in the connecting cilium, which affected the function of cilia by the attenuated recruitment of IFT particles and defective transport of opsins in cones and rhodopsin in rods.

Conclusions: These results reveal that tubulin glutamylation level, regulated by AGBL5, is critical for the structural integrity of the axoneme and intraflagellar transport of proteins in photoreceptors.

Cataract

Abstract No.: 203575

Panel No.: CAT-0123

A Case of Rotation of a Toric Multifocal Intraocular Lens After Phacoemulsification and Implantation in a Patient With Prior Laser In Situ Keratomileusis and Presbyopia Correction

First Author: Li CAIYUN

Co-Author(s): Zhang CHAOJUN, Liu MEIQING

Purpose: To report a case of rotation of a toric multifocal intraocular lens (IOL) after phacoemulsification and IOL implantation in a patient with a history of laser-assisted in situ keratomileusis (LASIK) and presbyopia correction.

Methods: A 55-year-old female patient presented with a complaint of «difficulty reading for the past six months.» She had undergone right-eye LASIK and right-eye presbyopia correction. •Right eye: (UDVA) 0.8; (CDVA) -0.75DC $\times$ 180 $\rightarrow$ 0.9; (UNVA) 0.3. Left eye: UDVA 1.0; UNVA 0.4. Diagnosis: Bilateral presbyopia with right-eye refractive error. The patient underwent right-eye phacoemulsification and IOL implantation (TFNT40 +23.0D with -0.05 residual). Postoperatively, on day 1, with 23° IOL rotation. IOL repositioning was performed. At 1 week post-repositioning, with 48° IOL rotation. Right-eye IOL exchange with (CTR) implantation (939MP SE +23D, +21.5D/+3.00 with -0.05 residual) was then performed.

Results: 1 week post-IOL exchange: UDVA/intermediate/near visual acuity 0.8/0.8/0.8; 1 month post-IOL exchange: UDVA 0.6, intermediate 1.0, near 1.0; CDVA -1.25DS $\rightarrow$ 1.0; 3 months post-IOL exchange: UDVA 0.8-, intermediate 1.0, near 1.0; CDVA -1.25DS $\rightarrow$ 1.0.

Conclusions: For patients with enlarged capsular bags, capsular tension rings (CTRs) enhance capsular stability, ensuring reliable fixation of toric multifocal IOLs and achieving optimal distance/intermediate/near visual outcomes. Post-keratorefractive changes in ocular and corneal morphology may increase IOL power calculation errors, and high expectations for visual quality pose challenges in cataract surgery.

Accurate IOL power calculation remains critical. The implantation of toric multifocal IOLs after myopia/presbyopia correction surgeries is rarely reported. Further clinical studies are needed to refine optimal IOL power calculation methods.

Abstract No.: 202900

Panel No.: CAT-0118

A Retrospective Real-World Evidence Study of the Performance of an Enhanced Non-Toric Monofocal Intraocular Lens in Patients Undergoing Cataract Surgery

First Author: Cathleen MCCABE

Purpose: To explore the real-world clinical performance and outcomes of the enVista ASPIRE (EA) and/or EA toric (ETA) enhanced monofocal IOLs, including surgeon satisfaction. This sub-analysis focuses on outcomes with the EA IOL.

Methods: This multicenter, retrospective, real-world study included 6 US cataract surgeons who had conducted cataract surgery using monofocal and/or toric IOLs for ≥ 3 years, including ≥ 5 cases with EA/ETA. In this sub-analysis, participants completed a retrospective user-experience survey and provided a convenience sample of ≥ 5 patient cases of EA implantation following cataract extraction using a standardized case report form. Outcome measures included monocular corrected and uncorrected distance, and uncorrected intermediate visual acuity (CDVA, UDVA, UIVA), refractive outcomes, and surgeon satisfaction.

Results: This sub-analysis included 88 eyes (54 patients). Mean $\pm$ SD spherical equivalent (SEQ) target was -0.08 ± 0.16 (n=88). Follow-up data up to 3 months were reported: 97% of eyes achieved a monocular CDVA of $20/\leq 25$ (n=72); 71% achieved a monocular UDVA of $20/\leq 25$ (n=87); 77% achieved a monocular UIVA of $20/\leq 32$ (n=77). Mean $\pm$ SD SEQ outcome was -0.06 ± 0.30 (n=79). No serious safety events were noted. The mean surgeon satisfaction score for overall lens performance was 9.2 (10=very satisfied; N=6).

Conclusions: In this real-world retrospective case review, EA delivered good distance and functional intermediate vision for most patients following cataract surgery, with minimal occurrences of visual changes or AEs. Surgeons reported high levels of satisfaction with the lens.

Abstract No.: 206496

Panel No.: CAT-0147

AI-Assisted Smartphone Slit-Lamp for Cataract Detection: A Validation Study Against Clinical Standards

First Author: Naimah BINTE ISMAIL

Co-Author(s): Muhammad Azri BIN RAZALI, Ziyou David CHEN, Quoc Dat DO, Pamela LEONG MEI EN

Purpose: To evaluate the performance of an AI-assisted portable slit-lamp device in predicting nuclear sclerotic cataracts through undilated eyes.

Methods: Two hundred patients on cataract follow-up underwent undilated anterior segment imaging using a portable slit-lamp attached to an iPhone 13 (Apple Inc., Cupertino, CA, USA) and a Samsung S22 Ultra (Samsung Electronics Co., Ltd., Suwon, South Korea). Nuclear colour (NC) of images was graded using the Lens Opacities Classification System III (LOCS III) scale by a clinician and an AI system. Graded images were assessed using Pearson's correlation and Bland-Altman analysis.

Results: The mean age of participants was 68.8 ± 6.8 years. 759 images were analysed across NC Grades 2–6. Mean grading scores were: Clinician = 3.40 ± 0.82 ; and AI = 3.41 ± 0.78 . Pearson's correlation was: [$r = 0.915$, 95%, CI 0.839–0.894, $p < 0.001$]. Bland-Altman analysis highlighted a mean difference of 0.014 (95% limits of agreement: -0.64–0.67), indicating 95% of AI gradings were within 1 LOCS III unit of the clinician's assessment. Mean difference in NC values between AI and clinicians' for the respective gradings were: Grade 2 = 0.11 ± 0.02 , Grade 3 = 0.03 ± 0.25 , Grade 4 = 0.01 ± 0.27 , Grade 5 = 0.24 ± 0.25 , and Grade 6 = 0.55 ± 0.24 . These results indicated a good correlation between the clinician and AI's grading.

Conclusions: AI grading paired with MIDAS demonstrated high accuracy of cataract grading, supporting its use for community-based cataract screening without pupillary dilation.

Abstract No.: 205976

Panel No.: CAT-0139

Accuracy of Refractive Target Prediction Following Cataract Surgery in Vitrectomized Eyes at a Tertiary Eye Hospital

First Author: Lydia Permata HILMAN

Co-Author(s): Andrew M.h KNOCH, Emmy Dwi SUGIARTI, Ludwig Melino TJOKROVONCO, Budiman

Purpose: To determine the accuracy of biometry in predicting target refraction using Barret Universal II who underwent phacoemulsification and primary intraocular lens (IOL) implantation in eyes that have undergone vitrectomy procedure through evaluating the prediction error (PE) and mean error (ME).

Methods: A retrospective descriptive study was conducted from medical records of patients presented to Tertiary Eye Hospital for three months between June and August 2023 who underwent phacoemulsification with IOL that was calculated with Barret Universal II formula after vitrectomy. The characteristics data included age, gender, vitrectomy indications, endotamponade, type of cataract, time between vitrectomy and phacoemulsification, and time between silicone oil removed and phacoemulsification. Refractive results, subject characteristics, and the determining variables affecting the biometry were assessed.

Results: A total of 22 patients were included in this study with the most common type of cataract was nuclear cataract. In this study, the mean interval between PPV and phacoemulsification was more than one year (55%) and the mean interval between silicon oil removal and phacoemulsification was more than six months (83.3%). At one months after surgery, the Postoperative PE within ± 0.50 D was found in 16 eyes (72.7%). The ME in this study was 0.28 ± 1.17 D.

Conclusions: The accuracy of biometry in predicting target refraction using Barret Universal II may achieve good refractive outcome in vitrectomized eye.

Abstract No.: 200211

Panel No.: CAT-0101

Advanced Artificial-Intelligence-Based Jiang Formula for Intraocular Lens Power in Congenital Ectopia Lentis

First Author: Yan **LIU**

Co-Author(s): Tianhui **CHEN**, Yongxiang **JIANG**

Purpose: The purpose of this study was to develop an artificial intelligence (AI)-based intraocular lens (IOLs) power calculation formula for improving the accuracy of IOLs power calculations in patients with congenital ectopia lentis (CEL).

Methods: A total of 651 eyes with CEL that underwent IOL implantation surgery were included in this study. An AI-based ensemble formula, the Jiang Formula, was developed using a training dataset of 520 eyes and evaluated on a testing dataset of 131 eyes. A five-fold cross-validation and a two-layer ensemble learning model were constructed. The formula was then tested in a test set and compared against five current classic formulas.

Results: The cohort included young patients (mean age = 14.38 ± 13.35 years). The Jiang Formula showed the lowest prediction error (PE; = 0.08 ± 1.01 diopters [D]), absolute error (AE; = 0.77 ± 0.65 D), median absolute error (MedAE; = 0.66 D), and root mean square error (RMSE; = 1.02 D) among six formulas ($P < 0.001$). Moreover, 68.00% of the eyes in the test set had AE within 1.0 D in the Jiang Formula.

Conclusions: An AI-integrated two-layer ensemble learning model demonstrates promising applications in IOLs power calculations for patients with CEL, not only providing higher predictive accuracy than current classic formulas but also accommodating extreme values and variations in surgical techniques.

Abstract No.: 206080

Panel No.: CAT-0140

Alcohol Consumption and Risk of Cataract: A Meta-Analysis

First Author: Kwan Lam Kelvin **CHAN**

Co-Author(s): Kelvin Kl **CHONG**, Kenneth Kh **LAI**, Calvin Cp **PANG**, Clement Cy **THAM**

Purpose: Studies have concluded conflicting results for the association between alcohol consumption and risk of cataract. Therefore, this study provides an overview and possible explanation.

Methods: A literature search was conducted in PubMed, ScienceDirect and Embase databases from inception until September 2025. Case-control, cross-sectional and cohort studies that investigated alcohol consumption and risk of cataract were identified. Random Effect Model was used to provide the pooled Risk Ratio (RR) and 95% Confidence Intervals (CI). Description and explanation of conflicting results were provided.

Results: Eight studies assuming 662,567 subjects were entailed. The pooled results demonstrated no significant relationship between alcohol consumption and the risk of cataract (RR 1.08, 95% CI: 0.93-1.25). Several studies conclude that light to moderate alcohol consumption has a protective effect against the risk of cataract. On the contrary, some studies indicate that even light alcohol consumption can increase the risk of cataract. The high heterogeneity between studies might have caused such a result ($\text{Tau}^2 = 0.0309$; $\text{Chi}^2 = 94.82$, $\text{df} = 7$ ($P < 0.0001$); $I^2 = 92.6\%$). Several studies have identified a U-shaped association. Potential mechanisms were discussed, pinpointing the antioxidative function in moderate alcohol consumption, while increased expression of the enzyme CYP2E1 among heavy drinkers causes clustering of lens protein.

Conclusions: No determinative relationship between alcohol consumption and risk of cataract could be established. However, a U-shaped relationship was frequently reported, with plausible biological explanations. Future research with standardized confounder adjustment is needed to delineate such an association.

Abstract No.: 201374

Panel No.: CAT-0108

Alzheimer's Disease Risk Reduction Post-Cataract Surgery: A Systematic Review and Meta-Analysis With Individual-Patient Data

First Author: Yonglin WU

Co-Author(s): Ya Yuan Rachel LEUNG, Natalie Nga Man TAM

Purpose: Visual impairment is a risk factor for cognitive decline. Cataract surgery, as a commonly performed visual impairment corrective intervention, may be a modifiable risk factor to reduce the risk of incident dementia. We conducted a systematic review and meta-analysis with individual patient data on the cumulative risk of incident Alzheimer's disease in patients with cataract.

Methods: We did a systematic review and meta-analysis of studies (from January 1, 1980 through June 1, 2025) reporting the risk of incident Alzheimer's disease in patients with uncorrected cataract and those who received cataract surgery. Individual patient datasets and aggregated data from 3 prospective cohorts enabled longitudinal analysis.

Results: Of 4 studies (36,927 patients, follow-up range: 5-16 years) reporting incident AD, 2 studies were from the UK, 1 study from Taiwan, and 1 study from the US. The cumulative risk of incident Alzheimer's disease was 2.05% (95% CI: 1.90% - 2.21%) in unoperated cataract patients (637 Alzheimer's disease cases out of 31129 patients) and 0.936% (95% CI: 0.83% - 1.06%) in post-cataract surgery patients (241 Alzheimer's disease out of 25752 patients; $p < 0.01$). Cataract surgery was associated with a 54.3% reduction in the cumulative risk of incident Alzheimer's disease (RR 0.45; 95% CI: 0.39 - 0.52) in patients with cataract.

Conclusions: While treatment options for Alzheimer's disease remained limited, cataract surgery may be associated with a reduction in the cumulative risk of incident dementia in the long term. Physicians should be aware of the cognitive sequelae of cataract, and the possible benefits of cataract surgery on cognitive decline risks.

Abstract No.: 205314

Panel No.: CAT-0137

Astigmatism Tamed: Scleral Fixation of Toric IOLs Without Capsular Bag Support

First Author: Nagesha Chokkahalli KRISHNAPPA

Co-Author(s): Naren SHETTY, Rohitha NAYAK

Purpose: This study aims to analyse visual outcomes following scleral fixation of toric intraocular lenses (IOLs). To observe the amount of astigmatism reduction, tilt and decentration of IOL and complications post intervention.

Methods: Consecutive patients with significant corneal astigmatism (>0.75 DC) without capsular bag support underwent scleral fixation of toric IOLs. Visual outcomes, including residual refraction, were measured at 6 weeks post-surgery. The frequency of immediate and late complications was analyzed.

Results: A total of 9 eyes underwent scleral fixation using a modified abexterno 4-point fixation technique using 9-0 polypropylene/Gore-Tex sutures. 3 eyes had closed-globe internal refixation of dislocated toric IOLs, and 6 eyes had aphakic correction. Four eyes received Alcon AcrySof toric IOLs, and 5 eyes received Envista toric IOLs. The mean preoperative corneal astigmatism was 2.12 DC (range: 0.9-3.7 DC), and the mean subjective refraction was 2.96 DC (range: 0.75-5 DC). Post-surgery, the residual subjective astigmatism was 0.52 DC. The mean postoperative uncorrected visual acuity (UCVA) was 0.2 logMAR units, further improved to 0.12 logMAR units with correction. The mean tilt was less than 5 degrees, and the mean decentration was less than 500 microns. No major immediate or late postoperative complications were noted, except for one eye with a transient vitreous hemorrhage.

Conclusions: Scleral fixation of toric IOLs emerges as a valuable technique for addressing astigmatism in eyes without capsular support, yielding encouraging results in terms of IOL stability, astigmatism reduction, and visual improvement.

Abstract No.: 201996

Panel No.: CAT-0113

Binocular Depth Perception in Blended Vision Using EDOF and +3 Add IOL

First Author: Neha DHOLAKIA

Purpose: The aim of this analysis was to evaluate the preservation of binocular depth perception after bilateral implantation of an asymmetric refractive segmental EDOF intraocular lens (IOL) in one eye, and a +3.0 add asymmetric refractive segmental multifocal IOL in the fellow eye.

Methods: Ten patients (20 eyes) were included. The dominant eye received a FEMTIS IOL with +1.5D add, and the non-dominant eye received a FEMTIS IOL with +3.0D add. Postoperatively, patients were assessed for halos, glare, and uncorrected visual acuity (UCVA) both monocularly and binocularly.

Results: Patient satisfaction was 100%. No halos or glare were reported. There were no complaints of waxy vision. Patients achieved good distance and near binocular vision.

Conclusions: Blended vision with an EDOF IOL in combination with a refractive trifocal IOL is an excellent option for patients who wish to avoid halo and glare while driving, yet still desire spectacle independence.

Abstract No.: 207264**Panel No.: CAT-0157**

Breaking the Mold: Multifocal Intraocular Lenses Through Manual Small Incision Cataract Surgery—Expanding the Boundaries of Cataract Surgery

*First Author: Ankeeta **THALI****Co-Author(s): Ravindra M.S., Deepthi **MEDA**, Tulasi **MEDA***

Purpose: To assess the feasibility and visual outcomes of multifocal intraocular lens (MFIOL) implantation using a modified manual small incision cataract surgery (MSICS) technique.

Methods: A retrospective analysis was performed on 2,600 eyes that underwent modified MSICS with MFIOL implantation between September 2020 and July 2025 by a single surgeon. A reduced and optimized incision size was utilized to minimize surgically induced astigmatism (SIA), aiming to achieve outcomes comparable to phacoemulsification. Preoperative and postoperative uncorrected distance visual acuity (UDVA), best-corrected visual acuity (BCVA), and refraction were evaluated.

Results: At one month postoperatively, 85% of eyes achieved a UDVA of 6/9 or better. The majority of patients reported spectacle independence for both distance and near vision.

Conclusions: With appropriate surgical modifications, MFIOLs can be successfully implanted via MSICS, offering excellent visual outcomes. To our knowledge, this represents the largest reported series demonstrating MSICS as a viable, precise, and resource-efficient technique for premium intraocular lens delivery.

Abstract No.: 203790

Capsular Phimosis in Retinitis Pigmentosa: Role of Capsular Tension Ring, Polishing, and Biomarker Analysis

*First Author: Vaibhav **VISHAL****Co-Author(s): Poornachandra B, Swaminathan **SETHU**, Naren **SHETTY***

Purpose: Retinitis pigmentosa is associated with increased subclinical inflammation, which accelerates the development of capsular phimosis after cataract surgery. This study aimed to evaluate the role of Capsular Tension Ring (CTR) implantation combined with anterior capsular polishing in preventing capsular phimosis. Intraocular biomarkers of inflammation were also analyzed.

Methods: This prospective interventional study included 20 patients (40 eyes) with retinitis pigmentosa who underwent cataract surgery in both eyes. In each patient, one eye underwent CTR implantation with anterior capsular polishing, while the fellow eye served

as control. Patients were evaluated preoperatively and up to six months postoperatively for the incidence of capsular phimosis. Tear fluid and aqueous humor samples were collected and analyzed for inflammatory biomarkers using a novel detection kit.

Results: Eyes receiving CTR implantation with anterior capsular polishing demonstrated significantly lower rates of capsular phimosis, improved visual outcomes, and reduced intraocular lens decentration and tilt compared with controls. Biomarker analysis revealed elevated levels of inflammatory mediators in both groups, with interleukin-1 (IL-1) and matrix metalloproteinase-9 (MMP-9) showing the greatest increase.

Conclusions: CTR implantation with anterior capsular polishing is a simple and effective technique to reduce capsular phimosis in retinitis pigmentosa, resulting in better postoperative outcomes. Biomarker findings suggest that prolonged corticosteroid therapy or safer targeted anti-inflammatory treatments may be warranted to improve long-term surgical success.

Abstract No.: 201931**Panel No.: CAT-0110**

Case-Based Management of Symptomatic IOL Glistening With the Double Sinskey Technique

*First Author: Givenchy Angela **WINARJO****Co-Author(s): Fajri **IJRIAN**, Cindy Prajna **METTA**, Bobby Ramses Erguna **SITEPU**, Kristo Hadi Audric **SUGIAMAN***

Purpose: Intraocular lens (IOL) glistening can significantly degrade visual function, leading to glare and reduced contrast sensitivity. This case report aims to describe the successful surgical management of a patient with severe vision loss secondary to clinically significant IOL glistening, highlighting the utility of the Double Sinskey Technique for IOL explantation.

Methods: A 62-year-old male presented two years after cataract surgery with persistent glare and visual acuity reduced to 3/60 due to an opaque, glistening hydrophobic acrylic IOL. An IOL exchange was performed. The initial plan involved using the Double Sinskey Technique, where two Sinskey hooks engage both haptics simultaneously to lift the IOL from the capsular bag while minimizing zonular stress. Due to the unavailability of an IOL cutter, the approach was modified by enlarging the corneal incision to facilitate the extraction of the intact IOL. A new polymethyl methacrylate (PMMA) lens was subsequently implanted into the capsular bag.

Results: The surgical procedure was completed successfully without intraoperative complications. One week postoperatively, the patient's uncorrected visual acuity showed substantial improvement from 3/60 to 6/18. The patient also reported a complete resolution of the debilitating glare and visual disturbances.

Conclusions: IOL exchange is the definitive and effective treatment for visually significant IOL glistening. This case demonstrates that the procedure can lead to excellent visual rehabilitation. The Double Sinsky Technique is a valuable and simple method for safely explanting an IOL from the capsular bag, as it helps distribute forces evenly and reduces the risk of iatrogenic zonulysis.

Abstract No.: 204856
Panel No.: CAT-0135

Clinical Outcomes of a Non-Diffractive EDOF IOL with Emmetropia vs. Mini-Monovision in a Taiwanese Population

First Author: Chen-cheng **CHAO**

Co-Author(s): Chao-kai **CHANG**, Tzu-te **HU**, I-hung **LIN**, Yu-lun **LO**

Purpose: To compare visual outcomes, spectacle independence, and dysphotopsia after bilateral implantation of a non-diffractive extended depth of focus (EDOF) intraocular lens (IOL) with either emmetropia or mini-monovision targets.

Methods: This prospective, multi-center study included 168 eyes of 84 patients bilaterally implanted with the AcrySof IQ Vivity IOL. Patients were targeted for either emmetropia (n=42) or mini-monovision (max offset $\leq 0.50D$, n=42). At 3 months post-surgery, outcomes included binocular visual acuity (VA), spectacle independence (IOLSAT questionnaire), visual disturbances (QUVID questionnaire), and reading speed (IREST).

Results: The mini-monovision group achieved slightly better mean binocular uncorrected visual acuity at all distances compared to the emmetropia group. At 3 months, uncorrected near VA was 0.24 ± 0.17 logMAR for mini-monovision and 0.26 ± 0.17 logMAR for emmetropia. Spectacle independence was high in both groups, with the mini-monovision group showing a slight advantage (e.g., for near vision in bright light, 85.7% vs. 82.4% rarely or never needed glasses). The incidence of bothersome photic phenomena was low, with the majority of patients unaffected by starbursts (82.4%), halos (85.3%), or glare (86.8%). Mean intermediate reading speed significantly improved from 172 ± 67 wpm preoperatively to 201 ± 58 wpm postoperatively ($p < 0.05$).

Conclusions: Bilateral implantation of this non-diffractive EDOF IOL provides good distance and intermediate vision with functional near vision and minimal dysphotopsia. A mini-monovision strategy offers a slight enhancement in uncorrected near vision and spectacle independence compared to targeting emmetropia.

Abstract No.: 206198
Panel No.: CAT-0145

Collodion Kid With White in the Eyes

First Author: Nayan **GUPTA**

Purpose: The following case report highlights the difficulties in a cataract surgery in a child with trichothiodystrophy.

Methods: A 7-year-old child, a known case of trichothiodystrophy, was accompanied by parents for the diminution of vision in both eyes. The child was diagnosed with bilateral developmental cataract and taken up for surgery. The child was approached by a multi-disciplinary team involving a dermatologist, pediatrician, and ophthalmologist for systemic stabilisation before surgery.

Results: Child had good visual gain post cataract surgery and was kept on close follow up to prevent any infections.

Conclusions: Children with trichothiodystrophy rarely survive beyond the neonatal period. The ophthalmic complications for such children do not end in the neonatal period but are also carried into school-going age groups. Regular follow-ups and appropriate treatment can help them to live a better life.

Abstract No.: 201440
Panel No.: CAT-0109

Comparative Evaluation of 6 Toric Intraocular Lens Formulas Using Predicted and Measured Posterior Corneal Astigmatism

First Author: Jooye **PARK**

Co-Author(s): So-hyang **CHUNG**, Youngseo **JEON**, Ga-gyeong **KIM**, Soonwon **YANG**

Purpose: This study aimed to evaluate and compare the accuracy, trueness, and precision of six toric intraocular lens (IOL) calculation methods that utilize either predicted or measured posterior corneal astigmatism (PCA), using vector analysis of refractive astigmatism prediction error (RA-PE).

Methods: A total of 146 eyes implanted with enhanced monofocal toric IOLs were retrospectively analyzed. The six formulas compared included Barrett and EVO toric calculators using predicted PCA (PPCA), measured PCA obtained from IOLMaster (MPCA IOLM), and measured PCA from Pentacam (MPCA Pentacam). RA-PE was evaluated using the Eyetemis platform, which applies robust t-tests and Hotelling T^2 tests to assess absolute RA-PE (accuracy), centroid error (trueness), and spread of error (precision).

Results: The centroid error of EVO MPCA IOLM, EVO MPCA Pentacam, and Barrett MPCA IOLM did not show a statistically significant difference from zero ($p = 0.44$, $p = 0.48$, and $p = 0.35$, respectively). The mean absolute RA-PE of EVO PPCA and EVO MPCA Pentacam was significantly lower than that of Barrett MPCA

Pentacam ($p < 0.01$ and $p = 0.04$, respectively). The spread of RA-PE compared to the centroid error was significantly smaller with EVO PPCA than with Barrett MPCA IOLM ($p = 0.02$).

Conclusions: Formulas using predicted PCA showed favorable results in terms of accuracy and precision, while those incorporating measured PCA tended to perform better in trueness.

Abstract No.: 206875

Panel No.: CAT-0152

Comparing Daily Task Performance Using Virtual Reality Following Bilateral Multifocal versus Monovision IOL Implantation

First Author: Ho Yin TANG

Co-Author(s): Yawen GUO, Ka Ngai Alexander LAM, Kai Shun LEUNG

Purpose: To compare visual outcomes and performance using virtual reality (VR) simulations in cataract patients receiving bilateral multifocal versus monofocal intraocular lens (IOL) implantation with monovision.

Methods: Forty-six bilateral cataract patients were randomized to receive either bilateral multifocal IOLs ($n=24$) or bilateral monofocal IOLs with monovision ($n=22$). Preoperatively and three months postoperatively, patients underwent comprehensive clinical assessments and three VR simulations: supermarket shopping, daytime city navigation, and nighttime city navigation. Overall VR performance scores were calculated with age adjustment. Visual outcomes and performance were compared using t-tests and regression analyses.

Results: While the multifocal IOL group demonstrated trends toward better uncorrected near, intermediate, and distance visual acuity compared to the monofocal group, these differences did not reach statistical significance. However, the multifocal group showed significantly superior defocus curves with better visual acuity at $-1.0D$, $-2.0D$, $-3.0D$, and $-4.0D$ ($p \leq 0.005$). Both groups showed improved overall VR performance scores following surgery, with the multifocal group demonstrating greater improvements from baseline.

Conclusions: The multifocal IOL group demonstrated superior defocus curves, indicating better tolerance to refractive error and potentially reduced spectacle dependence. VR simulation offers a novel, objective method for assessing functional visual performance beyond traditional clinical measures, providing valuable insights into real-world visual function following different IOL strategies.

Abstract No.: 200672

Panel No.: CAT-0104

Comparison of Anti-Inflammatory Effects of Prednisolone Versus Nepafenac 0.3% After Phacoemulsification and Intraocular Lens Implantation

First Author: Adnan ABDUL MAJEED

Purpose: To compare the anti-inflammatory effects and safety profiles of prednisolone acetate 1% and nepafenac 0.3% in patients undergoing phacoemulsification with intraocular lens implantation (IOL).

Methods: This is a cross-sectional study. The study included patients who underwent uneventful phacoemulsification with IOL implantation. Post-operative outcomes were assessed at a single follow-up conducted at 4 weeks. The primary efficacy endpoint was improvement in best-corrected visual acuity, measured as the reduction in Logarithmic Minimum angle of resolution (logMAR) values from baseline to follow-up. Clinically significant improvement was defined as a reduction of ≥ 0.2 logMAR units. Secondary outcomes included anterior chamber inflammation, graded using Standardization of Uveitis Nomenclature criteria, and incidence of adverse events.

Results: Of the total 324 patients, the mean age was 64.77 ± 9.27 years. Mean logMAR change from baseline to follow-up was 0.28 ± 0.11 units in the Prednisolone group and 0.30 ± 0.11 units in the Nepafenac group, with a statistically significant difference (p -value 0.050). The findings of clinical improvement showed that 121 (48.8%) patients achieved clinical improvement in the Prednisolone group and 127 (51.2%) in the Nepafenac group. The distribution of inflammation grades (0, 1+, 2+, 3+), was similar between the Prednisolone and Nepafenac groups. A total of 76 (23.4%) adverse events were reported, with 40 (52.6%) occurring in the Prednisolone group and 36 (47.4%) in the Nepafenac group.

Conclusions: Both prednisolone acetate and nepafenac are effective and safe in managing post-operative inflammation and improving visual outcomes following phacoemulsification.

Abstract No.: 207154

Panel No.: CAT-0154

Comparison of Visual Outcomes Between Extended Depth-of-Focus and Advanced Monofocal Intraocular Lenses and Exploring the Role of Micromonovision

First Author: Disha CHETANI

Co-Author(s): Amit GUPTA, Chintan MALHOTRA, Sonam YANGZES

Purpose: To make a comparative analysis between Extended Depth of Focus (EDOF) and advanced Mono focal intraocular lenses post cataract surgery.

Methods: In a prospective interventional study, 56 eyes were implanted either with EDOF or advanced Mono-focal IOLs. Uncorrected visual acuity, contrast sensitivity, defocus curve, spectacle dependence and patient satisfaction using a validated questionnaire were assessed at 2 months

Results: EDOF IOLs showed significantly better uncorrected distance, intermediate and near vision with higher spectacle independence (88% vs 65%). The defocus curve of EDOF IOLs demonstrated a significantly broader range of functional vision. They comparatively had higher contrast sensitivity at low-to-medium frequencies but lower at higher ones. EDOF showed higher internal spherical aberrations. Patient satisfaction was significantly better in EDOF group

Conclusions: EDOF IOLs provide a broader range of functional vision and reduce spectacle dependence. EDOF IOLs offer better intermediate and near vision and thus greater spectacle independence, without compromising distance vision. Advanced mono focal IOLs provide superior contrast at high frequencies. IOL choice should be individualized based on lifestyle and visual needs.

Abstract No.: 201087

Panel No.: CAT-0106

Comparison of the Efficacy of Symmetric pFSAK in Cataract Patients With Different Magnitudes of Corneal Astigmatism

First Author: Zunxia HU

Co-Author(s): Li LI, Jing SIMA

Purpose: To compare the efficacy of symmetric pFSAK in cataract patients with preoperative corneal astigmatism ≥ 1.5 diopters (D) versus < 1.5 D.

Methods: Arcuate incisions were made with an 8-mm diameter and 85% depth using the DONO algorithm. The correction index (CI) was calculated using the Alpins method. Patients were stratified into Group A (< 1.5 D, 90 eyes) and Group B (≥ 1.5 D, 74 eyes), with outcomes evaluated at 6 months postoperatively.

Results: The TIA and SIA in Group A (1.07 ± 0.19 , 0.66 ± 0.37) were both lower than those in Group B (1.84 ± 0.44 , 1.15 ± 0.68), with statistically significant

differences (both $P = 0.000$). The correction index (CI) for Group A and Group B was 0.62 ± 0.33 and 0.63 ± 0.32 , respectively, showing no statistically significant difference between the two groups ($P = 0.974$). The DV in Group B (0.95 ± 0.60) was greater than that in Group A (0.71 ± 0.36), with a statistically significant difference ($P = 0.028$). The regression equation between SIA and TIA was calculated as: $SIA = 0.59 \times TIA + 0.03$. This formula can be used to preliminarily estimate the SIA and residual astigmatism for each patient based on preoperative TIA.

Conclusions: Symmetric pFSAK achieves comparable correction efficacy across varying degrees of corneal astigmatism. To maintain postoperative residual astigmatism < 0.75 D, the TIA should be kept below 1.9 D.

Abstract No.: 203877

Panel No.: CAT-0127

Corneal Parameter Variations After One-Handed Phacoemulsification

First Author: Irum RAZA

Purpose: To assess the corneal parameters variations after one-handed phacoemulsification.

Methods: One hundred cases of age-related cataract were selected for surgery after approval of the study from the institutional ethical review board. Inclusion criteria were cataracts with normal corneal parameters and no prior intraocular surgery. While the exclusion criteria was mature/ hypermature cataracts, more than the grade 3 NS (Nuclear Sclerosis) and only eyed patients. Pre-op study related SOAP (Specific Ocular Assessment Parameters) included VA (Visual Acuity), astigmatism, CCT (Central Corneal Thickness) and endothelial cell count besides routine examination. A single limbal incision without any side port was created at 12 o' clock. All the surgical steps, including hydrodissection, phacoemulsification with high vacuum and adequate power, and intraocular lens implantation, were done through this single port. SOAP was repeated on the 1st postoperative day, 1st postoperative week, 1st and 3rd postoperative months, and compared to calculate results.

Results: Out of 100, 45 were cortical cataracts, 32 were NS grade 2, and the remaining were of NS grade 3. VA was 6/6 to 6/9 in 83% cases and 6/12 to 6/18 in the rest of the cases. Astigmatism turned out to be < -1.00 diopter in 72% cases and > -1.00 diopter in the rest of the patients. Increased CCT was noted in 11 corneas on the first postoperative day, which regressed with time, and remained increased in only 4 corneas on the last visit, which was non-significant (p -value=0.06). Percentile decrease for endothelial cell count (19%) was also non-significant (p -value=0.5).

Conclusions: One-handed phacoemulsification induces minimal trauma to the cornea and little astigmatism, leading to excellent visual outcomes.

Abstract No.: 201218

Panel No.: CAT-0107

Correlation Between Catalase Level and DNA Damage in Lens Extract Epithelial Cells of Senile Cataract Patients

First Author: Harshal SAHARE

Purpose: Cataracts, a leading cause of blindness worldwide, are primarily associated with oxidative stress-induced damage to the lens, with catalase playing a pivotal role in defending against oxidative damage by decomposing hydrogen peroxide (H_2O_2). This study investigates the correlation between catalase activity and DNA damage in lens epithelial cells (LECs) derived from cataract patients, aiming to understand the contribution of oxidative stress to cataractogenesis.

Methods: Fifty individuals diagnosed with senile cataracts (ages 45–60) were included in the study. Lens epithelial cells were isolated from the anterior lens capsule during cataract surgery. Catalase activity was measured using Beer's method, and DNA damage was assessed via the Comet assay, which quantifies DNA fragmentation at the single-cell level. Correlation analysis was performed using Pearson's coefficient.

Results: A weak negative correlation was observed between catalase activity and DNA damage ($r = -0.298$, $p = 0.03754$), with a small explanatory power ($r^2 = 0.08882$), indicating that only about 9% of the variance in catalase activity could be attributed to DNA damage. Although the correlation was statistically significant, the effect size was small, suggesting that other factors contribute to catalase activity and oxidative DNA damage in cataract development. Additionally, the data showed a slight inverse trend between age and Tail (% DNA), with a weak negative correlation ($r = -0.18$) that was not statistically significant ($p = 0.209$).

Conclusions: A weak association between reduced catalase activity and increased oxidative DNA damage lens epithelial cells of cataract patients. However, the modest correlation and low explanatory power highlight the complexity of cataractogenesis.

Abstract No.: 206658

Panel No.: CAT-0148

Customized Toric Intraocular Lens for Correcting Corneal Astigmatism: A Case Series

First Author: Nikita DAS

Co-Author(s): Shilpa TARINI

Purpose: To evaluate the refractive and visual outcomes of customized Smart Toric intraocular lenses (IOLs) in eyes with corneal astigmatism.

Methods: This retrospective case series included 10 eyes of 8 patients who underwent phacoemulsification with implantation of customized Smart Toric IOLs (ultima smart toric hydrophilic IOL- Care group). Indications were high myopia s/p ICL explantation (5 eyes), high myopia without ICL (2 eyes), pellucid marginal corneal degeneration (PMCD, 2 eyes), and post-DALK (1 eye). Preoperative assessment included refraction, keratometry, and biometry. Postoperative outcomes included uncorrected (UCVA) and best-corrected visual acuity (BCVA), spherical equivalent, manifest cylinder, and patient-reported symptoms. Statistical analysis was performed using Jamovi software.

Results: Median preoperative UCVA was 1.25 logMAR (20/360), improving to 0.20 logMAR (20/32) postoperatively ($p < 0.001$). Median BCVA improved from 0.32 logMAR (20/42) to 0.00 logMAR (20/20) ($p = 0.006$). Median SE improved from -4.50 D (IQR -7.25 to -3.25) to $+0.06$ D (IQR 0.00 to $+0.25$) ($p = 0.009$). Median refractive cylinder reduced from -2.17 D (IQR -2.48 to -1.92) to -0.95 D (IQR -1.08 to -0.76) ($p < 0.001$). Visual outcomes were favorable across all subgroups, including PMD and post-DALK eyes. Complications included posterior capsular opacification (20%) and glare (20%).

Conclusions: Customized toric IOLs are effective for correcting corneal astigmatism across diverse indications, including ectasia and post-keratoplasty. They enable precise refractive correction in eyes with low spherical and high cylindrical requirements, overcoming limitations of conventional IOL ranges.

Abstract No.: 204186

Panel No.: CAT-0128

Dual Challenge: Phacoemulsification in the Presence of a Traumatic Iris Cyst

First Author: Prika Maulina AGARISTI

Co-Author(s): Syska WIDYAWATI, Cecillia Apriliana WULANDARI

Purpose: Iris cysts are rare ocular anomalies characterized by fluid-filled lesions within the iris, often posing diagnostic and therapeutic challenges. Accurate differentiation is crucial to exclude malignant intraocular tumors. There are various approaches in managing iris cysts, and performing phacoemulsification can be particularly complex. This article presents a case of managing a challenging, complicated cataract extraction in the presence of an iris cyst.

Methods: A 44-year-old male presented with progressive blurred vision in the right eye for one year, with a remote trauma history. Initially, the visual acuity of the right eye was 0.5/60, with an iris cyst at the inferotemporal, anterior synechiae, a flat anterior chamber (AC), and a hazy lens. While minimally invasive techniques are golden rules in iris cyst

management, surgery was unavoidable due to visual axis obstruction and a flat AC, which could potentially compromise corneal endothelial integrity. Iris cyst aspiration, anterior chamber reformation, along with phacoemulsification and intraocular lens implantation, were performed uneventfully. A small pupil was another intraoperative challenge, which was managed successfully with an iris retractor.

Results: Postoperatively, the patient showed remarkable recovery, achieving 6/6 visual acuity at one week. The anterior chamber was deep and well-formed, and corneal edema resolved completely. Despite a small recurrent inferotemporal iris cyst, the visual acuity remained stable, and the cornea remained clear. Corneal endothelial cell density was later measured at 811 cells/mm², indicating sufficient endothelial function.

Conclusions: A tailored approach to iris cysts with coexisting cataracts is essential. Preoperative and intraoperative planning are crucial to overcome potential complications and ensure optimal visual outcomes.

Abstract No.: 208210

Panel No.: CAT-0163

Effect of Steep-Axis Clear Corneal Incision on Postoperative Residual Astigmatism in Cataract Surgery

First Author: Yingshi ZOU

Co-Author(s): Yali GAO, Yingyue XIONG, Ming-ming YANG, Jianan XU

Purpose: To examine the relationship between surgically induced astigmatism (SIA) and corneal astigmatic axis, establish a predictive model for residual astigmatism, and evaluate the effect of steep-axis clear corneal incisions on postoperative residual astigmatism.

Methods: This observational study included 170 subjects (305 eyes). Measurements were taken using the IOLMaster 700, and the Barrett Universal II formula was applied to simulate postoperative residual astigmatism under varying SIA values following steep-axis clear corneal incisions. Patterns of astigmatism and axis changes were analyzed to develop the predictive model.

Results: The mean age of the cohort was 67.47 ± 10.88 years (range: 31–94), with 104 eyes from males and 201 from females. With-the-rule (WTR) astigmatism showed a non-linear relationship between postoperative residual astigmatism and SIA, while against-the-rule (ATR) and oblique (OBL) astigmatism exhibited linear relationships. For a fixed SIA, WTR allowed the largest correction threshold, followed by OBL, and then ATR.

Conclusions: Based on the derived model, surgeons can assess—according to their typical SIA and the

patient's preoperative astigmatism magnitude and axis—whether to perform a steep-axis clear corneal incision or implant a toric IOL, thus optimizing surgical outcomes.

Abstract No.: 209889

Panel No.: CAT-0165

Efficacy and Safety Analysis of LenSX and Catalys Femtosecond Laser Systems in Short Axial Length Patients

First Author: Bin LIN

Co-Author(s): Dongkan LI

Purpose: This study compared cumulative dissipated energy (CDE), effective phacoemulsification time (EPT), fluid perfusion volume, corneal endothelial quantity changes, and capsular shrinkage incidence in short-axial cataract patients with LenSX and Catalys femtosecond laser systems.

Methods: A single-center, prospective, randomized controlled trial included 100 eyes of short axial length patients. They were randomly grouped for different femtosecond laser pretreatment before cataract phacoemulsification and IOL implantation. Data like age, LOCS III grade, and corneal endothelial counts were collected. Capsule tissue was stained, and its cell-free area was calculated to analyze capsular shrinkage.

Results: The two groups had similar preoperative features. Except for femtosecond laser time, there were no statistically significant differences in CDE, EPT, fluid perfusion, and corneal endothelial counts. Complications showed no significant difference either. LenSX had more capsule edge problems, while Catalys might affect surgeons. Pupil miosis and capsular shrinkage incidences were similar.

Conclusions: Catalys is better for soft cataracts or uncooperative patients with short axial lengths. LenSX is more suitable for cloudy and hard cataracts. Selecting the right system based on cataracts and patient conditions can improve surgical outcomes.

Abstract No.: 206783

Panel No.: CAT-0150

Enhancing Vision in Cataract With Congenital Aniridia: A Case Report of Yamane Technique for Scleral Fixation

First Author: Saraya AMAJIDA

Co-Author(s): Budiman, Andrew Maximilian KNOCH, Emmy Dwi SUGIARTI, Ludwig TJOKROVONCO

Purpose: To report the outcomes of sutureless scleral-fixated IOL implantation using the Yamane technique in a patient with bilateral congenital aniridia and cataracts.

Methods: A 30-year-old male fisherman presented with progressive bilateral blurred vision. Clinical evaluation revealed congenital aniridia with subluxated

cataracts in both eyes. Ultrasound confirmed posterior vitreous detachment and vitreous opacities. He underwent cataract extraction, anterior vitrectomy, and scleral-fixated IOL implantation in both eyes using the sutureless Yamane technique.

Results: Postoperatively, visual acuity improved from close-face finger counting to 0.16 in the right eye and 0.2 in the left eye. At the 7-day follow-up, both eyes demonstrated stable IOL centration, clear corneas, and well-controlled intraocular pressure without complications.

Conclusions: The Yamane technique provides a safe and effective method for visual rehabilitation in congenital aniridia with cataracts and absent capsular support. Proper surgical technique and postoperative management are crucial to minimize complications and optimize visual outcomes.

Abstract No.: 207195

Panel No.: CAT-0155

Evaluation of Kane, Barrett, EVO, and DGS Formulas for Refractive Outcomes in Trifocal IOL Implantation

First Author: Yingjie LIN

Co-Author(s): Xianjun LIANG

Purpose: To evaluate the predictive accuracy of four intraocular lens (IOL) power calculation formulas—Kane, Barrett Universal II (Barrett), Emmetropia Verifying Optical (EVO), and Double-Gaussian Spline (DGS)—in cataract patients implanted with trifocal IOLs (PanOptix, Alcon).

Methods: Prediction errors for each formula were analyzed and compared. Key outcome measures included median arithmetic error (ME), mean absolute error (MAE), and the percentage of predictions within tolerance ranges of ± 0.25 D, ± 0.50 D, ± 0.75 D, and ± 1.00 D. Statistical analysis was conducted to assess differences in formula performance.

Results: The EVO formula yielded the lowest ME (-0.37 D) and MAE (0.48 D), with the highest percentages of predictions within ± 0.25 D (30%) and ± 0.75 D (78%). The Barrett formula showed the largest ME (-0.50 D) and MAE (0.60 D), with the lowest percentages within ± 0.25 D (24%) and ± 0.75 D (68%). The Kane and DGS formulas demonstrated intermediate performance, with Kane outperforming DGS in predictions within ± 0.50 D (56% vs. 52%).

Conclusions: The EVO formula exhibited superior accuracy compared to the Kane, DGS, and Barrett formulas for trifocal IOL power calculations. These results suggest that EVO may offer the most reliable option for achieving precise refractive outcomes in patients receiving trifocal IOLs, potentially enhancing postoperative visual performance in clinical practice.

Abstract No.: 204590

Panel No.: CAT-0132

Factors Influencing the Ocular Surface Microbiota During the Perioperative Period of Phacoemulsification

First Author: Xiaochen ZHANG

Co-Author(s): Zhaohui LI, Zi YE

Purpose: To evaluate the dynamics of conjunctival sac and eyelid margin flora in cataract patients across key perioperative stages, including the impact of preoperative levofloxacin application, disinfection, and intraoperative eyelid speculum exposure.

Methods: This prospective, single-center study was conducted by extracting DNA from perioperative swab samples and sequencing the V3-V4 region of the 16S rRNA gene to assess the impact of various factors on the conjunctival sac and eyelid margin microbiome in phacoemulsification patients. Statistical analysis was done by SPSS Statistics Version 27.

Results: A total of 48 patients undergoing phacoemulsification were enrolled. Conjunctival sac swabs were collected at admission and after levofloxacin application, while eyelid margin swabs were obtained at admission, post-disinfection, and post-surgery. *Acinetobacter* was the most frequently isolated microorganism (32.50% of isolates), followed by *Corynebacterium* (19.26%), *Agrobacterium* (5.34%), and *Sphingomonas* (5.21%). After using of levofloxacin, the conjunctival microbial distribution shifted: *Acinetobacter* decreased to 30.36%, *Corynebacterium* to 12.37%, and *Agrobacterium* to 1.20%, while *Sphingomonas* increased to 7.95% and norank-f-*Neisseriaceae* increased from 2.48% to 6.73%. In the baseline eyelid margin flora, *Corynebacterium* (30.06%) was the most abundant genus. Following a series of procedures including ocular irrigation and disinfection, the abundance of *Corynebacterium* decreased to 2.64%. In contrast, the proportion of norank-f-*Neisseriaceae* showed little change before and after disinfection; however, it increased significantly to 11.83% post-surgery.

Conclusions: Despite limited susceptibility of the ocular surface microbiota to ofloxacin, levofloxacin application led to compositional changes in the conjunctival sac. Moreover, the pressure from the eyelid speculum partially counteracted the effect of disinfection on the eyelid margin flora.

Abstract No.: 202053

Panel No.: CAT-0114

First Case of Intravitreal Bevacizumab Injection for Persistent Serous Retinal Detachment Associated With Vogt-Koyanagi-Harada Disease in Timor-Leste

First Author: Frenky Ramiro DE JESUS

Purpose: To introduce the first case of Vogt-Koyanagi-Harada (VKH) disease associated with Serous retinal detachment (SRD) in Timor-Leste, which resolved with intravitreal injection of bevacizumab.

Methods: Interventional case report to show the effect of bevacizumab for the serous retinal detachment in VKH patient.

Results: A 43-year-old woman from a rural area with a sudden loss of vision for 2 weeks. The best-corrected visual acuity (BCVA) in both eyes was FC 1 m. The patient was diagnosed with VKH disease. OCT was performed, and SRD was confirmed. On OCT, the height of SRD in the right eye was 1029 μ m and 1084 μ m in the left eye. Even after 5 weeks of steroid treatment, the SRD was not totally resolved. At the time, the height of SRD in the right was 254 μ m and 203 μ m on the left. The BCVA was 6/15 on the right and 6/12 on the left. Despite a long-term dose course of systemic steroid therapy, an intravitreal injection of 3mg/0.12ml of bevacizumab was administered for the right eye, following informed consent. 2 weeks later, reabsorption of SRD was observed during the OCT examination. The retinal thickness was 191 μ m on the right and 199 μ m on the left. The BCVA was improved to 6/6 on the right and 6/9 on the left.

Conclusions: An intravitreal injection of bevacizumab combined with systemic steroids in VKH is expected to solve the persistent presence of SRD and to prevent permanent visual impairment.

Abstract No.: 202958

Panel No.: CAT-0119

From Relative Afferent Pupillary Defect Positive to Orbital Apex Tumor

First Author: Lingxi ZHANG

Co-Author(s): Zeyi LI, Cangeng XU

Purpose: This study presents an investigation into the etiology of unimproved visual acuity following cataract phacoemulsification with intraocular lens implantation surgery in a single case.

Methods: A 66-year-old woman underwent uncomplicated right-eye phacoemulsification with IOL implantation. However, preoperative BCVA of 0.3 (OD) persisted two weeks postoperatively. Subsequent examination revealed a RAPD, an inferior arcuate visual field defect, prolonged VEP latency, and reduced P100 amplitude. Consequently, MRI was performed and demonstrated a well-defined 16x10mm

extraconal orbital apex mass, which was isointense on T1, hyperintense on T2, and showed homogeneous enhancement.

Results: Based on these findings, the patient was diagnosed with a right orbital apex mass causing compressive optic neuropathy. She therefore underwent endoscopic endonasal tumor excision and optic nerve decompression using navigation. Subsequent pathology confirmed cavernous hemangioma. Postoperatively, intravenous methylprednisolone (500mg/day for 3 days) was administered. As a result, the RAPD was no longer detectable. At the 3-week follow-up, BCVA had improved to 0.7, the visual field defect had completely resolved, and VEP parameters had normalized.

Conclusions: Despite uncomplicated surgery, some patients exhibit no visual improvement even in the absence of fundus abnormalities, often leading to overlooked underlying causes. This case highlights one such patient in whom a postoperative RAPD crucially led to the diagnosis of an orbital apex tumor. Thus, we emphasize the importance of including RAPD testing in preoperative assessments, particularly for cases with unexplained vision loss. Ultimately, prompt tumor excision and nerve decompression achieved significant visual recovery.

Abstract No.: 204135

Panel No.: CAT-0129

Gradual Hydrodissection Technique to Enhance Safety of Phacoemulsification in Posterior Polar Cataract

First Author: Fajri IJRIAN

Co-Author(s): Cindy Prajna METTA, Gede PARDIANTO, Diyah PURWORINI

Purpose: To evaluate the safety of gradual hydrodissection during phacoemulsification in patients with posterior polar cataract.

Methods: This quasi-experimental pre-post study included 50 eyes of 50 patients with posterior polar cataract who underwent phacoemulsification. All procedures were performed by a single experienced surgeon using the phaco chop technique combined with gradual hydrodissection. This technique involved injecting small amount, sequential aliquots of balanced salt solution through the capsulorhexis to gently separate corticocapsular adhesions. Preoperative and 1-month postoperative data were collected, including best-corrected visual acuity (BCVA) and intraocular pressure (IOP). Intraoperative complications, posterior capsule rupture, vitreous prolapse, and nucleus drop, were meticulously documented. Data were analyzed using paired Student's t-test, with $P < 0.05$ considered statistically significant.

Results: The mean age of participants was 64.8 ± 16.5 years, 16 (32%) male and 34 (68%) female.

Postoperative BCVA improved significantly from a mean of 0.21 ± 0.13 to 0.93 ± 0.14 ($P < 0.001$). Similarly, mean IOP decreased significantly from 17.9 ± 2.7 mmHg to 13.2 ± 2.2 mmHg ($P < 0.001$). Notably, no cases of posterior capsule rupture, vitreous prolapse, or nucleus drop occurred during surgery. All procedures were completed successfully without complications.

Conclusions: Gradual hydrodissection may appear to be a safe technique during phacoemulsification for posterior polar cataract.

Abstract No.: 202912

Panel No.: CAT-0117

Grx Resists Diabetes Cataract by Activating AMPK/BNIP3/BNIP3L-Mediated Mitophagy in Lens Epithelial Cells

First Author: Jessica

Co-Author(s): Chenjun, Mia

Purpose: Glutaredoxin (Grx) plays an important antioxidant role in cataract pathogenesis. While its knockout accelerates age-related cataract, its regulatory mechanism in diabetic cataract (DC) remains unclear.

Methods: AMPK activity and Grx expression were assessed in lens capsules from DC patients and high-glucose (HG)-treated HLEC-B3 cells. We overexpressed Grx to examine its effects on HG-induced oxidative stress, apoptosis, and mitophagy. Mechanisms were probed using AMPK-siRNA, compound C (an AMPK inhibitor), and BNIP3L-siRNA.

Results: AMPK activity was decreased in DC and HG-HLEC-B3 models, with compensatory upregulation of Grx. Grx overexpression protected against HG-induced damage and induced mitophagy via the BNIP3/BNIP3L pathway. Inhibition of AMPK or knockdown of BNIP3L reversed the protective effects of Grx on mitophagy, oxidative stress, and apoptosis. In vivo experiments confirmed that Grx overexpression alleviated DC.

Conclusions: Our findings demonstrate that Grx protects against DC by activating AMPK/BNIP3/BNIP3L-mediated mitophagy, highlighting its potential as a novel therapeutic target.

Abstract No.: 206204

Panel No.: CAT-0146

High Glucose Induces Lens Epithelial Cells Senescence via H3K18la-CDK5RAP3 Axis in Diabetic Cataract

First Author: Lifang BAI

Co-Author(s): Jin YANG

Purpose: This study aims to elucidate the role and underlying molecular mechanisms between histone lactylation and senescence of lens epithelial cells (LECs) under high-glucose(HG) environment, providing a new target for the diagnosis and treatment of diabetic cataract (DC).

Methods: The senescence model was established by culturing human LECs under HG conditions. Transcriptomics and metabolomics analysis identified key mediators. The functional role of Cyclin-dependent kinase 5 regulatory subunit-associated protein 3 (CDK5RAP3) was investigated using siRNA knockdown and overexpression plasmids. Senescence was evaluated by SA- β -gal staining, cell cycle analysis, and p16/p21 expression. Oxidative stress, epithelial-mesenchymal transition (EMT) markers, and histone lactylation were analyzed via RT-qPCR, western blot, or immunofluorescence. Clinical validation used lens capsules and aqueous humor from patients with transparent lens, age-related cataracts (ARC), and DC.

Results: HG treatment induced cell cycle arrest, LECs senescence and oxidative stress. Multi-omics profiling revealed CDK5RAP3 upregulation and significant lactate accumulation under HG. CDK5RAP3 knockdown alleviated HG-induced senescence, ROS production, and EMT, while its overexpression exacerbated these effects. Mechanistically, HG-enhanced lactate accumulation promoted histone lactylation, predominantly at the H3K18 site. Crucially, clinical samples from DC patients confirmed elevated lactate levels, increased H3K18 lactylation, and higher expression of CDK5RAP3 and senescence markers compared to ARC.

Conclusions: This study uncovers a novel pathogenic axis for DC: HG-induced lactate accumulation drives H3K18 lactylation, which upregulates CDK5RAP3 expression, culminating in LECs senescence, which promotes EMT to accelerate the progression of DC. This H3K18la-CDK5RAP3 pathway links metabolic imbalance to epigenetic regulation and cellular senescence, identifying this axis as a potential therapeutic target for DC.

Abstract No.: 205517

Panel No.: CAT-0138

Impact of Phaco Tip Exposure on Corneal Endothelium and Central Corneal Thickness in Hard Cataract

First Author: Shreya SARAOGI

Co-Author(s): Tejal SJ, Naren SHETTY, Abhijit SINHA ROY

Purpose: To evaluate role of phacoemulsification probe tip exposure on corneal endothelial cell loss and central corneal thickness (CCT) in hard cataracts, comparing between more & less tip exposure.

Methods: A prospective study was conducted on 57 eyes in each group undergoing phacoemulsification for hard cataracts using a more tip exposure or a less tip exposure on the phaco probe. Tip exposure was measured from the phaco tip to the silicone sleeve, with less tip exposure set at 0.5 mm, and more tip exposure at 1.25 mm. Corneal endothelial cell density (ECD) and CCT were measured preoperatively,

on postoperative days 1 (POD1) and 30 (POD 30). Intraoperative cumulative dissipated energy (CDE) was also recorded. Median [IQR] values were calculated, and intergroup comparisons were performed.

Results: The less tip exposure group had lower CDE (9.31 [7.43 to 14.65]) than the more tip exposure group (12.00 [8.67 to 17.72]); this difference was statistically significant ($p = 0.05$). Cell count and CCT were lowest before surgery, peaked on day 1, improved by day 15 & day 30 in less tip exposure group. Compared to more tip exposure group, the short tip group showed better recovery with lower endothelial cell counts loss (2571 to 2277 cells/mm² vs. 2482 to 2233 cells/mm²) and less corneal oedema, demonstrated by a smaller increase in CCT (535 to 527 μ m vs. 517 to 528 μ m) at day 15, day 30. These differences were statistically significant, and the less tip-exposed group stabilised faster by postoperative day 15.

Conclusions: The less-tip exposure group showed reduced endothelial cell loss & less central corneal thickness post-cataract surgery.

Abstract No.: 203557

Panel No.: CAT-0122

Initial Clinical Outcomes of a Partial Range of Field Monofocal Intraocular Lens Following Cataract Surgery

First Author: Yau KIN

Purpose: The purpose of this study is to assess the preliminary visual outcomes at different distances, and to assess the functional benefits of an enhanced monofocal intraocular lens (IOL) in patients who underwent cataract surgery.

Methods: Retrospective single-surgeon case series of an enhanced monofocal (Aspire, EA, Bausch & Lomb) IOL in patients following cataract surgery. Patients with previous ocular surgery were excluded. All procedures were conducted by a single surgeon and in the same clinic. The clinical outcomes collected were corrected and uncorrected visual acuity at distance (CDVA and UDVA) and intermediate (DCIVA and UIVA), manifest refraction spherical equivalent (MRSE), and safety outcomes at up to 1 month follow-up.

Results: 9 eyes implanted with EA IOLs following cataract surgery were included. Mean $\pm$ SD SEQ target was -0.58 ± 0.60 D. Mean monocular CDVA was 0.08 ± 0.06 logMAR, with 78% of eyes achieving 0.1 logMAR or better. Mean monocular UIVA was 0.25 ± 0.11 logMAR. Mean postoperative MRSE was -0.42 ± 0.74 D. No serious adverse events were reported, and no photic phenomena were noted.

Conclusions: In the cases provided with this enhanced IOL, most patients achieved good visual acuity at distance with functional intermediate visual acuity and no AEs were reported.

Abstract No.: 209888

Panel No.: CAT-0164

Investigation Into the Influence of Secondary Suction Within FLACS on the Postoperative Ocular Surface and Associated Mechanisms

First Author: Bin LIN

Co-Author(s): Dongkan LI

Purpose: To explore secondary suction's impact on postoperative ocular surface, tear factors, and dry eye risk factors in femtosecond laser-assisted cataract surgery (FLACS).

Methods: Age-related cataract patients undergoing FLACS (Dec 2023–May 2024) were included (inclusion: FLACS consent, no prior eye surgery/trauma, pupil dilation >7 mm; exclusion: ≥ 3 suction attempts, lens dislocation, pregnancy, psychiatric issues, poor compliance). Preoperative parameters (corneal diameter, corneal K value) and intraoperative eye movement were recorded. Ocular Surface Disease Index (OSDI), Tear Meniscus Height (TMH), and tear cytokines were assessed preoperatively and at 1 day, 1 week, and 1 month post-surgery.

Results: 41 patients (21 secondary suction, 20 conventional) were analyzed. The secondary suction group had higher 1-week OSDI (6.43 ± 7.96 vs 1.90 ± 5.85 ; $P=0.045$), higher 1-week TMH (0.04 ± 0.09 vs 0.01 ± 0.07 mm; $P=0.020$) and 1-month TMH (0.07 ± 0.17 vs 0.03 ± 0.07 mm; $P=0.023$), and greater tear Interleukin-6 (IL-6) log increases at 1 day (0.44 ± 0.68 vs -0.04 ± 0.78 ; $P=0.042$) and 1 week (0.01 ± 0.64 vs -0.49 ± 0.89 ; $P=0.045$). Risk factors: smaller corneal diameter ($P=0.025$) and obvious eye movement ($P<0.001$).

Conclusions: Secondary suction in FLACS may worsen early-stage postoperative dry eye, but it recovers in 1 month. Key risk factors for secondary suction include smaller corneal diameter and significant ocular movement, which inform targeted prevention strategies to reduce secondary suction incidence.

Abstract No.: 203768

Panel No.: CAT-0125

Inward Haptic Collapse: A Rare and Severe Manifestation of Capsular Contraction Syndrome

First Author: Vinit TANWAR

Purpose: To report a case of unusually rapid and aggressive capsular contraction syndrome (CCS) leading to severe inward deformation of intraocular lens (IOL) haptics in a patient with a history of healed choroiditis, and to highlight the successful management with Nd:YAG laser.

Methods: A case report. A patient with healed choroiditis and a posterior subcapsular cataract underwent uneventful phacoemulsification with an adequate capsulorhexis and in-the-bag IOL

implantation. The patient received a standard postoperative regimen along with oral steroids for one week. The postoperative course was documented with serial slit-lamp photography. Management of the complication involved Nd:YAG laser.

Results: One month after surgery, the patient presented with decreased vision. Examination revealed severe anterior capsular phimosis and posterior capsular opacification. The constrictive force of the fibrotic capsule caused a dramatic inward «crumbling» and deformation of the IOL haptics. An Nd:YAG laser was used to perform both an anterior and posterior capsulotomy. This intervention successfully opened the visual axis and released the compressive forces, resulting in immediate visual improvement.

Conclusions: Eyes with a history of Uveitis are at high risk for an exaggerated postoperative fibrotic response. This can manifest as a rapid and severe CCS capable of physically deforming IOL haptics. This case underscores that standard anti-inflammatory prophylaxis may be insufficient in high-risk patients and demonstrates that timely YAG laser capsulotomy is an effective management strategy.

Abstract No.: 207806

Panel No.: CAT-0161

Loneliness and Social Isolation Are Associated With Increased Risk of Cataract: Evidence From the UK Biobank and Metabolomic Profiling

First Author: Xintian ZHU

Co-Author(s): Li Jia CHEN, Jason C. YAM, Yuzhou ZHANG

Purpose: To examine the associations between loneliness and social isolation with incident cataract risk, and to investigate the potential role of plasma metabolites as underlying biomarkers.

Methods: We included 172,971 participants from the UK Biobank without cataract at baseline. Loneliness and social isolation were assessed using questionnaire data. Incident cataract was identified via hospital records. Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for cataract incidence, adjusting for demographic, socioeconomic, lifestyle, and clinical covariates. LASSO logistic regression was applied to identify plasma metabolites associated with loneliness and isolation. Cox models were used to assess associations between these metabolite signatures and cataract risk. Restricted cubic spline (RCS) models were used to visualize dose-response relationships.

Results: Loneliness (HR: 1.10, 95% CI: 1.06–1.14), isolation (HR: 1.08, 95% CI: 1.04–1.12), and both (HR: 1.17, 95% CI: 1.11–1.22) were significantly associated with higher cataract incidence. LASSO identified 21 metabolites associated with isolation and 5 with loneliness. The metabolite signature for isolation was

independently associated with cataract (HR per SD increase: 1.57, 95% CI: 1.44–1.71). For loneliness, HR per SD increase was 1.60 (95% CI: 1.40–1.83).

Conclusions: Loneliness and social isolation are significant risk factors for incident cataract. Metabolomic profiling reveals biological signatures that may link psychosocial adversity to ocular aging. These findings underscore the importance of social determinants in ophthalmic disease and suggest potential roles for metabolite-based risk stratification.

Abstract No.: 207071

Panel No.: CAT-0153

Long-Term Outcomes of Primary Piggyback IOL Implantation in Nanophthalmic Eyes: A Retrospective Study

First Author: Vijayavarshcini DHANASEKARAN

Co-Author(s): Jebinth BRAYAN, Narayan RAJPAL

Purpose: To evaluate the outcomes of primary piggyback intraocular lens (IOL) implantation in nanophthalmic eyes.

Methods: A retrospective analysis of 18 eyes with nanophthalmos that underwent piggyback IOL implantation between 2019 and 2023 was conducted. All cases underwent phacoemulsification with in-the-bag placement of a single-piece IOL and sulcus placement of a three-piece IOL.

Results: The mean axial length was 17.85 ± 2.17 mm, and the mean follow-up duration was 8.3 months. At final follow-up, the mean best-corrected visual acuity (BCVA) was 0.3 logMAR, with 73% of eyes achieving BCVA better than 6/12. Intraoperative complications included a posterior capsular rent in one eye. Transient postoperative intraocular pressure (IOP) rise was observed in three eyes. No cases of IOL decentration, pigment dispersion, or interlenticular opacification were noted.

Conclusions: Primary piggyback IOL implantation is a safe and effective technique for visual rehabilitation in nanophthalmic eyes, providing good visual outcomes with minimal complications.

Abstract No.: 206082

Panel No.: CAT-0141

Long-Term Visual Performance of the Increased Range of Focus RayOne EMV® Premium IOL in Filipino Eyes

First Author: Maria Isabela DE GUIA

Co-Author(s): Victor Jose CAPARAS, Keshia Lourdes DUYONGCO-LENON

Purpose: To evaluate visual outcomes after bilateral implantation of the Increased Range of Focus RayOne EMV® intraocular lens (Rayner, Worthing, UK).

Methods: Sixteen patients (32 eyes) underwent phacoemulsification with bilateral RayOne EMV® implantation, targeting emmetropia. Post-op visits were at 2-8 days (V1), 30-45 days (V2), and 90-105 days (V3). Monocular/binocular and uncorrected/corrected visual acuity (VA) at 4 m, intermediate VA at 80cm and 63 cm, and near VA at 40 cm were measured. Defocus curve, contrast sensitivity (CS), photic phenomena (Halo and Glare Simulator, ViSU-L GmbH), and quality of vision (McAlinden QOV questionnaire) were also assessed.

Results: At V3, mean spherical refraction was -0.10 (std dev ± 0.31) D. Mean binocular uncorrected distance, intermediate (80cm and 63cm) and near VA were -0.11 (± 0.12), 0.40 (± 0.07), 0.36 (± 0.11), and 0.33 (± 0.11) logMAR; while binocular corrected distance, intermediate (80cm and 63cm), and near VA were -0.14 (± 0.07), 0.41 (± 0.09), 0.39 (± 0.13), and 0.35 (± 0.13). Defocus curve showed corrected distance VA ≤ 0.60 logMAR from +2.0D to -4.0D. Mean halo size/intensity were 10/100 and 9/100; glare size/intensity 11/100 and 12/100. Far (1 m) and near (40 cm) binocular CS were 1.57 (± 0.13) and 1.58 (± 0.13) logCS. Mean QOV was 87.8/100. Light and spectacle independence were high.

Conclusions: Implantation with the increased range of focus RayOne EMV provided an excellent postoperative VA for far, and a very good vision for intermediate and near distance. These features, along with outstanding contrast sensitivity and very low level of haloes and glare phenomena yielded a high degree of patient satisfaction after surgery.

Abstract No.: 203552

Panel No.: CAT-0124

Macular Morphology After Cataract Surgery With and Without Primary Posterior Continuous Curvilinear Capsulorhexis: A Randomized Intraindividual Comparative Clinical Trial

First Author: Wenjie WU

Co-Author(s): Yulong HUANG, Chishan KANG

Purpose: To evaluate changes in macular morphology after cataract surgery with and without primary posterior continuous curvilinear capsulorhexis (PPCCC).

Methods: One hundred and thirty eyes of 65 age-related cataract patients with normal macular morphology and function waiting for bilateral cataract surgery and intraocular lens (IOL) implantation were enrolled. Cataract surgery combined with PPCCC was performed in one eye, and routine cataract surgery in the fellow eye (NPCCC group). Optical coherence tomography (OCT) measurements were performed in all patients preoperatively and postoperatively on 1 day, 1 week, 1 month, and 3 months. Corrected distance visual acuity (CDVA) was also measured at each visit.

Results: One hundred and twenty eyes of 60 patients were able to complete scheduled follow-ups and were analyzed in the study. There was no statistically significant difference between the PPCCC group and NPCCC group in terms of subfoveal central retinal thickness (CRT), central 1-mm subfield (CSF), average retinal thickness of 1-3mm middle and 3-6mm outer rings at all timepoints postoperatively ($P > 0.05$). Three eyes developed cystoid macular edema (CME) 1 month post-surgery. One eye in the PPCCC group recovered in two weeks after topical treatment, while two in the NPCCC group took eight weeks to recover. In the NPCCC group, PVD progressed in two eyes. No PVD progression in the PPCCC group. The CDVA of all patients was logMAR 0.1 or better at 3 months.

Conclusions: Cataract surgery with combined manual PPCCC does not increase the risk of CME and PVD in patients. PPCCC is a safe cataract surgery technique.

Abstract No.: 203131

Panel No.: CAT-0121

Mechanism of a Novel Traditional Chinese Medicine Formula in Treating Senile Cataract Identified by Network Pharmacology and Experimental Validation

First Author: Jing DING

Co-Author(s): Xuemin LI

Purpose: To systematically investigate the active components and mechanism of a novel 8-herb Traditional Chinese Medicine (TCM) formula for senile cataract using network pharmacology and in vitro validation.

Methods: Bioactive components and their targets, as well as senile cataract-related targets, were screened from databases. Common targets were identified using the STRING database to construct a protein-protein interaction (PPI) network. A drug-component-target-disease network was visualized with Cytoscape. Kyoto Encyclopedia of Genes and Genomes (KEGG) and Gene Ontology (GO) pathway enrichment analyses for core targets were performed using Metascape. Molecular docking was used to verify interactions. The formula's effect on human lens epithelial cells (LECs) was assessed with a CCK-8 assay.

Results: Network pharmacology identified 110 bioactive compounds interacting with 1,024 targets, including 178 specific to senile cataract. Pathway analysis indicated a primary role in regulating phosphotransferase activity. Molecular docking confirmed strong binding affinities between the formula's components and key targets, with the lowest binding energy observed between naringenin and protein tyrosine phosphatase (PTP). In vitro, the formula significantly inhibited the proliferation of human LECs.

Conclusions: This study suggests that the novel TCM formula may delay senile cataract progression by modulating phosphotransferase activity. The findings provide a theoretical basis for further development of this formula as a potential cataract treatment.

Abstract No.: 204550

Panel No.: CAT-0131

Outcomes of Combined Vitreoretinal Surgery and Trifocal Intraocular Lens Implantation: A Case Series

First Author: Yuanfei **ZHU**

Co-Author(s): Wenxing **SHI**, Tieying **ZHAO**, Weihong **ZHAO**

Purpose: Multifocal intraocular lenses (IOLs) are typically avoided in eyes with vitreoretinal pathology due to concerns about reduced visual quality. This study aims to evaluate the feasibility and visual outcomes of combining vitreoretinal surgery with implantation of a diffractive trifocal IOL in patients with coexisting cataract.

Methods: This retrospective case series included 5 eyes of 4 patients (age range 34-57 years). Surgical indications included: silicone oil removal with traumatic cataract (1 eye), and epiretinal membrane (ERM) removal (4 eyes). Specific diagnoses were high myopia with macular schisis and lamellar hole (1 eye), secondary ERM after retinal tear and vitreous hemorrhage (1 eye), and idiopathic ERM (2 eyes). All procedures comprised standard vitrectomy (27G for ERM or 23G for silicone oil removal) with femtosecond laser-assisted phacoemulsification and implantation of a trifocal IOL (AT LISA tri 839MP or AcrySof IQ PanOptix) in the capsular bag. Patients were followed for 1 year.

Results: All surgeries were completed successfully without complications. Postoperative visual outcomes were excellent: mean monocular uncorrected distance visual acuity (UDVA) was 0.00 logMAR, mean uncorrected intermediate visual acuity (UIVA) was 0.00 logMAR, and mean uncorrected near visual acuity (UNVA) was 0.04 logMAR. Mean spherical equivalent was -0.38 D. All patients achieved spectacle independence and reported high satisfaction with their visual outcomes.

Conclusions: Combined vitreoretinal surgery and trifocal IOL implantation effectively restores full-range vision and addresses both cataract and macular pathology, ensuring high patient satisfaction and spectacle independence.

Abstract No.: 207357

Panel No.: CAT-0158

Outcomes of Primary Retropupillary Fixated Iris Claw IOLs: A Retrospective Analysis Report of 227 Eyes

First Author: Narayan **RAJPAL**

Co-Author(s): Jebinth **BRAYAN**, Vijayavarshcini **DHANASEKARAN**

Purpose: To evaluate the outcomes of primary retropupillary fixated iris claw intraocular lens (IOL) implantation for the management of aphakia in various clinical scenarios.

Methods: A retrospective analysis of 227 eyes that underwent iris claw IOL implantation between 2016 and 2023 at a tertiary eye care center was conducted. Data collected included demographics, visual outcomes, and postoperative complications.

Results: The study included 124 males and 103 females with a mean age of 60.2 years (range: 45-93 years). The mean follow-up duration was 9.2 months (range: 7-60 months). The mean postoperative best-corrected visual acuity (BCVA) at the final follow-up was 0.52 LogMAR, with 75% of eyes achieving BCVA better than 6/12. The most common complication was cystoid macular edema (CME), occurring in 15% (34 eyes), followed by raised intraocular pressure in 11% (25 eyes). Re-enclavation for disencavation was required in 4% (9 eyes).

Conclusions: Retropupillary fixated iris claw IOL implantation is an effective and safe option for visual rehabilitation in aphakic patients, offering favorable visual outcomes and a manageable complication profile.

Abstract No.: 204680

Panel No.: CAT-0133

Protective Effect of Metformin on Accommodation Amplitude in Type 2 Diabetes

First Author: Ruofan **LI**

Co-Author(s): Xuemin **LI**, Ziyuan **LIU**

Purpose: To determine whether metformin use is associated with better accommodative amplitude (AMP) in patients with type 2 diabetes mellitus (T2DM).

Methods: This cross-sectional study recruited patients with T2DM and age-matched controls (1:1) from Peking University Third Hospital. The T2DM patients were divided into two groups by metformin use. Binocular AMP was measured using the push-up method. A general linear model was applied to evaluate the association between metformin use and AMP with adjustments for age, disease duration, and blood glucose levels.

Results: Of 168 participants, there were 84 patients with T2DM, including 42 metformin users (Met) and

42 non-users (Non-Met). Overall, patients with T2DM had a significantly lower AMP than healthy controls (3.6 D vs 4.6 D, $P < 0.001$). Among the diabetic patients, a general linear model evaluating the combined effect of metformin use, age, disease duration, and blood glucose level on AMP was statistically significant ($R^2 = 0.324$). However, only metformin use ($F = 6.186$, $P = 0.016$) and age ($F = 20.855$, $P < 0.001$) were identified as significant independent predictors within the model. Cumulative metformin exposure (g-year) was not correlated with AMP ($P = 0.647$).

Conclusions: Metformin use is associated with preserved ocular accommodative function in patients with T2DM, suggesting a potential therapeutic strategy for presbyopia.

Abstract No.: 204322

Panel No.: CAT-0130

Radial Iris Depigmentation in a Child With 13q Deletion Syndrome Accompanied by Hematuria

First Author: Ting QIU

Purpose: 13q deletion syndrome is a rare chromosomal disorder in which part of the long (q) arm of chromosome 13 is missing. This syndrome causes great variability in clinical phenotypes and can involve multiple organs. It may cause hypoplasia of pigment-containing tissues in the eyeball.

Methods: An 11-year-old Chinese male child visited the hospital due to intermittent hematuria for 5 years. Imaging of the urinary system revealed no obvious abnormalities. General examination revealed intellectual delay, growth retardation, pectus excavatum, and double orifice mitral valve. Ophthalmic examination revealed that the most prominent feature was bilateral radial depigmentation of the iris, which causes a heterochromatic appearance of the iris. It is also accompanied by mottled depigmentation in the fundus and punctate opacities in the peripheral part of the lens. Chromosome G-banding analysis showed a partial deletion of chromosome 13 (q22-q32). Genetic sequencing revealed a 17.85 Mb deletion in the q21.33-q31.2 region of chromosome 13.

Results: Chromosome G-banding analysis revealed a partial deletion of chromosome 13 (q22-q32), along with a benign polymorphic variation of chromosome 9 (9qh+). Whole Exome Sequencing revealed a 17.85 Mb deletion in the q21.33-q31.2 region of chromosome 13, and this deleted region contains about 10 OMIM genes.

Conclusions: Radial iris depigmentation is extremely rare and highly characteristic. It might be the first report of radial iris depigmentation in a patient with 13q deletion syndrome accompanied by hematuria.

Abstract No.: 207215

Panel No.: CAT-0156

Randomised Controlled Trial to Compare Bromfenac and Difluprednate in Preventing Macular and Choroidal Changes in Cataract Surgery

First Author: Aanvi ALAKSHYA

Co-Author(s): Vishal KATIYAR, Sanjiv KUMAR GUPTA, Arun SHARMA

Purpose: Cataract surgery is known to induce postoperative macular and choroidal changes due to inflammation. This randomized controlled trial compared the efficacy of bromfenac and difluprednate in preventing such changes following uneventful phacoemulsification.

Methods: A total of 120 patients undergoing cataract surgery were randomized into two groups: bromfenac 0.09% (twice daily) and difluprednate 0.05% (QID, tapered). Baseline and postoperative best-corrected visual acuity (BCVA), intraocular pressure (IOP), and macular/choroidal thickness using OCT were recorded at 1 and 4 weeks. Data were analyzed with ANOVA, t-tests, and regression ($p < 0.05$ considered significant).

Results: Bromfenac showed superior control of macular thickening with minimal postoperative changes, while difluprednate was associated with significant IOP elevation at 4 weeks. Both drugs improved BCVA, but bromfenac demonstrated earlier and greater visual recovery. Patient satisfaction was higher in the bromfenac group.

Conclusions: Bromfenac was found to be more effective and safer than difluprednate in preventing postoperative macular and choroidal changes, with comparable visual outcomes and fewer side effects. It may be considered to be the preferred monotherapy in routine, non-diabetic cataract surgery.

Abstract No.: 207439

Panel No.: CAT-0159

Recognising the Triangle Sign – a Case of Reabsorbed Cortex of Morgagnian

First Author: Hong Nien LEE

Purpose: To highlight the importance of recognising the triangle sign and its surgical management.

Methods: Case report.

Results: A 52-year-old man presented with poor vision in his right eye for many years. He had a prior history of blunt trauma. On examination, the vision was hand movement. RAPD was positive. The lens had nuclear sclerosis 3+ and appeared subluxated inferiorly. No phacodonesis nor zonular fibrils seen. On close inspection, a triangle sign was noted superiorly. A 3-piece IOL was ordered with a planned phacoemulsification. Intraoperatively, the bag was able to be hydrodissection and reformed with an

ophthalmic viscoelastic device. CCC was performed with phacoemulsification. A 3-piece IOL was implanted.

Conclusions: A reabsorbed-cortex morgagnian cataract differs greatly from a subluxated crystalline lens. The triangle sign is a clue not to be missed. Surgical approach depends on clinical judgement.

Abstract No.: 206140

Panel No.: CAT-0144

Refractive Outcomes of the Four-Flanged Intrasceral Intraocular Lens Fixation Technique in the Philippine National Specialty Center for Eye Care

First Author: James Michael SUAREZ

Co-Author(s): Robert William KING, John Philip LIM

Purpose: To describe the refractive outcomes of eyes that underwent four-flanged intrasceral IOL fixation in the Philippine National Center for Eye Care

Methods: This was a retrospective single-center chart review of eyes that underwent four-flanged intrasceral IOL fixation using the Canabrava technique. Manifest refraction was measured at least 1 month following suture removal. Refractive prediction error (RPE) and absolute RPE (APE) were evaluated using the Barrett Universal II, Hoffer Q, Kane, SRK/T, and Holladay 1 formulas. Correlation analysis between the APE for each formula and axial length, mean keratometry, anterior chamber depth, and white-to-white was done.

Results: In total, 40 eyes from 40 patients were included in the study. Mean postoperative uncorrected and best correct DVA (LogMAR) were 0.35 ± 0.29 and 0.15 ± 0.19 , respectively. Mean postoperative spherical equivalent was 0.20 ± 1.53 D, with 60% of patients having a hyperopic postoperative refraction. Mean and median APEs for all IOL formulas were statistically significant from zero ($p < 0.005$). Mean RPEs for all formulas were positive and were highest for Hoffer Q (0.38 ± 1.47 D) and lowest for SRK/T formulas (0.19 ± 1.42 D). The percentage of eyes within ± 1.00 D of APE was highest for Kane (70%) and SRK/T formulas (70%), and lowest for the Hoffer Q formula (58%). There was no statistically significant difference in the APEs among the several formulas. Linear regression analysis showed no statistically significant relationship between postoperative mean APE with the biometry parameters tested.

Conclusions: Patients had refractive outcomes more hyperopic than predicted across all formulas. The difference in APEs among formulas was not statistically significant. The lack of significant association between APE and biometry values suggests that the outcomes of four-flanged intrasceral IOL fixation are less influenced by axial length and keratometry than other techniques. This suggests that effective lens position, as determined by the position of the sclerotomies and

point of fixation, may be the most important factor in refractive prediction accuracy.

Abstract No.: 202901

Panel No.: CAT-0116

Retrospective Real-World Evidence Study: Performance of a Full Visual Range, Non-Toric Intraocular Lens in Patients Undergoing Cataract Surgery

First Author: Cathleen MCCABE

Purpose: This multicenter, cross-sectional, retrospective case series aims to document health care providers' (HCPs) real-world experience using the enVista ENVY (EN) intraocular lens (IOL), including satisfaction, IOL utilization patterns, and patient (pt) outcomes. This interim sub-analysis reports pt outcomes.

Methods: This sub-analysis includes case report forms (CRFs) from 13 HCPs from the USA and Canada. HCPs provided on-label EN electronic medical record cases using a standardized CRF to document real-world clinical performance. Outcomes included monocular and binocular vision outcomes (uncorrected distance visual acuity [UDVA], corrected distance visual acuity [CDVA], uncorrected intermediate visual acuity [UIVA], uncorrected near visual acuity [UNVA]), mean refractive spherical equivalent (MRSE), occurrence of glistenings and posterior capsule opacification (PCO), and adverse events (AEs).

Results: This sub-analysis included 94 pts (144 eyes): 44 unilateral. Mean $\pm$ SD spherical equivalent target: 0.05 ± 1.91 (n=135). Monocular outcomes were: CDVA of 20/25 or better was achieved in 98% of eyes (116/118); UDVA of 20/32 or better in 88% of eyes (117/133); UIVA of 20/32 or better in 91% of eyes (53/58); UNVA of J2 or better in 78% of eyes (88/113). Mean $\pm$ SD MRSE was -0.09 ± 0.38 (n=116). No serious AEs or glistening was reported.

Conclusions: This multicentre, cross-sectional, retrospective study provides insights into the real-world vision outcomes and clinical performance of EN. Most patients achieved good distance, intermediate, and near vision. No serious AEs or glistening was reported.

Abstract No.: 202007

Panel No.: CAT-0115

Rotational Asymmetry Combined With Lens Technology and Its Benefits

First Author: Neha DHOLAKIA

Purpose: Multifocal intraocular lenses (IOLs) have transformed cataract surgery and presbyopia correction by improving the range of vision and reducing dependence on spectacles. Among the various designs, asymmetric refractive segmental IOLs have emerged

as a superior option. Their asymmetric design enables more precise focusing at different distances by distributing optical power more effectively.

Methods: By combining an asymmetric refractive segmental optic with advanced IOL design, three longstanding challenges can now be addressed: aligning IOLs with the visual axis, controlling lens tilt and decentration, and ensuring stable anterior-posterior positioning. This approach refines surgical outcomes and minimizes unexpected refractive errors.

Results: When a capsulorhexis is perfectly aligned with the visual axis—optimally achieved using a femtosecond laser—the IOL aligns precisely with the axis of vision. In contrast, IOLs centered within the capsular bag often align with the bag's equator, which may not correspond to the true visual axis.

Conclusions: Clinical studies and patient-reported outcomes confirm the superiority of this new IOL design as a significant advancement in ophthalmology. It provides a more balanced vision profile, enhances patient satisfaction, and reduces postoperative complications.

Abstract No.: 208260

Panel No.: CAT-0162

Sleep, Physical Activity, Sedentary Behavior, and Risk of Cataract: A Cross-Sectional and Prospective Study From UK Biobank

First Author: Yu PENG

Co-Author(s): Li Jia CHEN, Calvin Cp PANG, Jason Cs YAM, Yuzhou ZHANG

Purpose: To examine the independent and combined effects of sleep, physical activity (PA), and sedentary behavior (SB) on cataract risk.

Methods: The cross-sectional analyses included 440,645 participants from the UK Biobank with complete data on sleep, PA, and SB. For the longitudinal analyses, a subset of 426,540 participants without cataract at baseline was included. Logistic regression and Cox proportional hazards models were used to examine the independent and synergistic associations between sleep, PA, SB, and cataract.

Results: In the cross-sectional analyses, 440,645 participants were evaluated, of whom 14,105 (3.2%) had cataract. Significant associations were found between poor sleep (OR, 1.35; 95% CI, 1.23-1.48), low PA (OR, 1.06; 95% CI, 1.01-1.11), and cataract. Longitudinal analyses included 426,540 participants. During a mean follow-up period of 10.8 years, 55,658 incident cataract cases were recorded. Poor sleep (HR, 1.14; 95% CI, 1.08-1.19), low PA (HR, 1.05; 95% CI, 1.02-1.07), and high SB (HR, 1.08; 95% CI, 1.06-1.11) were correlated with increased cataract risk. The combination of poor sleep, low PA, and high SB further elevated the risk, with the highest odds in cross-sectional (OR, 1.73; 95% CI, 1.37-2.15) and prospective

(HR, 1.37; 95% CI, 1.21-1.55) analyses. Replacing 1 h/day of SB time with an equal time spent in total PA and sleep was associated with a 1.7% and 2.7% decreased risk of cataract, respectively.

Conclusions: Poor sleep, low PA, and high SB are independently and jointly associated with an increased risk of cataract. Modifying these behaviors, either individually or in combination, can effectively mitigate the risk of cataract.

Abstract No.: 201841

Panel No.: CAT-0111

Successful Management of Delayed Hyaluronidase Hypersensitivity Post Subtenon Anesthesia: A Rare Case

First Author: Kirandeep KAUR

Co-Author(s): Bharat GURNANI

Purpose: To report a rare case of delayed hypersensitivity reaction to hyaluronidase following subtenon's anesthesia (STA) in a patient undergoing manual small incision cataract surgery (MSICS).

Methods: A 65-year-old female underwent MSICS under subtenon's block in the left eye. On postoperative day 1, she presented with acute proptosis, periorbital edema, conjunctival chemosis, and restriction of extraocular movements. Pupillary reactions were intact, and dilated fundus examination was unremarkable. Clinical history, systemic review, and examination were carefully documented, and differential diagnoses including orbital cellulitis, mucormycosis, and hyaluronidase hypersensitivity (HH) were considered.

Results: The absence of fever, normal pupillary responses, and normal ENT, neurological, and fundus findings reduced the likelihood of orbital cellulitis and mucormycosis. The clinical picture was consistent with a diagnosis of delayed HH following STA. The patient was managed with intravenous dexamethasone (1 cc daily for 3 days) in addition to routine postoperative medications. Clinical signs, including proptosis, edema, and chemosis, resolved completely within a few days, with no residual ocular morbidity. A detailed literature review revealed that delayed HH after STA is extremely rare, with this case likely representing only the second such report.

Conclusions: Delayed hyaluronidase hypersensitivity, although rare, should be considered in the differential diagnosis of acute postoperative orbital swelling following STA. Early recognition and prompt administration of corticosteroids can lead to complete resolution without long-term sequelae. Awareness of this entity is essential for ophthalmic surgeons to avoid misdiagnosis and unnecessary interventions.

Abstract No.: 203964**Panel No.: CAT-0126**

Sutureless Scleral Fixation of Intraocular Lens Implantation Using Yamane's Technique in Timor-Leste: Initial Experience

First Author: Frenky Ramiro DE JESUS

Purpose: To report the first successful case of intraocular lens scleral fixation (SFIOL) implantation using Yamane's technique performed at the eye department of Hospital Nacional Guido Valadares, Timor-Leste.

Methods: Interventional case report in one patient with a dislocated IOL following ocular trauma.

Results: We performed SFIOL using Yamane's technique in a 55-year-old woman with a dislocated IOL in OD. The visual acuity (VA) was FC 1/2 m in OD and 6/9 in OS. Her medical history included cataract surgery performed 4 years earlier. A 5 mm scleral tunnel was created superiorly to remove the previous rigid polymethylmethacrylate (PMMA) three-piece IOL, and anterior vitrectomy was performed. A bimanual approach with 27-gauge needles was used, with the needles inserted at the 3 and 9 o'clock positions, 2 mm posterior to the limbus, and a Kelmsom forcep was used to thread the haptics into the needles. Both haptics were then cauterized and externalized onto the conjunctiva. The best-corrected visual acuity (BCVA) on the first day was 6/19, and the intraocular pressure was 11. The IOL is centered, the haptics well covered. The BCVA in the first week was 6/12. No post-operative complications were found.

Conclusions: Yamane scleral fixation IOL implantation technique can be considered as the treatment of choice for patients without adequate capsular support as a viable, and perhaps preferable option for patients requiring secondary IOL placement in Timor-Leste.

Abstract No.: 206041**Panel No.: CAT-0142**

Targeting Mitochondrial Dysfunction and Impaired Endogenous Melatonin Signaling: A Novel Mechanism for Melatonin's Anti-Fibrotic Action in the Lens

*First Author: Rong HUANG**Co-Author(s): Lei DU, Guojing LU, Hang XIE, Ke XU*

Purpose: While melatonin demonstrates anti-fibrotic effects in the lens, its mechanistic basis remains elusive. Given its known mitochondrial protection and high intramitochondrial concentration, this study investigated whether melatonin's benefits involve rescuing impaired endogenous melatonin synthesis and signaling, as well as counteracting mitochondrial dysfunction during TGF- β 2-induced lens epithelial cell (LEC) EMT.

Methods: Human and rat lens explants were treated with TGF- β 2. Expression of melatonin-synthesizing enzymes (AANAT, HIOMT) and receptors (MT1, MT2) was analyzed by qPCR and Western blot. Mitochondrial integrity and membrane potential ($\Delta\Psi$ m) were assessed via TOM20 immunofluorescence and JC-1 staining, respectively.

Results: Key components of the endogenous melatonin system (AANAT, HIOMT, MT1, MT2) were expressed in normal LECs but were significantly downregulated at both mRNA and protein levels after TGF- β 2 exposure. TGF- β 2 concurrently induced severe mitochondrial damage, evidenced by perinuclear clustering, fragmentation, loss of TOM20, and a reduction in JC-1 aggregate/monomer ratio (indicating $\Delta\Psi$ m loss). Treatment with melatonin effectively restored TOM20 expression, preserved mitochondrial morphology, and reversed the TGF- β 2-induced $\Delta\Psi$ m collapse.

Conclusions: Lens fibrosis is associated with a novel pathomechanism: the failure of the endogenous melatonin system and disruption of mitochondrial homeostasis. Melatonin exerts its anti-fibrotic effect, at least partially, by rectifying both these deficits—restoring endogenous signaling and rescuing mitochondrial function. This work unveils a new therapeutic axis for preventing fibrotic cataract.

Abstract No.: 204931**Panel No.: CAT-0134**

The 3D Genome Structure of a Blcap-Linked Silencer Loop Regulates Apoptosis-Like Differentiation During Lens Fiber Cell Denucleation

*First Author: Shurui KE**Co-Author(s): Zhong LIU, Lixia LUO, Yingfeng ZHENG*

Purpose: Lens fiber cells (LFCs) exhibit apoptosis-like organelle and nuclear clearance during terminal differentiation but avoid full execution of apoptosis. The underlying anti-apoptotic mechanisms remain poorly understood. This study integrates Hi-C, CUT&Tag, and RNA-seq to characterize chromatin dynamics and epigenetic regulatory networks during the transition of lens epithelial cells (LECs) into LFCs. We focus on a distal silencer region (DSR)-mediated chromatin loop near the Blcap gene and its role in repressing apoptosis during nuclear degradation, thereby contributing to lens transparency.

Methods: Hi-C sequencing mapped chromatin architecture in E16.5 mouse LECs and LFCs, focusing on apoptosis-related loci. CUT&Tag profiling for H3K27me3, CTCF, and SMC3, integrated with RNA-seq, identified a novel silencer element and an LFC-specific chromatin loop linking Blcap to the DSR. To assess function, an Adeno-Associated Virus-delivered saCas9 dual-sgRNA system was used to delete loop anchor regions in vivo. We validated the functional impact

through DNA-FISH, Western blotting, flow cytometry, and phenotypic analyses.

Results: Multi-omics analysis revealed extensive chromatin remodeling during LEC-to-LFC differentiation, including A/B compartment switching, silencer reprogramming, and transcriptional changes in differentiation- and apoptosis-related genes. A specific loop tethering Bicap to the DSR was identified in LFCs. Loop disruption abolished their spatial proximity, derepressed Bicap, reduced anti-apoptotic genes Bcl2 and Bcl2l1, increased apoptosis, and caused lens opacification.

Conclusions: The Bicap-DSR chromatin loop plays a key anti-apoptotic role by repressing Bicap in LFCs. Through silencer-associated looping and epigenetic reprogramming, LFCs evade terminal apoptosis during differentiation, preserving nuclear degradation and lens transparency.

Abstract No.: 205272

Panel No.: CAT-0136

The Effect of Incision Site on Surgically Induced Astigmatism in Manual Small Incision Cataract Surgery: A Systematic Review and Meta-Analysis

First Author: Annamalai ODAYAPPAN

Co-Author(s): Gopal ARCHANA, Senthil PRASAD, Ramalakshmi RAMAN, Rd RAVINDRAN, Madhu SHEKHAR

Purpose: To ascertain the relationship between surgically induced astigmatism (SIA) and manual small incision cataract surgeries (MSICS) performed through superior or temporal incision.

Methods: Literature search was conducted across PubMed, Scopus, Embase, and Web of Science. Studies published from January 1990 to January 2025 that reported surgical outcomes of MSICS with either a temporal or superior incision approach and described SIA were included. Two independent reviewers assessed the titles and abstracts for eligibility based on the predefined inclusion criteria. Risk of bias assessment and study quality reporting were performed using NIH quality assessment tools.

Results: The initial search yielded 2,014 articles; after removing duplicates, 831 were screened, 53 underwent full-text review, and 28 were included in the meta-analysis. The pooled mean SIA for the superior incision and temporal incisions were 1.10D (95%CI: 0.94 to 1.26D) and 0.82D (95%CI: 0.68 to 0.96D), respectively. A higher mean SIA was noted with straight incision compared to frown incision for both superior (1.14D vs 1.06D) and temporal approaches (1.02D vs 0.72D). The risk of bias assessment indicated that most studies had a low risk of bias with substantial heterogeneity ($I^2=98.7\%$ for superior incision and 97.05% for

temporal incision studies), and no publication bias (Egger's test, $p=0.122$).

Conclusions: Around 1D of pre-existing astigmatism can be neutralized by placing an incision along the steep axis. In the absence of any pre-operative astigmatism, a frown incision placed on the temporal aspect should be preferred since it produces the least SIA. The influence of sutures on SIA needs to be evaluated further.

Abstract No.: 200694

Panel No.: CAT-0103

Tips and Tricks for a Crystal-Clear Cornea on Day One: Optimizing Outcomes in Phacoemulsification

First Author: Adnan ABDUL MAJEED

Purpose: To share evidence-based surgical tips and intraoperative techniques that contribute to achieving a clear cornea on the first postoperative day after phacoemulsification.

Methods: A descriptive clinical audit was conducted on 1000 consecutive uncomplicated phacoemulsification cases performed by a single surgeon. Key intraoperative parameters were monitored including: phaco energy settings, fluidics, nucleus disassembly technique, incision architecture, use of dispersive vs cohesive viscoelastics, and intraoperative handling of the endothelium. Postoperative clarity was assessed at 24 hours using slit-lamp grading and correlated with intraoperative techniques.

Results: A clear cornea on day one was observed in 88% of cases. Strong correlations were found with the following surgical strategies: • Use of low effective phaco time (EPT) via divide-and-conquer or pre-chop technique • Minimizing fluid turbulence through stable anterior chamber maintenance • Proper construction of triplanar clear corneal incisions to prevent hydration-related edema • Routine use of dispersive viscoelastics (e.g., Viscoat) for endothelial protection • Gentle nucleus manipulation and complete viscoelastic removal Cases with corneal haze were primarily associated with prolonged phaco time and excessive fluid use.

Conclusions: A combination of thoughtful preoperative planning, energy-efficient nucleus removal, careful fluidic management, and endothelial preservation techniques can significantly enhance the likelihood of a clear cornea on the first postoperative day. These pearls are especially beneficial for young surgeons seeking to optimize early visual outcomes and patient satisfaction.

Abstract No.: 203137

Panel No.: CAT-0120

Toric Intraocular Lens Rotational Stability and Tilt After Cataract Surgery With and Without Primary Posterior Continuous Curvilinear Capsulorhexis: A Randomized Comparative Clinical Trial

First Author: Chishan **KANG**Co-Author(s): Yulong **HUANG**, Jianyang **LIM**, Wenjie **WU**, Mengting **YU**

Purpose: To evaluate toric intraocular lens (IOL) rotational stability after cataract surgery with and without primary posterior continuous curvilinear capsulorhexis (PPCCC).

Methods: The prospective randomized controlled trial was conducted at Fuzhou University Affiliated Provincial Hospital in Fujian, China, between September 2024 and December 2024. Thirty-eight eyes of 28 adult patients were included with cataracts undergoing phacoemulsification cataract surgery with toric IOL implantation. Eyes were randomized into two groups: one group received cataract surgery combined with PPCCC (PPCCC group), and the other group received cataract surgery without PPCCC (NPCCC group). Toric IOL axis orientation and residual astigmatism were measured at 1 day, 1 week, 1 month, and 3 months postoperatively using the OPD-Scan III.

Results: No eye exhibited a toric IOL rotation exceeding 10°. There was no statistically significant difference in toric IOL axis misalignment between the PPCCC and NPCCC groups at 1 day, 1 week, 1 month, and 3 months ($1.62^\circ \pm 1.69^\circ$ vs. $1.35^\circ \pm 1.53^\circ$, $2.15^\circ \pm 1.47^\circ$ vs. $1.77^\circ \pm 1.26^\circ$, $2.07^\circ \pm 1.76^\circ$ vs. $2.55^\circ \pm 2.06^\circ$, and $1.80^\circ \pm 1.61^\circ$ vs. $2.44^\circ \pm 1.75^\circ$, respectively, $P > 0.05$). Residual astigmatism was -0.37 ± 0.29 D at 3 months post-surgery. No statistically significant difference in residual astigmatism was found between the two groups at any postoperative time point ($P > 0.05$).

Conclusions: Cataract surgery involving PPCCC demonstrated comparable outcomes with conventional procedures regarding toric IOL rotational stability. PPCCC is a safe and effective option for cataract patients with toric IOL implantation.

Abstract No.: 201057

Panel No.: CAT-0105

Unveiling Modern Cataract Surgery: Comparative Study of Intraoperative Biometry and Its Outcome

First Author: Ritu **SINGH**Co-Author(s): Nishi **SATISH**, Harinder **SINGH SETHI**

Purpose: To compare the Refractive Predictive Error between preoperative A Scan biometry and peroperative aphakic biometry using IOL master 500.

Methods: This prospective interventional study was conducted at a tertiary care centre after obtaining Institutional Ethical Clearance. The study adhered to the tenets of the Declaration of Helsinki. 109 patients, with cataracts of higher grades, wherein the IOL master reading was variable, underwent A scan immersion biometry. Preoperative keratometry values were used along with the new axial length values in the Barrett universal formula II to calculate the final IOL power. All patients were examined on the post-operative days 1, 3, and 7. Visual acuity and slit lamp examination were performed on each visit. Refraction was performed three weeks after the surgery by a single optometrist for all cases.

Results: Paired sample t-tests performed on these variables revealed a significant statistical difference ($p=0.007$) with 95% confidence interval (0.714, 0.113) and a mean difference in axial length of 0.413mm. The IOL powers (in dioptres) with pre-operative versus intra-operative showed a mean of 22.34 ± 2.45 and 22.15 ± 2.68 respectively. Paired statistical samples for refractive predictive outcomes in both preoperative immersion biometry and peroperative aphakic biometry revealed a mean of -1.21 ± 1.68 D, which was significant ($p = 0.0001$). The mean refractive prediction difference (RPE-d) was $1.21 \text{D} \pm 1.67$.

Conclusions: Aphakic intraoperative biometry proved to be a useful tool for IOL power calculation.

Abstract No.: 201695

Panel No.: CAT-0112

Utility of the Three-Dimensional (3D) Heads-Up Visualization System for Phacoemulsification and goniotomy(GT) in Patients With Cataract and Glaucoma

First Author: Ye **XIANGYU**

Purpose: The purpose is to evaluate the clinical outcomes of a three-dimensional (3D) heads-up visualization system in cataract surgery combined with glaucoma procedures.

Methods: A single-center case series study. to evaluate the efficacy of the procedure and the subjective satisfaction of the surgeon. The clinical outcome of the procedure was evaluated by observing IOP control and best corrected visual acuity at 3 months postoperative follow-up. A questionnaire of the surgeon was used to evaluate the comfort of the operation, the quality of the images, the visibility of the structures in the anterior chamber angle, and the cooperation with the surgical procedure on a numerical scale from 0 to 10.

Results: Preoperatively, 8 eyes (16.7%) had a BCVA < 0.1 . At 3-month follow-up, 5 eyes (10.4%) showed a slight decrease in BCVA, 13 eyes (27.1%) showed no change in BCVA, and 30 eyes (62.5%) showed an increase in BCVA compared with the preoperative period. Preoperative IOP decreased from $29.08 \pm$

12.03 mmHg to 16.22 ± 2.58 mmHg at three months postoperatively. The questionnaire showed that surgeons were very satisfied with the simplicity of the procedure. The three-dimensional (3D) heads-up visualization system helped to enhance intraoperative recognition of anterior segment structures.

Conclusions: The three-dimensional (3D) heads-up visualization system applied to phacoemulsification+GT was easy to operate, convenient, and effective in patients with cataract and glaucoma.

Abstract No.: 206088

Panel No.: CAT-0143

Visual Outcomes and Cost-Utility Analyses of Toric Intraocular Lens Implantation in Cataract Patients Over 80 With Corneal Astigmatism: A Retrospective Cohort Study

First Author: Jiaqi SUN

Purpose: This study aimed to assess visual and refractive outcomes and cost utility of toric intraocular lens (IOLs) implantation in cataract patients over 80 with corneal astigmatism.

Methods: Patients ≥ 80 years with corneal astigmatism ≥ 1.50 diopters (D) who underwent cataract surgery with toric or monofocal IOLs were enrolled. Uncorrected distance visual acuity (UDVA) and residual refractive astigmatism at the 3-month postoperative follow-up were compared between the toric and non-toric groups. Cost data were gathered, long-term quality-adjusted life years (QALYs) were calculated, and the incremental cost-effectiveness ratio (ICER) was determined.

Results: The study included 50 eyes from 50 patients, with 25 eyes receiving toric IOLs and the remaining 25 receiving non-toric IOLs. Three months after surgery, both the mean UDVA ($P < 0.0001$) and the mean residual refractive astigmatism ($P < 0.0001$) in the toric group significantly outperformed those in the non-toric group. An average of 4.04 ± 0.25 QALYs were obtained in the toric group through cataract surgery, while 3.78 ± 0.26 QALYs were obtained in the non-toric group. The median ICER stood at 11,222 CNY (1,753 USD) per QALY [95% CI: 5,840 ~ 25,295 CNY (913 ~ 3,952 USD) per QALY], which is lower than the threshold of cost-effectiveness in China (80,976 CNY (12,653 USD) per QALY).

Conclusions: In cataract patients aged over 80 with corneal astigmatism and no complicating vision-threatening conditions, toric IOL implantation not only improved UDVA and reduced residual astigmatism but also emerged as a cost-effective intervention compared with non-toric IOL implantation.

Abstract No.: 206906

Panel No.: CAT-0151

Visual Outcomes of Aurovue vs Alcon AcrySof IQ Toric IOLs: A Retrospective Single-Surgeon Study

First Author: Narayan RAJPAL

Co-Author(s): Jebinth BRAYAN, Vijayavarshcini DHANASEKARAN

Purpose: To compare the visual outcomes and performance of Alcon AcrySof IQ Toric and Aurovue Toric intraocular lenses (IOLs) implanted during phacoemulsification, and to assess the viability of the cost-effective, indigenous Aurovue Toric IOL.

Methods: This retrospective study included 136 eyes operated on by a single surgeon between 2023 and 2024. Of these, 61 eyes received Alcon AcrySof IQ Toric IOLs, while 75 received Aurovue Toric IOLs. Patients were evaluated at 1 year for best-corrected visual acuity (BCVA), uncorrected visual acuity (UCVA), residual astigmatism, rotational stability, and subjective visual quality.

Results: At 1 year, both groups achieved comparable visual outcomes. Mean postoperative BCVA was 0.04 ± 0.07 logMAR for the Alcon group and 0.05 ± 0.08 for the Aurovue group. Residual astigmatism and UCVA were similar across both groups. Alcon IOLs showed better rotational stability, though the difference was not statistically significant ($P < 0.05$). Patients implanted with Aurovue IOLs reported better subjective contrast and color perception, likely due to its untinted optic.

Conclusions: Aurovue Toric IOLs delivered visual and refractive outcomes comparable to Alcon AcrySof IQ Toric lenses. Though Alcon showed slightly better rotational stability, Aurovue offered improved subjective visual quality. As a cost-effective, indigenous alternative, Aurovue Toric IOLs are well-suited for high-volume and resource-limited settings.

Abstract No.: 206811

Panel No.: CAT-0149

Visual Performance Comparison of Enhanced Monofocal and Non-Diffractive Extended Depth-of-Focus Intraocular Lenses in Cataract Surgery: A Systematic Review and Meta-Analysis

First Author: Ametysa MIRANDA

Co-Author(s): Angelina Patricia CHANDRA, Siti Rayhani FADHILA, Rio RHENDY, Angelina Riadi Alim SUPRAPTO

Purpose: To compare the visual performance and patient-reported outcomes of enhanced monofocal and non-diffractive extended depth-of-focus (EDOF) intraocular lenses (IOLs) in patients undergoing cataract surgery.

Methods: A systematic search of PubMed, ScienceDirect, Cochrane Library, ProQuest, Wiley, and

Scopus was conducted. Eligible studies were RCTs or observational studies published between 2015 and 2025, including adults undergoing cataract surgery with enhanced monofocal or non-diffractive EDOF IOLs, reporting ≥ 1 visual outcome at 3–6 months. Risk of bias was assessed (RoB 2.0, NIH tools), and random-effects meta-analysis was conducted in RevMan 5.4.

Results: From 3,598 records, 4 studies (376 eyes; 2 RCTs, 1 cohort, 1 case-control) were included. EDOF IOLs provided significantly better near vision, with superior UNVA (MD = 0.14, 95% CI: 0.05–0.23, $p = 0.003$) and DCNVA (MD = 0.14, 95% CI: 0.05–0.24, $p = 0.004$). Mean UNVA and DCNVA were 0.27 and 0.34 LogMAR with EDOF IOLs, versus 0.40 and 0.47 LogMAR with enhanced monofocal IOLs. No significant differences were observed in distance and intermediate vision. Photoc phenomena, including halo and glare, were less frequent with enhanced monofocal IOLs, though not statistically significant. Patient satisfaction was comparable, while spectacle independence was higher with EDOF IOLs (OR = 5.19, 95% CI: 2.01–13.39, $p = 0.0007$).

Conclusions: Enhanced monofocal and non-diffractive EDOF IOLs yielded comparable outcomes, with EDOF providing superior near vision and spectacle independence. Enhanced monofocal IOLs, however, may serve as a more affordable alternative. Standardized, multicenter trials are needed to confirm these findings.

Abstract No.: 200456

Panel No.: CAT-0102

Visual and Patient-Reported Outcomes After Hybrid Implantation of Trifocal and EDOF Intraocular Lenses in Cataract Surgery Patients

*First Author: Vong Virak **OU***

*Co-Author(s): Piseth **KONG**, Amarin **MAR**, Thorn **POK**, Vanlyda **YIN***

Purpose: To evaluate the visual performance, refractive outcomes, and patient satisfaction following hybrid bilateral implantation of premium intraocular lenses (IOLs), using a trifocal IOL in one eye and an extended depth-of-focus (EDOF) IOL in the fellow eye. This study aims to assess whether such a combination provides satisfactory spectacle independence and visual quality across different distances.

Methods: This prospective study included 138 patients who underwent bilateral cataract surgery between January and December 2024, receiving a trifocal IOL in the dominant eye and an EDOF IOL in the non-dominant eye. Postoperative evaluations were conducted at 1 and 3 months and included uncorrected distance visual acuity (UDVA), intermediate visual acuity (UIVA), near visual acuity (UNVA), and a standardized questionnaire measuring patient satisfaction, visual disturbances, and spectacle dependence.

Results: At 3 months, patients achieved excellent binocular UDVA (mean logMAR: 0.08 ± 0.05), functional intermediate and near vision, and high overall satisfaction. Spectacle independence was reported in 87% of participants, with minimal complaints of glare or halos. The hybrid approach offered a smooth visual transition across distances and reduced photic phenomena compared to bilateral trifocal implantation.

Conclusions: Hybrid implantation of trifocal and EDOF IOLs is a safe and effective strategy that yields excellent functional vision at all distances while minimizing visual disturbances. This method may be considered a viable option for patients seeking a balance between visual quality and spectacle independence.

Abstract No.: 207394

Panel No.: CAT-0160

Visual and Refractive Outcome After As – Oct-Guided Optimization of Ocular Surface in Cataract Surgery

First Author: Sangeetha T

*Co-Author(s): Inchara N, Harshitha **REDDY**, Rohith **REDDY***

Purpose: To determine the impact of anterior segment optical coherence tomography (AS-OCT) on detection and preoperative optimization of ocular surface abnormalities and its effect on refractive predictability and visual outcomes in cataract surgery.

Methods: This prospective study included 150 eyes undergoing cataract surgery. All patients underwent baseline clinical ocular surface evaluation (tear breakup time, Schirmer's test, corneal staining) and high-resolution AS-OCT imaging (tear meniscus height, epithelial thickness mapping, corneal surface regularity). Based on AS-OCT findings, targeted optimization (lubrication, lid hygiene, punctal plugs, thermal pulsation, epithelial remodeling) was performed. Biometry and keratometry were repeated post-optimization. Outcomes measured: change in keratometric variability, repeatability of IOL power, refractive prediction error, and uncorrected distance visual acuity (UDVA) at 1 month.

Results: AS-OCT revealed occult ocular surface disease in 46% of eyes not clinically apparent. After optimization, mean keratometric variability reduced ($0.58 \text{ D} \rightarrow 0.19 \text{ D}$; $p < 0.001$) and IOL power repeatability improved ($\pm 0.21 \text{ D} \rightarrow \pm 0.08 \text{ D}$). Mean absolute prediction error decreased ($0.39 \pm 0.27 \text{ D} \rightarrow 0.15 \pm 0.11 \text{ D}$), and 89% achieved UDVA $\geq 6/9$ versus 63% pre-optimization ($p < 0.001$). Epithelial thickness asymmetry strongly correlated with keratometric instability ($r = 0.71$, $p < 0.001$).

Conclusions: AS-OCT enables objective, non-invasive detection of subclinical ocular surface disease, guiding personalized optimization and significantly improving refractive accuracy and visual outcomes. Routine AS-

OCT integration should be considered a new standard in pre-cataract evaluation, particularly in premium IOL planning.

Cornea, Dry Eyes, External Eye Diseases and Eye Banking

Abstract No.: 203458
Panel No.: CDE-0228

100 Eyes, 1 Solution: Clinical Outcomes of Corneal Allogenic Intrastromal Ring Segments in Keratoconus

First Author: Shivohn Annalie DA SILVA
Co-Author(s): Jagdeesh Kumar REDDY, Vandhana SUNDARAM K, Prabhu VIJAYARAGHAVAN

Purpose: To evaluate the efficacy and safety of Corneal Allogenic Intrastromal Ring Segment (CAIRS) implantation in keratoconus, focusing on visual, refractive, and topographic outcomes in a large consecutive series.

Methods: In this prospective interventional study at a tertiary eye hospital (February 2024–September 2025), 100 eyes of keratoconus patients underwent femtosecond laser–assisted implantation of donor corneal intrastromal ring segments customised to cone morphology with or without crosslinking. Primary outcomes were changes in uncorrected distance visual acuity (UDVA) and corrected distance visual acuity (CDVA, Snellens), proportion gaining ≥ 2 lines UDVA or ≥ 1 line CDVA, changes in spherical equivalent (SE), and maximum keratometry (Kmax). Secondary outcomes included higher-order aberrations (HOAs) and complication rates. Patients were followed up at 1, 6 and 12 months.

Results: At 12 months, UDVA improved by a mean of 3.9 lines (95% CI, 3.5–4.3) and CDVA by 2.1 lines (95% CI, 1.8–2.4). SE shifted by +2.6 D toward emmetropia. Kmax and Kmean flattened by 4.5 D (95% CI, 4.1–4.9) and 4.7 D (95% CI, 4.4–5.0), respectively. Immune infiltrates occurred in 20 eyes at 1 week but resolved with topical steroids. One patient required segment adjustment, and one developed cross-linking–related haze that persisted but was non–vision-threatening. No cases of infection, extrusion, or corneal melt were observed.

Conclusions: Corneal allogenic intrastromal ring implantation yielded consistent improvements in visual acuity and corneal regularity with minimal complications. CAIRS represents a safe, reproducible, and minimally invasive alternative to synthetic rings in keratoconus, with better outcomes in treatment-naïve than post-cross-linking corneas.

Abstract No.: 201985
Panel No.: CDE-0205

3D Mesenchymal Stem Cell Exosome-Functionalized Hydrogels for Corneal Wound Healing

First Author: Yuehe XU

Purpose: Construction of a 3D exosome (Exos) functionalized gelatin methacrylate (GelMA) hydrogel sustained-release system for multi-dimensional repair of corneal injury.

Methods: 3D-Exos were prepared by culturing mesenchymal stem cells in a GelMA hydrogel 3D system. The Exos were characterized using scanning electron microscopy, dynamic light scattering, nanoparticle tracking analysis, and Western blot. The behavioral effects of 3D-Exos on corneal epithelial cells and stromal cells were assessed through Exos uptake assays, scratch wound healing assays, PCR, and immunofluorescence staining. The anti-inflammatory effects of 3D-Exos in vitro were evaluated using immunofluorescence staining and flow cytometry. The fabricated 3D-Exos functionalized GelMA hydrogel sustained-release system was applied to repair a rabbit corneal stromal injury model (3 mm in diameter) with partial limbal stem cell deficiency. Its in vivo biocompatibility and functionality were examined using slit-lamp microscopy, optical coherence tomography, confocal microscopy, immunofluorescence staining, PCR, and hematoxylin-eosin staining.

Results: Compared to traditional 2D-Exos, 3D-Exos not only exhibit increased yield but also demonstrate superior anti-inflammatory, pro-proliferative, and tissue remodeling properties. The 3D-Exos functionalized GelMA hydrogel effectively restores corneal morphology and function, mitigates inflammation, promotes the repair of corneal epithelium and limbus, and reduces stromal scar formation.

Conclusions: The 3D-Exos functionalized GelMA hydrogel sustained-release system developed in this study represents an effective cell-free therapy strategy for comprehensive repair of damaged corneas.

Abstract No.: 210372
Panel No.: CDE-0310

A Case of Conjunctival Malignant Melanoma With BRAF T599dup Mutation

First Author: Ryan LEE
Co-Author(s): Ka Wai KAM, Alvin Lerrmann YOUNG

Purpose: Conjunctival melanoma is a rare yet highly lethal ocular malignancy. It can clinically resemble conjunctival nevus or primary acquired melanosis.

Methods: This case report of conjunctival malignant melanoma highlights the challenges in managing this condition.

Results: A 60-year-old male presented with right temporal ocular surface mass since late 2022. Examination revealed a large melanotic mass measuring 18 x 15 mm on the right temporal conjunctiva, obscuring the temporal cornea. The patient underwent excisional biopsy with 100% alcohol application and double freeze-thaw cryotherapy performed on the conjunctival edge. Histopathological report confirmed conjunctival malignant melanoma with maximal thickness of 4.1 mm and involvement of deep margins. Genetic analysis revealed a positive BRAF mutation at NP_004324.2:p.T599dup. Post-operative MRI showed linear enhancement at surgical site, with no evidence of residual disease. PET-CT and ultrasound of the liver showed no distant metastasis. The patient completed four cycles of adjuvant topical mitomycin C 0.04% within 3 months after the surgery. In view of positive margin, adjuvant radiotherapy was suggested by oncologist and patient attended Beijing Tongren hospital for assessment, however adjuvant therapy was not recommended as no visible tumor was detected.

Conclusions: This case demonstrates the challenges in the management of conjunctival melanoma and highlights the importance of careful follow-up to monitor for potential recurrence or metastasis. A multidisciplinary approach is crucial for effective management.

Abstract No.: 201958

Panel No.: CDE-0203

A Case of *Trichomonascus ciferrii* Keratitis in an Immunocompetent Adult

First Author: George Michael SOSUAN

Co-Author(s): Pierre Aldwin ARCEO, Ruben LIM BON SIONG, Richard Raymund NEPOMUCENO, Patricia Kaye SY

Purpose: Fungal keratitis is a serious ocular infection that can result in permanent vision loss if not promptly diagnosed and treated. It is commonly caused by filamentous fungi following trauma in tropical countries and *Candida* species among the immunocompromised in temperate countries. *Trichomonascus ciferrii* is a rare etiologic agent of fungal keratitis following trauma in a young, healthy woman living in a tropical country.

Methods: Case report and review of related literature.

Results: A 20-year-old healthy woman developed keratitis nearly two weeks after an ocular trauma with an organic material, a cardboard paper, on her left eye. Ocular examination revealed a mid-stromal corneal infiltrate with brush-like borders and hypopyon. The Giemsa stain of the corneal scraping demonstrated branching septated hyphae, and fungal culture grew *T. ciferrii* resistant to amphotericin B. She was successfully treated with topical natamycin 5% drops for 2 weeks, leading to complete eradication of the corneal infection with a residual stromal scar.

Conclusions: This case documented *T. ciferrii*, a rare fungal etiology in post-traumatic keratitis in a tropical country, successfully treated with natamycin 5%. Despite the virulence of *T. ciferrii*, the infection was promptly treated, resulting in good functional vision.

Abstract No.: 206207

Panel No.: CDE-0279

A Case of a Missing Eyeball: Sequelae of Congenital Glaucoma Surgery

First Author: Tsabita ANNISA

Co-Author(s): Hisar DANIEL, Rina La Distia NORA, Fitri ROKIM, Erica WIDODO

Purpose: Corneal ulcers in eyes with absolute glaucoma can result in severe complications, including corneal perforation, infection, and eventual structural loss of the globe. We report a rare presentation of complete globe destruction in a patient with a history of absolute glaucoma and corneal ulceration.

Methods: Observational case report.

Results: A 46-year-old woman with a history of congenital glaucoma surgery in the left eye (LE) during childhood presented with pain, redness, and persistent mucopurulent discharge. Examination revealed absolute glaucoma, advanced scleromalacia, and corneal thinning in the right eye (RE), which served as her only functional eye. Ocular ultrasonography confirmed total globe loss of the LE, with absent scleral wall. Microbiological analysis revealed gram-positive cocci, and topical antibiotics were commenced. Due to the fragile residual tissue and risk of infection, surgical exploration was performed using a technically demanding evisceration combined with dermis-fat grafting to restore orbital volume. Histopathology revealed fibrotic tissue with acute inflammation and abscess formation. The patient's right eye, her only functional eye, was placed under close surveillance.

Conclusions: This case demonstrates not only the rare progression of absolute glaucoma to complete globe destruction, but also the surgical challenges of managing such sequelae. Complex reconstructive procedures, such as dermis-fat grafting in the absence of scleral support, may be required to preserve cosmesis and socket integrity. Early recognition of corneal complications and rigorous fellow-eye monitoring remain crucial to prevent irreversible blindness and maintain quality of life.

Abstract No.: 205230

Panel No.: CDE-0265

A Cost-Calculator Analysis of Diquafosol (DQS/DQS-S) Compared With Standard of Care in Dry Eye Disease

First Author: David CHAMPION

Co-Author(s): Jieyi LI, Yi Shi, Qi Qing NG, Jureeporn RATTAMANEE, Kun SHI-VAN WIELINK

Purpose: Dry eye disease (DED) is a chronic, multifactorial condition associated with substantial symptom burden and healthcare utilization. While standard of care is widely used, newer agents such as diquafosol ophthalmic solution and its preservative-free formulation (DQS/DQS-S) may offer additional benefits. This study quantifies the total costs and potential savings of DQS/DQS-S versus current treatments for DED in the Asia Pacific.

Methods: A cost-calculator model was developed for six countries (Thailand, Philippines, Indonesia, Malaysia, Vietnam, and Taiwan) to compare DQS/DQS-S with the most frequently used artificial tear or ointment/gel in each country. Analyses were conducted from a patient perspective. Annual costs included direct medical, indirect, and intangible components. Incremental costs between DQS/DQS-S and the respective comparators were calculated as total cost differences.

Results: DQS/DQS-S demonstrated per-patient cost differences compared with the standard of care in each country. For DQS-S, incremental costs were negative, indicating cost savings: -IDR 5.17 million in Indonesia (vs. Cenfresh), -MYR 2,604 in Malaysia (vs. Systane), -PHP 23,086 in the Philippines (vs. Systane), and -THB 7,965 in Thailand (vs. Systane). For DQS, the incremental cost was -TWD 18,191 in Taiwan (vs. Systane), reflecting country-specific cost-savings.

Conclusions: DQS/DQS-S demonstrated per-patient cost-savings in the majority of comparisons with the most frequently used alternative treatments across countries. These findings highlight the economic value of DQS/DQS-S, offering potential savings for patients and healthcare systems across diverse healthcare settings.

Abstract No.: 206164

Panel No.: CDE-0275

A Novel Drug Delivery Device – 3D-Printed Modified Morgen Lens for the Treatment of Fungal Keratitis

First Author: Jiannan LIU

Co-Author(s): Jianzhang YE

Purpose: To evaluate the efficacy and safety of a novel drug delivery device in the treatment of fungal keratitis.

Methods: The conventional Morgen lens, which has a single corneal drug delivery port, was modified

to incorporate a 360-degree corneal drug delivery channel. The ocular surface contact base was redesigned with a reduced diameter suitable for the palpebral fissure size of Chinese patients, and three different vault heights were created according to corneal curvature, using 3D printing technology. This device can be directly connected to an infusion set for alternating administration of two drugs, with controllable drop rate. Twenty-seven patients were randomized to a device group (13 eyes) or topical group (14 eyes). The device delivered alternating 1% voriconazole/2.5% amphotericin B for 4 h daily, up to two 3-day cycles, plus standard care between infusions. The topical group received alternating drops every 15 min; tropicamide was added for anterior-chamber inflammation. Daily assessments guided discharge or surgery. Primary outcome: 3-month cure rate; secondary outcomes: day-6 efficacy, infiltrate area, central corneal thickness, epithelial defect area, and symptom/sign scores after irrigation.

Results: Baseline characteristics were similar. At 3 months, the device group showed higher cure rate (71.4% vs 31.5%, $P = 0.045$) and faster reduction in infiltrate area, epithelial defect, infiltration depth, and hyphal density versus the topical group.

Conclusions: The novel ocular surface drug delivery device is an effective, safe, convenient, and non-invasive method for treating fungal keratitis, and it accelerates corneal lesion recovery.

Abstract No.: 200280

Panel No.: CDE-0169

A Single-Cell RNA Sequencing Atlas Revealed Immune Activation and Functional Keratinocyte Loss in the Conjunctiva of Sjögren's Syndrome-Related Dry Eye

First Author: Bowen WANG

Purpose: The role of conjunctiva in the pathophysiology of Sjögren's syndrome (SS) related dry eye disease (DED) remains obscure, especially in view of functional conjunctival epithelia. In order to illustrate the effects of the conjunctiva in SS, we investigate interactions between parenchymal cells and immune cells in the conjunctiva with the single-cell RNA sequencing technique.

Methods: Freshly collected conjunctiva from a canonical SS model was prepared for 10xGenomics single-cell RNA sequencing and TCR sequencing. Conjunctiva was collected for Western blot, immunofluorescence, multiplex immunohistochemical (mIHC), and flow cytometry. Phenol red thread test, lissamine staining, and qRT-PCR were applied to evaluate signs of DED.

Results: The DED phenotype was validated in the SS model. Loss of water-secreting keratinocyte was projected in scRNA-seq data and proved by mIHC test

in SS mice. The proportion of Lgr4+ basal epithelial cells with poor ability to differentiate into mature keratinocytes increased, and Wnt/ β -catenin signaling was upregulated in them under the regulation of TGF- β derived from macrophages. Such macrophages promoted angiogenesis through the secretion of VEGFA to activate endothelial cells. Immuno-fibroblasts had an increased population, which was implicated in specifically activated T cell chemotaxis.

Conclusions: In the SS conjunctiva, a TGF- β -Wnt/ β -catenin axis downregulated the formation of functional keratinocytes, accompanied by infiltration of pro-angiogenic and pro-fibrotic macrophages and pro-inflammatory T cells.

Abstract No.: 201965

Panel No.: CDE-0202

A Systematic Review and Meta-Analysis of the Long-Term Outcomes of Toric Intraocular Lens on Astigmatism

First Author: Chi-ying christine LAM

Co-Author(s): Ka Wai KAM, Alvin TSANG, Alvin YOUNG

Purpose: Toric intraocular lenses (IOLs) are widely used to correct corneal astigmatism during cataract surgery; however, most studies reported early post-operative outcomes. This study aimed to assess the effectiveness of toric IOL on reducing refractive astigmatism at one year or beyond, as well as long-term rotational stability, and reoperation rates.

Methods: We conducted a systematic review with a meta-analysis on the long-term outcomes following toric IOL implantation. We searched Ovid Embase and PubMed using the terms '(toric IOL)' OR '(toric intraocular lens)' AND '(long term)' OR '(outcome)' up to 11 April 2025. Studies reporting outcomes of at least 1 year after implantation were included. Residual refractive astigmatism, rotational stability, and reoperation rates were outcomes of interest.

Results: Twenty studies with 1221 participants were identified, and 1584 eyes with a mean pre-operative refractive astigmatism of -2.14 ± 1.05 D were analysed. The mean follow-up period was 21 ± 22.5 (range 12-96) months. The mean residual cylinder were -0.68 ± 0.38 D at one year and -0.64 ± 0.02 D at two years respectively. The mean rotation was 3.39 ± 1.20 degrees at one year. All IOL rotations reported were within 10 degrees except for one eye which rotated by 40 degrees and required surgical repositioning.

Conclusions: Toric IOL implantation maintains good astigmatism reduction for up to two years. The majority of toric IOLs exhibited excellent rotational stability and did not require surgical reoperation.

Abstract No.: 202714

Panel No.: CDE-0217

A Transcriptome Atlas of the Spleen Identifies B Lymphocytes As Critical Effectors Against Ocular HSV-1 Infection

First Author: Dingwen CAO

Co-Author(s): Jiayu MENG, Yu SUN, Chao WEI

Purpose: Herpes simplex virus-1 (HSV-1) is a major pathogen causing viral keratitis. The spleen plays a vital role in modulating both local and systemic innate and adaptive immunity. However, its connection to ocular HSV-1 infection remains unclear. This study seeks to underscore the functional relevance between ocular regional immunity and the spleen, supporting the spleen as a potential target for treating ocular HSV-1 infection.

Methods: Using a well-established murine herpes simplex keratitis (HSK) model, histopathology and transcriptional profiling of spleens post-infection were assessed via hematoxylin-eosin staining and RNA sequencing (RNA-seq). Splenectomy, EdU incorporation assays, pharmacological interventions, and other analyses were conducted to explore the relationship between the spleen and ocular infection and to evaluate the role of B cells in ocular HSV-1 infection.

Results: Compared to uninfected mice, HSV-1-infected mice exhibited splenomegaly, characterized by an increased splenic index and enlarged white pulp. Splenectomized mice showed more severe HSK symptoms than sham-operated controls. RNA-seq and EdU incorporation experiments revealed that the enlarged spleens had increased enrichment of proliferation-associated signaling pathways and greater accumulation of T and B lymphocytes. Blocking splenic proliferation with PCNA-I1 exacerbated HSK progression and significantly reduced T and B lymphocyte percentages in both spleens and corneal tissues. Notably, topical depletion of B cells in infected mice alleviated clinical symptoms but increased viral titers.

Conclusions: These findings demonstrate a functional connection between the spleen and ocular infection, highlighting the spleen-eye axis in controlling ocular HSV-1 infection. This suggests that targeting the spleen may be a potential therapeutic strategy for treating ocular HSV-1 infections.

Abstract No.: 201141
Panel No.: CDE-0183

ACE Inhibitors or ARBs Reduce Myofibroblast Activation in an Ex Vivo Porcine Model of Corneal Fibrosis

First Author: Yue CHANG

Co-Author(s): Jennifer CRAIG, Sanjay MARASINI, Jay MEYER, Jie ZHANG

Purpose: Corneal injuries frequently result in fibrosis, yet effective pharmacological interventions remain limited. Given the emerging role of the renin-angiotensin system (RAS) in fibrotic processes, this study aimed to evaluate the anti-fibrotic potential of angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin II receptor blockers (ARBs) in an ex vivo corneal scarring model.

Methods: An ex vivo porcine corneal injury model was established by applying 1 M NaOH for 30 seconds to induce stromal fibrosis. After injury, corneas were treated daily with topical ACEI pro-drugs and active forms (0.1% Enalapril, Enalaprilat, Perindopril, Perindoprilat, Ramipril, Ramiprilat) and ARBs (0.1% Losartan, Olmesartan, Valsartan) for 7 days. Untreated injured corneas and uninjured corneas served as controls. Corneal opacity was quantified from images using ImageJ. Tissues were fixed, cryosectioned, and subjected to immunofluorescence for α -smooth muscle actin (α -SMA) and vimentin, markers of myofibroblasts.

Results: Topical application of active ACEIs or ARBs resulted in a visible reduction in corneal opacity by day 7. Prodrug formulations showed a similar trend, though to a lesser extent and without statistically significant differences. Preliminary data also suggest reduced α -SMA and vimentin expression in some of the treatment groups, indicating potential suppression of myofibroblast differentiation.

Conclusions: Topical application of ACEIs or ARBs may attenuate corneal fibrosis by modulating keratocyte and fibroblast activation, thereby limiting myofibroblast differentiation and excessive extracellular matrix deposition. These findings highlight the therapeutic potential of repurposing ACEIs and ARBs for managing corneal scarring and strongly warrant further validation in relevant in vivo models.

Abstract No.: 205921
Panel No.: CDE-0270

Accelerometer-Derived "Weekend Warrior" and Regularly Active Physical Activity and Risk of Dry Eye Disease

First Author: Aixia JIN

Co-Author(s): Ning FAN, Rong ZHANG

Purpose: To explore the associations between accelerometer-derived moderate-to-vigorous physical activity (MVPA) patterns and the risk of dry eye disease (DED).

Methods: Methods: Retrospective analysis of UK Biobank cohort study participants who provided a full week of accelerometer-derived MVPA data between June 8, 2013, and December 30, 2015. Three MVPA patterns were compared: inactive (< 150 minutes), active weekend warrior (active WW, $\geq$ 150 minutes with 50% of weekly MVPA accumulated within 1 - 2 days), active regular ($\geq$ 150 minutes and not meeting active WW status). Association between MVPA patterns and DED's risk was assessed using multifactorial Cox models and restricted cubic spline models.

Results: Results: A total of 93,895 participants (mean [SD] age, 56.05 [7.85] years; 44.38% women) without DED at baseline were included. In multivariable-adjusted models, higher weekly MVPA was significantly associated with a lower risk of incident dry eye ($P = 0.0002$). The association was non-linear ($P = 0.0001$), with the steepest decline in risk observed between 0 and approximately 150 min/week, beyond which the risk plateaued. Active WW was associated with a similarly lower risk of DED as the active regular pattern (WW: hazard ratio [HR], 0.82 [95% CI, 0.70-0.96]; active regular: 0.77 [95% CI, 0.63-0.93; inactive: HR, 1.00 [the reference group]). Importantly, this trend persisted across multiple definitions of WW pattern in the sensitivity analyses.

Conclusions: Active MVPA was associated with lower risk of DED. Notably, the WW and regular exercise patterns conferred similar protective effects against DED.

Abstract No.: 206191
Panel No.: CDE-0278

Acupuncture Versus Sham Acupuncture for Dry Eye Disease: A Systematic Review and Meta-Analysis

First Author: Elva Lau Yung WONG

Co-Author(s): Nicole Ka Ying CHENG, Kelvin Kam Lung CHONG, Zhichao HU

Purpose: This study aims to evaluate the efficacy of Acupuncture (AC) used as a dry eye disease (DED) intervention by comparing AC and sham acupuncture (SA) groups.

Methods: A systematic search was conducted from 1 January 2005 to 21 July 2025 by importing data from Embase, PubMed, and Web of Science. Back-to-back data screening and extraction were applied by 2 researchers to intervene in patients with DED who were analysed. Ocular surface disease index (OSDI), tear break-up time (TBUT), and ocular surface grading (OSG) were the main outcomes. (PROSPERO ID: CRD420251148655)

Results: Four masked, randomized controlled trials met the inclusion criteria and 207 DED patients were involved. The analysis results of OSDI [Standard mean difference (SMD)=-0.18, 95% confidence interval (CI)

(-0.48, 0.11), $P=0.22$] and OSG [SMD=-0.12, 95% CI (-0.45, 0.22), $P=0.49$] showed that AC has a slightly better effect than SA, although the difference was not statistically significant. TBUT [SMD=0.13, 95% CI (-0.21, 0.46), $P=0.45$], in contrast, displayed improvement in the SA group with no statistically significant difference. No statistically significant difference is suggested between the two groups regarding all outcomes analysed.

Conclusions: No significant evidence showed that acupuncture was superior to sham acupuncture for treating DED. Future large-scale, rigorously designed clinical trials are needed to provide a more definitive conclusion.

Abstract No.: 205172

Panel No.: CDE-0261

Agreement Between a Swept-Source Optical Coherence Tomography and Dual Scheimpflug Placido Analyser in Healthy, Keratoconus Suspect and Keratoconus Eyes

*First Author: Mohd Asyraf **ABDUL KADIR***

Purpose: Accurate corneal assessment is essential for diagnosing and monitoring keratoconus (KC) and its early forms. This study evaluated the agreement between a swept-source optical coherence tomography device (ANTERION) and a dual scheimpflug-placido analyser (GALILEI) in measuring anterior and posterior corneal parameters in healthy, keratoconus suspect (KS), and keratoconus eyes.

Methods: A cross-sectional study was conducted at the IIUM Eye Specialist Clinic from July 2023 to February 2025. Participants underwent same-session imaging with ANTERION and GALILEI. Parameters analysed included anterior and posterior keratometry (K1, K2, Kmax, Best-Fit Sphere (BFS)), central corneal thickness (CCT), and minimal corneal thickness (MCT). Agreement was assessed using Bland-Altman analysis and intraclass correlation coefficients (ICC).

Results: A total of 221 eyes were analysed (normal = 129, KS = 40, KC = 52). In normal eyes, anterior parameters showed excellent agreement (ICC >0.94), posterior parameters showed good-excellent agreement (ICC 0.86–0.96), and pachymetry showed strong agreement (ICC >0.94). However, some statistically significant differences in anterior and posterior curvatures and pachymetry values. KS and KC groups demonstrated excellent agreement (ICC ≥0.90) across most parameters, except for anterior BFS in KC group. Variability increased in advanced KC, particularly for posterior measurements and pachymetry.

Conclusions: ANTERION and GALILEI provide reliable, clinically acceptable corneal measurements across normal, KS, and KC eyes. While devices may be used interchangeably for most parameters, caution is advised when interpreting posterior curvature and

pachymetric values in advanced KC, especially for longitudinal follow-up.

Abstract No.: 210164

Panel No.: CDE-0307

Air Pollutants Disrupt Ocular Surface Immunity and EGFR-Mediated Repair in Dry Eye Disease: An Integrated Network Toxicology and Single-Cell RNA Sequencing

*First Author: Yuan **ZHONG***

*Co-Author(s): Qinghua **PENG***

Purpose: To elucidate how air pollutants drive dry eye disease (DED) at the molecular level by integrating network toxicology, immune infiltration, single-cell RNA sequencing (scRNA-seq), and molecular docking.

Methods: Targets of air pollutants were predicted from ChEMBL and SwissTargetPrediction. PM2.5-responsive genes were obtained with limma. DED-associated genes were collected from OMIM and GeneCards. Functional enrichment (GO/KEGG/GSEA/GSEA) was conducted on the intersecting genes. Hub genes were screened using a PPI network and visualized in Cytoscape. Immune infiltration analysis was assessed using the CIBERSORT algorithm. GEO scRNA-seq data were used to profile expression of hub targets in the cornea. Finally, molecular docking examined the binding between air pollutants and hub targets.

Results: Five hub targets (EGFR, IL-1 β , IL-6, MYC, and JUN) were identified, demonstrating significant involvement in inflammatory responses, immune microenvironment imbalance, and corneal epithelial repair mechanisms. Immune infiltration analysis revealed increased activated dendritic cells in the DED. IL-6 expression showed a positive correlation with activated dendritic cells, while IL-1 β and JUN both positively correlated with M1 macrophage-specific signaling. ScRNA-seq confirmed expression of EGFR, IL-1 β , MYC, and JUN in corneal tissue, providing cellular-level evidence for the toxic mechanisms of air pollutants. Molecular docking showed high binding affinity between air pollutants and the hub targets.

Conclusions: Air pollutants may promote DED by disrupting the immune homeostasis of the ocular surface, amplifying inflammatory responses, and impairing epithelial repair. These findings enhance our understanding of air pollutant-induced DED and provide a theoretical basis for potential treatment strategies.

Abstract No.: 206767

Panel No.: CDE-0286

Altered Sphingolipids in Tear Are Potential Biomarkers of the Disease Severity of Vernal Keratoconjunctivitis

First Author: Shobhit GUPTA

Co-Author(s): Shweta AGARWAL, Nabanita HALDER, Angayarkanni NARAYANASAMY, Madhu NATH, Thirumurthy VELPANDIAN

Purpose: Vernal keratoconjunctivitis (VKC) is an allergic conjunctival inflammation, predominantly affecting boys during early childhood and typically subsiding by puberty. The mechanisms underlying this age-related resolution and male predominance remain unclear. The study aims to analyze the changes in the sphingolipid, chiefly the ceramides, in VKC cases less than 16 years, classified based on disease status.

Methods: Tear samples were collected using Schirmer's strips from VKC patients aged <16 years (n=105) classified as active and quiet based on disease status, and from age-matched (<16 years) healthy controls (n=39) at a tertiary eye care centre in South India. Sphingolipids were quantified in the pooled tears (n=3), VKC (n=35 sets), and healthy control (n=13 sets) after lipid extraction followed by LC-MS/MS analysis, as per US-FDA guidelines for bioanalytical method validation.

Results: Analysis revealed significantly higher levels of C2 C1P (d18:1/2:0) ($p < 0.004$) and S1P(d20:1) ($p < 0.05$) in VKC compared to the controls. Further, when VKC was further classified, C18(d18:1/18:0) ($p < 0.004$), C24(d18:1/24:0) ($p < 0.005$), and C2C1P (d18:1/2:0) ($p < 0.003$) were significantly increased in the active state of the disease compared to the quiet.

Conclusions: Altered sphingolipid metabolism in the ocular surface results in low tear ceramide levels in quiet VKC compared with the active cases. These novel findings support the use of sphingolipids as potential biomarkers for disease monitoring and for exploring targeted therapy.

Abstract No.: 206587

Panel No.: CDE-0283

An On-Table Diagnosis of Brittle Cornea Syndrome During Surgery

First Author: Ronak SOLANKI

Purpose: To describe a rare case of Brittle Cornea Syndrome (BCS), which was diagnosed while operating on the patient in the operating theatre, thereby confirming the spectrum of preoperative suspicious clinical findings.

Methods: A 36-year-old male born to parents with a non-consanguineous marriage presented with a painful, sudden onset of Loss of vision OD after an alleged minor finger nail trauma. Ocular Examination revealed OD visual acuity of Perception of Light (PL)

positive, projection of rays(PR) accurate, full-thickness linear corneal tear inferiorly, and a flat chamber. Documented blue sclera OD on one of his previous visits. OS no light perception, previous childhood trauma, and Pthysis Bulbi. General Examination revealed mental retardation, Short stubby nose, use of a Hearing Aid, mild contractures of fingers (5th finger), clinodactyly, Small joint hypermobility, and apparent Dentinogenesis imperfecta-like features.

Results: A corneal tear repair under local peribulbar anesthesia was undertaken. An additional side port entry was planned and made, which spontaneously extended into a larger linear tear than the expected size. Subsequent cheese wiring of sutures and difficulty in sealing the wound under air and viscoelastic agents helped us make an on-table diagnosis of Brittle Cornea Syndrome while operating on the patient.

Conclusions: In BCS with corneal rupture, primary repair is required. Surgical repair of spontaneous corneal ruptures in brittle cornea syndrome is difficult. Corneal sealing is achieved by a combination of cheese-wiring sutures with bandage contact lenses, pressure patches, and systemic CAIs. Gas(C3F8)/air tamponade, tissue adhesives in a dry operative field, viscoelastic agents, and onlay epikeratoplasty can be used.

Abstract No.: 201705

Panel No.: CDE-0199

Antiseptic Efficacy and Toxicity of Three 1% Povidone-Iodine Drops Versus a Single 5% Povidone-Iodine Drop on Patients Undergoing Elective Ocular Surgery.

First Author: Raphael GUMAFELIX

Co-Author(s): Ruben LIM BON SIONG, Reginal Robert TAN

Purpose: This prospective, randomized, single-blinded study compared the antiseptic efficacy and ocular surface toxicity of repeated 1% versus single-dose 5% povidone-iodine (PI) application in patients undergoing elective ocular surgery.

Methods: Seventy generally healthy adult participants (aged 18 to 80 years) without significant systemic comorbidities were randomly assigned to receive either three drops of 1% PI or one drop of 5% PI. Conjunctival swabs were collected before and after PI application for microbial culture on blood and chocolate agar. Corneal epithelial toxicity was assessed via fluorescein staining and graded using the National Eye Institute (NEI) scale.

Results: Both PI concentrations significantly reduced conjunctival bacterial counts ($p < 0.001$). The 5% PI group showed a significantly greater mean reduction in colony counts on blood agar (59.9% vs. 50.4%; $p = 0.007$). No significant difference was observed on chocolate agar ($p = 0.817$). However, corneal toxicity was significantly higher in the 5% PI group (Mean NEI

score: 9.5) compared to the 1% PI group (Mean NEI score: 4.3; $p < 0.001$).

Conclusions: While single-dose 5% PI showed slightly superior efficacy on blood agar, repeated application of 1% PI achieved comparable antiseptic effectiveness with significantly less epithelial toxicity. Repeated 1% PI may serve as a safer alternative for preoperative ocular disinfection.

Abstract No.: 203735

Panel No.: CDE-0233

Assessing Presentation of the Uniformly Thin, Non-Ectatic, Cornea: Brittle Cornea Syndrome Compared With Anterior Megalophthalmos

First Author: Dian ZHUANG

Co-Author(s): Charles MCGHEE

Purpose: To report anterior segment features in patients presenting with thin corneae, highlighted in Brittle Cornea Syndrome associated with Ehlers-Danlos Syndrome, and anterior megalophthalmos.

Methods: Two unique cases with thin corneae were evaluated by: slit lamp anterior segment assessment, anterior segment OCT, corneal tomography, central corneal thickness (CCT), and endothelial cell count. Associated ocular and systemic features were documented and analysed.

Results: A young female diagnosed with Ehlers-Danlos Syndrome, initially presented with marked, uniformly thin corneas (CCT: 331 μm OU). From 2021 to 2024, corneal thickness remained stable, with a significant increase to 408 μm (right eye) and 409 μm (left eye). Other anterior segment features remained unremarkable. A 29-year-old male, with a family history of anterior megalophthalmos, presented with megalocornea and pigment dispersion syndrome. He had large, uniformly thin corneas (CCT: right 452 μm , left 437 μm) and significant iris transillumination. Endothelial cell counts were 2247 cells/ mm^2 (right) and 2150 cells/ mm^2 (left). Annual follow-up showed stable corneal thickness and endothelial cell counts with marked arcus lipoides/shagreen.

Conclusions: Non-ectatic thin cornea, though uncommon, may indicate underlying ocular or systemic conditions such as Brittle Cornea Syndrome or megalophthalmos. These two cases highlight the importance of comprehensive anterior segment evaluation, in the context of thin corneas. Long-term monitoring is essential to detect potential progression or complications, guide appropriate management, and ensure timely referral when systemic involvement is suspected. Given the hereditary involvement, genetic considerations should also be part of the clinical evaluation to support diagnosis, counselling, and family screening when indicated.

Abstract No.: 204584

Panel No.: CDE-0244

Astaxanthin Mitigates Benzalkonium Chloride-Induced Dry Eye Disease by Inhibiting Inflammation and Oxidative Stress Through the Keap1-Nrf2/HO-1 Pathway

First Author: Mengzhen XIE

Co-Author(s): Ying JIE, Ziyu LIU

Purpose: This study aims to explore whether astaxanthin (AST) alleviates dry eye disease (DED) induced by benzalkonium chloride (BAC) and to elucidate the role of the Keap1-Nrf2/HO-1 pathway in its protective mechanism.

Methods: Potential targets of AST and DED were identified using network pharmacology. Binding interactions between AST and core targets were assessed by molecular docking and dynamics simulations. A DED mouse model was established with 0.1% BAC, followed by oral AST administration (100 mg/kg/day) for 7 days. Human corneal epithelial cells (hCECs) were exposed to hyperosmotic stress with and without AST. Ocular surface evaluation, RTqPCR, Western blot, and immunofluorescence were performed to assess therapeutic effects and mechanisms.

Results: Network analysis suggested AST mitigates DED through anti-oxidative pathways. In vivo, AST restored ocular surface health, downregulated Keap1, and enhanced Nrf2 and HO-1 expression. In vitro, AST increased cell viability and reduced ROS generation under hyperosmotic conditions.

Conclusions: AST effectively protects against DED by activating the Keap1-Nrf2/HO-1 signaling axis, reducing oxidative stress and inflammation. These results support the potential of AST as a novel therapeutic agent for dry eye disease.

Abstract No.: 200893

Panel No.: CDE-0181

Axenfeld-Rieger Syndrome Family Analysis: Clinical Characteristics Report of Two Cases in Mother and Daughter

First Author: Ying WU

Co-Author(s): Lijun ZHANG

Purpose: To analyze clinical manifestations of Axenfeld-Rieger syndrome in a mother-daughter pair and explore diagnostic features of this rare hereditary ocular disease.

Methods: Systematic ophthalmologic examinations were performed on two confirmed cases of Axenfeld-Rieger syndrome (mother and daughter), including best-corrected visual acuity, intraocular pressure measurement, slit-lamp biomicroscopy, gonioscopy, visual field testing, optical coherence tomography (OCT) anterior chamber angle imaging, and corneal

endothelial microscopy. A detailed family history was collected to analyze the correlation between genetic patterns and clinical phenotypes.

Results: The proband was a 39-year-old female presenting with right eye pain and blurred vision for 5 days. Ophthalmologic examination revealed typical manifestations of bilateral anterior segment dysgenesis: posterior embryotoxon, shallow anterior chamber, and angle dysgenesis. Intraocular pressure measurements showed 26mmHg in the right eye and 19mmHg in the left eye. Gonioscopy demonstrated peripheral anterior chamber angle adhesions with iris-like tissue bands extending from the peripheral iris to Schwalbe's line. OCT examination confirmed angle closure with adhesions in the right eye and a slit-like angle configuration in the left eye. Corneal endothelial cell counts were 1993cells/mm² in the right eye and 2870cells/mm² in the left eye. Family history analysis showed a maternal inheritance pattern consistent with autosomal dominant inheritance with high penetrance.

Conclusions: Axenfeld-Rieger syndrome is a rare autosomal dominant hereditary ocular disease characterized by anterior segment dysgenesis and associated glaucoma. The condition originates from neural crest cell developmental abnormalities during embryogenesis. Early recognition and timely intervention are crucial for preventing glaucoma and preserving visual function.

Abstract No.: 203219

Panel No.: CDE-0225

Berberine Ameliorate Inflammation and Apoptosis via Modulating PI3K/AKT/NFκB and MAPK Pathway on Dry Eye

First Author: Jiani LI

Purpose: To detect the effects and explore the potential mechanisms of BBR on DED.

Methods: Human corneal epithelial viability was assayed across BBR doses. Desiccating stress-induced murine dry eye received topical CSA, BBR, or vehicle for 7 days; tear secretion (phenol-red thread), Oregon-Green-dextran leakage, and PAS staining quantified ocular surface damage. Inflammation and apoptosis were assessed by qPCR/Western blot. Putative BBR targets were mined from public databases; PPI networks and GO/KEGG enrichment (STRING, Metascape, Cytoscape) identified hub genes and pathways. Molecular docking (Schrödinger) and visualization (PyMOL) supported binding predictions. PI3K/AKT/NF-κB and MAPK pathway activation was determined.

Results: The data revealed BBR could rescue impaired HCE under hyperosmotic conditions. In addition, BBR eye drops could ameliorate dry eye. And BBR eye drops suppressed the inflammatory factors and CD4+T cells infiltration in conjunctiva. Besides, BBR eye

drops protected ocular surface by avoiding the severe apoptosis and decreasing the level of MMP-3 and MMP-9. 148 common targets intersection between BBR and dry eye were found via network pharmacology analysis. Core proteins and core pathways were identified through PPI and GO&KEGG enrichment analysis. Molecular docking displayed excellent binding between BBR and those core targets. Finally, in vivo study verified that BBR eye drops had a therapeutic effect in dry eye by inhibiting PI3K/AKT/NFκB and MAPK pathways.

Conclusions: The research provided convincing evidence that BBR could be a candidate drug for dry eye.

Abstract No.: 208328

Panel No.: CDE-0304

Beyond Systemic Toxicity: A Rare Ocular Complication of Antibody-Drug Conjugate Therapy

First Author: Keli MAO

Co-Author(s): Man YU

Purpose: To establish an accurate diagnosis for an elderly female patient presenting with acute bilateral hypopyon.

Methods: Comprehensive medical history documentation was obtained. A detailed slit-lamp biomicroscopy examination was performed. In vivo confocal microscopy (IVCM) were used to characterize pathological features.

Results: A 63-year-old female presented with a 3-day history of bilateral foreign body sensation, redness, and blurred vision. The patient had undergone a resection for urothelial carcinoma six months prior to presentation, after which she began Antibody-Drug Conjugate (ADC) therapy 20 days before the onset of ocular symptoms. Slit-lamp examination showed conjunctival hyperemia and edema without discharge. Both corneas exhibited edema with well-demarcated central ulcers (right eye: 6×5 mm; left eye: 8×4 mm) and 1 mm hypopyon. Best-corrected visual acuity was 0.5. IVCM revealed increased Langerhans cells without fungal hyphae. A diagnosis of ADC-induced ocular surface complication was established. Following treatment with topical corticosteroids, deproteinized calf blood extract gel, and growth factor eye drops, the ulcers showed significant regression, and the hypopyon resolved completely.

Conclusions: ADC-related ocular complications primarily involve the corneal surface, with manifestations including conjunctivitis, reversible epithelial lesions, and ulceration. To our knowledge, this is the first reported case of ADC-associated severe ocular surface disease accompanied by hypopyon. Multidisciplinary coordination and standardized

management are essential for effective symptom control.

Abstract No.: 202392

Panel No.: CDE-0209

Bilateral Peripheral Ulcerative Keratitis With Positive Syphilis Serology: Four-Year Follow-Up After Combined Medical and Surgical Management

*First Author: Brigitta Marcia **BUDIARDJA***

*Co-Author(s): Yulia **AZIZA**, Lukman **EDWAR**, Rina La Distia **NORA**, Ratna **SITOMPUL**, Made **SUSIYANTI***

Purpose: Peripheral ulcerative keratitis (PUK) is an acute, sight-threatening corneal condition with diverse systemic associations. Syphilis is rarely implicated, and the relationship remains uncertain. This report presents a rare case of bilateral PUK in a patient with positive syphilis serology and long-term follow-up demonstrating favorable visual and structural outcomes after combined systemic and ocular treatment.

Methods: Single-patient observational case report with four-year follow-up.

Results: A 70-year-old man presented with five months of progressive bilateral redness, pain, and visual loss (visual acuity 0.5/60 in the right eye, hand movement in the left eye). Slit-lamp revealed peripheral thinning with edema, and the right eye developed iris prolapse within one week despite initial therapy. Systemic work-up was negative except for positive treponemal serology. Although this may represent a coincidental finding, systemic therapy with benzathine penicillin was given together with oral corticosteroids, methotrexate, and azathioprine. Sequential corneal patch grafting and amniotic membrane transplantation were performed in both eyes. At four years, visual acuity improved to 6/15 in the right eye and 6/12 in the left eye, with stable graft-host junctions and no recurrence. Literature remains sparse, and direct evidence of *Treponema pallidum* in corneal tissue has not been established.

Conclusions: Positive syphilis serology in PUK cases may be coincidental but should not be overlooked. Early recognition, comprehensive systemic evaluation, and pathogen-directed therapy combined with timely surgical intervention can help preserve vision and ocular integrity, even in severe cases. This case underscores the importance of considering syphilis in the differential diagnosis of bilateral or rapidly progressive PUK while acknowledging that causality remains unproven.

Abstract No.: 202484

Panel No.: CDE-0213

Bilateral Sequential Microsporidial Stromal Keratitis in an Immunocompetent Patient With Underlying Uveitis: A Case Report

*First Author: Rinrada **KREESANG***

*Co-Author(s): Weerapat **UDOMWONG***

Purpose: To report a case of bilateral sequential microsporidial stromal keratitis in an immunocompetent patient with chronic anterior uveitis and herpes keratouveitis.

Methods: Case report and literature review.

Results: A 66-year-old woman with chronic bilateral anterior uveitis and herpes keratouveitis in the left eye was referred for evaluation. Examination revealed bilateral keratic precipitates and central stromal haze in the left eye. Despite topical corticosteroids and systemic antivirals, the left cornea developed deep central stromal infiltration. Microsporidial stromal keratitis was suspected, and topical polyhexamethylene biguanide, voriconazole, and moxifloxacin were initiated. Due to poor clinical response, penetrating keratoplasty (PK) was performed, and histopathology confirmed microsporidia. The graft subsequently failed, and repeat PK was planned. Eighteen months later, the right eye developed central stromal infiltration. Corneal scraping confirmed microsporidial stromal keratitis. Intensive topical and systemic antifungal therapy was ineffective, necessitating therapeutic PK. Histopathology again demonstrated microsporidia. Post-operative recovery in the right eye was uneventful, and the graft remained clear. Predisposing factors in this patient included possible exposure to contaminated water or soil, long-term corticosteroid use, and chronic ocular inflammation.

Conclusions: Microsporidial stromal keratitis can occur sequentially in both eyes of immunocompetent patients with pre-existing ocular inflammatory disease. It should be considered in cases of chronic stromal keratitis unresponsive to conventional therapy. Early diagnosis and timely surgical intervention are essential for achieving a favorable outcome.

Abstract No.: 202613

Panel No.: CDE-0216

CLARITY Trial: 4-Week Interim Analysis of Chloroquine (0.03%), Lifitegrast (5%), and Cyclosporine (0.05%) in Moderate-Severe Dry Eye Disease

*First Author: Shweta **DHIMAN***

*Co-Author(s): Raj **KENIA**, Madhusmita **BEHERA**, Santosh **MAHAPATRA**, Anjalika **PARHI***

Purpose: To compare the short-term efficacy and safety of chloroquine 0.03%, lifitegrast 5%, and cyclosporine 0.05% eye drops as monotherapy in moderate-severe

dry eye disease (DED), focusing on tear film stability, symptoms, and ocular surface health.

Methods: The CLARITY trial (CTRI/2025/07/091185) is an ongoing, randomized, parallel-group, active-controlled, assessor-masked clinical study conducted at a single tertiary center in Odisha, India. Adults aged 18–70 years with OSDI >13, TBUT <10 s, and Schirmer's ≤10 mm without anesthesia were randomized (1:1:1) to chloroquine (four times daily), lifitegrast (twice daily), or cyclosporine (twice daily) for 12 weeks. Due to different approved dosing schedules, identical dosing could not be maintained; however, outcome assessors were masked to treatment allocation. The primary endpoints are change in TBUT and OSDI from baseline to week 12. This interim analysis includes patients completing the 4-week follow-up, assessing early change in TBUT, OSDI, Schirmer's test, and ocular surface staining.

Results: Of 225 planned participants, 48 have been enrolled; 11 (chloroquine: 3, lifitegrast: 4, cyclosporine: 4) have completed the 4-week follow-up. Baseline mean TBUT ranged 4–6 s across groups; mean OSDI ranged 18–28. At 4 weeks, mean TBUT improved by +2.0 s with chloroquine, +3.5 s with lifitegrast, and +2.5 s with cyclosporine. Mean OSDI decreased by –7 points, –9 points, and –8 points, respectively. All treatments were well tolerated; no serious adverse events occurred.

Conclusions: Early 4-week findings suggest all three agents improve tear stability and symptoms in moderate–severe DED, with lifitegrast showing the largest numerical gains so far. Longer follow-up and full cohort analysis will determine comparative efficacy and cost-effectiveness at 12 weeks.

Abstract No.: 200285

Panel No.: CDE-0168

Calotropis-Induced Ocular Toxicity

First Author: Mariya DOCTOR

Purpose: Outcome of Calotropis-induced ocular trauma.

Methods: Retrospective analysis based on an Electronic medical record search using the keywords Calotropis and ocular toxicity, where patients who presented to our institute with these keywords were included in the data analysis.

Results: Thirty-two patients were included, 17 females and 15 males, with a mean age of 46 years. Average duration of the exposure to calotropis was 3+/-10days. Decrease in vision and pain were the most common symptoms, while corneal edema was the most common sign. Eyewash was given along with topical steroids to most patients. Mean time for total recovery 7+/-2 days, and significant recovery in visual acuity was noted from LogMar 0.607 +/- 0.591 to LogMar 0.166 +/-0.434 at 1 month.

Conclusions: Calotropis is a perennial plant, used for curing various systemic ailments and also worshipping gods in many countries. It can cause corneal edema and toxic keratopathy if exposed to the ocular tissue. This can be easily resolved with topical steroids. Hence, awareness about Calotropis-induced ocular toxicity and differentiating it from viral stromal keratitis is important. Simple health education, like washing hands, avoiding contact, and rubbing of eyes while plucking the Calotropis flower, is important to prevent this kind of injury. Early intervention and prompt management can result in full recovery of corneal edema in a short period of time, and surgical intervention is seldom needed.

Abstract No.: 200576

Panel No.: CDE-0178

Case Report: Ocular Surface Squamous Neoplasia

First Author: Leesha SHRESTHA JOSHI

Purpose: To report clinical features and treatment outcome of five cases of Ocular Surface Squamous Neoplasia.

Methods: This case series presents 5 patients with isolated OSSN. Data collected included presenting signs and symptoms, including vision, anterior segment examination, medical and surgical outcomes, and signs and symptoms at the last post-treatment visit.

Results: Case 1 was a 25-year-old female who presented with an isolated reddish amoeboid corneal lesion, which was excised with alcohol assisted epitheliectomy with cryotherapy, and the mass was sent for biopsy. Case 2 was a 64-year-old male with a corneal lesion, which was completely excised, and cryotherapy was done, followed by topical steroid. However, the pterygium-like lesion recurred after a few months post-treatment. Case 3 was a 52-year-old male patient who presented with a corneal lesion, including conjunctiva, that was excised with cryotherapy. Case 4 was a 65-year-old male with a conjunctival mass, which was excised, followed by cryotherapy. Case 5 was a 55-year-old female with a conjunctival mass, which was also excised, followed by cryotherapy. All the excised mass was sent for biopsy, and the result was mild to moderate dysplasia.

Conclusions: Ocular Surface Squamous Neoplasia is a rare entity with few reported cases in the literature. In this case series, we report the management outcomes of combined surgical and medical therapy.

Abstract No.: 205129**Panel No.: CDE-0260****Characteristics of Ocular Demodicosis in Dry Eye Patients***First Author: Varissaranan AUERAREERAT**Co-Author(s): Raveewan CHOONTANOM, Pichaya CHUEPHANICH***Purpose:** To identify the characteristics of demodex blepharitis in patients with dry eye disease.**Methods:** This prospective, cross-sectional study investigated the characteristics of ocular demodicosis in 92 patients with dry eye disease. Participants completed the OSDI questionnaire and underwent a comprehensive eye examination. Ocular staining score assessment, Schirmer's test, meibography, and meibomian gland dysfunction (MGD) grading were conducted. Cylindrical dandruff was defined as the presence of scales ranging from clear to total coverage around the base of the eyelashes. Eyelash samples were collected and examined under a microscope by a single investigator to ensure consistency.**Results:** Of the total 92 patients, Demodex infestation was detected in 57 (61.96%), and Demodex blepharitis was present in 21 (22.83%). The Demodex blepharitis group had a significantly higher mean age compared to the non-Demodex blepharitis group ($p=0.001$). The presence of collarettes was strongly associated with blepharitis ($p<0.001$), with both total ($p=0.004$) and partial ($p=0.006$) eyelash coverage showing significant associations compared to no collarette. Moreover, collarette location on the upper eyelid was also strongly correlated with Demodex blepharitis ($p<0.001$).**Conclusions:** An increased number of collarettes, particularly on the upper eyelid, is the most frequently observed and significantly associated clinical sign of Demodex blepharitis in dry eye patients. This should be given particular attention in cases where Demodex infestation is suspected. Although there is a clear association between Demodex infestation and blepharitis, no significant association was found between Demodex and the severity of dry eye.**Abstract No.: 204330****Panel No.: CDE-0238****Clinical Course of a Case of Corneal Penetrating Bee Sting Injury***First Author: Benedicto Juan Enrique AGUILAR**Co-Author(s): Stricklyn CAINGLES-PAASA, Margarita ECHAVEZ-QUITOS, Shasta Grace TIRO***Purpose:** To present the clinical course of a patient with a penetrating bee sting injury who underwent emergency wound exploration and removal of the foreign body.**Methods:** Case report.**Results:** The patient was seen two hours post-injury. Visual acuity was counting fingers. Slit lamp examination showed a dark linear foreign body lodged in the patient's midperipheral 3 o'clock cornea with epithelial sloughing, and surrounding corneal inflammation, which precluded full examination of the anterior chamber and depth of the foreign body penetration. Generalized grade 4 corneal edema with microcysts was also noted. Anterior Segment Optical Coherence Tomography showed penetration of the foreign body into the anterior chamber. The patient underwent removal of the foreign body with suture closure of the wound and intracameral antibiotics. Topical nonsteroidal anti-inflammatory and antibiotics were given immediately post-operation, which showed promising resolution of inflammation, thus it was followed by cautious initiation of topical steroid. The patient had a gradual recovery of vision to LogMAR 0.1 at two months post-surgery, with a persistent corneal scar around the point of entry.**Conclusions:** Corneal penetrating bee sting injury can lead to rapid loss of vision. Immediate surgical removal with subsequent aggressive anti-inflammatory treatment can resolve corneal inflammation and restore vision; however, persistent endothelial damage may be a consequence.**Abstract No.: 201793****Panel No.: CDE-0193****Clinical Features and Antiviral Response in Epstein-Barr Virus-Associated Endotheliitis Patients: A 12-Year Retrospective Case Series Study***First Author: Fok Chak IENG**Co-Author(s): Hung-chi CHEN, Yueh-ling CHEN, Ching-hsi HSIAO, Yih-shiou HWANG***Purpose:** To describe the clinical characteristics and outcomes of polymerase chain reaction (PCR)-confirmed Epstein-Barr virus (EBV) corneal endotheliitis and to compare them with Cytomegalovirus (CMV) corneal endotheliitis.**Methods:** We retrospectively reviewed 14 eyes of 14 patients with PCR-confirmed EBV endotheliitis managed at a tertiary referral center. Demographic data, best-corrected visual acuity (BCVA), intraocular pressure (IOP), anterior segment findings, endothelial cell density (ECD), and treatment response were analyzed. Aqueous humor samples from cataract patients served as negative controls.**Results:** The mean age was 60.9 ± 15.7 years; 71% were male. Mean follow-up was 40.9 ± 29.6 months. All patients presented with corneal edema and keratic precipitates, with anterior chamber inflammation ranging from trace to 2+. The mean BCVA at baseline was 1.68 ± 1.25 logMAR and mean IOP 18.0 ± 11.1 mmHg; 29% had prior keratoplasty and 14% prior glaucoma surgery. Antiviral regimens included

famciclovir, acyclovir with intravitreal ganciclovir, topical ganciclovir, or valganciclovir. Despite transient clinical improvement, most patients showed progressive endothelial cell loss. Longitudinal ECD analysis revealed a steady decline, with several eyes ultimately requiring keratoplasty. Control aqueous samples from cataract patients were uniformly negative for EBV DNA.

Conclusions: EBV is an under-recognized cause of corneal endotheliitis, often mimicking CMV infection but demonstrating a more relapsing and refractory course. Even with antiviral and corticosteroid therapy, endothelial deterioration frequently progresses. Routine inclusion of EBV in aqueous PCR testing is warranted in atypical or recurrent cases. Development of EBV-specific antiviral strategies is needed to improve long-term outcomes.

Abstract No.: 207372

Panel No.: CDE-0302

Clinical Profile and Indications of the First 125 Patients Who Underwent Corneal Transplants at a New Tertiary Care Eye Center in a Metropolitan City in Western India

First Author: Somasheila MURTHY

Co-Author(s): Prajakta DANDEKAR, Supriya SHARMA

Purpose: To analyze the demographic profile and indications of patients who underwent keratoplasties over a period of 18 months at a newly established tertiary eye care centre in Mumbai.

Methods: Retrospective observational study. Details were obtained from the hospital electronic medical records. All patients who underwent partial or full-thickness keratoplasty, including corneal patch grafts, were included, with a minimum period of follow-up of 6 months. Success for grafts for an optical indication was visual improvement of 20/40 or better, and for grafts for a therapeutic indication was infection control. All patients were followed up for at least six months.

Results: A total of 127 eyes of 125 new patients underwent surgery during the study period. Male: female ratio was 1.6, and the majority of the patients (97, 77.6%) hailed from the same city. The majority (92, 72%) were from poorer socio-economic strata. The commonest indication for surgery was: pseudophakic bullous keratopathy (30%), followed by failed graft (18%), corneal scar (11%), and microbial keratitis (10%). Keratoconus and other indications comprised 3%. When combining all indications, visual outcomes were good (<20/60) in 42%, moderate (20/100-20/200) in 24% and poor vision (<20/400 -PL) in 34%.

Conclusions: This is the first study to report the outcomes of corneal transplant in this metropolitan city. Males were almost twice as likely to get surgery, and a large majority of our patients had limited paying ability. Overall, the results for optical indications

showed 90% success at 6 months follow-up. In one year, the hospital was able to provide care for over 100 patients, and this study is an indicator of existing gaps in the management of corneal blindness.

Abstract No.: 205980

Panel No.: CDE-0272

Comparative Correlation Analysis of Dry Eye Screening Methods With Self-Reported Symptoms in Drug Users

First Author: Kin Yip YIN

Co-Author(s): Yan Hei Yannis CHAN, Kelvin Kl CHONG, Kenneth Kh LAI, Calvin Cp PANG, Clement Cy THAM

Purpose: To compare the correlation between measurements of dry eye screening tools and self-reported ocular symptoms.

Methods: Fifty-eight (36 males, 22 females) regular drug users within the past 24 months were recruited under the project supported by the Beat Drug Fund (BDF210067). Dry eye assessments were conducted on the right eye using OCULUS Keratograph 5M, TearScience LipiView II Interferometer, and Tearlab Osmolarity System. Metrics obtained were correlated with the Ocular Surface Disease Index (OSDI) questionnaire.

Results: In Methamphetamine users, Tear osmolarity showed a stronger positive correlation with the composite OSDI score ($r = 0.254$), while NIKBUT had a weaker positive correlation ($r = 0.004$). In polysubstance (Cocaine and Methamphetamine) users, a stronger negative correlation existed between Tear osmolarity and OSDI score ($r = -0.222$) when compared with that between NIKBUT and OSDI score ($r = -0.144$). The stronger correlations shown in both directions potentially hint that tear osmolarity might be a more sensitive measure in screening drug abusers with dry eye symptoms compared to NIKBUT. Interestingly, Lipid Layer Thickness showed a positive correlation with the OSDI score in both groups ($r = 0.298, 0.107$, respectively), implying that a thicker tear film lipid layer might abnormally cause more discomfort in patients.

Conclusions: Though the current statistics support that tear osmolarity might be more sensitive in screening dry eye patients among drug addicts, significant correlations were not found between the metrics and reported symptoms. Hence, post-screening investigations are necessary.

Abstract No.: 204375**Panel No.: CDE-0240**

Comparative Evaluation of CORVIS ST Imaging of Post-Full-Thickness and Lamellar Keratoplasty Corneas

*First Author: Tapashree GHOSH**Co-Author(s): Vanathi MURUGESAN*

Purpose: To compare corneal biomechanics by CORVIS ST in penetrating keratoplasty (PK) & Deep Anterior Lamellar Keratoplasty (DALK) grafts.

Methods: A retrospective cross-sectional observational study of CORVIS ST data was done. Comparative evaluation of 17 CORVIS-ST parameters [b-IOP, AT1, HCT, 2nd AT2, DA, WD, HCR, VELin, VELout, DA ratio, IR, IVR, SSI, SP-A1, ARth, CBI, TBI] between corneas with full-thickness & anterior lamellar grafts was done.

Results: Data of 59 PK (mean age 38.55±16.37 years) & 52 DALK (mean age 23.03±8.99 years) corneas over a mean follow-up of 2.9±3.60 years (3 months-16 years)[PK - 3.53±4.56; DALK 2.38±2.44 years] was analysed. Median CBI of PK & DALK corneas was 0.78 & 0.93 (0.001) respectively. 5 CORVIS ST parameters (median values) were significantly altered [HCR 7.14 & 6.24 (0.009); VELout 0.28 & 0.32(0.043), IR 8.15 & 9.5 (0.001), SSI 0.98 & 0.85 (0.010), ARth 319.75 & 193.95 (0.001).

Conclusions: CORVIS ST parameters were reduced in all keratoplasty corneas; DALK corneas had a significantly lesser biomechanical strength as compared to full thickness grafts.

Abstract No.: 206964**Panel No.: CDE-0290**

Comparison of Culture Positivity of Corneal Scraping With Half Corneal Tissue for Patients Undergoing Therapeutic Keratoplasty

*First Author: Sujata DAS**Co-Author(s): Himansu BEHERA, Nisha RAHUL*

Purpose: To compare the culture positivity of corneal scraping with half-corneal tissue (HCT) for patients undergoing therapeutic penetrating keratoplasty (TPK) and the role of HCT culture after TPK for the management of fungal keratitis.

Methods: This hospital-based retrospective observational study performed at a tertiary eye care centre in eastern India from September 2023 to August 2024 included 73 cases. This is a comparison of microbiology records of culture positivity of fungal ulcer that underwent diagnostic scraping, with culture positivity of half-corneal tissue in patients undergoing therapeutic keratoplasty using an electronic medical record system.

Results: Out of 73 patients, fungus was found on direct smear examination in 64/73 (87.67%) corneal scraping samples. Fungus was recovered in culture from scraping

in 49/73 (67.12%), mixed organisms in 7/73 (9.58%). Half-corneal tissue sent for culture after therapeutic keratoplasty showed fungus in 19/73 (26.02%) and no organism in 54/73 (73.97%) samples. Half-corneal tissue sent for histopathological evaluation revealed fungal filaments in fifty-nine (80.82%) samples.

Conclusions: This study shows less culture positivity of half-corneal tissue post therapeutic keratoplasty in patients compared with culture from cornea scraping.

Abstract No.: 206194**Panel No.: CDE-0277**

Comparison of the NEI-VFQ and OSDI Questionnaires in Drug Users With Dry Eye

*First Author: Sze Wing LEE**Co-Author(s): Kelvin Kl CHONG, Kenneth Kh LAI, Calvin Cp PANG, Clement Cy THAM*

Purpose: Aim to explore the relationship between NEI-VFQ and OSDI questionnaires in drug users with dry eye.

Methods: Twenty-six regular drug users (26 worst eyes) within past two years were recruited under the project supported by Beat Drug Fund (BDF210067), completed objective dry eye assessments including fluorescein tear breakup time (FBUT), Schirmer's test (ST), lipid layer thickness (LLT) by TearScience LipiView II Interferometer, and non-invasive keratography break-up time (NIK BUT) from OCULUS Keratograph 5M. Ocular Surface Disease Index (OSDI) and the 25-item National Eye Institute Vision Functioning Questionnaire (NEI-VFQ) measuring subjective symptoms were also correlated.

Results: The mean age of subjects was 41.7±11.8, and consisted of 15 males and 11 females. Correlation between OSDI score and objective ocular parameters- NIK BUT ($p=-0.328$) was the modest among four parameters and not statistically significant. Moderate correlations were observed between NEI-VFQ score and ocular parameters, with a mild significance for FBUT ($r=-0.397$, $p=0.046$). The strongest association of the two questionnaires were composite score of OSDI with overall NEI-VFQ score ($r=-0.653$, $p<.001$); and OSDI overall score showed significant negative correlations with ocular pain, distance activities, social functioning, mental health, dependency, color vision and peripheral vision ($p=-0.52$, -0.55 , -0.55 , -0.63 , -0.73 , -0.55 , and -0.67 respectively).

Conclusions: Correlations between objective measures of dry eye and its impact were mild. Strong relationship between NEI-VFQ and OSDI have been shown, therefore these two questionnaires have similar ability in measuring the impact of drug usage on dry eye.

*Figures shown by mean±SD

Abstract No.: 206405
Panel No.: CDE-0282

Comprehensive Evaluation of Large Language Models for Dry Eye Knowledge Question-Answering Tasks

First Author: Xinyuan DU

Co-Author(s): Wei LI, Zugu LIU, Shaopan WANG, Yuqian WANG

Purpose: To compare the accuracy and completeness of state-of-the-art large language models (LLMs) in answering questions related to dry eye disease (DED).

Methods: Twenty questions encompassing the definition, epidemiology, symptoms and signs, examination methods, diagnosis, treatment, and prevention of DED were selected. Each question was individually input into six LLMs: GPT-4o, GPT-o1, GPT-o3, Deepseek-V3, Deepseek-R1, and Gmini-2.0. The responses generated by these models were de-identified and independently assessed by three expert ocular surface specialists. Each response was evaluated along two dimensions, accuracy and completeness, using 10-point and 6-point Likert scales, respectively. Statistical analyses were conducted using nonparametric methods, including the Kruskal–Wallis and Mann–Whitney U tests.

Results: Deepseek-R1 consistently achieved the highest scores across both dimensions, with significantly better accuracy and completeness than the other five models ($P < 0.001$). GPT-4o demonstrated the lowest performance in accuracy, with considerable variability across raters and question sets. Expert-level differences were also observed: senior ophthalmologists tended to favor medically rigorous and structured responses, while junior physicians were more influenced by fluent and intuitive language.

Conclusions: This study thoroughly and comprehensively evaluated the accuracy and completeness of responses provided by state-of-the-art LLMs in the context of DED knowledge. Despite advancements, inaccuracies persist even among the most advanced LLMs, indicating that specialized, domain-specific LLMs may represent a more appropriate approach for disseminating expert knowledge within specialized medical fields.

Abstract No.: 203933
Panel No.: CDE-0235

Comprehensive Immune Landscape in Allergic Conjunctivitis: Insights From Mendelian Randomization Analysis

First Author: Tianyi ZHOU

Purpose: Current understanding of the immune landscape underlying allergic conjunctivitis (AC) remains rather limited. We investigated the potential association between circulating immunophenotypes

and AC using Mendelian randomization (MR) methodology.

Methods: Based on genome-wide association study (GWAS) summary-level statistics, a 2-sample MR was employed to analyze the bidirectional causal relationships between 731 circulating immunophenotypes and AC risk.

Results: A total of 33 genetically predicted immunophenotypes were significantly associated with AC risk. A protective effect of 18 immunophenotypes against AC was found, such as CD3 on CD39+CD8br (inverse variance weighted [IVW] odds ratio [OR] = 0.936, 95% confidence interval [CI]: 0.925–0.985, $p = 0.003$) and CD25 on CD28+CD4+ (IVW OR = 0.921, 95% CI: 0.863–0.983, $p = 0.013$). Conversely, 15 immunophenotypes were found to be significantly associated with AC risk, such as CD25 on IgD–CD38dim (IVW OR = 1.042, 95% CI: 1.012–1.073, $p = 0.006$). Reverse MR based on these 33 genetically predicted immunophenotypes suggested that AC also had a significant influence on four circulating immune cells, including CD33–HLA DR–AC (IVW OR = 1.187, 95% CI: 1.034–1.362, $p = 0.015$), CD3 on CD39+CD8br (IVW OR = 0.876, 95% CI: 0.779–0.985, $p = 0.027$), HLA DR on CD14+monocyte (IVW OR = 0.831, 95% CI: 0.725–0.953, $p = 0.008$), and CD39 on CD39+secreting Treg (IVW OR = 1.123, 95% CI: 1.002–1.259, $p = 0.046$).

Conclusions: Our study highlights the intricate association between immune cells and AC, providing a valuable basis for future mechanistic and therapeutic studies from an immunological perspective.

Abstract No.: 207371
Panel No.: CDE-0300

Contact...Lens for Help: Game Changer for the Varying Irregular Cornea

First Author: Yash GALA

Co-Author(s): Pavan LOHIYA

Purpose: To demonstrate the critical role of specialized contact lens designs in the visual and functional rehabilitation of patients with complex corneal irregularities stemming from trauma, previous refractive surgeries, and their complications.

Methods: Case 1 - 44/Y old male s/p traumatic corneal tear repair and subsequent lens extraction in LE, CDVA (3/60) with severe photophobia due to a large, irregular pupil. Case 2 - 42/Y old male with a history of RK and LASIK, presenting with acute corneal hydrops in LE, CDVA 1/60, Dense epithelial-deep stromal edema along RK cuts, along with irregular DM noted on ASOCT. Case 3 - 69Y/M one-eyed came with h/o grade 4 pterygium excision with a patch graft with PCIOL, CDVA 2.5M in RE, a dense demarcation scarred line along the visual axis bisecting the cornea was noted.

Results: Case 1 - Piggyback lens system(a soft prosthetic lens with a 4mm pupil paired with a Rose K rigid lens)

successfully improved CDVA to 6/12 with a dramatic reduction of the patient's debilitating photophobia and glare. Case 2 - Acute episode managed by air descemetopexy & topical steroids led to the complete resolution of corneal edema. Subsequent fitting with a scleral lens successfully rehabilitated CDVA to 6/9p, overcoming the irregular astigmatism caused by ectasia. Case 3 - Corneal-scleral lens with appropriate size and fitting parameters improved CDVA to 6/18P.

Conclusions: Specialized CL (including scleral, prosthetic, and piggyback systems) are indispensable tools for visual rehabilitation in eyes with complex corneal surface irregularities. They effectively correct irregular astigmatism and manage associated symptoms like photophobia, often serving as the definitive treatment after surgical correction of acute complications. A tailored, patient-specific approach is essential for optimal functional and quality-of-life outcomes.

Abstract No.: 200624

Panel No.: CDE-0176

Corneal Globular Cells and Their Association With the Ocular Surface in Dry Eye Disease and Diabetes Mellitus

First Author: Haotian LIAO

Co-Author(s): Isabelle Xin Yu LEE, Chang LIU, Yu-chi LIU, Louis TONG, Mingyi YU

Purpose: To characterize corneal globular cells (GC) and dendritic cells (DC) in diabetes mellitus (DM), dry eye disease (DED), and healthy subjects, and investigate the relationship between GCs, DCs, and ocular surface health.

Methods: This retrospective study included 452 eyes from 320 subjects, comprising 231 DM, 52 DED, and 37 healthy subjects. In-vivo confocal microscopy was used to image GCs and DCs. Cell parameters, including cell count, density, area, elongation, and length, were quantified. Ocular surface assessment included corneal sensitivity, tear break-up time (TBUT), Schirmer test, and corneal and ocular surface staining.

Results: The DED group had significantly higher GC count than controls ($p=0.033$). DED patients also had significantly lower DC elongation than DM patients ($p=0.036$), suggesting more mature DC activity. Significant and positive correlations were found between DC count and GC count, area, elongation, and length (all $p<0.05$). Significant inverse correlations were found between DC elongation and GC count, density, and elongation (all $p<0.05$). DC length was negatively correlated with GC density ($p=0.027$). Linear mixed model analysis showed that higher GC count was significantly associated with lower TBUT ($p=0.047$). Multivariable logistic regression demonstrated that GC count was significantly associated with TBUT<10 seconds ($p=0.015$). GC count >15 per IVC frame

were 2.51-times more likely to have TBUT <10 seconds (OR=2.51, 95% CI, 1.12 to 5.26, $p=0.015$).

Conclusions: Corneal GCs were increased in DED and associated with tear film instability. It may serve as an imaging indicator for ocular surface health.

Abstract No.: 201680

Panel No.: CDE-0196

Correlation Between Serum Autoantibodies and Severity of Dry Eye Disease in Sjögren's Syndrome Patients: A Systematic Review and Meta-Analysis

First Author: Siu Ting FU

Co-Author(s): Yan Yu Julia CHAN, Wing Sze Vanissa CHOW

Purpose: To investigate the correlation between serum antibody positivity and dry eye disease severity in patients with Sjögren's syndrome.

Methods: Observational studies published between 2000 and 2025 in PubMed, Embase, and Scopus were systematically reviewed. Eligible studies reported correlations (r) or odds ratios (ORs) between antinuclear antibody (ANA), rheumatoid factor (RF), anti-SS-A/Ro, and anti-SS-B/La and dry eye outcomes, including Ocular Surface Staining (OSS), Schirmer's test, and Tear Break-Up Time (TBUT). ORs were converted into correlation coefficients using the logoddsratio to Cohen's d method and then to r . Fisher's z transformed correlations were pooled using random effects models with restricted maximum likelihood estimation. Heterogeneity was assessed with Q and I^2 statistics.

Results: Nine studies, including 2,870 patients with Sjögren's syndrome, were analysed. Anti-Ro/SSA was modestly correlated with worse OSS ($r = 0.17$, 95% CI 0.12 to 0.21), shorter TBUT ($r = -0.27$, 95% CI -0.40 to -0.12), and lower Schirmer's test scores ($r = -0.15$, 95% CI -0.31 to 0.02). Anti-La/SSB displayed weak and inconsistent correlations across ocular measures. RF was associated with shorter TBUT ($r = -0.18$, 95% CI -0.30 to -0.06), while ANA was negatively correlated with both Schirmer's ($r = -0.15$, 95% CI -0.29 to -0.01) and TBUT ($r = -0.16$, 95% CI -0.30 to -0.02). All correlations were weak in magnitude.

Conclusions: Anti-Ro/SSA, RF, and ANA are weakly but significantly correlated with more severe ocular surface damage and tear film instability in patients with Sjögren's-related dry eye disease, suggesting the possible use of antibody profiling for risk stratification of dry eye severity in Sjögren's syndrome patients.

Abstract No.: 201580

Panel No.: CDE-0192

Correlation Between Symptom Burden and Productivity in Patients with Hay Fever: A Digital Cross-Sectional Study

*First Author: Weicong **PENG***

*Co-Author(s): Kenta **FUJIO**, Takenori **INOMATA**, Ken **NAGINO**, Shintaro **NAKAO***

Purpose: To examine how specific nasal and non-nasal symptoms and demographic factors relate to work productivity, activity impairment, and quality of life (QoL) in patients with hay fever in Japan.

Methods: In this cross-sectional study, participants with hay fever who used the AllerSearch smartphone application between February 2018 and May 2025 were enrolled. Symptoms were evaluated by nasal (NSS), non-nasal (NNSS), and total symptom scores (TSS); QoL by JACQLQ. Productivity impairment, including absenteeism (work time missed), presenteeism (reduced on-the-job effectiveness), total productivity loss, and activity impairment, was assessed via WPAI:AS. Spearman correlation and multivariable regressions were used to evaluate and visualize the association between symptoms and productivity.

Results: Among 3,351 participants with hay fever (mean age 40.1 ± 11.7 years; 48.7% female), NSS and NNSS were strongly correlated (Spearman coefficient, all $P < 0.001$) with presenteeism (NSS 0.565; NNSS 0.477), total productivity loss (0.560; 0.474), activity impairment (0.572; 0.496), and QoL (0.611; 0.534). Rhinorrhea showed the highest correlation with productivity loss (presenteeism 0.469; productivity loss 0.463; activity impairment 0.471). In multivariable regression analysis (regression coefficient [95% CI]), nasal congestion predicted QoL worsening (2.374 [1.748–2.999], $P < 0.001$) but not productivity loss. Non-nasal symptoms had stronger impacts on both productivity loss and QoL than nasal symptoms. Preventive measures were linked to reduced presenteeism and activity impairment.

Conclusions: Nasal and non-nasal symptoms drive productivity and QoL impairment in the working population with hay fever in Japan. Nasal congestion predominantly worsens QoL, whereas non-nasal symptoms more strongly affect work performance.

Abstract No.: 201732

Panel No.: CDE-0197

Cross-Sectional Study on the Quality of Life of Patients With Recurrent Ocular Herpes Simplex Virus Disease

*First Author: Julia **CHAN***

Purpose: Herpes Simplex Virus (HSV) is the most common eye disease-causing virus. The frequent relapse leads to corneal opacification, causing permanent visual loss. The psychological impact

of recurrent ocular HSV disease has been under-reported in the literature. The study aims to report the psychological impact and the effect on their daily activities and living in patients with the condition.

Methods: Thirty-six Chinese patients with recurrent ocular HSV disease underwent face-to-face interviews for the National Eye Institute Visual Functioning Questionnaire-28R (NEI VFQ-28R) and Ocular Surface Disease Quality of Life (OSD-QoL) questionnaire delivered by a single research assistant between February and August 2025.

Results: Subjects interviewed were 56% male ($n=20$), with a mean age of 67.06 ± 13.3 years (range: 18–89). 19.4% ($n=7$) of patients were at the active phase, while the remaining were in remission. For the VFQ-28R Questionnaire, the mean VFQ28R composite score was 83.01 ± 19.03 , with a general vision score of 53.18 ± 20.15 . Components with worse responses are near activity (71.76 ± 30.23) and mental health (73.79 ± 23.09), while social functioning (91.67 ± 18.18) and colour vision (90.44 ± 20.23) were relatively unaffected. For the OSD-QoL Questionnaire, the mean scores for most of the components were low, especially for “Perception of the Others” ($67.14 \pm 18.21\%$) and “Fear of the future” ($56.24 \pm 29.13\%$), reflecting that uncertainty of disease prognosis had caused a significant burden in the subjects.

Conclusions: Due to the characteristic relapsing nature of the condition, Recurrent Ocular HSV Disease has a significant impact on patients’ quality of life and activities of daily living.

Abstract No.: 205009

Panel No.: CDE-0251

Development of a Translational Model to Explore the Effect of Surface Topography on Corneal Epithelial Wound Healing

*First Author: Isabel **COWLISHAW***

*Co-Author(s): Richard **CLARKE**, Trevor **SHERWIN***

Purpose: Delayed re-epithelialisation over collagen-based artificial corneal implants has been implicated in the loss of transparency. Interactions of corneal epithelial cells with basement membrane topography may modulate wound healing. In silico modelling offers an inexpensive approach to assess material design iterations. However, predictive accuracy is dependent on the availability of physiologically representative data. A translatable in vitro model was established to evaluate the macro-level trends of void closure and inform in silico model design.

Methods: An in vitro circular exclusion assay was developed with spontaneously immortalised human corneal epithelial cells (HCE-S) cultured outside cylindrical stainless-steel barriers. Polystyrene inserts with 5 μm height and width ridges in a 5 mm diameter radial pattern were fabricated via photolithography.

Hydrophilicity was induced by oxygen plasma treatment and polyvinylpyrrolidone (PVP) coating. Controls included unpatterned inserts and both collagen-coated and untreated tissue culture plastic (TCP). Time-lapse imaging at one-hour intervals on the Nikon BioStation captured void closure over two weeks ($n=3$ for all interventions).

Results: Void area on untreated TCP exhibited a distinct lag-phase for ~24 hours following barrier removal, with closure between days 5-7. Closure on collagen-coated TCP occurred within 4-5 days. PVP-coated inserts did not exhibit a lag phase and closed by day 4 for unpatterned and days 6-7 for patterned inserts. Ridges appeared to direct leading cell migration without accelerating closure.

Conclusions: HCE-S demonstrated comparable hole-closing behaviour on patterned inserts and untreated TCP. The complexity of cell behaviour during wound healing highlights the limitations of simplified computational models in capturing biological variability.

Abstract No.: 206839

Panel No.: CDE-0288

Diagnostic Accuracy of Rapid Immunoassay-Based Point-of-Care Tests for Adenoviral Conjunctivitis: A Systematic Review and Meta-Analysis

First Author: Christina WUNARDI

Co-Author(s): Muhammad ALFATIH, Alfiani Zukhruf Fitri RIFA'I

Purpose: To evaluate the diagnostic accuracy of rapid immunoassay-based point-of-care (POC) tests for adenoviral conjunctivitis compared with polymerase chain reaction (PCR) or adenoviral culture.

Methods: Five electronic databases were searched from inception to September 2025. Eligible studies assessed immunoassay-based POC tests against PCR or culture as the reference standard. A systematic review and bivariate random-effects meta-analysis were conducted. Pooled sensitivity, specificity, likelihood ratios, diagnostic odds ratio (DOR), and the summary receiver operating characteristic (SROC) curve with area under the curve (AUC) were calculated. Risk of bias was assessed with QUADAS-2, and between-study heterogeneity was quantified with I^2 .

Results: Nine studies (910 eyes) were included. Pooled sensitivity was 75.0% (95% CI: 56.1–87.5) and specificity was 92.1% (95% CI: 87.0–95.4). The positive likelihood ratio was 9.7 (95% CI: 5.8–15.4), negative likelihood ratio 0.3 (95% CI: 0.1–0.5), and pooled DOR 38.4 (95% CI: 15.3–80.4). The SROC analysis yielded an AUC of 0.93 (95% CI: 0.86–0.94), confirmed by bootstrap validation. Between-study heterogeneity was low to moderate (I^2 : 8–13%). Most studies were judged at low risk of bias.

Conclusions: Rapid immunoassay-based POC tests demonstrate high specificity and good sensitivity compared with PCR or culture, with excellent diagnostic accuracy. They represent a reliable tool for diagnosing adenoviral conjunctivitis and can support more precise clinical decision-making while reducing unnecessary antibiotic use.

Abstract No.: 202844

Panel No.: CDE-0220

Dome-Shaped Protrusions on Descemet's Membrane in Bullous Keratopathy: Preliminary Histopathological Observations

First Author: Naruki HIGASHISE

Co-Author(s): Takahiko HAYASHI, Noriko KOIZUMI, Sayaka NISHIHATA, Naoki OKUMURA, Satoru YAMAGAMI

Purpose: In advanced bullous keratopathy (BK), structural alterations of Descemet's membrane (DM) are sometimes observed, but their details remain unclear. Intracellular dark endothelial spots (IDESs) are dark lesions detected by specular microscopy and have been regarded as one of the clinical indicators of corneal endothelial dysfunction. However, no histopathological correlate of IDES has yet been established.

Methods: We investigated two patients with severe BK who underwent endothelial keratoplasty (EK): an 88-year-old male with a history of multiple intraocular surgeries, and a 77-year-old male following trabeculectomy. During EK, DM specimens were excised, and corneal endothelial cells were removed by gentle water washing. The isolated DM was then examined using phase-contrast microscopy and scanning electron microscopy (SEM).

Results: Phase-contrast microscopy revealed dome-shaped lesions on the DM surface that differed morphologically from guttae typically seen in Fuchs endothelial corneal dystrophy. It was not possible to determine whether these represented elevations or depressions on phase-contrast images alone. SEM analysis confirmed that these structures were true protrusions extending outward from DM.

Conclusions: This preliminary observation highlights the presence of previously unrecognized dome-shaped protrusions on DM in patients with advanced BK. Although we cannot definitively conclude whether these lesions correspond to IDESs observed on specular microscopy, the morphological similarity raises this intriguing possibility. Further investigation with larger cohorts is warranted to clarify the nature, clinical significance, and potential relationship of these protrusions to IDES.

Abstract No.: 202841
Panel No.: CDE-0221

Donor-Transmitted Infectious Keratitis and Endophthalmitis Following DSAEK: Clinical Features, Management, and Outcomes

First Author: Somasheila MURTHY

Co-Author(s): Vaibhav NAGPAL, Madhu RAI

Purpose: Transmission of infection from donor tissue during corneal transplantation is rare, however, due to the sequestration of infection in a closed space, these cases can be difficult to manage. Medical management alone may be ineffective due to inadequate penetration. Repeat surgery is often indicated in order to avoid unchecked spread of the infection, which can even lead to endophthalmitis. We report the clinical features, management, and outcomes in three patients who developed donor-related ocular infections at our center.

Methods: Retrospective case series.

Results: Three patients presented with post- DSAEK infection. The first two presented on day one and day five with fulminant infection due to multi-drug-resistant gram-negative organisms and the third patient had an indolent course, presenting one month after the surgery with candida infection. All three patients underwent surgical intervention, which included therapeutic keratoplasty and vitrectomy in the first and third cases and primary evisceration in the second case. The third case subsequently underwent evisceration too. A good outcome was obtained only in the first case, which could be correlated with early presentation.

Conclusions: Lamellar procedures carry a higher risk of donor contamination due to loss of the cold chain during tissue processing, such as pre-cut. In our series, acute presentation correlated with bacterial and delayed with fungal etiology, similar to that reported in literature. In addition, multidrug-resistant organisms suggest hospital-based contamination. Delayed identification or presentation carried a very poor prognosis. We recommend immediate surgical intervention as soon as the infection is identified, as medical therapy is unlikely to be effective.

Abstract No.: 201414
Panel No.: CDE-0187

Dry Eye Prevalence and Associated Factors Among School-Age Children in Yingjisha County, Kashgar Prefecture, Xinjiang, China

First Author: Nuan ZHANG

Co-Author(s): Lingyi LIANG

Purpose: To investigate the prevalence and risk factors of dry eye disease (DED) among schoolchildren in Yingjisha County, Kashgar, Xinjiang and to provide an evidence base for prevention and control strategies.

Methods: This cross-sectional study was conducted from May to June 2024 at Yingjisha County No. 3 Middle School and Mangxin Central Primary School. A total of 3,305 schoolchildren completed the questionnaire, and 557 were randomly selected for ocular surface examinations. Tear meniscus height and non-invasive tear break-up time were measured using the Keratograph 5M. DED diagnosis was based on the Dry Eye WorkShop II criteria published by Tear Film & Ocular Surface Society. Multivariate logistic regression was used to assess associated risk factors.

Results: Among the 557 examined children, the prevalence of DED was 16.88% (94/557). No significant difference was found between genders ($p = 0.81$). DED prevalence increased with age, showing a significant linear trend. Children with refractive errors in either eye had a significantly higher prevalence of DED (29.05% vs. 12.47%, $p < 0.001$). Logistic regression identified age ($OR = 1.21$) and refractive error ($OR = 2.72$) as risk factors. No significant associations were found for gender, Body Mass Index, axial length of the right eye, or parental myopia.

Conclusions: The prevalence of DED among school-age children in Yingjisha County is comparable to, or slightly lower than, the national average. Age and refractive error significantly increase the risk of DED. More attention should be paid to refractive status in children to protect ocular surface health and implement early preventive measures.

Abstract No.: 201986
Panel No.: CDE-0204

Early Transcriptomic and Pathologic Changes of Col8a2 Mutant Fuchs Endothelial Corneal Dystrophy

First Author: Xintian ZHAO

Purpose: To characterize early transcriptomic and pathologic changes in Fuchs endothelial corneal dystrophy (FECD) using the Col8a2 Q455K/Q455K mutant mouse model.

Methods: Mutant mice were classified into an early stage (≤ 2 months) and a late stage (≥ 8 months) according to corneal endothelial morphology assessed by slit-lamp, OCT, and confocal microscopy. Corneal endothelial cells from early- and late-stage mutants, together with age-matched wild-type controls, were subjected to RNA sequencing, followed by validation with qPCR and immunofluorescence staining.

Results: No apparent corneal abnormalities were observed for 2 months, whereas endothelial alterations and stromal edema emerged after 4 months and progressively worsened with age. Despite the absence of early morphological changes, transcriptomic analysis revealed 221 upregulated and 55 downregulated genes in early-stage mutants compared with controls; these transcriptomic changes became more pronounced

at the late stage. Differentially expressed genes were enriched in extracellular matrix remodeling (Lgals3, Timp1, Mmp3), endoplasmic reticulum stress (Hspa5, Dnajb9, Atf3), and early immune activation (Icam1, Bpifb1, C1q). These molecular alterations were further validated at both the RNA and protein levels.

Conclusions: The Col8a2 Q455K/Q455K mutant model exhibits extracellular matrix remodeling, endoplasmic reticulum stress, and immune activation in the corneal endothelium before overt corneal pathology, suggesting potential early biomarkers and therapeutic targets for FECD.

Abstract No.: 206150

Panel No.: CDE-0274

Effect of Alcohol Consumption on the Risks of Dry Eye Disease: A Systematic Review

First Author: Hei Ching **CHEUNG**

Co-Author(s): Kam Lung **CHONG**, Kai Hei **LAI**, Chi Pui Calvin **PANG**, Clement Chee Yung **THAM**, Tate **WAI**

Purpose: To identify the association between alcohol consumption and risks of Dry Eye Disease (DED).

Methods: Articles were screened from PubMed, ScienceDirect, and Google Scholar. Twelve studies and three meta-analyses (2000-2025) involving 92,700 subjects globally were included. Studies included acute alcohol administration (3) and habitual alcohol drinkers of different degrees vs non-drinkers (9). Participants either measured breath alcohol concentration values (BrAC) (3) or reported drinking habits through questionnaires (9). Indicators of DED and its severity included self-reported questionnaires (including SPEED), OSDI, tear evaporation and blink rate, tear lipid, TBUT, Schirmer's test, PRT tear test, and visual analogue scale (VAS) evaluation.

Results: The majority of ten articles presented a positive association between alcohol use and risk or prevalence of DED. One of which reported that alcohol consumption caused higher OSDI scores ($\beta = -0.15$, $t = -3.21$, $p = 0.001$). With machine learning prediction, alcohol drinking is suggested to be a heavily weighted predictor which negatively affect meibum quality, SPEED score, and VAS scores. However, two studies found no statistically significant relationship between alcohol drinking and DED. Whereas another study even suggested an inverse correlation ($OR = 0.47$). Moreover, two studies highlighted a gender difference in the impact of alcohol on DED. One discovered alcohol was a risk factor of DED in females ($OR = 1.08$) but showed statistically significant mild protective effects in males ($OR = 0.77$).

Conclusions: The association between alcohol consumption and DED is not conclusive based on current studies. Further investigation is needed to determine whether different levels and types of

alcohol use in different genders may contribute to the development of DED.

Abstract No.: 203384

Panel No.: CDE-0227

Effectiveness of Intense Pulse Light Therapy (IPL) in Treatment of MGD (Meibomian Gland Dysfunction)

First Author: Samhitha H R

Co-Author(s): Namita **ANAGOL**, Sri **GANESH**, Puja **NAYAR**

Purpose: To study the effectiveness of intense pulsed light therapy in treatment of meibomian gland disorders.

Methods: Intense pulsed light therapy was done for a total of 170 eyes and the lipid layer thickness and partial blink detection were evaluated using lipiview 1st sitting, 2nd sitting 3rd sitting and 4th sitting at 2 weeks 1 month, and 2 months respectively. Patient satisfaction was also evaluated after each sitting

Results: The study included 170 eyes (85 participants) aged 20 to 80 years, with the most represented age groups being 20–30 years and 61–70 years (20.5% each). The mean age was 50.19 ± 19.18 years. The sample comprised 45.2% males and 54.8% females. A majority (75.9%) reported symptoms, with 92.8% having undergone prior medical management. Symptom duration varied, with 76% experiencing onset within 1–5 years. Nearly half (49.4%) had no systemic conditions, while common comorbidities included hypertension (19.4%), diabetes mellitus (12.9%), hypothyroidism (12.4%), and autoimmune disorders (4.7%). Most participants (68.1%) had not undergone other interventions, while 28.3% had a post-surgical history. Among 158 eyes (92.9%) who received four IPL sessions, lipid layer thickness improved significantly over time from 55.88 ± 19.638 at baseline to 76.55 ± 17.932 at 2 months ($p < 0.05$). Partial blink frequency also decreased, indicating improved ocular surface stability. Pairwise comparisons confirmed a statistically significant increase in lipid layer thickness, highlighting the effectiveness of IPL therapy.

Conclusions: Our study found that intense pulsed light (IPL) therapy significantly improved meibomian gland function by increasing lipid layer thickness and reducing partial blinking. These physiological changes enhanced tear film stability, with benefits sustained over follow-ups. IPL shows promise as an adjunct or alternative for chronic, treatment-resistant meibomian gland dysfunction (MGD). IPL is a well-tolerated, non-invasive option for MGD.

Abstract No.: 208185

Panel No.: CDE-0303

Efficacy of Topical Insulin in Refractory Neurotrophic Keratopathy: A Case Series

First Author: Andrea Chor Kiu AU

Co-Author(s): Wing Man HO, Anita Lai Wah LI, Kai Wang Kenneth LI

Purpose: To present the results of topical insulin in refractory neurotrophic keratopathy (NK).

Methods: A retrospective case series of four Chinese patients on topical insulin for refractory NK. Topical insulin was prepared by mixing short-acting insulin in artificial tears with a polyethylene glycol and propylene glycol base at a concentration of 1 unit/mL, prescribed 4-6 times daily for 1-2 months.

Results: Four patients, aged 31-67 years, with stage 1-2 NK were included. Etiologies included herpetic stromal keratitis, trigeminal nerve damage from resection of trigeminal schwannoma, and facial nerve palsy. All patients failed to respond to conventional treatment including topical lubricants, steroid, cyclosporine, bandage contact lens, punctal occlusion, amniotic membrane grafting and temporary tarsorrhaphy. Each patient was started on topical insulin eyedrops. Complete corneal re-epithelialization was achieved in 3 patients within 7-14 days. The fourth patient reported significant symptomatic relief. The patients were maintained on lubricants, apart from one who also used ciclosporin 0.05%. No recurrence was observed up to 6-11 months at the latest follow-up. No local or systemic side effects were reported.

Conclusions: Topical insulin has been reported to be effective and safe for treating refractory NK. It is also an inexpensive and widely available drug with excellent tolerability, making it an easily accessible treatment option. This case series demonstrated encouraging results of topical insulin in refractory NK patients who failed all conventional treatment. Further studies are needed to determine the long-term efficacy and safety of topical insulin, and stability tests with a defined concentration and diluent have to be developed.

Abstract No.: 205639

Panel No.: CDE-0269

Endothelial Cell Loss Following Cataract Surgery in Eyes With Pseudoexfoliation: A 10-Year Comparative Study

First Author: Hari Priya ARAVIND

Co-Author(s): Shivkumar CHANDRASHEKARAN, Kalpana NARENDRAN, Venkatesh RENGARAJ, Alan ROBIN, Madhu SHEKAR

Purpose: During a 10-year period, we compared endothelial cell density (ECD) and best corrected visual acuity (BCVA) in eyes with and without pseudoexfoliation (PEX) undergoing cataract surgery.

Methods: This is a prospective study of 930 cataract patients with and 476 cataract patients without PEX who underwent phacoemulsification.

Results: The ten-year follow-up rate was 82.2% in the PEX and 85.6% in the control group. Mean ECD before surgery was 2144 (349) cells/mm² in the PEX group and 2241 (330) cells/mm² in the control group ($p < 0.001$). After 10 years, ECD was 2026 (376) in the PEX group and 2097 (328) in the control group ($p = 0.009$). There was a significant reduction ($p < 0.001$) in ECD from pre-op to final follow-up. At 10 years, logMAR BCVA was better in control than the PEX group (0.08 versus 0.12; $P = .035$).

Conclusions: In this large-scale, long-term, prospective study, ECD was significantly lower in PEX compared to control eyes, with significant endothelial cell loss in both groups.

Abstract No.: 204867

Panel No.: CDE-0254

Endothelium-In Preloaded versus Surgeon-Loaded DMEK: A Comparative Study in Asian Eyes

First Author: Wen Pei Angeline TOH

Co-Author(s): Marcus ANG, Ezekiel CHEONG, Qiu Ying WONG

Purpose: To prospectively compare complications between imported preloaded grafts and surgeon-loaded grafts in Descemet membrane endothelial keratoplasty (DMEK) amongst Asian eyes.

Methods: Twenty preloaded DMEKs were compared with donor-matched 40 surgeon-loaded DMEKs, all performed by a single surgeon in the Singapore National Eye Centre using endothelium-in pull-through cartridges (CORONET DMEK Endoglide; Network Medical Products, United Kingdom). Imported preloaded grafts were prepared 72 to 96 hours prior to surgery for the indications of Fuchs' endothelial cell dystrophy and pseudophakic bullous keratopathy. The primary outcome was intraoperative complications, with secondary outcomes including endothelial cell loss and postoperative complications within 3 months.

Results: Preloaded DMEKs had significantly shorter intra-operative times compared with surgeon-loaded DMEKs (26.2 min vs 39.5 min; $P < 0.001$), but a higher conversion rate to standard injector-DMEK (15% vs 0%; $P = 0.033$). No significant differences were observed between the groups in overall intraoperative (40% vs 22.5%; $P = 0.156$) or postoperative (40% vs 30%; $P = 0.439$) complications, rebubbling rates (5% vs 5%; $P > 0.999$), visual outcomes, or endothelial cell loss.

Conclusions: In our Asian cohort of pull-through DMEKs, endothelium-in preloaded grafts were significantly faster than surgeon-loaded grafts while demonstrating comparable clinical outcomes. Preloading endothelium-in, rather than endothelium-

out, appears to achieve outcomes similar to surgeon-loaded DMEKs.

Abstract No.: 201796

Panel No.: CDE-0194

Enhanced Staff Referral Program in the Accident and Emergency Department Increases Opportunities for Corneal Donation

First Author: Agnes HO

Co-Author(s): Yan Yu Julia CHAN, Wing See Vanissa CHOW, Amanda LUK, Catherine WONG, Maggie WU

Purpose: Corneal tissue shortage poses a significant challenge in Hong Kong, with almost 600 patients awaiting corneal transplants as of July 2025. Given that 40% of eye donors originate from Accident and Emergency Departments (AEDs), an enhanced staff referral program was implemented in 2017 to boost donation rates. This initiative included providing educational lectures, posters, and pamphlets for healthcare professionals across 16 AEDs and the incorporation of a simplified checklist and referral procedure into the workflow of death certification. A retrospective study is conducted to study the effect of the enhancement in the AED Staff Referral Program.

Methods: This retrospective study analyzed Hospital Authority Eye Bank data from January 2017 to December 2024, comparing referred, solicited, approached, and consented AED cases to those solicited by Eye Donation Coordinators (EDCs) using independent t-tests in SPSS (significance level at $p < 0.05$).

Results: After implementation of the program, AED referrals increased until 2020 (peaked at 190 cases in 2018) but declined below baseline during 2021-2023 amid the pandemic, with a modest recovery to 81 cases in 2024. Consent rates for AED-referred cases averaged 49.8%, significantly higher than 35.3% for EDC-solicited cases ($p = 0.002$).

Conclusions: The Enhanced AED Staff Referral Program had a significant impact on the number of referred cases. Nevertheless, cases identified by AED staff had a significantly higher consent rate over the years. The program's success underscores its potential to boost donation rates and make a meaningful impact on the lives of those awaiting corneal transplants.

Abstract No.: 204726

Panel No.: CDE-0250

Favourable Response to Tacrolimus in a Case of Refractory Peripheral Ulcerative Keratitis in Paediatric ANCA-Associated Vasculitis

First Author: Tsz Him Johnson KWOK

Co-Author(s): Eugenie MOK, Alvin L. YOUNG

Purpose: To report a case of peripheral ulcerative keratitis (PUK) in a girl with ANCA-associated vasculitis

(AAV) which progressed despite conventional B cell depletion therapy and eventually responded to oral tacrolimus.

Methods: A 14-year-old Chinese girl with anti-myeloperoxidase (MPO) positive AAV developed aggressive PUK. Her clinical course, immunosuppressive regimens, and outcomes were reviewed.

Results: The patient with known AAV presented with right eye PUK after an upper respiratory infection. She received cyanoacrylate glue, intravenous methylprednisolone and rituximab. However, after 2 months, there was progression in corneal thinning and anti-MPO antibodies remained positive despite B-cell depletion. She was therefore initiated on oral cyclosporine, but its side effects led to poor compliance. During this time, the disease continued to progress and culminated in corneal perforation, requiring a second application of cyanoacrylate glue. The patient eventually responded to a combination of oral tacrolimus and intravenous immunoglobulin, with stabilisation of corneal thinning and complete resolution of conjunctival injection.

Conclusions: The patient had disease progression despite adequate B cell depletion and only achieved disease control after switching to tacrolimus. Although AAV is considered a primarily B cell driven disease, this case illustrates that T-cell mediated immunity may play a critical role in the pathophysiology as well. When first line B-cell depletion therapy fails, T-cell-directed treatments such as tacrolimus can be an effective salvage option.

Abstract No.: 202337

Panel No.: CDE-0208

Ferroptosis Pathway Dysregulation in Fuchs Endothelial Corneal Dystrophy Revealed by RNA-Seq

First Author: Taichi YUASA

Co-Author(s): Noriko KOIZUMI, Taisuke NUMAO, Naoki OKUMURA, Yasuomi URANO

Purpose: Fuchs endothelial corneal dystrophy (FECD) is a progressive disorder characterized by extracellular matrix accumulation beneath corneal endothelial cells and subsequent corneal edema leading to visual impairment. Although oxidative stress, endoplasmic reticulum stress, and trinucleotide repeat (TNR)-induced splicing abnormalities in the TCF4 gene have been implicated, the full pathogenesis of FECD remains unclear. Recently, ferroptosis, an iron-dependent form of regulated cell death, has emerged as a potential mechanism. This study aimed to investigate the involvement of ferroptosis in the pathogenesis of FECD using RNA-Seq analysis.

Methods: RNA-Seq data from corneal endothelial cells of FECD patients (with and without TCF4 TNR expansion) and healthy controls were analyzed.

Differentially expressed genes (DEGs) were identified, with a focus on ferroptosis-related genes (FRGs) curated from the FerrDb database. Functional enrichment and pathway analyses were performed, and findings were validated using two additional independent RNA-Seq datasets.

Results: A total of 150 FRGs were significantly dysregulated in FECD samples compared with controls. Principal component analysis and heatmap clustering revealed a distinct ferroptosis-related gene expression signature in all FECD patients, regardless of TCF4 TNR expansion status. Pathway enrichment implicated ferroptosis together with oxidative stress response and TNF signaling pathways. Cross-validation across three independent datasets consistently identified 27 dysregulated FRGs.

Conclusions: Our findings confirm the potential involvement of ferroptosis in FECD pathogenesis, independent of the common genetic risk factor of TCF4 TNR expansion. The identified genes provide novel insights into the disease's mechanisms and represent potential targets for future therapeutic strategies.

Abstract No.: 206087

Panel No.: CDE-0273

From Drink to Blink: Associations Between Chronic Alcohol Consumption and Dry Eye Disease: A Cross-Sectional Study

First Author: Stephany Wing Lam TAI

Co-Author(s): Kelvin KI CHONG, Kenneth Ka Hei LAI, Calvin Cp PANG, Clement Cy THAM

Purpose: To investigate associations between chronic alcohol consumption and Dry Eye Disease (DED).

Methods: A cross-sectional study was conducted in the community during March-September 2025. We included adults with chronic alcohol consumption who reported continuous drinking for ≥ 1 year. Controls were recruited who had never consumed alcohol during their lifetime. Exclusions: any type of inflammatory disease, recent use of eyedrops, or having had ocular surgeries. Evaluations of ocular surface included lipid layer thickness (LLT) by LipiView® II, tear meniscus height (TMH), and non-invasive keratography break-up time (NIKBUT) by Keratograph® 5M, Schirmer Test (ST), and slit lamp examination conducted by ophthalmologists. Ocular Surface Disease Index (OSDI) was self-reported.

Results: We recruited 61 chronic alcohol users (aged 46.4 ± 15.8 years; 46 current, 15 former; mean consumption 16.6 ± 11.5 years) and 61 age- and sex-matched controls. Alcohol users exhibited lower ST (7.0 vs 9.5 mm, $P=0.003$); lower FBUT (4.8 ± 2.9 vs 6.1 ± 2.4 s, $P=0.012$); lower NIKBUT (8.2 ± 5.1 vs 10.7 ± 6.4 s, $P=0.005$). They also presented more severe MGD signs: lower LLT (58.3 ± 21 vs 66.4 ± 17 nm, $P=0.008$), rounding ($P=0.002$); foaming ($P=0.013$); telangiectasia ($P=0.003$); capping ($P=0.032$); conjunctival injection ($P=0.0001$).

They also showed 4.0 points higher OSDI scores ($P=0.026$). On LLT subgroup analysis, no difference among females between alcohol users and controls: (52.9 ± 23 vs 57.5 ± 18 nm, $P=0.084$), yet remained significant for males (45.2 ± 20 vs 56.8 ± 17 nm, $P=0.021$). On dose-response analysis, median ST differed among controls, former, and current drinkers ($9.5/7.0/5.0$ mm, $P=0.045$).

Conclusions: Alcohol consumption is associated with DED. Our study, for the first time, shows both aqueous deficiency and evaporative dry eye found in chronic alcohol users. We suggest ocular surface evaluation is warrant in patients with chronic alcohol usage.

Abstract No.: 202445

Panel No.: CDE-0211

From Rupture to Rescue: Crescent Deep Anterior Lamellar Keratoplasty for a Paper-Thin Cornea Terrien's Marginal Degeneration

First Author: Kiara NURMATHIAS

Co-Author(s): Rio RHENDY

Purpose: To report successful surgical rescue of a paper-thin cornea in Terrien's Marginal Degeneration (TMD) using Crescent Deep Anterior Lamellar Keratoplasty (DALK).

Methods: A 29-year-old woman suffered right-eye rupture after trauma, managed with corneal-limbal patch graft and pupilloplasty. The fellow left eye displayed classical TMD features: clear central cornea, multiple peripheral dystrophic opacities, superior lipid deposition, and nearly 320° of peripheral thinning without staining. Topography revealed high irregular astigmatism, while AS-OCT confirmed extreme thinning of $150 \mu\text{m}$ compared with $502 \mu\text{m}$ centrally. Preoperative best corrected visual acuity (BCVA) was 3/60. Given the imminent risk of perforation, a crescent DALK was performed.

Results: Intraoperatively, surgery proceeded with a manual layer-by-layer keratoplasty. After stromal dissection, a Descemet membrane rupture was identified. A deep stromal bubble could not be formed. The surgery was then carefully continued, and a donor lamellar graft was successfully implanted, restoring corneal contour and tectonic stability. Serial postoperative AS-OCT confirmed smooth graft-host integration and progressive peripheral thickening. Visual outcome improved significantly, BCVA 6/20 at last follow-up. The graft remained stable, with no recurrence or failure.

Conclusions: In cornea thinner than $200 \mu\text{m}$, Crescent DALK can preserve globe integrity and restore functional vision in TMD. Multimodal imaging with topography and AS-OCT was essential for surgical planning and precise depth assessment, while careful adaptation to intraoperative steps allowed safe manual

completion with stable graft integration and significant visual improvement.

Abstract No.: 202460

Panel No.: CDE-0212

Full-Thickness Corneal Perforation in Femtosecond Laser-Assisted Deep Anterior Lamellar Keratoplasty Due to Unpredictable Micro-Cavitation Bubble Size

First Author: Lauren Ya Wen FONG

Co-Author(s): Julia CHAN, Vanissa CHOW

Purpose: Femtosecond laser (FSL) is widely utilized in keratoplasties. We report a rare case of intraoperative Descemet's membrane (DM) perforation despite a sufficient safety margin in FSL planning.

Methods: Inadvertent full thickness right eye corneal perforation occurred during FSL-assisted lamellar corneal trephination in a 21-year-old Chinese male. He was originally planned for deep anterior lamellar keratoplasty (DALK) due to dense corneal scarring secondary to Acanthamoeba keratitis. FSL-assisted DALK with circular graft and "peeling-off" method was performed with the FEMTO LSV Z8 laser system. Surgical planning was guided by intraoperative anterior segment optical coherence tomography. The intended residual stromal bed was 190um. The laser cutting and energy speed were 8.0 mm/s and 130% respectively, for the stromal cut, and 1.0mm/s and 160% respectively, for the side cut.

Results: Inadvertent full-thickness corneal perforation with a circumferential break from 9 to 12 o'clock at the DM was only made aware to the surgeons during anterior lamella dissection. In view of the status of the DM, the surgery was converted to a penetrating keratoplasty. The patient had an uneventful recovery postoperatively. FSL-assisted keratoplasties aim to reduce the risk of DM perforation. DM perforation despite a safety margin of 1/3 corneal thickness is rare. Subsequent in-vivo porcine eye testing showed large discrepancies between actual and set cutting depth secondary to micro-cavitation bubble variations, where increased cutting power would lead to a larger cavity and downward directional movement.

Conclusions: Micro-cavitation bubble variations should be considered and evaluated to increase the success of FSL-DALK and to reduce intra-operative complications.

Abstract No.: 204301

Panel No.: CDE-0239

Glue to the Rescue!

First Author: Gaurav VERMA

Co-Author(s): Jagadeesh Kumar REDDY, Vandhana SUNDARAM

Purpose: To evaluate the safety and efficacy of use of Fibrin glue as an adjuvant in management of

Descemet's membrane detachment post Deep Anterior Lamellar Keratoplasty.

Methods: This retrospective observational case series consisted of 7 eyes which had Descemet's membrane detachment after DALK due to micro perforations.

Results: The mean age of patients included in the case series was 21 +/- 2.5 years with a mean follow up period of 18 +/- 5 months. The need for re air injection was significantly reduced. By reducing reliance on air tamponade, it removes the need for extended supine positioning. The glue gradually gets absorbed with time, with no interface vascularization or infiltration. There was also reduced risk of pupillary block, postop fixed dilated pupil, cataract and posterior synechia formation.

Conclusions: Fibrin glue can be a valuable adjunct in the management of micro perforation in DALK even post operatively.

Abstract No.: 204876

Panel No.: CDE-0255

Growth Factor Receptor-Bound Protein 2-Mediated Corneal Epithelial Injury Drives Depression-Associated Dry Eye Disease

First Author: Kuangqi CHEN

Purpose: Depression is increasingly recognized as a comorbidity of dry eye disease (DED), yet its underlying mechanisms remain unclear. This study investigates the therapeutic effects of fluoxetine on depression-associated corneal injury and explores the molecular pathways involved.

Methods: Chronic unpredictable mild stress (CUMS) mice received fluoxetine treatment. Behavioral tests, corneal wound healing, tear secretion, and 4D-DIA proteomics were performed. GRB2 expression was validated via immunohistochemistry, qRT-PCR, and western blot. Human corneal epithelial cells (hCECs) under hyperosmotic stress (450 mOsm) were transfected with GRB2 siRNA to assess oxidative stress, inflammation, and migration.

Results: Fluoxetine treatment significantly reduced depressive behaviors, accelerated corneal epithelial wound healing, and restored tear secretion. Proteomic analysis of corneal tissues revealed dysregulation of cytoskeletal and metabolic pathways in depressed mice, which fluoxetine partially reversed. GRB2 emerged as a critical protein, showing elevated expression in depressed mice and hyperosmolar-stressed hCECs. Silencing GRB2 in hCECs attenuated hyperosmolarity-induced oxidative stress, inflammation, and migration inhibition. Immunohistochemical and behavioral analyses confirmed GRB2's role in corneal epithelial thinning and depression-related DED pathology.

Conclusions: These findings highlight GRB2 as a potential therapeutic target and underscore

fluoxetine's dual efficacy in mitigating depressive symptoms and ocular surface damage. This study provides novel insights into the molecular interplay between depression and DED, advocating for integrated therapeutic strategies addressing both psychiatric and ophthalmic dimensions.

Abstract No.: 206215

Panel No.: CDE-0276

Herpes Simplex Keratitis as a Consideration in Interface Fluid Syndrome Following Small Incision Lenticule Extraction

First Author: Cristina Erika ELAZEGUI

Co-Author(s): Irwin CUA

Purpose: To report a case of presumed herpes simplex virus (HSV) keratitis following small-incision lenticule extraction (SMILE), which subsequently led to interface fluid syndrome (IFS).

Methods: We describe the case of a 31-year-old man who underwent uneventful SMILE surgery and later presented with persistent corneal edema, ultimately diagnosed as IFS secondary to HSV keratitis. Anterior segment findings, visual acuity, refraction, intraocular pressure (IOP), pachymetry values, and AS-OCT were documented throughout the clinical course

Results: Two weeks postoperatively, the patient presented with whitish granular material within the SMILE interface in the left eye. A presumptive diagnosis of diffuse lamellar keratitis was made, and topical corticosteroids were started. Although initial improvement was noted, corneal edema recurred within the lenticule interface, accompanied by a decline in visual acuity from 20/25 to 20/100 and an IOP of 40 mmHg. Pressure-induced stromal keratitis (PISK) secondary to steroid use was initially suspected, and IOP-lowering medications were prescribed. At the 6-week follow-up, worsening edema, a 93 μ m increase in pachymetry, fine keratic precipitates, and grade 1 anterior chamber cells were observed. A diagnosis of HSV keratitis with secondary IFS was made. The patient was treated with oral acyclovir, topical corticosteroids, and aggressive IOP control, resulting in marked clinical improvement.

Conclusions: HSV keratitis is a potential but underrecognized complication following SMILE. Postoperative corneal interface anatomy may mask classic signs and predispose to secondary IFS in the setting of elevated IOP. Prompt recognition and antiviral therapy are essential to prevent vision-threatening sequelae.

Abstract No.: 205249

Panel No.: CDE-0263

Impact of Glaucoma on Descemet Membrane Endothelium Keratoplasty Using a Widefield Endothelial Imaging Technique

First Author: Ezekiel CHEONG

Co-Author(s): Marcus ANG, Qiu Ying WONG

Purpose: Glaucoma has been shown to be a risk factor for endothelial graft failure following endothelial keratoplasty. We used a novel widefield endothelial imaging technique to examine the impact of glaucoma on peripheral, paracentral, and central regions of the endothelium following Descemet membrane endothelial keratoplasty (DMEK).

Methods: Prospective study of 50 consecutive DMEKs performed in Asian eyes with Fuchs' endothelial cell dystrophy (FECD) and pseudophakic bullous keratopathy (PBK). All eyes had serial non-contact widefield endothelial imaging specular microscopy (CEM-530, Nidek Co. Ltd, Japan) at 1, 3, and 6 months follow-up. Central, paracentral (1-2mm), and peripheral (7-8mm) regions of the cornea endothelium, which correspond to the approximate dimensions of a DMEK donor, were scanned. The main outcome measure was the effect of glaucoma on cornea endothelial cell loss (ECL) comparing central, paracentral, and peripheral regions of the DMEK graft. Secondary outcome measures the effect of glaucoma on intra-operative and post-operative complications, including graft survival.

Results: Mean age was 69 ± 9 years, 54% female, majority Chinese (88%) with 21/50 (42%) eyes with pre-existing glaucoma. Central ECL alone was not significantly different between glaucoma and non-glaucomatous eyes (32.1% vs 29.7%; $P = 0.770$). Including the paracentral region resulted in significant differences between glaucoma and non-glaucomatous eyes (40.4 vs 27.0%, $P = 0.033$) at 3-month follow-up. Overall, intra-operative complications ($P > 0.05$) and post-operative complications were not significant between groups ($P > 0.05$).

Conclusions: Our pilot prospective study suggests that pre-existing glaucoma may impact ECL at the paracentral region in DMEK, which may not be detected when only the central corneal ECL is examined.

Abstract No.: 205806

In Situ Integrated Spermidine Hydrogel Suppresses Subconjunctival Inflammation and Fibrosis

First Author: Haohao CUI

Co-Author(s): Jingguo LI

Purpose: Subconjunctival fibrosis (SCF) treatment is challenging due to drug side effects and ocular barriers. This study aimed to develop a novel adhesive hydrogel for the sustained delivery of spermidine, an

endogenous substance with anti-inflammatory and anti-fibrotic potential, to effectively treat SCF.

Methods: A dual-crosslinked hydrogel was fabricated via dynamic covalent chemistry. Hyaluronic acid was functionalized with phenylboronic acid and aldehyde groups, then mixed with polyvinyl alcohol and spermidine to form a network stabilized by imine and borate ester bonds. The hydrogel's mechanical properties, self-healing, injectability, adhesiveness, and drug release profile were characterized. Its anti-fibrotic efficacy was evaluated in a subconjunctival injury model.

Results: The resulting hydrogel exhibited excellent self-healing, injectability, and tissue adhesiveness, allowing for minimally invasive in-situ formation and sustained spermidine release. It also demonstrated multiple free radical scavenging abilities. In the animal model, the hydrogel significantly reduced early inflammatory cell infiltration, congestion, and edema. At 8 weeks post-treatment, it markedly suppressed the deposition of collagen I and III, confirming a potent anti-fibrotic effect at the tissue level.

Conclusions: This spermidine-delivering hydrogel platform synergistically modulates the oxidative stress microenvironment and sustainably releases its cargo, effectively intervening in the SCF pathological process. It represents a promising single-administration strategy for treating fibrotic diseases.

Abstract No.: 204544

Panel No.: CDE-0243

Insulin Eye Drops as Novel First-line Treatment for Persistent Epithelial Defect Secondary to Radiation Keratopathy: A Case Report

First Author: Pauline Andrea WONG

Co-Author(s): Richard Dean DELA CRUZ, Raymond Nelson REGALADO, Reginald Robert TAN

Purpose: To describe the use of insulin eye drops in the management of persistent epithelial defect secondary to radiation-induced neurotrophic keratopathy.

Methods: A 21-year-old female with a history of surgical resection of optic nerve schwannoma and sixteen cycles of radiation therapy to the right eye presented with mild conjunctival hyperemia and diffuse punctate epitheliopathy. Initial treatment with unpreserved lubricating eye drops and lubricating gel was given. Two weeks later, after completing twenty-eight cycles of radiotherapy, she developed severe conjunctival hyperemia and a central oval epithelial defect (3 × 4.5 mm) with elevated edges. Insulin eye drops (1 IU/mL) were prescribed in addition to unpreserved lubricating eye drops.

Results: At the 7-day follow-up, a 90% reduction in the size of the epithelial defect (0.6 × 2.6mm) was observed. At the 14-day follow-up, the epithelial defect

remained stable in size. Epithelial debridement was done at this time and insulin eye drops continued. Complete epithelial healing was observed at 28 days after initiating insulin eye drop therapy.

Conclusions: To our knowledge, this is the first reported case of using insulin eye drops as a novel first-line treatment for persistent epithelial defect secondary to radiation-induced neurotrophic keratopathy. Insulin eye drops were well-tolerated without significant adverse effects, supporting its feasibility in clinical use.

Abstract No.: 201117

Panel No.: CDE-0182

Integrated Blink Analysis Technologies for Ocular Surface Diseases: A Scoping Review

First Author: Chee Wui ONG

Co-Author(s): Sanjiv BHATIA, Blanche Xiaohong LIM, Chris Hong Long LIM, Tareq NABHAN, Tjaart VAN DER WALT

Purpose: To describe integrated technologies for blink analysis and their utility in evaluating ocular surface diseases.

Methods: A literature search was conducted using PubMed, Embase and Google Scholar. Search terms included "Eye Blink", "Blink", "Blinking", "Device", "Technology", "Appliance", "Application". Publications from January 1, 2000 to August 15, 2025 were included. Studies describing the use of integrated technologies to capture and analyze blink metrics for the evaluation of dry eye disease and other ocular surface conditions were included. Publications describing technical engineering or technologies without an evaluation of ocular surface diseases were excluded. Findings from relevant studies were extracted and compared.

Results: Of 2,565 identified records, 37 met the final inclusion criteria, evaluating the use of 10 technologies. These comprised desk-bound devices – Intelligent Vision Sensor, LipiView™, and IDRA, wearable devices – Wink Glass, DualBlink, Blink-sensing Glasses, and smartphone or computer applications – HealthyRoad, DryEyeRhythm, Dry eye or not? and EyeScore. LipiView™ and IDRA were most commonly studied. Blink rate and partial blink rate were the most commonly analyzed parameters. DED was the most commonly evaluated ocular surface condition. Consistent with existing literature, some studies demonstrated associations between increased partial blink rates and ocular surface disease. There was heterogeneity in methods of blink analysis and insufficient validation of the accuracy and diagnostic ability of measured blink parameters for ocular surface conditions.

Conclusions: Integrated blink analysis technologies are promising for the assessment of ocular surface diseases. Further studies are needed to evaluate the validity and reliability of these technologies.

Abstract No.: 205110
Panel No.: CDE-0258

Integrated Clinical and Proteomic Evaluation of Dry Eye Symptoms and Signs Following Administration of a Novel Nanoemulsion Artificial Tear Formulation

*First Author: Kenrick Kai-yuen **CHAN***

*Co-Author(s): Jingfang **BIAN**, Biyue **GUO**, Thomas Chuen **LAM**, Xulin **LIAO**, Jimmy Sung-hei **TSE***

Purpose: Dry eye disease (DED) significantly impacts people worldwide. This study investigated changes in dry eye symptoms, clinical signs, and tear proteomic profiles following preservative-free nanoemulsion artificial tear application in mild-moderate DED patients.

Methods: This prospective study recruited 31 Chinese DED adults (aged 20-50 years) with OSDI scores of 13-32 and positive dry eye signs using the TFOS DEWS II diagnostic criteria. Subjects used artificial tears four times daily and attended baseline, 2-week, and 3-month visits. The primary outcome was the OSDI score change at 2 weeks. Secondary outcomes included non-invasive tear break-up time (NITBUT), lipid layer thickness, and tear meniscus height. Tear samples were collected using Schirmer's strips and processed by an in-house S-TRAP protocol. Samples were then analyzed by LC-MS/MS with data-independent acquisition and dual proteomics software at 1 % false discovery rate (FDR). Differentially expressed proteins with $q\text{-val} < 0.05$ and $\text{Log}_2\text{FC} > 0.585$ were profiled.

Results: OSDI scores significantly improved at 2-weeks (18.7 ± 9.2 vs 23.9 ± 5.3 , $p = 0.002$) and 3-months (16.1 ± 11.3 , $p = 0.001$) versus baseline. First and average NITBUT showed a numerical reduction at 2 weeks ($p = 0.007$, $p = 0.027$) but not at 3 months. Proteomic analysis identified >1,800 unique proteins with 3 and 23 differentially regulated at 2 weeks and 3 months, respectively. Compared to baseline, previously proposed DED biomarkers were downregulated at 2 weeks, with broader downregulation of inflammatory and stress-related proteins at 3 months.

Conclusions: The preservative-free nanoemulsion artificial tear demonstrated sustained subjective improvement with corresponding reduction in key DED biomarkers. This represents the first study concurrently showing clinical and molecular improvements in the same cohort. Larger validation is needed to confirm therapeutic mechanisms.

Abstract No.: 200505
Panel No.: CDE-0174

Intraoperative OCT as a Reliable Tool for Predicting Graft Thickness and Microkeratome Selection in DSAEK

*First Author: Manasi **TRIPATHI***

*Co-Author(s): Manpreet **KAUR**, Shraddha **SNEHA***

Purpose: To evaluate the reliability of intraoperative optical coherence tomography (iOCT) in predicting Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK) graft thickness, and its utility in guiding microkeratome head selection.

Methods: In this prospective observational study, donor lenticules were assessed intraoperatively using iOCT before microkeratome-assisted cut. Based on the donor thickness, an appropriate microkeratome head size was selected, aiming the lenticule thickness to be between 100-130 microns. After microkeratome cut, graft thickness was re-evaluated intraoperatively on iOCT and postoperatively on day 1 using anterior segment OCT. Measurements were taken centrally, paracentrally, and peripherally. The primary outcome was the agreement between intraoperative and postoperative thickness measurements.

Results: The mean expected central graft thickness was $127.10 \pm 27.2 \mu\text{m}$ while the measured post-cut thickness was $113.30 \pm 26.7 \mu\text{m}$. There was no statistically significant difference between expected graft thickness and actual post-cut thickness measurements ($p = 0.65$). Additionally, no intraoperative complications such as incomplete cuts or perforations occurred. On POD-1, the mean graft thickness was measured to be $123.20 \pm 24.3 \mu\text{m}$ as measured on ASOCT. The difference between intra-operative and post-operative measurement was not statistically significant ($p = 0.37$). The close agreement between expected (post-cut) and actual (POD-1) graft thickness, along with accurate pre-cut lenticule assessment, allowed for appropriate microkeratome head selection in all cases and matched expected lenticule thickness profiles.

Conclusions: iOCT is a safe and dependable adjunct in DSAEK procedures. It aids accurate prediction of graft thickness and enables informed intraoperative decisions regarding microkeratome head selection.

Abstract No.: 207041
Panel No.: CDE-0292

Investigating Shared Diagnostic Genes and Mechanisms Between Metabolic Syndrome and Dry Eye Disease via Integrated Bioinformatics Analysis and In Vivo Validation

*First Author: Ziyu **LIU***

Purpose: This study aimed to identify shared diagnostic genes and molecular mechanisms between MetS and DED using integrated bioinformatics analysis and in

vivo validation. The goal was to uncover overlapping pathogenic pathways and provide insights for improved diagnosis and treatment strategies for patients with both conditions.

Methods: This study employed bioinformatics and in vivo validation to investigate the shared diagnostic genes and underlying mechanisms linking MetS and DED. Differential expression analysis using Limma and weighted gene co-expression network analysis (WGCNA) identified 247 shared driver genes from MetS and DED cohorts. Functional enrichment analysis indicated that these genes are associated with immune regulation and inflammatory responses. Key diagnostic genes were identified via PPI network analysis and validated using a ROC curve. The MetS-DED mouse model further demonstrated CXCR4 overexpression in the corneal epithelium and liver.

Results: Bioinformatics: 247 shared genes were identified between MetS and DED. Functional enrichment highlighted immune and inflammatory processes. KEGG analysis revealed significant pathways, including Cytokine-Cytokine Receptor Interaction and Chemokine Signaling. Four hub genes were identified and validated with high diagnostic accuracy (AUC > 0.7). In Vivo Validation: HFD mice exhibited MetS (weight gain, glucose intolerance, liver steatosis) and DED (reduced tear secretion, corneal damage). CXCR4 was significantly upregulated in both liver and corneal tissues of HFD mice, confirming its role as a key gene in MetS-DED comorbidity.

Conclusions: In this study, we have, for the first time, employed a variety of bioinformatics methods to explore and validate the hub gene in MetS-DED in vivo, providing new insights for future clinical treatments.

Abstract No.: 200525

Panel No.: CDE-0171

Iota-Carrageenan Eye Drops: Effective Treatment for Mild to Moderate Dry Eye Disease

First Author: Anaïs CASTEX

Co-Author(s): Marta BLANCO-VÁZQUEZ, Margarita CALONGE, Hanna DELLAGO, Eva PRIESCHL-GRASSAUER, Sabine ROCH-NAKOWITSCH, Markus SAVLI, Nicole UNGER-MANHART

Purpose: This investigation aimed to evaluate the lubricating performance of Iota-Carrageenan (I-C) eye drops in patients with mild to moderate dry eye disease (DED).

Methods: In this prospective, single-arm investigation, 30 patients with mild to moderate DED (OSDI score 13-32) used I-C eye drops three times daily for 28 days. Assessments were conducted in both normal and adverse controlled environments (ACE). The primary endpoint was the change between baseline and Day28 in DED symptoms, measured by a composite symptom

score (CSS). Secondary endpoints included Ocular Surface Disease Index (OSDI), tear film break-up time, and corneal staining.

Results: Data from 28 patients revealed a significant 54% reduction in mean CSS, decreasing by 11.9 points (95% CI: -15.1, -8.7; $p < 0.001$). The mean OSDI also decreased by 7.8 points (95% CI: -10.9, -4.6; $p < 0.001$). Improvements in tear film stability and corneal integrity were noted after ACE exposure ($p < 0.05$ and $p < 0.001$, respectively). A total of 98 mild adverse events were reported by 21 patients (70%), with no serious events. Additionally, 93% of patients rated I-C eye drops as «well» or «very well» tolerated.

Conclusions: I-C eye drops have demonstrated lubricating performance, safety, and excellent tolerability in the management of mild to moderate dry eye disease (DED). They significantly improve symptoms and enhance tear film stability while protecting the ocular surface, presenting a promising therapeutic option for DED management.

Abstract No.: 201485

Panel No.: CDE-0190

Isolated Streptococcus pyogenes Keratitis With Scleritis: A Case Series and Review of Literature of Streptococcus pyogenes Ophthalmic Manifestations

First Author: Vincent YUEN

Co-Author(s): Jacqueline CHAN, Julia CHAN, Vanissa CHOW, Ke LIU, Rachel TSUI

Purpose: To present two cases of isolated Streptococcus pyogenes keratitis and scleritis from a tertiary ophthalmology referral center in Hong Kong, emphasizing their rapidly progressive and intensely inflammatory nature.

Methods: Patient records were reviewed to identify cases of isolated Streptococcus pyogenes keratitis and scleritis between October 2024 and July 2025. Both cases lacked systemic involvement. Diagnoses were made through clinical examinations, microbiological cultures, and B-scan ultrasonography. A literature review of Streptococcus pyogenes ophthalmic manifestations was conducted using PubMed, Medline, and Cochrane Library databases.

Results: Two eyes from two patients were included. Both had histories of prior ocular trauma or surgery. In contrast to previous reports with systemic involvement, these cases only had ophthalmic manifestations. Each exhibited severe inflammation unresponsive to intensive topical antibiotics alone, requiring the use of topical NSAIDs and steroids. One case rapidly progressed to endophthalmitis and required emergency tap-and-inject surgery. Despite bandage contact lenses and amniotic membrane transplantation, persistent epithelial defects led to bullous keratopathy and corneal scarring. The patient

is awaiting corneal transplantation. The second case showed a favorable response to timely topical steroid administration, resulting in the resolution of inflammation and minimal residual scarring, suggesting the potential benefit of early topical steroid even in the presence of an epithelial defect.

Conclusions: Although rare, isolated *Streptococcus pyogenes* keratitis and scleritis without systemic involvement are possible. These cases highlight the need for prompt diagnosis and early intervention, with topical steroids playing a possible role in improving clinical outcomes.

Abstract No.: 204801

Panel No.: CDE-0248

Keratoconic Mirage: Posterior Pseudo-Lenticulus Sign

First Author: Jann Perrie ALIPIO

Co-Author(s): Sharlene NOGUERA

Purpose: We report the first documented case in our country, and only the second worldwide, of keratoconus presenting with posterior pseudo-lenticulus, a novel optical phenomenon mimicking posterior lenticulus and accompanied by an oil droplet-like reflex.

Methods: We present the case of a 24-year-old male with a three-year history of progressive blurring of vision in the left eye. He was initially diagnosed as a case of posterior lenticulus, a rare congenital anomaly classically characterized by posterior conical protrusion of the posterior lens capsule and oil droplet sign on slit-lamp examination. In contrast, keratoconus is a bilateral ectatic corneal disease that may also present with a posterior pseudo-lenticulus and an oil droplet-like reflex (Charleaux sign), leading to diagnostic confusion.

Results: Anterior segment optical coherence tomography (AS-OCT) revealed that the apparent conical protrusion of the posterior lens capsule, initially suggestive of posterior lenticulus, was an optical illusion of keratoconus, termed the posterior pseudo-lenticulus sign. Following scleral contact lens fitting, the left eye improved from uncorrected visual acuity (UCVA) of 5/200 to 20/40 at distance and J1 at near. Resolution of both the posterior pseudo-lenticulus and the oil-drop-like reflex was also noted.

Conclusions: Keratoconus can create a mirage of posterior conical protrusion of the posterior lens capsule. Differentiating true from pseudo-lenticulus is important, as these two unrelated clinical entities differ in etiology, management, and prognosis, and misdiagnosis can lead to incorrect treatment. AS-OCT is a valuable imaging tool in establishing the correct diagnosis.

Abstract No.: 204959

Panel No.: CDE-0253

Longitudinal Evaluation of Central and Peripheral Corneal Endothelium After DMEK Using Widefield Imaging

First Author: Qiu Ying WONG

Co-Author(s): Marcus ANG, Ezekiel CHEONG, Angeline TOH

Purpose: To evaluate longitudinal corneal endothelial changes after Descemet Membrane Endothelial Keratoplasty (DMEK) using widefield specular microscopy (WSM), a novel modality allowing comprehensive assessment across central, paracentral, and peripheral regions.

Methods: Fifty-three eyes from 43 patients with existing DMEK grafts were imaged at baseline and 6 months using widefield specular microscopy (WSM; CEM-530, Nidek, Japan) and Scheimpflug tomography (Pentacam HR, Oculus Optikgeräte GmbH, Germany) at a tertiary eye center in Singapore. Endothelial cell density (ECD) and image quality (IQ) were evaluated across central, paracentral, and peripheral corneal regions.

Results: Mean age at DMEK was 67.4 years; 49.1% were female. 35.8% of eyes were glaucomatous, 71.7% had Fuchs endothelial corneal dystrophy and 22.6% had pseudophakic bullous keratopathy as DMEK indications. Over 6 months, ECD declined significantly across central, paracentral, and peripheral regions ($P = 0.012$, <0.001 , 0.016), whereas image quality decreased only in peripheral regions ($P < 0.001$). Central ECD decline correlated strongly with paracentral ($r = 0.698$) but weakly with peripheral ECD ($r = 0.332$).

Conclusions: This study demonstrates the utility of widefield specular microscopy beyond the central cornea. Peripheral ECD loss, potentially discordant with central changes, may be missed by conventional imaging, highlighting the value of widefield assessment in detecting early regional endothelial compromise.

Abstract No.: 206789

Panel No.: CDE-0287

Lycium barbarum Polysaccharide (LBP): Investigating Its Anti-Fibrotic and Pro-Healing Properties on the Cornea Utilizing an In-Vivo Alkali Injury Model

First Author: Wang Yee CHU

Co-Author(s): Yau Kei CHAN, Kendrick Co SHIH

Purpose: Corneal scarring affects 5.1% of the blind, a heavy socioeconomic burden on healthcare systems. Although topical Mitomycin-C and corticosteroids are used to treat corneal opacity, they lead to increased intraocular pressure and scleral necrosis. Lycium barbarum polysaccharide (LBP) is an extract of goji berries and has demonstrated in vitro anti-fibrotic properties on corneal fibrosis. This study aims to

investigate the efficacy of topical LBP application in reducing corneal opacity and promoting corneal healing utilizing a mice corneal alkali-injury model.

Methods: Right eye of C57Bl/6J wild-type mice (n=6) was injured with 0.5M NaOH for 45 seconds under sedation. Excessive NaOH was rinsed off with filtered water. Two concentrations of LBP were used in the treatment groups: 2 mg/mL and 20 mg/mL, while PBS was used in the control group. LBP treatment was given either for 7 consecutive days before injury (pre-injury), 7 consecutive days after injury (post-injury), or both (pre-post-injury). Corneal opacity was assessed until Day 28 after injury, quantified using Modified Fantes score (0-4). Epithelial defect was estimated using fluorescein staining. Corneal thickness and Fibronectin expression was evaluated using H&E staining and ELISA.

Results: 0.5M NaOH was effective in inducing corneal opacity. Pre-post-injury treatment with 2 and 20 mg/mL LBP significantly reduced corneal opacity, with Modified Fantes score of 2.00 and 1.67 respectively on Day 28, compared to 3.17 in control group ($p < 0.0245$; $p < 0.0051$). 20 mg/mL LBP pre-post-injury treatment reduced total corneal thickness and corneal fibronectin expression. Estimated corneal epithelial defect area was smaller in 2 and 20 mg/mL LBP pre-post-injury treatment groups on Day 1 ($0.06 \pm 0.14 \text{ mm}^2$ and $0.05 \pm 0.11 \text{ mm}^2$ respectively, vs $0.45 \pm 0.15 \text{ mm}^2$ in control group ($p < 0.05$)).

Conclusions: 2 mg/mL and 20 mg/mL LBP reduced corneal opacity and expedited corneal healing when applied topically before and after alkali injury, exemplifying its therapeutic potential against alkali burns.

Abstract No.: 206796

Management Outcomes of Tenon Patch Graft With Cyanoacrylate Glue Overlay for Moderate-Sized Perforated Corneal Ulcers

First Author: Pranita SAHAY

Co-Author(s): Subhash DADEYA, Arushi SAINI, Vaishali TOMAR

Purpose: To evaluate the visual, anatomical, and morphological outcomes of Tenon patch graft (TPG) combined with cyanoacrylate glue overlay for moderate-sized perforated corneal ulcers (CU).

Methods: Twenty-five patients with perforated CU (3-5 mm) who underwent TPG with cyanoacrylate glue overlay and had a minimum follow-up record of 3 months were included. A record review was done to obtain baseline findings, Intra-operative details, and post-operative outcome. Anterior segment optical coherence tomography (ASOCT) records were also reviewed. The primary outcome was complete success, defined by anatomical integrity of the globe and graft integration.

Results: The study involved 25 eyes of 25 patients, with a mean age of 47.4 ± 20.9 years (range 5-77 years) and a male-to-female ratio of 2:3. The etiology for corneal perforation was sterile corneal melt in 52% and infectious in 28%. The perforations were peripheral in 24%, mid-peripheral in 20%, and central in 56%. The mean maximum size of perforations was $4.1 \pm 0.3 \text{ mm}$ (range 3-5 mm). No intra-operative complications were reported. Complete Success was noted in 70.8% cases. Overall complication was 28% (phthisis 8%, staphyloma 20%). Re-intervention was needed in 12%. Multi-logistic regression analysis for complete success did not show any association with etiology, site or size of perforation. However, post-op ACD showed significant association with etiology ($p=0.0001$; PUK>sterile melt>infection>chemical injury). Graft thickness from $328 \mu\text{m}$ on the first post-operative day to $256 \mu\text{m}$ at last follow-up

Conclusions: Tenon patch graft is a good rescue measure for moderate-sized perforated CU. The primary diagnosis, perforation site, and size do not affect the overall success.

Abstract No.: 200252

Panel No.: CDE-0167

Management of Small Corneal Perforation with Recurrent Graft Melting: A Case Report

First Author: Basitali LAKHANI

Purpose: Case Presentation: A patient presented with a small corneal perforation approximately 5mm in size. An initial corneal patch graft was successfully performed under antibiotic coverage. The patient initially demonstrated good recovery, with complete healing observed over the first 1.5 months. However, the graft subsequently melted, raising suspicion of an underlying viral etiology. Consequently, antiviral treatment was initiated. Under antiviral coverage, a second corneal patch graft with tarsorrhaphy was performed. The patient's condition stabilized, and they continue to do well on prophylactic antiviral therapy

Methods: .

Results: .

Conclusions: This case underscores the critical importance of considering viral etiologies in cases of recurrent graft melting. The successful management of this case with antiviral therapy and repeat grafting, along with adjunctive tarsorrhaphy, highlights the need for a comprehensive diagnostic approach. Recognizing and treating the underlying viral infection can lead to favorable outcomes and prevent further complications in recurrent corneal perforations.

Abstract No.: 200622

Panel No.: CDE-0177

Management of Superior Limbic Keratoconjunctivitis in a Patient With Severe Meibomian Gland Dysfunction: Role of Thermal Pulsation Therapy

First Author: Stella Weng Chi SIO

Co-Author(s): Vanessa Wing See CHOW

Purpose: To report the clinical effectiveness of combining LipiFlow thermal pulsation with meibomian gland expression for treating Superior Limbic Keratoconjunctivitis (SLK) associated with Meibomian Gland Dysfunction (MGD).

Methods: A case report of a 28-year-old female with bilateral SLK complicated by severe MGD who failed conventional treatment. The patient presented with intense foreign body sensation, tearing, and sharp pain during horizontal eye movement for 2 weeks. Initial treatment included artificial tears, topical steroids, and cyclosporine 0.1% eye drop, eyelid hygiene, warm compress therapy, therapeutic bandage contact lens (BCL), and punctal occlusion. While the BCL provided symptomatic relief and reduction of SLK, symptoms recurred immediately upon BCL removal. After poor response to these treatments and unsuccessful conjunctival cautery, LipiFlow thermal pulsation, followed by meibomian gland expression, was performed for treatment of the co-existing MGD.

Results: Following LipiFlow and meibomian gland expression, significant reduction in upper eyelid margin thickening and hardening was observed. Unlike previous reports where patients required long-term BCL wear, our patient was successfully weaned off BCL wear and remained asymptomatic. This approach may work by addressing the underlying meibomian gland dysfunction, potentially reducing lid margin thickening, which could lead to decreased friction between the superior tarsal conjunctiva and the cornea.

Conclusions: LipiFlow thermal pulsation combined with meibomian gland expression may be an effective treatment option for SLK associated with MGD. This case suggests that treating MGD can result in remission of SLK symptoms and offering advantages over long-term BCL dependency in select patients where the two conditions coexist.

Abstract No.: 207194

Panel No.: CDE-0297

Matrix Stiffness Regulates Corneal Fibrosis and Energy Metabolism Through the Hippo/ β -Catenin Signaling Pathway: Mechanisms and Therapeutic Implications

First Author: Kexin LI

Co-Author(s): Liang HU

Purpose: To investigate how matrix stiffness acts as an initial mechanical trigger for corneal fibrosis development and to clarify its potential mechanotransduction pathways, focusing on the interaction between the Hippo signaling pathway and β -catenin.

Methods: Human primary corneal fibroblasts were cultured in hydrogel models with varying matrix stiffness to replicate the natural compliance of the corneal stroma and the stiffness of fibrotic corneas. Combined with proteomics analysis, we comprehensively characterized cellular changes induced by stiffness. Key findings were validated through functional assays, including Western blotting and immunofluorescence staining, to assess changes in protein expression and pathway activation after pharmacological inhibition of key nodes in the Hippo and β -catenin pathways.

Results: We demonstrate for the first time that increased matrix stiffness significantly enhances the fibrotic response and reprograms cellular energy metabolism. Proteomics findings suggest this process may be mediated through activation of the Hippo/ β -catenin signaling axis. Functional studies show that inhibiting the Hippo pathway effectively reduces fibrosis, lowers β -catenin levels, and restores normal metabolic functions. However, while β -catenin inhibition lessens fibrosis and decreases TAZ expression, it does not reverse YAP activation or fix abnormal energy metabolism, indicating that the Hippo pathway acts at a more upstream regulatory level in stiffness sensing.

Conclusions: This study first maps a "mechanical signal-biochemical pathway/cellular metabolism" regulatory network in corneal fibrosis. Our findings establish the Hippo/ β -catenin pathway as a key mechanosensitive effector, offering a highly promising new therapeutic target for anti-fibrotic strategies and opening new avenues for treating corneal scarring and other fibrotic diseases.

Abstract No.: 208558

Panel No.: CDE-0306

Mechanism Studies of Pathogenic Role of CMTM3 Through the Regulation of Th17 in Dry Eye Disease

First Author: Liang **YEUNG**

Purpose: This research aims to investigate the molecular mechanism of CMTM3 promoting Th17 differentiation and to provide potential diagnostic and therapeutic targets for Th17-mediated dry eye disease.

Methods: Immunofluorescence, Flow Cytometry, RT-qPCR, Western blot, Gene overexpression, and knockout techniques.

Results: The membrane molecule CMTM3 is highly expressed in human Th17 cells and may be involved in Th17-mediated autoimmune diseases. Preliminary experiments demonstrated that CMTM3 expression was elevated in corneal tissues of dry eye mice; CMTM3 exerted pathogenic effects in dry eye, and Cmtm3 knockout mice had reduced dry eye phenotype and decreased Th17 secretion of IL-17A in conjunctiva and draining lymph nodes; in vitro experiments confirmed that CMTM3 significantly promoted Th17 secretion of IL-17A during pathogenic Th17 differentiation.

Conclusions: CMTM3 expression is upregulated during Th17 differentiation after the onset of dry eye, aggravating ocular surface damage, and promoting a vicious cycle of ocular surface inflammation.

Abstract No.: 201463

Panel No.: CDE-0189

Melatonin-Mediated Inhibition of Proinflammatory Response Attenuates Meibomian Gland Dysfunction In Vitro and In Vivo Models

First Author: Jiaxu **HAN**Co-Author(s): Lingyi **LIANG**, Ren **LIU**, Caizhen **QIU**, Jianwen **XUE**

Purpose: Inflammation is a significant risk factor for meibomian gland dysfunction (MGD), yet effective therapies remain unavailable. This study examined the synthesis and release of neurohormone melatonin (MLT) within the meibomian gland (MG) and investigated the therapeutic potential of MLT for MGD.

Methods: Human MG tissues were stained to identify MLT receptors (MT1/MT2) and MLT synthetic enzymes (AANAT/ASMT). To establish an in vitro MGD model, human meibomian gland epithelial cells (HMGECS) were exposed to LPS and then pre-treated with MLT. For the in vivo MGD model, mice were fed with a high-fat diet and intraperitoneally injected with MLT. Cytokine levels, lipid metabolism, apoptosis, and MAPKs/JAKs phosphorylation in two models were analyzed.

Results: MT1/MT2 and AANAT/ASMT were expressed in human MG acini. Pretreatment with MLT attenuated proinflammatory response and lipogenesis in LPS-stimulated HMGECS, manifested as decreased production of cytokines (IL-1 β , IL-6, IL-8, and TNF- α), reduced lipid droplet formation, and downregulated expression of meibum lipogenic proteins. Systemic MLT administration alleviated corneal epithelial erosion, MG orifice obstruction, and glandular dropout in MGD mice. MLT markedly rescued progenitor depletion, cellular apoptosis, lipogenic derangement, and ductal hyperkeratinization by reinstating Ki67/Lrig1 expression, rectifying the PPAR γ -AWAT2/SOAT1/HMGR lipogenic axis, and suppressing inflammatory cells recruitment. MLT protective actions may be mediated through the dephosphorylation of MAPK and JAK inflammatory signaling cascades.

Conclusions: MG is the producer and target organ of MLT, and MLT supplementation effectively suppressed inflammation-mediated MG structural and functional damage in LPS-stimulated HMGECS and MGD mice, indicating MLT represents a promising therapy for MGD.

Abstract No.: 210370

Panel No.: CDE-0309

Mitochondria-Targeted Polymer With ROS-Scavenging Capacity Ameliorates Ocular Surface Inflammation

First Author: Yijia **ZHANG**Co-Author(s): Jian **LI**, Nasha **QIU**, Youqing **SHEN**, Yangla **XIE**, Jiabei **XIONG**

Purpose: Ocular surface inflammation is associated with excessive reactive oxygen species (ROS) accumulation. There are challenges for current treatments, such as limited bioavailability and several side effects. This study investigates the anti-inflammatory effects of OPT10, a novel mitochondria-targeted polymer with potent ROS-scavenging properties.

Methods: The H₂O₂-induced oxidative stress model in human corneal epithelial cells (HCECs) and a benzalkonium chloride (BAC)-induced dry eye mice model were employed. In vitro: HCECs were divided into control, H₂O₂-injured, and OPT10-treated (different concentrations) groups. Assessments included cell viability, intracellular ROS levels, and inflammatory cytokines secretion. In vivo: Mice were allocated into saline, dexamethasone, and OPT10 (different concentrations) treatment groups. Clinical inflammatory scores for ocular surface tissues, corneal ROS detection, ocular surface retention, and histopathological analysis were evaluated.

Results: OPT10 treatment significantly and concentration-dependently reduced intracellular ROS and suppressed the secretion of inflammatory cytokines in HCECs, without inducing cytotoxicity

even at high concentrations. In the BAC-induced dry eye mice model, OPT10 markedly improved clinical manifestations, decreased corneal ROS levels, and inhibited expression of inflammatory cytokines. Its efficacy was comparable to dexamethasone, and no ocular surface irritation was observed. Histopathological analysis revealed preserved corneal epithelial integrity with minimal tissue damage and inflammatory infiltration in OPT10-treated mice.

Conclusions: OPT10 effectively mitigates oxidative stress and ocular surface inflammation, demonstrating efficacy comparable to steroid treatment while exhibiting favorable biosafety and ocular retention. These findings support its potential as a novel therapeutic strategy for oxidative stress-related ocular surface inflammatory diseases.

Abstract No.: 200508

Panel No.: CDE-0172

Multifocal Nodular Conjunctival Ulcers as a Rare Presentation of Ocular Herpes Simplex

First Author: Manasi TRIPATHI

Co-Author(s): Ashish MARKAN

Purpose: To report a rare presentation of herpes simplex virus (HSV-1) infection manifesting as multifocal conjunctival ulcers.

Methods: A 20Y/M presented with persistent conjunctival redness, worsening after steroid use. Examination revealed multiple fluorescein-staining conjunctival epithelial defects & a superotemporal purulent nodule. Corneal sensations were reduced; the cornea remained clear. Investigations included a conjunctival swab for bacterial culture and tear fluid PCR for HSV-1 DNA.

Results: PCR confirmed HSV-1. Bacterial cultures were negative. Initiation of topical and oral acyclovir led to the rapid resolution of nodules and ulcers over 3 weeks, with flattening of the conjunctival lesion.

Conclusions: HSV conjunctivitis may rarely present with multifocal conjunctival ulcers and nodules, mimicking other infectious or immune-mediated etiologies. Prompt recognition and discontinuation of steroids are essential to avoid exacerbation and facilitate recovery.

Abstract No.: 203173

Panel No.: CDE-0224

Neuropathic Corneal Pain and Blepharospasm: A Case Series

First Author: Zhang Zhe THIA

Co-Author(s): Yu-chi LIU, Aya TAKAHASHI, Louis TONG

Purpose: Chronic involuntary muscle contraction in blepharospasm may lead to irritation of trigeminal afferents and corneal neurogenic inflammation, causing neuropathic corneal pain (NCP). We herein present the clinical manifestations, corneal imaging features, and

treatment modalities in 3 patients with NCP associated with blepharospasm.

Methods: Ocular surface evaluation was performed using slit-lamp biomicroscopy and corneal in-vivo confocal microscopy (IVCM). Pain symptoms and quality of life (QoL) were assessed using the Ocular Pain Assessment Survey (OPAS). The median follow-up period is 1 year.

Results: The subjects had a median age of 50 years. Initial findings included minimal ocular surface staining but disproportionate ocular pain, accompanied by burning sensation and photophobia. IVCM scans revealed reduced corneal nerve density, increased nerve tortuosity, and corneal microneuromas. All patients received weekly periorbital quantum molecular resonance electrotherapy for 2 months. 2 of the 3 cases received 4 to 5 injections of botulinum toxin for blepharospasm, while 1 had previously undergone treatment at a private clinic prior to review. Additional treatments included oral Pregabalin or Gabapentin, topical lubricants, Cyclosporine 0.05% (1 case), and autologous serum eye drops (1 case). Improvement in all domains of OPAS evaluation, including QoL, ocular pain, and non-ocular pain scores, was observed among all 3 subjects following a multimodal treatment.

Conclusions: Blepharospasm is a possible predisposing factor of NCP. Concurrent treatment for blepharospasm and NCP can effectively relieve symptoms, and adopting a multimodal approach is recommended.

Abstract No.: 201907

Panel No.: CDE-0200

Neurotrophic Keratopathy With Medicamentosa Keratoconjunctivitis In Trigeminal Trophic Syndrome: A Rare Case Report

First Author: Vinit TANWAR

Purpose: To present a rare case of neurotrophic keratopathy (NK) complicated by keratoconjunctivitis medicamentosa in a patient with Trigeminal Trophic Syndrome (TTS), highlighting the vision-threatening implications and the importance of early recognition.

Methods: A 55-year-old female with a four-year history of TTS presented with a persistent, non-healing corneal epithelial defect in her right eye. Her symptoms had acutely worsened following self-administration of an Ayurvedic eye drop. A comprehensive evaluation included clinical examination, corneal sensation testing, and neuroimaging (MRI). The implicated eye drop underwent pharmacological analysis for pH and osmolality.

Results: Examination revealed a 6x6.5 mm central corneal epithelial defect with significantly reduced corneal sensation. MRI showed enhancement at Meckel's cave, consistent with trigeminal nerve involvement. The Ayurvedic drop was found to

be highly acidic (pH 3) and hyperosmolar (>1500 mOsm/L), confirming its epithelial toxicity. Following a diagnosis of NK exacerbated by medicamentosa keratoconjunctivitis, the patient was treated with preservative-free lubricants, topical antibiotics, and a bandage contact lens. This regimen led to complete corneal re-epithelialization and visual recovery within two weeks.

Conclusions: Trigeminal Trophic Syndrome is a rare but significant cause of corneal hypoesthesia predisposing to NK. This case underscores the severe risk of ocular surface toxicity from unregulated topical agents, which can dangerously complicate the underlying neurotrophic state. Meticulous history-taking, patient education on avoiding irritants, and prompt, appropriate management are crucial to prevent permanent ocular damage and preserve vision.

Abstract No.: 206933

Panel No.: CDE-0289

New Exploration of Epiphora Treatment in Patients With Narrow Tear Point and Dry Eye Syndrome

First Author: Yi ZHANG

Purpose: To explore new treatment methods for epiphora caused by stenosis of the lacrimal puncta with dry eye syndrome and evaluate their effectiveness.

Methods: A total of 56 patients with narrow lacrimal puncta, dry eye syndrome, and epiphora were selected. All patients underwent pre-treatment examinations including Schirmer's test for tear secretion, tear film break-up time, meibomian gland photography, mite detection, anterior segment photography, corneal staining, and lacrimal duct irrigation. Patients with stenosis or obstruction of the lacrimal duct as revealed by lacrimal duct irrigation were excluded. All patients received lid margin deep cleaning therapy (including demodex removal for patients with mites). Dry eye syndrome patients were treated with intense pulsed light combined with medication. Patients whose epiphora symptoms remained unresolved after the above treatments underwent surgical intervention, which included either removal of lacrimal punctal polyps or implantation of a porous non-degradable punctal plug.

Results: All patients showed improvement in their tearing symptoms. After conservative treatment (intense pulsed light combined with medication for eyelid margin cleaning), tearing symptoms significantly improved in 40 patients. In 16 patients where tearing symptoms did not improve with conservative treatment, they underwent punctal surgery (punctoplasty or implantation of a porous non-degradable punctal plug) and their tearing symptoms then significantly improved.

Conclusions: Epiphora caused by narrow lacrimal puncta accompanied by dry eye syndrome require consideration of multiple factors in treatment, and combined therapeutic approaches can be adopted; surgery is not the only solution.

Abstract No.: 201910

Panel No.: CDE-0198

Nick, Loop and Pull Technique of Corneal Suture Removal

First Author: Vinit TANWAR

Purpose: To devise and report a standardized step-wise approach to corneal suture removal.

Methods: A review of the literature and observed practiced suture removal techniques by ophthalmologists and corneal surgeons was performed. Associated problems were noted, such as epithelial defects, wound dehiscence, and bleeding from the vascularized cornea in deeply buried sutures. A step-wise approach was devised, hitherto described as the Nick, Loop, and Pull technique, providing a systematic step-wise method of corneal suture removal, which was tested clinically for complications.

Results: This technique was performed successfully in 20 eyes with comparatively fewer complications after corneal suture removal compared to routine methods.

Conclusions: This standardized step-wise approach of corneal suture removal is feasible, reproducible, and easy to learn, and causes less deleterious effects on the cornea and its wound integrity.

Abstract No.: 207179

Panel No.: CDE-0296

Nigrospora oryzae Keratitis: A Rare Fungal Etiology

First Author: Huy TRAN NGOC

Co-Author(s): Huong DUONG NGUYEN VIET, Simon FUNG, Vinh LAM MINH, Mai NGUYEN THI TRUC

Purpose: To report a rare case of fungal keratitis caused by *Nigrospora oryzae* in an immunocompetent patient without a history of ocular trauma, and to compare its clinical and microbiological features with a previously published case.

Methods: A 62-year-old female farmer presented in December 2019 with a two-week history of ocular pain, redness, and visual loss in the right eye. Initial treatment by a local provider was unsuccessful. On presentation, slit-lamp examination revealed a raised central corneal infiltrate with feathery margins, associated with corneal neovascularization and hypopyon, but without epithelial defect. Corneal scraping was performed, and the specimen was analyzed by fungal staining, culture, and DNA sequencing.

Results: Staining revealed septate hyphae, suggestive of a filamentous fungus. Culture confirmed *Nigrospora oryzae* with susceptibility to amphotericin B, itraconazole, and fluconazole. The patient was treated with oral itraconazole, topical amphotericin B 0.15%, and fortified povidone-iodine 5%. Complete resolution was achieved without recurrence, but with residual central scarring. No prophylactic antibiotics or corticosteroids were used. A comparative review with the only other reported case revealed differences in ulcer characteristics, treatment protocols, and antifungal susceptibility.

Conclusions: *Nigrospora oryzae* is a rare cause of fungal keratitis that can present in immunocompetent individuals without apparent trauma. In resource-limited settings like Vietnam, delayed diagnosis due to limited microbiological support may obscure the detection of uncommon pathogens. This case underscores the need for enhanced diagnostic capacity and awareness of atypical fungal agents in cases of infectious keratitis.

Abstract No.: 200439

Panel No.: CDE-0170

Novel Eye Drops Based on Iota-Carrageenan for the Treatment of Dry Eye: In Vitro and Ex Vivo Studies

First Author: Anaïs CASTEX

Co-Author(s): Eva PRIESCHL-GRASSAUER, Sabine ROCH-NAKOWITSCH, Antonella RUSSO, Nicole UNGER-MANHART

Purpose: Iota-Carrageenan (I-C) is a natural high molecular weight polysaccharide polymer that has mucoadhesive, lubricating, and moisturizing properties. The aim of this study was to evaluate the protective effect of I-C eye drops against dehydration in vitro and ex vivo, in comparison to other marketed moisturizing products.

Methods: Human cornea epithelial cells were incubated in vitro with eye drops for two hours, and then dehydrated at 33°C for 2 to 40 minutes. Cell survival was determined using an Alamar blue fluorometric assay. In an ex vivo assay, porcine eyes were placed in a laminar flow for 6 hours to induce dehydration. Every 15 minutes, one drop of product was applied to the eyes. Corneal damages were evaluated using a fluorescein staining.

Results: In vitro, I-C treatment induced a fourfold increase in cellular half-life upon dehydration, when compared to the untreated control (15.1 min versus 3.6 min). Its efficacy was also higher than other marketed products, for which cellular half-lives ranged from 5.3 to 10.1 min. In the ex vivo model, I-C significantly reduced the corneal damage in comparison to NaCl treated eyes (reduction by 53.4%). The other marketed products exhibited lower reductions (maximum 34.9%).

Conclusions: I-C demonstrated superior efficacy in dry eye in vitro and ex vivo models when compared to other marketed products, therefore highlighting the potential of I-C as a treatment for dry eye disease.

Abstract No.: 210369

Panel No.: CDE-0308

Observation on Omitting Bandage Contact Lenses in Primary Hospital Pterygium Surgery With Standardized Medication

First Author: Xudong FANG

Co-Author(s): Jian LI

Purpose: To assess short-term postoperative efficacy and complications of omitting bandage contact lenses (BCLs) after pterygium excision plus limbal stem cell transplantation in primary hospitals.

Methods: Retrospective analysis was performed on 50 patients (50 eyes) who underwent the above surgery without BCL. Perioperative medications: 1 day preoperatively, levofloxacin eye drops (1 drop, qid); immediately postoperatively, tobramycin-dexamethasone eye ointment; 1 week postoperatively: ① levofloxacin drops (1 drop, qid), ② tobramycin-dexamethasone drops (1 drop, qid), ③ sodium hyaluronate drops (1 drop, qid), ④ tobramycin-dexamethasone ointment (1 drop, qn). Corneal epithelial healing time, subjective discomfort and complications were recorded.

Results: All 50 patients achieved corneal epithelial healing within 3-5 days; postoperative irritative symptoms were manageable. Complications: 1 case (2%) of conjunctival flap displacement (eye rubbing-induced), 2 cases (4%) of conjunctival granuloma; no scleral melting or corneal infection.

Conclusions: With standardized anti-inflammatory/anti-infective medications (quinolones, corticosteroids, lubricants perioperatively), omitting BCL is feasible in primary hospitals, ensuring 100% corneal healing and avoiding severe complications. Strict patient education (no eye rubbing), vigilance for granulomas (4%), standardized surgery and close follow-up are essential, which reduces healthcare costs.

Abstract No.: 206290

Panel No.: CDE-0280

Ocular Manifestations in Alport Syndrome: A Retrospective Case Series From a Tertiary Eye Care Center in India

First Author: Swetha BUGGAREDDIGARI

Co-Author(s): Muralidhar RAMAPPA

Purpose: To describe the spectrum of ocular manifestations in Alport syndrome, assess associated systemic involvement, and evaluate the visual outcomes following surgical intervention.

Methods: A retrospective analysis was conducted on 22 patients with Alport syndrome who presented to a tertiary eye care centre between 2013 and 2025. Data on demographics, systemic findings, visual acuity, anterior and posterior segment examination (including Optical Coherence Tomography when available), and surgical outcomes were analysed.

Results: Twenty-two patients (44 eyes) were included. Mean age at presentation was 23.3 years (range: 8–54), with a male predominance of 86%. Bilateral anterior lenticonus was seen in all patients; in some, one eye had undergone cataract surgery prior to presentation. Dot-and-fleck retinopathy, consistent with classical mid-peripheral retinal changes, was observed in 36% of eyes. OCT revealed macular thinning in selected cases. Central corneal thickness ranged from 450–546 µm (available records). Surgical intervention (lens aspiration with IOL implantation) in visually significant lenticonus or cataract resulted in Best Corrected Visual Acuity improvement from as low as 20/600 to 20/20. Systemic involvement included nephropathy and sensorineural hearing loss in 72 % patients. Genetic confirmation with COL4A5 mutation was available in three cases. A family history suggestive of renal disease or early-onset hearing loss was documented in 18% patients.

Conclusions: Ocular signs, particularly bilateral anterior lenticonus and dot-and-fleck retinopathy, are reliable diagnostic markers in Alport syndrome. In resource-limited settings, their presence, along with systemic and family history, can support early syndromic diagnosis. Surgical intervention offers excellent visual rehabilitation.

Abstract No.: 200488

Panel No.: CDE-0173

Ocular Mucous Membrane Pemphigoid on a 59-Year-Old Male: A Case Report

*First Author: Paul Gilbert **APILADO***

Purpose: To present the clinical course, diagnosis, and management of a 59-year-old male, Filipino with ocular mucous membrane pemphigoid presenting as recurrent cicatricial entropion and ocular surface disease.

Methods: A detailed history was performed, presenting a case of recurrent cicatricial entropion for both eyes and a previous history of surgical repair. A conjunctival biopsy was obtained, and direct immunofluorescence (DIF) was performed to confirm the diagnosis.

Results: DIF showed a homogenous linear deposition of immunoglobulin G (IgG), A (IgA), M (IgM), and C3 in the conjunctival basement membrane zone, confirming the diagnosis.

Conclusions: Ocular mucous membrane pemphigoid is an autoimmune disease primarily affecting the conjunctiva that may lead to vision loss. A high index

of suspicion in patients with cicatricial conjunctivitis, forniceal shortening, and symblepharon is vital. Supportive management for ocular surface disease and Methotrexate was given as an immunosuppressant. Surgical intervention with blepharoplasty and anterior lamellar recession was done once the ocular inflammation was stable, providing better ocular surface and visual acuity. Overall, early detection and prompt treatment are essential to halt disease progression for early surgical intervention.

Abstract No.: 200979

Panel No.: CDE-0184

Ocular Tuberculosis Presenting as Nodular Scleritis in an Immunocompetent Host: A Case Report

*First Author: Rishanne Meire **ORTIZ***

*Co-Author(s): Mary Ellaine **DIAZ**, Rey Carlo **NARAVAL***

Purpose: Ocular tuberculosis (OTB) is a rare extrapulmonary presentation of Mycobacterium tuberculosis. Its clinical manifestation varies and can mimic various ocular and systemic conditions that can make its diagnosis and management challenging. The purpose of this study is to report a case of intraocular tuberculosis presenting as nodular scleritis in an immunocompetent individual with no presenting symptoms other than its ocular findings.

Methods: A 45-year-old immunocompetent male presented with eye redness accompanied with pain and blurring of vision in the left eye with iris-angle granuloma, scleral thinning and anterior chamber inflammation on slit lamp examination.

Results: The work-up revealed a positive QuantiFERON-TB test, while other systemic signs and chest radiography were unremarkable. The patient was then managed as a case of presumptive ocular tuberculosis and was started on antitubercular therapy. Within days, the patient developed worsening inflammation and posterior synechiae formation, consistent with a paradoxical immune response. Topical steroids and introduction of systemic corticosteroids led to marked clinical improvement, with gradual resolution of inflammation and improvement of vision.

Conclusions: This case underscores the importance of considering OTB even with atypical presentations such as nodular scleritis and even in immunocompetent patients. Early recognition, appropriate diagnostic testing, and a timely treatment approach are essential to prevent long-term visual sequelae.

Abstract No.: 201871

Panel No.: CDE-0201

One Donor, Three Visions: Clinical Outcomes of Shared Corneal Tissue in Limbal Dermoid Cyst, Corneal Scarring, and Perforation

First Author: Yaumil QORISA

Co-Author(s): Rio RHENDY

Purpose: Donor cornea shortage remains a major limitation in corneal transplantation, especially in developing countries. Innovative tissue-sharing strategies may help overcome this gap.

Methods: We report the utilization of a single donor cornea for three patients. The anterior stromal lamella was transplanted via anterior lamellar keratoplasty in a patient with limbal dermoid cyst. The remaining donor lamella was used for anterior lamellar keratoplasty in a pediatric patient with corneal cicatrix. The excised cicatricial tissue from this second procedure was subsequently repurposed as a patch graft to seal a corneal perforation following foreign body injury. The limbal dermoid cyst and corneal perforation cases achieved favorable outcomes with corneal integrity and stable recovery, whereas the cicatrix case showed a suboptimal outcome due to poor compliance with postoperative medication.

Results: This case series illustrates the potential of combining split donor cornea allocation with host tissue recycling to maximize surgical benefit. Previous studies have reported comparable visual and anatomical outcomes between conventional and split corneal grafting, supporting feasibility of such approaches. Proper case selection, meticulous surgical planning, and careful handling of donor and host tissue are essential for graft adequacy and clinical success. By integrating donor sharing and tissue recycling, corneal surgeons may expand the impact of limited tissue availability, particularly in resource-constrained regions.

Conclusions: The use of one donor cornea for two anterior lamellar keratoplasties, combined with recycling host tissue for a corneal patch graft, represents a practical strategy to optimize scarce resources, though outcomes may be influenced by compliance, especially in pediatric cases.

Abstract No.: 202803

Panel No.: CDE-0222

Optimized Transepithelial Corneal Cross-Linking for Keratoconus: A Mid-Term Clinical Observation

First Author: Liu JUNQI

Purpose: Early diagnosis and timely intervention with corneal cross-linking (CXL) are crucial for halting keratoconus progression. Epi-off CXL penetrates deeper but causes discomfort, while epi-on CXL is more comfortable but less effective. We optimized

the epi-on CXL protocol for early-stage keratoconus, demonstrating effective disease control and patient comfort.

Methods: A clinical study on 15 patients (25 eyes) with keratoconus used an optimized epi-on CXL protocol with 7.2 J/cm² energy at 24 mW/cm² for 5 minutes via continuous UV-A irradiation. Preoperative assessments included corneal biomechanics, anterior segment OCT, and endothelial cell density. Follow-ups were at 1 day, 1 week, and 1, 3, 6, 12, 18, and 24 months postoperatively. Primary outcomes were corneal stiffness, maximum K-value (Kmax), and epithelial integrity.

Results: Follow-up from 1 week to 1 year showed all treated eyes maintained intact epithelia. Mild corneal edema resolved by day 7, with thickness restored by 1 week. Biomechanical enhancement was significant (2.0–2.75-fold stiffness increase). Mean Kmax decreased by 0.5–1.5 D at 1 month and 1.5–2.0 D at 3 months. No significant decrease in comfort was reported throughout the study.

Conclusions: This interim analysis confirms that the optimized epi-on CXL protocol leads to favorable outcomes: increased corneal rigidity, reduced keratometry values, and preserved comfort. Future studies will refine the protocol for individualized keratoconus management.

Abstract No.: 204681

Panel No.: CDE-0245

Osimertinib Induces Oxidative Stress in Corneal Epithelial Cells and Therapeutic Effects of Tacrolimus

First Author: Li LI

Co-Author(s): Xinyi ZHAO

Purpose: Osimertinib, a first-line tyrosine kinase inhibitor for advanced non-small cell lung cancer (NSCLC), has been associated with increased keratitis risk. This study aims to investigate the mechanisms of osimertinib-induced damage to corneal epithelial cells and evaluate the role of tacrolimus.

Methods: Immortalized human corneal epithelial cells (HCEC-T) were cultured on polyacrylamide hydrogels mimicking corneal stiffness. Cells were treated with osimertinib, tacrolimus, osimertinib plus tacrolimus, or blank control. Cell viability was assessed via CCK-8 assay; migration ability via scratch assay; intracellular reactive oxygen species (ROS) production using DCFH-DA fluorescent staining; hydrogen peroxide release and membrane permeability via scanning electrochemical microscopy (SECM); protein expression via Western blot; and mRNA levels via RT-qPCR.

Results: Osimertinib exhibited time- and concentration-dependent cytotoxicity in HCEC-T cells. Compared to control, 2.5μM osimertinib reduced cell viability, slowed migration, increased ROS generation and

hydrogen peroxide release, elevated membrane permeability, and suppressed EGFR/AKT pathway mRNA and protein expression. Coadministration of 1 μ M tacrolimus with osimertinib attenuated these effects. Furthermore, pretreatment with tacrolimus prevented osimertinib-induced damage.

Conclusions: The corneal epithelial toxicity of osimertinib, which is characterized by oxidative stress, increased membrane permeability, and deficits in migration, viability, and survival, coincides with the inhibition of EGFR/AKT signaling. Tacrolimus counteracts these cytotoxic effects by alleviating oxidative stress and maintaining epithelial homeostasis.

Abstract No.: 208417

Panel No.: CDE-0305

Overactivation of Mineralocorticoid Pathway Aggravates UVB-Induced Corneal Damages: Restoration by Spironolactone Eyedrops

First Author: Linxin ZHU

Co-Author(s): Francine BEHAR-COHEN, Min ZHAO

Purpose: Ultraviolet radiation (UVR) is a known trigger of ocular diseases, with the majority of UVB absorbed by the cornea. Chronic exposure can cause irreversible damage, including neovascularization and keratopathy, potentially linked to limbal stem cell dysfunction. The mechanisms of UVB-induced corneal opacity remain unclear, and no specific treatment exists. Mineralocorticoid receptor (MR) antagonism has been reported to improve corneal integrity in models of stem cell deficiency and wound healing. We aimed to investigate the role of MR signalling in UVB-induced corneal damage and assess spironolactone (SPL) therapy.

Methods: Eyes of adult SD rats and hMR-overexpressing transgenic rats ($n = 24$ / group) were exposed to UVB (370 μ W/cm²; 280–315 nm) for 3 mins daily over 3 days. SPL (0.1%) or placebo (PBO) eye drops were applied three times daily for 14 days. Corneal morphology was assessed by OCT, while opacity, smoothness, and epithelial defects were evaluated by slit lamp and fluorescein staining. Corneas were collected for histological analysis.

Results: UVB exposure significantly increased corneal thickness ($p < 0.001$), irregularity, and opacity. hMR-overexpressing rats developed larger epithelial defects and greater edema compared to wild-type rats ($p < 0.05$). Histology confirmed epithelial loss, stromal edema, and inflammatory infiltration, which were more pronounced in transgenic rats. SPL treatment markedly reduced edema and neovascularization, improved epithelial integrity, and limited inflammation.

Conclusions: MR overactivation exacerbates UVB-induced keratopathy by promoting epithelial damage, edema, and inflammation. SPL eye drops significantly alleviated these changes, supporting MR antagonism

as a promising therapeutic strategy for UVB-related corneal injury. Transcriptome will be investigated to further elucidate underlying mechanisms.

Abstract No.: 202835

Panel No.: CDE-0218

Possible Contribution of Early FECD to Bullous Keratopathy Following Argon Laser Iridotomy: A Preliminary Observation in Japanese Patients

First Author: Sayaka NISHIHATA

Co-Author(s): Takahiko HAYASHI, Noriko KOIZUMI, Naoki OKUMURA, Toshiki SHIMIZU, Satoru YAMAGAMI

Purpose: Bullous keratopathy (BK) after argon laser iridotomy (ALI) is more frequent in Japanese patients than in Western populations. However, the underlying mechanisms remain unclear, and the contribution of subclinical Fuchs endothelial corneal dystrophy (FECD) has not been fully explored.

Methods: We retrospectively analyzed 8 patients who underwent endothelial keratoplasty for BK presumed to be secondary to ALI. Descemet's membrane (DM) specimens were excised during surgery and examined by phase-contrast microscopy to evaluate the presence of guttae. Clinical history and slit-lamp findings at the time of ALI were reviewed to exclude cases with overt FECD.

Results: All 8 cases demonstrated histopathological evidence of guttae on DM, consistent with FECD. None of these patients were clinically diagnosed with FECD at the time of ALI, and although referral cases limited full verification, no definite signs of FECD were recorded. Moreover, due to corneal edema associated with BK, guttae could not be reliably confirmed by slit-lamp biomicroscopy before ALI. These findings suggest that ALI may have accelerated endothelial stress in eyes with unrecognized early FECD or guttae alone, leading to BK.

Conclusions: This preliminary observation raises the possibility that the relatively high prevalence of so-called ALI-induced BK in Japanese eyes may, in fact, reflect the presence of underlying FECD, particularly in populations with shallow anterior chambers. Although confirmatory studies are required, clinicians should exercise caution when performing ALI in eyes with even subtle endothelial abnormalities.

Abstract No.: 202778

Panel No.: CDE-0219

Posterior Blepharitis Mimicking Ectasia on Corvis-ST

First Author: Khushbakht PETERS

Co-Author(s): Kanwal RUKHSAR

Purpose: To report a case of posterior blepharitis in which tear film instability mimicked early ectasia by

causing a false-positive elevation of the Tomographic and Biomechanical Index (TBI) on Corvis-ST, despite normal tomography and clinical findings.

Methods: A 24-year-old male presented with a 2-week history of burning sensations in both eyes. Best corrected visual acuity (BCVA), refraction, slit-lamp examination, keratometry, Pentacam tomography, and Corvis-ST analysis were performed.

Results: BCVA was 6/6 in the right eye with $-0.50/-2.00 \times 15$ and 6/7.5 in the left eye with $-0.75/-2.00 \times 165$. Keratometry revealed 42.50/45.25 D in the right eye and 42.25/45.00 D in the left eye. Slit-lamp examination showed bilateral posterior blepharitis, while the rest of the ocular examination was unremarkable. Pentacam tomography was normal in both eyes. Corvis-ST revealed a normal TBI in the right eye but an elevated TBI of 0.52 in the left eye, falsely suggesting ectatic risk. After initiating lubricants and lid hygiene, repeat imaging at 2 weeks showed normalization of TBI values, confirming that the apparent "ectasia" was secondary to tear film instability rather than true biomechanical weakness.

Conclusions: Posterior blepharitis can mimic corneal ectasia by producing false-positive elevations in TBI despite structurally and biomechanically normal corneas. In patients with ocular surface disease, repeat imaging after surface optimization is crucial to avoid misdiagnosis and inappropriate management.

Abstract No.: 207061

Panel No.: CDE-0293

Power of the Air Bubble in Descemet Membrane Detachment

First Author: Vishakha WADIBHASME

Co-Author(s): Yogesh JIBHAKATE

Purpose: To demonstrate the simple and easy technique of air bubble instillation in the management of corneal edema due to Descemet membrane detachment.

Methods: Fifteen patients having corneal edema due to Descemet membrane detachment were included in the study. All the patients were thoroughly examined on the slit lamp and investigated with anterior segment OCT. The patients were managed by a simple procedure of air bubble instillation. The trick is we have to identify the part of the clear cornea, and from that side, we have to inject air towards the edematous. Cornea with 30 gauge needle and 5 ml syringe. As the anterior chamber becomes air-tight, we have to make multiple perpendicular incisions with the tip of MVR. Triangular sponges are used over the slit incisions pressed and consequently gush of water trapped between descemet membrane and corneal stroma is ejected. These steps are repeated till we get a clear cornea at the end of the procedure. Anterior chamber is well formed and patient is made to lie in

supine position for 30 minutes. Pad and patch done. The patients were started on antibiotics steroids and hyperosmotic agents.

Results: All patients responded to the management and, within 3 days, restored clarity of the cornea. Post op procedure, anterior segment OCT revealed attachment of the Descemet membrane.

Conclusions: A safe, easy, and effective technique of air bubble instillation with perpendicular slit incisions can manage corneal edema due to Descemet membrane detachment, preventing corneal blindness. This procedure can be done by any beginner surgeon with ease.

Abstract No.: 200869

Precision Microneedle-Enhanced Riboflavin Delivery for Customized Corneal Cross-Linking in Keratoconus Therapy

First Author: Jinhai HUANG

Co-Author(s): Zhongxing CHEN, Mei YANG, Xinning YANG, Xingtao ZHOU

Purpose: This study is to develop a customized CXL treatment for keratoconus, utilizing microneedles to precisely deliver riboflavin directly into the cornea, thereby improving the precision and efficacy of the treatment compared to conventional methods.

Methods: The study encompassed crafting of four unique microneedle mold, namely circular, semi-circular, annular, and butterfly-shaped. These molds served as templates for fabricating microneedle arrays that were preloaded with an optimized solution of riboflavin and hyaluronic acid. The microneedles were subsequently employed to gently penetrate the corneal epithelium while preserving the integrity of the underlying stromal layer. Following the application of the microneedles, the riboflavin (RF) solution was replenished to augment the RF concentration within the stroma, leveraging the punctures created by the microneedles. Microneedles were applied to A-CXL and efficacy was evaluated compared with conventional RF A-CXL protocol.

Results: The application of the customized microneedles led to a notable flattening of the corneal curvature in the treated zone. Replenishing the RF solution enhanced the stromal riboflavin content, which is crucial for effective cross-linking. Moreover, the treatment facilitated a swift postoperative recovery of corneal tissue, demonstrating the potential to reduce healing durations. Importantly, the customized corneal cross-linking effects proved to be comparable to those achieved through the conventional epi-off CXL protocol.

Conclusions: The integration of customized microneedle riboflavin delivery with CXL presents an innovative treatment modality for keratoconus. This approach offers a more precise and efficient alternative

to conventional methods, affording the possibility to customize treatments according to individual patient requirements.

Abstract No.: 207098

Panel No.: CDE-0291

Predicting Trouble: What Drives Graft Infections After TPK? A Prospective Study at Tertiary Eye Hospital

First Author: Tejaswi PRASAD

Co-Author(s): Tejaswi PRASAD

Purpose: To determine the incidence and timing of graft infections following TPK, and evaluate the influence of preoperative microbial flora, donor-related, and surgery-related factors on their development.

Methods: A prospective observational study of 84 patients who developed graft infections. Data on demographics, systemic illness, compliance, infiltrate size, microbiological profile, limbal involvement, and surgical parameters were analysed among 249 TPKs from January to December 2024.

Results: The graft infection rate was 34.53%. Major preoperative risk factors included infiltrates ≥ 7 mm (73.49%), limbal involvement (51.02%), and corneal perforation (44.90%); diabetes was present in 32.65% and 24.49% were non-compliant preoperatively. Microbiology showed fungal predominance: *Fusarium* spp. (38.78%) and *Aspergillus flavus* (20.41%) predominated; no growth in 12.24%. *Pythium insidiosum* accounted for 6.12%, while *Streptococcus pneumoniae* and dematiaceous fungi were each 4.08%; other rare isolates were 2.04% each. Overall, 73.47% were fungal, 8.16% bacterial, 6.12% pythium, and 12.24% culture-negative. Infections presented between 7–82 days postoperatively and clustered in larger grafts (>10 mm: 42.86%; 9–10 mm: 28.57%; 8–9 mm: 22.45%; <8 mm: 6.12%). Outcomes were poor: 97.96% attained $\leq$ CFCF vision; total graft infection occurred in 57.14%, partial in 26.53%, and 6.12% progressed to phthisis or required evisceration.

Conclusions: Post-TPK graft infections were predominantly associated with fungal keratitis, large infiltrates, and cases with limbal involvement or perforation. Early microbiological diagnosis, strict adherence to therapy, and timely intervention are crucial to minimizing infection risk and optimizing surgical outcomes.

Abstract No.: 204815

Panel No.: CDE-0247

Preliminary Analysis of the Efficacy of Traditional Chinese Medicine Ultrasonic Atomization Treatment for Dry Eye Disease: A Randomized Controlled Trial

First Author: Zhichao HU

Co-Author(s): Kelvin Kam Lung CHONG, Yiu Man WONG

Purpose: To investigate the efficacy of traditional Chinese medicine (TCM) atomization for Dry Eye Disease (DED).

Methods: Two hundred participants were allocated (1:1:1:1:1) to compound decoction (CD), dendrobium caulis (DC), houttuynia cordata (HC), placebo atomization (PA), or artificial tear (AT) group randomly. Ocular Surface Disease Index (OSDI) and non-invasive tear break-up time (NIBUT) from baseline (m0) to week 4 (w4) and month 4 (m4) were analyzed by generalized estimating equations on SPSS 29. (Clinicaltrials.gov: NCT06089317)

Results: 199 subjects (154 females) aged 54.53 ± 14.72 were analyzed. At w4, only the first NIBUT in DC group was significantly different from m0 (3.06, $P=0.027$), while no significant NIBUT change in m4 compared to m0, and among all groups at w4 and m4. There was a significant change of OSDI in CD (-7.57, $P<0.001$), DC (-8.52, $P<0.001$), HC (-12.85, $P<0.001$), and PA (-8.49, $P<0.001$) from m0 to w4, and also in CD (-5.03, $P=0.023$), DC (-7.65, $P<0.001$), HC (-8.98, $P<0.001$), PA (-7.91, $P<0.001$), and AT (-3.78, $P=0.031$) from m0 to m4. OSDI in the HC group was significantly lower than CD and DC.

Conclusions: TCM atomization could improve OSDI and NIBUT, and act as an effective DED treatment.

Abstract No.: 205925

Panel No.: CDE-0271

Prevalence and Management of Allergic Sensitizations in a Pediatric Population: Demographic and Clinical Insights

First Author: Divya KATTA

Co-Author(s): Mahathi VANKIREDDI

Purpose: This study aimed to investigate the prevalence of allergic sensitizations among pediatric patients, focusing on demographic characteristics, diagnosis severity, healthcare engagement, and the distribution of allergens. It also explored associations between allergen sensitization and clinical outcomes such as astigmatism.

Methods: A cohort of 74 pediatric participants aged 3 to 23 years was assessed for demographic data, allergy diagnosis severity, frequency of clinical visits, medication use, and results from skin prick tests. Allergen distribution was specifically evaluated, with statistical analyses including Chi-square and Fisher's

Exact Test performed to evaluate associations among variables.

Results: The findings revealed that 98.6% of participants tested positive for allergies, with significant sensitization to common indoor allergens such as cockroach (25 cases) and house dust mites (*Dermatophagoides pteronyssinus* at 26 cases, *D. farinae* at 15 cases). The study also identified associations between positive skin prick test results and higher rates of astigmatism ($X^2 = 17.74$, $p < 0.001$). Furthermore, 51.4% of participants reported using three medications annually, reflecting a strong reliance on ongoing medication management. Notably, 80.0% of participants engaged in follow-up visits post-testing, with 72.7% adjusting their medication regimens accordingly.

Conclusions: This study underscores the urgent need for thorough assessments and tailored management strategies in pediatric populations affected by allergies, emphasizing the significant prevalence of sensitizations and the implications for clinical practice. The high engagement in follow-up care suggests an opportunity to improve outcomes through targeted interventions that address both allergen exposure and associated clinical conditions.

Abstract No.: 204984

Panel No.: CDE-0252

Primary Results of the MIHE Keratoprosthesis Surgery

First Author: Jie BAI

Co-Author(s): Zexia DOU, Yifei HUANG, Ling LI, Shaowei LI, Chang LIU, Lin ZHAO

Purpose: To evaluate the primary anatomical and functional results of MIHE keratoprosthesis (KPro) for bilateral end-stage corneal blindness.

Methods: Retrospective consecutive case series of 16 (16 eyes) patients with end-stage corneal blindness who underwent MIHE KPro implantation. Preoperative characteristics, surgical details, and postoperative data, including best-corrected visual acuity (BCVA), KPro retention, and complications, were collected.

Results: Surgical indications included chemical injury (4 eyes), multi-penetrating keratoplasty failure (4 eyes), mucous membrane pemphigoid (3 eyes), graft-versus-host disease (2 eyes), explosive injury (1 eye), Stevens-Johnson syndrome (1 eye), and severe dry eye caused by cytomegalovirus keratitis secondary to HIV (1 eye). Mean follow-up was 11.81 ± 6.56 months (range: 3 to 24 months). Fifteen of the 16 eyes underwent simultaneous implantation of the MIHE KPro's frame and optical cylinder, while 1 eye required a two-stage procedure due to corneal perforation that occurred during lamellar corneal dissection. Autologous auricular cartilage reinforcement was performed in all patients. At last follow-up, all 16 eyes achieved postoperative

BCVA of 20/200 or better, with 7 eyes reaching 20/40 or better. Postoperative complications included surface mucosa overgrowth (4 eyes), conjunctival defect (2 eyes), and one case each of retro-prosthetic membrane, trauma-induced displacement of the KPro, retinal detachment, and aqueous humour leakage. All 16 eyes retained their initial KPro at the latest follow-up.

Conclusions: MIHE KPro, no allogeneic corneal donor needed, is an effective treatment for end-stage corneal blindness. It offers broad indications and a favorable safety profile. The procedure is highly feasible, with most patients eligible for simultaneous implantation of the frame and optical cylinder.

Abstract No.: 205199

Panel No.: CDE-0262

Quality of Life in Patients With Mild to Moderate Dry Eye Disease in a Hong Kong Cohort

First Author: Zhichao HU

Co-Author(s): Kelvin Kam Lung CHONG, Chi Pui Calvin PANG, Clement Chee Yung THAM, Yiu Man WONG

Purpose: This study aimed to investigate the quality of life (QoL) in patients with mild to moderate dry eye disease (DED) in a Hong Kong cohort.

Methods: QoL was assessed via the Short Form Health Survey (SF-36), which evaluates eight domains: Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH). Clinical measures of DED included Tear Break-Up Time (TBUT) and the Ocular Surface Disease Index (OSDI). The correlations between the SF-36 domains and the DED outcomes were analyzed using Spearman's correlation analysis in SPSS Version 29. (ClinicalTrials.gov ID: NCT06089317)

Results: A total of 198 subjects (153 females, 76.9%), with a mean age of 54.69 ± 14.58 years, were included. The mean scores for the eight SF-36 domains were as follows: PF (86.31 ± 14.47), RP (77.40 ± 33.94), BP (79.86 ± 13.93), GH (60.45 ± 16.08), VT (68.18 ± 17.95), SF (90.21 ± 12.13), RE (79.80 ± 33.69), and MH (68.81 ± 16.12). The means of OSDI and TBUT were 22.99 ± 11.92 and 3.65 ± 2.36 , respectively. Significant negative correlations with the OSDI score were observed for RP ($P < 0.001$, $r = -2.87$), BP ($P = 0.010$, $r = -0.183$), VT ($P = 0.027$, $r = -0.158$), SF ($P < 0.001$, $r = -0.234$), RE ($P < 0.001$, $r = -0.252$), MH ($P = 0.02$, $r = -0.165$), and. A significant positive correlation with TBUT was found only for VT ($P = 0.036$, $r = 0.015$).

Conclusions: The findings indicated that the impact of DED on QoL is more strongly and broadly associated with patient-reported symptom severity (OSDI) than with the objective measure of tear film stability (TBUT).

Abstract No.: 204877**Panel No.: CDE-0257****Quality of Life in Patients with Ocular Herpes Simplex Virus Disease***First Author: Hei Tung SHEK**Co-Author(s): Yan Yu Julia CHAN*

Purpose: To compare the quality of life (QoL) in active ocular herpes simplex virus disease patients with inactive ocular herpes simplex virus disease patients.

Methods: A prospective case-control study was carried out. 59 patients with ocular herpes simplex virus disease were recruited. Patient demographics, including age, gender, treatment and disease state, were collected for analysis. Three previously validated QoL questionnaires were used: National Eye Institute Visual Functioning Questionnaire, 28-item, Rasch-based revised (VFQ-28R), Glaucoma Quality of Life 17 (Glau-QoL17) questionnaire, and European Quality of Life 5 Dimensions 5 Level Version (EQ-5D-5L) questionnaire. Each questionnaire covered various aspects of the disease. An independent t-test was done to evaluate statistical significance.

Results: The results of the 3 questionnaires were compared. The total VFQ-28R score did not differ significantly in patients with active and inactive disease (64.5 ± 30.7 vs. 83.3 ± 20.5 , $p = 0.065$). For Glau-QoL17, patients with active disease had lower scores in the constraint (5.56 ± 2.40 vs. 7.09 ± 1.52 , $p < 0.05$) and self-care (3.25 ± 1.14 vs. 4.15 ± 1.38 , $p < 0.05$) domains when compared to patients with inactive disease. For EQ-5D-5L, the overall health score in patients with active disease was significantly lower than patients with inactive disease (54.6 ± 19.7 vs. 66.5 ± 14.1 , $p < 0.05$).

Conclusions: Patients with active ocular herpes simplex virus disease had worse overall health when compared to patients with inactive disease. They had a significantly lower QoL in constraints and self-care domains.

Abstract No.: 202092**Panel No.: CDE-0206****Quantitative Assessment of the Biomechanical Properties of Normal Human Eyes Using Brillouin Spectroscopy***First Author: Jiwon JEONG*

Purpose: With testing of a large normal population, we explored factors such as patient age, sex, and corneal thickness that might be associated with Brillouin spectroscopy measurements of corneal stiffness.

Methods: Preoperative data from 1,763 eyes of 888 refractive surgery patients (17–52 years old; 424 females) were retrospectively collected. These included V/A, IOP, MRSE, and Pentacam measurements (central corneal thickness (CCT), K1, and K2). Corneal

scans were recorded on a Brillouin Optical Scanning System (BOSS) using an automated 10-point pattern. The device measures the Central, Mean, Minimum, and Maximum Brillouin modulus (BM) values from the multiple localized values per scan. Non-parametric methods, such as Spearman rank correlations and Wilcoxon tests, were used in the data analyses.

Results: There were no significant interocular differences in the clinical measurements or in 3 of the 4.; however, the Max BM was greater for OS than OD ($P=0.03$). There were significant differences between the sexes in CCT, K1, K2 ($P \leq 0.0001$), and MRSE ($P=0.03$). Age correlated with MRSE, IOP and CCT ($P \leq 0.002$). BM values correlated significantly with CCT ($P \leq 0.04$) but not with IOP, K1, K2 or MRSE ($P \geq 0.11$). Corneal stiffness tended to increase with age ($P \leq 0.01$), but the increase was slow and slightly nonmonotonic, with variability between patients of the same age. The scans showed significantly greater Brillouin moduli for males than for females.

Conclusions: Non-contacting Brillouin scans of normal eyes showed associations between corneal stiffness and age, sex, and CCT of patients, suggesting that these factors should be considered in refractive surgery planning.

Abstract No.: 205247**Panel No.: CDE-0266****Recent Data of Keratitis/Scleritis-Related Endophthalmitis at a Tertiary Hospital in Thailand***First Author: Natasha YINGSAKMONGKOL**Co-Author(s): Thipsukon AMNARTPANICH, Pitipol CHOOPONG, Dhanach DHIRACHAIKULPANICH, Sathiya KENGPNPANICH*

Purpose: To report 9-year data in epidemiology, prognostic factors, clinical features, microbiology, treatment, visual outcomes, and ocular complications of keratitis/scleritis-related endophthalmitis (KSE).

Methods: We retrospectively reviewed KSE cases in a single-center tertiary hospital from January 2014 to December 2022. Demographics, associated factors, clinical presentation, microbiology, treatment, visual outcomes and ocular complications were collected. Data were analyzed for prognostic factors of poor visual outcomes (final visual acuity worse than hand motion) using univariable and multivariable logistic regression.

Results: Of 295 endophthalmitis cases, 48 (16.3%) were KSE with a mean follow-up of 8.25 months (interquartile range [IQR] 0.96–28.37). Mean age was 69.61 ± 14.99 years. Cultures were positive in 66.7%. The most commonly identified pathogen was *Pseudomonas aeruginosa* (20.8%), followed by fungi (4.2%) and mixed infections (12.5%). Median symptom-to-treatment time was 3.5 days (IQR 1.0–8.75). Initially, 54.3% of patients had visual acuity worse than hand

motion. The poor visual outcomes (visual acuity worse than hand motion) increased to 70.2% at final follow-up. Enucleation/evisceration was performed in 62.5%. Only 14.9% achieved functional vision (equal or better 6/60). Univariable and multivariable analysis identified intravitreal antimicrobial therapy (univariable analysis: crude odds ratio (OR) 0.08, 95% confidence interval [CI] 0.02-0.44, $p=0.003$; multivariable analysis: adjusted OR 0.09, 95% CI 0.015-0.529, $p=0.008$) as a protective factor of poor visual outcomes.

Conclusions: KSE remains sight-threatening with high enucleation rates. *Pseudomonas aeruginosa* represents the key target for empiric antibiotics. Low fungal detection emphasizes comprehensive microbiological work-up in suspected cases. Intravitreal antimicrobial therapy is a protective factor for visual outcomes. These findings could guide KSE management.

Abstract No.: 206673

Panel No.: CDE-0284

Restoring Vision With Descemetopexy in Descemet Membrane Detachment Following Cataract Surgery

First Author: Dhiny LIDINILLAH

Co-Author(s): Budiman, Ludwig TJOKROVONCO

Purpose: This case report aims to highlight the role of descemetopexy as an effective treatment for Descemet membrane detachment (DMD) following cataract surgery, emphasizing its potential in restoring corneal clarity and achieving significant visual improvement.

Methods: We report a case of a 74-year-old male who presented with blurred vision in the right eye (RE) one week after cataract surgery. On examination, the uncorrected visual acuity (UCVA) was 0.25 in the RE and the best-corrected visual acuity (BCVA) was 0.32 in the RE (S+1.50 C-1.50 $\times$ 35). Anterior segment examination of the RE revealed corneal edema, Descemet membrane folds extending from the temporal to central cornea, guttata, and a beaten metal appearance. Anterior Segment Optical Coherence Tomography (AS-OCT) confirmed DMD, while specular microscopy demonstrated polymegathism and pleomorphism in both eyes, suggesting Fuchs endothelial corneal dystrophy. Descemetopexy with 20% sulfur hexafluoride (SF6) gas was performed to achieve anatomical reattachment and visual rehabilitation.

Results: One day postoperatively, the cornea appeared clearer with attached Descemet membrane on AS-OCT, and intraocular pressure remained within normal limits. By one week, the patient reported markedly improved vision without discomfort. The cornea was transparent, anterior chamber was stable, and the intraocular lens was well positioned in the capsular bag. BCVA in the RE improved significantly to 0.8 with no postoperative complications observed.

Conclusions: Descemetopexy is a safe and effective treatment for DMD following cataract surgery, enabling rapid anatomical recovery and significant restoration of visual function.

Abstract No.: 200286

Panel No.: CDE-0166

Retention Cyst Mimicking Lacrimal Gland Cyst in a Patient of Mycoplasma-Induced Rash and Mucositis (MIRM)

First Author: Mariya DOCTOR

Purpose: To report the development of a large palpebral cyst mimicking lacrimal gland cystic swelling, in a patient with mycoplasma-induced rash and mucositis (MIRM).

Methods: A 25-year-old male presented with foreign body sensation and severe photophobia in both eyes for the past 1 month after an episode of sore throat, fever, and recurrent multiple oral ulcers. On examination, a large cystic swelling was noted in the upper temporal quadrant of the right eye, which appeared to be arising from the lacrimal gland. Slit lamp examination showed an extremely dry ocular surface, forniceal shortening, early nasal symblepharon, diffuse corneal punctate keratitis, and atrophic meibomian gland with lower lid keratinisation. The left eye showed central corneal thinning. Given the history, a suspicion of MIRM-induced cicatrizing conjunctivitis was made.

Results: He was subjected to Serum IgG and IgM for Mycoplasma, which came positive. MRI orbit confirmed the presence of a palpebral cyst. The patient was planned for a cyst biopsy. He was started on oral azithromycin 500mg for two weeks. When he came for the biopsy, the lesion had completely resolved, with fibrosis noted in the lacrimal gland region. After two weeks of systemic antibiotic cover, the patient was started on topical steroids, following which he was better symptomatically. Scleral contact lenses were prescribed to him at 2 months, which helped his vision to improve to 20/20p and also provided symptomatic improvement.

Conclusions: Retention cysts are common in conditions of cicatrizing conjunctivitis. Ophthalmologists should be aware of its various presentations and association with cases of MIRM.

Abstract No.: 207190

Panel No.: CDE-0295

Risk Factors and Patterns of Recurrence of Lid Margin Keratinization After Mucous Membrane Grafting in Stevens–Johnson Syndrome: A Case Series

First Author: Swetha **BUGGAREDDIGARI**Co-Author(s): Pragnya Rao **DONTHINENI**

Purpose: To identify the patterns of recurrence of lid margin keratinization (LMK) and risk factors associated with it in patients undergoing repeat mucous membrane grafting (MMG) in chronic Stevens–Johnson Syndrome sequelae (SJS) patients.

Methods: In this retrospective review of 89 patients who underwent MMG, operated by a single surgeon between 2018 and 2025 at a tertiary care centre, we identified 6 eyes of 5 patients who presented with LMK recurrence and underwent repeat MMG. Demographics, graft size, timing and location of recurrence, graft behaviour, associated keratopathy, donor-site morbidity, and clinical outcomes were recorded. Recurrence was defined as significant lid margin keratinization causing lid-related keratopathy requiring repeat surgery.

Results: The mean age was 34.2 years (range 11–64). Out of 5 patients, 4 had unilateral recurrence of LMK 1 had bilateral recurrence. The mean interval between surgery to recurrence was 5.3 months (range 3.5–7 months), with one late recurrence at 2.5 years. Recurrences predominantly involved the lower eyelid margin, particularly over the medial half. All grafts were well taken up; no displacement was observed in any of the eyes. However, horizontal graft shortening with epithelial breakdown at graft edges was seen in two cases. All eyes had associated keratopathy due to the LMK recurrence.

Conclusions: In chronic SJS, recurrence of LMK was typically seen within 6 months, more commonly over the medial half of the eyelid and commonly associated with horizontal graft shortening. Thus, optimizing graft dimensions, ensuring solid edge apposition, and managing ocular surface risk factors are crucial to reducing recurrence.

Abstract No.: 200595

Panel No.: CDE-0175

Safety and Efficacy of 30 mV/cm² Epi-Off Corneal Collagen Crosslinking in Eyes Affected by Progressive Keratoconus After 2 Years

First Author: Luigi **SERRA**Co-Author(s): Francesco **ABBATE**, Francesca **AGRICOLA**, Salvatore **AMBROSIO**, Rosa **BOCCIA**, Teresa **CANGIANO**, Italo **FATTORE**, Michele **LANZA**, Francesca **SIMONELLI**

Purpose: To investigate efficacy, safety, and outcomes of epi-off accelerated corneal collagen crosslinking (ACCC) in eyes affected by progressive keratoconus (KC) 2 years after treatment.

Methods: Epi off ACCC procedures using an energy of 30 mV/cm² were performed in 28 progressive KC eyes of 22 patients with a mean age of 24.07 ± 5.78 years (ranging from 17 to 36 years). A complete eye visit, including Scheimpflug camera scan, was performed in every patient at baseline and at 1, 3, 6, 12, and 24 months follow-up. Mean anterior (AMK) and posterior (PMK) keratometry, anterior maximum keratometry (Kmax), thinnest corneal point (TCP) changes were evaluated.

Results: After 2 years, no significant variations were observed in best corrected visual acuity (-0.04 ± 0.16 logMAR, $p = 0.07$), AMK (-0.08 ± 0.58 D), PMK (-0.06 ± 0.16 D), Kmax ($+0.06 \pm 0.22$ D, and TCP (-4.13 ± 9.31 μ m). Moreover, no complications were detected in every patient treated.

Conclusions: According to data observed in this study, even if they need to be confirmed in a larger population and longer follow-up, ACCC using an energy of 30 mV/cm² could be a safe and effective procedure aiming to stabilize the clinical conditions of eyes affected by progressive KC.

Abstract No.: 207359

Panel No.: CDE-0301

Scleral Contact Lens in Complex Corneal Situations in a Tertiary Eye Center

First Author: Nandita **TRIVEDI**Co-Author(s): Avani **HARIANI**, Parul **JAIN**

Purpose: To showcase a myriad of complex scenarios where scleral contact lenses (SCL) were used as a treatment choice in patients for better quality of vision and comfort.

Methods: This is a retrospective analysis of SCL fitting done in complex corneal situations in a contact lens clinic in a tertiary eye center in Delhi.

Results: The most common indication for the use of SCL in our setup was keratoconus. Other complex situations that were corrected include post-RK, post-Lasik Ectasia, operated Keratoplasty, surface

irregularities like Epithelial Basement Membrane Dystrophy, Pellucid Marginal Degeneration, Terrien's Degeneration, and Salzmann Nodular Keratopathy.

Conclusions: There has been a shifting trend to manage various degrees of irregular corneas due to varied etiology with scleral contact lens (SCLs) hence adopting a more conservative approach which is reversible and more acceptable to the patients. These lenses have become a useful tool in ocular surface abnormalities, providing a protective interface as well as improving the visual acuity and quality of life.

Abstract No.: 200827

Panel No.: CDE-0180

Screening and Identification of Basement Membrane-Related Gene Signatures for Diagnosis in Keratoconus Through WGCNA and Machine Learning

First Author: Peiyun XIE

Co-Author(s): Ding CHEN, Zhanhao GU, Bowei YUAN

Purpose: Keratoconus (KC) can lead to severe vision loss, impacting daily life. The etiology of KC is not yet clear, and early diagnosis and treatment are crucial for prognosis. This study aimed to explore basement membrane (BM)-related gene signatures for the diagnosis and therapy of KC and provide novel insights into its pathogenesis.

Methods: Based on the public datasets GSE112155 and GSE151631 in the GEO database, we obtained the DEGs of KC, and downloaded BM-related genes based on the GeneCard database. Through a combination of bioinformatics methods, primarily WGCNA and machine learning such as RF and SVM, BM-related genes were identified as biomarkers for KC diagnosis. Subsequently, we further validated these findings using unsupervised clustering analysis, a nomogram, and ROC curve analysis.

Results: Through the analysis of two KC-related datasets, 227 DEGs were screened out and intersected with BM-related genes to obtain 195 intersecting genes. By WGCNA and two machine learning algorithms, we identified four genes, namely CRY2, RNF19B, PPP1R18 and PFKFB3. These genes were significantly expressed in the normal group. By the ROC analysis, four genes demonstrated excellent diagnostic performance in internal validation. In external validation, CRY2, RNF19B, and PPP1R18 showed good predictive performance, each with AUC values greater than 0.6. Unsupervised clustering and nomogram also supported the good diagnostic capabilities of these genes. Immune infiltration analysis and functional enrichment analysis further suggested that immune inflammation, metabolism, and apoptosis were also involved in KC.

Conclusions: Using bioinformatics analysis, we found that three novel hub genes, CRY2, RNF19B, and

PPP1R18, are beneficial for the diagnosis and therapy of KC.

Abstract No.: 205468

Panel No.: CDE-0267

Simple Limbal Epithelial Transplant (SLET) in Chinese Patients With Limbal Stem Cell Deficiency

First Author: Jeffrey Kai Chun MAK

Co-Author(s): Ka Wai KAM, Stephanie KWOK, Eugenie MOK, Alvin Lerrmann YOUNG

Purpose: Simple limbal epithelial transplant (SLET) is a promising surgical technique for treating limbal stem cell deficiency. This study reports our experiences at a tertiary eye center in Hong Kong with SLET for LSCD of various etiologies since 2018.

Methods: We reviewed medical records of patients who underwent SLET for LSCD, collecting demographic data, visual outcomes, ocular parameters, etiology of LSCD, and type of SLET performed. We measured follow-up duration, recurrence of LSCD, days to re-epithelization, and the proportion of eyes with a 2-line increase in Snellen acuity.

Results: Eleven eyes from 4 males and 4 females were analysed. Five eyes suffered from an autoimmune cause, five from chemical burns, and one from treatment of ocular surface squamous neoplasia. The mean follow-up duration was 2.4 years (0.3 to 6.3). Five SLETs were autologous, while 6 allogenic SLETs were performed on both eyes of two patients and twice in one eye of one patient with bilateral LSCD. One eye received subsequent cataract and penetrating keratoplasty, and two eyes underwent cataract surgery with implantation of an intraocular lens following SLET. Nine of eleven eyes (81.8%) showed no recurrence of LSCD at the last follow-up. Excluding one bilateral allogeneic SLET performed for acute chemical burn, five out of nine eyes (55.5%) achieved a 2-line increase in visual acuity. None of the donor eyes in autologous SLET exhibited focal LSCD.

Conclusions: SLET is an effective and safe surgical option for Chinese patients with LSCD of various etiologies.

Abstract No.: 205238

Panel No.: CDE-0264

Six-Month Comparison of Clinician-Guided Thermal Pulsation With Warm Compress Therapy for Managing Meibomian Gland Dysfunction

First Author: Dian ZHUANG

Co-Author(s): Jennifer CRAIG, Catherine JENNINGS, Stuti MISRA, Alex MUNTZ, Michael WANG

Purpose: Patient compliance limits the effectiveness of standard therapy for meibomian gland dysfunction

(MGD). This study compared the therapeutic efficacy of in-office clinician-guided thermal pulsation (Systane iLux®, Alcon) to daily warm compress therapy as standard of care.

Methods: In this prospective, investigator-masked, parallel-group trial, participants with MGD and DED meeting TFOS DEWS II criteria were randomised to receive in-office thermal pulsation at day 0, or 6 months of daily self-applied warm compress and eyelid massage. Symptoms and clinical measures of tear film, ocular surface, and meibomian glands were assessed at baseline and monthly for 6 months. Conjunctival impression cytology samples (EYEPRIM®, Opia) were analysed for IL-1 β , -8, -18, caspase-1, NLRP3, and MMP-9 gene expression using digital droplet PCR (ddPCR) and compared between groups at baseline and month 6 in a subset of participants.

Results: A total of 77 participants (aged 58 $\pm$ 18 years; 82% female) were included (thermal pulsation n=38, warm compress n=39). A total of 36 (thermal pulsation n=19, warm compress n=17) underwent inflammatory marker analysis. Both groups showed sustained improvements in DEQ-5, OSDI and SANDE symptomology scores, lipid layer grade, and lid wiper epitheliopathy from day 30 ($p<0.05$). Expressed meibum quality improved from day 90 only following thermal pulsation ($p<0.01$). SPEED scores improved earlier with thermal pulsation (day 30) than with warm compress (day 60, $p<0.01$). Caspase-1 expression significantly increased from baseline to month 6 in the warm compress group ($p<0.05$), while other markers showed no significant change in either group.

Conclusions: Both thermal pulsation and standard of care resulted in significant improvements in clinical outcomes, with the former providing a slightly more rapid and greater effect. Biomarker findings suggest comparable inflammatory control between groups. Outcomes suggest clinician-guided thermal pulsation therapy is effective, and the efficient in-clinic treatment may mitigate poor compliance with daily standard-of-care.

Abstract No.: 204939

Panel No.: CDE-0256

Somatostatin Analog Pasireotide Reestablishes Corneal Neuro-Immune Homeostasis and Promotes Nerve Regeneration in Dry Eye Disease

First Author: Xujiao ZHOU

Co-Author(s): Jiaxu HONG

Purpose: Dysregulated neuro-immune crosstalk perpetuates chronic dry eye disease (DED), yet targeted interventions remain limited. While somatostatin signaling—a pleiotropic neuro-immune modulator—holds therapeutic potential, its role in DED is uncharted. This study investigates whether the long-acting analog pasireotide (SOM230) promotes corneal

nerve repair and alleviates pain by modulating neuro-immune interactions.

Methods: In a murine DED model induced by lacrimal gland excision, pasireotide or vehicle was administered topically. Corneal integrity, neuropathic pain, and sensitivity were assessed via fluorescein staining, behavioral tests, and esthesiometry. Unbiased RNA sequencing, flow cytometry, immunofluorescence, and qPCR were employed to delineate mechanisms and evaluate macrophage polarization.

Results: Pasireotide accelerated epithelial healing, reversed mechanical allodynia, and restored corneal nerve density. Transcriptomic analysis revealed suppression of key inflammatory pathways, including TNF- α , NF- κ B, and IL-17. Crucially, pasireotide directly modulated ocular surface immunity by skewing macrophage polarization—diminishing M1 pro-inflammatory populations (reducing IL-1 β , TNF- α) while expanding reparative M2 macrophages (elevating Arg1, IL-10)—thereby transitioning the immune milieu from destructive inflammation to tissue repair.

Conclusions: We identify somatostatin signaling as a critical regulator of neuro-immune homeostasis in DED. Pasireotide reprograms macrophage plasticity via direct immunomodulation, curbing neurogenic inflammation and fostering a regenerative niche. These findings unveil a novel therapeutic axis, positioning pasireotide as a pioneering dual neuro-immune modulator with transformative potential for treating DED-associated neuropathic pain and corneal neuropathy.

Abstract No.: 201702

Panel No.: CDE-0195

Spark Plasma Sintered Titania-Graphene Oxide: A Toothless Keratoprosthesis for End-Stage Corneal Blindness

First Author: Sean NG

Co-Author(s): Evelina HAN, Jodhbir MEHTA, Hon Shing ONG, Andri K. RIAU, Yoke-rung WONG

Purpose: The osteo-odonto keratoprosthesis (OOKP) remains a groundbreaking treatment for end-stage corneal blindness after 50 years, but it is surgically complex and unsuitable for certain patients, particularly those without healthy teeth. We developed a novel keratoprosthesis (KPro) comprising spark plasma sintered titania-graphene oxide (TiGO) and a 5-mm PMMA optical cylinder, and evaluated its performance as an alternative to the tooth in the OOKP.

Methods: The KPro's suitability for implantation was demonstrated through the preservation of surface integrity, chemical structure, and mechanical strength following ethylene oxide sterilization. Mechanical pull-out tests showed that PMMA adhered more strongly to TiGO than to primate teeth after bonding with dental cement, suggesting that the same cement used in OOKP procedures can be used with TiGO

skirts. In addition, in-vitro studies confirmed TiGO's biocompatibility, supporting adhesion, proliferation, and viability of human corneal stromal fibroblasts.

Results: In a rabbit model of OOKP stage 1 surgery, the TiGO integrated successfully into dermal tissue, showing vascularized connective tissue with positive staining for collagen I and III and CD31. In stage 2 simulation, implantation of fibrovascularized KPro onto the ocular surface was uneventful with no evidence of tissue melt, PMMA detachment, or adverse inflammatory response over six months. Immunohistological analyses revealed minimal fibrosis and immune reactions in the nictitating membrane, with even less reaction in the rabbit host corneas.

Conclusions: In conclusion, our TiGO-based KPro offers a promising alternative to OOKP, with advantages including a larger PMMA optical cylinder, less complex surgery, and much broader surgical indications.

Abstract No.: 202344

Panel No.: CDE-0210

Splicing Dysregulation Associated with Trinucleotide Repeat Expansion in Fuchs Endothelial Corneal Dystrophy

First Author: Yuma YATA

Co-Author(s): Kruse FRIEDRICH, Noriko KOIZUMI, Taisuke NUMAO, Naoki OKUMURA

Purpose: Most Fuchs endothelial corneal dystrophy (FECD) patients carry trinucleotide repeat (TNR) expansions in the TCF4 gene, which cause splicing abnormalities through MBNL protein sequestration. Previous studies using short-read RNA sequencing could not fully resolve isoform structures. This study used long-read sequencing to comprehensively characterize isoform dynamics associated with TNR expansion in FECD.

Methods: Long-read RNA sequencing was performed on corneal endothelial cells obtained from FECD patients with TNR expansion (n=7) and healthy controls (n=5). Isoforms were classified into annotated and novel categories. In addition, three independent short-read RNA-seq datasets were analyzed to validate differential expression patterns of the identified isoforms.

Results: Long-read RNA sequencing revealed that both FECD and control samples contained 39~49% annotated isoforms and 18~31% novel isoforms. Differential expression analysis demonstrated that FECD patients with TNR expansion exhibited 318 upregulated isoforms (42 genes) and 203 downregulated isoforms (15 genes) across three datasets. Notably, a previously uncharacterized TCF4 isoform was consistently upregulated in FECD, terminating upstream of the TNR region and containing a functional poly(A) signal at the 3' end, supporting its biological relevance.

Conclusions: This study provides the first comprehensive long-read RNA sequencing analysis of FECD, revealing altered isoform expression dynamics associated with TNR expansion. The consistent upregulation of a novel TCF4 isoform highlights a potential mechanistic link to pathogenesis. Further validation using patient-derived samples and functional studies will be essential to clarify its pathogenic significance and contribution to FECD progression.

Abstract No.: 201467

Panel No.: CDE-0188

Standard Induction Chemotherapy Regimen Before Allogeneic Hematopoietic Stem Cell Transplantation Induces Functional and Morphological Damage to Ocular Surface Tissues

First Author: Jianwen XUE

Co-Author(s): Jiaxu HAN, Lingyi LIANG, Ren LIU, Caizhen QIU

Purpose: Prevalent ocular discomfort in patients before hematopoietic stem cell transplantation implied that the pretreatment conditioning regimens may contribute to ocular surface dysfunction, yet causality remains unproven. This study explored the effects of cytarabine (Ara-C) chemotherapy conditioning regimens on ocular surface tissues.

Methods: Mice received Ara-C with or without rosiglitazone (PPAR γ agonist) for 7 days. Slit-lamp biomicroscope was used for ocular examinations. Immunofluorescence detected acinar cell proliferation, differentiation, and ductal keratinization in the meibomian gland (MG) and the lacrimal gland (LG). Lipid accumulation was evaluated by LipidTox staining. Lipogenic status, FoxO1/FoxO3a cellular localization, and oxidative stress were visualized via immunohistochemistry. Western blotting assessed relative protein expression and AKT/FoxO1/FoxO3a pathway phosphorylation.

Results: Ara-C (50 mg/kg) did not affect mouse survival but induced damage to ocular surface, including corneal epithelial defects, MG obstruction and acinar dropout, and LG dysfunction. Ara-C caused progenitor loss in MG, as evidenced by reduced P63+/Lrig1+ acinar cells. Ducts of Ara-C-treated mice exhibited marked dilatation, lipid deposition, and hyperkeratinization. Ara-C disrupted MG lipid metabolism by downregulating PPAR γ and its downstream lipogenic targets AWAT2/SOAT1/ELOVL4 and upregulating HMGCR. Dephosphorylation of AKT and the subsequent nuclear translocation of FoxO1/FoxO3a contributed to Ara-C-induced PPAR γ downregulation. Ara-C triggered oxidative stress with increases in 4-HNE/8-OHdG and Keap1/Nrf2/HO-1/SOD1 axis dysregulation. Rosiglitazone treatment ameliorated MGD-associated pathological manifestations, LG function, MG lipid

metabolism, and oxidative stress in Ara-C-exposed mice.

Conclusions: Ara-C chemotherapy exerted topical cytotoxic effects on ocular surface, and PPAR γ restoration mitigated Ara-C-induced MGD alterations.

Abstract No.: 203410

Panel No.: CDE-0229

Starting From Schwalbe's Line With a Sharp Blade: A New Technique for Descemet's Membrane Endothelial Keratoplasty Graft Preparation

First Author: Guigang LI

Purpose: To introduce a new Starting from Schwalbe's line with a sharp blade (SSS) technique for DMEK graft preparation.

Methods: We performed a retrospective, uncontrolled study involving 109 patients (114 donors) who underwent DMEK over eight years (from October 2017 to December 2024). Starting from Schwalbe's line with a sharp blade (SSS) technique was used for donor graft preparation in all cases. A total of 109 patients were divided into two groups based on surgical timing: the earlier 54 cases and the later 55 cases. We compared DMEK graft preparation success rate (SR), complication rate (CR), and time used for graft preparation. For the last 19 cases in 2024, we analyzed corneal endothelial cell density (ECD) loss ratio by comparing donor cornea ECD before and after transplantation.

Results: In this study, 109 patients underwent DMEK surgery using 114 donor corneas. The first ($n = 54$) and second ($n = 55$) groups showed no significant differences in donor age, preservation time, graft diameter, or preparation time ($P > 0.05$). The overall graft preparation success rate was 97.37%, with no significant differences ($P = 1.000$). Complications varied, with eccentric punch showing a significant difference between groups ($P = 0.01$). Postoperative ECD measurements revealed no significant difference in ECD between groups ($P = 0.930$). In 2024, the post-transplantation ECD loss rate averaged $50.0 \pm 22.5\%$, indicating moderate endothelial cell loss.

Conclusions: SSS technique can guarantee a nearly 100% success rate (97.37%) for Descemet's membrane endothelial keratoplasty graft preparation. It is a time-efficient, easy-to-learn, and donor-cornea-saving method for donor graft preparation.

Abstract No.: 204033

Panel No.: CDE-0236

Surgical Management of Sclerocorneal Cyst Secondary to Ciliary Body–Scleral Fistula: Two-Year Follow-Up

First Author: Tu Nga NGUYEN

Co-Author(s): Hoang Viet Chi VU

Purpose: A primary sclerocorneal cyst represents a rare entity, with only a few cases documented in the literature. We report two cases of sclerocorneal epithelial cyst with emphasis on underlying etiology, surgical approach, and long-term outcomes.

Methods: Two patients with subconjunctival cystic lesions present since early childhood were evaluated. Neither patient had a history of ocular trauma or surgery. In both cases, the cysts had enlarged rapidly in recent months, causing visual impairment. Ophthalmic examination revealed fluid-filled sclerocorneal cysts extending into the corneal stroma and involving the visual axis. Surgical excision of the cysts was performed. During removal of the anterior cyst wall, a scleral fistula overlying the ciliary body was identified, with evident leakage of aqueous humor. The fistula was cauterized and closed with sutures, followed by placement of a tectonic lamellar kerato-scleral graft at the excised area.

Results: Histopathology confirmed the epithelial-lined cysts with minimal epithelial debris. Postoperative follow-up demonstrated restoration of corneal clarity, improvement of visual acuity, and no evidence of recurrence over a two-year period.

Conclusions: These cases suggest that a congenital ciliary body–scleral fistula may act as a conduit for aqueous humor, leading to the formation of a sclerocorneal epithelial cyst. Complete excision of the cyst, closure of the fistula, and tectonic kerato-scleral grafting can result in favorable anatomical and visual outcomes with minimal risk of recurrence.

Abstract No.: 204411

Panel No.: CDE-0241

Tacrolimus Prolongs Corneal Allograft Survival and Prevents Dendritic Cell Infiltration in a Myeloid-Derived Suppressor Cell-Dependent Manner

First Author: Yingyi LIU

Co-Author(s): Yan HE

Purpose: To clarify the cellular mechanism by which tacrolimus (FK506) suppresses immune activation and elongates allograft survival, with a focus on understanding its effects on immune regulation via myeloid-derived suppressor cells (MDSC).

Methods: A mouse model of corneal penetrating keratoplasty was utilized, with recipient mice receiving FK506 treatment and MDSC depletion using anti–

Gr-1 antibody at different time points post-transplant. Flow cytometry was used to evaluate the proportion of MDSC and dendritic cells (DC) in immune organs. Single-cell RNA sequencing and immunofluorescence staining were performed on corneal graft to analyze immune cell populations within the graft microenvironment. Ex vivo-generated MDSCs were cocultured with immature DCs, and RNA sequencing was performed to determine how FK506 modulates MDSC immunosuppressive activity.

Results: Administration of FK506 led to increased expansion of MDSC in recipient mice and prolonged survival of corneal allografts. In contrast, antibody-mediated depletion of MDSC abolished the FK506-mediated beneficial effects, which were associated with increased DC activation and recruitment to the graft bed and allografts. Notably, unlike continuous depletion and temporary early depletion, delayed depletion beginning on day 8 post-transplant failed to disrupt the FK506-induced elongation of corneal allograft survival. Single-cell RNA sequencing analysis and immunofluorescence staining of corneal grafts revealed that FK506 reduced graft infiltration of immune cells, including DC and T cells, in an MDSC-dependent and temporal fashion. Moreover, depletion of MDSC reverted FK506's suppression of DC maturation in the draining lymph node on day 7.

Conclusions: These findings indicate that FK506 prolongs allograft survival through induction of MDSC-mediated suppression of early DC activation.

Abstract No.: 203705

Panel No.: CDE-0232

Tear Cytokines and Ocular Surface Damage in Pemphigus: A Triphasic Dry Eye Mode

First Author: Hui ZHANG

Purpose: To investigate the progression of pemphigus-associated dry eye and its correlation with tear cytokines.

Methods: In this cross-sectional study, 45 pemphigus patients (90 eyes) and 28 healthy controls (56 eyes) were evaluated using ocular surface parameters and tear cytokine analysis.

Results: Pemphigus patients showed significantly worse ocular surface metrics and higher dry eye prevalence (71.11% vs 46.43%) than controls. A three-phase progression was identified: early (disease duration with pemphigus ≤ 3 months) with tear film deficiency, intermediate (3–12 months) with conjunctival injury, and late (>12 months) with Meibomian glandular atrophy and corneal damage. Tear levels of IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, TNF- α , IFN- α , and IFN- γ were significantly elevated (all $p < 0.05$), with IL-6 and IL-8 positively correlating with conjunctival damage and disease duration.

Conclusions: These findings suggest that pemphigus-related dry eye progresses through inflammatory phases, supporting early anti-inflammatory intervention targeting IL-6/IL-8.

Abstract No.: 201334

Panel No.: CDE-0186

Tear Proteome Alterations Over One Year With Topical 0.1% Cyclosporine a Emulsion in Patients Undergoing Allogeneic Stem Cell Transplantation

First Author: Jingwen YU

Co-Author(s): Lim LI, Yuchi LIU, Louis TONG, Lei ZHOU

Purpose: To profile longitudinal tear proteomics in allo-HSCT patients receiving daily 0.1% cyclosporine-A cationic emulsion and explore its relationship with clinical phenotypes.

Methods: This study included 24 participants using cyclosporine eye drops from 3–5 weeks pre-HSCT to 12 months post-HSCT. Ocular surface examinations and tear collection were done at pre-HSCT, HSCT, and 3/6/12 months post-HSCT. Patients were grouped into Responders (R) and non-Responders (NR) via impression cytology flow analysis. Tear proteomics was analyzed by LC-MS/MS with data-independent acquisition, followed by linear mixed model regression.

Results: None of the patients developed ocular GVHD in the first year after HSCT. The overall OSDI, Schirmer, TBUT and conjunctival redness did not change significantly from baseline (pre HSCT). 2570 proteins were identified. Pre-HSCT, AGT, HRG, and SERPIND1 differed between R and NR (all $P < 0.05$). Post-HSCT, COL6A1, RAB11B, XRCC6, etc., showed significant differences. WGCNA clustered these proteins into 6 modules linked to immune response, lysosome, etc., correlating with Schirmer test, tear osmolarity, and conjunctival redness.

Conclusions: Prophylactic 0.1% cyclosporine-A cationic emulsion may prevent ocular GVHD post-allo-HSCT in one year by modulating immunoinflammatory proteins and pathways.

Abstract No.: 202514

Panel No.: CDE-0214

The Correlation of Corneal Endothelial Cell Parameters and Anthropometry in Children With Diabetes Mellitus

First Author: Aisha ANDRIANA

Co-Author(s): Nanda Wahyu ANINDITA, Lely Retno WULANDARI

Purpose: Studies on corneal endothelial morphology in children with diabetes are limited. This study aimed to analyze the relationship between anthropometric measures and corneal endothelial parameters in

children with diabetes, to clarify whether growth-related factors influence corneal health.

Methods: This cross-sectional study included children with diabetes at Dr Saiful Anwar Hospital, Malang, Indonesia, in October 2024. We analyzed cell density (CD), coefficient of variation (CV), and hexagonality (HEX) as the corneal endothelial parameters with a non-contact specular microscope. Height, weight, and BMI were measured. Their associations were analyzed with Spearman's correlation and simple linear regression (two-tailed, $p < 0.05$). Ethics approval and informed consent were obtained.

Results: A total of 80 eyes from 40 children aged 7-18 years old were examined; 67.5% were female. We categorized BMI as underweight (45%), normal (30%), overweight (10%), and obese (15%). Specular microscope showed the mean CD of 3198.7 cells/mm², CV 24.0%, HEX 68.4%. BMI showed no significant correlation with CD, CV, or HEX. No significant correlations were observed between anthropometric measures and CV or HEX. CD correlated negatively with height ($p = 0.015$) and weight ($p = 0.029$), decreasing by 3.81 cells/mm² for each additional centimeter in height ($R^2 = 6\%$) and by 3.48 cells/mm² for each additional kilogram in weight ($R^2 = 5.5\%$).

Conclusions: There was no correlation between corneal endothelial cell parameters and BMI. Greater height and weight were associated with lower CD. Clinically, these findings suggest that growth parameters may influence corneal endothelial status. Incorporating anthropometry in ocular monitoring and conducting longitudinal studies is recommended to inform surgical planning and follow-up strategies.

Abstract No.: 204779

Panel No.: CDE-0246

The Efficacy of Topical Treatments for Vernal Keratoconjunctivitis: A Network Meta-Analysis

First Author: Ziming XU

Purpose: This meta-analysis aims to evaluate the efficacy and safety of topical cyclosporine on the management of vernal keratoconjunctivitis compared to placebo, tacrolimus and dexamethasone.

Methods: This meta-analysis was conducted in accordance with the 2020 PRISMA guidelines. We searched PubMed, Cochrane, Embase and Web of Science for relevant randomized controlled trials (RCTs) that had been published by August 2025. Studies that compared topical cyclosporine, tacrolimus and dexamethasone with a control were included. Direct and indirect comparisons were evaluated using network meta-analysis. Outcomes for efficacy evaluation include sign score, symptom score, and corneal fluorescein staining score. The Bayesian NMA

was conducted using the R-package, gemtc (version 1.0-1).

Results: Among 1,209 studies assessed, we identified 9 eligible RCTs involving 1,041 children aged 4 to 18 years. Cyclosporine was more effective than placebo in managing vernal keratoconjunctivitis, with a higher reduction in symptom score (standardised mean difference [SMD] = -1.57, 95% CI [-2.54; -0.61]), sign score (SMD = -0.95, 95% CI [-2.13; 0.23]) and corneal fluorescein staining score. There was no statistically significant difference between 0.05% cyclosporine and 0.01% dexamethasone ($p > 0.05$), and between 0.05% cyclosporine and 0.03% tacrolimus ($p > 0.05$).

Conclusions: This study indicates that cyclosporine was effective drug for the management of vernal keratoconjunctivitis, and its efficacy was similar to 0.01% dexamethasone to tacrolimus. More doses of cyclosporine were warranted to investigate the relationships between different doses.

Abstract No.: 203606

Panel No.: CDE-0231

The Impact of Extraocular Muscle Hypertrophy on Intraocular Pressure in the Primary Position and Special Positions of Gaze in Patients With Thyroid Eye Disease

First Author: Zijing SUN

Co-Author(s): Wei LU

Purpose: This study evaluates the effect of medial and inferior rectus muscle hypertrophy on intraocular pressure (IOP) in thyroid eye disease (TED) patients and its association with extraocular muscle involvement to facilitate clinical management.

Methods: A retrospective analysis was conducted on TED patients diagnosed with extraocular muscle hypertrophy at the Second Hospital of Dalian Medical University from September 2023 to September 2024. Patients were categorized into two groups based on the presence of muscle involvement: isolated inferior rectus hypertrophy and combined medial and inferior rectus hypertrophy. A control group comprising healthy individuals without orbital disease was also incorporated. IOP measurements were taken in the primary position and during temporal-superior gaze using the Icare Pro tonometer. Statistical comparisons of IOP among the groups were performed, along with correlation analyses between IOP changes and the number of affected muscles.

Results: The study comprised 24 TED patients (40 eyes), including 34 eyes with varying degrees of restrictive strabismus. The control group exhibited IOP values of 15.6 ± 1.9 mmHg and 18 ± 2.3 mmHg in the primary position and temporal-superior gaze, respectively. The isolated inferior rectus hypertrophy group presented IOP values of 17.4 ± 1.9 mmHg and 25 ± 2.9 mmHg, while the combined medial and inferior rectus hypertrophy

group showed IOP values of 17.2 ± 2.1 mmHg and 26.7 ± 3.0 mmHg. Significant differences in IOP were noted among the groups ($P < 0.001$ for all comparisons). A positive correlation was established between the degree of IOP change during temporal-superior gaze and the number of affected extraocular muscles ($r = 0.345$; $P < 0.001$).

Conclusions: TED patients exhibit normal primary position IOP. Inferior rectus hypertrophy raises IOP during temporal-superior gaze, exacerbated by medial rectus hypertrophy. Further research is needed on IOP management for TED patients with gaze-dependent IOP elevations.

Abstract No.: 206548

Panel No.: CDE-0281

The Relationship Between Sedentary Behaviour, Dry Eye Disease and Retinal Microvascular Dysfunction in Elderly Patients

First Author: Kelly WONG

Purpose: To determine the impact of sedentary behaviour on ocular surface and retinal microvascular health in Chinese subjects aged 50 or above.

Methods: This cross-sectional study included 1,230 Chinese subjects aged ≥ 50 . All subjects underwent comprehensive dry eye assessment (OSDI, tear breakup time, meiboscore, etc.) and retinal imaging via OCT-Angiography to quantify vascular parameters. Physical activity was categorised using the Metabolic Equivalent of Task (MET) minutes per week.

Results: The prevalence of dry eye disease (DED) was 20.2%. Lower physical activity levels were significantly associated with a higher prevalence of DED. Subjects with DED had significantly worse retinal vascular parameters (e.g., central subfield thickness, capillary flux) than those without DED. OCT-A parameters also correlated with dry eye signs, like meiboscore and OSDI.

Conclusions: Sedentary behaviour is significantly associated with both DED and retinal microvascular dysfunction in elderly subjects. DED may serve as an indicator for lower exercise levels and poorer vascular health. Ophthalmologists should counsel DED patients on adopting healthy habits to improve vascular health.

Abstract No.: 202201

Panel No.: CDE-0207

The Study of PPBP in Fungal Keratitis

First Author: Xiaoxin GUO

Co-Author(s): Bo GONG, Weijia WU, Jialing XIAO

Purpose: To clarify the pathogenesis of fungal keratitis (FK) and identify new therapeutic targets.

Methods: • Intrastromal injection of *Aspergillus fumigatus* to induce FK mouse model. • Single-cell RNA-seq of infected corneas to map cellular

composition and transcriptional changes. • Human FK corneal transcriptome validation. • AAV-mediated Pbp knockdown in vivo.

Results: • FK corneas showed immune-cell infiltration, and reduced epithelial cell. • PPBP was the top differentially expressed gene across corneal epithelial cell. • Human corneal RNA-seq confirmed PPBP elevation. • Pbp knockdown attenuated corneal opacity, edema, epithelial defects, and decreased IL-1 β , IL-6, TNF- α expression.

Conclusions: PPBP is a critical pro-inflammatory mediator in FK. Targeting PPBP offers a promising therapeutic strategy to improve FK management.

Abstract No.: 205427

Panel No.: CDE-0268

Three-Year Outcomes of Accelerated Cross-Linking Techniques for Thin Keratoconic Corneas: A Comparison of Standard, Contact Lens-Assisted, and Lenticule-On Approaches

First Author: Anastasiya INSAPOVA

Co-Author(s): Mukharram BIKBOV, Giulli KAZAKBAEVA, Iulia RUSAKOVA, Karine TITOIAN

Purpose: To evaluate the safety and efficacy of accelerated corneal collagen cross-linking (CXL) with an overlaying corneal lenticule (A-LACXL) for thin corneas in progressive keratoconus (KC), and to compare the outcomes with accelerated contact lens-assisted CXL (A-CACXL) and accelerated CXL (A-CXL).

Methods: This study enrolled eyes with progressive KC and a corneal thickness of less than 400 μ m after epithelial removal. Patients were divided into three groups: the A-LACXL group (12 patients/14 eyes) received a femtosecond laser-prepared lenticule on which accelerated CXL was performed; the A-CACXL group (22 patients/26 eyes) underwent accelerated CXL using contact lens; and the control group (20 patients/24 eyes) underwent standard A-CXL. The mean patient age was 27.0 ± 7.2 years, with a follow-up period of 3 years. Uncorrected (UDVA) and corrected (CDVA) distance visual acuity, manifest refraction, corneal topography, and endothelial cell density (ECD) were evaluated preoperatively and postoperatively.

Results: Mean UDVA improved significantly in all three groups at 12 months ($p < 0.05$) and remained stable throughout the follow-up period. Maximum keratometry (Kmax) decreased by 1.05 ± 1.84 D in the A-CACXL group and by 0.86 ± 1.57 D in the A-CXL group, though these changes were not statistically significant compared to baseline ($p > 0.05$). ECD remained stable in all groups ($p > 0.05$). There were no statistically significant differences in the mean changes in UDVA, CDVA, Kmax, mean keratometry (Kmean), or ECD between the three groups (all $p > 0.05$).

Conclusions: A-CACXL and A-LACXL are effective and safe techniques for managing progressive KC in thin

corneas, demonstrating outcomes comparable to standard A-CXL. A-CACXL halted progression in 76.7% of eyes and induced regression in 33.3%. A-LACXL represents a viable therapeutic option for patients with thin corneas where standard CXL is not indicated.

Abstract No.: 201298

Panel No.: CDE-0185

Topical Insulin (25 IU/ML) Combined With Propylene Glycol-Based Artificial Tears in the Management of Persistent Corneal Epithelial Defects: A Case Series

First Author: Hong Ngoc NGUYEN THI

Purpose: To evaluate the effectiveness of topical insulin (25 IU/mL) prepared with Propylene glycol-based artificial tears in treating persistent corneal epithelial defects (PCEDs) of various etiologies.

Methods: This case series included six patients with PCEDs unresponsive to standard therapy. Etiologies were: delayed epithelial healing after viral keratitis ($n = 2$), chemical burn ($n = 1$), infectious keratitis ($n = 1$), severe dry eye with suspected Sjögren's syndrome ($n = 1$), and persistent epithelial bullae following phacoemulsification in a diabetic patient ($n = 1$). Persistent epithelial defects were defined as lasting beyond complete resolution of infection or initial injury, with a mean duration of 23 ± 3.5 days before initiating insulin therapy. Topical insulin (25 IU/mL) was prepared by mixing insulin with Propylene glycol-based artificial tears and applied until complete re-epithelialization.

Results: All six cases achieved complete epithelial closure with a mean healing time of 9 ± 2.6 days after initiating topical insulin. No recurrences were observed during follow-up. No local or systemic adverse effects related to insulin were recorded.

Conclusions: Topical insulin (25 IU/mL) combined with Propylene glycol-based artificial tears is a safe, effective, and low-cost treatment option for PCEDs from various causes. It may be considered as an adjunctive therapy in cases unresponsive to conventional management.

Abstract No.: 205171

Panel No.: CDE-0259

Translation, Adaptation and Validation of the Malay Version of the Standard Patient Evaluation of Eye Dryness: In a Non-Clinical Sample

First Author: Mohd Asyraf ABDUL KADIR

Purpose: Dry eye disease (DED) is a multifactorial condition where symptoms often poorly correlate with clinical signs, necessitating validated patient-reported outcome measures. The Standard Patient Evaluation of Eye Dryness (SPEED) questionnaire is a concise, reliable tool for assessing DED symptom frequency

and severity. This study aimed to translate, culturally adapt, and validate the SPEED questionnaire into the Malay language (mSPEED) to address a critical gap in ophthalmic care for the Malay-speaking population in Malaysia.

Methods: The translation followed a rigorous cross-cultural adaptation process, including forward and backward translation, expert panel review, and cognitive debriefing. Participants completed the mSPEED questionnaire at baseline (T1) and one week later (T2) to assess reliability. Internal consistency was evaluated using Cronbach's alpha, and repeatability was assessed with intraclass correlation coefficients (ICC) and Bland-Altman plots.

Results: A total of 250 participants completed first assessment but only 180 completed both assessments. The mSPEED demonstrated excellent internal consistency, with a Cronbach's alpha of 0.866 for the SPEED score and 0.880 for the full score. Test-retest reliability was high, with an ICC of 0.974 (95% CI: 0.966–0.981) for the SPEED score and 0.986 (95% CI: 0.976–0.991) for the full score. Bland-Altman analyses showed good agreement between the two time points.

Conclusions: The Malay version of the SPEED questionnaire is a valid and reliable instrument with strong psychometric properties. The mSPEED is an indispensable tool for both clinical practice and epidemiological research, enabling standardised assessment of DED symptoms in Malay-speaking populations and promoting health equity.

Abstract No.: 202626

Panel No.: CDE-0215

Trends in Surgical Procedures and Timing for Keratoconus at a Tertiary Referral Center in Northern China Over 20 Years

First Author: Yu SUN

Purpose: To analyze the trends in surgical procedures and timing in patients diagnosed with keratoconus (KC) over 20 years in a tertiary referral center in northern China.

Methods: This retrospective descriptive study included all patients who underwent surgical procedures for KC between January 2004 and December 2023. The categories of surgical procedures included penetrating keratoplasty (PK), lamellar keratoplasty (LK), and corneal crosslinking (CXL). Statistical analyses were performed on procedure types, surgery timing, and KC clinical stages. Trends in surgical procedures and timing changes were evaluated.

Results: A total of 1,497 patients (2,093 eyes) with KC underwent surgery. Regarding the category of keratoplasty, conventional PK decreased significantly from 22.2% to 1.0% over the study period, while LK decreased from 77.8% to 49.2%. As for different types of LK, femtosecond laser-assisted surgeries increased

from 0 to 76.2%. CXL rose from 0% to 49.6% following its introduction. Femtosecond laser-assisted surgeries and CXL dominated the fourth period, comprising 87.3% of the total surgical volume. The proportion of patients undergoing surgeries at early stages (I~II) of KC increased continuously (from 18.5% to 79.6%). Surgical procedures performed at different periods within the same KC stage varied significantly ($p < 0.001$).

Conclusions: Over the past 20 years, the main surgical procedure for KC has shifted from PK to more minimally invasive femtosecond laser-assisted lamellar keratoplasty and CXL. Femtosecond laser-assisted surgeries and CXL now occupy an increasingly important role. The timing of surgery for KC patients has shifted to earlier stages.

Abstract No.: 200858

Panel No.: CDE-0179

U-Shaped Association Between Residential Greenness and Keratoconus

First Author: Longyue LI

Co-Author(s): Weijing CHENG, Lingyi LIANG

Purpose: Keratoconus is a leading cause of corneal blindness in adolescents influenced by genetic factors. Whether environmental factors influence it remains unclear. This study explores the association between residential greenness and keratoconus risk.

Methods: We conducted a case-control study within the Chinese Environment-Ocular Surface (EOS) study, comprising 4341 keratoconus cases and 3723 controls. Validation was performed with data from the United Kingdom Biobank (UKB), a prospective cohort of 502,367 participants. The relationship between keratoconus and residential greenness, measured by the normalized difference vegetation index (NDVI) at a 300 m buffer, was assessed using multivariate-adjusted odds ratios (ORs) and spline analysis.

Results: Both studies revealed a U-shaped association between residential greenness and keratoconus. In the EOS study, participants in the lowest and highest quartiles of greenness had ORs (95% CIs) of 1.33 (1.23, 1.55) and 1.54 (1.37, 1.72), respectively, compared to the intermediate quartile. The lowest odds of keratoconus were observed at 0.42 NDVI. A similar pattern was found in the UKB cohort, where the first quartile of greenness was associated with 1.8 times higher odds (1.12, 2.91) of keratoconus compared to the intermediate quartile.

Conclusions: Our findings indicate a U-shaped relationship between residential greenness and keratoconus, with both low and high levels of greenness associated with increased keratoconus risk. These results underscore the complex interplay between environmental factors and keratoconus, offering insights for urban planning and environmental health policies.

Abstract No.: 206746

Panel No.: CDE-0285

Uncovering the Impact of Aging on Corneal Endothelial Cells in Older Adults of West Java, Indonesia

First Author: Rafida KAMILA

Co-Author(s): Nadhira AUGUSTRIA, Aurilia BHARATA, Isma SUHAIMA, Syska WIDYAWATI

Purpose: This study aims to evaluate the correlation between age and Corneal Endothelial Cells (CEC) characteristics, specifically endothelial cell density (ECD), coefficient of variation (COV), and Hexagonality (HEX), among the older population in Cianjur, West Java, Indonesia.

Methods: A cross-sectional observational study was conducted during a cataract surgery social service screening event. One eye from each patient aged over 50 years scheduled for cataract surgery was enrolled in this study. Data was collected from the CEC obtained using a specular microscope. Three parameters were selected for analysis: ECD, HEX, and COV. Descriptive statistics analysis was provided to illustrate corneal endothelial characteristics across age groups, followed by an analysis of their correlation with age.

Results: A total of 136 eyes were examined (mean age 65.18 ± 7.58). The mean ECD demonstrated a decreasing trend with advancing age, although not significantly correlated ($r = -0.122$, $p = 0.159$). The lowest mean of ECD was in the >80 year group (2198.40 ± 479.287 cells/mm²). No significant correlation was found between age and HEX ($r = -0.055$, $p = 0.536$). In contrast, age showed a moderate positive correlation with COV ($r = 0.275$, $p = 0.001$), indicating increased polymegathism in older individuals.

Conclusions: Aging demonstrates a trend of decreased values of corneal ECD although statistically insignificant. In contrast, the COV showed a significant positive correlation with age. This suggests that changes in cell size variation may serve as an early marker of age-related endothelial stress, rather than ECD or HEX.

Abstract No.: 203920

Panel No.: CDE-0234

Uncovering the Role of Transient Receptor Potential Channels in Pterygium: A Machine Learning Approach

First Author: Yuchen CAI

Purpose: We aimed at identifying the role of transient receptor potential (TRP) channels in pterygium.

Methods: Based on microarray data GSE83627 and GSE2513, differentially expressed genes (DEGs) were screened and 20 hub genes were selected. After gene correlation analysis, 5 TRP-related genes were obtained and functional analyses of gene ontology (GO) and Kyoto Encyclopedia of Genes and Genomes

(KEGG) were performed. Multifactor regulatory network including mRNA, microRNAs (miRNAs) and transcription factors (TFs) was constructed. The 5 gene TRP signature for pterygium was validated by multiple machine learning (ML) programs including support vector classifiers (SVC), random forest (RF), and k-nearest neighbors (KNN). Additionally, we outlined the immune microenvironment and analyzed the candidate drugs. Finally, in vitro experiments were performed using human conjunctival epithelial cells (CjECs) to confirm the bioinformatics results.

Results: Five TRP-related genes (MCOLN1, MCOLN3, TRPM3, TRPM6, and TRPM8) were validated by ML algorithms. Functional analyses revealed the participation of lysosome and TRP-regulated inflammatory pathways. A comprehensive immune infiltration landscape and TFs-miRNAs-mRNAs network was studied, which indicated several therapeutic targets (LEF1 and hsa-miR-455-3p). Through correlation analysis, MCOLN3 was proposed as the most promising immune-related biomarker. In vitro experiments further verified the reliability of our in silico results and demonstrated that the 5 TRP-related genes could influence the proliferation and proinflammatory signaling in conjunctival tissue, contributing to the pathogenesis of pterygium.

Conclusions: Our study suggested that TRP channels played an essential role in the pathogenesis of pterygium. The identified pivotal biomarkers (especially MCOLN3) and pathways provide novel directions for future mechanistic and therapeutic studies.

Abstract No.: 207407

Panel No.: CDE-0298

Unilateral Pigmented Papillomatosis With Acanthosis: Ophthalmological Diagnosis and Management

First Author: Inchara **NAGARAJ**

Co-Author(s): Asam **NAVEENA**

Purpose: Eyelid papillomas are common benign lesions, typically presenting as smooth, rounded, or pedunculated growths. Squamous papilloma is the most common subtype, predominantly seen in individuals over 30 years of age. While usually innocuous, their clinical appearance can mimic that of other benign or malignant eyelid lesions, including squamous cell carcinoma, necessitating an accurate diagnosis and management.

Methods: We report a rare case of an unusual presentation of squamous papilloma in a 35-year-old female from a rural background. She presented with blackish, progressive swellings involving both the upper and lower eyelids since childhood, which had increased in size in recent years, causing cosmetic concerns.

Results: Surgical excision with 2 mm margins was performed, followed by lid reconstruction. The lower

eyelid was reconstructed using Mustarde's cheek rotation flap, and the upper eyelid with a postauricular split-thickness skin graft. Histopathological examination revealed squamous epithelial proliferation with acanthosis, papillomatosis, and pseudo-cysts, confirming the diagnosis of squamous papilloma. The patient was monitored for two years postoperatively and remained recurrence-free.

Conclusions: Squamous papilloma, although benign, can present with unusual clinical features that mimic malignancy. Comprehensive evaluation, meticulous excision, and appropriate reconstructive procedures are crucial for achieving both curative and cosmetically favourable results. Successful lid reconstruction techniques can achieve satisfactory anatomical and aesthetic outcomes. Long-term follow-up is crucial for monitoring recurrence.

Abstract No.: 204311

Panel No.: CDE-0237

Unravelling the Unknown: A Retrospective Study of Ocular Hypertension (OHT) and Glaucoma After Pre-Descemet Endothelial Keratoplasty (PDEK)

First Author: Sarah **GEORGE**

Co-Author(s): Murali **ARIGA**, Soosan **JACOB**, Preethi **NAVEEN**

Purpose: To evaluate the incidence and risk factors of ocular hypertension (OHT) and glaucoma following PDEK, and to assess the temporal profile of patients developing OHT or glaucoma, and those with pre-existing glaucoma.

Methods: A retrospective review of 525 patients who underwent PDEK over 18 months at a tertiary eye care center was performed. Comprehensive ocular evaluation, including glaucoma assessment, was undertaken. Variables analyzed were demographics, pre-existing glaucoma, plain PDEK, combined PDEK with IOL surgery, repeat PDEK, pre-operative IOP, timing of IOP spikes, steroid regimen, anti-glaucoma medications (AGMs), response to AGMs, optic nerve head changes, OCT RNFL findings, and Humphrey visual fields. Statistical analysis included Mann-Whitney U, Kruskal-Wallis, Pearson Correlation, and Chi-square tests.

Results: OHT occurred in 12.5% and new-onset glaucoma in 1.33% of cases. Steroid response was the leading cause of raised IOP, with spikes correlating with steroid dosage and the number of steroid used. Although pseudophakic bullous keratopathy showed the highest mean IOP spike, no significant correlation was found between diagnosis or surgical procedure and IOP spikes. 8.9% patients used 1 AGM, 3.6% used 2 AGMs, and 5.14 % used 3 or above AGMs for IOP control. 14.6% continued AGMs at final follow-up. Surgical IOP control (AGV or trabeculectomy) was

needed in 3.04%. Importantly, OHT did not adversely affect postoperative BCVA.

Conclusions: PDEK demonstrates lower OHT and glaucoma incidence compared to DMEK and DSAEK, supporting its role as a reliable endothelial keratoplasty technique.

Abstract No.: 201460

Panel No.: CDE-0191

Urban Particulate Matter Triggers Meibomian Gland Dysfunction via PANoptosis Pathway

First Author: Caizhen QIU

Co-Author(s): Jiaxu HAN, Lingyi LIANG, Ren LIU, Jianwen XUE

Purpose: The meibomian gland (MG) is potentially damaged by urban particulate matter (UPM) based on epidemiological evidence, but the specific experimental mechanisms remain unknown. This study investigated the effects of UPM on MG dysfunction (MGD) in rodent models.

Methods: Female C57BL/6J mice received eye drops containing UPM suspension or PBS for 14 days. The proliferative capacity and progenitor of MG were evaluated by immunofluorescence. Cell apoptosis was confirmed by the TUNEL assay. Lipid accumulation was visualized by Oil Red O staining and LipidTox staining. Ductal hyperkeratinization, inflammatory cell infiltration, and PANoptosome activation were detected through immunostaining. The relative gene expression and PANoptosis signaling pathway activation were determined by Western blot analysis.

Results: Administration of UPM caused MGD-like clinical signs, manifested as distinct corneal epithelial erosion, increased MG orifice occlusion, and glandular dropout. UPM exposure significantly induced progenitor loss and lipogenic disorder in MG by reducing P63/Lrig1 expression and increasing meibum lipogenic protein (HMGCR/SREBP-1) expression. UPM-treated mice exhibited ductal hyperkeratinization and inflammatory cell recruitment. Simultaneously, PANoptosis was motivated, as indicated by the heightened expression of NLRP3/ZBP1/RIPK1 and the cleavage of caspase-3, -8, and -1 and gasdermin D, as well as the phosphorylation of MLKL. The underlying pathological mechanisms of UPM involve the phosphorylation of mitogen-activated protein kinase and nuclear factor- κ B.

Conclusions: These results provided direct evidence for the toxicity of UPM in MG. UPM-induced activation of PANoptosis and the MAPKs/NF- κ B signaling pathway might account for the inflammatory MGD.

Abstract No.: 203243

Panel No.: CDE-0226

Validity of the OSDI-6 Questionnaire in a Japanese Population: The First Report of the J-OSDI-6

First Author: Hiroki NISHIMURA

Co-Author(s): Rohan KHEMLANI, Shintaro NAKAYAMA, Eisuke SHIMIZU, Hirotsugu SOGA, Yuji TAKAYANAGI, Koharu TOZAWA

Purpose: The TFOS DEWS III report recommends the use of OSDI-6, a shortened six-item version of the OSDI questionnaire, to assess dry eye symptoms. While OSDI-6 has been validated in Chinese, no Japanese version existed. This study aimed to translate and validate the OSDI-6 in Japanese (J-OSDI-6) for use in Japanese clinical settings.

Methods: This single-center, prospective observational study was approved by the Human Sciences Ethics Committee of the Japan Orthoptic Vision Society. From June to August 2025, 100 Japanese adults (mean age 42.37 ± 14.42 years) who visited Yokohama Keiai Eye Clinic were enrolled. All participants completed the 12-item J-OSDI questionnaire. The J-OSDI-6 was extracted as a subset, and its total score was compared with the full J-OSDI-12. Cutoff values of 4 for J-OSDI-6 and 13 for J-OSDI-12 were applied based on previous literature.

Results: The J-OSDI-6 showed excellent correlation with J-OSDI-12 ($r = 0.952$). Sensitivity and specificity were 0.977 and 0.913, respectively. The AUC for detecting dry eye symptoms was 0.945. No significant associations were found between J-OSDI-6 scores and age, visual acuity, intraocular pressure, or screen time.

Conclusions: The J-OSDI-6 demonstrated strong validity and high diagnostic performance in comparison with the full J-OSDI-12. This tool provides a simple, efficient, and reliable option for assessing dry eye symptoms in Japanese clinical practice. This study was conducted at a single center and future multicenter studies are needed to validate the generalizability of the J-OSDI-6 across diverse populations.

Abstract No.: 206978

Panel No.: CDE-0294

Visual and Therapeutic Impact of Scleral Lenses in Diverse Eye Diseases

First Author: Smruti PRIYADARSHINI

Co-Author(s): Shalvika GUPTA

Purpose: To study the indications and benefits of scleral contact lenses in various ocular conditions.

Methods: A retrospective, observational study was conducted at a tertiary eye care center between January 2019 and December 2024. Patients who underwent a scleral lens trial and were dispensed BostonSight Scleral contact lenses (BSS) were included,

and those with incomplete records and those who were unwilling were excluded.

Results: A total of 179 eyes from 146 patients were included in the study, with a mean age of 29.25 ± 11.38 years, male predominance (62%), and first-time scleral lens users (64.2%). Common indications were corneal ectasia (62.6%), Stevens–Johnson syndrome (SJS) sequelae (22.9%), corneal scars (12.3%), and dry eye disease (4.5%). The purpose of scleral lenses was visual rehabilitation (96%), dry eyes (18.4%), comfort (18.4%), and cosmesis (4.5%). About 40.2% underwent prior surgical interventions before scleral lens fitting. The mean improvement in vision compared with spectacles was 0.71 logMAR units ($p < 0.001$) and 9.52 ± 5.57 lines on the logMAR chart. Symptomatic relief was experienced in the form of reduced ocular discomfort (24.7%), decreased dependency on topical lubricants (17.4%), reduction in epithelial breakdown (14.6%). Complications included sterile infiltrates (3 eyes) and non-sterile infections (2 eyes).

Conclusions: Scleral contact lenses (SCLs) have emerged as an important tool for both visual rehabilitation and ocular surface protection. This study reaffirms SCLs' efficacy in visual rehabilitation and OSD protection.

Abstract No.: 204486

Panel No.: CDE-0242

Washed Microbiota Transplantation in the Effective Treatment of Dry Eye Disease

First Author: Huiyi WU

Co-Author(s): Shengyu HE

Purpose: Currently, the treatment of DED mainly focuses on symptom relief and has a limited effect in regulating the immune-inflammatory imbalance of the disease. Previous studies have indicated that patients with DED exhibit ocular surface dysbiosis, manifesting as alterations in microbial diversity and abnormal abundance of specific taxa. The «Gut-Eye Axis» reveals that the gut microbiome can influence the eye by modulating systemic immune and inflammatory status. Gut dysbiosis has been linked to various ocular diseases, and its role in DED is being actively uncovered.

Methods: Analyzed and compared OSDI, TBUT, and TMH of patients who underwent WMT (Washed Microbiota Transplantation) and those who underwent TAT (Topical Artificial Tears). Furthermore, 16S sRNA sequencing of patients' ocular surface and gut microbiota was performed, and the composition at the Phylum and Genus levels was compared.

Results: The target and control patients' condition improved with WMT treatment. The characteristics of the target patient's ocular surface and gut microbiota changed after WMT, while the ocular surface microbiota of the control patient remained unchanged.

The characteristics of the patient's gut microbiota changed after WMT treatment, mainly presenting an increase of beneficial bacteria, *Bacteroides* and *Prevotella*, while a decreased abundance of *Ruminococcus* and *Faecalibacterium*.

Conclusions: Our results supported that WMT may be an effective and safe choice for the treatment of patients with DED by changing ocular surface and gut microbiota characteristics of the host.

Abstract No.: 203627

Panel No.: CDE-0230

What The Fluff: Fungal Keratitis In A 9-Year Old Treated With Intrastromal Voriconazole

First Author: Nikolai Thadeus MAPPATAO

Co-Author(s): Pia Regina GALVANTE

Purpose: To report a case of presumed fungal keratitis in a pediatric patient treated with intrastromal and intracameral Voriconazole.

Methods: AS-OCT revealed a hyperreflective mass with fuzzy borders adherent to the paracentral endothelium and hyperreflective dots in the anterior chamber (AC). The patient was initially treated with topical Natamycin, Atropine, and Levofloxacin for 18 days, but showed limited improvement and worsening corneal infiltrates, with vision deteriorating to 20/200. Due to the absence of epithelial defects and involvement of Descemet's membrane, a therapeutic cleanup of the fungal ball in the AC through irrigation and aspiration followed by intracameral and intrastromal injection of Voriconazole (50 µg/0.1ml) were performed under general anesthesia. Post-operatively, the patient continued with topical Levofloxacin and Voriconazole.

Results: The corneal infiltrate density gradually resolved, and the fungal ball did not recur. Visual acuity improved (20/250 pre-op, 20/100 day 1, 20/20 day 25). Though there was no apparent post-procedure endothelial cell loss, there was a note of scarified endothelial opacity in the area of the Descemet's break, and an anterior sub-capsular cataract at day 18 post-op.

Conclusions: This is the first documented local case of presumed fungal keratitis in a pediatric patient treated with intrastromal Voriconazole. The treatment, including the evacuation of the fungal ball and Voriconazole injections, was more effective than topical antifungals alone. Clinical trials are needed to further evaluate the safety and efficacy of intrastromal and intracameral Voriconazole injections in pediatric fungal keratitis.

Abstract No.: 207424

Panel No.: CDE-0299

When Brittle Bones Meet Fragile Eyes: Osteogenesis Imperfecta With Corneal Ectasia

First Author: Sri Satviki POSINA

Co-Author(s): Inchara NAGRAJ, Asam NAVEENA

Purpose: To report a rare case of osteogenesis imperfecta with corneal ectasia and cataract, emphasizing the need for comprehensive ophthalmic evaluation in systemic collagen disorders.

Methods: We present the case of a 65-year-old female, a known case of osteogenesis imperfecta, who reported gradual, painless diminution of vision in the left eye for two months and poor vision in the right eye since childhood. Detailed ophthalmic evaluation included visual acuity, slit-lamp examination, and fundus assessment.

Results: Visual acuity was counting fingers at 1 m in both eyes. The anterior segment showed bluish scleral discoloration bilaterally. The right eye demonstrated a deep anterior chamber with corneal edema and a descemetocoele, suggestive of corneal ectasia with impending perforation, along with a mature cataract. The left eye revealed a senile immature cataract. Fundus evaluation of the right eye was not possible due to media opacity, while the left eye showed a healthy optic disc (cup-disc ratio 0.3) with normal vasculature and dull foveal reflex.

Conclusions: This case highlights the rare association of osteogenesis imperfecta with corneal ectasia and cataract. Vigilant ophthalmic evaluation in systemic connective tissue disorders is essential, as timely detection and intervention can prevent vision-threatening complications and preserve quality of life.

Abstract No.: 203045

Panel No.: CDE-0223

When the Fellow Eye Has Almost Nothing Left: Autokeratoplasty for Sudden Corneal Perforation

First Author: Kiara NURMATHIAS

Co-Author(s): Rio RHENDY

Purpose: To highlight a globe-preserving technique using manual lamellar autokeratoplasty harvested from a phthisical fellow eye in acute corneal perforation.

Methods: A 56-year-old woman presented with acute full-thickness corneal perforation (2 × 1.5 mm, paracentral) in the left eye. The fellow right eye was phthisical, with a long history of corneal ulcer and epithelialized iris prolapse. The visual acuity pre-operative were 1/300 in left eye. Examination revealed 180° conjunctivalization and dense corneal scarring, leaving only a minimal residual clear cornea. Emergency surgery involved manual lamellar graft

harvesting from the fellow eye, transplantation to the left eye, intracameral triamcinolone injection, and anterior chamber reformation. The donor site was reinforced with multilayer amniotic membrane transplantation (AMT).

Results: At 2-month follow-up, the left eye showed a stable graft, reformed anterior chamber, and visual acuity of 0.5/60. The donor site in the right eye healed without further complications. Systemic work-up revealed rheumatoid factor positivity and digital ulcers, suggesting a possible autoimmune background as a risk factor for corneal thinning and perforation.

Conclusions: This case illustrates that even a compromised fellow eye can serve as a source of life-saving tissue. Manual lamellar autokeratoplasty from a minimally viable fellow eye may offer a globe-preserving solution in cases of sudden corneal perforation. It also highlights the importance of systemic evaluation in patients with corneal melting, which in this case was presumed to have an autoimmune background.

Abstract No.: 204797

Panel No.: CDE-0249

ΔNp63α as a Master Regulator of Meibomian Gland Progenitors and Age-Associated Decline

First Author: Naiwen FAN

Co-Author(s): Hsu CHIA-AN, Ya-shan YU, Yih-shiuan KUO

Purpose: Meibomian gland atrophy and dysfunction are common features of aging, leading to reduced lipid secretion and ocular surface disorders. This study investigated the role of ΔNp63α in meibomian gland epithelial progenitors, focusing on its impact on cell proliferation, differentiation, and age-associated changes.

Methods: Meibomian glands were harvested from C57BL/6 mice at 2, 7, and 12 months. ΔNp63α expression was assessed by immunohistochemistry and western blotting. Human immortalized meibomian gland epithelial cells (HMGECS) were cultured under proliferative, basal, and differentiation conditions to evaluate ΔNp63 isoform expression. Nuclear fractionation determined subcellular localization. LipidTOX staining was used to assess differentiation. Functional assays were conducted following ΔNp63α overexpression or knockdown, with cell proliferation measured by proliferation assays and Cyclin D1 levels. RNA sequencing (RNA-seq) was performed to profile transcriptomic changes associated with ΔNp63α overexpression.

Results: ΔNp63α was predominantly expressed in the basal layer of meibomian glands and significantly decreased in aged mice (P < 0.05). In HMGECS, ΔNp63α was the major isoform in progenitors, localized mainly

to the nucleus, and diminished during differentiation. Overexpression of $\Delta Np63\alpha$ promoted proliferation ($P < 0.05$), whereas knockdown reduced cell number and Cyclin D1 expression ($P < 0.001$). RNA-seq analysis revealed broad transcriptional reprogramming, with upregulation of gene clusters related to epithelial morphogenesis, stratified epithelium differentiation, and p53-family signaling, alongside downregulation of lipid metabolism and inflammatory pathways. These findings suggest that $\Delta Np63\alpha$ can both sustain progenitor programs and activate epithelial lineage networks when overexpressed.

Conclusions: $\Delta Np63\alpha$ is essential for maintaining progenitor identity and proliferation in meibomian gland epithelial cells. Its age-associated decline may contribute to impaired gland regeneration and lipid homeostasis. The dual ability of $\Delta Np63\alpha$ to support progenitor renewal and influence epithelial differentiation highlights its central role in meibomian gland aging and dysfunction.

Glaucoma

Abstract No.: 202072

Panel No.: GLA-0335

1% Atropine for Treatment of Idiopathic Orbital Inflammation With Acute Angle Closure

First Author: Zhaole LI

Co-Author(s): Jianhao CAI, Zeyi LI

Purpose: To report a rare case presented with idiopathic orbital inflammation (IOI) with acute angle closure (AAC), who was treated with 1% atropine instead of pilocarpine with excellent effect.

Methods: A 21-year-old male presented with redness and swelling with exophthalmos in his left eye for 6 days, and was diagnosed with IOI. After receiving intravenous methylprednisolone (IVMP) treatment for 5 days, the symptoms of IOI resolved, and the visual acuity improved from 1/25 to 16/20 OS, while the intraocular pressure (IOP) increased from 25 mm Hg to 32 mm Hg OS with a shallow anterior chamber. Ultrasound biomicroscopy revealed a 360-degree angle closure and ciliary body thickening, which confirmed the diagnosis of IOI with involvement of ciliary body edema and thickening to cause anterior rotation of the lens-iris diaphragm, resulting in AAC. Thus, 1% atropine was administered to paralyze the ciliary muscle, and IOP-lowering treatment was also adopted.

Results: The IOP reduced to 22 mm Hg OS 3 days later, and the visual acuity increased to 20/20 with a decline in IOP to 12 mm Hg 2 week later. Slit-lamp examination revealed that the ACD improved to 3.0 times the corneal thickness and the macular edema disappeared. UBM showed open angle and ciliary body with clear

boundaries and homogeneous echo. Besides, the ACD increased to 2.91mm.

Conclusions: IOI involved ciliary body to cause AAC, which had different pathogenesis from frequently encountered AAC. Therefore, 1% atropine was administered instead of pilocarpine with excellent effect.

Abstract No.: 206981

Panel No.: GLA-0427

A Case Report: A Complex Case of Secondary Glaucoma Drainage Device Implantation in a Post Penetrating Keratoplasty Patient With Secondary Angle Closure From Ice Syndrome

First Author: Lee Tomas TAN

Co-Author(s): Nilo Vincent FLORCRUZ, Anna Victoria SAN PEDRO

Purpose: A Case Report of a Complex Case of Secondary GDD Implantation that resulted in post operative hypotony and hemorrhagic choroidal detachment. The patient underwent external drainage and old tube explantation resulting in the resolution of the choroidal detachment.

Methods: 76 year old female diagnosed Bilateral ICE Syndrome and Secondary Angle Closure Glaucoma Underwent penetrating keratoplasty and multiple glaucoma surgeries on the left eye including a primary GDD implantation IOP uncontrolled on maximum tolerated medications at 31

Results: The first surgery done was a secondary GDD implantation using an Ahmed FP7 placed superonasally to control the IOP. The surgery was unremarkable 1 Day post op, the VA dropped to hand movement, the anterior chamber was shallow and hypotony noted Ocular UTZ revealed serous choroidal detachment. On the 7th day post op, the patient underwent external drainage of the the left eye and ligation of the secondary tube. On the 1st day post op from the external drainage, the patient was still hypotonic at 2 but there still a view of the macula. The patient then underwent, tube explantation of the old tube and ligation of the new GDD OP increased to 10 and there was noted resolution of the choroidal detachment.

Conclusions: There are multiple factors that may cause post op hypotony in complex cases of secondary glaucoma for GDD implantation. In placement of a secondary GDD, checking the flow of the primary GDD is important. The timely co-management of hemorrhagic choroidal detachment is important in complex cases

Abstract No.: 204676
Panel No.: GLA-0372

A Case of Free Conjunctival Autograft for the Ruptured Avascular Bleb Following Descemet Membrane Endothelial Keratoplasty

First Author: Mari **MIMURA**

Co-Author(s): Masashi **FUJIHARA**, Yasuhiko **HIRAMI**, Shin-ichiro **ITO**, Yasuo **KURIMOTO**, Takahiro **NAKAMURA**

Purpose: To report a case of avascular bleb rupture caused by postoperative anterior chamber air migration following Descemet Membrane Endothelial Keratoplasty (DMEK) and to evaluate the effectiveness of a free conjunctival autograft.

Methods: A 73-year-old man with exfoliation glaucoma in his left eye had previously undergone Ex-PRESS implantation and trabeculectomy, resulting in the formation of an avascular filtering bleb with intraocular pressure (IOP) maintained in the low teens. Subsequently, the patient developed bullous keratopathy and underwent DMEK. On postoperative day (POD) 3, air from the anterior chamber migrated into the filtering bleb, resulting in bleb rupture, aqueous leakage, and ocular hypotony. A 3×3 mm free conjunctival graft was harvested from the inferonasal quadrant and secured to the rupture site using blocking sutures. Due to inadequate air tamponade and persistent hypotony, the DMEK graft underwent primary failure. Therefore, repeat endothelial keratoplasty (DSAEK) was performed.

Results: After free conjunctival autografting, aqueous leakage decreased and ceased on POD4. The filtering bleb remained intact, and the IOP stabilized in the lower teens. Although air from the anterior chamber again migrated into the filtering bleb immediately after DSAEK, the bleb wall remained undamaged. The graft firmly adhered to the host cornea, and corneal transparency was restored.

Conclusions: Air in the anterior chamber may migrate to an avascular filtering bleb immediately after DMEK, potentially causing bleb wall rupture. Free conjunctival autografting with blocking sutures appears to be an effective and straightforward technique for bleb repair.

Abstract No.: 200354
Panel No.: GLA-0311

A Complex Case of Secondary Glaucoma Drainage Device Implantation in a Post Penetrating Keratoplasty Patient With Secondary Angle Closure Glaucoma From Ice Syndrome

First Author: Lee Tomas **TAN**

Co-Author(s): Nilo Vincent **FLORCRUZ**, Anna Victoria **SAN PEDRO**

Purpose: The presentation of a case report on a complex case of secondary GDD implantation that resulted in hypotony and hemorrhagic choroidal detachment.

Methods: A 76-year-old female diagnosed with bilateral ICE syndrome and secondary angle closure glaucoma. She underwent penetrating keratoplasty and multiple glaucoma surgeries on the left eye, including a primary GDD implantation (AADI). Her IOP on the left eye was still uncontrolled on maximum tolerated medications. The planned procedure was a secondary GDD implantation using an Ahmed FP7 placed superonasally to control the IOP.

Results: On the first day post-secondary GDD implantation, the VA decreased, the anterior chamber was shallow, and the IOP was hypotonic. The patient was noted to have a hemorrhagic choroidal detachment. 3 Days postoperatively, Ocular UTZ revealed persistence of choroidal detachment. The patient underwent external drainage of the left eye and ligation of the secondary tube. Due to the recurrence of the choroidal detachment, tube explantation of the old tube and ligation of the new GDD with absorbable vicryl suture. There was then noted resolution of choroidal detachment, an increase in IOP to 10, and return to pre op vision.

Conclusions: There are multiple factors that may cause post op hypotony in complex cases of secondary glaucoma for GDD implantation. In the placement of a secondary GDD, checking the flow of the primary GDD is important. In patients with a previous trabeculectomy site, careful manipulation of the conjunctiva must be performed. The timely co-management of hemorrhagic choroidal detachment with fellow subspecialty colleagues is important in complex cases

Abstract No.: 206760
Panel No.: GLA-0425

A Dilemma: Managing Secondary Glaucoma in Microspherophakia During Pregnancy

First Author: Veronica **SINURAT**

Co-Author(s): Elsa **GUSTIANTY**, Maula **RIFADA**, Sonie **UMBARA**

Purpose: It is reported that 31% of ophthalmologists were unsure about dealing with glaucoma management

during pregnancy. The management of glaucoma in women planning pregnancy, during pregnancy, and during the breastfeeding period, presents a number of challenges and uncertainties. The choices of glaucoma medication and surgery need to be considered at every stage of pregnancy. This case report aims to describe the management of pregnant woman with secondary glaucoma due to microspherophakia.

Methods: A case of a 29-year-old woman presented in the sixteenth week of pregnancy with chief complaints of blurred vision and glare on both eyes. She had history of wearing S-14.00 glasses. Intraocular pressure were 34 mmHg and 28 mmHg, with cup disc ratio of 0.9 both eyes. Subluxation of lens revealed on both eyes, with diameter of lens was 6.0 mm. She was treated with a non-selective beta-blocker glaucoma medication, given with punctal occlusion. The patient underwent intracapsular cataract extraction followed by implantation of retropupillary iris-claw intraocular lens. After surgeries, glaucoma medication was still given with a great attention to her baby's condition.

Results: Presenting visual acuity (VA) improved from finger counting on both eyes pre-operatively to 0.63 and 0.5 (best corrected VA) post-operatively. Intraocular pressure reduced to 14 mmHg and 13 mmHg with glaucoma medications. There was no sign of complications during and after surgery within the three-month follow-up.

Conclusions: Managing glaucoma in pregnancy requires a holistic and multidisciplinary approach to avoid negative impacts on the mother and fetus.

Abstract No.: 200637

Panel No.: GLA-0317

A Pilot Case Series of iStent Inject W Implantation in Asian Eyes With Uveitic Glaucoma and Ocular Hypertension – 12-Month Outcomes

First Author: Bryan ANG

Co-Author(s): Rupesh AGRAWAL, Elizabeth CHEN, Celyn CHNG

Purpose: To evaluate the 12-month safety and efficacy outcomes of combined phacoemulsification and iStent inject W implantation in Asian eyes with uveitic glaucoma (UG) or uveitis-related ocular hypertension (OHT).

Methods: A pilot, single-surgeon, prospective case series was conducted from September 2022 to March 2024 in a tertiary eye centre in Singapore. Primary outcomes included change in intraocular pressure (IOP) and anti-glaucoma medications up to 12 months post-operatively (POM12). Secondary outcome measures included visual acuity (VA), Humphrey Visual Field (HVF) progression and intra- and post-operative complications.

Results: Five eyes with quiescent UG or uveitis-related OHT underwent combined phacoemulsification with iStent inject W implantation. 100% (5 eyes) were from Chinese subjects, and 60% (3 eyes) were from male subjects. Mean age was 68.8 (range 57-74) years. Mean pre-operative IOP was 12.8 (range 11-16) mmHg, maintained at 13.4 (range 11-16) mmHg at POM12. The median number of anti-glaucoma medications reduced from 2 preoperatively to 0 at POM12. In 3 eyes with reliable HVFs, the mean baseline VF MD of -6.87 dB improved to -3.98dB by POM12. There was no loss in best corrected VA and no eyes required secondary glaucoma procedures. One eye with UG secondary to cytomegalovirus anterior uveitis with prior steroid response maintained stable IOP with reduction of one glaucoma medication, despite ongoing use of topical corticosteroids.

Conclusions: In this pilot case series, combined phacoemulsification and iStent inject W implantation demonstrated glaucoma medication burden reduction with stable IOP control and good safety outcomes, up to 12 months post-operatively.

Abstract No.: 204656

Panel No.: GLA-0371

A Stiff Prediction: Corneal Hysteresis and the Risk of Visual Field Progression in Open-Angle Glaucoma Patients of South India

First Author: Shubham DARADE

Co-Author(s): Sathi DEVI, Zia PRADHAN, Harsha RAO

Purpose: To evaluate the association between baseline ocular response analyser (ORA) measurements and progressive visual field (VF) loss in patients with open-angle glaucoma (OAG) from South India.

Methods: Prospective, longitudinal study of OAG patients who had undergone a baseline ORA and were followed up for a minimum of 3 years with at least 5 reliable visual fields. Eyes with retinal pathology, neurological disorders and poor-quality ORA measurements (Waveform Score <4) were excluded from the analysis. Progression was determined by the rate of change of visual field index (VFI) over time (VFI slope). Effect of demographic (age, gender, etc), clinical (intraocular pressure IOP variables, corneal pachymetry, presence of disc haemorrhage, baseline visual field parameters), and baseline ORA parameters (CH, and corneal resistance factor CRF) on VFI slope was analysed using linear mixed models.

Results: Eighty eyes of 59 OAG patients were included in the analysis. The mean age of the participants was 62.57 ± 10.9 years. The mean follow-up duration was 6.6 ± 1.8 years. Mean baseline VFI was $78.2 \pm 22\%$ and final VFI was $73.7 \pm 26\%$ (VFI slope $-0.93 \pm 0.2\%$ /year, $p=0.001$). On univariate analysis, eyes with greater IOP fluctuation (co-efficient -0.27 , $SE=0.16$) and higher baseline pattern standard deviation (PSD) on visual fields (-0.08 , $SE=0.05$) showed faster VF progression.

However, on multivariate analysis which included these variables and other factors shown previously to be associated with glaucoma progression such as mean IOP during follow-up, CH, and presence of disc haemorrhages, only great baseline PSD was associated with a faster VFI decline (-0.1 , $SE=0.05$, $p=0.049$).

Conclusions: Hence, higher PSD on a baseline visual field is a risk factor for progression in open-angle glaucoma. This study in a cohort of OAG eyes from South India did not find any association between CH and glaucoma progression.

Abstract No.: 205504

Panel No.: GLA-0394

Ahmed Glaucoma Valve Implant – Clinical Outcomes in Pars Plana Versus Anterior Chamber Entry in Refractory Glaucoma

First Author: Salwa KAIDAKATH

Co-Author(s): Meena GOPINATH MENON, Shalini

Purpose: To compare the clinical outcomes, intraocular pressure (IOP) control, and complication rates of Ahmed Glaucoma Valve (AGV) implantation with tube placement in the anterior chamber (AC) versus pars plana (PP) in eyes with refractory glaucoma.

Methods: This single-centre, retrospective study included 60 eyes that underwent AGV implantation (FFP 7/8). 38 eyes received AC tube placement, and 31 received PP tube placement. Pre- and postoperative data, including intraocular pressure, best-corrected visual acuity, number of anti-glaucoma medications, and complications, were analyzed. Surgical success was defined as IOP between 6–21 mmHg with or without AGM, no additional glaucoma surgery or implant removal, and maintenance of light perception vision. Statistical significance was set at $P < 0.05$.

Results: Both groups showed significant IOP reduction from preoperative levels (AC: 35.00 to 16.37 mmHg; PP: 38.96 to 16.90 mmHg; $P < 0.001$) and a decrease in AGM use. Final IOP, AGM use, and visual outcomes were comparable ($P > 0.05$). Overall success rates were 78.9% in the AC group and 67.7% in the pars plana group ($P = 0.170$). Complication rates did not differ significantly between groups ($P = 0.683$).

Conclusions: AGV implantation via either anterior chamber or pars plana is effective in lowering IOP, reducing medication burden, and maintaining vision in refractory glaucoma, with comparable safety profiles and complication rates. Both approaches remain viable options depending on ocular anatomy and surgical indications.

Abstract No.: 200520

Panel No.: GLA-0313

Analysis of Lens Zonular Ligament Relaxation in Primary Angle Closure Disease by Pentacam

First Author: Hui LIU

Co-Author(s): Danyan LIU

Purpose: To explore the differences in lens zonular ligament relaxation among patients with various types of primary angle-closure disease (PACD).

Methods: A total of 86 PACD patients (consisting of primary angle-closure suspects (PACS), acute primary angle-closure (APAC), chronic primary angle-closure (CPAC), and primary angle-closure glaucoma (PACG)) and 40 controls were recruited. The central anterior chamber depth (CADC) and peripheral anterior chamber depth (peri-ACD) in 8 directions under normal pupil condition, changes in CADC after mydriasis and miosis (Δ CADC), and changes in peri-ACD after mydriasis (Δ peri-ACD) of all patients were measured and compared by using the Pentacam. Δ CADC and Δ peri-ACD could show the degree of zonular ligament laxity.

Results: The CADC and peri-ACD in all 8 directions were significantly lower in PACD patients as compared to controls under normal pupil state, and APAC group concerning CADC and peri-ACD was significantly lower than the other three types of PACD (all $P < 0.0001$). The Δ CADC and Δ peri-ACD in all 8 directions were distinctly different between PACD patients and controls (all $P < 0.05$). Further comparisons revealed that lower Δ CADC and Δ peri-ACD in superior and temporal directions were observed in APAC patients as compared to PACS, CPAC and PACG patients (all $P < 0.05$).

Conclusions: The four types of PACD may be associated with a certain degree of zonular relaxation. Lens zonular relaxation was most significant in APAC eyes, and the degree of relaxation was greater than that of the contralateral eyes.

Abstract No.: 206012

Panel No.: GLA-0407

Antibody-Mediated GFAP Targeting Protects Retinal Neurons in Experimental Glaucoma and Inhibits Astrocyte Reactivity In Vitro

First Author: Chaoqiang GUAN

Co-Author(s): Zhijie LI, Linglin ZHANG

Purpose: Glaucoma causes progressive retinal ganglion cell (RGC) loss and irreversible vision loss. Astrocyte reactivity, marked by elevated GFAP, promotes neuroinflammation and RGC degeneration. This study tested the neuroprotective potential of a GFAP-targeting monoclonal antibody in vivo and its effects on astrocyte reactivity in vitro.

Methods: Glaucoma was induced in female Sprague-Dawley rats by episcleral vein occlusion to establish sustained ocular hypertension (OHT), followed by an intravitreal injection of either a GFAP monoclonal antibody (mAb) or an IgG control. Retinal nerve fiber layer (RNFL) thickness was measured using optical coherence tomography, and retinal ganglion cell (RGC) survival was assessed by Brn3a immunostaining. In vitro, primary mouse astrocytes were stimulated with lipopolysaccharide (LPS) with or without GFAP mAb treatment, and astrocyte reactivity was evaluated by GFAP expression and morphology, while neurotoxic activation was determined by lipocalin-2 (LCN2) expression. GFAP mAb internalization was visualized by fluorescence labeling.

Results: GFAP mAb treatment significantly preserved RNFL thickness and enhanced RGC survival in vivo. In vitro, it attenuated astrocyte reactivity by reducing GFAP and LCN2 expression, normalizing reactive morphology, and suppressing the pro-inflammatory mediators TNF- α and IL-1 β . Fluorescence imaging further confirmed astrocytic uptake of GFAP mAb, which was increased under LPS-induced inflammatory conditions.

Conclusions: GFAP mAb provides neuroprotection in experimental glaucoma and reduces astrocyte reactivity and inflammation in vitro, highlighting its potential as a novel immunotherapeutic strategy targeting glial dysfunction in glaucoma.

Abstract No.: 200699

Panel No.: GLA-0316

Association Between Sleep Disturbances and Glaucoma: A Cross-Sectional Study

First Author: Noriko **HIMORI**

Co-Author(s): Maki **FUKUMOTO**, Makoto **ISHIKAWA**, Toru **NAKAZAWA**, Takahiro **NINOMIYA**, Satoru **TSUDA**, Mitsuhide **YOSHIDA**

Purpose: Sleep disturbances have recently been implicated in the pathogenesis of glaucoma, but the mechanisms remain unclear. This study aimed to explore whether sleep quality is associated with glaucomatous damage via systemic physiological changes, such as reduced antioxidant capacity.

Methods: We enrolled 151 patients (79 men, 72 women; mean age: 57.1 $\pm$ 10.6 years) with open-angle glaucoma treated at our clinic. The primary endpoint was circumpapillary retinal nerve fiber layer thickness (cpRNFLT) measured with optical coherence tomography (OCT). The secondary endpoint was biological antioxidant potential (BAP) assessed with a free radical analyzer. Sleep quality was evaluated using sleep duration and the Pittsburgh Sleep Quality Index (PSQI). Multiple regression analyses were conducted to assess the associations among these parameters.

Results: The cpRNFLT was significantly reduced in patients with poor sleep quality (PSQI $\geq$ 6, n=67) compared to those with better sleep (PSQI <6, n=84) (p=0.04). In multiple regression, PSQI score (p<0.01) and age (p<0.01) were significant predictors of cpRNFLT. Sleep duration was significantly associated with BAP (p=0.04).

Conclusions: Poor sleep quality and short sleep duration were significantly associated with reduced cpRNFLT and lower antioxidant capacity. These findings suggest that adequate sleep may play an important preventive role in the pathophysiology of glaucoma, potentially via its influence on systemic antioxidant capacity.

Abstract No.: 201368

Panel No.: GLA-0324

Association of Serum Complement C3 With Primary Open Angle Glaucoma

First Author: Shams **NOMAN**

Purpose: Elevated intraocular pressure (IOP) is a key risk factor in POAG, some patients still experience vision loss despite IOP reduction. Evidence shows that low serum complement C3 is linked to early nerve damage and retinal ganglion cell (RGC) loss, implying C3's protective role against early glaucomatous damage.

Methods: This cross sectional comparative study was carried out into Department of Ophthalmology, Bangabandhu Sheikh Mujib Medical University (BSMMU) during January, 2022 to August, 2023. A total of 40 diagnosed cases of POAG were the study population and 40 patients were selected considering similar age group as comparison group without glaucoma. Serum complement C3 level was measured by immunonephelometry system in Department of Microbiology, BSMMU. Statistical analyses of the results were obtained by using Statistical Packages for Social Sciences (SPSS-26).

Results: The mean serum complement C3 level was 1.02 $\pm$ 0.12 (g/l) in POAG group and 1.09 $\pm$ 0.15 (g/l) in control group. The difference was statistically significant (p<0.05) between groups. The mean serum complement C3 level was 1.07 $\pm$ 0.12 (g/l) in mild glaucomatous damage, 1.03 $\pm$ 0.14 (g/l) in moderate glaucomatous damage and 0.99 $\pm$ 0.99 (g/l) in severe glaucomatous damage. The mean Serum complement C3 was not statistically significant (p>0.05) in different grading of severity of POAG patients.

Conclusions: The analysis revealed reduced serum concentrations of C3 in individuals diagnosed with POAG than comparison group. However, there was no correlation between serum complement C3 levels and the severity of POAG.

Abstract No.: 207177

Panel No.: GLA-0430

Calcified Glaucoma Implant in a Child With Secondary Glaucoma Due to Sturge Weber Syndrome: A Case Report

First Author: Rachel ETHELIND

Co-Author(s): Virna Dwi OKTARIANA

Purpose: Calcium deposits have been reported in several types of ocular implant such as silicone scleral buckles and intraocular lenses. However, to our knowledge, they have not been previously observed in connection with a glaucoma drainage device (GDD).

Methods: Observational case reports.

Results: A 12-year-old boy presented with uncontrolled intraocular pressure in the right eye. The patient had a history of Ahmed Glaucoma Implant placement in the right eye 12 years prior due to Secondary Glaucoma of the right eye due to Sturge Weber Syndrome. Upon examination, visual acuity was light perception (previously 1/300), intraocular pressure was 40 mmHg despite full medication, anterior chamber showed a flat area at the inferonasal quadrant, the tube tip at the 1 o'clock position was patent, whereas the tube at the 11 o'clock position was not visualized. The pupil was round, centrally located, and patent peripheral iridectomy. Posterior synechiae were present throughout all quadrants. The patient subsequently underwent an exchange surgery of the Ahmed Glaucoma Implant with a Virna Glaucoma Implant GL-52 (VGI GL-52). Intraoperatively, the Ahmed Glaucoma Implant was found to be calcified and strongly adherent to the sclera. Histopathological examination of the implant tissue revealed fibrotic connective tissue with calcification and ossification.

Conclusions: This rare case of calcification of glaucoma drainage device might be underrecognized because of the lack of signs or symptoms that might lead to the suspicion of calcification. Further consideration should be accounted.

Abstract No.: 201215

Panel No.: GLA-0320

Cataract Surgery in Primary Angle Closure Suspect (PACS) Subjects With Laser Peripheral Iridotomy (LPI): A 15-Year Cohort Study at the Hong Kong West Cluster (HKWC)

First Author: Rachel YIU

Co-Author(s): Yawen Philip GUO, Min Yu HUANG, Christopher Kai Shun LEUNG

Purpose: The Zhongshan Angle Closure Prevention trial recommends against LPI for all PACS patients. Meanwhile, data showed an association between rising cataract surgical rates and decreasing rates of acute angle closure. This study aimed to retrospectively review the performance of cataract surgery for PACS subjects after LPI.

Methods: Data from LPI clinics at the HKWC hospitals from 1 July 2010 to 30 June 2015 were obtained from the electronic medical records. All patients were followed up for 10 years after LPI. Detailed clinical information from 1 July 2010 to 30 June 2025 was reviewed.

Results: A total of 157 subjects received LPI for PACS at HKWC hospitals during 2011-2015. Among them, 35 (22.3%) and 54 (34.4%) subjects underwent cataract extraction within 5 and 10 years after LPI, respectively, with 80-100% indicated for visually significant cataract. The mean age of PACS subjects who underwent cataract surgery (75.3 years) was significantly higher than that of subjects who did not have cataract surgery (65.2 years) during the follow-up period ($P < 0.00001$). The median age of PACS subjects receiving LPI was 70 years. There was no conversion to PAC or occurrence of acute angle closure in all subjects.

Conclusions: More than 50% of patients were beyond the mean age of PACS subjects undergoing cataract extraction after LPI. Further cost-effectiveness analyses incorporating the pseudophakic factor could guide the management of PACS subjects in the public hospital setting.

Abstract No.: 203517

Panel No.: GLA-0358

Causal Effects of Plasma Proteins on Primary Open-Angle Glaucoma: Evidence From Mendelian Randomization, Single-Cell RNA Sequencing, and Network Pharmacology

First Author: Nachuan LUO

Co-Author(s): Xin MA, Chengguo ZUO

Purpose: To explore the causal role of circulating plasma proteins in the pathogenesis of primary open-angle glaucoma (POAG) and identify potential therapeutic targets.

Methods: We performed a two-sample, bidirectional Mendelian randomization (MR) analysis using genome-wide association study (GWAS) summary statistics to assess the causal effects of 4,907 plasma proteins on POAG risk. Single-cell transcriptomic data from retinal tissues were used to determine protein expression patterns across cell types. Drug enrichment analysis and molecular docking were employed to evaluate potential interactions between candidate proteins and small-molecule compounds.

Results: MR analysis identified 49 plasma proteins causally associated with POAG. Functional enrichment highlighted roles in endoplasmic reticulum lumen biology and cytokine-cytokine receptor interactions. Protein-protein interaction mapping revealed 10 hub proteins, including CLU and WNT5A. Single-cell data showed CLU was predominantly expressed in Müller glia, while WNT5A lacked cell-type specificity. Network pharmacology analysis identified gemcitabine

($P = 0.000195$), dacarbazine ($P = 0.000305$) and acrasin ($P = 0.000758$) as significantly enriched candidate compounds targeting the hub proteins. Docking simulations suggested high binding affinity of gemcitabine to CLU (vina score = -6.7 kcal/mol) and WNT5A (vina score = -6.8 kcal/mol) as well as dacarbazine to CLU (vina score = -5.7 kcal/mol) and acrasin to WNT5A (vina score = -7.6 kcal/mol).

Conclusions: The findings suggest that plasma proteins CLU and WNT5A contribute to the pathogenesis of POAG and may represent viable targets for therapeutic intervention. Gemcitabine, dacarbazine and acrasin warrant further investigation for potential repurposing in glaucoma treatment.

Abstract No.: 206671

Panel No.: GLA-0424

Cerium Single-Atom Nanozyme Penetrates the Corneal Barrier to Suppress Mitochondrial Damage and Pyroptosis in the Trabecular Meshwork for Glaucoma Intervention

First Author: Mengyang ZHAO

Co-Author(s): Jingguo LI, Zhanrong LI

Purpose: Glaucoma, the leading irreversible blinding eye disease worldwide, is characterized by abnormal accumulation of extracellular matrix in the trabecular meshwork (TM), which induces oxidative damage and exacerbates aqueous humor circulation disorders, forming a vicious cycle. Current topical eyedrops suffer from limited therapeutic efficacy due to the ocular drug delivery barrier, resulting in less than 2% bioavailability in the anterior chamber.

Methods: This project aims to develop a novel cerium single-atom nanozyme-based eyedrop (Ce-SAN/CDs). Firstly, Ce-SAN/CDs was prepared through hydrothermal synthesis. Further, the in vitro anti-inflammatory and antioxidant activities of the substance were verified through experiments on cells constructed in vitro to simulate oxidative stress conditions. Finally, a glaucoma model of oxidative damage to the mouse trabecular meshwork was established to verify the therapeutic effect of Ce-SAN/CDs on glaucoma in mice.

Results: The Ce-SAN/CDs structure were characterized to confirm the successful preparation of Ce-SAN/CDs. The formulation leverages positively charged carbon dots as carriers to reversibly open corneal epithelial tight junctions, effectively penetrating the corneal barrier without damaging the epithelial layer. Furthermore, the Ce-SAN/CDs mimics the synergistic effects of multiple antioxidant enzymes to efficiently scavenge reactive oxygen species, thereby inhibiting mitochondrial oxidative damage and pyroptosis in the TM. By establishing a glaucoma model of oxidative damage to the TM in mice, Ce-SAN/CDs showed significant therapeutic effects on glaucoma in mice,

successfully reducing the intraocular pressure (IOP) of the mice.

Conclusions: The system demonstrates restoring the redox homeostasis of TM mitochondria to reverse oxidative damage at its root and achieve IOP reduction.

Abstract No.: 205155

Panel No.: GLA-0376

Changes in Anterior Segment Configuration During Acute Angle Closure in Eyes With and Without Zonular Laxity

First Author: Jianrong JIANG

Co-Author(s): Jingjing HUANG, Litong YE

Purpose: To describe and compare the changes in anterior segment parameters in eyes with and without zonular laxity during an episode of acute angle closure (AAC).

Methods: We retrospectively reviewed the records of 931 patients with AAC treated at a single tertiary eye center between June 2019 and September 2025. Patients with available detailed anterior biometric data from both before and during the AAC were included. The diagnosis of zonular laxity was confirmed via intraoperative findings. Anterior segment parameters were compared between groups using the Mann-Whitney U test.

Results: At baseline, compared to the AAC without zonular laxity eyes ($n=4$), the eyes with zonular laxity ($n=4$) had a significantly shallower anterior chamber depth (ACD) but a wider superior angle opening distance (AOD) and anterior chamber angle (ACA) (all $P < 0.05$). During the AAC, the magnitude of change was significantly greater in the zonular laxity group for ACD, lens vault, inferior AOD, inferior ACA, and superior iris-ciliary process distance (all $P < 0.05$). No significant inter-group differences were found for the baseline and change in lens thickness, iris curvature and trabecular meshwork-ciliary process distance.

Conclusions: AAC Eyes with zonular laxity present with a unique baseline anatomy and undergo significantly greater changes in anterior segment configuration during episode of AAC. Zonular integrity appears to be a critical factor influencing the stability of the anterior segment during AAC.

Abstract No.: 201279

Panel No.: GLA-0321

Climbing the MIGS Learning Curve: Surgical Confidence With Hydrus® and iStent Inject®

First Author: Aditi KOCHAR

Co-Author(s): Shamira PERERA

Purpose: To analyse the early learning curve of minimally invasive glaucoma surgery (MIGS) using Hydrus® Microstent ($n = 24$) and iStent inject® ($n = 19$), performed in combination with phacoemulsification

between January 2024 and January 2025 at the Singapore National Eye Centre (SNEC).

Methods: A retrospective comparative study. All procedures were conducted by a single surgeon under mentor supervision.

Results: First-attempt correct placement was achieved in 80% of early Hydrus cases and 90% of iStent cases, improving to 93.75% and 95%, respectively, with increasing experience. Major challenges encountered included gonioscopic stabilization, consistent identification of Schlemm's canal, and controlled device deployment. Notable improvements in operative time and intraoperative handling were observed after approximately the 10th case in both groups, marking a transition in confidence and technical fluency.

Conclusions: The fellowship's exposure and structured mentorship accelerated surgical proficiency, leading to enhanced precision, consistency, and predictable outcomes. These findings underscore the importance of guided training and repetition in mastering angle-based MIGS techniques and provide practical insights into the transition from early novice performance to surgical confidence.

Abstract No.: 200593

Panel No.: GLA-0315

Clinical Profile and Surgical Outcomes of Lens-Induced Glaucoma Patients in a Tertiary Eye Hospital

First Author: Habiba SULTANA

Co-Author(s): Shajeda AZIZI, Md Sajidul HUQ, Khairul ISLAM

Purpose: To evaluate the clinical profile and surgical outcomes of Lens-Induced Glaucoma patients in a Tertiary Eye Hospital, Bangladesh.

Methods: This prospective study was conducted from July 2024 to July 2025. A total of 43 patients who underwent cataract surgery in the hospital with classic symptoms of lens-induced Glaucoma were taken into the study. Informed consent was obtained from all eligible participants before undertaking surgery. The institutional review board provided ethical approval for this study.

Results: Females comprised 74.4% of patients, with most aged 61–70 years (48.8%). Phacomorphic glaucoma was more frequent (62.8%), while Blurred vision (73.1%) and pain (62.5%) were the most common symptoms. Clinical signs in phacomorphic cases included edematous cornea (60.7%) and shallow anterior chamber (100%). Treatment delay was mainly due to good vision in the fellow eye (76.7%). Most patients (88.4%) underwent SICS with PCIOL surgery. Preoperative IOP >40 mmHg was higher in patients operated within 7 days (60.7%). Postoperative IOP ≤20 mmHg was achieved by most patients by day 7th and 30th. Early surgery presented better visual outcomes

compared to delayed surgery. Complications occurred in 27.9% of cases, with zonular dialysis being most common (41.7%). Moderate to severe optic nerve damage was noted in the majority based on cup-to-disc ratio assessment.

Conclusions: Early surgical intervention leads to improved visual recovery and effective IOP control. Increased awareness and timely management are vital to prevent vision loss in lens-induced glaucoma patients.

Abstract No.: 209900

Panel No.: GLA-0437

Clinical Profile of Secondary Glaucoma and Its Management in a Tertiary Eye Care Center: A Hospital-Based Prospective Study

First Author: Roopambara Singh RATHORE

Co-Author(s): Jaishree DWIVEDI, Alka GUPTA, R.c. GUPTA

Purpose: To study the clinical profile of secondary glaucoma and its management in a tertiary eye care center.

Methods: This hospital-based, prospective study was conducted for 1 year, including patients with high IOP >21mmHg, a history of ocular trauma, inflammation of the eye, long-term steroid use, any associated eye or systemic disease, and a history of ocular surgery. After proper history, detailed examination, including visual acuity, anterior segment, posterior segment examination, IOP, gonioscopy, and anterior chamber depth via A-Scan, and central corneal thickness were done for all the patients enrolled in the study.

Results: The prevalence of secondary glaucoma was 19.5%. The most common risk factor associated with secondary glaucoma was found to be hypermature & intumescent cataracts in 40.8% of total eyes. Phacomorphic glaucoma (38.8% eyes) was the most common cause, followed by inflammatory glaucoma (17%). The BCVA at presentation and post-treatment visual acuity at 6 months were recorded. At 6 months follow-up, phacomorphic (17.5% eyes) & steroid-induced glaucoma (66.66% eyes) showed the best visual recovery with 6/36-6/18 visual acuity. Mean IOP was recorded at 2 weeks, 3 months, and 6 months follow-up. Malignant glaucoma presented with the highest IOP at presentation, followed by phacomorphic glaucoma. The majority of eyes underwent medical treatment, followed by surgical treatment (57%).

Conclusions: The study showed that the prevalence of secondary glaucoma was 19.5%. The most common associated risk factors were intumescent and hypermature cataracts. The most common type of secondary glaucoma encountered was phacomorphic glaucoma. Significant reduction in IOP after treatment was found in 95% of eyes with p-value < 0.05. Visual acuity improvement was found to be best in steroid-

induced glaucoma. Medical management, followed by surgical management, was successful in controlling IOP in the majority of eyes.

Abstract No.: 202951

Panel No.: GLA-0348

Comparative Evaluation of Treatment Strategies for Advanced Glaucoma: A Systematic Review

First Author: Sarangerel ENKHTAIKHAN

Co-Author(s): Munkhtuya TSEGMID

Purpose: To compare key clinical outcomes across different medical, laser, and surgical treatment modalities for adult patients with advanced primary open-angle glaucoma (POAG) and primary angle-closure glaucoma (PACG).

Methods: A systematic search of PubMed, EMBASE, and Scopus was conducted for studies published from 2000 to 2025. The study selection process adhered to the PRISMA 2020 guideline. Eligible studies reported outcomes in adult patients with advanced POAG or PACG. Extracted outcomes included IOP reduction, medication burden, and complication rates. The risk of bias was assessed using the RoB 2, ROBINS-I, and the Newcastle–Ottawa Scale. Meta-analysis was not performed due to heterogeneity in study design and outcome definitions.

Results: The database search yielded 1,865 records. After screening based on predefined inclusion and exclusion criteria, 69 studies were included in the final analysis. Among the included studies, 20 standalone and 17 combined surgical treatment modalities were identified. Across all treatment modalities, mean IOP reduction ranged from as high as 51.3%, as seen with non-penetrating deep sclerectomy (NPDS), and filtering tube shunt surgeries, to as low as 2.5% with the Hydrus microstent. MicroShunt implant (83.5%) and trabeculectomy (82.8%), demonstrated high rates of postoperative medication reduction. Among combined surgical interventions, GATT combined with diode laser cyclophotocoagulation (DLCP) achieved the highest reported IOP reduction (55.6%) and medication reduction (91.7%).

Conclusions: Traditional filtering surgical treatments offer the greatest efficacy for both advanced POAG and PACG but come with increased risk. Treatment decisions should be individualized. Future research should aim to standardize success criteria and reporting methods to better guide clinical decision-making.

Abstract No.: 205450

Panel No.: GLA-0390

Comparative Long-Term Clinical Outcomes of a Novel Tube Flushing Technique Using Balanced Salt Solution Injection to Cyclophotocoagulation in Patients With Failed Glaucoma Tube-Shunt Devices

First Author: Alicia Hoi Ying LIU

Co-Author(s): Hussain ALUZRI, Velota SUNG, Tsz Chun Jason WONG

Purpose: Tube flushing (TF) and transscleral cyclophotocoagulation (CPC) are two surgical options for managing refractory glaucoma in patients with pre-existing tube shunts, yet their long-term outcomes remain poorly characterised.

Methods: A retrospective study was conducted in refractory glaucoma patients with prior tube shunts who had undergone either TF or CPC. The primary outcome was IOP reduction. Secondary outcomes included surgical success, best-corrected visual acuity (BCVA), number of glaucoma medications (NOM), complications, and further glaucoma surgeries.

Results: We included 23 eyes treated with TF and 8 eyes with CPC. Baseline mean IOP (standard deviation) for TF was 21.26 (6.43) mmHg on 2.39 (1.27) glaucoma medications which improved to 17.35 (6.26) mmHg on 2.30 (1.46) medications at final follow-up ($p=0.8640$), with an IOP reduction of 12.85% (33.76%). BCVA worsened from 0.76 (0.69) to 1.02 (0.82) ($p=0.5871$). For CPC, baseline mean IOP was 32.5 (10.57) mmHg, on 3.63 (0.92) medications, which improved to 17 (11.97) mmHg on 2.5 (1.20) medications at final follow-up, with IOP reduction of 45.88% (37.07%) ($p=0.1859$). BCVA worsened from 0.63 (0.37) to 0.82 (0.66) at final follow-up ($p=0.5871$). Surgical success was higher in the CPC cohort (50% vs. 13.04%, $p=0.0497$). Additional glaucoma surgeries were required in 26.08% of TF and 50% of CPC cohort.

Conclusions: Both TF and CPC offer limited long-term clinical effectiveness. CPC affords a deeper and longer IOP drop but at 2-fold higher odds of re-operation; TF offers a modest pressure benefit with fewer sight-threatening sequelae. We highlighted the need for more effective solutions in this challenging population.

Abstract No.: 203059

Panel No.: GLA-0350

Comparative Outcomes of Microinvasive Glaucoma Surgery Alone Versus Combined With Phacoemulsification in Normal-Tension Glaucoma

First Author: Ulil Albab HABIBAH

Purpose: Normal-tension glaucoma (NTG) remains a therapeutic challenge, as optic nerve damage progresses despite statistically normal intraocular

pressure (IOP). Microinvasive glaucoma surgery (MIGS) is increasingly used, often with phacoemulsification in eyes with cataract. However, evidence specific to NTG and direct comparisons with standalone MIGS remain limited. To systematically review the clinical outcomes of MIGS in NTG, with particular focus on procedures combined with phacoemulsification, and to identify evidence gaps regarding MIGS performed alone.

Methods: A systematic search of PubMed, Embase, Scopus, and Cochrane Library was performed up to January 2025. Eligible studies included clinical trials, cohort studies, and case series reporting MIGS outcomes in NTG. Primary endpoints were mean IOP and medication reduction; secondary outcomes included visual acuity, surgical success, and safety.

Results: Three studies (367 eyes, 310 patients) met inclusion criteria. All evaluated trabecular micro-bypass stents (iStent or iStent inject) were combined with phacoemulsification. Across studies, combined procedures achieved meaningful IOP reduction (20–22% from baseline) and substantial decreases in medication use (60–87%), with 67–81% of NTG eyes medication-free at 12–24 months. Visual acuity improved primarily due to cataract extraction. Safety profiles were favorable, with transient hyphema and occasional stent occlusion being the most reported events; <2% required subsequent filtering surgery. Notably, no included study assessed MIGS alone in NTG.

Conclusions: MIGS combined with phacoemulsification appears safe and effective for NTG, providing sustained IOP and medication reduction with minimal complications. However, the absence of standalone MIGS data highlights the need for well-designed comparative studies to clarify the relative benefits of different surgical strategies in NTG.

Abstract No.: 201525

Panel No.: GLA-0332

Comparative Study of Netarsudil As Adjunctive Therapy in Angle Closure and Mixed Mechanism Glaucoma

First Author: Elizabeth SUN

Co-Author(s): Maral AIBYEK, Andrew IWACH, Shan LIN, Terri-diann PICKERING, Sunita RADHAKRISHNAN

Purpose: To evaluate the real-world efficacy of netarsudil in reducing intraocular pressure (IOP) among patients with angle closure (ACG), mixed mechanism (MMG), and primary open-angle glaucoma (POAG).

Methods: Medical charts from a single clinical site (Glaucoma Center of San Francisco) were reviewed. Adult patients were included if they were initiated on netarsudil between January 2018 and June 2024, and had a diagnosis of ACG, MMG, or POAG. ACG was defined as ≥ 180 degrees of iridotrabecular contact on gonioscopy or Shaffer grade 0-1. MMG was

defined as prior angle closure with open angles after laser iridotomy, with persistent IOP elevation and/or glaucomatous optic neuropathy necessitating glaucoma therapy. Outcomes included IOP and discontinuation due to side effects.

Results: There were 396 and 109 eyes in the POAG and ACG/MMG groups, respectively. The ACG/MMG group was significant for having older age, more females, and different race distribution, with a higher proportion of Asians, compared to the POAG group. Other baseline characteristics were similar. Mean IOP reduction was comparable between groups at all timepoints. Discontinuation due to side effects was also similar, occurring in 40.7% of POAG and 48.6% of ACG/MMG eyes.

Conclusions: Netarsudil showed similar IOP reduction in POAG and ACG/MMG eyes. Discontinuation rates due to tolerability were also similar. These findings support its role as an adjunctive therapy for both angle closure and mixed mechanism glaucoma in real-world clinical practice.

Abstract No.: 206346

Panel No.: GLA-0418

Comparing Biomechanically Corrected Intraocular Pressure (IOP) by Corvis ST With Intraocular Pressure by iCare IC200 Across Axial Lengths

First Author: Tsun Hin NG

Purpose: To evaluate the utility of biomechanically-corrected non-contact tonometry intraocular pressure measurement (bIOP), as calculated using Corvis-ST (Oculus, Germany), across different axial lengths, with reference to iCare tonometry measurements.

Methods: Right eye data from 2,138 consecutive subjects were obtained from a cross-sectional random population study of Chinese subjects, aged 50 and above, between 1st of May 2019 to 30th of April 2020. Parameters, including IOP, bIOP and Corvis Biomechanical Index (CBI) were measured for all subjects. IOP was measured using iCare and Corvis ST devices. Data were grouped according to axial length (AXL), and correlations between IOP and bIOP values were examined across groups.

Results: Correlations between iCare IOP and bIOP (0.367 in 20-22mm, $p=0.002$ to 0.643 in 26-30mm, $p<0.001$) as well as iCare IOP and uncorrected IOP (0.542 in 20-22mm, $p<0.001$ to 0.729 in 26-30mm, $p<0.001$), as measured by CORVIS-ST, significantly increased with axial length. Compared to iCare IOP, uncorrected IOP tended to be overestimated (74.5% overestimated), while bIOP values were equally overestimated and underestimated (51.0% overestimated). Mean CBI was significantly lower in eyes with higher axial lengths [0.168(± 0.291), 0.133($\pm$

0.262), 0.089($\pm$ 0.220), 0.063($\pm$ 0.207), 0.110($\pm$ 0.245), $F(3,2102)=9.643$, $p<0.001$].

Conclusions: Correlation between bIOP and iCare IOP increased with higher axial lengths. The observed findings may be related to differences in corneal biomechanical properties across axial lengths. Thus, bIOP may be more relevant in high myopic patients with longer axial lengths and lower CBIs.

Abstract No.: 205945

Panel No.: GLA-0403

Comparison of Surgical Outcomes of Tanito Microhook Trabeculotomy With Bent Ab Interno Needle Goniectomy in Open Angle Glaucoma at 12 Months

First Author: Nimrita NAGDEV

Co-Author(s): Devendra MAHESHWARI, Madhavi PILLAI

Purpose: To compare the safety and efficacy of Tanito microhook trabeculotomy (TMH) versus Bent ab interno needle goniectomy with phacoemulsification in eyes with primary open-angle glaucoma.

Methods: A retrospective and comparative study included 70 eyes (35 TMH-Phaco group 1 and 35 BANG-Phaco group 2). Baseline characteristics like Intraocular pressure (IOP), Best corrected visual acuity (BCVA), and anti-glaucoma medications (AGMs) were compared at each post-operative visit. Data were collected at 2 weeks, 1 month, 3,6, and 12 months. Surgical success was defined as IOP ≤ 21 / ≤ 18 / ≤ 15 mmHg with $> 20\%/25\%/30\%$ reduction from baseline, respectively (Criteria 1, 2 and 3). Complications, secondary interventions, and surgical risk factors were also analyzed.

Results: The mean (SD) IOP decreased from 24.69 ± 7.09 to 14.14 ± 2.33 and from 23.20 ± 7.90 to 13.09 ± 2.87 in groups 1 and 2 respectively at the end of 12 months ($p<0.001$). AGM reduced from 1.57 ± 1.07 to 0.20 ± 0.58 and from 1.46 ± 0.85 to 0.14 ± 0.36 in groups 1 and 2 respectively at the end of 12 months ($p<0.001$). Complete and Qualified success was 80%,71.4%,65.7% and 14.3%,11.4%, 8.6% in group 1, respectively. In group 2, it was 71.4%,65.7%,62.9% and 14.3%,14.3%, 5.7%. Micro hyphemas were seen in 5 patients (3 group 1, 2 group 2), and 6 patients had IOP spikes (4 group 1, 2 group 2).

Conclusions: Both TMH and BANG achieved significant IOP and medication reduction, with TMH showing superior outcomes and higher success at 12 months.

Abstract No.: 205307

Panel No.: GLA-0382

Comparison of Surgical and Patient-Related Outcomes of Phaco-GATT Versus Phaco-Trabeculectomy in Open-Angle Glaucoma

First Author: Madhavi PILLAI

Co-Author(s): Shivam GUPTA, Devendra MAHESHWARI

Purpose: To compare outcomes (Surgical & patient related) of phaco-GATT&Phaco-Trabeculectomy in Open angle glaucoma

Methods: Prospective, non-randomised interventional, comparative study. Consecutive patients with POAG and PXFG and visually significant cataract were divided into PhacoGATT (Grp1-75) & PhacoTrab (Grp2-77) & followed up for 1 year. Outcome measures included were IOP, AGM, surgical success, complications & interventions. Success was defined as at least 20%/25%IOP reduction and IOP < 21 or 18 mm Hg(Criteria 1/2). The quality of life post-surgery was assessed with the help of a questionnaire at the end of 12 months.

Results: In Group 1, mean IOP reduced significantly from 17.93 ± 4.29 mmHg to 13 ± 3.18 mmHg, and in Group 2 from 17.81 ± 4.52 mmHg to 12.16 ± 3.28 mmHg at 12 months($p<0.001$), with no significant difference between the groups($p=0.135$).AGM significantly reduced from 1.03 ± 0.43 to 0.09 ± 0.29 in group 1 and from 1.04 ± 0.41 to 0.16 ± 0.37 in group 2 ($p<0.001$), without a significant difference between the groups ($p=0.244$). The cumulative probability of success was 68%,60% in group 1, and 63.6%,50.7% in group 2 (Criteria 1,2). The number of postoperative visits was significantly less in Group 1 ($p<0.001$). Group 1 had a significantly higher patient satisfaction score (8.37) when compared to Group 2 (7.14) ($p<0.001$). Macrohyphema (>1 mm) was seen in 10 patients in Group 1, and two patients required an anterior chamber wash.

Conclusions: Phaco-GATT is safe, efficacious, and comparable to Phaco-Trabeculectomy.Phaco-GATT performed better in terms of quality of life and required fewer postoperative visits and interventions.

Abstract No.: 205000

Panel No.: GLA-0375

Conjunctival Peritomy in Trabeculectomy: All "Frills", Nothing Fancy

First Author: Shubham DARADE

Co-Author(s): Zia PRADHAN, Sujani SHROFF

Purpose: To compare the incidence of bleb leaks following trabeculectomy in eyes which underwent the Frill peritomy vs a conventional fornix-based peritomy.

Methods: Eighty-one eyes underwent Frill peritomy (conjunctiva cut 1mm away from limbus) and 79 eyes underwent conventional peritomy (conjunctiva cut

flush with limbus). The incidence of leaks and their management were compared between the techniques.

Results: Incidence of leaks was significantly lower in the Frill group (2 vs 10 eyes, $p=0.01$). In the Frill group, both leaks resolved with conservative management, while in the conventional group, 4 eyes needed conjunctival re-suturing.

Conclusions: The Frill peritomy has fewer conjunctival complications compared to the conventional peritomy. The Frill peritomy combines the benefits of limbus-based flaps (water-tight closure of anatomically similar tissues) and fornix-based flaps (diffuse posterior blebs) in a single procedure.

Abstract No.: 208367

Panel No.: GLA-0436

Cost-Effectiveness Analysis of Population-Based Glaucoma Screening Using OCT-Based AI System in China

First Author: Jiaying ZHOU

Co-Author(s): Carol Y. CHEUNG, Xin LIU, Anran RAN, Clement THAM, Shuyi ZHANG

Purpose: Glaucoma is frequently diagnosed at advanced stages and relies on opportunistic finding in clinical practice given its asymptomatic nature in early stages, while the high diagnostic costs of conventional approaches have prevented the implementation of population-based screening for early glaucoma. We aim to evaluate the cost-effectiveness of population-based screening using an optical coherence tomography (OCT)-based AI system in China.

Methods: We developed a Markov model comparing OCT-based AI screening for primary angle-closure (PACG) and open-angle glaucoma (POAG) versus opportunistic finding from a societal perspective. A cohort of 100,000 individuals aged 50 through 35 1-year Markov cycles. Parameters were derived from literature, with costs from Beijing Haidian Hospital converted to USD (2024 exchange rate: 7.1 HKD/USD). Primary outcomes were incremental cost-utility (ICURs) using quality-adjusted life years (QALYs) and incremental cost-effectiveness ratios (ICERs) using years of blindness avoided. To reflect the uncertainty around ICURs and ICERs, both one-way deterministic and simulated probabilistic sensitivity analysis were done. Willingness-to-pay (WTP) thresholds used three-times local per capita gross domestic product (GDP).

Results: Over 35 years, opportunistic finding cost US\$ 6,535.34 per person (16.73 QALYs), while OCT-based AI screening cost US\$1,820.26 (17.91 QALYs). OCT-Based AI screening achieved 62,000 years of blindness avoided among 100,000 individuals, with ICUR of -US\$3,996 and ICER of -US\$7,605. One-way sensitivity analysis demonstrated AI performance as the most influential factor. Probabilistic sensitivity analysis confirmed robust ICURs and ICERs.

Conclusions: The OCT-based AI system for population-based glaucoma screening is highly cost-effective compared to opportunistic finding, offering evidence for implementing the AI system in real-world.

Abstract No.: 203583

Panel No.: GLA-0360

Cost-Effectiveness and Cost-Utility of Angle-Based Minimally Invasive Glaucoma Surgery in Primary Open Angle Glaucoma – a Systematic Review

First Author: Eleanor Jia Xin CHONG

Co-Author(s): Bryan Chin Hou ANG, Kevin Kun Peng WANG

Purpose: This study aims to evaluate current economic evidence on cost-effectiveness and cost-utility of angle-based minimally invasive glaucoma surgery (MIGS), compared to conventional treatments, for primary open-angle glaucoma (POAG).

Methods: Database searches on MEDLINE, Cochrane Library, and International Health Technology Assessment identified economic evaluations of angle-based MIGS, with or without concurrent cataract surgery, compared with standalone cataract surgery, medical or laser therapy, or traditional incisional surgery in POAG. Primary outcome measures include costs, quality-adjusted life years (QALYs), incremental cost-effectiveness ratios (ICER), and incremental cost-utility ratios (ICUR) — stratified by MIGS device types, comparators, and economic model scenarios.

Results: Fourteen out of 321 screened studies were included for final analysis. Studies employed Markov models with varying factors such as time horizons and glaucoma severity, adopting healthcare or societal perspectives. Across all studies, base case analyses demonstrated cost-effectiveness in MIGS, with the ICER or ICUR below willingness-to-pay thresholds and supported by sensitivity analyses. From the ten studies comparing MIGS with cataract surgery versus cataract surgery alone, MIGS was found to have limited advantage in the context of short time horizons or in advanced disease. Five studies comparing MIGS to medical or laser therapy, and one study comparing MIGS to incisional surgery, found higher initial costs of MIGS offset by QALYs gained and reduced long-term direct and indirect treatment-related costs, making MIGS cost-effective in the long term.

Conclusions: Angle-based MIGS is cost-effective compared to conventional POAG treatments. Standardised methodologies and longer-term data will strengthen future economic evaluations to guide health technology assessment decisions.

Abstract No.: 205575

Panel No.: GLA-0397

Cost-Utility Analysis of Preservative-Free Latanoprost Eye Drop Cationic Emulsion Versus Preserved First-Line Treatments for Open-Angle Glaucoma or Ocular Hypertension in the Philippines

First Author: David **CHAMPION**Co-Author(s): Amish **CHATURVEDI**, Jieyi **LI**, Vrinda **MATHUR**, Kun **SHI-VAN WIELINK**, Prachi **SINGH**

Purpose: To evaluate the economic value of preservative-free latanoprost eye drop cationic emulsion (PF-LAT E) versus preserved first-line treatments for open-angle glaucoma (OAG)/ocular hypertension (OHT) in the Philippines context to inform resource-allocation (policymakers) and treatment-choice (clinicians) decisions.

Methods: A lifetime (46-year) Markov model (6 states; 30-day cycle) estimated the cost-utility of PF-LAT E versus preserved latanoprost, bimatoprost, tafluprost, brimonidine, and dorzolamide. Analyses used a Philippine societal perspective and 7% annual discounting (cost in 2025 ₱). Outcomes included incremental total costs, incremental quality-adjusted life years (QALYs), and net monetary benefits (NMBs). Model inputs for efficacy, safety, adherence, utility values, and disease progression were sourced from published literature, while healthcare resource utilization was gathered from glaucoma specialists. An informal willingness-to-pay (WTP) threshold of ₱160,890 per QALY was applied. One-way (OWSA) and probabilistic sensitivity (PSA) analyses tested robustness.

Results: PF-LAT E consistently delivered additional health gains (+0.025 to +0.132 QALYs per patient) versus preserved therapies while reducing lifetime costs by ₱12,747-₱40,750. Net monetary benefit was uniformly positive (₱16,784-₱54,813 per patient at the accepted WTP). Results were robust in both OWSA and PSA. PF-LAT E benefits were driven by fewer adverse-event costs, reduced need for treatment escalation, and better tolerability.

Conclusions: Findings suggest PF-LAT E offers a more favourable tolerability profile, and enhanced cost-effectiveness compared to preserved formulations, supporting its adoption as a clinically and economically advantageous option within the Philippine healthcare system.

Abstract No.: 205437

Panel No.: GLA-0392

Dead Bags, Elevated Pressures: A Case Series on Late in-the Bag IOL Complications With Secondary Glaucoma

First Author: Amrita **PUGALENTHI**Co-Author(s): Rathini **DAVID**, Ronnie **GEORGE**, Baskaran **MANI**, Smita **PANDA**

Purpose: To describe the clinical presentation of patients with dead bag syndrome associated with posterior capsular tear, vitreous prolapse and secondary ocular hypertension.

Methods: A case series of six pseudophakic patients presenting with high intraocular pressure (IOP) and vitreous prolapse into the anterior chamber due to posterior capsular tear and late IOL-bag complex instability. Clinical records were reviewed for demographics, visual acuity, Intraocular pressure (IOP), gonioscopy, optic nerve evaluation, visual fields, and management.

Results: All patients had a history of uncomplicated phacoemulsification with in-the-bag posterior chamber IOL implantation. The latency period ranged from 4 - 12 years after cataract surgery. Clinical findings included posterior capsular tear with vitreous in the anterior chamber, IOL decentration in some cases, raised IOP (22–32 mmHg) at presentation, and optic nerve changes consistent with glaucomatous optic neuropathy were seen in three patients, while two developed additional complications, including cystoid macular oedema and retinal detachment. Management included topical antiglaucoma medications in all cases, with one patient requiring filtration surgery.

Conclusions: The clinical entity “Dead bag syndrome” is still a mystery that can present several years after routine phacoemulsification with sequelae such as capsular bag instability with vitreous prolapse that can lead to secondary glaucoma and vision-threatening complications. Long-term surveillance of pseudophakic patients is essential for early recognition and timely management.

Abstract No.: 201336

Panel No.: GLA-0326

Development and Validation of a Predictive Model for Blindness After Lens Extraction Surgery in Acute Primary Angle Closure: A Multicenter Longitudinal Study

First Author: Yining **GUO**Co-Author(s): Chendi **LI**, Xuemin **LI**, Zhongping **LUO**, Chun **ZHANG**

Purpose: To develop and validate a nomogram for predicting blindness in patients with acute primary angle closure (APAC) treated with lens extraction (LE) surgery.

Methods: This multicenter retrospective longitudinal study included 254 eyes in the training cohort and 111 eyes from three centers in the validation cohort. Univariate and multivariate Cox regression analyses were performed to identify predictors of blindness. Nomogram performance was assessed using time-dependent receiver operating characteristic (ROC) curves, area under the curve (AUC), and concordance index (C-index). Kaplan-Meier curves were used to compare the blindness incidence between risk groups.

Results: Cox regression identified significant predictors including logMAR visual acuity (VA) at attack (HR, 1.935; 95% CI, 0.966-3.879), intravenous mannitol use during the acute phase (HR, 0.453; 95% CI, 0.231-0.887), timing of surgery (linear term: HR, 0.771; 95% CI, 0.315-1.887; quadratic term: HR, 0.304; 95% CI, 0.144-0.646; cubic term: HR, 0.792; 95% CI, 0.419-1.498), preoperative logMAR VA (HR, 1.886; 95% CI, 1.174-3.028), and preoperative intraocular pressure (HR, 1.047; 95% CI, 1.022-1.073). The C-index was 0.860 and 0.826 in the training and validation cohorts, respectively. The 1-year and 5-year AUC values were 0.906 and 0.875 in the training cohort, and 0.947 and 0.894 in the validation cohort, respectively. Kaplan-Meier analysis revealed significant differences in blindness probability between low- and high-risk groups ($P < 0.0001$).

Conclusions: The nomogram provides an effective tool for predicting blindness in APAC patients treated with LE surgery, enabling risk stratification and aiding clinical decision-making.

Abstract No.: 201949

Panel No.: GLA-0334

Development of Peripheral Anterior Synechiae Following Combined Bent Ab Interno Needle Goniectomy and Phacoemulsification

First Author: Samyak KHETAN

Co-Author(s): Sarita BERI, Poonam, Rhea BHARTI, Mukund GARG, Piyush Kumar R RAMAVAT

Purpose: To study the 3-month incidence of Peripheral Anterior Synechiae after combined Bent Ab Interno Needle Goniectomy and Phacoemulsification.

Methods: A hospital-based, prospective, observational study in which 30 eyes of Primary open-angle glaucoma patients having visually significant cataract underwent uneventful phacoemulsification followed by Bent Ab Interno Needle Goniectomy (BANG) with a bent-tipped 25-G needle. Preoperative Gonioscopy was done, followed by gonioscopy at post-op 3 months.

Results: Eight eyes out of the 30 eyes developed Peripheral Anterior Synechiae (PAS) at 3 months of follow-up. There was statistically significant when comparing different degree of treatment of BANG i.e. 30°, 45° and 60° and relation with PAS. There were

3 eyes that had mild hyphema on post-operative day 1 and all these eyes developed PAS at the end of 3 months follow-up period, indicating a positive correlation between postoperative hyphema and incidence of PAS. When comparing post-operative IOP change in the PAS and non-PAS groups at 3 months post-op there was no statistical significance, indicating that in a follow-up period of 3 months, PAS didn't cause an increase in IOP.

Conclusions: The findings suggest that while PAS formation after combined phacoemulsification with BANG is 26%, the risk is increased in cases with postoperative hyphema. The absence of correlation with the treatment extent highlights that factors other than the degree of trabecular meshwork removal may influence PAS development. Thus, emphasis should be given more on significance of controlling inflammation and developing specialized follow-up plans for BANG patients.

Abstract No.: 206107

Panel No.: GLA-0412

Diverse Presentations of ICE Syndrome: A Case Series of Experience With Trabeculectomy and Various Implant Devices

First Author: Maula RIFADA

Co-Author(s): Elsa GUSTIANTY, Andika PRAHASTA, Indriyani RIFANDI, Sonie UMBARA

Purpose: To present the clinical spectrum of iridocorneal endothelial (ICE) syndrome and report surgical outcomes of glaucoma management using trabeculectomy and various glaucoma drainage implants.

Methods: Four patients with different ICE variants—progressive iris atrophy (32-year-old man), Chandler syndrome (30-year-old man), Cogan–Reese syndrome (44-year-old woman), and a mixed-type variant (52-year-old woman)—were included. All patients developed secondary glaucoma with uncontrolled intraocular pressure (IOP) despite maximal medical therapy and had advanced glaucoma. Surgical interventions consisted of trabeculectomy with 5-fluorouracil, Aurolab Aqueous Drainage Implant (AADI), Virna Glaucoma Implant (VGI), and Paul Glaucoma Implant (PGI). Pre- and postoperative IOP and visual acuity (VA) were analyzed.

Results: • Progressive iris atrophy: trabeculectomy reduced IOP from 40 to 18 mmHg in 2 months post-surgery, VA remained hand movement (HM). • Chandler syndrome: AADI decreased IOP from 37 to 12 mmHg in 10 month post-surgery, VA remained 0.2. • Cogan–Reese syndrome: VGI lowered IOP from 56 to 11 mmHg in 5 months post-surgery, VA from HM to 0.1 • Mixed variant: despite prior trabeculectomy and cataract surgery, IOP remained at 30 mmHg; subsequent PGI reduced IOP to 11 mmHg at one week

and maintained 16 mmHg after ripcord removal at 1 month with VA from 0.1 to 0.4

Conclusions: ICE syndrome represents a rare and heterogeneous disorder often associated with refractory glaucoma. Surgical management is challenging; trabeculectomy provide short term reduction, but glaucoma drainage implants appear more effective in long-term control. Individualized surgical selection tailored to ICE subtype and disease course is essential for optimal outcomes.

Abstract No.: 206557

Panel No.: GLA-0423

Effect of Navigation Rehabilitation Module for Stroke on Physical Activities, Quality of Life and Serum Total Anti-Oxidant Capacity in Patients With Primary Glaucoma

First Author: Damia Faiqah MOHAMAD SHAHBODIN
Co-Author(s): Liza-sharmini AHMAD TAJUDIN, Muhammad Hafiz HANAFI

Purpose: To determine the effect of Chessington Occupational Therapy Neurological Assessment Battery on physical activities, serum total anti-oxidant capacity (TAC) and quality of life (QoL) in patients with primary glaucoma.

Methods: A randomized, single-blinded controlled trial involving 72 primary glaucoma patients was conducted at Hospital Pakar Universiti Sains Malaysia (HPUSM) from March 2019 to December 2020. Patients were recruited by simple random sampling and randomized using sequentially numbered, opaque sealed envelopes (SNOSE). Group A attended a visual occupational rehabilitation programme based on the Chessington Occupational Therapy Neurological Assessment Battery (COTNAB): once fortnightly for 2 months, monthly for 2 months, followed by 2 months of self-directed home practice. Physical activity was measured using an accelerometer, quality of life (QOL) using the Malay GlauQOL-36 questionnaire, and serum total antioxidant capacity (TAC) using the QuantiChrom™ Assay. Assessments were performed at baseline and 6 months.

Results: Of 72 recruited patients however 4 drop-out and 1 deceased, 67 patients completed the study (32 in group A, 35 in group B); mean age was 63.3 ± 6.7 years. Mean daily steps were 2128.0 ± 1824.0 . Group A showed increased steps, lower GlauQOL-36 scores, and higher serum TAC post-intervention, but differences were not statistically significant ($p > 0.05$). Repeated measures ANOVA showed no significant between-group effects.

Conclusions: Visual rehabilitation based on COTNAB has no significant effects on mobility, QoL and serum TAC level. However, patients with glaucoma are encouraged to be physically active and independent. An easy and user-friendly visual rehabilitation module

specific for patients with glaucoma needs to be developed in the future.

Abstract No.: 203433

Panel No.: GLA-0357

Effect of Pre-Operative 0.1% Brimonidine on Post-Operative Conjunctival Hyperemia, Subconjunctival Hemorrhage and Surgical Outcomes of Trabeculectomy With MMC: A Pilot, Triple-Blind Randomized Placebo-Controlled Trial

First Author: Methaphon CHAINAKUL

Co-Author(s): Nucharee PARIVISUTT, Vasu THAKAEW

Purpose: To assess efficacy of 0.1% Brimonidine on reducing post-operative conjunctival redness and bleeding, and to evaluate surgical outcomes, specifically in terms of intraocular pressure (IOP) control and bleb survival.

Methods: Thirty-six eyes from 35 glaucoma patients were analyzed. Post-operative conjunctival bleeding was evaluated using Keratograph 5M imaging. The automated Redness Score (RS) was used to assess conjunctival hemorrhage in position 1 (look straightforward). Additionally, grayscale images in position 2 (look downward to expose the bleb area) were enhanced, followed by conjunctival segmentation using a U-Net deep learning model. Finally, bleeding in the upper quadrant around the bleb area was quantitatively analyzed using an adaptive threshold pixel measurement technique. Clinical outcomes were also compared between groups.

Results: The treatment group had a significantly lower post-operative RS compared to controls (2.84 ± 0.58 vs. 4.26 ± 0.82 ; $p < 0.001$), with a significantly smaller increase from baseline ($p < 0.001$). Percentage pixel analysis of conjunctival bleeding in position 2 from treatment group tended to be lower in post-operative ($46.42 \pm 3.93\%$ vs. $48.82 \pm 6.54\%$; $p = 0.216$) and in the change from baseline ($17.00 \pm 7.20\%$ vs. $19.60 \pm 7.43\%$; $p = 0.315$). Intraoperative complications occurred only in the control group (12.5%). Post-operatively, the treatment group showed trends toward a lower bleb failure rate (5.9% vs. 25%; $p = 0.174$) and required fewer interventions. IOP reduction from baseline was higher in treatment group (14.66 ± 14.01 vs. 12.02 ± 14.55 ; $p = 0.601$).

Conclusions: 0.1% Brimonidine appears to be an effective method to reduce early postoperative conjunctival hyperemia and bleeding following Trabeculectomy surgery and implicates that it can also minimize intraoperative bleeding. As reduced inflammation and bleeding can potentially improves patient's early post-operative experience and may contribute to a more successful bleb function. Consequently, this study provides evidence to support Brimonidine's novel indication in mitigating inflammation and bleeding postoperatively.

Abstract No.: 201376

Panel No.: GLA-0325

Effectiveness of Standalone iStent Technologies for Glaucoma: A Systematic Literature Review

First Author: Kyoko ISHIDA

Co-Author(s): Geoffrey CHAN, Alice CHU, Colin CLEMENT, Jennifer EVANS, Masaru INATANI

Purpose: To investigate clinical outcomes following implantation of second- and third-generation iStent as a standalone surgery in glaucoma patients.

Methods: Searches were conducted in MEDLINE, Embase, Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials. Interventional and observational studies reporting ≥ 6 months of follow-up, enrolling adult glaucoma patients regardless of treatment history, receiving standalone iStent technologies (iStent inject®, iStent inject® W or iStent infinite®), and reporting change from baseline (CfB) in intraocular pressure (IOP) and glaucoma medications, and eyes achieving success criteria, were included.

Results: Eighteen unique studies, including 1,810 eyes, were identified. Despite varied baseline IOP, number of IOP-lowering medications, and surgical history, a reduction in mean IOP from baseline was observed in all studies reporting this outcome. CfB in mean IOP at Month 12 ranged from -0.5 mmHg to -12.2 mmHg. Eyes achieving unmedicated IOP ≤ 18 mmHg at Month 12 ranged from 12.8% to 100% in four reporting studies. A decrease in IOP-lowering medication burden was observed following iStent implantation in 9 of 12 studies reporting this outcome; CfB in mean medication number at Month 12 ranged from -0.1 to -2.1. No change was observed in the remaining 3 studies.

Conclusions: This review summarised evidence for the effectiveness of newer generation iStent standalone surgeries in reducing IOP and medication burden in patients with glaucoma, regardless of baseline IOP, medication burden, and surgical history. Meta-analysis to account for observed between-study heterogeneity in baseline characteristics is recommended for future investigation.

Abstract No.: 206394

Panel No.: GLA-0420

Effectivity of Selective Laser Trabeculoplasty in Open Angle Glaucoma in a Tertiary Hospital

First Author: Tommy WIBOWO

Co-Author(s): Elsa GUSTIANTY, Andika PRAHASTA, Maula RIFADA, Sonie UMBARA

Purpose: To evaluate efficacy of selective laser trabeculoplasty (SLT) in lowering intraocular pressure (IOP) and decreasing glaucoma medication in open-

angle glaucoma (OAG). And to correlate its laser parameter and history of surgery to its success rate.

Methods: This study is a retrospective study. The sample is 23 eyes from 17 patients with OAG in Cicendo Eye Hospital from 1st November 2023 to 31st June 2023. Inclusion criteria were OAG patient with IOP > 21 mmHg. Patient with history of uveitis, steroid, trauma, absence in follow up period, and surgery during follow up period was excluded. The main parameter was IOP pre SLT, one week, one month, two months, and three months after SLT. Successful criteria determined as $> 20\%$ IOP reduction from Pre SLT IOP. The data was analyzed using SPSS 20.

Results: A total of 23 eyes from 17 patients underwent SLT. Mean baseline IOP was $20,74 \pm 4,58$ mmHg. During follow up period IOP is reduced $18,17 \pm 5,47$ mmHg at one week, $15,87 \pm 4,43$ mmHg at one month, $16,61 \pm 4,91$ mmHg at two months, and $17,48 \pm 4,78$ mmHg at three months. The highest successful rate was 65,21%. There was correlation between total energy used with IOP reduction in one month with correlation coefficient of 0,361 and P value 0,046.

Conclusions: Selective laser trabeculoplasty is effective to reducing IOP and number of glaucoma medication in open angle glaucoma whether there is history of surgery prior to SLT or not.

Abstract No.: 206091

Panel No.: GLA-0413

Effects of Daily Ambient Temperature on Intraocular Pressure: A Time-Series Analysis Using Generalized Additive and Distributed Lag Nonlinear Models

First Author: Yuto YOSHIDA

Co-Author(s): Yuuri FUJINO, Noriko KOIZUMI, Nobuaki MICHIIHATA, Naoki OKUMURA, Masaki TANITO

Purpose: To investigate the previously underexplored non-linear association between ambient temperature and intraocular pressure (IOP), as well as the short- to medium-term lagged effects of temperature exposure on IOP.

Methods: A time-series study was conducted using 2018–2023 outpatient data from Shimane University Hospital in Izumo, Japan. Daily meteorological data were obtained from the Japan Meteorological Agency. We analyzed the association between ambient temperature and IOP using generalized additive models (GAMs) to assess nonlinearity, and distributed lag nonlinear models (DLNMs) to evaluate cumulative lag-effects. Models were adjusted for time-related confounders (timeline, day of the week, public holidays, season).

Results: We analyzed 1,269 observation days comprising 33,979 IOP measurements: 921 days with 8,756 measurements in the non-glaucoma group and 1,182 days with 25,173 measurements

in the glaucoma group. In the non-glaucoma group, nonlinear associations with IOP were suggested for daily temperatures, with significant increase at average temperatures between 2.2 °C and 12.2 °C. In the glaucoma group, no nonlinear associations were detected. Cumulative exposure to warm average temperatures was associated with lower IOP in the non-glaucoma group (lag 0–6: 15.6–21.1 °C; lag 0–13: 15.6–29.6 °C), whereas colder ranges (lag 0–6: 14.6–15.1 °C; lag 0–13: 13.1–15.1 °C) increased IOP in the same group; no significant cumulative effects were observed for lag 0–30.

Conclusions: This study provides novel epidemiological evidence that ambient temperature is associated with IOP through nonlinear relationships and short-term cumulative effects, particularly in the non-glaucoma group. These findings suggest that monitoring ambient temperature is important for IOP management.

Abstract No.: 203991

Panel No.: GLA-0366

Efficacy and Safety of Ahmed Glaucoma Valve in Inpatients With Neovascular Glaucoma: A Retrospective Study

First Author: Lei FANG

Co-Author(s): Keith BARTON, Jingjing HUANG, Zhishu LIANG, Xing LIU

Purpose: To evaluate the efficacy and safety of the Ahmed glaucoma valve (AGV) implantation in the management of neovascular glaucoma (NVG).

Methods: This retrospective study analyzed 190 eyes of 184 inpatients with NVG who underwent AGV implantation at Zhongshan Ophthalmic Center between January 2020 and February 2024. Data collected included demographic characteristics, preoperative and postoperative intraocular (IOP), number of glaucoma medications, best-corrected visual acuity (BCVA), surgical success rates, and complications were recorded. Potential preoperative characteristics that influence success rates were assessed using Cox proportional hazards regression models.

Results: The most common etiology was diabetic retinopathy (54.7%, 104/190 eyes). The mean patients age was 50.9±13.6 years, with a mean follow-up 15.4±5.2 months. Among 190 eyes, prior treatments included anti-VEGF (73.7%), panretinal photocoagulation (41.6%), vitrectomy (21.1%), and cataract surgery (34.7%). Postoperatively, IOP significantly decreased from 41.0±8.5 mm Hg to 15.3±6.4 mm Hg, along with a reduction in the number of glaucoma medications from 2.8±1.6 to 1.4±1.2 (both $P<0.001$). Preoperatively, 64.2% of eyes had a BCVA of $<20/400$; postoperative BCVA remained stable (2.2 ±0.7 vs 2.2 ±0.8, $P=0.091$). The cumulative surgical success rates at 12 and 24 months postoperatively were 86.7% and 68.5%, respectively. No factors were found to be significantly associated with the success

rate. Postoperative complications were observed in 31.6% of eyes, primarily shallow anterior chamber (9%) and hypotony (8%), all of which resolved spontaneously without any vision-threatening events.

Conclusions: AGV implantation was a safe and effective procedure in NVG which could be considered as one of the first choices for management of NVG.

Abstract No.: 202429

Panel No.: GLA-0342

Efficacy and Safety of Combined Phacoemulsification and iStent Implantation in Primary Angle Closure Disease: A Systematic Review and Meta-Analysis

First Author: Sheng Yang LIM

Co-Author(s): Bryan Chin Hou ANG, Bjorn Kaijun BETZLER, Kai En CHAN, Eric Yihao JIN

Purpose: This systematic review and meta-analysis (SRMA) aims to evaluate the efficacy and safety of combining phacoemulsification and the iStent trabecular micro-bypass (phaco-iStent) in patients with primary angle-closure disease (PACD), a procedure that, while commonly performed, remains 'off-label'.

Methods: A comprehensive search of Medline, Embase, and CENTRAL databases through August 18, 2024, identified studies evaluating the efficacy of Phaco-iStent (all generations) in PACD patients. Meta-analyses of single means and binary outcomes were conducted, including pairwise comparisons with standalone phacoemulsification.

Results: Four studies involving 219 eyes were included. At 12 months postoperatively, the procedure achieved a mean intraocular pressure (IOP) reduction of 2.69 mmHg (95% CI: 4.72-0.66; $p<0.001$) and a mean reduction of 1.33 IOP-lowering medications (95% CI: 1.60 –1.06; $p<0.001$). Compared to standalone phacoemulsification, Phaco-iStent showed greater reductions in both IOP ($p=0.314$) and medication use ($p<0.001$, statistically significant). The most frequent complication was stent occlusion (9.69%, 95% CI: 0.00–31.47%), followed by transient hyphema (3.50%, 95% CI: 0.00–20.72%). The odds of transient hyphema were 10 times higher with Phaco-iStent compared to phaco alone (OR: 10.01; 95% CI: 1.24–81.15; $p=0.031$). Conversely, the odds of postoperative IOP spikes were six times lower in the Phaco-iStent group (OR: 0.16; 95% CI: 0.05–0.52; $p=0.002$).

Conclusions: This SRMA quantitatively supports the potential use of Phaco-iStent surgery in PACD. Future studies are needed to establish comparative efficacy against standalone phacoemulsification, as well as its longer-term outcomes.

Abstract No.: 201468

Panel No.: GLA-0330

Efficacy and Tolerability of Rocklatan in Asian Eyes With Primary Open Angle and Normal Tension Glaucoma: 3 Week Results

First Author: Claire Lixian PETERSON

Co-Author(s): Nur Insyirah Binte AZNAN, Rachel CHONG, Samantha LOR, Tina WONG

Purpose: Studies on Rocklatan in Asian eyes are limited. We evaluated the efficacy, safety, and tolerability of Rocklatan (Netarsudil0.02% + Latanoprost0.005%) in Asian patients with primary open-angle glaucoma (POAG) or normal-tension glaucoma (NTG).

Methods: Prospective single-arm study at a tertiary eye centre. POAG/NTG patients on prostaglandin mono- or combination therapy were switched to once-daily Rocklatan in one eye for 12 weeks. Enrollment began in June 2025. Baseline and 3-week data were analyzed. Assessments included Goldmann applanation tonometry, visual acuity, Humphrey visual field, biometry, and patient-reported comfort/tolerability questionnaire (baseline and week 12). Masked anterior segment photos were graded on the Cornea and Contact Lens Research Unit (CCLRU) scale at each visit.

Results: Eighteen patients (70.8±6.8years) completed baseline and 3-week visits, 2 months from study initiation. 5 had POAG, 13 NTG, most were myopic (axial length26.9±2.3mm), with early-moderate disease (mean deviation -5.8±3.3dB). 13 were on prostaglandin monotherapy and 3 on prostaglandin-combination therapy. Baseline mean intraocular pressure (IOP) was 13.3±2.7mmHg, decreasing to 10.5±2.5mmHg at 3 weeks, reflecting a mean 20.4%±13.0% (-2.8±2.1mmHg, p<0.001) reduction in IOP. 44.4% achieved ≥20% reduction. The most common side effect was conjunctival hyperaemia: 10 had 1-point; 2 had 2-point bulbar redness worsening on the CCLRU scale. 1 discontinued due to intolerance; no serious ocular or systemic adverse events were reported.

Conclusions: Interim analysis suggests Rocklatan provides effective short-term IOP reduction with acceptable tolerability in Asian eyes with POAG/NTG. A 12-week follow-up is ongoing.

Abstract No.: 202487

Panel No.: GLA-0345

Efficacy of Rho Kinase Inhibitors in Open and Closed Angle Glaucomas Within the Vietnamese Population

First Author: Dzuy TRUONG

Co-Author(s): Sunee CHANSANGPETCH, Andrew IWACH, Shan LIN, Eden NG, Kelly NGUYEN, Ngoc NGUYEN, Sunita RADHAKRISHNAN

Purpose: Rho kinase (ROCK) inhibitors are a class of glaucoma medications that may provide benefit across open and closed-angle types. This study evaluated the

efficacy of Netarsudil (a ROCK inhibitor) for both types within a predominantly Vietnamese population.

Methods: We performed a retrospective chart review of eyes diagnosed with primary open-angle glaucoma (OAG), combined mechanism glaucoma (CMG), or angle-closure glaucoma (ACG) that received Netarsudil for at least three months. OAG was defined as >180 degrees grade II or greater, CMG as closed angles subsequently opened after laser iridotomy, and PACG as ≥180 degrees grade I or lower or possessing any PAS. All patients were from a single clinical site (Ngoc Nguyen).

Results: 235 eyes were included, of which 210 (89%) were from Vietnamese patients. At baseline, mean intraocular pressure (IOP) was 17.7 mmHg in both OAG and CMG groups and 19.2 mmHg in ACG groups. At six months, mean IOP reduction did not significantly differ when comparing OAG to CMG (4.2 ± 3.9 mmHg in OAG, 3.4 ± 4.1 mmHg in CMG, p=0.254). This was similar when comparing OAG to ACG (4.3 ± 5.0 mmHg in ACG, p=0.739). Comparing discontinuation rates due to side effects, OAG did not differ from CMG [n=29 (25%) in OAG, n=13 (20%) in CMG, p=0.623]. This was similar when comparing OAG to ACG [n=10 (19%) in ACG, p=0.488].

Conclusions: Our findings suggest that Netarsudil is equally effective in reducing IOP across glaucoma subtypes of angle status. Furthermore, it appears to be a useful adjunctive therapy for glaucoma in Vietnamese patients.

Abstract No.: 204802

Panel No.: GLA-0373

Evaluation of Intraocular Pressure and Optical Coherence Tomography Angiography Parameters in Preeclampsia

First Author: Ayush ARYA

Co-Author(s): Akshat ARYA, Kirti SINGH

Purpose: Understanding Intra Ocular Pressure (IOP) changes and ocular vascular complications in pre-eclampsia by determining differences in intraocular pressure (corrected), central corneal thickness (CCT), and retinal circulation (Optical Coherence Tomography Angiography) parameters between pregnant women with preeclampsia and uncomplicated pregnancy.

Methods: A cross-sectional comparative study was conducted comparing 40 pregnant females with pre-eclampsia in the study group to 40 healthy pregnant females in the control group. Clinical assessment with IOP measurement using Goldmann's Applanation Tonometer, CCT using Sonomed PACSCAN 300AP, and Optical Coherence Tomography Angiography using Cirrus HD-OCT 5000 version were performed and compared between the two groups.

Results: The CCT corrected IOP, and Mean ocular perfusion pressure were found to be significantly

higher in preeclampsia as compared to normotensive pregnancy. OCTA (Optical Coherence Tomography Angiography) parameters were suggestive of similar Foveal Avascular Zone (FAZ) and Superficial Capillary Plexus Vascular Density (SCPVD) despite significantly increased Radial Peripapillary Capillary Vessel Density (RPCVD) in preeclampsia patients as compared to normotensive pregnancy. Retinal Nerve Fibre Thickness (RNFL) was found to be similar in both groups.

Conclusions: Glaucoma control may be hampered in pregnancy with preeclampsia due to an increase in IOP, requiring close monitoring and changes in anti-glaucoma medications. Optic disc vasculature is vulnerable to systemic haemodynamic changes, as shown by a significant increase in RPCVD, but the underlying retinal autoregulatory mechanism prevents significant changes in the retinal vasculature, as shown by similar SCPVD values and RNFL thickness between the two groups.

Abstract No.: 207283

Panel No.: GLA-0434

Evaluation of Visual Outcomes in Patients With Concurrent Glaucoma and Cataract Following Multifocal Intraocular Lens Implantation

First Author: Guoxing LI

Co-Author(s): Lin FU, Shudan LI, Yuanbo LIANG, Yijing PING, Shumeng YAO

Purpose: To investigate the visual outcomes of multifocal intraocular lens implantation in patients with concurrent glaucoma and cataract.

Methods: We conducted a prospective study involving 90 eyes: 21 with glaucoma and cataract implanted with multifocal IOLs (Multifocal Glaucoma group), 38 with cataract-only receiving multifocal IOLs (Multifocal Cataract group), and 31 with glaucoma and cataract receiving monofocal IOLs (Monofocal Glaucoma group). Preoperative and three-month postoperative outcomes—including visual acuity, visual field, OQAS parameters, defocus curves, and contrast sensitivity—were compared using SPSS.

Results: The near visual acuity (NVA) of the Multifocal Glaucoma group was better than that of the Monofocal Glaucoma group at three months after surgery ($P=0.005$), and there was no difference compared with the Multifocal Cataract group ($P\geq 0.005$). In the Multifocal Glaucoma group, there was no decrease in visual field (VF) and contrast sensitivity after the operation ($P\geq 0.005$), and the objective visual quality (OQAS) remained unchanged. Postoperative NVA and contrast sensitivity in glaucoma patients had no significant correlation with the degree of VF defect ($P\geq 0.005$).

Conclusions: The NVA of the Multifocal Glaucoma group was significantly better than that of the

Monofocal Glaucoma group, and there was no difference compared with the Multifocal Cataract group. Postoperative VF, contrast sensitivity and OQAS did not decline significantly, and there was no significant correlation between the above visual function indicators and the degree of visual field defect.

Abstract No.: 205362

Panel No.: GLA-0389

Eyes on Adherence in Glaucoma Treatment: A Comparative Evaluation of Medication Reminder Apps

First Author: John Davis AKKARA

Purpose: To identify available medication reminder apps and analyze them quantitatively & qualitatively. To compare the features & usefulness of various medication reminder smartphone apps.

Methods: Cross-sectional observational study. Quantitative & qualitative analysis of medication reminders apps (especially eyedrops). Out of more than 100 medication reminder smartphone apps, the 26 best-rated apps were selected for further analysis. Analyzed for ratings, downloads, file size, essential features, user interface, ease of use, presence of advertisements, paid upgrades, paid app, reliability, and errors.

Results: Applying criteria, 26 apps were selected. Main reasons for exclusion were not being specific for medication, not having at least 1000 installs, and having rating less than 3.0. Tables show the detailed analysis for the selected 26 apps. Some apps were paid, some free and some had ads. A good number of the apps were made for all sorts of medications while a few (3 numbers = 12%) were dedicated for eyedrops and 1 for glaucoma specifically. Number of installs ranged from 1000 to 1 million installs. In addition, it is also important to look at the number of raters who rated the app. This ranged from 13 for the very specific "Glaucoma App" to 204908 for "MediSafe" which correspondingly had 1000 and 1 million installs. File size varied from 0.3MB for the simple Glaucoma App to 35MB for feature-rich MediSafe App.

Conclusions: Our study shows availability of medication reminder apps and their usability. Apps vary widely in file size, ratings and number of installs. Number of installs was better parameter for quality of app than rating. Apps can improve patients' adherence to medications.

Abstract No.: 202752

Panel No.: GLA-0347

Five-Year Cumulative Success Rates of Trabeculectomy Versus Tube Implantation in Advanced Glaucoma Management in Cambodia

First Author: Channdarith KITH

Co-Author(s): Kossama CHUKMOL, Baljean DHILLON, Piseth KONG, Bunseng SEA

Purpose: The aim is to evaluate the effectiveness of primary trabeculectomy with mitomycin-C and tube implant surgery in adult Cambodian patients with advanced stage glaucoma.

Methods: A retrospective chart study was conducted on adult patients who underwent primary trabeculectomy or primary tube implant surgery at national tertiary eye care centre between January 2017 and October 2024. Patients who had previous intraocular procedures were excluded. Demographics, intraocular pressure (IOP), use of anti-glaucoma medications (AGM), and complications were all documented. The complete success was defined as maintaining IOP control with or without medications while avoiding additional glaucoma surgery.

Results: A total of 216 eyes were examined from 197 patients. Of these, 35 eyes (16.20%) received tube implants, while 181 eyes (83.80%) had trabeculectomy. The mean IOPs of the trabeculectomy group decreased from 32.45 ± 12.54 mmHg to 13.10 ± 3.94 mmHg, while the tube group decreased from 32.80 ± 13.69 to 12.06 ± 3.08 mmHg following five years, with no significant difference between the two groups ($p = 0.93$). At five years, the trabeculectomy group had a slightly higher cumulative success rate (67.96%) than the tube group (62.86%), although the difference was not statistically significant ($p = 0.35$).

Conclusions: In Cambodia, while trabeculectomy continues to be the preferred treatment, tube implants are gaining popularity. Our findings revealed that, in this Cambodian cohort, trabeculectomy had a slightly higher five-year cumulative success rate than tube implantation for advanced glaucoma. Both treatments provided effective long-term IOP control, emphasising the importance of tailored surgical planning based on each patient's risk profile and available resources.

Abstract No.: 205457

Panel No.: GLA-0391

Frailty Syndrome and Its Impact on Intraocular Pressure Regulation: An Epidemiological Analysis

First Author: Jianqi CHEN

Co-Author(s): Zhidong LI, Yingting ZHU, Yehong ZHUO

Purpose: As populations age, the prevalence of frailty syndrome is expected to rise. Frailty is characterized by decreased resilience and increased susceptibility

to stressors, and is linked to various adverse health outcomes. Intraocular pressure (IOP) is a significant risk factor for glaucoma and may be influenced by mechanisms such as autonomic nervous dysfunction and inflammation, which share underlying mechanisms with frailty. This study aims to investigate whether frailty syndrome affects the regulation of IOP.

Methods: This study utilized a two-sample Mendelian randomization analysis. The genome-wide association study data for frailty were obtained from a meta-analysis conducted by Atkins et al., which incorporated data from the UK Biobank and TwinGene, encompassing 175,226 participants. The IOP data were sourced from a meta-analysis by Springelkamp et al., based on 19 cohorts comprising 29,578 participants, with no overlap between the two datasets. The inverse variance-weighted method served as the primary inference technique, supplemented by several sensitivity analyses to ensure robustness.

Results: The inverse variance-weighted method suggests that frailty syndrome may contribute to an increase in IOP ($\beta=1.05$, 95% CI: 0.58–1.52, $P<0.001$). This finding is corroborated by sensitivity analyses, as evidenced by the weighted median method ($\beta=1.16$, 95% CI: 0.49–1.82, $P=0.001$) and the weighted mode method ($\beta=1.25$, 95% CI: 0.14–2.37, $P=0.032$), both of which support this conclusion.

Conclusions: This study indicates that frailty syndrome may affect the regulation of IOP. Its potential impact should be considered in the management of IOP in patients with glaucoma, particularly in frail older adults.

Abstract No.: 202271

Panel No.: GLA-0339

From Hemorrhage to High Pressure: A Case Report of Ghost Cell Glaucoma Following Vitrectomy

First Author: Rahmah AMRAN

Co-Author(s): Rina La Distia NORA, Virna Dwi OKTARIANA, Faiz Alwan TAGAR

Purpose: To report a case of ghost cell glaucoma following vitrectomy for vitreous hemorrhage and emphasize the importance of differentiating it from postoperative endophthalmitis.

Methods: A 53-year-old patient presented with severe right eye pain, redness for three days, blurred vision, and photophobia two months post-vitrectomy. Endophthalmitis was initially suspected. However, ocular examination and intraocular pressure (IOP) assessment were performed to refine the diagnosis.

Results: The IOP was markedly elevated at 52 mmHg, associated with corneal edema, conjunctival injection, and a crescent-shaped pseudohypopyon. Further evaluation revealed a deep hazy anterior chamber containing ghost cells, confirming the

diagnosis of ghost cell glaucoma. Ghost cell glaucoma is a secondary open-angle glaucoma caused by degenerated red blood cells obstructing the trabecular meshwork, often developing weeks after vitreous hemorrhage or intraocular surgery. In this case, initial treatment with topical pressure-lowering agents and systemic acetazolamide successfully normalized IOP and alleviated pain. However, the pseudohypopyon persisted, requiring irrigation–aspiration for definitive management.

Conclusions: This case underscores that not all postoperative red and painful eyes represent infection. Early recognition of ghost cell glaucoma is crucial for timely management and preservation of vision.

Abstract No.: 203985

Panel No.: GLA-0365

Functional Visual Parameters in Open-Angle Glaucoma Suspects (NTG) With and Without High Axial Myopia

First Author: Kaveri **BIRLA**

Co-Author(s): Zia **CHAUDHURI**, Sunil **KUMAR**, Om **PRAKASH**

Purpose: To compare functional visual performance—best corrected visual acuity (BCVA), contrast sensitivity, colour vision, stereopsis, speed of reading (SOR), and visual fields—in open-angle glaucoma (NTG) suspects with and without high axial myopia (HAM).

Methods: In this hospital-based cross-sectional study, 80 adults (40 NTG with HAM; 40 NTG without HAM) underwent standardized assessments: BCVA (ETDRS), contrast sensitivity (Pelli-Robson), colour vision (Hardy–Rand–Rittler and Farnsworth D-15), stereopsis (Lang I & II, Titmus Fly, TNO), speed of reading (MNREADS), and Humphrey 24-2/10-2 visual fields. Group differences were analyzed using t-tests or chi-square tests.

Results: NTG with HAM presented younger (mean 28.7 ± 13.5 yrs vs 40.3 ± 20.5 yrs, $p=0.003$) and had significantly poorer distance BCVA (logMAR 0.21 vs 0.12, $p=0.02$). Contrast sensitivity and colour vision did not differ significantly between groups ($p>0.3$). Stereopsis was consistently reduced in the HAM group, with higher mean thresholds on Lang I (876 arcsec vs 602 arcsec, $p=0.002$) and Lang II (457 arcsec vs 243 arcsec, $p<0.001$). Speed of reading and visual field defects showed no significant inter-group difference. The findings indicate that while overall visual function remains largely comparable, stereopsis and distance acuity are selectively impaired in NTG with HAM, reflecting the combined effects of myopic axial elongation and early glaucomatous damage.

Conclusions: Functional visual assessment reveals that NTG suspects with HAM exhibit significantly poorer stereopsis and slightly reduced distance visual acuity, despite similar contrast sensitivity and colour

vision. Early stereopsis testing may help identify subtle functional compromise in highly myopic NTG suspects.

Abstract No.: 206007

Panel No.: GLA-0406

Glaucoma Following Microincision Vitreous Surgery (MIVS) for Treatment Naïve Adult Rhegmatogenous Retinal Detachment

First Author: Akanksha **SHARMA**

Co-Author(s): Mohit **DOGRA**, Surinder **PANDAV**, Ramandeep **SINGH**, Faisal **THATTARUTHODY**

Purpose: To evaluate the incidence, clinical course, and management of ocular hypertension/ glaucoma following Microincision Vitreous Surgery (MIVS) for treatment-naïve adult rhegmatogenous retinal detachment (RRD) at a tertiary care centre in Northern India.

Methods: We conducted a retrospective observational non-comparative study of 148 adult patients who underwent MIVS with internal tamponade for RRD and completed a minimum follow-up of six months. Postoperative ocular hypertension/glaucoma was identified based on intraocular pressure (IOP) measurements and clinical findings. Management strategies included antiglaucoma medications, silicone oil removal (SOR), glaucoma drainage device implantation, and diode laser cyclophotocoagulation. Preoperative and postoperative IOP, timing of glaucoma onset, interventions required, and surgical outcomes were analysed.

Results: The mean age of patients was 52.2 years. Most patients (87%) underwent combined scleral band with pars plana vitrectomy and silicone oil tamponade (SB+PPV+SOT), while 10% had SB+PPV with gas tamponade, and 3% underwent PPV with silicone oil tamponade. A mean postoperative IOP rise of 24.4 mmHg was observed compared to baseline. Glaucoma or ocular hypertension developed in 27% of patients. Among these, 52.5% achieved IOP control with medications alone, while 37.5% required SOR to achieve target pressures. Patients undergoing glaucoma surgery, including drainage devices or cyclophotocoagulation, achieved a qualified success rate of 83%. No major vision-threatening complications were noted following secondary glaucoma interventions.

Conclusions: Postoperative glaucoma is a common and potentially sight-threatening complication after MIVS with internal tamponade for RRD. Early recognition and prompt, aggressive management—medical and surgical—are essential for optimal IOP control.

Abstract No.: 201344

Panel No.: GLA-0323

Goniotomy for Secondary Glaucoma in Post-Phacoemulsification Patients: A Way to Dodge the Tube

First Author: Widya ANANDITA

Purpose: This case series aims to report the successful use of goniotomy in secondary glaucoma patients due to complications in phacoemulsification.

Methods: A case series done by retrospective review of three patients.

Results: We have three cases, all of which have a history of phacoemulsification, and in all, we found foldable IOL in the sulcus with closed angle and significant synechiae. All underwent IOL exchange and goniotomy. First patient is 56 y.o. A female who underwent phacoemulsification 4 months before presentation, visual acuity (VA) was 2 meters, finger counting (mfc), and IOP was 45 mmHg. After intervention, VA was 20/60 and pressure decreased to 24, 11, 16, 15.5 mmHg in 1 day, 1 week, 1 month, and 1 year, respectively, without anti-glaucoma medication. Second was 60 y.o. male with history of phacoemulsification 2 years before, VA was 1/2 mfc, and IOP of 34 mmHg. After intervention, VA was 20/60, and IOP decreased to 16.6 and 8.9 mmHg in 1 week and 1 month without medication. The third patient is a female, 53 y.o. who underwent phacoemulsification 4 months before. Pressure was 51 mmHg, and VA was 3 mfc. Afterwards, VA was 20/50, and IOP was 29.3, 42, and 17 mmHg in 1 day, 1 month, and 3 months, with 2 topical anti-glaucoma medications.

Conclusions: Conventionally, secondary glaucoma in patient with history of phacoemulsification complication is primarily treated with glaucoma drainage device. This case series shows goniotomy can be a good alternative to control IOP in such patients.

Abstract No.: 202380

Panel No.: GLA-0341

Gut-Eye Axis in Action: Association of Probiotic Use With Major Glaucoma Subtypes

First Author: Chien-yun TSAI

Purpose: To investigate the association between probiotic use and the risk of developing ocular hypertension (OHT), primary open-angle glaucoma (POAG), normal-tension glaucoma (NTG), and primary angle-closure glaucoma (PACG).

Methods: We conducted a retrospective cohort study using the TriNetX multinational database. Adults aged ≥ 40 years with a diagnosis of dry eye and no prior glaucoma history were included. Participants were categorized into probiotic and non-probiotic groups according to prescription records. Propensity score matching (1:1) was applied to balance demographics,

comorbidities, and medication use. Cox proportional hazards models estimated hazard ratios (HRs) with 95% confidence intervals (CIs), and Kaplan–Meier analyses assessed five-year cumulative incidence. Sensitivity and subgroup analyses were performed to evaluate robustness across age, sex, race, diabetes, and obesity strata.

Results: A total of 15,613 matched pairs were analyzed. Probiotic use was associated with significantly lower risks of OHT (HR: 0.67, 95% CI: 0.54–0.85), POAG (HR: 0.44, 95% CI: 0.32–0.61), NTG (HR: 0.51, 95% CI: 0.27–0.97), and PACG (HR: 0.37, 95% CI: 0.19–0.75). These associations were consistent in sensitivity analyses and across multiple subgroups.

Conclusions: Probiotic use was associated with a reduced risk of multiple glaucoma subtypes in this large real-world cohort. These findings support a potential role of the gut–eye axis in glaucoma pathogenesis and underscore the need for prospective studies to confirm causality and elucidate underlying mechanisms.

Abstract No.: 205834

Panel No.: GLA-0401

Hong Kong Glaucoma Surgery Practice Patterns: A Survey Among Glaucoma Specialists

First Author: Rachel Lancey LAI

Co-Author(s): Virna ASRORY, Thomas Chi-ho LAM, Dexter LEUNG, Clement THAM

Purpose: To Characterize Current Glaucoma Surgical Practice Patterns Among Glaucoma Specialists in Hong Kong

Methods: An anonymous online survey was distributed to glaucoma specialists in Hong Kong via Google Forms, capturing demographic data and detailed preferences for surgical procedures.

Results: Among 27 respondents (44.4% public, 55.6% private), practice patterns for trabeculectomy included a preference for a superonasal site (51.9%), a fornix-based conjunctival flap (96.3%), a rectangular scleral flap (74.1%), and MMC 0.4mg/ml for 3 minutes (77.8%). Postoperative management showed varied use of NSAIDs, rare use of subconjunctival steroids, and no reported use of intracameral anti-VEGF. The Ahmed valve was the dominant tube shunt (81.5%), with a unanimous preference for a superotemporal initial site, followed by a superonasal site (63%). The usage of MIGS was highest for iStent (88.9%), followed by goniotomy (48.1%), and minimally invasive bleb surgeries (MIBS) such as the XEN Gel Stent and PRESERFLO Microshunt (37% each). Patient selection criteria varied: angle-based MIGS were primarily used for mild-moderate glaucoma (92.6%), whereas MIBS were favoured for medication intolerance (61.5%). Key barriers included narrow angles for angle-based MIGS (81.5%) and conjunctival scarring for MIBS (57.7%). In

the next five years, 40.7% of specialists foresee MIGS remaining primarily for mild-moderate disease, while 33.3% predicted broader earlier use.

Conclusions: The glaucoma surgical landscape in Hong Kong is characterized by a hybrid model, where well-established techniques are integrated with a cautious adoption of newer MIGS. Surgeon preference and specific patient factors heavily influence strategy. These patterns provide a valuable benchmark for regional comparison within the Asia-Pacific region.

Abstract No.: 204713

Panel No.: GLA-0374

Identification of a 2MB Plausible Novel Locus on Chromosome 7, and a Novel Mutation p.Ser464Pro in CYP1B1 in Primary Congenital Glaucoma Families of Pakistani Origin

First Author: Hamza KHAN

Co-Author(s): Nauman AHMAD, Humaira AYUB, Israr Ahmed BHUTTO, Sadia BUKHARI

Purpose: The current study was conducted to explore the genetic factors associated with PCG families of Pakistani origin.

Methods: The study participants comprised of nine large unrelated consanguineous PCG families and three trios families collected from Pakistan. Probandes were investigated for CYP1B1 mutations by Sanger sequencing, followed by segregation analysis of the identified variants. Moreover, one family (PCG02) not linked to CYP1B1 was further subjected to 250K SNP microarray, homozygosity mapping, and whole exome sequencing (WES).

Results: Nine recurrent and one previously unreported mutation was identified in the current cohort of nine families and three trios cases. The variant p.Ser464Pro was not found in any of online databases such as genomAD, ClinVar, and dbSNP, and was predicted to be deleterious by all the pathogenicity predicting tools. Six known missense mutations [p.Arg444Gln, p.Arg368His, p.Arg390His, p.Arg390Ser, p.Gly61Glu, and p.Arg469Trp], two frameshift mutations [p.Arg290Profs*37, and p.Pro442Glufs15*], and one hypomorphic allele [p.Glu229Lys] segregated with the disease phenotype in the respective families. In a trios family (PCGT02) compound heterozygous mutations p.Arg368His, and p.Arg390His were identified. Furthermore, In PCG02, a plausible 2Mb novel locus was identified on chromosome 7q34 (139,681,371-141,507,822) (GRCh38/hg38).

Conclusions: The current study expands the mutation spectrum of the CYP1B1 in Pakistani population with the identification of previously unreported mutation p.Ser464Pro. Additionally, the mapping of a 2MB novel locus mapped to chromosome 7 provides strong evidence of additional genetic contributors,

highlighting the genetic heterogeneity of the disease in Pakistani population.

Abstract No.: 203189

Panel No.: GLA-0352

Impact of Early Medication Discontinuation on Intraocular Pressure Outcomes Following Selective Laser Trabeculoplasty in Medicated Asian Patients

First Author: Ching Wen CHIU

Co-Author(s): Chia-an HSU, Yu-chieh KO

Purpose: Based on the hypothesis that a higher baseline intraocular pressure (IOP) is associated with better selective laser trabeculoplasty (SLT) outcomes, we investigated whether immediate medication reduction after SLT could improve IOP response in medicated primary open-angle glaucoma (POAG) patients.

Methods: This retrospective study enrolled medicated POAG patients who underwent SLT for additional IOP lowering at a medical center in Taiwan between 2023 and 2024. Patients were stratified by whether one glaucoma medication, typically the most effective one, was withdrawn immediately post-SLT. Primary outcomes were IOP changes, and secondary outcomes were predictors for an IOP reduction of $\geq 20\%$ over a 6-month follow-up period.

Results: A total of 178 eyes (mean baseline IOP 17.4 ± 4.82 mmHg) were analyzed. The mean IOP was significantly reduced by 13% at 7 days, 4.8% at 12 weeks, and 2.7% at 24 weeks. Patients with immediate medication discontinuation (n=76) showed similar IOP outcomes compared to those who continued prior medications (n=97). Predictors for better mid-term IOP control were a higher baseline IOP and a significant IOP drop at day 7, with an area under the receiver operating characteristic curve (AUC) of 0.903 and 0.809 for 12-week and 24-week outcomes, respectively.

Conclusions: Early withdrawal of medication after SLT is an effective approach to maximize the benefits of SLT, achieving additional IOP reduction while lowering the medication burden, with improvements evident as early as one week after treatment.

Abstract No.: 201609

Panel No.: GLA-0331

Impact of Sleep Apnea Syndrome on Lipid Oxidation in Patients With Glaucoma

First Author: Takahiro OHSHIMA

Co-Author(s): Noriko HIMORI, Shunji KATO, Kiyotaka NAKAGAWA, Toru NAKAZAWA, Yurika OTOKI

Purpose: Sleep apnea syndrome (SAS) has been reported to be associated with glaucoma, but the mechanisms underlying this association remain unclear. This study aimed to clarify the impact of SAS-induced lipid oxidation in patients with glaucoma.

Methods: Forty-five patients with normal-tension glaucoma (33 with SAS, 12 without SAS) were enrolled. Serum samples were collected, and phospholipid hydroperoxides (PLOOHs) were quantified as a lipid peroxidation marker using liquid chromatography–tandem mass spectrometry. Statistical comparisons between groups with and without SAS were performed using the Mann–Whitney U test.

Results: PLOOHs were consistently detected in the serum of the glaucoma patients. The patients with SAS had significantly higher levels of PLOOHs associated with radical-mediated oxidation compared to glaucoma patients without SAS (198.5 ± 64.4 vs. 124.7 ± 42.6 , $p < 0.001$). In contrast, PLOOHs associated with singlet oxygen-mediated oxidation showed no significant difference (20.7 ± 6.5 vs. 21.5 ± 7.9 , $p = 0.747$). These findings indicate that glaucoma patients with SAS have an increased oxidative burden that acts via radical-mediated oxidation pathways.

Conclusions: Our analysis using PLOOHs as a biomarker revealed that oxidative stress is closely linked with glaucoma, particularly in glaucoma patients with SAS. This finding indicates that monitoring oxidative stress could offer valuable insights into the underlying mechanisms of glaucoma and emphasizes the need to account for SAS in clinical practice.

Abstract No.: 205228
Panel No.: GLA-0381

Injectable Hyaluronic Acid Hydrogel for Sustained Pirenzepine Release Enhances Neuroprotection in Optic Nerve Crush Injury

First Author: Xuehan LIU

Co-Author(s): Yiqing LI, Jiahui TANG

Purpose: Glaucoma causes significant impairment of visual function, but the efficacy of current drug therapies remains limited. Sustained-release ophthalmic formulations offer the potential to enhance drug retention, decrease dosing frequency, and improve patient compliance. Hydrogels represent a class of materials with considerable versatility for ophthalmic applications. To investigate whether injectable intravitreal hydrogels can enhance the drug therapy in optic nerve crush (ONC) by sustaining drug release.

Methods: Pirenzepine, an M1 mAChR antagonist, was delivered via single/multiple intravitreal injections or encapsulated in an HA-based hydrogel. Retinal ganglion cell (RGC) survival was then quantified by immunofluorescence. Axon regeneration was assessed by manually counting CTB-labeled axons at specific distances in the whole-mount optic nerve.

Results: Pirenzepine enhanced both RGC survival and stimulated intense axonal regeneration compared to control in an optimal concentration of 100 μ M. Furthermore, injecting pirenzepine immediately after

injury and again 3 d later, was more effective than a single early injection to augment axon regeneration. Drug-loaded hydrogels demonstrated equivalent efficacy to repeated pirenzepine administration in promoting RGC survival and exceeded the protective effect of single-dose therapy.

Conclusions: Our findings demonstrate that the HA-A/HA-SH hydrogel is injectable, biocompatible, and enhances pirenzepine therapy in ONC by sustaining drug release. This approach represents a promising strategy for improving the therapeutic index of glaucoma medications by potentially reducing side effects associated with frequent dosing.

Abstract No.: 207242
Panel No.: GLA-0432

Injectable vs. Sponge Mitomycin C in Trabeculectomy: A Retrospective Comparative Study

First Author: Shalini SHALINI

Co-Author(s): Salwa KAIDAKATH, Meena MENON, Niharika PRASAD

Purpose: To compare the efficacy and safety of intraoperative subconjunctival injectable mitomycin C (MMC) versus sponge-applied MMC during trabeculectomy.

Methods: Retrospective analysis of patients who underwent trabeculectomy with injectable MMC ($n=58$) and sponge-applied MMC ($n=61$) with the concentration of 0.4mg/ml of MMC solution. The primary outcomes measured were intraocular pressure (IOP) and the number of anti-glaucoma medications (AGM) at various time points, including pre-operatively and post-operatively.

Results: Both the injectable and sponge-based groups showed a significant reduction in mean IOP from pre-operative levels over a six-month follow-up period ($p=0.001$ for both groups). The mean pre-operative IOP of the injectable group was 20.78mmhg (SD 9.35), which decreased to 12.62mmhg (SD 4.95) at 6 months. The sponge-based group's mean pre-operative IOP was 26.00 (SD 8.97), which reduced to 14.49mmhg (SD 6.26) at 6 months. There was no significant difference in the trend of IOP change over time between the two groups ($p=0.055$). Both groups demonstrated a significant decrease in the mean number of AGMs post-operatively ($p=0.001$ for both). Bleb morphology was studied by comparing each component, which did not show any statistically significant difference. While postoperative suturolysis was done in 13.6% patients in the sponge group and 3.5% patients in the injectable group, this was not statistically significant.

Conclusions: Injectable MMC is as effective as the conventional sponge-based application in reducing IOP. The injectable method of administering MMC offers a safe and equally effective alternative to the

traditional sponge application in trabeculectomy, with a comparable safety profile.

Abstract No.: 206270

Panel No.: GLA-0417

Innovative Use of Ahmed ClearPath in ICE Syndrome–Related Glaucoma with Sulcus Tube Placement: A Case Report

First Author: Rida AZEEM

Co-Author(s): Afshan ALI, Muhammad Kaunain Razzak GOGHARI, Umair QIDWAI

Purpose: To report a unique case of secondary glaucoma due to iridocorneal endothelial (ICE) syndrome managed successfully with the Ahmed ClearPath (ACP) glaucoma drainage device, highlighting the novel use of sulcus tube placement via combined cataract surgery.

Methods: A 30-year-old woman presented with acute onset of right eye pain and vision loss. Examination revealed intraocular pressure (IOP) of 50 mmHg, corneal edema, iris nodules, corectopia, and pseudopolycoria—findings suggestive of the Cogan-Reese variant of ICE syndrome. Initial medical therapy provided transient relief. Despite maximal medical treatment, IOP remained uncontrolled at 42 mmHg.

Results: The patient underwent combined clear lens extraction and implantation of an ACP device with sulcus tube placement. The rationale for cataract extraction was to avoid anterior chamber tube placement, which in ICE syndrome carries a higher risk of endothelial decompensation due to shallow chamber and abnormal anatomy. Postoperatively, IOP decreased to 28 mmHg at 1 month and stabilized at 18 mmHg at 3 months, with improved visual acuity to 6/6. No intraoperative or postoperative complications occurred.

Conclusions: This is one of the first reported cases outside the United States using Ahmed ClearPath in ICE-related glaucoma. The case demonstrates successful short-term IOP control using ACP in a challenging ICE morphology, highlighting the importance of early surgical intervention and tube placement strategy. Given the high failure rate of trabeculectomy and the progressive angle closure in ICE syndrome, the ACP provides a promising alternative. More studies are needed to evaluate long-term efficacy of ACP in ICE and other secondary glaucoma.

Abstract No.: 207173

Panel No.: GLA-0431

Inter-Grader Reliability of Portable Diagnostic Devices for Monitoring Stable Glaucoma

First Author: Lynn QUEK

Co-Author(s): Maria Cecilia Domingo AQUINO, Victor KOH, Jun Ying LEE, Weihan TONG

Purpose: To determine the inter-grader reliability of ophthalmologists of varying experience in interpreting results from portable diagnostic devices for assessing disease stability and treatment requirements in patients with stable glaucoma.

Methods: A prospective pilot study was conducted at a Singapore tertiary ophthalmology outpatient clinic, where patients with stable glaucoma, ranging from mild to severe, were recruited for monitoring. Visual acuity, visual field, and intraocular pressure were assessed using portable devices. The device results were independently reviewed by two ophthalmologists: a general ophthalmologist (undergoing first year of glaucoma fellowship) and a senior ophthalmologist (>10 years after fellowship training). Each grader classified disease status as stable or unstable and indicated whether medication changes were required. Inter-grader agreement was calculated, with subgroup analyses by disease severity.

Results: Seventy patients were enrolled (mean age 67.8 ± 8.1 years; 23 mild, 24 moderate, 23 severe glaucoma). For disease stability classification, overall inter-grader agreement was 74.3% (95% CI, 63.0–83.1%). By severity, concordance was highest in mild cases at 82.6% (95% CI, 67.1–98.1%), compared with 70.8% (95% CI, 52.6–89.0%) in moderate and 69.6% (95% CI, 50.8–88.4%) in severe disease. For medication change decisions, overall agreement was 80.0% (95% CI, 69.2–87.7%). Subgroup analyses showed concordance of 78.3% (95% CI, 58.1–90.3%) in mild, 83.3% (95% CI, 64.1–93.3%) in moderate, and 78.3% (95% CI, 58.1–90.3%) in severe glaucoma.

Conclusions: In this pilot study, glaucoma-trained ophthalmologists demonstrated promising inter-grader reliability in assessing disease stability and treatment needs using portable diagnostic devices, supporting the utility of portable devices for reliable monitoring of stable glaucoma in outpatient settings.

Abstract No.: 205926

Panel No.: GLA-0402

Intermediate Outcome of Preserflo MicroShunt in the Treatment of Open Angle Glaucoma in a Chinese Population – a Retrospective Interventional Study

First Author: Anthony Chuk-him LAI

Co-Author(s): Poemen Pui Man CHAN

Purpose: To evaluate the safety and efficacy of Preserflo MicroShunt in the management of open-angle glaucoma in a Chinese population.

Methods: Records of consecutive glaucoma patients with MicroShunt implantation at Hong Kong Eye Hospital from May 2023 to May 2024 were retrospectively reviewed. Patients of Chinese ethnicity with open-angle glaucoma were recruited. The MicroShunt was implanted in an ab externo fashion over the superotemporal or superonasal quadrant as a standalone procedure or combined with phacoemulsification, augmented with adjunctive mitomycin C (0.4mg/ml).

Results: Twenty-seven eyes of 26 patients were implanted with the MicroShunt, of which 22 cases (81.5%) were done as a standalone procedure, and 5 cases (18.5%) were combined with phacoemulsification. The mean follow-up period was 18.89 ± 5.81 months. The mean intraocular pressure (IOP) decreased from 22.33 ± 6.73 mmHg preoperatively to 16.11 ± 5.38 mmHg at the final follow-up ($p < 0.001$, paired t-test). The mean number of medications decreased from 3.93 ± 1.04 preoperatively to 1.48 ± 1.60 at the final follow-up ($p < 0.001$, paired t-test). There were no significant intraoperative complications noted. For post-operative interventions, 10 cases (37.0%) required needling, 5 cases (18.5%) required bleb revision, and 3 cases (11.1%) eventually required trabeculectomy.

Conclusions: Preserflo MicroShunt is a safe and effective treatment of open angle glaucoma in the Chinese population.

Abstract No.: 200515

Panel No.: GLA-0314

Investigating Developmental Glaucoma in a Series of Clinical Cases

First Author: Vandana ARORA

Purpose: Developmental glaucomas are a group of disorders characterized by improper development of the eye's aqueous outflow system, typically manifesting in infancy or childhood. They include primary congenital glaucoma and secondary glaucomas associated with ocular or systemic developmental anomalies. This case series aims to highlight the importance of recognizing adolescent presentations of developmental glaucoma and initiating timely diagnosis and management.

Methods: Three adolescent patients with elevated intraocular pressure (IOP) were evaluated for developmental glaucoma. A detailed systemic and family history was obtained. Ocular examination included IOP measurement using Goldmann applanation tonometry, central corneal thickness assessment, gonioscopy, specular microscopy, and fundus examination. Each case was assessed for associated ocular or systemic developmental anomalies.

Results: Case 1 was 18-year-old female with right eye posterior embryotoxon, peripheral anterior synechiae, and 0.7 cup-disc ratio, along with dento-facial anomalies and positive family history—diagnosed as Axenfeld-Rieger syndrome. Case 2, 18-year-old male, had corneal decompensation, flat iris insertion, IOP of 30 mmHg, 0.6 cup-disc ratio, and high polymegathism—diagnosed as Chandler syndrome. Case 3 16-year-old female, showed Haab's striae, megalocornea, anterior iris insertion, and corneal scarring diagnosed as mesodermal dysgenesis. Cases 1 and 2 underwent successful antiglaucoma surgery; Case 3 was managed medically.

Conclusions: Adolescent presentations of developmental glaucoma are uncommon but clinically significant. Accurate and early diagnosis, guided by characteristic ocular and systemic findings, is crucial for prompt intervention. Tailored management strategies—surgical or medical can help preserve vision and reduce long-term morbidity in such cases.

Abstract No.: 205812

Panel No.: GLA-0399

Investigation of 4E-BP1 as a Crucial Regulator of Collagen Synthesis in Human Trabecular Meshwork Fibrosis

First Author: Zuimeng LIU

Co-Author(s): Pin WANG, Binrong WU, Shaodan ZHANG

Purpose: This study aims to investigate the role of 4E-BP1 as a pivotal regulator of collagen synthesis in trabecular meshwork (TM) fibrosis and assess the efficacy of interventions targeting 4E-BP1 in this process.

Methods: Firstly, human trabecular meshwork cell (HTMC) injury models were utilized to induce dexamethasone (DEX), TGF- β 1, and oxidative damage (H₂O₂). The expressions of extracellular matrix (ECM) and fibrosis-related proteins such as fibronectin, α -SMA, and collagen I, alongside factors associated with the mTORC1 and mTORC2 pathways, namely 4E-BP1 and eIF4E, were assessed through immunofluorescence (IF) and Western Blot (WB) analysis. Secondly, various inhibitors of the 4E-BP1 pathway (such as AZD8055, CZ415, TORIN1, and Rapamycin), along with small interfering RNA (siRNA), were employed to investigate the significant involvement of 4E-BP1 in the development of TM fibrosis. Finally, the impact

of inhibitors targeting the phosphorylation of 4E-BP1 on TM fibrosis in DEX-induced mouse models with elevated intraocular pressure (IOP) was assessed, along with their efficacy in reducing IOP.

Results: Indicated a notable increase in the expression and phosphorylation of 4E-BP1 during TM fibrosis induced by various stressors. Inhibitors of 4E-BP1 phosphorylation demonstrated notable anti-fibrotic effects on diverse models of TM fibrosis. In Vivo, these inhibitors effectively mitigated DEX-induced TM fibrosis in mice and led to a significant reduction in IOP.

Conclusions: 4E-BP1 emerges as a pivotal regulator of TM fibrosis, and its inhibition represents a promising therapeutic strategy for managing glaucoma.

Abstract No.: 202188

Panel No.: GLA-0338

Investigation on the Current Status of Basic Knowledge About Glaucoma Among Primary-Level Ophthalmologists

First Author: Yuanyuan **ZHANG**

Co-Author(s): Ping **GE**, Yuan **HE**, Yan **LIU**, Qingqing **MU**

Purpose: As the leading irreversible blinding eye disease worldwide, early screening and intervention for glaucoma are critical to reducing vision loss. Primary-level ophthalmologists' limited knowledge, poor screening capacity, and scarce resources cause high misdiagnosis/missed diagnosis. This study evaluated their glaucoma knowledge in Shaanxi, explored cognitive factors, and provided evidence for improving primary ophthalmic care.

Methods: Cross-sectional survey with cluster random sampling of primary/secondary hospital ophthalmologists in Shaanxi. A validated questionnaire (KMO=0.837, Cronbach's $\alpha > 0.7$) covered 4 dimensions. 299 valid online responses were analyzed via SPSS 25.0.

Results: This study assessed glaucoma knowledge of primary ophthalmologists in Shaanxi, analyzing proficiency and cognitive differences. Among participants, secondary hospital doctors were the most (65.66%), tertiary next (24.49%), primary least (7.58%); 49.24% had >16 years of experience. Tertiary hospitals had advanced equipment, primary (especially private clinics) lacked it. Tertiary scored highest (32.94 ± 3.21), secondary lowest (31.76 ± 3.45).

Conclusions: Shaanxi's primary ophthalmologists have basic glaucoma knowledge but gaps in advanced diagnostic techniques. Continuing education and optimized equipment allocation are needed to enhance competence and reduce glaucoma-related blindness.

Abstract No.: 205279

Panel No.: GLA-0379

Large-Scale Multi-Trait GWAS and Retinal Flavoprotein Autofluorescence Imaging Implicate Mitochondrial Quality Control and Function in Glaucoma

First Author: Shisong **RONG**

Co-Author(s): Shihao **CHEN**, Chenfeng **GU**, Zhanhao **GU**, Qiuruo **JIANG**, Junfeng **LI**

Purpose: To test whether mitochondrial quality control and function contribute to glaucoma and related traits.

Methods: We performed multi-trait genome-wide association study (MTAG) analyses by integrating genetically correlated datasets from the UK Biobank, FinnGen, the GWAS Catalog, and curated literature. Findings were benchmarked against a meta-analysis of primary open-angle glaucoma (POAG; ~383,500 individuals). Within MTAG, gene-level associations for regulators of mitochondrial fission, fusion, and mitophagy were evaluated using MAGMA. To complement genomic analyses, we conducted retinal mitochondrial functional imaging in a hospital-based myopic cohort without retinal degenerations ($n = 446$; 892 eyes). Mitochondrial redox status was quantified by flavoprotein autofluorescence (FPF) assessed by OcuMet Beacon. Cup-to-disc ratio (CDR) was recorded, and its association with FPF tested using linear mixed-effects models with comprehensive covariate adjustment.

Results: Of 11 POAG-related GWAS datasets, four genetically correlated datasets were included in MTAG, yielding an effective sample size of ~560,000. MTAG results showed strong concordance with established POAG loci ($P < 0.05$; $R^2 > 0.95$). Among 30 mitochondrial dynamics genes, MFF and DNMT1L were significantly associated with POAG ($P < 0.005$), while fusion and mitophagy genes were not ($P > 0.05$). In the imaging cohort (mean age 25.8 ± 7.2 years), mean FPF was 17.8 ± 4.7 and mean CDR was 0.36 ± 0.11 . Larger CDR correlated with higher FPF at the optic disc ($P < 0.05$) but not at the macula ($P > 0.05$).

Conclusions: Genomic and imaging evidence supports a role for mitochondrial quality control and function—particularly fission pathways—in POAG. These findings nominate mitochondrial dynamics genes as potential targets for mechanistic studies and biomarker development in glaucoma.

Abstract No.: 204294

Panel No.: GLA-0367

Late-Detected Primary Congenital Glaucoma: Decision-Making and Salvage Therapy in a 7-Month-Old

First Author: Alma Pustika Kartikananda Retina

FIBULARIS

Co-Author(s): Evelyn KOMARATIH, Rozalina LOEBIS

Purpose: Primary congenital glaucoma (PCG), a rare disease occurring in 1:10,000-20,000 births with classic triads (photophobia, epiphora, and blepharospasm), presents diagnostic challenges leading to misdiagnosis and potentially irreversible damage.

Methods: A 7-month-old boy was referred to the General Hospital for the left eye enlargement and haziness for 6 months, with excessive tearing starting at 2 weeks old. Despite treatment from four ophthalmologists, his condition worsened. Visual acuity (VA) was 1.8 LogMAR in the right eye (RE) and no light perception in the left eye (LE). Examination revealed LE buphthalmos, megalocornea, and corneal edema, leading to a diagnosis of primary congenital glaucoma (PCG). Initial examination under anesthesia (EUA) showed LE intraocular pressure (IOP) of 50.4 mmHg and RE 17.3 mmHg. Due to the opaque cornea, cyclocryotherapy was performed on LE. Subsequent EUAs indicated fluctuating IOPs, necessitating further cyclocryotherapy with the last LE IOP 25.8 mmHg. Timolol was prescribed for both eyes and eyeglasses, improving VA in the RE to 0.3 LogMAR and enhancing cognitive and motor functions.

Results: Ophthalmologists must understand the PCG diagnosis algorithm to effectively diagnose, refer, and treat patients for better vision prognosis. Although angle surgery is the gold standard, cyclodestructive surgery can be used as a last resort. Early collaboration with pediatricians is essential to optimizing growth and development.

Conclusions: Accurate diagnosis is essential for early PCG management to prevent blindness. While proper treatment in delayed cases can optimize outcomes, as timely salvage surgery can preserve severely advanced cases with no light perception and enhance neuro-developmental milestones.

Abstract No.: 206356

Panel No.: GLA-0416

Lens or Barrier? Investigating the Paradox of Iris-Claw Lens-Induced Pupillary Block

First Author: Kemala OCTARINY

Co-Author(s): Elsa GUSTIANTY, R.Maula RIFADA, Indriyani RIFANDI, Sonie UMBARA

Purpose: To report the management of pupillary block following retropupillary iris-claw IOL implantation, highlighting the importance of early detection and

appropriate treatment when laser peripheral iridotomy (LPI) is insufficient.

Methods: A 62-year-old woman complained of ocular pain in the right eye for 1 month, which worsened 1 week ago. Symptoms included blurred vision, redness, and nausea. Visual acuity was hand movement, and intraocular pressure (IOP) was 56 mmHg. Examination revealed blepharospasm, ciliary injection, corneal edema, a shallow anterior chamber, a mid-dilated pupil with iris-claw enclavation at 5 and 11 o'clock, and a retropupillary iris-claw IOL. Posterior segment findings included a round optic disc, cup-to-disc ratio of 0.8-0.9 with optic disk cupping, and a flat retina. Anterior-segment OCT showed iris apposition with the corneoscleral wall, and ultrasound biomicroscopy revealed the dome-shaped optic of the IOL facing anteriorly. The patient was treated with ocular hypotensive agents and underwent trabeculectomy due to inadequate LPI.

Results: Following trabeculectomy, ocular pain resolved, corneal clarity improved, and the anterior chamber deepened with a functioning bleb. The IOP decreased to 21 mmHg and remained stable over a 3-month follow-up period.

Conclusions: Pupillary block after retropupillary iris-claw IOL implantation is a rare but serious complication. An iris-claw lens can paradoxically act as a barrier, obstructing aqueous humor flow and disrupting normal anterior chamber dynamics. Trabeculectomy may be needed when LPI is insufficient.

Abstract No.: 201245

Panel No.: GLA-0322

Long-Term Efficacy of Combined Phacoemulsification and Hydrus Microstent in Open-Angle Glaucoma Versus Combined-Mechanism/Primary Angle Closure Glaucoma

First Author: Kelly NGUYEN

Co-Author(s): Sunee CHANSANGPETCH, Andrew IWACH, Shan LIN, Eden NG, Ngoc NGUYEN, Sunita RADHAKRISHNAN

Purpose: Compare efficacy of combined Hydrus-cataract surgery in open angle glaucoma (OAG) to combined mechanism glaucoma (CMG) and primary angle closure glaucoma (PACG) over 36 months.

Methods: Retrospective review of OAG, CMG, or PACG eyes which underwent combined Hydrus-cataract surgery between Jul 2020-Dec 2021. Regression models were used to evaluate IOP, medication use, success rate (IOP $\leq$ 18 mmHg without medication) and proportion of medication-free eyes.

Results: CMG/PACG (n=39) group had significantly higher IOP reduction from baseline to 36-months than OAG (n=34) group (OAG, 15.03 $\pm$ 2.90 to 13.44 $\pm$ 3.85 mmHg, p=0.016; CMG/PACG, 15.62 $\pm$ 3.10 to 13.21 $\pm$ 2.61 mmHg, p=0.002) (p=0.021). Number of medications

was significantly reduced similarly in both groups (OAG, 2.44 ± 1.33 to 1.18 ± 1.40 , $p < 0.001$; CMG/PACG, 2.29 ± 1.27 to 0.87 ± 1.08 , $p < 0.001$) ($p = 0.882$). CMG/PACG had higher success rate (49% vs 29%) and more medication-free eyes (49% vs 35%) than OAG but these were not statistically significant ($p = 0.09$ and 0.25 , respectively).

Conclusions: This retrospective study supports long-term efficacy of combined Hydrus-cataract surgery for CMG/PACG and OAG.

Abstract No.: 201952

Panel No.: GLA-0336

Machine Learning With Aptamer-Based Plasma Proteomics for Detecting Oxidative-Stress-Linked Glaucoma

First Author: Takahiro **NINOMIYA**

Co-Author(s): Noriko **HIMORI**, Toru **NAKAZAWA**, Kota **SATO**, Airi **TAKAGI**, Satoru **TSUDA**

Purpose: To detect glaucoma that has progressed under the influence of oxidative stress using machine learning with aptamer-based plasma proteomics.

Methods: We analyzed 162 participants with primary open-angle glaucoma (POAG) (age 66.9 ± 6.8 years; visual-field mean deviation [MD] -13.1 ± 7.7 dB); one eye per participant was included (worse MD). Targets were defined by an and rule: visual-field damage (MD threshold as proxy for progression) and high derivatives of reactive oxygen metabolites (d-ROMs). We first trained a model at clinical cutoffs ($MD \leq -12$ dB; d-ROMs > 400 U.CARR), then scanned nearby thresholds (MD -14 to -12 ; d-ROMs 400-440) using five-fold out-of-fold logistic regression with elastic net feature selection ($k=166$) from 7,596 plasma protein measurements obtained with an aptamer-based platform (SomaScan). Final models (logistic, XGBoost, CatBoost) were compared by out-of-fold area under the receiver operating characteristic curve (AUC). Interpretation used Shapley additive explanations (SHAP).

Results: Clinical cutoffs yielded limited discrimination (logistic AUC 0.47; XGBoost 0.53). Including plausible pairs near the clinical range (MD -13.4 dB; d-ROMs 430) improved logistic AUC to 0.74. With these labels, XGBoost performed best (AUC 0.784), exceeding elastic net logistic (AUC 0.729-0.732). SHAP highlighted S100A8/A9 (calprotectin), Kelch-like protein 2, and thrombospondin-1, associated with oxidative stress biology.

Conclusions: Machine learning with aptamer-based proteomics improved detection when thresholds were adjusted near clinical cutoffs. These findings support oxidative stress involvement in glaucoma and highlight proteomics' potential for stratifying cases influenced by oxidative stress, warranting validation.

Abstract No.: 208380

Panel No.: GLA-0435

Macular Vascular Responses to Hyperoxia in Primary Open-angle Glaucoma: An Optical Coherence Tomography Angiography Study

First Author: Xintong **FAN**

Co-Author(s): Xiangmei **KONG**

Purpose: To explore macular vasoreactivity to hyperoxia in primary open-angle glaucoma (POAG) with optical coherence tomography angiography (OCTA).

Methods: With a prospective study design, we enrolled 45 patients (45 eyes) with POAG and 19 sex- and age-matched healthy controls (19 eyes). Macular vessel density (VD) was measured in the superficial capillary plexus (SCP) and deep capillary plexus (DCP) among all participants using OCTA before and after breathing 80% oxygen. The VD reduction, including absolute difference (value of baseline minus hyperoxia) and relative difference (the ratio between absolute difference and baseline value), was calculated and compared between the two groups. The factors influencing macular vasoreactivity were determined. Systemic blood flow characteristics before and after hyperoxia were also detected.

Results: Systemic hyperoxia significantly decreased macular SCP and DCP VD in healthy controls ($P < .001$, $P = .008$, respectively) and POAG patients (all $P < .001$). The VD reduction (between baseline and hyperoxia) was similar between the SCP and DCP in healthy controls ($P = .55$); however, in POAG patients, it was significantly lower in the SCP than in the DCP ($P = .007$). The VD changes in the SCP and DCP were significantly positively correlated with baseline VD in POAG patients (all $P < .001$), but there was no correlation in healthy subjects ($P = .50$, $P = .42$, respectively).

Conclusions: Macular microcirculation reacts to hyperoxia through decreasing SCP and DCP perfusion in healthy and POAG subjects. However, this vascular autoregulation was altered in POAG patients and was associated with baseline macular perfusion.

Abstract No.: 205564

Panel No.: GLA-0396

Managing Glaucoma With iStents as a Cataract and Refractive Surgeon in Australia

First Author: Kenneth **OOI**

Co-Author(s): Natasha **GOH**

Purpose: To measure the effectiveness of iStent inject W as a standalone (SA) procedure and combined with phacoemulsification (combined) as management of open-angle glaucoma (OAG) over 24 months (M24).

Methods: A longitudinal assessment was performed in patients with OAG implanted with iStent inject W as SA or combined from a private ophthalmology practice in Sydney. The primary endpoints were the changes

in mean intraocular pressure (IOP) and the number of glaucoma medications over time. Other endpoints included changes in the proportion of medication-free eyes, and average mean deviation (MD) and logMAR postoperatively at M24.

Results: Fifteen eyes from 11 patients and 15 eyes from 10 patients were analysed from the SA and combined groups respectively. The mean preoperative IOP was 14.7 ± 4.4 mmHg and 13.9 ± 4.5 mmHg for the SA and combined groups, respectively. The mean number of glaucoma medications preoperatively was 1.5 ± 0.7 for the SA group and 2.1 ± 1.1 for the combined group. At M24, the reductions in mean IOP were 2.1 mmHg (95%CI: -4.2, -0.1) for the SA group and 3.3 mmHg (95%CI: -6.0, -0.6) for the combined group. In terms of the mean number of glaucoma medications, the SA group exhibited reductions of 0.8 (95%CI: -1.7, 0.1), whereas the combined group had reductions of 2.7 (95%CI: -4.6, -0.8). 40% of SA eyes and 54% of combined eyes became medication-free postoperatively. No statistically significant improvement was observed in mean MD in both groups postoperatively. Mean logMAR values were improved in the combined group only.

Conclusions: iStent inject W, whether SA or combined, is a suitable surgical intervention in managing OAG and reducing medication burden.

Abstract No.: 206094

Panel No.: GLA-0411

Mid-term Outcomes of Trabeculectomy and Predictors of Surgical Success

First Author: Clarice SU

Co-Author(s): Thomas LAM, Audrey TANG

Purpose: To evaluate the two-year outcome and identify predictors of success for primary trabeculectomy in a heterogeneous glaucoma population at a tertiary referral center in Hong Kong

Methods: A retrospective chart review of 63 consecutive primary trabeculectomy cases was performed. The primary outcome measures were intraocular pressure (IOP), number of glaucoma medications, and surgical success, defined as complete (IOP ≤ 15 mmHg without medication) or qualified (IOP 15-18 mmHg on ≤ 3 medications).

Results: The cohort included diagnoses of primary open-angle glaucoma (57.1%), uveitic glaucoma (19.0%), and primary angle-closure glaucoma (9.5%). Trabeculectomy demonstrated significant efficacy, reducing mean IOP from 23.8 ± 6.7 mmHg preoperatively to 14.1 ± 3.8 mmHg at one year and 15.6 ± 6.1 mmHg at two years ($p < 0.003$). The mean number of medications was reduced from 4.0 to 0.7 at one and two years. The proportion of complete and qualified success was 81% at final follow-up. Five cases (7.9%) required further glaucoma surgery, including

cyclophotocoagulation, re-trabeculectomy and Paul glaucoma implant. In multilevel mixed-model logistic regression analysis, adjusting for inter-eye correlation, placement of the trabeculectomy in the superonasal quadrant (as opposed to the superior quadrant) was a significant predictor of surgical success ((odds ratio [OR], 4.26; 95% confidence interval [CI], 1.31-13.81). Other preoperative, intraoperative, and postoperative factors, including surgeon experience were not significant.

Conclusions: Trabeculectomy provides excellent IOP control and a high success rate in a complex, tertiary-level population. A potential novel finding is that the superonasal surgical location is a key predictor of surgical success, suggesting it may be a superior approach to the traditional superior location.

Abstract No.: 206538

Panel No.: GLA-0419

Midterm Outcomes of Phacotrabeculectomy Augmented With Mitomycin C in Patients With Advanced Glaucoma With Split Fixations

First Author: Shivam GUPTA

Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV, Madhavi PILLAI

Purpose: To assess the surgical outcomes of phacotrabeculectomy in patients with advanced glaucoma with split fixations over 24 months.

Methods: This prospective observational study included patients with advanced glaucoma having split fixation undergoing combined phacoemulsification with Trabeculectomy. All patients were evaluated on postoperative days one, on day 15, one month, 3 months, 6 months, 12 months, and 24 months postoperatively. Baseline and follow-up visits were compared to assess significant differences in intraocular pressure (IOP), the number of antiglaucoma medications (AGM), and best-corrected visual acuity (BCVA). Other outcome measures included surgical success, complications, and interventions.

Results: 79 patients with advanced glaucoma were included. Mean IOP (mmHg) reduced from preoperative 19.59 ± 5.8 to 14.43 ± 5.8 ($p < 0.001$) at the end of 2 weeks and 14.04 ± 4.8 , 12.99 ± 4.8 , 12.35 ± 3.6 , 12.57 ± 4.2 , and 12.63 ± 4.3 at the end of one, 3, 6 months, 1 and 2 years ($p < 0.001$). The mean preoperative AGM was 1.76, which was reduced to 0.11 at 6 months and 0.22 at 2 years. Preoperatively, the BCVA was 0.60 log MAR (0.30 to 0.78), which improved to log MAR 0.18 (0 to 0.18) at 1 and 0 (0 to 0.18) 2 years postoperatively. BCVA at the third month and sixth month showed zero patients with a decline in visual acuity of ≤ 3 lines from pre-op vision. Most patients retained the same BCVA or experienced an improvement of 1 or more lines. No patients experienced the wipe-out phenomenon. Complete success was 70.9% and 64.6% using criteria

1 (IOP ≤ 18 mmHg and >5 mmHg or 30% reduction from baseline without AGM) and criteria 2 (IOP ≤ 15 mmHg and >5 mmHg or 40% reduction from baseline without AGM). Bleb needling was needed in 5 patients and 4 patients developed choroidal detachment, which resolved with conservative management.

Conclusions: Trabeculectomy has a beneficial effect in patients with severely compromised visual fields and intractable IOP. Sudden unexplained postoperative loss of vision in patients with end-stage glaucoma undergoing filtering surgery is, at most, a rare complication.

Abstract No.: 203239

Panel No.: GLA-0353

Misdiagnosed Glaucoma Revealing a Suprasellar Meningioma Causing Compressive Optic Neuropathy

First Author: Tumenjargal **ERDENEBAATAR**

Co-Author(s): Sanjaadorj **GANSUKH**, Bayasgalan **PUREVDORI**

Purpose: To highlight the importance of differentiating glaucoma from compressive optic neuropathies by presenting a case of suprasellar meningioma initially misdiagnosed as glaucoma, emphasizing the role of neuro-ophthalmological evaluation in preventing delayed diagnosis and irreversible vision loss.

Methods: The patient underwent a comprehensive ophthalmic and neuro-ophthalmic evaluation, which included best-corrected visual acuity testing, slit-lamp examination, fundus evaluation, optical coherence tomography for structural assessment, and automated perimetry for functional analysis of the visual field. Standard laboratory investigations were performed to exclude endocrine dysfunction. Magnetic resonance imaging of the brain and orbits with contrast was subsequently conducted to identify possible compressive lesions affecting the optic pathways.

Results: Topical antiglaucoma therapy was discontinued. The patient was referred to neurosurgery, where the tumor was surgically resected. Histopathology confirmed a WHO grade I meningothelial meningioma. Postoperative recovery was uneventful. At one month and four months post-surgery, the patient's visual acuity improved to 6/6 bilaterally, with restoration of color vision and resolution of headaches. Follow-up visual field testing showed marked reduction of bitemporal defects.

Conclusions: Suprasellar meningiomas can masquerade as glaucoma in their early stages. This case emphasizes the importance of comprehensive evaluation for atypical glaucoma presentations. Early recognition and surgical management can lead to significant visual recovery and improved quality of life.

Abstract No.: 200761

Panel No.: GLA-0318

Mitochondria Transplantation Reduces Intraocular Pressure by Improving Mitochondrial Function and Remodeling Trabecular Meshwork

First Author: Xiaoling **WANG**

Co-Author(s): Yuanbo **LIANG**

Purpose: Mitochondria transplantation represents a promising therapeutic strategy for diseases characterized by mitochondrial dysfunction. Primary open-angle glaucoma (POAG) is characterized by trabecular meshwork's (TM) mitochondrial dysfunction, where mitochondrial impairment drives sustained intraocular pressure (IOP) elevation. Here, we describe a novel, effective approach that direct mitochondria transplantation to replenish mitochondrial quantity in TM cells.

Methods: Our study employed a comprehensive approach to investigate mitochondrial transplantation therapy, beginning with the isolation and characterization of healthy mitochondria from mouse liver. At the cellular level, we established an oxidative stress-induced trabecular meshwork (TM) cell injury model using H₂O₂, followed by therapeutic intervention with exogenous mitochondria. The treatment efficacy was systematically validated through confocal microscopy (mitochondrial uptake), flow cytometry (quantification), MTT (viability), ROS detection, and ATP measurement, complemented by mechanistic investigations via WB and proteomic analyses. These cellular findings were further confirmed in 3D TM cell cultures. In vivo, we developed a dexamethasone-induced ocular hypertensive mouse model and administered mitochondrial therapy via anterior chamber injection, subsequently evaluating therapeutic outcomes including intraocular pressure modulation, systemic safety (body weight), TM structural integrity, and mitochondrial functional recovery. This multi-level experimental design bridges fundamental mechanisms with translational potential in glaucoma treatment.

Results: This restoration included normalized cellular bioenergetics, attenuated oxidative stress, and enhanced TM cells viability. Consequently, mitochondria transplantation reinstated aqueous humor outflow capacity, remodeled TM tissues structure, and achieved IOP normalization. Mechanistically, supplemented mitochondria downregulated aberrantly elevated mitophagy-a key contributor to TM pathogenesis-thereby stabilizing cellular homeostasis.

Conclusions: Exogenous mitochondrial transplantation represents a potential therapeutic strategy for glaucoma

Abstract No.: 204469

Panel No.: GLA-0370

Morphology of Filtering Bleb After Ahmed Valve Glaucoma Surgery Using AS-OCT

First Author: Dinh Cang NGUYEN

Co-Author(s): Thi Thuy Tien PHAM, Thanh Nghiep TRANG

Purpose: To assess the morphology of filtering bleb after Ahmed valve glaucoma surgery using anterior segment optical coherence tomography (AS-OCT) and propose a classification system for bleb according to clinical and AS-OCT parameters.

Methods: A total of 48 patients who had received Ahmed valve implantation participated in this prospective study. Clinical morphology and AS-OCT parameters were measured post-operatively at 1 week, 1 month, 3 months and 6 months. The relationship between the bleb morphology and success of the surgery was evaluated. Success was defined as IOP < 21 mmHg with a maximum of 2 glaucoma medications.

Results: Photographic standards illustrating clinical bleb morphology characteristics were selected from the slit lamp images of blebs in the study. Bleb vascularity and color were significantly correlated with the hypertensive phase and surgery success ($p < 0.05$). Bleb analysis using AS-OCT revealed a significant reduction in bleb wall thickness and an increase in bleb wall reflectivity at 1 month, which was mostly associated with the hypertensive phase. There was a significant correlation between AS-OCT parameters (bleb wall thickness, bleb wall reflectivity, bleb height, microcyst) and surgery success ($p < 0.05$).

Conclusions: AS-OCT is an objective method for the assessment of bleb morphology. Clinical characteristics and AS-OCT parameters show potential as a tool to better understand, predict, and modify outcomes of Ahmed valve glaucoma surgery.

Abstract No.: 203758

Panel No.: GLA-0362

Ocular Surface Changes in Primary Open-Angle Glaucoma on Anti-Glaucoma Medications Versus Treatment-Naïve Patients

First Author: Kavita BHATNAGAR

Purpose: To evaluate the effect of anti-glaucoma medications on the ocular surface using conjunctival impression cytology, AS-OCT, and conjunctival and corneal staining.

Methods: Prospective cohort study of 75 eyes of newly diagnosed patients and 77 eyes of POAG patients on anti-glaucoma medications. The follow-up period was 1 year. At each visit, Schirmer's test, TBUT, conjunctival and corneal staining, AS-OCT, and impression cytology were done.

Results: Mean values of lissamine green & rose bengal staining in newly diagnosed POAG patients and patients on anti-glaucoma medications were 0.05 ± 0.0228 , 0.23 ± 0.424 , 0.59 ± 0.526 , and 0.77 ± 0.602 , respectively (p -value < 0.05). Patients on anti-glaucoma medications for > 5 years showed pleomorphic changes and decreased goblet cell density (p -value < 0.05). Values of TMH, TMD, and TMA on AS-OCT showed statistically significant changes in patients on anti-glaucoma medications. Patients on more than 3 drops showed statistically significant ocular surface changes.

Conclusions: Long-term anti-glaucoma medication causes significant damage to the ocular surface.

Abstract No.: 204444

Panel No.: GLA-0369

Ocular Surface Disease Management in Glaucoma Treatment

First Author: Dinh Cang NGUYEN

Co-Author(s): Thanh Nghiep TRANG

Purpose: To determine the pathophysiology of ocular surface inflammation (OSI) in glaucoma medical therapy and its effect on the treatment outcome. To propose new updates on the management of ocular surface disease (OSD) and innovation of glaucoma treatment.

Methods: We reviewed 3 clinical cases of glaucoma patients with OSD, which affects the treatment outcome. By that, we discussed pathophysiology on current literature of OSI caused by glaucoma medical therapy. The updates on management of OSD: preservative-free medications, OSI treatment were analysed.

Results: Case 1: A glaucoma patient with resolved OSD by switching from medical therapy to SLT treatment. Case 2: A patient with advanced glaucoma had improved ocular outcome by iStent implantation and preservative-free medication. Case 3: A patient with an Ahmed valve implantation had an overgrowth bleb resulting from severe OSI.

Conclusions: We proposed OSD to be a concurring diagnosis and monitoring factor of glaucoma. The inflammation affects the treatment outcome by reducing patient adherence, medication efficacy, and worsening post-operative wound healing. Preservative-free medication, MIGs, and addressing the underlying OSI were recommended recently by expert consensus.

Abstract No.: 205305**Panel No.: GLA-0384**

One-Year Outcomes of 5–0 Prolene Suture Gonioscopy-Assisted Transluminal Trabeculotomy in Juvenile Open-Angle Glaucoma

*First Author: Madhavi PILLAI**Co-Author(s): Shivam GUPTA, Devendra MAHESHWARI*

Purpose: To study the surgical outcomes of suture GATT in JOAG.

Methods: Prospective, non-randomised, interventional study. JOAG patients underwent GATT & followed up at 1 week, 1, 3, 6 months, and 1 year. Outcome measures were IOP, AGM, BCVA, Surgical success, and complications.

Results: Thirty eyes (26 patients) 11(mild-moderate-Group 1) 19-severe (Group 2) JOAG were included. Mean IOP reduced from 23.43 ± 9.65 to 13.27 ± 4.54 ($p=0.002$) in grp 1 & 23.26 ± 9.80 to 14.10 ± 8.32 at 1 year in grp 2. Mean AGM reduced from 2.89 ± 0.94 to 0.74 ± 0.81 & 3 ± 0.77 to 0.91 ± 1.30 ($p<0.001$) in group 1 & 2. Mean IOP reduction was 36.3% & 28.7% at 1 year. Complete success (IOP ≥ 6 & ≤ 21 mmHg & $\geq 20\%$ IOP reduction without AGM) was seen in 63.6% (30.0 – 84.5) & 73.7% (47.9 – 88.1) (Grp 1&2). 63.6% and 47.4% in each group remained medication free. Microhyphema (<1 mm) was the most common complication (6 patients), which resolved by the end of one week, with the need for AC wash in two cases.

Conclusions: GATT is a safe & efficacious procedure in JOAG, with good surgical success & IOP reduction.

Abstract No.: 205303**Panel No.: GLA-0387**

One-Year Outcomes of Standalone 5-0 Prolene Suture GATT in Advanced Open-Angle Glaucoma

*First Author: Madhavi PILLAI**Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV*

Purpose: Surgical Outcomes of GATT in advanced POAG.

Methods: Prospective, interventional. Outcomes of GATT in advanced POAG. Fifty-one eyes of advanced POAG pts who underwent standalone GATT were included & followed for 2 weeks, 1, 3, 6, & 12 months. Outcome measures were changes in IOP, BCVA, AGM, Surgical success & complications. Complete success was defined as IOP ≤ 18 mmHg & 25% reduction without AGM.

Results: Baseline MD was $-19.18(10.06)$. Mean(SD) IOP decreased from 20.73 ± 8.98 to 14.59 ± 5.7 , 14.18 ± 5.2 , 15.24 ± 8.06 ($P<0.001$) at 3, 6, 12 mo. AGM reduced from 3.24 ± 0.8 to 1.08 ± 1.41 , 0.96 ± 1.3 , 1.0 ± 1.47 ($p<0.001$) at 3, 6, 12 months. The

percentage reduction in IOP was 16.8% at 1 year & 58.8% of pts remained medication-free. Cumulative probability of overall success was 54.9% 2 patients had IOP spikes, 2 patients had microhyphema, and 1 patient had macrohyphema requiring AC wash.

Conclusions: GATT is safe and effective, with good IOP reduction and medication burden in advanced open-angle glaucoma. GATT offers substantial pressure control with a reduced medication burden, underscoring its potential to serve as a standalone procedure in advanced POAG.

Abstract No.: 205581**Panel No.: GLA-0395**

Optic Disc Swelling in Acute Primary Angle Closure: Risk Factors and Longitudinal OCT Changes

First Author: Sung Uk BAEK

Purpose: To identify clinical risk factors associated with optic disc swelling (ODS) in acute primary angle-closure glaucoma (AACG) and to evaluate longitudinal structural changes in the retinal nerve fiber layer (RNFL) and ganglion cell-inner plexiform layer (GCIPL) using optical coherence tomography (OCT).

Methods: A prospective study was conducted on 102 eyes from AACG patients who underwent laser iridotomy (LI) and had at least years of follow-up. Patients were classified into ODS and control groups based on optic disc appearance and OCT findings. Risk factors were analyzed using multivariate logistic regression. RNFL and GCIPL thicknesses were measured at six time points post-LI. Thinning rates were calculated for short-term (1 week–6 months) and long-term (6 months–2 years) periods and compared between groups.

Results: ODS was identified in 42 eyes. Larger pupil diameter (odds ratio = 15.23) and longer symptom duration (odds ratio = 2.03) were independently associated with ODS. Mean IOP was consistently <16 mmHg in both groups at any time point, yet ODS eyes showed RNFL thickening followed by sustained thinning, whereas GCIPL thickness declined continuously. From 6 months to 2 years, RNFL thinning averaged $-2.86 \mu\text{m}/\text{year}$ in ODS vs. $-0.77 \mu\text{m}/\text{year}$ in controls; GCIPL thinning was -1.27 vs. $-0.69 \mu\text{m}/\text{year}$. Fellow eyes showed no differences in RNFL or GCIPL thinning rates between groups.

Conclusions: ODS in AACG is linked to delayed treatment and larger pupil size, suggesting more severe ischemic stress. ODS eyes exhibit sustained structural loss despite IOP control, highlighting the need for early intervention and tailored follow-up strategies.

Abstract No.: 205425

Panel No.: GLA-0393

Optical Coherence Tomography Artifacts in Pathologic Myopia: Prevalence and Impact on Glaucoma Diagnosis

First Author: Yuzhou XIANG

Co-Author(s): Ying HAN, Jing HUANG, Jingjing HUANG, Nan LUO, Litong YE

Purpose: To investigate the prevalence of peripapillary retinal nerve fiber layer thickness (pRNFLT) and Bruch's membrane opening-minimum rim width (BMO-MRW) artifacts in pathologic myopia (PM) and the impact of artifacts on the diagnostic ability for open-angle glaucoma (OAG).

Methods: This cross-sectional study was conducted at Zhongshan Ophthalmic Center. PM eyes were divided into two groups based on OAG diagnosis. Artifacts of pRNFLT and BMO-MRW were classified, and their prevalences were compared. The diagnostic ability of pRNFLT and BMO-MRW for OAG was compared before and after the inclusion of eyes with artifacts.

Results: A total of 136 participants with PM were included, with a median age of 49 years and mean axial length of 28.03 mm. Seventy-four (54.4%) eyes were diagnosed as OAG. Seven and three types of pRNFLT and BMO-MRW artifacts were observed, respectively. Presence of pRNFLT artifacts was identified in 74.2% of eyes in PM group and 63.5% of eyes in PM with OAG (PMG) group, which was more prevalent than BMO-MRW artifacts (27.4% in PM group and 4.1% in PMG group, both $P < 0.001$). Before and after including eyes with artifacts, the AUC of global RNFLT decreased from 0.927 to 0.869, and the AUC of global BMO-MRW slightly decreased from 0.884 to 0.882.

Conclusions: Artifacts of pRNFLT were more complex and prevalent than those of BMO-MRW. In PM, the diagnostic ability of pRNFLT and BMO-MRW were comparable when artifacts were considered.

Abstract No.: 205316

Panel No.: GLA-0380

Outcomes and Comparison of Trabeculectomy and Ahmed Glaucoma Valve Implant (AGV) in Eyes With In Situ Silicone Oil: A Retrospective Study

First Author: Smita PANDA

Co-Author(s): Parivadhini A, Baskaran M, Amritha P, Rathini DAVID

Purpose: To compare outcomes of trabeculectomy + Mitomycin -C and Ahmed glaucoma valve (AGV) implantation in eyes undergoing silicon oil insertion or in eyes with in situ silicone oil (SIO), without concurrent oil removal.

Methods: Records of patients with uncontrolled glaucoma and SIO undergoing trabeculectomy (Group

A) or AGV implantation (Group B) with ≥ 2 months' follow-up were retrospectively reviewed. Surgical success was defined as intraocular pressure (IOP) ≤ 21 mmHg $\pm$ antiglaucoma medications (AGMs).

Results: Thirty-two eyes of 32 patients were included (Group A: 21; Group B: 11). Mean age was 45.9 years in Group A, 42 years in Group B. Post-vitreotomy glaucoma was the most common etiology. At 2 months, mean IOP reduced from 30.7(13.5) to 22.0(10.7) mmHg in Group A ($p = 0.02$) and from 32.2(11.6) to 15.6(6.0) mmHg in Group B ($p = 0.003$). Mean AGMs decreased from 3.19(0.86) to 0.57(0.95) in Group A and from 3.72(0.8) to 1.27(0.7) in Group B ($p < 0.001$). At 6 months, mean IOP was 18.2(4.7) mmHg {1.5(1.5) AGMs} in Group A and 14.6(5.7) mmHg {1.53(1.2) AGMs} in Group B, with no significant intergroup difference. Surgical success at 2 months was 71.4% (Group A) and 90.9% (Group B). One-year cumulative success probability was 55% versus 71%, respectively. Five trabeculectomy eyes and 1 AGV eye required re-surgery. Silicone oil migration into the anterior chamber occurred in three AGV eyes.

Conclusions: Both procedures provided modestly effective IOP reduction in glaucomatous eyes with in situ SIO. AGV showed a higher trend of surgical success.

Abstract No.: 206106

Panel No.: GLA-0410

Outcomes of Ahmed Clear Path vs Aurolab Aqueous Drainage Implant in Refractory Glaucoma

First Author: Disha CHETANI

Co-Author(s): Sushmita KAUSHIK, Surinder Singh PANDAV, Srishti RAJ, Faisal THATTARUTHODY

Purpose: To compare the interim surgical outcomes of the Ahmed Clear Path (ACP) 250 mm² and Aurolab Aqueous Drainage Implant (AADI) 250 mm² in refractory glaucoma.

Methods: This prospective quasi-experimental trial included patients with uncontrolled intraocular pressure (IOP) despite maximally tolerated medical therapy or failed prior filtration surgery. Eyes were allocated to ACP or AADI based on affordability and patient preference. All procedures were performed by a single surgeon using standardized techniques with adjunctive Ripcord removal at 6–8 weeks. Primary endpoints were mean IOP and antiglaucoma medication (AGM) reduction at 3 months. Secondary outcomes included complete success (IOP 6–21 mmHg without AGMs), qualified success (IOP 6–21 mmHg with ≤ 2 AGMs), complications, and early postoperative interventions.

Results: Thirty-nine eyes (19 ACP, 20 AADI) were analysed. Baseline demographics and IOP were comparable. At 3 months, the mean IOP was 15.5 ± 3.5 mmHg in the ACP group and 13.9 ± 3.0 mmHg in the AADI group ($p = 0.19$). Mean AGM use was 1.6 ± 1.2

vs. 1.8 ± 0.9 , respectively ($p = 0.61$). Rates of complete and qualified success were similar between groups. One ACP eye developed endophthalmitis, while one AADI eye progressed to no perception of light due to hypotony-related complications.

Conclusions: Both ACP and AADI implants achieved significant IOP reduction, decreased medication burden, and demonstrated acceptable safety at 3 months. Outcomes were comparable between groups, supporting AADI-250 mm² as a cost-effective alternative to ACP in resource-limited settings. Device choice may thus be guided by availability, affordability, and surgeon preference.

Abstract No.: 204453

Panel No.: GLA-0368

Outcomes of High-Dose MMC(40µg) Augmented Bleb Needling After Failed/Failing Filtering Procedures

First Author: Shivam GUPTA

Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV, Madhavi PILLAI

Purpose: Evaluate outcomes of bleb needling with high-dose (40µg) subconjunctival MMC after failing/failed filtering procedures

Methods: Prospective, interventional study. Pts who had raised IOP following filtering procedures, flat bleb, encapsulation, &/or requiring AGM were included. Outcome measures were AGM, IOP, BCVA, and success rate.

Results: Fifty-two eyes (52 pts) were included. Mean time to needling was 6.77 months & mean glaucoma duration was 2.92 years. IOP decreased from mean (SD) 25.56(6.78)mmHg to 13.65(4.58), 15.13(3.66), 15.42(4.23), 14.74(4.28) at 1,3,6,12 months ($p < .0001$) & AGM 2.02(0.96) to 0.17(0.47), 0.48(0.73), 0.85(0.94), 1.10(0.98) at 1,3,6,12 months ($p < .0001$). Complete success (IOP $>5 \leq 21$ mmHg without AGM) 95.8, 87.5 & 74.4% at 3,6,12 months. Overall success was 98.1, 94.2 & 88.3% at 3,6,12 months. No significant complication was noted. 3 patients required GDD implantation.

Conclusions: Bleb needling with high-dose MMC appears to be a viable option for salvaging failing/failed filtration without compromising safety.

Abstract No.: 205295

Panel No.: GLA-0385

Outcomes of Interventional Valve-Enhancing Trabeculotomy (iVenT) – a Novel TM Sparing MIGS

First Author: Devendra MAHESHWARI

Co-Author(s): Nimrita NAGDEV, Madhavi PILLAI

Purpose: Outcomes of phaco-iVenT in open-angle glaucoma.

Methods: A novel surgical technique, iVenT (Interventional valve-enhancing trabeculotomy), leverages motion-dependent outflow. It utilises a unique spatula to create a tiny vent in the anterior non-filtering part of the Trabecular meshwork. The key benefit of this technique is the unharmed Trabecular meshwork and minimal damage to the intracanalicular valve system. A total of 106 eyes (53 Phaco-Grp 1, 53 iVenT-phaco-Grp 2) were included & followed for 2 weeks, 1, 3, 6 & 12 months. A unique spatula is used to create a tiny vent in the anterior non-filtering TM, enhancing pulsatile outflow. Outcome measures were IOP, BCVA, AGM, surgical success, and complications. Surgical success was defined as IOP $\leq 21/\leq 18/\leq 15$ with $>20\%$, 25%, 30% reduction (Criteria 1,2,3).

Results: Mean IOP decreased from 24.0 ± 6.1 to 16.4 ± 3.7 , 18.04 ± 3.7 , 18.7 ± 3.6 with 19.1% redn in Group 1, and from 21.28 ± 4.2 to 13.2 ± 3.2 , 13.8 ± 3.2 , 13.7 ± 2.8 with 33.8% redn in Group 2 at 3,6,12mo, with significant differences between groups ($p < 0.001$). AGM changed from 1.35 ± 0.5 to 1.55 ± 0.7 ($p = .010$) & 1.7 ± 0.9 to 0.04 ± 0.19 in Grp 2 ($p < 0.001$). Cumulative probability of overall success in Grp1 was 60.4%, 41.5%, 17.9% & Grp2 77.4%, 69.8%, 54.7% ($p = 0.045, 0.002, < 0.001$) by Criteria 1, 2, 3. 4 pts (Group1) & 2 (Group2) had IOP spikes, micro hyphema (2-Grp 2). The conclusion is that iVenT with Phaco is safe & efficacious in OAG.

Conclusions: iVenT adds a unique and novel TM sparing procedure to the MIGS armamentarium. It leverages physiological mechanisms—specifically enhancing pulsatile aqueous outflow via inward and posterior displacement of the scleral spur while maintaining TM integrity.

Abstract No.: 206486

Panel No.: GLA-0421

Outcomes of Pars Plana Placement of Aurolab Aqueous Drainage Implant in Neovascular Glaucoma in Indian Eyes

First Author: Shivam GUPTA

Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV, Madhavi PILLAI

Purpose: To study the outcomes of pars plana placement of Aurolab Aqueous Drainage Implant (AADI) in neovascular glaucoma (NVG).

Methods: The medical data of NVG patients (28 eyes) who underwent AADI implantation were retrospectively analyzed.

Results: Mean IOP reduced from preoperative 46.21 ± 8.6 mmHg to 32.07 ± 13.0 mmHg, 23.08 ± 12.8 mmHg, 21.00 ± 14.4 mmHg, and 22.67 ± 19.5 mmHg at 2 weeks, 6 weeks, 6 months, and 12 months, respectively. The mean number of AGM reduced from 3 preoperative to 2.42, 1.37, 1.55, and 1.65 at 2 weeks, 6 weeks, 6 months, and 12 months, respectively. The

BCVA was stabilized or improved in 54% of the eyes at 2 months, and in 66.6% of the eyes at the end of 12 months. Complete success was 50% and 37.5% (using criteria 1: IOP $\leq$ 18 mmHg or 30% reduction from the baseline without AGM, and criteria 2: IOP $\leq$ 15 mmHg or $\geq$ 5 mmHg or 40% reduction from baseline without AGM, respectively) after 12 months. Qualified success was seen in 83.3% and 72.2% (using criteria 1: IOP $\leq$ 18 mmHg or 30% reduction from the baseline with AGM, and criteria 2: IOP $\leq$ 15 mmHg or $\geq$ 5 mmHg or 40% reduction from baseline with AGM, respectively) of patients after 12 months.

Conclusions: This study demonstrates surgical success with the pars plana placement of the AADI in NVG in terms of IOP control and visual acuity.

Abstract No.: 202416

Panel No.: GLA-0343

Outcomes of Phacoemulsification Combined With Endoscopic Cyclophotocoagulation and iStent, in Open-Angle Glaucoma: A Meta-Analysis

First Author: Sheng Yang LIM

Co-Author(s): Bryan Chin Hou ANG, Bjorn Kaijun BETZLER, Angeline Rui Xi LAI, Nicole Xin Yi LEE, Krystal Valerie Qian Ying SOH

Purpose: This systematic review and meta-analysis (SRMA) evaluates the efficacy and safety of the combined Phacoemulsification-iStent-Endoscopic Cyclophotocoagulation (ICE) procedure in the management of open-angle glaucoma (OAG), which has been proposed to have synergistic effects for enhanced outcomes.

Methods: A literature search was performed on Embase, PubMed, and Cochrane Library from inception until 13 September 2024. All pilot, cohort, observational studies, and randomised controlled trials including subjects undergoing ICE for OAG were included. Meta-analysis of continuous outcomes was performed using the meta routine in R version 4.3.1.

Results: Four studies were included, with three studies (199 eyes) contributing to the meta-analysis. Results demonstrated statistically significant reductions in both mean IOP and anti-glaucoma medication (AGM) use at all timepoints up to 12 months post-operatively. The greatest effect was observed at 12 months, showing a mean IOP reduction of 5.28 mmHg (95%CI:1.93–8.63; $p < 0.05$) and a decrease of 0.77 AGMs (95%CI:0.50–1.04; $p < 0.05$). Safety outcomes were favourable, with the most common complication being transient IOP spikes ($< 5\%$), which resolved without significant sequelae.

Conclusions: The ICE procedure delivers sustained reductions in both mean IOP and medication burden for OAG patients, while maintaining an excellent safety profile, at least up to 12 months post-operatively.

The favourable outcomes may be attributed to the complementary mechanisms of both iStent implantation and ECP, the conjunctival-sparing nature of the procedure and preservation of the physiological aqueous outflow pathway.

Abstract No.: 205677

Panel No.: GLA-0398

Outcomes of the Paul Glaucoma Implant vs the Ahmed ClearPath Implant: A Systematic Review

First Author: Umair QIDWAI

Co-Author(s): Mariam ZEHRA, Muhammad Faisal Fahim, Shahmeer Hamid, Thiri Nyan Coe

Purpose: To systematically compare the clinical outcomes of two modern non-valved glaucoma drainage devices—the Paul Glaucoma Implant (PGI) and Ahmed ClearPath (ACP)—in patients with refractory glaucoma.

Methods: A systematic review was conducted according to PRISMA guidelines and registered with the Open Science Framework. Searches of PubMed, Scopus, Google Scholar, and Cochrane Library were performed up to January 2025, using terms related to PGI, ACP, and glaucoma drainage devices. Studies were included if they reported intraocular pressure (IOP) outcomes, success rates, or complication profiles for PGI or ACP. Data were extracted on patient demographics, surgical techniques, IOP and medication changes, complications, and follow-up durations. Methodological quality was assessed using the AXIS tool.

Results: Twenty-one studies (16 PGI, 5 ACP) met inclusion criteria. Both implants significantly reduced IOP from a preoperative mean of ~ 29 – 30 mmHg to ~ 12 – 14 mmHg at 12–24 months (~ 50 – 60% reduction). PGI recipients had a higher likelihood of achieving medication-free success (55–60%) compared to ACP (~ 40 – 45%). Complication rates were low and comparable, with transient hypotony ($\sim 10\%$), hyphema (slightly higher in ACP), and tube-related issues being rare ($< 3\%$). The PGI was more widely studied in pediatric and complex glaucomas, while ACP data were predominantly adult-based. Postoperative flow modulation (e.g., ripcord removal) was more commonly reported in PGI studies.

Conclusions: Both PGI and ACP are effective and safe for managing refractory glaucoma, offering significant IOP reduction with low complication rates. The PGI demonstrates broader applicability across age groups and a greater likelihood of medication independence, while the ACP offers comparable outcomes in adult populations. Further head-to-head trials and longer-term studies are needed to clarify their relative advantages.

Abstract No.: 206026**Panel No.: GLA-0409****Overlapping Phakomatoses With Secondary Glaucoma: A Rare Presentation***First Author: Rajat Mohan SRIVASTAVA**Co-Author(s): Siddharth AGRAWAL, Farheen ANSARI, Aradhna MISRA*

Purpose: To showcase an interesting and rare case of an adolescent male presenting to us with advanced glaucoma, along with overlapping clinical features of Sturge Weber and Klippel-Trenaunay Syndromes.

Methods: Descriptive case report. We describe the clinico-radiological profile and management of a patient with secondary glaucoma having overlapping clinical features of Sturge Weber Syndrome (SWS) and Klippel-Trenaunay Syndrome (KTS).

Results: A teenager with a history of seizures, presented with bilateral facial port-wine stain with hypertrophy of the left side of the face associated with ipsilateral advanced glaucomatous neuropathy. The port-wine stain was also present over the left side of the neck, shoulder, chest, and upper back. Additionally, the right lower limb had prominent dilated and tortuous veins with soft tissue hypertrophy of the limb. Patient was diagnosed with bilateral (L>R) Secondary Glaucoma with coexisting SWS & KTS. The intra-ocular pressures (IOP) remained uncontrolled even on maximal therapy in the left eye, which was subsequently managed with Mitomycin-C augmented trabeculectomy. At the 1-year follow-up, intraocular pressure is controlled with two antiglaucoma medications in each eye.

Conclusions: Multiple co-existing phakomatosis is rare but should be suspected, especially in the presence of bilateral extensive facial port-wine stain with underlying tissue hypertrophy. A primary trabeculectomy is a good option in managing advanced glaucoma in such cases.

Abstract No.: 203585**Panel No.: GLA-0361****Pattern of RNFL Damage in Early- and Late-Stage Primary Open-Angle Glaucoma Using the Disc Damage Likelihood Scale and Optical Coherence Tomography***First Author: Noor UL AIN**Co-Author(s): Tayyaba GUL MALIK*

Purpose: To determine patterns of the peripapillary retinal nerve fiber layer (RNFL) damage in early- and late-stage glaucoma based on the Disc Damage Likelihood Scale (DDLS).

Methods: This cross-sectional, multi-center study involved 267 eyes of 135 patients aged 18 years or older with suspected or diagnosed glaucoma. Exclusion criteria were high refractive errors, media opacities, trauma history, and systemic conditions

affecting the optic disc. After a comprehensive ocular examination, the DDLS was used for glaucoma staging. Disease severity was classified into three zones: green, orange, and red. RNFL thickness was measured in four quadrants using optical coherence tomography. Patterns of RNFL damage were analyzed, especially in terms of the ISNT (inferior>superior>nasal>temporal) rule, and compared between the three groups.

Results: The male-to-female ratio was 1.59:1 and the mean age was 45.12±15.76 years. There were statistically significant differences among the groups for average, inferior, superior, and temporal RNFL thickness ($p<0.00001$). However, the difference in nasal RNFL was insignificant. The ISNT rule was the commonest pattern in the study participants (64.4%) and progressive loss of pattern was observed with increased disease severity.

Conclusions: This study revealed an association between disease severity and RNFL thinning in the inferior, superior, and temporal quadrants, while nasal RNFL showed no significant association with disease severity. The ISNT rule was more frequently observed in the early stages and diminished with advanced glaucoma. These results highlight RNFL thinning based on the DDLS as an important marker for glaucoma monitoring

Abstract No.: 205127**Panel No.: GLA-0377****Portability, Precision, and Patient Experience: A Systematic Review Comparing Virtual Reality Perimetry to the Humphrey Gold Standard for Expanding Global Glaucoma Accessibility***First Author: Tiara DZULKARNAIN**Co-Author(s): Ardiella YUNARD*

Purpose: Glaucoma is projected to affect 112 million people by 2040, highlighting the urgent need for precise and accessible diagnostic tools. Visual field (VF) testing is indispensable for diagnosis and monitoring. The Humphrey Field Analyzer (HFA) is the current gold standard, but its bulk, cost, and immobility restrict accessibility, particularly in low-resource settings. HFA testing is also lengthy and fatiguing, reducing patient compliance. This systematic review compared the performance of virtual reality perimetry (VRP) with HFA across key outcomes.

Methods: A total of 20 studies directly comparing VRP with HFA were reviewed, involving adults with diagnosed or suspected glaucoma and healthy participants. The primary outcome was diagnostic accuracy, while secondary outcomes included test-retest reliability, patient acceptability, test duration, and feasibility. Owing to study heterogeneity, results were synthesized narratively.

Results: VRP demonstrated strong diagnostic precision with good agreement to HFA across global indices. Multiple studies reported high correlations. VRP consistently offered superior patient experience, with greater comfort, shorter fatigue, and reduced anxiety compared to HFA. Devices were lightweight, portable, and feasible for bedside, at-home, or community clinic use, offering critical flexibility to improve access in underserved and resource-limited regions.

Conclusions: VRP stands out as a highly promising alternative to HFA for VF testing, pairing solid diagnostic accuracy with portability and patient-friendly design. Though still complementary at this stage, VRP's unique potential to bring glaucoma monitoring directly into underserved communities makes it a powerful step toward more accessible, patient-centered eye care, awaiting validation in larger, long-term studies.

Abstract No.: 207102

Panel No.: GLA-0429

Postoperative Complications of iStent Inject Combined With Phacoemulsification in Asian Eyes With Glaucoma: Findings From a Systematic Review and Meta-Analysis

First Author: Masaru INATANI

Co-Author(s): Poemen CHAN, Wungrak CHOI, Alice CHU, Ashley REHN, Vivien Cherng-hui YIP

Purpose: To estimate the incidence rates of postoperative complications following implantation of iStent inject/iStent inject W combined with phacoemulsification in Asian eyes with glaucoma.

Methods: We systematically searched MEDLINE, Embase, Cochrane Library, and Web of Science through July 2025 for observational, interventional, and economic studies of iStent inject®, iStent inject® W, or iStent infinite® implanted either as a combined or standalone procedure in Asian patients with glaucoma, with ≥6 months of follow-up. Extracted outcomes included pre- and postoperative mean intraocular pressure, mean number of glaucoma medications, proportion of eyes meeting success criteria, frequency of complications and reinterventions, and economic results. This abstract reports pooled safety findings.

Results: Eighteen studies, including one cost-effectiveness analysis, contributed data from 1,140 eyes that all had combined procedures (60% implanted with iStent inject W), representing 1,162 eye-years of follow-up. The pooled incidence rate of postoperative complications was 14.4 events per 100 eye-years (95% CI, 10.4-20.1; $I^2=70.9\%$). Stent obstruction was the most frequent complication (6.2 events per 100 eye-years; 95% CI, 3.4-11.3; $I^2=51.6\%$). Of 153 postoperative complication events, 43% were considered mild/transient, and 31% stent-related. Additional glaucoma surgery was uncommon (1.6 events per 100 eye-years; 95% CI, 1.0-2.8; $I^2=0.0\%$).

Conclusions: In Asian eyes with glaucoma, combined iStent inject/iStent inject W had manageable postoperative adverse events with minimal failures. This systematic literature review supports the safety value proposition of iStent technologies.

Abstract No.: 202986

Panel No.: GLA-0349

Postoperative Outcomes of Microhook Trabeculotomy Using the Matsushita TMH Device

First Author: Rumi KAWASHIMA

Co-Author(s): Takahiro FUJINO, Kenji MATSUSHITA, Kohji NISHIDA, Tomoyuki OKAZAKI, Shinichi USUI

Purpose: To evaluate 3-year outcomes of microhook trabeculotomy (μ LOT) performed with the Matsushita-Tanito microhook trabeculotomy device (Matsushita TMH device) developed by our group.

Methods: Retrospective cohort study. Additional intraocular pressure (IOP)–lowering therapy was permitted as clinically indicated and recorded. Surgical “failure” was defined as a composite of (Definition 1) loss of light perception or IOP ≥ 22 mmHg on two consecutive visits ≥ 1 month after surgery, and (Definition 2) loss of light perception or IOP ≥ 17 mmHg on two consecutive visits ≥ 1 month after surgery. Changes in IOP and topical medication score over 3 years were analyzed using Dunnett’s test.

Results: Baseline diagnoses were primary open-angle glaucoma (POAG) in 17.0% and secondary glaucoma (SG) in 83.0%. Over 3 years, both IOP and topical medication scores decreased significantly ($p<0.01$). Kaplan–Meier survival at 1, 2, and 3 years was 62.3%, 52.8%, and 47.2% by Definition 1, and 40.8%, 35.0%, and 31.1% by Definition 2. Additionally, IOP-lowering therapy was required in 25 eyes (47.2%). Early postoperative events included hyphema in 14 eyes (26.4%), vitreous hemorrhage in 3 eyes (5.7%), and transient IOP elevation within 2 weeks in 28 eyes (52.8%).

Conclusions: μ LOT using the Matsushita TMH device achieved sustained reductions in IOP and medication burden over 3 years with an acceptable safety profile. Three-year survival ranged from 31.1% to 47.2% depending on the failure definition employed.

Abstract No.: 206955

Postoperative Outcomes of PreserFlo MicroShunt Surgery

First Author: Shinichi USUI

Co-Author(s): Yuto HASEGAWA, Rumi KAWASHIMA, Kenji MATSUSHITA, Kohji NISHIDA, Tomoyuki OKAZAKI

Purpose: To evaluate postoperative outcomes of PreserFlo MicroShunt (PMS) surgery.

Methods: We retrospectively analyzed 249 eyes that underwent initial PMS surgery at the University of Osaka Hospital between March 2023 and March 2025, with at least one month of follow-up. Parameters included intraocular pressure (IOP), medication score up to 24 months, glaucoma subtype, combined cataract surgery, stent placements. The surgical success rate was evaluated using Kaplan–Meier survival curves.

Results: Mean age was 70.2 ± 12.5 years. Diagnoses included primary open-angle glaucoma (POAG, 72%), exfoliation glaucoma (XFG, 16%), and secondary glaucoma (SG, 12%). Phakic eyes accounted for 38%, pseudophakic 60%, with 13% undergoing combined cataract surgery. Nylon stents were placed in 28% of cases and removed at 16.0 ± 14.5 days postoperatively. IOP and medication scores decreased significantly from baseline (21.1 ± 7.7 mmHg, 4.12 ± 1.25) to 1 month (11.1 ± 4.7 mmHg, 0.04 ± 0.28), and remained reduced through 24 months. The surgical success rate was lower for combined procedures involving lens reconstruction compared to standalone surgeries. Among glaucoma subtypes, eyes with XFG tended to have lower success rates than those with POAG. Additionally, eyes with stent implantation demonstrated better control of early postoperative hypotony and showed reduced incidence of shallow anterior chamber and choroidal detachment.

Conclusions: PMS is an effective surgical option; however, glaucoma subtype and combined cataract surgery may influence postoperative intraocular pressure. Furthermore, stent implantation helps suppress early postoperative hypotony and reduces the risk of associated complications.

Abstract No.: 202359

Panel No.: GLA-0340

Primary Ovarian Failure and the Risk of Glaucoma: Evidence From a Large Real-World Cohort

First Author: Chien-yun TSAI

Purpose: To investigate the association between primary ovarian failure (POF) and the subsequent risk of primary open-angle glaucoma (POAG) and ocular hypertension (OHT).

Methods: We conducted a retrospective cohort study using the TriNetX Global Research Network. Female patients aged ≥ 18 years with a diagnosis of POF (ICD-10-CM E28.3) were included as the exposure cohort. Controls were women with gynecological examinations but without POF, matched 1:1 by propensity scores for demographics and comorbidities. Patients with prior glaucoma, anti-glaucoma medication use, or other retinal disorders before the index date were excluded. Outcomes were incident POAG and OHT. Kaplan–Meier survival analysis and Cox proportional hazards regression were performed.

Results: A total of 31,783 women with POF were matched to 31,783 controls. Women with POF exhibited a significantly higher risk of POAG (HR: 1.71, 95% CI: 1.31–2.25). Likewise, the risk of OHT was also increased in the POF group (HR: 1.77, 95% CI: 1.36–2.32).

Conclusions: Primary ovarian failure was associated with a significantly higher risk of POAG and a trend toward increased risk of OHT. These findings suggest that estrogen deficiency and related hormonal dysregulation in women with POF may contribute to glaucoma susceptibility, highlighting the importance of regular ophthalmic surveillance in this population.

Abstract No.: 206934

Panel No.: GLA-0426

Profile of Secondary Glaucoma and Ocular Hypertension Following Retina Procedures Referred to the Glaucoma Clinic in a Tertiary Institution in the Philippines

First Author: Lee Tomas TAN

Co-Author(s): Nilo Vincent FLORCRUZ, Cesar PEREZ

Purpose: To provide valuable insights into the epidemiology, risk factors, and management of secondary glaucoma and ocular hypertension following retina procedures in the Filipino population, ultimately improving patient care and outcomes.

Methods: The study will be an epidemiologic study involving patients of the Section of Glaucoma in a tertiary hospital in the Philippines. The charts of glaucoma patients managed at out patient clinic from January 2022 to December 2024 will be reviewed. All charts to be review are electronic medical records.

Results: Among the 95 patients referred to the glaucoma clinic for secondary glaucoma or ocular hypertension, the majority were diagnosed with secondary open-angle glaucoma. The mean age of the cohort was 49. The most common underlying retinal diagnosis preceding glaucoma was rhegmatogenous retinal detachment. Only a minority required glaucoma surgery, with 64.21% not undergoing any surgical intervention. The most common procedure was implantation of a glaucoma drainage device.

Conclusions: Secondary open-angle glaucoma was the most common diagnosis among patients referred after retina procedures, followed by angle closure glaucoma and ocular hypertension. Patients were generally middle-aged, with significant visual impairment at the time of referral and advanced optic nerve damage as reflected in high cup-to-disc ratios. Most referrals occurred late, often more than a year after the initial retina intervention and were primarily due to uncontrolled IOP. Despite these measures, a large proportion of patients presented with poor baseline visual acuity, underscoring the advanced stage of

disease at referral and the complexity of managing secondary glaucoma in this setting

Abstract No.: 205795

Panel No.: GLA-0400

Quantitative Assessment of Retinal Parameters and Differential Diagnosis in Highly Myopic Glaucoma Using Deep Learning

First Author: Xiaohong CHEN

Co-Author(s): Zhidong LI, Lin LV, Yingting ZHU, Yehong ZHUO

Purpose: Despite the increasing incidence of highly myopic glaucoma (HMG) and its severe impairment to vision, the diagnostic parameters for early detection are lacking owing to atypical retinal deformation. Therefore, we aimed to assess retinal parameters quantitatively for discovering early signs and diagnostic markers.

Methods: This retrospective cross-sectional study recruited 256 color fundus photographs from 176 patients at Zhongshan Ophthalmic Center. Using a deep-learning-based algorithm, the retinal optic disc parameters, retinal vessel caliber, and the fundus tessellated density (FTD) were separately analyzed. FTD was quantified as the average exposed choroid area per unit area on fundus photographs. The tessellated fundus (Category 1) was defined based on the META-analysis for Pathologic Myopia classification system. Correlation analyses were performed to evaluate the parameters in association with axial length (AL) and visual field mean deviation (VFMD). Multivariate linear and logistic regression models were used to evaluate the differences between groups. Diagnostic efficacy was analyzed using the area under the curve (AUC).

Results: In the HMG fundus photographs, longer AL was correlated with increased vertical-disc diameter ($\beta = 0.002$) and inferior neuroretinal-rim widths (NRW, $\beta = 0.004$), while lower VFMD was associated with larger vertical cup diameter ($\beta = -0.008$) and vertical cup-disc ratio (VCDR, $\beta = -14.427$) but narrower superior NRW ($\beta = 0.019$, all $P < 0.05$). Compared to highly myopic (HM) eyes, a VCDR ≥ 0.48 (AUC, 0.88) had a 23.71-fold risk of being HMG. Besides, the retinal calibers including arteriolar diameter (AD), venular diameter (VD), vessel density and fractal dimension (FD) were negatively correlated with AL in HMG ($-0.485 \leq r \leq -0.260$, all $p \leq 0.05$). Negative VD-VCDR ($r = -0.304$, $p = 0.018$) and positive arterio-to-venule ratio (AVR)-VCDR correlations ($r = 0.312$, $p = 0.015$) were found in the HMG eyes. Moreover, in the tessellated fundus, the HMG eyes had lower global (0.20 ± 0.12 versus 0.36 ± 0.09) and macular FTD (0.25 ± 0.14 vs. 0.40 ± 0.09) but larger disc FTD (0.24 ± 0.11 vs. 0.19 ± 0.07) than HM eyes (all $P < 0.001$). A macular region nasal/temporal FTD ratio > 0.96 (AUC = 0.909) was 15.7 times more indicative of HMG than HM.

Conclusions: Our findings highlight alterations in retinal parameters in the pathogenesis of HMG. A comprehensive analysis of these data acquired by deep learning-based algorithms could potentially assist differential diagnosis of HMG in clinical practice.

Abstract No.: 207202

Panel No.: GLA-0433

Quirk of Fate - Catastrophic Bilateral Ocular Trauma Following a Game of Tug of War

First Author: Shalini SHALINI

Co-Author(s): Salwa KAIDAKATH, Meena MENON

Purpose: To report an unusual case of bilateral ophthalmic injury following a game of tug of war and its successful management.

Methods: A 17-year-old boy presented to our Glaucoma clinic for a second opinion, with diminution of vision in both eyes (OS>OD) and elevated intraocular pressure (IOP) in OS following injury with a rope while playing "tug of war". Comprehensive examination and investigations revealed Retinal Dialysis in OD, while Irido-dialysis with traumatic cataract, with angle recession glaucoma, with vitreous hemorrhage in OS. The patient was initially managed medically and then treated surgically in a stepwise approach. He underwent Scleral buckle with cryotherapy in OD, Phaco-Trabeculectomy along with irido-dialysis repair in OS.

Results: With prompt and active intervention, good IOP control was achieved, and the patient's vision was well-preserved.

Conclusions: "Tug of war", seemingly innocuous, is a popular game played by all age groups and socio-economic segments. The physical exertion demanded by the game, compounded by the competitive fervor it ignites, poses a significant risk of injury. This case emphasizes the need for heightened awareness and stringent safety measures to prevent any harm.

Abstract No.: 202493

Panel No.: GLA-0344

Rare Bilateral Iridocorneal Endothelial Syndrome: A Case Report

First Author: Lorenz Jacob MANGAHAS

Co-Author(s): Ian Ben BATCAGAN

Purpose: Iridocorneal Endothelial (ICE) Syndrome is a rare, progressive disorder of the corneal endothelium, usually unilateral and classified into three variants: Essential Iris Atrophy, Chandler's Syndrome, and Cogan-Reese Syndrome. This report describes an unusual bilateral manifestation of ICE syndrome complicated by cataract and secondary glaucoma.

Methods: A 65-year-old female with a 10-month history of recurrent eye pain, redness, and progressive visual loss was evaluated. Comprehensive assessment

included slit-lamp biomicroscopy, gonioscopy, specular microscopy, anterior segment OCT, and B-scan ultrasonography. Management involved topical Timolol for intraocular pressure control in the right eye and cataract extraction in the left eye.

Results: On presentation, the right eye was blind with an intraocular pressure (IOP) of 50 mmHg, while the left eye had hand movements vision with IOP of 12 mmHg. Both eyes presented corneal edema, extensive peripheral anterior synechiae, and iris atrophy. Specular microscopy revealed endothelial polymegathism and pleomorphism. Postoperatively, the left eye achieved functional vision of 6/30 at two months, with minimal Descemet membrane folds and stable IOP without any medications. The right eye remained blind, and IOP was controlled with one topical antiglaucoma medication.

Conclusions: This case underscores the diagnostic and management challenges of bilateral ICE syndrome. Although typically unilateral, bilateral involvement can occur and requires a high index of suspicion. Cataract surgery in ICE patients must be approached cautiously due to endothelial compromise, shallow anterior chambers, and iris abnormalities. Careful preoperative planning, individualized surgical strategies, and vigilant follow-up are essential to preserve vision and minimize complications.

Abstract No.: 202617

Panel No.: GLA-0346

Re-surgery Rates Across the Glaucoma Spectrum

First Author: Mona KHURANA

Co-Author(s): Machanagari AISHWARYA, Mani BASKARAN, Ronnie GEORGE

Purpose: To determine the rate, reasons, and risk factors of re-surgery following glaucoma surgery (GS).

Methods: Retrospective case control study. Patients who had undergone re-surgery within 2 years of GS (trabeculectomy, glaucoma drainage device-GDD with or without cataract surgery) were included (January 2011- December 2021). Demographics, clinical features, management, re-surgery type, and reason for re-surgery were noted. Age, surgery, and surgeon-matched controls (1:1) who had not undergone re-surgery were included to assess risk factors for re-surgery.

Results: Of the 14,008 primary GS, 350 eyes underwent re-surgeries within 2 years of primary glaucoma surgery. The overall re-surgery rate was 2.49%. The highest re-surgery rate was 3.39% (year 2020). Re-surgery rate was 3.74% in the trabeculectomy subgroup, 1.63% in the phacotrabeculectomy subgroup, 2.57% in the GDD subgroup, and 21.28% in the phacotrabeculectomy combined with vitreoretinal procedures. The mean number of re-surgeries per eye was 1.25 ± 0.5 . Bleb failure was the most common cause

of resurgery in the trabeculectomy group, and tube exposure in the GDD group. Lower visual acuity (Odds Ratio (OR) 1.47, confidence interval (CI) 1.03 - 2.11, $p=0.034$), highest recorded preoperative IOP (OR 1.02, CI 1.004 - 1.04; $p=0.014$), uveitic glaucoma (OR 2.78, CI 1.3 - 5.96; $p=0.008$), previous intraocular surgery (odds ratio: 1.57, CI 1.20 - 2.05; $p=0.001$) were associated with an increased odds of re-surgery.

Conclusions: Overall re-surgery rates following GS were low and comparable with other studies. Eyes with uveitic glaucoma, higher preoperative IOP and lower visual acuity prior to GS had a higher odds of resurgery and may need close follow up or modification of surgical technique.

Abstract No.: 206603

Panel No.: GLA-0422

Real World Clinical Results of 360/High Protocol Selective Laser Trabeculoplasty (SLT) Using Tango Reflex Neo in Patients With Primary Open-Angle Glaucoma and Ocular Hypertension in Northern Thailand

First Author: Damrong WIWATWONGWANA

Co-Author(s): Wichaya SANGPANICH, Atchareeya WIWATWONGWANA

Purpose: To evaluate the efficacy and safety of 360/high protocol SLT performed with the Tango Reflex Neo equipment in patients with primary open-angle glaucoma and ocular hypertension. Both in naïve patients and in patients who would like to change the medication from eyedrops to laser due to poor compliance in the real world.

Methods: Patients with a diagnosis of open-angle glaucoma and uncontrolled IOP under medical treatment and/or patients with an initial diagnosis of ocular hypertension and primary open-angle glaucoma who had not previously received any form of treatment (first line) were included. SLT was performed with Tango Reflex Neo in 360° using the 360/high protocol and adapting the fluence of the treatment to the pigmentation of the angle of everyone. Baseline IOP and post-procedure values at 1, 3, and 6 months were recorded, as well as the presence of complications or adverse events.

Results: Treated patients showed a significant reduction in IOP from baseline to subsequent controls. The success rate, defined as $\geq 20\%$ reduction in IOP without additional medication, was 75%. Adverse events were mild and transient, mainly mild inflammation and self-limiting eye discomfort.

Conclusions: 360/high protocol SLT with Tango Reflex Neo is a safe and effective therapeutic option for IOP control in ocular hypertension and open-angle glaucoma, with results comparable to or superior to previous reports with other SLT systems. Its

safety profile reinforces its role as an alternative or complement to medical treatment.

Abstract No.: 202957

Panel No.: GLA-0351

Reduction of Lipid Droplets Alleviates Optic Nerve Inflammation and Enhances CNTF-Induced Axon Regeneration in Optic Nerve Crush

First Author: Xiaowei FAN

Co-Author(s): Ningli WANG, Shen WU, Jingxue ZHANG

Purpose: To explore the location of lipid droplets (LDs) in retina and optic nerve, and the effect of inhibiting LDs biogenesis on survival and function of retinal ganglion cells (RGCs) from optic nerve crush mice.

Methods: The right optic nerve was crushed for 5 seconds. Eyeball and optic nerve frozen sections were co-immunofluorescence stained by LDs and Tuj1, IBA1 and GFAP. Mice daily received oral gavage of DGAT1 inhibitor A-922500 to suppress LDs biogenesis beginning one day before crush. The retinal RBPMs positive cells, and IBA1+ cells and GFAP- area in optic nerve were calculated in 1week after injury. Post 2 weeks after injury, the CTB-labeled regenerated axons were compared among group receiving A-922500 monotherapy, group receiving intravitreal injection of AAV2-CNTF monotherapy and group combining A-922500 with AAV2-CNTF. Flash visual evoke potential (FVEP) was applied to evaluate the visual function.

Results: LDs were observed within Tuj1-positive cells in retina, whereas in IBA1-positive cells within GFAP-negative regions in optic nerve following injury. A-922500 markedly reduced LDs numbers and efficiently diminished microglia in lesion site without altering the GFAP-negative area in optic nerve. Neither RGCs survival nor FVEP responses were significantly affected by A-922500 therapy. No discernible CTB-labelled regenerating axons were detected after A-922500 treatment alone. However, combined intervention resulted in better axon regeneration than AAV2-CNTF monotherapy.

Conclusions: After optic nerve crush, LDs appeared within RGCs soma in retina and microglia in optic nerve injury site. Reduction of LDs did not independently preserve RGCs survival and function, but attenuated inflammation and enhanced CNTF-induced axon regeneration.

Abstract No.: 205358

Panel No.: GLA-0388

Regulation of Lactate Flux in Optic Nerve Head Astrocytes: The Roles of Insulin, dbcAMP and Monocarboxylate Transporters

First Author: Kenji MATSUSHITA

Co-Author(s): Weiran HUAN, Rumi KAWASHIMA, Kohji NISHIDA, Andrew J. QUANTOC, Shinichi USUI, Yuichi YASUKURA

Purpose: To investigate regulations in lactate flux in Optic Nerve Head (ONH) astrocytes.

Methods: Lactate sensor (laconic) was transfected into primary cultured ONH astrocytes, after which insulin and dibutyl cyclic adenosine monophosphate (dbcAMP) were used to regulate the expression of the lactate importing-related proteins, Aquaporin 9 (AQP9), Monocarboxylate Transporter 1 (MCT1) and Monocarboxylate Transporter 2 (MCT2). Lactate flux changes were assessed as fluorescence rate alterations upon exposure to lactate and pyruvate solutions. Furthermore, the influence of AQP9 on lactate uptake and release was analyzed after inhibiting MCT function.

Results: ONH astrocytes displayed pronounced fluorescence ratio changes when exposed to lactate gradient solutions. Insulin and dbcAMP had opposite effects on AQP9 expression, with insulin downregulating AQP9 ($p=0.0023$) and dbcAMP upregulating it ($p=0.0012$). MCT1 (fold-change, insulin-treated 1.417 ± 1.001 , dbcAMP-treated 1.843 ± 1.354) and MCT2 (fold-change, insulin-treated 1.020 ± 0.316 , dbcAMP-treated 1.104 ± 0.454) showed slight fluctuations but no significant statistical differences. Lactate inflow and outflow remained balanced, however, this balance was disturbed once the functions of MCT1 and MCT2 were inhibited. Laconic monitoring revealed that insulin pretreatment reduced lactate influx into the cells ($p=0.0256$). dbcAMP pretreatment, on the other hand, enhanced both lactate influx ($p=0.0008$) and efflux ($p=0.0089$). Inhibition of MCT1 and MCT2 functions significantly reduced lactate flux, but astrocytes pretreated with dbcAMP showed a marked improvement in both lactate influx ($p < 0.0001$) and efflux ($p < 0.0001$) even after inhibition.

Conclusions: ONH astrocytes respond to some metabolic-influencing chemicals, altering the expression of AQP9 and affecting their lactate flux. Specifically, insulin treatment reduced lactate flux, whereas dbcAMP increased it.

Abstract No.: 201456

Panel No.: GLA-0329

Retinal Nerve Fiber Layer (RNFL) Thickness Before and After Trabeculectomy in Primary Open-Angle Glaucoma

*First Author: Shams **NOMAN***

Purpose: To assess the RNFL thickness in primary open-angle glaucoma (POAG) before and one month after trabeculectomy using optical coherence tomography

Methods: Patients aged 40-60 years with POAG comprised the study patients. 20 eyes of 16 patients were selected for the study group. The study duration was one year. A complete clinical evaluation was conducted, including intraocular pressure (IOP) measurement before and one month after surgery. Optical coherence tomography (OCT) RNFL was performed preoperatively and postoperatively in the ophthalmology department. Statistical analysis of the results was conducted using computer-based software, SPSS 22.

Results: Regarding retinal nerve fiber layer (RNFL) thickness, the superior RNFL thickness was 75.2 ± 23.7 preoperatively and 81.6 ± 25.29 postoperatively. The mean overall RNFL thickness was 60.65 ± 10.34 preoperatively and 63.85 ± 12.74 postoperatively. A significant (<0.05) increase was observed in superior and mean RNFL thickness postoperatively compared to the preoperative period. But in other quadrants, there were changes in RNFL thickness, but the changes weren't statistically significant (>0.05).

Conclusions: This study assessed RNFL thickness changes before and after trabeculectomy in primary open-angle glaucoma. A significant reduction in IOP was observed postoperatively. Superior and mean RNFL thickness increased notably, while inferior, nasal, and temporal regions showed mild changes.

Abstract No.: 201126

Panel No.: GLA-0319

Scleral Thinning Following MicroPulse Cyclophotocoagulation (MPCPC)

*First Author: Yin Yung Alison **CHAN***

*Co-Author(s): Chee Yung Clement **THAM**, Mandy Oi-man **WONG***

Purpose: Micropulse cyclophotocoagulation (MPCPC) is a glaucoma laser treatment that has gained popularity over the past decade. It has generally demonstrated a favorable safety profile, with commonly reported complications being persistent anterior chamber inflammation, loss of best-corrected visual acuity, cystoid macular edema and hypotony, while scleral thinning remains a rare occurrence. We present 4 cases who developed scleral thinning following MPCPC at Hong Kong Eye Hospital. We aim to highlight this infrequent complication, which may impact or limit future treatment options.

Methods: Retrospective case series of patients who exhibited scleral thinning after MPCPC at Hong Kong Eye Hospital between January 2019 and July 2025. Demographic and treatment-related data is collected, including: MPCPC settings, pre-operative and post-operative visual acuity and IOP, complications specifically scleral thinning – onset, location, extent, presence of progression and need for treatment.

Results: A total of 4 eyes of 4 subjects demonstrated scleral thinning following MPCPC. This includes 2 paediatric patients, a 40-year-old with uveitic glaucoma, and a 60-year-old with steroid-induced glaucoma. Notably, none had pre-existing scleral thinning or identifiable secondary causes. The procedures were uneventful, with parameters well within the normal range. In all cases the thinning was non-progressive and required no treatment.

Conclusions: MPCPC continues to be a valuable treatment option owing to its favorable safety profile, low invasiveness, repeatability, and feasibility as an office procedure. Albeit rare, it is worthwhile to be vigilant and monitor for any post-operative scleral thinning, as it may impact future glaucoma interventions.

Abstract No.: 201690

Panel No.: GLA-0333

Sequential Serous Choroidal Detachment in Subjects Undergoing Bilateral Trabeculectomy

*First Author: Maryam **YADGARI***

*Co-Author(s): Sara **KAVOUSNEZHAD**, Nader **NASSIRI**, Kourosh **SHEIBANI***

Purpose: This study aims to assess the incidence of serous choroidal detachment (SCD) in the second eye of patients undergoing bilateral trabeculectomy (BT) and evaluate its impact on the clinical outcomes and failure rate of trabeculectomy in the second-operated eyes.

Methods: This retrospective case-control study analyzed 90 eyes of 45 patients who underwent BT. Surgical success was defined as maintaining intraocular pressure (IOP) between 5 and 21 mmHg, requiring no additional glaucoma surgery, and exhibiting a visual acuity of at least light perception. Relevant patient data, such as age, glaucoma type, systemic diseases, preoperative and postoperative IOP, and complications, were extracted from medical records.

Results: The mean age of patients was 59.8 ± 11.1 years. The five-year cumulative probability of success in the first- and second-operated eyes was 61.0% and 67.6%, respectively (log rank = 0.085, $P = 0.77$). Among the participants, 28.9% experienced SCD, and 76.9% of those who had SCD in the first-operated eye developed the same condition in the second eye as well ($P < 0.001$). In the first-operated eyes, the five-year

cumulative probability of survival was 71.7% without SCD and 35.0% with SCD (log rank = 2.59, $P = 0.107$).

Conclusions: The occurrence of SCD in the first eye following trabeculectomy may indicate a predisposition to its development in the second eye during BT. Furthermore, the surgical success rate of the second-operated eye is comparable to the outcomes of the first eye undergoing BT.

Abstract No.: 201424

Panel No.: GLA-0328

Should Glaucoma Surgical Devices Be the First Surgical Option for Refractory Uveitic Glaucoma on Maximally Tolerated Drugs? A Systematic Review

First Author: Ulifna **SIFYANA**

Co-Author(s): Aurilia **AFIA**, Desy **KUSUMANINGRUM**, Rina La Distia **NORA**, Ikhwanuliman **PUTERA**, Maria **WIBAWA**

Purpose: This review summarises the existing body of evidence comparing the efficacy and safety of implant versus non-implant surgical procedures in refractory uveitic glaucoma (UG). UG, if inadequately managed, can cause irreversible vision loss due to progressive optic nerve damage. Managing glaucoma in the context of uveitis is challenging, as elevated intraocular pressure (IOP) may arise either from corticosteroid therapy or from trabeculitis, which requires effective anti-inflammatory treatment. When IOP remains uncontrolled despite maximally tolerated medical therapy, surgical interventions are considered. These can be broadly classified into implant-based procedures, such as glaucoma drainage devices (GDD), and non-implant procedures, including trabeculectomy and sclerectomy.

Methods: A systematic search was performed in PubMed, ScienceDirect, EBSCOhost, Cochrane Library, and SpringerLink databases using predefined keywords to identify clinical trials and observational studies. Outcomes related to efficacy and safety, including complications, were summarised. The study protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO: CRD420251023969).

Results: Out of 195 screened articles, six studies were selected following abstract and full-text review. Implant-based procedures demonstrated comparable IOP reduction to non-implant procedures in refractory UG patients in five of the six studies. Complete or qualified success was more frequently achieved with implant-based procedures. In long-term follow-up, implant-based procedures showed a higher success rate, defined as sustained IOP reduction to target levels (<21 mmHg or $\geq 20\%$ from baseline), fewer reoperations, greater reduction in antiglaucoma medications, and improved surgical survival over ≥ 24 months compared to non-implant surgeries.

Conclusions: Both implant and non-implant surgeries effectively manage refractory uveitis glaucoma, with implant surgeries demonstrating better long-term pressure control with fewer bleb-dependent failures. Individualized surgical decision-making remains essential. Cost-effectiveness analyses and well-designed prospective studies are required.

Abstract No.: 202185

Panel No.: GLA-0337

Study on the Relationship Between Disease Cognition Level, Anxiety, Depression, and Self-Management Behavior in Glaucoma Patients

First Author: Yan **LIU**

Co-Author(s): Ping **GE**, Yuan **HE**, Qingqing **MU**, Yuanyuan **ZHANG**

Purpose: To assess glaucoma patients' disease cognition, anxiety, depression, and self-management, analyze their correlations, and provide a basis for targeted interventions to improve prognosis and quality of life.

Methods: Cross-sectional study: Tertiary hospital ophthalmology glaucoma patients recruited via convenience sampling (inclusion/exclusion criteria). Data were collected using five instruments: the General Information Questionnaire, the Glaucoma Awareness and Knowledge Questionnaire (GAKQ), the SAS, the SDS, and the Glaucoma Self-Management Behavior Questionnaire (GSMQ). All questionnaire responses are being analyzed with SPSS software.

Results: The glaucoma patient group had relatively low overall cognition scores (15.70 ± 6.052 , moderate-to-low level, significant individual differences), 37.5% anxiety incidence, and 27.5% depression incidence. Their self-management behavior scores were relatively high (57.85 ± 5.419) with smaller individual differences. Cognition scores had a significant positive correlation with self-management behavior ($r=0.372$, $p=0.018 < 0.05$) but no significant correlation with anxiety ($r=-0.212$, $p=0.190$) or depression ($r=-0.137$, $p=0.401$). Anxiety and depression had a highly significant positive correlation ($r=0.796$, $p < 0.001$). Anxiety showed no significant negative correlation with self-management behavior ($r=-0.259$, $p=0.106$), while depression did ($r=-0.373$, $p=0.018 < 0.05$).

Conclusions: Glaucoma patients with higher disease cognition show better self-management behavior. Anxiety and depression are closely related, and those with depressive symptoms have poorer self-management behavior. This suggests enhancing disease cognition and alleviating anxiety-depression symptoms in glaucoma patient management can help improve their self-management capabilities, thereby boosting prognosis and quality of life.

Abstract No.: 203235**Panel No.: GLA-0354**

The Clinical Significance of Pressure-to-Cornea Index in Primary Open Angle Glaucoma, Normal Tension Glaucoma, Ocular Hypertension and Normal Individuals: A Comparative Analysis in Eastern India

*First Author: Shraddha SHATAPARBA**Co-Author(s): Madhusmita Behera BEHERA, Santosh Kumar MAHAPATRA, Raj VAISHAL KENIA*

Purpose: This study aims to evaluate the Pressure-to-Cornea Index (PCI) as a predictive and diagnostic marker in glaucoma by analyzing its association with disease severity in POAG, OHT, NTG, and normal individuals. PCI was calculated using intraocular pressure and central corneal thickness, and its correlation with clinical staging, visual field loss, and optic nerve changes was assessed. Demographic influences such as age and sex were also analyzed. PCI values were compared with benchmarks established by Iliev et al. to validate their utility in early detection and risk assessment, especially where traditional IOP measurements may be misleading.

Methods: A longitudinal, non-randomized, observational design consisting of 80 eyes was employed at a tertiary eye hospital in Eastern India. The IOP (using GAT), CCT, and Visual Fields were estimated across all the groups and followed up after 6 months to see if PCI was a reasonable marker.

Results: Glaucoma diagnosis varied significantly with age ($p < 0.001$); POAG was most common in older groups, while normals dominated ≤ 40 years. NTG was male-predominant (90%, $p = 0.009$). POAG and NTG had poorer BCVA ($p = 0.019$) and thinner CCT (0.15 mm), while OHT showed thicker corneas (0.20 mm, $p = 0.003$). Mean IOP was highest in OHT (27.00 mmHg) and lowest in NTG (15.65 mmHg) ($p < 0.001$). PCI was significantly elevated in POAG (156.17) and OHT (135.77) ($p < 0.001$), correlating strongly with IOP in NTG ($r = 0.892$) and POAG ($r = 0.644$). Visual field defects were present in 95% of POAG and NTG ($p < 0.001$). At 6 months, PCI remained highest in POAG (134.95 ± 25.21), followed by OHT (117.26 ± 26.33), with lower values in NTG (105.30 ± 17.58) and normals (107.34 ± 16.02). The differences were statistically significant ($p < 0.001$), mirroring baseline trends. This stability across time supports PCI's potential as a reliable predictor for glaucoma severity and progression.

Conclusions: A strong positive correlation was found between IOP and PCI in POAG and NTG and strong negative correlation between PCI and CCT indicating that thinner corneas are associated with high PCI. In normal eyes, the IOP-PCI relationship remains significant, while in OHT, CCT appears to be the dominant correlating factor with PCI. These findings support the relevance of PCI as a useful structural

parameter that reflects both pressure-related and corneal biomechanical changes in glaucoma diagnostics and monitoring. In Eastern India with very less glaucoma screening and follow up in glaucoma, PCI becomes a composite structural and functional marker of disease progression.

Abstract No.: 203766**Panel No.: GLA-0363**

The Effectiveness of Micropulse Laser in Refractory and Neovascular Glaucoma

*First Author: Chansathya KHIEU**Co-Author(s): Sreyneang SIM*

Purpose: This study aims to report on the effectiveness of laser surgical procedures for end-stage glaucoma patients using a micropulse laser. The objective is to measure post-operative intraocular pressure >12 weeks post laser, the amount of anti-glaucoma eye drop used, and patient comfort.

Methods: Using micropulse transscleral cyclophotocoagulation for a patient with refractive glaucoma and neovascular glaucoma, in a sweeping motion. Standard laser power setting was used, including 2000mW, 80 seconds, and 31.3% duty cycle for one hemisphere (180 degrees). Postoperative anti-inflammatory eye drops were given, and IOP was measured at week 1, week 3, week 6, and week 12. Initial anti-glaucoma drops were kept until week 3. IOP, anti-glaucoma medication, and patient comfort were documented.

Results: Neovascular glaucoma has shown the most unpredictable IOP control post laser treatment, with fluctuation of IOP up until week 6. IOP dropped in most cases; however, at least one to two anti-glaucoma eye drops are still needed. Patient comfort was reported to be better than cyclocryocoagulation (CCC), but hypotony and rebleeding can also be seen.

Conclusions: Micropulse laser is an effective treatment for patients with refractory or end-stage glaucoma. However, results can be unpredictable, and patient selection should be advised. Noticeably, anti-glaucoma medication cannot be stopped post-laser treatment.

Abstract No.: 205901**Panel No.: GLA-0404**

The Efficacy of Thermal Pulsation and Intense Pulsed Light on Dry Eye and Intraocular Pressure in Glaucoma Patients With Meibomian Gland Dysfunction

*First Author: Shui King TSOI**Co-Author(s): Poemen Pm CHAN, Vanissa Ws CHOW, Thomas Ch LAM, Clement Cy THAM*

Purpose: This study aims to evaluate the clinical efficacy of a thermal pulsation procedure (LipiFlow) and intense pulsed light (IPL) treatments on dry eye

parameters and glaucoma disease control reflected by intraocular pressure (IOP).

Methods: Retrospective review of 9 glaucomatous patients with MGD who underwent either LipiFlow or IPL in a local eye hospital between July 2022 and December 2024. Changes in symptomatology (OSDI and SPEED scores), corneal staining, conjunctival hyperemia, tear break-up time, lipid layer thickness, Schirmer's test, meibum quality, meibomian gland expressibility, and dropout were analyzed before and after treatment. IOP was also analyzed before (mean of 2 measurements) and after the procedure.

Results: We included 17 eyes of 9 patients (mean age 63.47 years), with 4 patients (8 eyes) receiving a single LipiFlow and 5 patients (9 eyes) receiving 3-4 IPL sessions. They had been treated with an average of 2.5 no. of IOP-lowering eyedrops for a mean of 6.71 years. Statistically significant improvements were demonstrated in OSDI scores and meibum quality (graded by clinicians from clear to cloudy to toothpaste-like) ($p=0.026$ and $p=0.020$, respectively, Wilcoxon signed rank test). Mean change in OSDI was -21.33 ± 9.90 . $\frac{2}{3}$ eyes had meibomian quality improvement post-procedure. Mean baseline and post-procedure 3-month IOP were 16.38 mmHg and 15.31 mmHg ($p=0.041$, paired t-test). The mean % IOP reduction was 6.57%.

Conclusions: IPL and LipidFlow are effective in improving MGD symptoms and meibum quality in glaucomatous patients. A slight but significant IOP reduction was observed 3-months post-procedure. However, further studies with larger sample sizes are warranted.

Abstract No.: 203442

Panel No.: GLA-0356

The Metabolites Mediate the Effect of Immune Cells on Glaucoma: A Mendelian Randomization Study

First Author: Ma XIN

Co-Author(s): Zuo CHENGGUO, Luo NACHUAN

Purpose: To certify the causal relationship between circulating immune cells and glaucoma as well as quantify the role of blood metabolites as potential mediators.

Methods: A bidirectional Mendelian randomization (MR) analysis of circulating immune cells and glaucoma was performed with genome-wide association studies (GWAS). Moreover, two-step MR analysis was employed to quantify the proportion of the effect of blood metabolites mediating circulating immune cells on glaucoma. Genetic proxies of immunophenotypes and glaucoma were obtained from IEU OpenGWAS, while circulating metabolites were sourced from GWAS Catalog. These cross-sectional designs do not report a

duration of follow-up. Data analysis was performed in February 2024.

Results: MR analysis revealed a causal relationship between 33 immune cell traits and glaucoma. Further analysis identified a causal relationship between 10 blood metabolites and glaucoma. Generally, 9 specific blood metabolites mediated the effects of 8 immune cell phenotypes on glaucoma. The Aspartate-to-citrate ratio contributed to the effect of CD24+CD27+%lymphocytes on glaucoma, while N-acetyltaurine mediated the effect of Naive CD4+AC and SSC-A on HLA-DR+ CD8br on glaucoma. 5-acetylamin-6-amino-3-methyluracil facilitated the impact of CD64 on CD14-CD16+ monocytes and CD3 on EM CD4+ on glaucoma. 4-hydroxyhippurate contributed to the effect of Naive-mature B cell%B cell on glaucoma, while cortolone glucuronide and 2-hydroxy-4-(methylthio) butanoic acid (HMTBA) mediated the effect of Activated & resting Treg %CD4+ on glaucoma. Additionally, 1-palmitoyl-2-arachidonoyl-GPE, HMTBA and Adenosine 5'-diphosphate (ADP) to mannose ratio partially explained the effect of CD3 on EM CD4+ on glaucoma.

Conclusions: Immune cells contribute to the pathogenesis of glaucoma, partly through the influence of blood metabolites.

Abstract No.: 206238

Panel No.: GLA-0415

The Qidwai Quilt Pull-Over Patch-Graft (Q-POP) Technique: A Novel Method for Repairing Glaucoma Tube Exposure in Conjunctival Adhesions

First Author: Umair QIDWAI

Purpose: To describe a novel surgical technique—Qidwai Quilt Pull-Over Patch graft (Q-POP)—for managing glaucoma drainage device (GDD) tube exposure in high-risk patients with conjunctival scarring and mechanical stress from severe nystagmus.

Methods: A preventive revision was performed in a monocular 45-year-old male with aphakia, silicone oil tamponade, prior retinal surgeries, and secondary glaucoma. The conjunctiva over the drainage tube showed progressive thinning with posterior graft migration. The Q-POP technique was employed, involving hydrodissection, subconjunctival tunnel creation, and pullover delivery of a scleral graft without limbal peritomy.

Results: Postoperatively, the drainage tube remained well covered, conjunctival integrity was maintained, and intraocular pressure was well controlled during follow-up.

Conclusions: The Q-POP technique provides a safe, minimally invasive alternative to traditional patch graft approaches, particularly in eyes with limited conjunctival mobility and high surgical risk.

Abstract No.: 206148**Panel No.: GLA-0414****Trickling Down of Blood – Care Approaches in 2 Case Scenarios***First Author: Salwa KAIDAKATH**Co-Author(s): Shalini, Minija CK, Meena GOPINATH MENON, Divyansh MISHRA*

Purpose: To discuss care strategies in two uncommon presentations of anterior segment hemorrhage and to highlight individualized management strategies that resulted in favourable outcomes.

Methods: Case 1: A 72-year-old on systemic anticoagulants presented with a sudden onset of diminution of vision 1 year post-trabeculectomy. Examination revealed an evident trickling of blood into the anterior chamber secondary to a loose conjunctival suture superonasally. Following the loose suture removal, bleeding ceased, and visual acuity returned to baseline. Case 2: A 54-year-old diabetic presented with a sudden onset of diminution of vision and increased intraocular pressure. Clinical suspicion of iris microhemangioma was confirmed by iris fluorescein angiography, which demonstrated a linear streak of hyperfluorescence at 10 o'clock near the pupillary margin and additional hyperfluorescence in the mid-iris at 11–12 o'clock. The lesion was successfully treated with focal photocoagulation, leading to resolution of the vascular abnormality and stabilization of vision.

Results: With appropriate management, both cases of anterior segment bleeding resolved and vision stabilized.

Conclusions: Careful observation and utilization of appropriate diagnostic methods, along with timely and individualized interventions, are essential for optimal patient care and visual preservation.

Abstract No.: 205300**Panel No.: GLA-0386****Two-Year Comparative Outcomes of Gatt Combined With Phacoemulsification in Primary Open Glaucoma Versus Primary Angle-Closure Glaucoma***First Author: Madhavi PILLAI**Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV*

Purpose: To compare the two-year outcomes of Gonioscopy assisted transluminal trabeculotomy combined with phacoemulsification in primary open angle glaucoma versus primary angle closure glaucoma.

Methods: In this prospective comparative, non-randomised study design, 121 consecutive eyes (61 POAG and 60 PACG) underwent 5-0 prolene suture GATT-Phaco and followed for 2 weeks, 1, 3, 6, 12, and 24 months. Outcome measures were Intraocular pressure (IOP), antiglaucoma medications (AGM), best corrected

visual acuity (BCVA), surgical success, complications, and interventions. Surgical success was defined as IOP $\leq 21/\leq 18/\leq 15$ with $>20\%$, 25% , 30% reduction from baseline (Criteria 1, 2 & 3).

Results: Mean IOP decreased from 21.15 ± 3.7 to 13.20 ± 3.5 , 13.20 ± 3.2 , 13.96 ± 3.4 mmHg in POAG (33% IOP reduction) and from 21.88 ± 6.4 to 12.72 ± 3.0 , 13.37 ± 3.6 , 13.27 ± 3.9 mmHg in PACG (33.8% IOP reduction) at 6, 12, 24 months respectively ($p=0.511$). AGM reduced from 1.64 ± 0.84 to 0.38 ± 0.59 in POAG (67.9% meds free) and from 1.95 ± 0.95 to 0.53 ± 0.79 in PACG (61.8% meds free) at 24 months ($p=0.21$). Complete success rates were 65.6%, 62.3%, and 49.2% in POAG and 56.7%, 55%, and 43.3% in PACG for Criteria 1, 2, and 3, respectively. Qualified success rates were 19.7%, 14.8%, and 11.5% in POAG and 26.7%, 21.7%, and 15% in PACG. 14 eyes had macrohyphema, and 10 eyes had IOP spikes. One patient with PACG had one clock hour of iridodialysis. 6 eyes underwent anterior chamber wash for non-resolving hyphema.

Conclusions: GATT combined with phacoemulsification is efficacious with similar surgical outcomes in both POAG and PACG, with a favourable safety profile. The results of this study reinforce that angle-closure does not preclude the use of GATT, expanding the role of MIGS in PACG management as well.

Abstract No.: 205297**Panel No.: GLA-0378****Two-Year Comparative Outcomes of Phacoemulsification With Microhook Trabeculotomy Versus Standalone Phacoemulsification in Open Angle Glaucoma – a Randomised Controlled Trial***First Author: Devendra MAHESHWARI**Co-Author(s): Nimrita NAGDEV, Madhavi PILLAI*

Purpose: To evaluate the 24-month safety and efficacy of phacoemulsification combined with ab interno Tanito microhook trabeculotomy (microLOT) compared with phacoemulsification alone in patients with open-angle glaucoma (OAG) and cataract.

Methods: Prospective, randomized, interventional clinical trial. 114 eyes of 114 patients with mild-to-moderate OAG and visually significant cataract were randomized to phaco-microLOT ($n=57$) or phacoemulsification alone ($n=57$). Outcome measures included intraocular pressure (IOP), antiglaucoma medication (AGM) burden, best-corrected visual acuity (BCVA), surgical success, and complications, assessed through 24 months. Success was defined as a combination of at least 20%, 25%, or 30% reduction in IOP and an absolute IOP of less than 21, 18, or 15 mm Hg, respectively (Criteria 1, 2, and 3).

Results: At 24 months, 99 patients out of the original cohort of 114 patients were analyzed (Group 1 = 50;

Group 2= 49). The mean IOP decreased from 26.5 ± 5.2 to 15.2 ± 4.9 mmHg in the phaco-microLOT group and from 25.3 ± 3.1 to 18.2 ± 2.8 mmHg in the phaco-alone group ($P < 0.001$). The percentage IOP reduction was significantly greater in Group 1 (42.6% vs 28.1%, $P = 0.004$). In Group 1, the mean (standard deviation [SD]) AGM used preoperatively was 0.6 (0.9), which significantly decreased to 0.2 (0.4) at 24 months, whereas in Group 2, it marginally increased from 1.4 (0.6) to 1.5 (0.9). Overall success (Complete + qualified) in Group 1 using Criteria 1, 2, and 3 was 83.3%, 72.9% and 43.8% while in Group 2 was 57.8%, 40% and 20% respectively. The risk of failure in Group 2 was 2.87 times higher. No additional complications were observed, and no interventions were required between 12 and 24 months of follow-up.

Conclusions: Phaco-microLOT achieved sustained IOP and medication reduction at 24 months, with a favorable safety profile and superiority over phacoemulsification alone. These results underscore the long-term role of microLOT as a cost-effective MIGS procedure for OAG.

Abstract No.: 203804

Panel No.: GLA-0364

Two-Year Outcome of Phacogoniotomy for Advanced Primary Angle-Closure Glaucoma With Cataracts: A Multicentre Study

First Author: Bin XIE

Co-Author(s): Yunhe SONG, Xiulan ZHANG

Purpose: To report the 2-year effective and safety profile of integrated phacoemulsification with intraocular lens implantation (PEI), goniosynechialysis (GSL) and 120° goniotomy (GT) in advanced primary angle-closure glaucoma (PACG) and cataracts.

Methods: A total of 201 eyes of 196 patients who received combined PEI+GSL+ GT were assessed at baseline and re-evaluated at days 1, 7, and at 1, 3, 6, 12 and 24 months post-surgery. The intraocular pressure (IOP), the number of topical hypotensive medications, surgical complications, and achievements of surgery success were also evaluated.

Results: All participants were followed up for a 2-year period. The average IOP declined from 33.0 ± 10.7 mm Hg to 13.6 ± 2.9 mm Hg, and the number of topical hypotensive medication decreased from an average of 2.4 types to 0.4 at month 24. For the safety profile, the major complications were hyphema ($n=14$, 7.0%), IOP spike ($n=9$, 4.9%) and transit corneal oedema ($n=23$, 11.4%). The complete success was achieved in 72.6% of the eyes (146 out of 201), and the qualified success rate was 91.5% (184 out of 201). Only one eye required tube shunt surgery while no one developed severe vision-threatening complications. The best-corrected visual acuity increased from 0.80 ± 1.08 to 0.54 ± 0.78 LogMAR.

Conclusions: PEI+GSL+GT is shown to be effective and safe in treating advanced PACG with cataract over a 2-year follow-up period. The combined surgery may be considered as an alternative for patients with advanced PACG.

Abstract No.: 205938

Panel No.: GLA-0405

Two-Year Outcomes of Gonioscopy-Assisted Transluminal Trabeculotomy in Eyes With Primary-Open Angle Glaucoma and Pseudo-Exfoliation Glaucoma

First Author: Nimrita NAGDEV

Co-Author(s): Devendra MAHESHWARI, Madhavi PILLAI

Purpose: Efficacy of gonioscopy-assisted transluminal trabeculotomy in primary open-angle glaucoma and pseudo-exfoliation glaucoma.

Methods: A prospective, interventional, and comparative study included 74 primary open-angle glaucoma (group 1) and 76 pseudo-exfoliation glaucoma (group 2) patients. Combined gonioscopy-assisted transluminal trabeculotomy with phacoemulsification was performed in both groups. Baseline characteristics like Intraocular pressure (IOP), best corrected visual acuity (BCVA), and anti-glaucoma medications (AGMs) were compared. Data were collected at 2 weeks, 1 month, 3, 6, 12, and 24 months. Surgical success was defined as IOP ≤ 21 / ≤ 18 / ≤ 15 mmHg with $> 20\%$ / 25% / 30% reduction from baseline, respectively (Criteria 1, 2, and 3). Complications, secondary interventions, and surgical risk factors were also analyzed.

Results: The mean (SD) IOP (mmHg) decreased from 21.26 ± 3.69 to 14.09 ± 3.42 and from 27.46 ± 6.57 to 13.17 ± 2.57 in groups 1 and 2, respectively, at the end of 24 months. ($p=0.117$). AGM reduced from 1.69 ± 0.84 to 0.38 ± 0.57 and 1.88 ± 0.75 to 0.11 ± 0.44 in groups 1 and 2, respectively, at 24 months. ($p=0.002$). Success rate 85.1%, 76.8% and 58 % by criteria 1, 2, and 3 in group 1, respectively. In group 2, it was 98.6%, 95.8% and 87.6%. Micro hyphemas were seen in 34 patients (20 in group 1, 14 in group 2), macro hyphemas in 10 patients (6 in group 1, 4 in group 2), and 19 patients had IOP spikes (8 in group 1, 11 in group 2). 6 patients required AC wash (4 in group 1, 2 in group 2).

Conclusions: At 24 months, gonioscopy-assisted transluminal trabeculotomy reduced IOP and AGM in POAG and PXF-G, with greater success in PXF-G.

Abstract No.: 200355**Panel No.: GLA-0312****Ultrasound Cycloplasty: Dynamic Efficacy and Long-Term Safety in Glaucoma Patients from Northwest China***First Author: Ping GE**Co-Author(s): Yuan HE*

Purpose: This study aims to comprehensively analyze the dynamic efficacy of UCP in treating various types of glaucoma in Northwest China, and to explore the changes in efficacy at different follow-up time points as well as its long-term safety.

Methods: We enrolled 24 patients (30 eyes) with complete clinical data. Sociodemographic characteristics and ophthalmic examination data were collected. All patients underwent UCP treatment and were followed up at various time points postoperatively. Follow-up assessments consisted of IOP measurements, IOP reduction from baseline, surgical success rate, 24-hour IOP fluctuation, pain score improvement, and complications.

Results: The overall IOP in all patients significantly decreased after UCP compared to preoperative levels ($P < 0.01$). UCP demonstrated significant long-term IOP-lowering effects in patients with various types of glaucoma, with a 59.91% reduction at 1 year postoperatively. The efficacy was particularly notable in patients with primary angle-closure glaucoma, achieving a surgical success rate of 96.67% at 1 year. Preoperative baseline IOP showed a positive correlation with IOP reduction at 1 year postoperatively ($r_s = 0.641$, $P < 0.01$), indicating that higher baseline IOP was associated with greater IOP reduction. 4. UCP significantly improved IOP fluctuation, with the mean 24-hour IOP fluctuation decreasing from 10.6 preoperatively to 5.3 postoperatively ($P = 0.001$). 5. UCP exhibited excellent safety, with significant reductions in pain scores ($P < 0.05$) and no severe complications such as hypotony or macular edema observed during follow-up.

Conclusions: UCP demonstrates significant long-term and dynamic efficacy and high safety in patients from Northwest China.

Abstract No.: 203487**Panel No.: GLA-0359****Unmasking the Ghost: A Rare Case of Ghost-Cell Glaucoma***First Author: Yulinda Arty LAKSMITA**Co-Author(s): Mario Marbungaran HUTAPEA, Devina Bunga MAWARNI, Virna Dwi OKTARIANA, Florentina PRISICILIA*

Purpose: To show the diagnostic challenges of ghost cell glaucoma (GCG), a rare secondary glaucoma that can mimic other ocular pathologies, thus prone to being misdiagnosed and mistreated.

Methods: A case report. A 50-year-old man with a whitish appearance on the left eye (LE), as well as moderate pain and persistent eye redness for 2 weeks. These occurred about 10 days after a core vitrectomy. His LE vision had been blurred for 5 months prior due to vitreous hemorrhage and tractional retinal detachment resulting from diabetes mellitus. Ophthalmology examination showed light perception visual acuity of the LE. The intraocular pressure (IOP) was 15 mmHg (on timolol and oral acetazolamide). Anterior chamber (AC) depth was von Herrick grade 2, filled with prominent AC cells and 4.7 mm in height, tan-colored hypopyon. Ocular ultrasound showed a dense vitreous haziness.

Results: The presence of a prominent hypopyon, vitreous opacity, and a history of recent intraocular procedure led to the diagnosis of possible postoperative endophthalmitis. AC clearance, re-vitrectomy, and antibiotic intravitreal injection were then performed. Surprisingly, aqueous and vitreous gram, KOH stains, and cultures showed no microorganisms, but instead showed Heinz bodies, degenerating erythrocytes, a typical finding in ghost-cell glaucoma. The diagnosis of ghost-cell glaucoma was confirmed, then management was focused on IOP control, cycloplegia, and surgical clearance of erythrocyte debris.

Conclusions: Although rare, GCG may follow vitreous hemorrhage and vitreoretinal surgery. With rising vitrectomy rates, clinicians may encounter it more often. Early recognition helps avoid misdiagnosis as uveitis or infection and enables timely, targeted treatment.

Abstract No.: 205282**Panel No.: GLA-0383****Visual Field Abnormalities in High Myopia With or Without Pathologic Changes and Open-Angle Glaucoma***First Author: Jing HUANG**Co-Author(s): Ying HAN, Jingjing HUANG, Jost B JONAS, Ajay KOLLI, Nan LUO*

Purpose: To develop a perimetric classification system for highly myopic eyes with or without pathologic changes and open-angle glaucoma (OAG), and to identify factors associated with OAG in these eyes.

Methods: In this hospital-based, cross-sectional study, participants with high myopia were consecutively enrolled and underwent visual field testing as well as detailed ocular examination. A modified perimetric classification system was proposed based on a previous literature review. And using this modified system, the prevalence of perimetric defect subtypes was determined by the presence of pathologic high myopia (PHM) and OAG.

Results: A total of 601 participants (906 eyes) were included in this study. Both non-PHM and PHM eyes

with OAG were more likely to have a nasal step, combined superonasal and inferonasal defects, and altitudinal defects compared to those without OAG ($P<0.05$ for each), while partial arcuate defects, arcuate defects, vertical step and central defect were associated with OAG only in non-PHM ($P<0.05$ for each), but not in PHM eyes. Older age, male sex, absence of peripapillary hyperreflective ovoid mass-like structures, and presence of glaucoma-related perimetric defects were associated with a higher risk of OAG in non-PHM eyes, while only older age and presence of glaucoma-related perimetric defects were associated with a higher risk of OAG in PHM eyes.

Conclusions: Glaucoma-similar perimetric defects can occur in highly myopic eyes without OAG, especially in those with pathologic changes. The overlap of myopic and glaucoma-similar perimetric defects should be taken into account in clinical routine.

Abstract No.: 206956

Panel No.: GLA-0428

Visual Outcomes Following PreserFlo MicroShunt Surgery With or Without Nylon Stent Placement

First Author: Yuto **HASEGAWA**

Co-Author(s): Rumi **KAWASHIMA**, Kenji **MATSUSHITA**, Kohji **NISHIDA**, Tomoyuki **OKAZAKI**, Shinichi **USUI**

Purpose: To evaluate postoperative visual acuity following PreserFlo MicroShunt (PMS) surgery with or without nylon stent placement.

Methods: We retrospectively analyzed 114 eyes that underwent initial standalone PMS surgery at the University of Osaka Hospital between March 2023 and March 2025. Eyes were categorized into non-stent (NS, $n=79$) and stent (S, $n=35$) groups. Parameters assessed included pre- and postoperative LogMAR visual acuity, intraocular pressure (IOP), central four-point threshold values from Humphrey visual field (SITA 24-2 or 30-2), and axial length.

Results: No significant differences were found between groups in age ($p=0.51$), central threshold ($p=0.48$), or axial length ($p=0.30$). IOP was significantly lower in the NS group within 2 days (7.0 ± 2.6 vs. 11.1 ± 3.6 mmHg, and at 1 week (7.1 ± 2.7 vs. 11.3 ± 2.5 mmHg, $p<0.0001$), but not at 1 month ($p=0.42$). Visual acuity change was significantly smaller in the S group (0.04 ± 0.12 vs. 0.12 ± 0.16 LogMAR, $p=0.02$). In the NS group, eyes with ≥ 2 -step visual decline had significantly higher IOP (pre-op: $p=0.04$; 1 month: $p=0.01$) and lower pre-op acuity ($p=0.015$) and superior/inferior central thresholds ($p=0.04$ each).

Conclusions: Stent placement may mitigate early postoperative hypotony and help preserve visual acuity. Preoperative visual function and IOP dynamics appear to influence postoperative visual outcomes.

Abstract No.: 203320

Panel No.: GLA-0355

Visual Reality Training Improves Visual Field Defects in Patients With Glaucoma

First Author: Fen **NIE**

Purpose: To investigate whether virtual reality (VR)-based visual perception training can improve the visual field of patients with glaucoma.

Methods: Patients with open-angle glaucoma who visited the Glaucoma Clinic of Changsha Aier Eye Hospital from July 2024 to March 2025 were recruited. A visual perception examination system was used to conduct binocular visual perception tests, and personalized training plans were developed based on the interocular relative threshold criteria of the patients. The patients completed 3 months of binocular visual perception training at home using a VR headset, with two 20-minute sessions per day. Before training and at the 3rd month after training, the patients' BCVA, IOP, RNFL thickness, ganglion cell thickness, and visual field were examined.

Results: A total of 8 patients completed the study. Before training, none of the 8 patients had fine stereoscopic vision; 4 had gross stereoscopic vision, and 4 had no gross stereoscopic vision. After training, all patients showed improvement in stereoscopic vision. The patients were aged 23-61 years, including 3 males and 5 females. There were no significant differences in BCVA, IOP, RNFL thickness in all directions, or ganglion cell thickness before and after training ($P>0.05$). After training, the visual field index (VFI) ($72.17\pm25.69\%$ vs. $67.75\pm26.88\%$, $P=0.001$) and mean deviation (MD) (-9.07 ± 8.56 dB vs. -11.08 ± 8.41 dB, $P<0.001$) were significantly improved compared with those before training.

Conclusions: VR-based visual perception training can improve the visual function (stereoscopic vision) and visual field of glaucoma patients. Further studies with larger sample sizes are necessary to evaluate the value of this novel therapeutic approach.

Abstract No.: 205997

Panel No.: GLA-0408

Wound Closure Techniques in Trabeculectomy: Impact on Postoperative Wound Leak and Hypotony

First Author: Audrey **TANG**

Co-Author(s): Poemen **CHAN**, Thomas **LAM**, Clarice **SU**

Purpose: To evaluate the incidence and clinical course of wound leak and hypotony following trabeculectomy and to compare the effect of two conjunctival closure techniques—wing sutures versus combined purse-string with horizontal mattress sutures—along with tenon repositioning, on these complications.

Methods: A retrospective chart review was performed for consecutive trabeculectomy cases at a single tertiary eye center.

Results: Among 63 trabeculectomy cases, the overall wound leak rate was 33.3% (21/63). Leaks presented at a mean of 5.0 ± 5.3 days postoperatively and persisted for an average of $11.5 \text{ days} \pm 10.3 \text{ days}$. Conservative management with a bandage contact lens was successful in 85.7% (18/21) of cases, while 14.3% (3/21) required surgical repair. The combined purse-string with horizontal mattress suture technique demonstrated a significantly lower leak rate (19.2%, 5/26) compared to wing sutures alone (43.2%, 16/37; $p = 0.040$). Multilevel mixed-effects logistic regression, adjusting for inter-eye correlation, confirmed the protective effect of the purse-string technique ($p = 0.047$) against wound leak. Tenon repositioning showed a non-significant trend toward reduced leakage ($p = 0.185$). Hypotony occurred in 34.9% of cases (22/63), with a mean onset of 4.09 days and resolution after 9.3 days. Conservative management was effective in 13 cases, whereas 9 required anterior chamber reformulation (mean 2.22 reforms per eye). No significant difference in hypotony rates was observed among closure techniques, and no other factors were significantly associated with hypotony.

Conclusions: Wound leak and hypotony are common complications after trabeculectomy. Using purse-string and horizontal mattress suture, along with tenon reposition, provides a higher rate of watertight closure and reduces complication rate.

Abstract No.: 201332

Panel No.: GLA-0327

"Incidence of and Risk Factors for Steroid-Induced Ocular Hypertension Following Cataract Surgery in 150 Patients Without Glaucoma: A Prospective Study"

First Author: Virabot SOK

Co-Author(s): Sothea AIM, Kossama CHUKMOL, Piseth KONG, Leng UN

Purpose: This study aims to report the incidence of and risk factors for steroid-induced ocular hypertension in patients without glaucoma after cataract surgery.

Methods: This one-year hospital-based prospective observational study observes the changes in postoperative intraocular pressure in 150 non-glaucomatous patients who underwent phacoemulsification or small manual incision cataract surgeries for the incidence of steroid-induced ocular hypertension (defined as intraocular pressure (IOP) higher than 21 mmHg) after using topical prednisolone 1% or dexamethasone 0.1% for 1 month. In addition, risk factors were analyzed.

Results: Among 150 patients, 7 patients (4.67%) showed increased intraocular pressure during our

study, among whom the younger age group (in their 40s or under) and choice of steroid use (dexamethasone 0.1%) were found to be risk factors. However, all of our steroid-induced ocular hypertension patients had their intraocular pressure notably returned to within normal limits ($<21 \text{ mmHg}$) after 2 weeks of steroid cessation.

Conclusions: This study shows that topical steroids could be safely used by cataract surgeons postoperatively in non-glaucomatous patients with regard to steroid-induced ocular hypertension, as the risk is relatively low (4.67%) and the patients' intraocular pressure will return to normal limits upon cessation of steroid. Although some precautions should be taken with patients in their 40s or under and with a choice of steroid, dexamethasone.

Intraocular Inflammation, Uveitis and Scleritis

Abstract No.: 202996

Panel No.: IUS-0460

A Case of Red Eye With Pain and Headache

First Author: Yujie YAN

Co-Author(s): Yi CHEN, Honglei HAN, Mengyu HAN, Xiaoming SHU

Purpose: To report a case of scleritis with atypical relapsing polychondritis.

Methods: Case report.

Results: A 66-year-old female was admitted to the hospital with intermittent eye redness with pain and headache in both eyes for over a month. She had high IOP up to 30mmHg and was treated eye drops. BCVA was 0.6 in both eyes, IOP (mmHg) was 21.3 in the right eye and 25.3 in the left eye. Bilateral conjunctiva and sclera congestion were obviously seen. She had 3+++ mutton-like kps and 1+ flare in the anterior chamber. Vitreous was clear and fundus was almost normal. B-ultrasound indicated thickening of the eye walls with typical "T-sign". No significant leakage and vessel staining was found in FA+ICG except optic disc staining in late stage. OCT indicated choroidal folds. CRP and ESR were significantly increased. Aqueous humor test showed a significant increase in inflammatory factors. PET-CT indicated increased local metabolism in the upper and posterior wall of the left nasopharynx, left nasal tip, bilateral auricles, epiglottis, and thyroid cartilage suggesting the possibility of multiple cartilage inflammations; Pathological examination of the cartilage and subcutaneous tissue of the right auricle suggested lymphocyte infiltration in the cartilage, skin, and subcutaneous fibrous tissue. Scleritis with recurrent polychondritis was diagnosed. Methylprednisolone and cyclophosphamide were administered intravenously. Symptoms were relieved,

conjunctival and scleral congestion were reduced, and ESR and CRP were decreased.

Conclusions: Etiological diagnosis of scleritis is important in clinical practice. Relapsing polychondritis should be considered for scleritis with negative etiological laboratory tests.

Abstract No.: 203719

Panel No.: IUS-0464

A Conundrum of Cladosporium Endophthalmitis

First Author: Lisa SUNNY

Co-Author(s): Rajshree EZHILAN, Vedhanayaki RAJESH, Radhika THUNDIKANDY

Purpose: To report an unusual case of Cladosporium endophthalmitis.

Methods: A 54-year-old man presented to the uvea clinic with a 1-month history of blurred vision in the right eye. He had complaints of redness previously, which was relieved with topical steroids and cycloplegics. At presentation, he was on topical and oral steroids. He mentioned noticing a white meniscus in the eye, which had recently increased in height. He worked in the veterinary department and had a doubtful history of trauma to eye with goat tail a month back. Best corrected visual acuity was 1/60, with 4+cells in anterior chamber(AC); thick endoexudates with few blackish pigments settled in AC inferiorly; at nasal pupillary and lens margin and at 1 o'clock position. Fundus had grade 2 vitreous cells and haze, and a few exudates in the vitreous. A diagnosis of endophthalmitis was made. Oral and topical steroids were stopped, and the patient was started on topical and oral broad-spectrum antibiotics. Pars plana vitrectomy and lensectomy were done with intravitreal vancomycin, ceftazidime, and voriconazole injection. Remnant exudates behind the iris were removed with a cutter. Culture of aqueous and vitreous grew Cladosporium fungus, which prompted 2 repeat voriconazole injections and initiation of oral itraconazole 200 mg bd.

Results: Post 3 months of itraconazole, patient has 6/9 BCVA, with complete resolution of exudates and is planned for secondary IOL implantation.

Conclusions: A high index of suspicion should be kept for fungal etiology in case of atypical presentations. This, when managed appropriately, can provide an excellent visual outcome.

Abstract No.: 210364

Panel No.: IUS-0486

A Nanotechnology-Based Dexamethasone Delivery System for Treatment of Anterior Uveitis

First Author: Jiabei XIONG

Co-Author(s): Jiayin CAI, Jian LI, Nasha QIU, Yangla XIE, Yijia ZHANG

Purpose: To develop a novel dexamethasone-loaded nanoparticle(DEX-NP) system to overcome the limitations of conventional eye drops, including poor ocular bioavailability and off-target effects, for anterior uveitis treatment.

Methods: DEX-NPs were synthesized using an optimized nano-preparation technique and systematically characterized. The biocompatibility, cellular uptake, and transport behavior of the system were assessed in human corneal epithelial cells. The therapeutic efficacy and safety were further investigated in an animal model of endotoxin-induced anterior uveitis, comparing the DEX-NPs to commercial dexamethasone eye drops.

Results: The optimized DEX-NPs demonstrated desirable physicochemical properties and excellent biocompatibility. In vitro, DEX-NPs significantly enhanced drug permeability across the corneal epithelium barrier. In the uveitis animal model, DEX-NPs achieved superior control of intraocular inflammation compared to conventional eye drops, with no signs of ocular toxicity.

Conclusions: This study demonstrates that the nanotechnology-based dexamethasone delivery system, as a non-invasive therapeutic strategy, holds considerable potential for improving efficacy and safety in the treatment of anterior uveitis, with significant potential for clinical translation.

Abstract No.: 202735

Panel No.: IUS-0458

A Rare Case of Retinochoroiditis in a Patient Co-Infected With Syphilis, Tuberculosis, and Human Immunodeficiency Virus (HIV) in Rural Papua

First Author: Janice Eloise TAN

Co-Author(s): Evander Samuel BANUA ROUW, Dian I PAPENTE, Nathaniel Farrel TAN, Nyssa Alexandra TEDJONEGORO

Purpose: A 29-year-old man presented with sudden vision loss in the right eye. He was diagnosed with pulmonary tuberculosis 8 months ago and received antitubercular therapy. BCVA OD was 1/300 and BCVA OS was 20/20. Anterior segment had cell & flare. Fundoscopy OD revealed vitritis, papillitis, circinate hard exudates, soft exudates, chorioretinitis, peripapillary hemorrhage, and retinal vasculitis with dilatation. Retinal vasculitis, dilatation, and scattered

soft exudates found in OS. ELISA for HIV, rapid plasma reagin, and treponema pallidum hemagglutination test were positive. CD4 count was 278 cells/ μ L. A chest x-ray found active pulmonary tuberculosis. Treatment was with antisyphilis, antituberculosis, and antiretrovirals. Coinfection syphilis and tuberculosis in patients with newly diagnosed HIV is rare. Screening HIV-positive individuals for multiple co-infections is an appropriate measure.

Methods: This is a rare case report of a patient with retinochoroiditis coinfecting with syphilis, tuberculosis, and HIV. The patient was reviewed for clinical history, clinical examination, and prompt treatment.

Results: Antiretroviral therapy was deferred because of presence of multiple co-infections, the potential risk of immune reconstitution, good CD4 count, and oral corticosteroids were administered. At one month follow-up, BCVA OD improved to 20/40. Found a quiet anterior chamber, improvement in retinal abnormalities. Subsequently, antiretroviral therapy was given.

Conclusions: Intraocular inflammation caused by syphilis, tuberculosis, and HIV in the same eye is rarely reported. This case illustrates the increased susceptibility of HIV-infected patients to multiple opportunistic infections. Systematic and multidisciplinary management approach is essential to effectively control inflammation and recovery of visual acuity.

Abstract No.: 202368

Panel No.: IUS-0456

A Retrospective Study to Describe Clinical Features and Multimodal Imaging Features of Ocular Parasitosis in a Tertiary Care Ophthalmic Centre in South India

First Author: Eliza ANTHONY

Co-Author(s): Prabu BASKARAN, Anand RAJENDRAN, Mulla SHAIBAAN

Purpose: To study clinical features and multimodal imaging features of ocular parasitosis in a tertiary care ophthalmic centre in south India.

Methods: It's a retrospective study of patients diagnosed with ocular parasitosis, who presented to our outpatient clinic, over eight years (2017-2025). Complete analysis of demographic and clinical features was done. Detailed history taking, ocular examination, colour fundus photography, spectral domain optical coherence tomography (SDOCT), fluorescein angiography (FFA), indocyanine angiography (ICG) and B-scan ultrasonography was done to describe the multimodal features. Necessary blood work was performed.

Results: Among the 257 cases of ocular parasitosis, 187 cases were of ocular toxoplasma with age range of 4-73 years (mean age of 39.5 years), 31 cases of Diffuse

Unilateral Subacute Neuroretinitis (DUSN) having age range of 11-71 years (mean age of 29.35 years), 37 cases of toxocara in age group of 4-65 years (mean age of 26.1 years) and two cases of Gnathostomiasis. No gender predilection was noted in the toxocara and DUSN group, whereas in the toxoplasmosis group male gender was predominant. Appropriate blood work and multimodal imaging was done in each case and correlations were made to plan management options.

Conclusions: Our study demonstrates various clinical features of ocular parasitosis and the multimodal imaging features, which can aid in prompt and definitive diagnosis and management.

Abstract No.: 202427

Panel No.: IUS-0457

A Vision of Vasculitis: Ocular Ischemia in Takayasu Arteritis

First Author: Sabrina Adabelle TIU

Co-Author(s): Timothy TANG LEE SAY

Purpose: To present a case of Takayasu retinopathy (TR), emphasizing the importance of early ophthalmic evaluation, laboratory work-up, and multidisciplinary management in patients diagnosed with or suspected to have Takayasu arteritis (TAK).

Methods: This study was conducted as a retrospective chart review of a single patient with TAK. Clinical data included visual acuity, slit-lamp biomicroscopy, gonioscopy, and fundus examination. Ancillary testing consisted of fluorescein angiography, indocyanine green angiography, and computed tomography angiography. Laboratory evaluation included inflammatory markers and infectious screening. Management strategies and short-term ocular outcomes were documented.

Results: A 21-year-old Filipino female presented with a two-year history of bilateral progressive vision loss. At baseline, visual acuity was hand movement in both eyes. Examination revealed iris and angle neovascularization with diffuse retinal ischemia, and angiography confirmed widespread retinal nonperfusion. Systemic evaluation demonstrated diminished upper limb pulses, asymmetric blood pressure, elevated inflammatory markers, and diffuse arterial wall thickening with branch vessel stenosis on CT angiography. Laboratory work-up was positive for purified protein derivative (PPD) and QuantiFERON-TB Gold. A diagnosis of TAK was established. The patient was started on immunosuppressants, and both eyes received intravitreal anti-VEGF injections with panretinal photocoagulation. One week after completing ocular treatment, vision improved to counting fingers at 5 feet in the left eye and remained hand movement in the right eye.

Conclusions: Ocular manifestations may precede systemic features in TAK. Early ophthalmic recognition, supported by laboratory and imaging findings, is

essential for timely multidisciplinary intervention to preserve vision and manage systemic disease.

Abstract No.: 204739

Panel No.: IUS-0469

Acute Anterior Uveitis Secondary to Hyperglycemic Crisis: A Case Report

First Author: Isela Angela VELASCO

Co-Author(s): Paul Gilbert APILADO, Francis Ezra LAXAMANA, Ronnie MANAYSAY, Giancarlo Miguel SANTOS

Purpose: To report a rare case of acute anterior uveitis with hypopyon associated with markedly elevated glycemic levels.

Methods: A 55-year-old male with poorly controlled Type 2 Diabetes Mellitus (HbA1c 15.73%) presented with a three day onset of unilateral hypopyon, eye redness, ocular discomfort, blurring of vision, and photophobia. Initial workup focused on infectious and autoimmune etiologies, which were ruled out through comprehensive laboratory tests and imaging.

Results: Of particular significance was the immediate resolution of the hypopyon the following day after prompt correction of the hyperglycemic crisis, even before starting topical corticosteroids or antibiotics. After ten days of topical corticosteroids and cycloplegics, along with good glycemic control, there was improvement in ocular symptoms and no recurrence on follow-up.

Conclusions: This case reinforces the potential role of hyperglycemia as a precipitating factor in intraocular inflammation. It underscores the importance of considering uncontrolled diabetes as a rare trigger of uveitis, particularly when infectious and autoimmune causes are excluded.

Abstract No.: 204977

Panel No.: IUS-0471

Adalimumab Reprograms M1 Macrophages to Promote CD4+ T Cell Apoptosis and Attenuate Th1/Th17 Responses in Behçet's Disease and Vogt-Koyanagi-Harada Syndrome

First Author: Yunyun ZHU

Purpose: To investigate the effects and mechanisms of adalimumab on monocyte-derived macrophage polarization and CD4+ T cell responses in patients with Behçet's disease (BD) and Vogt-Koyanagi-Harada (VKH) syndrome.

Methods: Macrophages were differentiated from CD14+ monocytes isolated from 30 patients with active BD disease and 32 patients with VKH syndrome. The effects of adalimumab on M1 macrophage polarization and cytokine production were assessed by flow cytometry and ELISA. Coculture experiments

of adalimumab-treated or untreated patient macrophages with CD4+ T cells from healthy donors were performed to evaluate T cell apoptosis and Th1/Th17 differentiation. Integrated transcriptomic and proteomic analyses were conducted on adalimumab-treated M1 macrophages from BD and VKH patients.

Results: Pro-inflammatory M1 macrophage polarization was significantly increased in BD and VKH. Adalimumab treatment reversed the M1-polarized phenotype and markedly reduced the expression of TNF- α , IL-1 β , IL-6, and IL-12 (all $P < 0.05$). Adalimumab-conditioned M1 macrophages promoted CD4+ T cell apoptosis and inhibited Th1/Th17 differentiation, while adalimumab itself had no direct effect on T cells. Multi-omics analysis revealed disease-specific mechanisms: significant downregulation of metallothionein members (MT1H, MT1G, MT1A, MT1F, MT1E, MT1X, and MT2A) was specific to BD, while suppression of SAA1, SLC39A8, SLC1A3, and TNFAIP2 characterized VKH.

Conclusions: Adalimumab exerts its therapeutic effects by inhibiting pro-inflammatory M1 macrophage polarization, which subsequently promotes CD4+ T cell apoptosis and attenuates Th1/Th17 immune responses. Disease-specific targets, particularly metallothioneins in BD, were identified, providing novel insights for precision immunotherapy in uveitis.

Abstract No.: 201756

Panel No.: IUS-0449

Airborne Fine Particulate Matter (PM2.5) Damages the Inner Blood-Retinal Barrier by Inducing Inflammation and Ferroptosis in Retinal Vascular Endothelial Cells

First Author: Yuzhou GU

Co-Author(s): Qiuli FU, Ke YAO

Purpose: Epidemiological studies suggest a potential link between major atmospheric pollutants like fine particulate matter (PM2.5) and retinal diseases such as retinal artery occlusion, including changes in retinal layer thickness and vascular caliber. This study aims to explore the impact and molecular mechanisms of atmospheric pollutant exposure on the retina using animal and cell models.

Methods: In vivo experiments utilized rat models exposed to PM2.5 suspension via eye drops. Inner blood-retinal barrier (iBRB) function was assessed using OCTA and Evans blue extravasation assays. In vitro experiments employed a model of human retinal microvascular endothelial cells (HRMECs) exposed to PM2.5. Cell viability, proliferation, migration, along with markers of inflammation and ferroptosis were evaluated.

Results: We observed iBRB damage in PM2.5-exposed animals, manifested as retinal vascular dilation, increased leakage, and retinal edema.

Concurrently, increased adhesion of leukocytes to vessels and elevated expression of inflammation-related proteins indicated that PM2.5 induces retinal vascular endothelial cell damage by triggering inflammatory responses. To investigate the specific injury mechanisms, we found that PM2.5 induced time- and concentration-dependent damage in HRMECs, inhibiting their viability, proliferation, and migration, while inducing inflammation and apoptosis. Ferroptosis was also triggered by PM2.5 exposure in HRMECs. Notably, the ferroptosis inhibitor Ferrostatin-1 significantly alleviated PM2.5-induced cytotoxicity.

Conclusions: This study is the first to investigate the effects of PM2.5 on the retina in vivo, revealing the critical role of inflammation and ferroptosis in PM2.5-induced iBRB injury. These novel findings further provide new perspectives for the prevention and treatment of PM2.5-related fundus pathologies.

Abstract No.: 202169

Panel No.: IUS-0452

Anterior Non-Necrotizing Scleritis With Semilunar Keratopathy- Morphological Patterns, Treatment Outcomes and Resolution

First Author: Vishal JADHAV

Co-Author(s): Anup KELGAONKAR, Mitali MANGOLI

Purpose: Non-necrotizing anterior scleritis has been linked to multiple etiologies. In literature, a semilunar sign is defined as keratopathy affecting the posterior corneal stroma and is usually associated with anterior scleritis. We report a cohort of such patients to determine their clinical presentation and management course.

Methods: A prospective, interventional, multicenter study included 14 patients (18 eyes) clinically diagnosed with anterior scleritis and semilunar sign. The descriptive findings and inclusion of cases were done by a single observer.

Results: Mean age was 40.92 years. 10 were unilateral, 4 were bilateral. All patients denied prior history of tuberculosis, except one. Mean number of semilunar lesions was 2.1. All patients had active anterior non necrotizing scleritis, with temporal (5) and superior quadrants (4) commonly involved. All semilunar lesions involved posterior stroma with granular (12), tigroid (2) and homogenous (2) as morphological patterns. 2 cases had ANA positive, while 5 had Mantoux positive. All cases were started on topical steroids and cyclosporine 0.1%, while 4 cases required systemic immunosuppressive therapy. 5 cases showed resolution of lesions and scleritis at mean treatment period of 3 months.

Conclusions: Anterior scleritis associated with semilunar lesions, although demonstrate slow resolution, but show response to topical steroids and immunosuppressives.

Abstract No.: 202199

Panel No.: IUS-0454

Anterior Non-Necrotizing Scleritis in Ophthalmia Nodosa: Clinical Features and Healing Patterns

First Author: Vishal JADHAV

Co-Author(s): Kasturi CHAVAN, Anup KELGAONKAR

Purpose: Caterpillar hair setae-induced ophthalmic manifestations exhibit a seasonal pattern and have a wide spectrum of manifestations. We describe these morphological patterns at presentation and post-treatment.

Methods: Retrospective case series of cases presenting with ophthalmia nodosa associated scleritis.

Results: We analysed retrospectively 22 patients with a mean age of 40.5 years (+/-12.50 years). We observed a mean of 29.53 days' delay between presentation as scleritis and exposure to caterpillar setae. Inferonasal scleral quadrant was most common (n=13), followed by inferotemporal (n=9). Diagnostic feature was identification of corneal setae (n=22); common location being posterior corneal stroma (n=17). The healing pattern was non-necrotising (n=22) with the development of conjunctival brown pigmentation (n=16) in the area of scleritis. Pigmentation was either unifocal (n=10) or multifocal (n=6). The most common pattern of pigmentation noted was linear (n=14). Vitreous setae were seen in four eyes. Management of scleritis- 1. topical steroids & oral NSAIDs (n=20); 2. Oral steroids (baseline one eye, consecutively two eyes). Corneal removal of caterpillar hair was done in 5 patients. Recurrence was noted in the form of scleritis (n=5), keratitis (n=1), vitritis (n=1), and anterior chamber inflammation (n=1) requiring additional extension of treatment, including pars plana vitrectomy (n=1).

Conclusions: Caterpillar hair setae can cause anterior scleritis, which had a healing pattern of non-necrotising with localised conjunctival pigmentation. The scleritis resolved with oral NSAIDs, topical steroids and rarely needed oral steroids. It recurred in about one-fifth of the cases.

Abstract No.: 207025

Panel No.: IUS-0483

Atypical Management of Presumed Tubercular Choroiditis With Isoniazid

First Author: Syecha Tsania ALAYDRUS

Co-Author(s): Halida WIBAWATY, Gagan Vihari Izzan YULIANTO

Purpose: To report a case of presumed tubercular choroiditis with multiple large choroidal tuberculomas that improved with isoniazid and corticosteroid therapy.

Methods: A 73-year-old woman presented with long-standing blurred vision mainly in the right eye. Initial

examination revealed UCVA 1/300 and 0.4, grade 2 cataracts in both eyes, and vitreous opacities. Fundus photography of the right eye showed multiple, yellowish elevated choroidal lesions, which collectively occupied approximately one-quarter to one-third of the imaged fundus. Laboratory evaluation showed elevated ESR, but Mantoux testing and systemic evaluation for tuberculosis were negative. The patient denied a history of tuberculosis and currently had no systemic TB symptoms. Based on these findings, a diagnosis of presumed tubercular choroiditis was made. The patient was started on oral isoniazid monotherapy combined with oral and topical corticosteroids.

Results: After two weeks of isoniazid therapy, visual acuity improved from UCVA 1/300 to 2/60. By four weeks, UCVA further improved to 0.5 in the right eye, accompanied by regression of the choroidal lesions.

Conclusions: This case demonstrates clinical improvement of presumed tubercular choroiditis with isoniazid monotherapy plus corticosteroids, suggesting a potential therapeutic role despite current recommendations for multidrug anti-tubercular therapy.

Abstract No.: 205617

Panel No.: IUS-0475

Balanced Medication Use in Patients With Systemic Lupus Erythematosus Fungal Endophthalmitis

First Author: Zhongyang YAN

Co-Author(s): Xin JIN, Lifei WANG, Kaixuan ZHAO

Purpose: Endogenous fungal endophthalmitis (EFE) is a blinding eye disease caused by hematogenous spread and is easily misdiagnosed as retinal vascular disease or noninfectious uveitis. This article reports the diagnosis and treatment of *Candida albicans* EFE secondary to SLE and vaginitis, exploring the risk of misdiagnosis and individualized management strategies.

Methods: A 33-year-old female SLE patient with vaginitis and nephrolithiasis was admitted to the hospital with blurred vision in her left eye. After differential diagnosis, EFE was confirmed and treated with intravitreal voriconazole and vitrectomy, combined with systemic oral fluconazole.

Results: There is a conflict between the underlying SLE disease and EFE: immunosuppression creates conditions for fungal entry into the bloodstream, but lupus control requires maintenance of immunosuppression, and antifungal treatment requires immune restoration. Compared to patients with common fungal endophthalmitis, our team adopted a prolonged antifungal therapy strategy, extending oral fluconazole therapy to 16 weeks after ocular treatment, which significantly improved the patient's vision, infection, and retinal condition.

Conclusions: Intravitreal injection of 100 µg voriconazole can reach a bactericidal concentration of 200 times the MIC90, and long-term regular systemic medication is recommended. Clinically, we should be alert to EFE manifestations. Even if the anterior segment symptoms are mild and the vitreous humor test is negative, infection cannot be ruled out. Antifungal treatment should be balanced with hormone therapy, and individualized treatment should be emphasized.

Abstract No.: 210368

Panel No.: IUS-0488

Bartonella-Associated Optic Retinitis: A Case Report of Treatment With Ranibizumab Plus Compound Sulfamethoxazole

First Author: Qihang LI

Co-Author(s): Jian LI

Purpose: To describe the clinical features, diagnosis, and treatment outcomes of Bartonella-associated optic retinitis (related to Cat Scratch Disease, CSD) and provide references for clinical differential diagnosis.

Methods: A retrospective analysis of a single case was conducted, integrating ophthalmic specialist examinations, multimodal imaging (OCT, FFA), laboratory tests, and etiological detection, with 13 weeks of follow-up data recorded.

Results: A 43-year-old male with hypertension and asymptomatic hepatitis B virus (HBV) carrier state (Xiaoyangsan) had blurred vision in the right eye for 2 days. He was misdiagnosed as optic neuritis locally, with ineffective hormone therapy. After transfer, his right eye visual acuity was 0.5, with optic disc edema (accompanied by hemorrhage), macular edema, and star-shaped exudation. The right eye's average retinal nerve fiber layer (RNFL) thickness was 146 µm (left eye: 97µm), and macular ILM-RPE thickness was 426 µm (left eye: 253µm). Further history showed he long-term kept unvaccinated stray cats. Serum Bartonella indirect immunofluorescence assay (IFA) titer was 1:256 (indicating recent infection). Post-diagnosis, he received 3 intravitreal Ranibizumab injections plus oral compound sulfamethoxazole tablets (twice daily for 8 weeks). After 13 weeks of follow-up, his right eye visual acuity improved to 1.0, RNFL thickness decreased to 102 µm, and edema and exudation completely resolved.

Conclusions: Inquiry about cat contact history, serum IFA detection, and multimodal imaging can confirm this disease, and Ranibizumab combined with compound sulfamethoxazole is an effective treatment.

Abstract No.: 201511**Panel No.: IUS-0447**

Biopsy-Proven Herpes B Virus Infection With Ocular Involvement in a Living Patient Following Monkey Bite

*First Author: Wilson Chung Fai CHAN**Co-Author(s): Rose Pui San CHAN, Eva Wai Nam WONG*

Purpose: Herpes B Virus infection is a rare zoonotic disease acquired via contact with macaques. Human infection of the virus typically leads to encephalitis and myelitis, which may result in permanent neurological sequelae or death. Ocular involvement of Herpes B virus is rarely reported in literature. We report the first vitreous biopsy proven Herpes B virus related panuveitis and chorioretinitis in an adult with severe neurological involvement.

Methods: Retrospective review of medical record was performed to extract the essential clinical history and management.

Results: A 37-year-old man with good past health developed severe Herpes B Virus infection after bitten by a monkey in Hong Kong. He presented with severe meningoencephalitis with bilateral ocular involvement. Diagnosis was delayed as the collateral history of monkey bite was obtained 10 days after admission. Ocular manifestations included anterior uveitis, vitritis, vasculitis and multifocal necrotizing haemorrhagic chorioretinitis with optic nerve involvement. Left eye vitreous biopsy PCR was positive for Herpes B Virus. Treatment included systemic and intravitreal ganciclovir injections, leading to gradual improvement of ocular disease. On his final eye review, retinitis had resolved bilaterally. Both eye showed optic atrophy, chorioretinal atrophy and residual vitritis. However patient had poor systemic recovery, resulting in death after two months.

Conclusions: This is the first reported vitreous biopsy-proven intraocular Herpes B Virus infection in a living patient. Systemic infection led to devastating outcome due to delay in diagnosis and severe neurological involvement, emphasizing the need of prompt diagnosis and treatment to prevent blindness and mortality.

Abstract No.: 206864**Panel No.: IUS-0482**

Clinical Profile and Long-Term Prognosis of Pediatric Uveitis at One Medical Institute in Beijing

*First Author: Liu YANG**Co-Author(s): Zonghui MA*

Purpose: To analyze the clinical characteristics and the prognosis of pediatric uveitis in a single eye center in Beijing.

Methods: This is a retrospective study. The children who were diagnosed with uveitis at the onset, aged no

more than 16 years old, were included. The patients underwent routine visual acuity, slit-lamp microscopy, ophthalmoscopy, and relevant laboratory tests. The clinical data of patients' onset age, unilateral or bilateral eye involved, recurrence, inflammation site, etiology, treatment modality, complications, and other clinical data were collected. The multifactorial regression analysis model was established to comprehensively analyze the factors affecting the prognosis of uveitis in children.

Results: A total of 198 pediatric uveitis patients were included in the study, with a mean age of 11.6 ± 3.1 years (range :2-16), and a slight female predominance (55.2%). A high proportion of patients presented with an insidious onset (52.5%) and bilateral involvement (64.1%). The most common type was pan-uveitis (43.9%), the most frequent cause was Juvenile Idiopathic Arthritis (13.6%), and the most common complications were concomitant cataracts (17.2%) and secondary ocular hypertension/glaucoma (13.1%). Key factors influencing visual prognosis include early standardized treatment, recurrence frequency, and ocular complications

Conclusions: Pediatric uveitis presents greater diagnostic and therapeutic challenges than adult uveitis due to insidious onset, atypical symptoms, relapsing course, and resistance to conventional management. Early diagnosis, individual-based, and more aggressive treatment are crucial. During management, efforts should focus on minimizing the risk of vision-threatening complications from uncontrolled ocular inflammation, preventing lifelong burdens of vision loss and medication side effects on affected children and their families.

Abstract No.: 200416**Panel No.: IUS-0440**

Clinical Profile of Sympathetic Ophthalmia in a Tertiary Eye Care Centre in Eastern India

*First Author: Amitabh KUMAR**Co-Author(s): Jyotirmay BISWAS*

Purpose: To study the clinical profile of 43 patients with Sympathetic Ophthalmia (SO) in a tertiary eye care centre in Eastern India

Methods: Retrospective observational case series of 43 patients between January 2009 and December 2023. Data was compiled based on a detailed history, a thorough ophthalmological examination, relevant investigations, treatment and visual outcome

Results: Out of the 43 patients, 33 were males (76.74%) with a mean age of 34.60 years. The commonest cause was an open globe injury (34.9%). 11 patients (25.5%) developed SO post intraocular surgery. 2 patients had already undergone evisceration at the time of presentation. Mean duration between trauma or surgery and the onset of symptoms in the sympathising

eye was 77.3 months. Commonest symptom was diminution of vision(100%). Commonest anterior segment sign was granulomatous uveitis (88.3%). 88.3% had vitreous cells,53.5% had disc oedema and exudative retinal detachment each. 76.7% of patients were treated with intravenous steroids. Commonest steroid sparing agent used was azathioprine (81.4%). Average follow-up period was 40 months. Commonest complications were glaucoma (25.6%) and cataract (16.3%). Pre-treatment vision in the sympathising eye (LogMAR) was 1.03+/-1.02 which improved to 0.56+/-0.99 post treatment. 48.8% patients had no recurrence whereas 34.8% had one,9.3% had 2 and 2.3 % had 3 or more recurrences

Conclusions: Sympathetic Ophthalmia is a potentially visually devastating condition affecting people in their most productive years. It needs an early diagnosis and adequate treatment in view of recurrences

Abstract No.: 204521

Panel No.: IUS-0467

Collateral Damage: A Case Report on Sympathetic Ophthalmia in a 35-Year-Old Female Filipino Patient

First Author: Pia Jejame **MAMARIL**

Co-Author(s): Angelique **ANG**, *Janice* **FERRER-BERNARDO**

Purpose: Sympathetic ophthalmia is a rare autoimmune ocular inflammatory, with an incidence of approximately 0.03 per 100,000 persons per year. This case report details the progression, diagnosis, and management of SO, specifically analyzing the sequential blurring of vision in the fellow eye.

Methods: A 35-year-old Filipino female initially presented with a one- month history of bilateral sequential progressive painless blurring in the left eye, following a prior traumatic injury on the right eye. Initial ophthalmic examination revealed poor light projection and an intraocular pressure of 8 mmHg in OD, along with a supraorbital scar, enophthalmos, and Grade I traumatic hyphema. Visual acuity in OS was counting fingers, best corrected to 20/200, with granulomatous keratic precipitates, an IOP of 12 mmHg and optic nerve swelling. Despite multiple consultations and an initial impression of non-penetrating globe injury with intraocular hemorrhage on OD and optic disc edema on OS, further diagnostic workup- including an orbital MRI with contrast- led to the final diagnosis of a ruptured right globe, and Sympathetic Ophthalmia in OS.

Results: Early enucleation of the injured OD was performed, a measure known to improve the visual prognosis of the fellow eye. Also, following treatment with high-dose intravenous steroids and immunosuppressive therapy, vision in OS improved to 20/20.

Conclusions: The incidence of SO following traumatic eye injury is approximately 0.19%. Management requires prompt hospitalization, administration of high-dose corticosteroids, and Immunosuppressive therapy, which are key to improving visual outcomes in affected patients.

Abstract No.: 202031

Panel No.: IUS-0450

Complement Mediated Innate Immunity in Tubercular Serpiginous-Like Choroiditis: Initial Insights From a Targeted Genetic Study

First Author: Reema **BANSAL**

Co-Author(s): Payal **BAJAJ**, *Prateek* **BHATIA**, *Vishali* **GUPTA**, *Basavaraj* **TIGARI**

Purpose: Complement system is a key part of innate immunity, involved in inflammation. Complement proteins are expressed by retinal pigment epithelial cells. Dysregulation of this pathway is linked to diseases like AMD, diabetic retinopathy, and uveitis. However, its role in tubercular uveitis is unclear. This study investigates complement factor variations in patients with tubercular Serpiginous-like Choroiditis (TB-SLC).

Methods: Participants included: Group A (30 TB-SLC patients), Group B (30 TB-associated uveitis without SLC), and Group C (90 healthy controls). Genomic DNA was extracted from peripheral blood. A custom amplicon-based next-generation sequencing (NGS) panel targeting 25 complement-related genes was employed to detect single nucleotide variants (SNVs), insertions/deletions (INDELs), and copy number variations (CNVs). Variants were annotated and mapped to different complement pathways.

Results: Distinct variant patterns were observed. Group A had more CNVs (n=11) than SNVs/INDELs (n=5), involving C3, C5, and CFH. Group B showed more SNVs/INDELs (n=13) than CNVs (n=5), affecting CFHR1/2/4, CFB, CFI, and others. Controls had five SNVs/INDELs and no CNVs. Group A variants mostly affected complement proteins, while Group B showed a balanced protein-regulator distribution. Pathway analysis revealed predominant involvement of alternative pathway in Groups A and B.

Conclusions: This first-of-its-kind study in TB-SLC highlights the potential role of complement pathway variants, in disease susceptibility and phenotype. This opens future directions for prospective validation, and in vitro animal or cell line functional studies before exploring anti-complement therapy for TB-SLC.

Abstract No.: 210035**Panel No.: IUS-0485**

Core Fucosylation Modulates T Cell Proliferation and Differentiation in Autoimmune Uveitis

First Author: Peng XUENING

Purpose: Autoimmune uveitis (AU) is a severe disorder causing poor vision and blindness. Immune checkpoint inhibitor-associated uveitis (ICIU) accounts for 1% of ocular immune-related adverse events (irAEs). Core fucosylation—catalyzed by FUT8—represents a specialized N-glycosylation mechanism that has been reported to modulate several autoimmune diseases. However, the pathogenic mechanisms of FUT8 in AU as well as ICIU are still unknown.

Methods: In this paper, single-cell RNA sequencing of the retina and cervical draining lymph nodes (CDLNs) in experimental autoimmune uveitis (EAU) mice was conducted to identify the N-glycosylation level and upregulation of the core fucosylation-related gene FUT8.

Results: In results, our data indicated that the FUT8 inhibitor effectively alleviated inflammatory infiltration and reversed pathological alterations of EAU via suppression of core fucosylation. The imbalance of T effector (Teff) cells/T regulator (Treg) cells was rescued in CDLNs, spleen and retina in the EAU model. On the other hand, in tumor-bearing EAU mice and immune checkpoint inhibitor-associated uveitis (ICIU) models, FUT8 inhibitor demonstrated dual anti-tumor and anti-inflammatory effects. Tumor volume and weight in both B16 + EAU and B16 + EAU + anti-PD-1 (ICIU) models were significantly reduced by the FUT8 inhibitor. Though EAU inflammation level was exacerbated with anti-PD-1 treatment, our data suggested that the FUT8 inhibitor effectively restored the abnormal Teff/Treg ratio and alleviated EAU symptoms. Furthermore, combination therapy with FUT8 inhibitor and anti-PD-1 enhanced CD8⁺ T cell-mediated cytotoxicity while reducing CD8⁺ T cell exhaustion. Additionally, the FUT8 inhibitor promoted tumor cell apoptosis in vitro.

Conclusions: Collectively, these results elucidate the immunomodulatory mechanisms of the FUT8 inhibitor, highlighting its potential as a novel therapeutic strategy for AU and ICIU.

Abstract No.: 200436**Panel No.: IUS-0439**

Diagnosis and Management in a Case of Ampiginous Chorioretinitis

*First Author: Chynna Pearl Tana BACCAY**Co-Author(s): Albert John BROMEIO*

Purpose: Ampiginous chorioretinitis (AC) is a rare inflammatory chorioretinopathy involving the retinal pigment epithelium (RPE) in a severe variant with features overlapping of acute posterior multifocal

placoid pigment epitheliopathy (APMPEE) and serpiginous choroiditis (SC). The lesions tend to recur in crops over time, leading to a wave of active chorioretinitis lesions and atrophy in healed areas. We report the clinical findings, diagnostic features, and management of a case of relentless placoid chorioretinitis (RPC).

Methods: Case Report

Results: A 33 year old male presented with blurring of vision OU. Best corrected visual acuity (BCVA) was 20/63 OD and 20/32 OS. Examination showed multifocal placoid hyper- and hypopigmented lesions on the retina associated with vitritis. Fluorescein angiography (FA) showed early hypofluorescence with late hyperfluorescence of active lesions and transmission defects in old lesions. OCT revealed RPE discontinuity and outer retinal loss with areas of hypertransmission defects and focal areas of RPE bumps. Fundus autofluorescence (FAF) showed mixed areas of hyperautofluorescent hypoautofluorescent areas. Systemic work-up was unremarkable. The patient was diagnosed with AC OU and started on course of oral prednisone as well as methotrexate. Over a follow-up period of 1 year, active lesions eventually became atrophic with no appearance of new lesions.

Conclusions: AC is a rare but vision-threatening inflammatory condition requiring early diagnosis and prompt initiation of immunosuppressive treatment. Multimodal imaging greatly aids in the diagnosis. Long-term follow-up is essential for effective management and improved visual outcome

Abstract No.: 201391**Panel No.: IUS-0446**

Distinct Glycoprotein B Genotypes in Cytomegalovirus Ocular Infection and Their Potential Impact on Antigen Presentation

*First Author: Tantri LESTARI**Co-Author(s): Hiroko MIYADERA, Yasuo MORI, Mariko SHIRANE, Koh-hei SONODA, Nobuyo YAWATA*

Purpose: Human cytomegalovirus (CMV) establishes latent infection and is typically asymptomatic in immunocompetent hosts. Nevertheless, CMV ocular infection can occur in the absence of immunodeficiency. UL55 encoding glycoprotein B (gB) is essential for viral entry and serves as a major immune target for antibody-mediated immunity. UL55 is highly polymorphic and classified into five genotypes (gB1-gB5). This study investigated the distribution of UL55 genotypes in CMV infection and their impact on antigen presentation.

Methods: Intraocular fluid and blood samples were obtained from 62 patients with CMV ocular infection or CMV viremia. UL55 polymorphic regions were sequenced, and genotype frequencies were determined using multiplex polymerase chain reaction.

gB genotype-specific peptides were identified and assessed in silico for binding affinity to HLA class II molecules. Predicted high-affinity peptides underwent peptide–HLA class II complex expression assays to evaluate binding efficiency.

Results: UL55 genotype distribution differed significantly between the eye and blood. In blood samples, gB2 predominated (41%), whereas in ocular fluid, gB3 (43%) and gB1 (37%) were most frequent, with gB2 found in only 17%. A peptide spanning residues 190–204, shared by gB3 and gB1 but distinct in gB2 was predicted to have altered HLA class II binding affinity. Expression assays confirmed that the gB1/gB3-derived peptide exhibited significantly lower peptide–HLA class II complex expression compared with the gB2-derived peptide.

Conclusions: gB1 and gB3 dominated UL55 genotypes in ocular fluids from patients with CMV infection. These genotypes may facilitate intraocular expansion of CMV through reduced peptide presentation on HLA class II molecules.

Abstract No.: 200862

Panel No.: IUS-0443

Efficacy and Safety of Pulsed Intravenous and Daily Oral Corticosteroids in Non-Infectious Intermediate and Posterior Uveitis: A Systematic Review

First Author: Ayu **NAWANG WULAN**

Co-Author(s): Teofilus **ABDIEL**, Elizar **ASRIYANI AKIB**

Purpose: Intermediate and posterior non-infectious uveitis account for 5–15% of visual impairment. Corticosteroids remain first-line, but the relative efficacy of pulsed intravenous (IV) versus daily oral therapy is uncertain. This review evaluates efficacy and safety.

Methods: Following PRISMA guidelines, PubMed, Cochrane Library, and ScienceDirect were searched (2005–2025). Nine studies including (638 patients; three randomized controlled trials, six observational) were analyzed. Risk of bias was assessed using the Newcastle–Ottawa Scale for observational or Cochrane Risk of Bias tool for RCTs. Study selection and data extraction were performed independently by two reviewers, with discrepancies resolved through consensus or adjudication by a third author.

Results: Most included studies involved Vogt–Koyanagi–Harada (VKH) and Behçet’s representative forms of uveitis. In VKH, comparative studies found no significant difference in final visual outcomes between IV and oral corticosteroids. Other VKH series reported the majority achieving good vision at follow-up. In Behçet’s disease, IV pulse improved vision compared with placebo. Recurrence in VKH ranged 15–25%, with IV showing fewer relapses. Despite aggressive treatment, many progressed to chronic–

recurrent disease. Complications included cataract and glaucoma, both lower with IV in some cohorts. Sunset glow fundus also appeared less frequent with IV. Adjunct therapy with IV pulse was non-inferior to prednisolone–cyclosporine for recurrence prevention and lowered cataract risk.

Conclusions: IV pulse and oral corticosteroids provide comparable visual improvement. IV may lower cataract, glaucoma, relapses, and sunset glow fundus in VKH, long-term safety requires further study.

Abstract No.: 206737

Panel No.: IUS-0480

Efficacy of Oral Methotrexate in Adolescents With Refractory Vernal Keratoconjunctivitis: A Case Series

First Author: Gaganvihari Izzan **YULIANTO**

Co-Author(s): Syecha Tsania **ALAYDRUS**, Halida **WIBAWATY**

Purpose: To evaluate the efficacy of low-dose oral methotrexate as an adjunct therapy in adolescents with refractory vernal keratoconjunctivitis (VKC).

Methods: Three boys aged 13–15 years presented with severe vernal keratoconjunctivitis (VKC). All patients exhibited symptoms of itching, excessive tearing, redness, and blurred vision. Slit-lamp examination revealed multiple giant papillae on the palpebral conjunctiva in all cases, with two patients developing corneal ulcers and one showing conjunctivalization of the cornea, suggestive of limbal stem cell deficiency (LSCD). Initial treatment with conventional therapies resulted in minimal improvement. Subsequently, oral methotrexate (5 mg/week) was added, leading to significant symptom relief within two weeks, stabilization of corneal involvement, and reduced dependence on corticosteroids, with no major adverse effects observed during follow-up.

Results: All three patients demonstrated significant symptomatic relief within two weeks of initiating oral methotrexate. Improvement included reduction in itching, tearing, and redness, along with stabilization of corneal involvement. The need for prolonged corticosteroid therapy decreased, and no major systemic adverse effects were observed during follow-up.

Conclusions: Low-dose oral methotrexate demonstrated efficacy as an adjunctive treatment in refractory VKC, providing symptom control, reducing steroid dependence, and stabilizing corneal complications, including LSCD. This therapy may represent a safe and effective option for adolescents with severe disease unresponsive to conventional management.

Abstract No.: 205796
Panel No.: IUS-0476

Endogenous Endophthalmitis in Diabetes: Breaking the Vicious Cycle With Aggressive Management and Ultra-Wide-Field Imaging

First Author: Yura PRADIPTAMA

Co-Author(s): Valerie GRACIA, Yelsi KHAIRANI, Rina La Distia NORA, Kiara NURMATHIAS

Purpose: To highlight the importance of aggressive management and ultra-wide-field fundus (UWFF) imaging in diagnosing and controlling endogenous endophthalmitis in uncontrolled diabetes.

Methods: A 54-year-old female with uncontrolled diabetes initially developed right endogenous endophthalmitis and underwent vitrectomy, with *Escherichia coli* isolated from the vitreous. She was discharged but was later readmitted for diabetic ketoacidosis and an intravenous site infection. During this admission, she developed new visual complaints in the left eye. UWFF imaging revealed posterior lesions consistent with endogenous endophthalmitis, despite minimal anterior signs. The patient was hospitalized, given systemic antibiotics, and underwent right eye evisceration. Blood and ocular cultures again confirmed *E. coli*. Evisceration revealed extensive pus trapped behind silicone oil, not apparent on anterior examination. The left eye was initially treated with broad-spectrum antimicrobials, then switched to intravitreal meropenem once cultures confirmed *E. coli*. Aggressive approach then was taken for the left eye that have visual acuity 1/300 to the vitrectomy for the patient. 1 week after the surgery patient visual acuity improved to 0.5/60 and planned for cataract extraction.

Results: The right eye was lost to infection, but aggressive systemic, intravitreal therapy, and ultimately the vitrectomy stabilized the left eye with visual acuity improving to 1/60 after cataract surgery. UWFF imaging guided repeated injections and objectively evaluate infection control.

Conclusions: Endogenous endophthalmitis in diabetes requires early aggressive management rather than conservative globe preservation. Breaking the vicious cycle of uncontrolled infection and hyperglycemia is essential. UWFF imaging is a powerful tool for early diagnosis, detecting hidden lesions, and monitoring therapeutic response.

Abstract No.: 206812
Panel No.: IUS-0481

Epidemic Retinitis With Extensive Retrobulbar Optic Neuritis in the Winter of 2023–24

First Author: Ronnie Abhishek TALLURI

Co-Author(s): Soumyava BASU, Anup KELGAONKAR

Purpose: To understand the extent of optic nerve involvement contributing to vision loss in retinitis post-

febrile illness and use of systemic corticosteroids in the treatment of epidemic retinitis.

Methods: We retrospectively reviewed all patients diagnosed with post-fever retinitis in the electronic medical records from October 2023 to February 2024 in a tertiary eye care facility. The study was approved by the Institutional Review Board (IRB) and adhered to the guidelines of the Declaration of Helsinki. Cases with documentation of best corrected visual acuity (BCVA) for near, intraocular pressure, slit lamp examination, and fundus evaluation, including investigations, were considered for inclusion.

Results: Eight patients (10 eyes) were included in the study. Bilateral presentation was in two (n=2, 28.5%) patients. Five patients (n=5, 62.5%) were male. Mean best corrected visual acuity (BCVA) in log MAR for distance was 0.896 and 0.65 for near. Symptomatic fever with skin rashes was seen in three cases (n=3, 42.8%). The etiology was Typhoid (n=2, 25%), Typhus (n=4, 50%), and Herpes viruses (n=2, 25%). Magnetic resonance imaging (MRI) showed optic nerve involvement in three (n=3, 37.5%) and a normal study in two (n=2, 28.5%). Doxycycline was given as empirical treatment in all patients except for two who had herpetic dermatitis and fever, who were treated with Valacyclovir. IV methylprednisolone was given to 4 patients (n=4, 50%) at baseline. Oral steroids were used in all cases. The mean BCVA for distance improved to 0.178 and for near to 0.21.

Conclusions: Disproportionate vision loss compared to fundus evaluation should raise the suspicion of optic nerve involvement necessitating the use of pulse steroids in the management of epidemic retinitis with extensive vision loss.

Abstract No.: 203609
Panel No.: IUS-0462

Famciclovir to the Rescue in a Case of Paediatric Acute Retinal Necrosis

First Author: Lisa SUNNY

Co-Author(s): Vedhanayaki RAJESH, Rathinam SIVAKUMAR, Radhika THUNDIKANDY

Purpose: To report a case of Paediatric Acute Retinal Necrosis (ARN), with poor response to Valacyclovir, treated successfully with oral Famciclovir

Methods: 9 year old child presented to the Uvea clinic with complaints of blurred vision in left eye (LE) for 2 weeks. Child had been treated outside as viral posterior uveitis and was on oral Valacyclovir 1 gram (g) thrice a day (tds), along with oral steroids for the past 1 week. She had history of bilateral parotitis 9 months back. Mumps was ruled out. She also had exposure to a chicken pox patient 1 week before onset of symptoms, but did not develop any viral exanthem. On examination, Right eye (RE) was within normal limits. LE had a best corrected visual acuity (BCVA)

of 6/24 p with 4+ cells in anterior chamber, grade 1 vitreous haze, 3+ cells, hyperaemic disc, multiple yellowish retinitis patches with haemorrhages and vessel sheathing in the periphery, nasally encroaching the optic disc with a serous retinal detachment. Patient was given 3 days of intravenous acyclovir 10 mg/kg tds, along with oral steroids, but with poor response. She was then switched over to oral Famciclovir 500 mg tds and underwent LE vitrectomy, biopsy, intravitreal gancyclovir with silicone oil injection. Vitreous biopsy was positive for Herpes Simplex Virus.

Results: 3 weeks post op, BCVA was 6/18, with complete resolution of retinitis. Famciclovir was continued with tapering oral steroids and child asked to review in 1 month.

Conclusions: Famciclovir can be considered as an alternative in cases of paediatric ARN with inadequate response to Valacyclovir.

Abstract No.: 206301

Panel No.: IUS-0478

From Darkness to Light: Tubercular Neuroretinitis Unmasked in a Young Dialysis Patient With IgA Nephropathy

First Author: Sameera V V

Purpose: To present a rare and diagnostically challenging case of bilateral sudden vision loss in a young lady on dialysis with IgA nephropathy, initially mimicking central serous retinopathy (CSR) and later evolving into tubercular neuroretinitis with exudative retinal detachment.

Methods: A 28-year-old female on chronic dialysis for IgA nephropathy presented with sudden bilateral vision loss to counting fingers. Initial fundus findings suggested CSR. Extensive investigations, including infectious, inflammatory, and vascular work-up, were performed. The exudative retinal detachment did not resolve despite high-dose corticosteroids. Vision did not improve, and exudates appeared, creating a diagnostic dilemma. Radiological workups and sputum evaluation were done later.

Results: Empirical anti-tuberculosis therapy (ATT) was initiated based on clinical suspicion and risk factors. The patient exhibited gradual improvement, ultimately achieving complete visual recovery to 6/6 in both eyes. This case highlights the atypical presentation of tubercular neuroretinitis and the potential for full visual restoration with timely, targeted therapy.

Conclusions: Neuroretinitis can mimic CSR and progress to sight-threatening complications such as exudative retinal detachment, particularly in immunocompromised patients. Maintaining a high index of suspicion for infectious etiologies and initiating appropriate therapy can lead to excellent visual outcomes, underscoring the importance of vigilance in atypical retinal presentations.

Abstract No.: 204259

Panel No.: IUS-0466

From Stiffness to Sight: "A Case Series on Rheumatoid Arthritis and Eye"

First Author: Prem SAI.T

Co-Author(s): Roshita GARGAIN, Krithika M, Padma REKA

Purpose: Rheumatoid arthritis (RA) is a chronic autoimmune disorder affecting joints, but can also involve the extra-articular manifestations, including eyes, cardiac, skin, pulmonary, renal & skeletal.

Methods: This case series examines eight RA patients, highlighting dry eyes as the most common symptom, along with other rare conditions being secondary to RA management. Ocular evaluations included visual acuity, intraocular pressure, and tests for dry eye.

Results: Results showed that 7 females and 1 male were diagnosed to have dry eyes, episcleritis, scleromalacia, posterior scleritis, PUK, steroid-induced cataract, and HCQ-induced maculopathy.

Conclusions: This study emphasizes the importance of regular ophthalmic evaluations in RA patients for early detection and management of ocular complications, ultimately improving health outcomes and quality of life.

Abstract No.: 205137

Panel No.: IUS-0473

Intraocular Abscess Caused by Fusicolla – a Plant Fungus

First Author: Radhika THUNDIKANDY

Co-Author(s): Lisa SUNNY

Purpose: To report a case of intraocular abscess in a female patient caused by Fusicolla quarantina.

Methods: A 32-year-old healthy female presented with pain in her right eye. She denied trauma or a foreign body fall. She worked with coconut fiber and was exposed to air blast in the factory. Best-corrected visual acuity was 6/6, N6, in both eyes, with normal intraocular pressures. Anterior segment right eye showed cells, streak hypopyon with dense yellow exudates in the anterior vitreous temporally. The left eye was normal. She underwent core vitrectomy with intravitreal vancomycin, ceftazidime, and voriconazole. There was no growth in the vitreous on culture. She was continued on topical and systemic antibiotics. The exudates continued to increase. Ultrasound bio-microscopy showed a hyper-echoic lesion in the inferotemporal quadrant with localized thickening of the sclera, ciliary body, and iris. She underwent repeat pars plana vitrectomy with lensectomy for the complicated cataract. The polymerase chain reaction was reported positive for pan fungus. Gene sequencing showed Fusicolla quarantina as the causative organism. During vitrectomy, a small piece of the lesion was

biopsied, and pathology reported Geimsa stain-positive round bodies suggestive of spores. Patient was treated with intravitreal voriconazole, topical, and systemic antifungals.

Results: After antifungal treatment the lesion resolved well.

Conclusions: This is the first report of fusicolla causing intraocular abscess. This fungus is found to grow on the bark and fruit of palm. This is significant because our patient was exposed to coconut fibres and is likely that fibres could have pierced the sclera.

Abstract No.: 202187

Panel No.: IUS-0453

Intravitreal Triamcinolone Acetonide (IVTA) Alone as a Treatment Modality for Post-Fever Retinitis

First Author: Vishal JADHAV

Co-Author(s): Anup KELGAONKAR

Purpose: Post fever retinitis (PFR) is a terminology used to describe immune mediated uveitic entity seen post febrile episode. It shows distinctive morphological characteristics and is usually managed using systemic steroids with antibiotics, with good visual outcomes at end of treatment. However Intravitreal Triamcinolone Acetonide (IVTA) is a choice less opted for treatment. We describe clinical profile, imaging characteristics, visual outcomes, and resolution patterns in 36 eyes (25 cases) of PFR treated with intravitreal triamcinolone acetonide alone.

Methods: Single centre, retrospective analysis of patients diagnosed with PFR

Results: We report 36 eyes of 25 cases with mean-age 41.5 years (10 unilateral, 13 bilateral). 23 cases were males, while 2 were females. Retinitis lesions were either multifocal (n=24) or unifocal (n=12). All the retinitis lesions healed with variable retinal thinning. Patterns of resolution noted were centripetal and/or breadcrumb like. Best corrected visual acuity-Baseline 0.86 logMAR, Last visit 0.50 logMAR (P<0.05). There was statistically significant visual improvement after injection at 3 month follow up. Mean resolution time of lesions- 13.25 weeks. Raised IOP was found in 2 eyes, whereas none developed any Cataract/ Endophthalmitis during the course of treatment

Conclusions: We observed overall favourable visual outcomes and anatomical outcomes after IVTA, with resolution of lesions in cases of PFR. IVTA in PFR was a safe alternative in our case series, negating the need of oral steroids/ antibiotics and decreasing side effects of periocular depot steroids. Also, no treatment failures were noted

Abstract No.: 206353

Panel No.: IUS-0479

Management of Vogt-Koyanagi-Harada Syndrome in Pregnancy

First Author: John Joseph DAYRIT

Co-Author(s): Albert BROMEO, Nikki Regis DE MESA

Purpose: Vogt-Koyanagi-Harada (VKH) syndrome is a rare, bilateral, granulomatous panuveitis that can threaten vision usually accompanied by auditory, neurologic and integumentary manifestations. The disease is usually treated by early aggressive high dose systemic corticosteroids. However, management during pregnancy requires balancing maternal and fetal safety. We describe the clinical course and treatment outcome of a case of VKH during pregnancy.

Methods: Case Report

Results: A 25 year old G2P1 pregnant patient presented at 13 weeks of gestation with a three month history of fever, myalgia, headache, and tinnitus followed by two months of bilateral blurring of vision, redness, and photophobia. On examination, best corrected visual acuity (BCVA) was 20/160 on the right eye and 20/100 on the left eye. Examination showed anterior chamber cells with flare, posterior synechiae, vitritis, disc hyperemia, and multifocal serous retinal detachment. The patient was diagnosed with VKH. She was started on topical prednisolone and underwent posterior sub-Tenon triamcinolone injection on both eyes, and started on low dose prednisone at 10 mg daily under the guidance of an obstetrician. There was complete resolution of serous retinal detachment and decrease in macular thickening and leakage at 1 month follow-up. BCVA recovered to 20/20 on both eyes and quiescence was maintained during the course of pregnancy with no significant maternal or fetal adverse events.

Conclusions: The course of VKH may vary during pregnancy and needs close monitoring and follow-up. Treatment protocols may vary from nonpregnant patients and requires multidisciplinary collaboration.

Abstract No.: 205998

Panel No.: IUS-0477

Metastatic Breast Adenocarcinoma Manifestation Mimicking Unilateral Vogt-Koyanagi-Harada Disease

First Author: Kampang SRIVIYA

Co-Author(s): Taniya BHOOPAT

Purpose: Case report for early recognition of a rare disease that presented with an uncommon manifestation.

Methods: Acquisition and analysis of the data of the case report.

Results: Vogt-Koyanagi-Harada (VKH) disease is a rare inflammatory disorder challenging diagnosis in clinical

practice. This case report highlights a 43-year-old previously healthy Thai woman who presented with unilateral VKH-like disease as the initial manifestation of metastatic breast carcinoma. Clinical findings included serous retinal detachment with multiple pinpoint leakages in fundus fluorescein angiography and diffuse choroidal thickening, suggestive of VKH; however, the unilateral presentation was atypical. Following corticosteroid treatment, her vision deteriorated, leading to further imaging that revealed irregular enhancing masses, ultimately confirmed as metastatic adenocarcinoma of breast origin. This case underscores the importance of considering malignancy in the differential diagnosis of atypical uveitis and illustrates that failure to respond to corticosteroids should raise suspicion for masquerade syndromes, highlighting the need for early oncologic intervention to improve patient outcomes.

Conclusions: In summary, this case exemplifies how systemic malignancies can masquerade as atypical presentations of uveitis and emphasizes the importance of an interdisciplinary approach involving oncologists, ophthalmologists, and pathologists to ensure comprehensive patient care. A thorough investigation is essential to avoid misdiagnosis and inappropriate management. As breast cancer survival rates continue to improve due to advancements in systemic therapies, awareness of ocular metastases must also increase among healthcare professionals. Timely recognition of such cases can lead to early treatment interventions that significantly impact patient prognosis and quality of life.

Abstract No.: 201593

Panel No.: IUS-0448

Ocular Ischemic Pathologies as Early Indicators of Antiphospholipid Antibody Syndrome: A Southeast Asian Case Series

*First Author: Bryan Vincent **MESINA***

*Co-Author(s): Teresita **CASTILLO**, Gino Nicolo **GUANZON**, Jonathan Paul **LACANILAO**, Faye **LEVINA***

Purpose: To describe the ocular manifestations of antiphospholipid antibody syndrome (APS) among Filipino patients and highlight its role as a cause of ocular ischemic disease.

Methods: We conducted a retrospective case series of seven patients with criteria-defined APS who presented with ocular ischemic pathologies at a tertiary referral center in the Philippines. Demographic, clinical, laboratory, and treatment data were reviewed.

Results: The cohort included six females and one male (6:1 ratio) with a median age of symptom onset of 26 years. All patients demonstrated ocular findings consistent with arterial thrombosis, including ischemic optic neuropathy, retinal vessel occlusion, vascular sclerosis, vasculitis, retinal and vitreous hemorrhage, and vitritis. One patient (14.3%) presented with

central retinal vein occlusion. Obstetric complications were noted in two patients (28.6%). Persistent lupus anticoagulant positivity was observed in all patients, most commonly via dilute Russell viper venom test (85.7%). Reported ocular sequelae included glaucoma (42.9%), fibroproliferative membranes with tractional retinal detachment (28.6%), subretinal fibrosis (14.3%), and macular edema (14.3%). Medical management via anticoagulant therapy was coordinated with rheumatology and immunology, while four patients (57.1%) required surgical intervention including panretinal photocoagulation, pars plana vitrectomy, glaucoma drainage device implantation, and intravitreal anti-VEGF injections. Final visual outcomes ranged from 6/7.5 to no light perception.

Conclusions: APS is an important but underrecognized cause of ocular ischemic events. Early recognition and prompt systemic evaluation are essential to reduce vision loss and systemic morbidity. Larger studies are warranted to better characterize and document APS-associated ocular disease in Filipino patients.

Abstract No.: 204818

Panel No.: IUS-0470

Ocular Kaposi's Sarcoma as a Sentinel of Disseminated Disease in HIV

*First Author: Christy **MAGDALENA***

*Co-Author(s): Fadima Fitri **LARASATI**, Rina La Distia **NORA**, Pura Riza **PRATAMA**, Nathania **SUTANDI***

Purpose: To describe a rare case of where ocular Kaposi's sarcoma served as the first clinical indicator of disseminated disease in an HIV-positive patient, highlighting diagnostic and management challenges.

Methods: Case report.

Results: A 42-year-old male with poorly controlled HIV presented with one month of progressive bilateral periorbital edema and violaceous conjunctival nodules. During the week prior to admission, he developed fever, nasal obstruction, and discharge. He had initially been diagnosed with dacryoadenitis and bacterial rhinosinusitis, but symptoms persisted despite treatment. Examination revealed bilateral violaceous conjunctival nodules with chemosis, as well as cutaneous nodules on the chest, axillae, and neck. Nasoendoscopy identified a nodular mass in the nasopharynx. Laboratory tests showed severe anemia and leukopenia, consistent with autoimmune hemolytic anemia (AIHA), with CD4 count was 69 cells/ μ L and HIV RNA viral load was 203 copies/mL. Histopathology and immunohistochemistry confirmed Kaposi's sarcoma in conjunctiva, skin, and nasopharynx. Coexisting autoimmune hemolytic anemia and recurrent infections further complicated management. Despite antiretroviral adjustment, corticosteroids, transfusions, and intravenous antibiotics, the patient deteriorated and died of refractory septic shock secondary to hospital-acquired pneumonia.

Conclusions: This case underscores that ocular Kaposi's sarcoma may represent a sentinel sign of disseminated disease in profoundly immunosuppressed patients. Early recognition by ophthalmologists is crucial, as ocular findings may precede or coincide with systemic involvement. Management requires careful multidisciplinary coordination to balance immune reconstitution, immunosuppression for autoimmune comorbidities, and infection control.

Abstract No.: 200626

Panel No.: IUS-0442

Ocular Leprosy: Socioeconomic Aspects, Clinico-Surgical Features, Visual Outcomes and Associated Visual Impairment in the Last Decade

First Author: Vishal JADHAV

Co-Author(s): Soumyava BASU, Anup KELGAONKAR

Purpose: To determine the socioeconomic impact, demographic profile, and clinical features, varied surgical interventions, visual outcomes, and World Health Organisation (WHO) defined visual impairment associated with ocular leprosy in the last decade.

Methods: Retrospective, single-center study. Demographic details, ocular and systemic treatment, socioeconomic aspects, clinico-surgical features, and vision loss (pre- and post-treatment) of 29 patients (43 eyes) were analysed. Patients presenting as a known case of leprosy or diagnosed as having leprosy based on ocular features were included.

Results: Twenty-nine patients were recruited, 2 of whom were diagnosed with leprosy after ocular manifestation: Non-granulomatous anterior uveitis (NGAU) (n=12), nodular scleritis (n=6), necrotizing scleritis (n=1), and adnexal features (5) were the commonest. The mean age of patients was 56.2 years. Baseline and final follow-up best corrected visual acuity were 1.06 and 1.04 logMAR, respectively. Diagnosed lepromatous leprosy were 4, borderline lepromatous were 2 and 2 were multibacillary. 17 cases were economically underprivileged, while only 3 were economically privileged. 13 recruited cases required non surgical treatment, while 16 required surgical intervention including posterior subtenon injection (5), scleral derroofing (1), corneal scraping/ Tissue adhesive with bandage contact lens (2), vitreous biopsy (2), EDTA chelation (1), cataract surgery (2), DCT (1), descemetopexy (2), Anti- VEGF injections (1) and pars plana vitrectomy (2). Recurrences were accounted as NGAU-5, infectious scleritis-2, and staphyloma formation (1). WHO based visual impairment included economic (5), social (2), and legally (3) blind categories.

Conclusions: Lepromatous blindness is on the rise, with multiple cases requiring surgical intervention.

Abstract No.: 203115

Panel No.: IUS-0459

Ocular Tuberculosis: From Diagnostic Confusion to Clinical Conclusion – a Case Series

First Author: Ferdi KURNIAWAN

Co-Author(s): Siti CHADIJAH, Eka FALINTINA WATI

Purpose: To report a case series of ocular tuberculosis presenting as a primary active infection, and to highlight the diagnostic challenges as well as the clinical reasoning process that led to the final diagnosis and management.

Methods: This retrospective case series was conducted between March 2024 and July 2025. Six eyes from five patients with atypical ocular inflammation mimicking other uveitic entities were diagnosed with ocular tuberculosis. Clinical data, ancillary investigations (including chest imaging, tuberculin skin test or interferon-gamma release assays, and ocular imaging), treatment regimens, and outcomes were analyzed.

Results: There were four females (80%) and one male (20%) aged 34–47 years. All cases presented with recurrent anterior uveitis and vitritis. Bilateral exudative retinal detachment was observed in one case (33.3%), while others presented with papillitis (66.6%) and cystoid macular edema (16.6%), with no pathognomonic signs of ocular tuberculosis. Ancillary testing for other infectious causes, such as syphilis and toxoplasmosis, was initially performed and yielded negative results. Further work-up, however, revealed supportive evidence of tuberculosis infection. Anti-tuberculosis therapy, with or without adjunctive systemic corticosteroid treatment, resulted in significant clinical improvement and complete resolution of ocular inflammation in all cases.

Conclusions: Ocular tuberculosis remains a diagnostic dilemma due to its variable presentations and lack of pathognomonic signs. This case series underscores the importance of high clinical suspicion, comprehensive systemic evaluation, and timely initiation of anti-tuberculosis therapy to achieve favorable visual outcomes.

Abstract No.: 203827

Panel No.: IUS-0465

Overlapping Clinical Characteristics of Vogt-Koyanagi-Harada (VKH) Disease and Multifocal Central Serous Chorioretinopathy (CSC): A Case Report

First Author: Nikki Colleen ONGTO

Co-Author(s): Jessica Marie ABANO, Francis Ezra LAXAMANA, Lorenzo MANIPON, Roberto UY

Purpose: This case aims to raise awareness among ophthalmology providers about the potential for confusion between these two posterior segment conditions, which can present with serous retinal

detachments. It emphasizes the importance of recognizing key clinical and imaging distinctions to enhance diagnostic accuracy, deliver appropriate treatment, and improve outcomes. It aims to provide an overview of emerging therapeutics, introducing the potential of immunosuppression with Methotrexate in equivocal or chronic cases of CSR.

Methods: The patient presented with progressive blurred vision in the left eye. Fundoscopic and angiographic findings raised concern for Posterior Uveitis (VKH). However, the patient was eventually reclassified as CSCR due to lack of response with high-dose oral corticosteroids, prior history of CSCR in the fellow eye, absence of systemic VKH features, and multimodal imaging findings leaning towards CSCR. Treatment was shifted from high-dose corticosteroids to low-dose Methotrexate, resulting in marked visual improvement and resolution of clinical findings.

Results: While Methotrexate is not traditionally a first-line treatment for CSCR, this case emphasizes that its immunomodulatory and steroid-suppressing properties offer a therapeutic advantage in a diagnostically ambiguous setting.

Conclusions: VKH and CSCR are two distinct chorioretinal disorders but may present with overlapping clinical and imaging features. Misdiagnosis can lead to inappropriate treatment and blindness since the therapeutic approaches to these two conditions are divergent, steroids treat VKH but worsen CSCR. The emerging use of Methotrexate offers potential benefits in ambiguous clinical scenarios since it is a treatment option for both VKH and chronic CSCR, with benefits particularly related to its steroid-sparing effects.

Abstract No.: 202310

Panel No.: IUS-0455

PEACOCX Study: A Phase 1 Evaluation of TRX103, an Engineered Tr1 Cell Therapy for Uveitis

First Author: Jia-horung HUNG

Co-Author(s): Amir AKHAVANREZAYAT, Frances Andrea ANOVER, Gunjan Anil AWATRAMANI, Ryan BJORDAHL, David CHANTHAN, Dalia EL FEKY, Jingli GUO, Hareem KHAN, Marco LONDEI, Viktoriya MEGRABOVA, Quan Dong NGUYEN, Janine POWERS, Mohammad Bagher RAJABI, Aim-on SAENGSRINAVIN, Ngoc Trong Tuong THAN, Zheng Xian THNG, Gunay ULUDAG, Negin YAVARI

Purpose: Despite advancements in novel biologics and drug delivery methods, many patients with noninfectious uveitis (NIU) remain refractory to treatment, and long-term remission remains elusive. Adoptive T cell therapy offers a new therapeutic modality for NIU, and TRX103, an engineered type 1 regulatory T (Tr1) cell product, represents a pioneering cell-based approach to NIU treatment. It aims to

modulate pathogenic inflammatory responses and induce durable immune tolerance.

Methods: The PEACOCX trial is a Phase 1, open-label, first-in-human clinical study evaluating the safety, tolerability, and preliminary efficacy of TRX103 in patients with active NIU. TRX103 will be administered as a single intravenous infusion. Pharmacokinetics and pharmacodynamics, both intraocular and in patient peripheral blood, will be monitored for 48 weeks. Clinical endpoints including best-corrected visual acuity and vitreous haze, will be evaluated.

Results: TRX103 is an allogeneic, off-the-shelf product generated by engineering CD4+ T cells with a lentiviral vector encoding for human IL-10. In preclinical in vitro studies, TRX103 secreted high levels of IL-10, suppressed the proliferation of CD4+ and CD8+ T cells, and reduced the production of inflammatory IL-1 β and TNF α cytokines by myeloid cells. TRX103 expressed multiple chemokine receptors, facilitating homing to the site of inflammation. Additionally, TRX103 had low immunogenic capacity, supporting extended persistence in vivo.

Conclusions: The PEACOCX trial represents a significant step toward developing Treg cell therapies for uveitis, aiming to offer a durable, targeted, and steroid-sparing treatment strategy.

Abstract No.: 200440

Panel No.: IUS-0438

Pattern of Uveitis in Pregnant Females

First Author: Eiman DESSOUKI

Purpose: To explore the referral pattern of uveitis in a cohort of pregnant females, the most prevalent causative diseases, and the effect of treatments.

Methods: Retrospective medical records review of all pregnant women with uveitis visiting a tertiary uveitis facility during a 12-year period.

Results: About two-thirds of all pregnant patients presented during the second trimester of pregnancy. Anterior uveitis was the major anatomical category depicted, affecting 57% of all referred patients. Herpetic uveitis, followed by toxoplasmosis and systemic lupus erythematosus, were the most prevalent causative diseases identified, respectively.

Conclusions: Infective uveitis followed by systemic lupus erythematosus, representing an antibody-mediated autoimmune disease, was the leading cause of uveitis among our 604 pregnant patients seeking care in a tertiary uveitis hospital over a period of 12 years.

Abstract No.: 210365
Panel No.: IUS-0487

Quantitative Assessment of Fluorescein Angiography Leakage via Deep Learning in Pediatric Uveitis: Correlation With Clinical Parameters

First Author: Yu JIN

Co-Author(s): Yuhan CHANG, Xumei DU, Nanhao GONG, Jianguo HUANG, Yuqin WANG, Jin YAO, Changlin ZHAO, Weifang ZHU, Xuefei ZHU

Purpose: Develop a deep learning algorithm for automated segmentation of retinal vascular and macular edema leakage in fluorescein angiography (FA) of pediatric uveitis.

Methods: The model was trained, validated, and applied to 28 independent pediatric cases to correlate leakage area with clinical metrics and determine clinically significant change thresholds.

Results: In five-fold cross-validation on 2,459 internal images (155 patients), the best mean Dice was 0.7241 (retinal leakage) and 0.7273 (macular leakage). On external data, the best mean Dice reached 0.7015 and 0.5918, respectively. In the cohort of 28 pediatric uveitis patients, vitreous cells (VC) and central macular thickness (CMT) were the most consistent parameters associated with retinal leakage across multiple analyses. After multiple comparison correction, both VC and CMT remained significantly associated with total and posterior-pole leakage areas at all timepoints. For macular edema leakage, CMT and best corrected visual acuity (BCVA) showed consistent associations, while VC was significant only at follow-up. whereas other examined variables showed no consistent association after correction for multiple comparisons. ROC analysis identified a -54.8% relative change in total visible retinal leakage area as the optimal cutoff, indicating quiescent inflammation.

Conclusions: The deep learning model reliably segments leakage in pediatric uveitis FA, showing multicenter generalizability. Quantitative angiographic parameters correlate with clinical metrics, suggesting potential utility for informing disease management strategies.

Abstract No.: 205368
Panel No.: IUS-0474

Rapid Plasma Reagin Tests of Serum, Cerebrospinal Fluid, and Aqueous Humor of Patients With Ocular Syphilis and AIDS

First Author: Yingjie WANG

Co-Author(s): Yong TAO

Purpose: The diagnosis of ocular syphilis in patients with acquired immunodeficiency syndrome (AIDS) remains challenging. This study aimed to evaluate the potential utility of aqueous humor (AH) RPR testing as an adjunctive diagnostic tool for assessing clinical

manifestations and visual function in AIDS-associated ocular syphilis.

Methods: We conducted a retrospective observational cohort study of 31 patients (42 eyes) with ocular syphilis and AIDS treated at Beijing You'an Hospital between 2022 and 2025, based on comprehensive ophthalmic and systemic evaluations.

Results: In patients with concurrent syphilis and AIDS, pre-treatment higher AH RPR reactivity level was associated with higher vitreous haze grades (OR = 4.10, 95% CI: 1.62–10.38, $p = 0.003$). Pre-treatment serum, CSF, and AH RPR titers individually predicted macular chorioretinal involvement (AUC 0.76–0.85) and optic nerve involvement (AUC 0.62–0.78). Combining all three markers improved prediction for macular chorioretinal involvement (AUC 0.88) and for optic nerve involvement (AUC 0.79). RPR titers in serum, CSF, and AH were all significantly correlated with both pre- and post-treatment best-corrected visual acuity, indicating that higher titers were associated with worse visual function.

Conclusions: AH RPR can serve as a valuable adjunct for diagnosing ocular syphilis, as it indicates intraocular disease activity and informs treatment recommendations for the condition.

Abstract No.: 203272
Panel No.: IUS-0461

Recurrent Methamphetamine-Associated Posterior Scleritis: A Case Report

First Author: Randolph DOBSON

Co-Author(s): Jonathan LAM

Purpose: To describe posterior scleritis associated with methamphetamine use, emphasizing diagnostic challenges, treatment response, and recurrence.

Methods: Retrospective case report.

Results: A 52-year-old woman presented with a two-month history of progressive left eye vision loss, acutely worsening with central scotoma, pain, and photophobia. Posterior scleritis was diagnosed on clinical and imaging findings, including B-scan ultrasound demonstrating scleral thickening with a T-sign. Optical coherence tomography, fundus angiography, and magnetic resonance imaging supported the diagnosis. Systemic workup for autoimmune and infectious causes was negative. She was treated with intravenous methylprednisolone followed by high-dose oral corticosteroids, with marked improvement during admission and methamphetamine abstinence. After discharge, she relapsed with bilateral involvement following methamphetamine use but again responded to systemic steroids. She has remained abstinent and recurrence-free since.

Conclusions: Posterior scleritis is rare and diagnostically challenging due to nonspecific symptoms. This case

underscores the value of early recognition, multimodal imaging, and timely immunosuppression to preserve vision. The recurrence temporally associated with methamphetamine use suggests a causative role, potentially mediated through sympathomimetic vasoconstriction, vascular injury, or direct toxic effects.

Abstract No.: 204816

Panel No.: IUS-0468

Sympathetic Ophthalmia: A Rare but Serious Complication of Penetrating Ocular Trauma – a Case Report

First Author: Muhammad Fachri Ridha **HERLAN**

Co-Author(s): Ovi **SOPIA**

Purpose: Sympathetic ophthalmia (SO) is a rare but potentially blinding bilateral granulomatous panuveitis triggered by ocular trauma or surgery. Delayed diagnosis can cause severe visual impairment. This case highlights the importance of timely recognition, multimodal imaging, and aggressive immunosuppressive therapy to preserve vision.

Methods: A 41-year-old woman developed SO after penetrating trauma to the fellow eye. A comprehensive approach, including history-taking, perimetry, and multimodal imaging such as funduscopy, ultrasonography (B-scan), and optical coherence tomography (OCT) of the optic disc and macula was performed. The patient was monitored for three months.

Results: The patient presented with profound visual impairment, severe anterior chamber inflammation, vitritis, and later finding of choroidal depigmentation. High-dose intravenous methylprednisolone was given, followed by oral prednisone and azathioprine. Perimetry showed generalized visual field depression. B-scan ultrasound revealed exudative retinal detachment in the right eye, which resolved after one month of treatment. Optic disc OCT showed retinal nerve fiber layer thickening, which decreased with treatment. Early corticosteroid and immunosuppressant therapy improved vision from light perception to 6/12. Imaging confirmed the resolution of vitritis, reduced optic disc edema, and retinal stabilization, demonstrating the role of early and intensive therapy in controlling inflammation and improving prognosis.

Conclusions: This case highlights the value of multimodal imaging and a prompt, aggressive treatment approach with corticosteroids and immunosuppressants. Increased awareness, early diagnosis, and standardized management can improve the prognosis of this rare but serious condition.

Abstract No.: 205015

Panel No.: IUS-0472

Taming the Unknown – Vitrectomy for Exudative Retinal Detachment

First Author: Saarang **HANSRAJ**

Purpose: To report a case where pars plana vitrectomy in a patient with exudative retinal detachment helped diagnose and treat tuberculoid panuveitis

Methods: A 17-year-old man presented with sudden, painful, and progressive loss of vision in his right eye for 2 months, with acuity of PL PR inaccurate. His other eye was phthisical, with no vision for 7 years. There was no history of ocular trauma or ocular procedures for any of the eyes, with no systemic comorbidities. The right eye had 4+ AC cells, 4+ vitritis, with view of the retina. Ultrasound showed a retinal detachment. A diagnosis of exudative retinal detachment was made. Systemic investigations were ordered and a vitreous biopsy taken, with injection of intraocular antibiotics. Two days later, when the retinal detachment appeared to worsen on ultrasound, a pars plana vitrectomy with silicone oil injection was performed. This allowed retina to attach and view clearly, allowing multiple modal imaging. A diagnosis of ocular tuberculosis was made due to the presence of large choroidal granulomas as well as a history of positive tuberculosis contact and calcified lymph nodes on CT thorax. Patient was given IV methyl prednisolone and started on anti-tubercular therapy, oral corticosteroids, and methotrexate.

Results: Two months after the surgery patient is maintained on ATT and immunosuppression, with ambulatory vision of 1/60.

Conclusions: Pars plana vitrectomy may be beneficial in very selected cases of exudative retinal detachment. It allows for visualization, imaging and treatment. Ocular tuberculosis may present with severe panuveitis in certain cases, requiring intense immunosuppression.

Abstract No.: 200511

Panel No.: IUS-0441

Tattoo-Associated Uveitis

First Author: Xuchuan **WANG**

Purpose: This paper elaborates on the clinical features of tattoo associated uveitis by presenting a well-documented case, analyzes the pathogenesis of this disease based on the tattoo history, and describes the treatment process.

Methods: The patient's eye examination: Best Corrected Visual Acuity (BCVA): Right eye 20/100, Left eye 20/200. Intraocular pressure (IOP) in both eyes: 19mmHg (1mmHg = 0.133kPa). Slit-lamp examination: Conjunctival injection in both eyes; Keratic precipitates (KP) posterior to the cornea; Scattered gray-white nodules visible on the iris surface; Posterior synechiae of the iris. B-scan ultrasonography of the eyes showed:

Vitreous opacity in both eyes; Papilledema. Chest CT scan and the enhanced scan indicated that sarcoidosis was ruled out. The patient had no history of ocular surgery or trauma and no signs of hearing loss. Serum tests for C-reactive protein, rheumatoid factor, erythrocyte sedimentation rate, and autoantibodies were all negative. Ocular fluid analysis excluded viral infections, fungal infections, and lymphoma but indicated active intraocular inflammation. Hematological examination of the serum revealed a significant number of lymphocytes and neutrophils with lobulated nuclei, some of which contained blue homogeneous material within their cytoplasm. Additionally, multiple tattoos were noted on the patient's body, with discoloration, stiffness, redness, unevenness, and slight skin damage on the left upper arm where a tattoo had been removed by laser six months prior. Five days after the laser removal, the patient developed decreased vision, eye redness, and photophobia in both eyes.

Results: The patient's condition improved after local and systemic treatment with corticosteroids. Follow-up one month after discharge showed stable condition.

Conclusions: Both tattooing and laser tattoo removal can cause uveitis.

Abstract No.: 201147

Panel No.: IUS-0444

The Association Between Diabetes Mellitus and Idiopathic Anterior Uveitis in Thai Patients

*First Author: Panida **SRISAT***

*Co-Author(s): Plern **SUTRA***

Purpose: To determine the association between diabetes mellitus (DM) and idiopathic anterior uveitis (AU).

Methods: Retrospective, cross-sectional study of patients with AU and DM. Logistic regression analysis was used to evaluate the association of DM and idiopathic AU.

Results: Among the 196 AU patients assessed, 112 (57.1%) had idiopathic AU, and 53 (47.3%) had a diagnosis of DM. A statistically significant association was found between DM and idiopathic AU ($p=0.015$). Idiopathic AU was associated with a 2.6-fold increased risk compared to AU without DM (adjusted OR = 2.640, 95% CI: 1.207–5.776). Furthermore, poorly controlled DM was significantly associated with idiopathic AU ($p<0.05$). A 1% increase in HbA1c levels correlated with a 56.3% increased risk of idiopathic AU (adjusted OR = 1.563, 95% CI: 1.197–2.041, $p=0.001$). Patients with preexisting DM also have a demonstrated a 79.7% higher risk compared to those without preexisting DM (adjusted OR = 1.797, 95% CI: 1.067–3.029, p -value = 0.028).

Conclusions: Elevated blood glucose and HbA1c levels are significantly associated with idiopathic anterior uveitis. We recommend that blood glucose and HbA1c levels should be routinely incorporated into the diagnostic workup for patients presenting with acute uveitis.

Abstract No.: 203721

Panel No.: IUS-0463

The Myriad Presentations of the Master Masquerader

*First Author: Lisa **SUNNY***

*Co-Author(s): Rajshree **EZHILAN**, Jonathan **MALCOLM CHAVAN**, Vedhanayaki **RAJESH***

Purpose: To report 4 varied presentations of Ocular syphilis.

Methods: Patient 1- 27-year-old male with 3 3-week history of right eye (RE) blurred vision, Best corrected visual acuity (BCVA) of 1/60 with vitritis, 5 DD necrotising retinitis temporal to macula, vasculitis, and superficial retinal precipitates. Lab investigations -positive VDRL, TPHA, and HIV. Patient 2 - 32-year-old man with left eye(LE) panuveitis. BCVA was 5/60 with circumcorneal congestion, 2+cells in the anterior chamber, an iris roseola at 2 o'clock, posterior synecchia, 2+vitreous cells, haze, and a nasal retinitis patch with haemorrhages and vasculitis. He also had healing vesicular lesions at the angle of the mouth. Lab testing was positive for HIV, VDRL, and TPHA. He was empirically started on oral valacyclovir and referred to the antiretroviral treatment centre. Patient 3 was a 34-year-old male with posterior uveitis, BCVA 1/60, on treatment elsewhere with oral steroids for the past 1 month. A placoid lesion was noted at the posterior pole with disc edema. OCT showed a sawtooth appearance of the outer retina. He was positive for VDRL and TPHA. Patient 4- 26-year-old male, with 1 1-week history of blurred vision. Background retina revealed pigment mottling, and OCT -sawtooth appearance. He was both VDRL and TPHA positive.

Results: Patients 1 and 4 reviewed with us post-treatment for syphilis and showed excellent clinical and visual outcomes with resolution of retinitis. Patient 1 was treated with antiretroviral therapy and benzathine penicillin, and patient 4 with oral doxycycline.

Conclusions: A high index of suspicion should be kept for ocular syphilis, as it can have varied manifestations.

Abstract No.: 201291

Panel No.: IUS-0445

Unveiling the Diagnostic Power of Metagenomic Sequencing in Ocular Infections: Evidence From Systematic Review and Meta-Analysis

*First Author: Florentina **FEBRINA***

*Co-Author(s): Azzahra **JELITA**, Rina La Distia **NORA**, Ikhwanuliman **PUTERA**, Fitri Setyani **ROKIM**, Made **SUSIYANTI***

Purpose: To evaluate the diagnostic value of mNGS for ocular infections, while highlighting the advantages, limitations, and future directions for the clinical application of mNGS in ocular cases

Methods: Literature search from electronic databases of PubMed/MEDLINE, Embase, Web of Science, and Scopus were done within the past decade, with general search term of «mNGS» and «ocular infection». Eligible original studies assessing the diagnostic utility of mNGS for ocular infections were evaluated according to predefined criteria. Meta analyses were conducted to evaluate overall diagnostic performance. Methodological quality was assessed using QUADAS-2.

Results: Sixteen studies (923 specimens) were included for analysis. Pooled sensitivity and specificity of mNGS for ocular infections were 84% (95% confidence interval (CI) 81-87%, I² 78.5%) and 62% (95% CI 57-67%, I² 83.7%), respectively. Bacteria were the most frequently detected (10/16 studies), followed by virus (10/16), fungi (8/16), and parasite (3/16). A diverse range of pathogens at the genus and species level were identified. Sub-group analysis was done based on ocular sample type and reference standard used. SROC analysis showed good overall diagnostic performance of mNGS with an AUC of 0.872 (SE=0.022).

Conclusions: mNGS shown to be valuable in identifying pathogens especially those undetectable through conventional methods, although it requires careful interpretation. It showed promising diagnostic performance in detecting different types of ocular infections, especially for ocular surface specimens. Further larger research on its application for ocular diagnostic that implement a well-defined protocol which address its drawbacks would be needed to enhance its applicability.

Abstract No.: 207426

Panel No.: IUS-0484

Uveitis in Flux: A Case of Perpetual Surprises and Incomplete Resolution

*First Author: Raj Shri **HIRAWAT***

Purpose: To describe an unusual case of recurrent, self-resolving panuveitis with presumed tubercular etiology.

Methods: A 51-year-old female with spastic paresis underwent detailed clinical evaluation and a

comprehensive uveitis work-up after presenting with left-eye blurring (6/60).

Results: Initial findings showed bilateral healed choroiditis and active retinochoroiditis in the left eye. Despite an initial course of oral steroids—discontinued due to intolerance—each new ill-defined lesion resolved spontaneously without therapy. A higher-centre opinion recommended observation. During long-term follow-up, recurrent episodes continued to resolve on their own. The patient later underwent cataract surgery and achieved a final visual acuity of 6/9.

Conclusions: The case serves as a reminder of the challenges and unexpected resolutions that can occur in medical practice. This case was not about indecision but about adaptation in the face of uncertainty. “Every step taken was guided by the patient’s evolving clinical picture and evidence at hand.” Sometimes, seemingly unrelated symptoms (like the «shadowing») can be due to a simple issue (cataract) rather than a complex underlying condition. “The management balanced caution with compassion — avoiding overtreatment while still addressing possible vision-threatening conditions.” “Referral and multidisciplinary collaboration were pursued at the right juncture, ensuring patient safety.”

Abstract No.: 202082

Panel No.: IUS-0451

Visual Outcomes of Bridging Sub-Tenon’s Triamcinolone Acetonide With Adalimumab in Refractory Uveitic Macula Edema: A Retrospective Case Series

*First Author: Yaru **ZOU***

*Co-Author(s): Koju **KAMOI**, Kyoko **OHNO-MATSUI**, Mingming **YANG**, Jing **ZHANG**, Yuan **ZONG***

Purpose: To assess the efficacy of adalimumab (ADA) for refractory noninfectious Uveitic Macular Edema (UME) and to compare outcomes between ADA with sub-Tenon’s triamcinolone acetonide (STTA) bridging and ADA alone.

Methods: This retrospective study included 14 patients (18 eyes) with refractory noninfectious UME treated between January 2018 and 2024. Patients were divided into two groups: ADA monotherapy (without STTA) and ADA with STTA bridging therapy (20 mg of STTA administered within 4 weeks before initiating ADA, then discontinued). ADA was initiated with an 80-mg subcutaneous loading dose, followed by 40 mg every 2 weeks for 12 months. The primary outcome measures included central foveal thickness (CFT), best-corrected visual acuity (BCVA/Snellen), and intraocular pressure (IOP) at baseline, 1, 3, 6, and 12 months.

Results: The median age of 14 patients was 29 years (interquartile range, 23.5–53.25 years), and 10 patients (71.5%) were female. At 12 months, mean

CFT decreased from 416.33 μm to 245.50 μm ($P < 0.001$). The STTA-bridging group achieved greater CFT reduction than ADA monotherapy (119.60 μm vs. 92.25 μm ; $P < 0.001$ vs. $P = 0.013$). Mean BCVA improved from 0.41Log MAR (20/50) to 0.30 LogMAR (20/40) with STTA bridging ($P < 0.001$), while ADA monotherapy showed no significant change. A majority of eyes (13/18, 72.7%) showed improvement, with a sustained remission rate of 52.4% (11/18 eyes). IOP remained stable in all groups.

Conclusions: Our study highlights the potential short-term benefits of STTA bridging to ADA, providing both anatomical and functional improvements.

Myopia

Abstract No.: 202785

Panel No.: MYO-0513

0.01% Atropine for Myopia Prevention in Pre-Myopia (AMPP Study)

First Author: Meinan HE

Co-Author(s): Bei DU, Ruihua WEI

Purpose: This study aimed to evaluate the efficacy and safety of 0.01% atropine eye drops in preventing myopia in children with pre-myopia.

Methods: In this randomised controlled trial (ChiCTR2200055482), children aged 5-12 years with cycloplegic spherical equivalent (SE) between +0.75D and -0.50D were randomised 1:1 to receive either 0.01% atropine (0.01% atropine once nightly) or placebo (once nightly). The primary endpoint was the change in SE after 12 months.

Results: Sixty-four subjects (48.4% female) completed the 12-month follow-up (32 per group, mean age, 7.47 ± 1.72 vs. 7.84 ± 1.32 years). After 12 months, the change in SE was significantly smaller in the 0.01% atropine group than in the placebo group ($-0.23 \pm 0.50\text{D}$ vs. $-0.49 \pm 0.42\text{D}$; $p=0.030$), representing a 53% reduction in myopia progression. No significant intergroup difference was observed in axial length (AL) change ($+0.26 \pm 0.16\text{mm}$ vs. $+0.32 \pm 0.15\text{mm}$; $p=0.134$), corresponding to a 19% reduction in AL elongation. The 0.01% atropine group exhibited significantly larger pupil diameters at all time points (all $p < 0.05$), while safety parameters (e.g., amplitude of accommodation, tear film stability, intraocular pressure) remained comparable between the groups (all $p > 0.05$).

Conclusions: In 5-12-year-old pre-myopic children, nightly administration of 0.01% atropine eye drops for 1 year was found to delay myopic shift compared with placebo, and no persistent adverse events were observed. Additionally, the atropine group exhibited less axial elongation than the control group, though this difference was not statistically significant.

Abstract No.: 201281

Panel No.: MYO-0497

A Bibliometric Analysis of Pharmacological Interventions for Myopia Control: A 30-Year Review (1994-2024)

First Author: Yufeng HAN

Co-Author(s): Xiaotong LI, Wei ZHANG

Purpose: Myopia has emerged as a global epidemic, with its prevalence rapidly increasing among children and adolescents. In recent years, pharmacological treatments, particularly those involving atropine, have gained significant attention as a potential strategy for myopia control. This bibliometric analysis aims to provide a comprehensive overview of the research landscape and trends in pharmacological interventions for myopia over the past three decades (1994-2024).

Methods: We collected literature from the Web of Science Core Collection database, and analyzed it using VOSviewer and CiteSpace.

Results: The study included 848 papers published between 1994 and 2024. China had the most publications, while Singapore had the highest average number of citations. Fudan University led in publications, while the National University of Singapore had the highest average citations. The most cited journal is "Investigative Ophthalmology and Visual Science", while "Ophthalmology" has the highest average number of citations. The top cited references primarily focused on atropine for myopia, followed by those on dopamine. Burst analysis revealed that emerging trends in the field included the terms "pharmacological concentration", "childhood myopia", "efficacy", "axis length" and "prevention".

Conclusions: This bibliometric analysis reveals the milestone research trajectory of atropine treatment for myopia and identifies current research hotspots and future development directions in the field of myopia pharmacological treatment. This study is expected to be significant for researchers, helping them understand this field better.

Abstract No.: 202459

Panel No.: MYO-0508

A Modified Aniseikonia Measurement Method Based on Peripheral Fusion Lock

First Author: Xin TAN

Co-Author(s): Hongxi WANG

Purpose: Aniseikonia, often overlooked, can cause asthenopia, distorted vision, and headache. Traditional dichoptic tests are susceptible to fusion interference and central fixation instability, causing measurement errors. This study proposes a modified method based on peripheral fusion locking and compares its performance with the traditional method.

Methods: Participants aged 23–26 years without anisometropia were recruited. Size lenses (1%, 3%, 5%) over the non-dominant eye induced aniseikonia. In the traditional dichoptic test, participants judged when red and green stimuli appeared equal. The modified method spaced the stimuli and added four peripheral dot locks to stabilize fusion. Throughout testing, dominant-eye stimulus size varied randomly in 0.5% steps while non-dominant eye remained constant. Horizontal and vertical aniseikonia were measured. Pearson correlation assessed the relationship between measured and induced magnification, while linear regression evaluated the fit to theoretical values. Fusion instability or misalignment incidence was recorded.

Results: All 23 participants completed the study. The traditional method showed positive correlations for horizontal and vertical measures ($r = 0.799, 0.649$; slopes 0.630, 0.500; $R^2=0.638, 0.421$). The modified method showed stronger correlations ($r = 0.872$ and 0.749), slopes nearer theoretical values (0.728, 0.644), and higher R^2 (0.761 and 0.561) (all $P < 0.001$). Fusion instability occurred in 17.4% of participants using the modified method, significantly lower than 47.8% with traditional method ($P = 0.028$).

Conclusions: The modified method reduced fusion interference and improved fixation stability. Regression slopes and consistency suggest peripheral fusion locks enhance measurement accuracy.

Abstract No.: 201956

Panel No.: MYO-0501

A Stitch in Time Saves Sight: Early Intervention in Congenital Glaucoma With Sturge-Weber Syndrome

First Author: Prasanna Vekatesh RAMESH

Purpose: To report the outcomes and challenges of performing a combined trabeculotomy-trabeculectomy on a 15-day-old infant diagnosed with congenital glaucoma and Sturge-Weber syndrome.

Methods: The patient presented with left-eye (OS) buphthalmos, congenital glaucoma, and a hazy cornea, along with port-wine stains indicative of Sturge-Weber syndrome. Preoperative measurements revealed an increased axial length (AL) of 19.23 mm in the OS, with vertical and horizontal corneal diameters of 12 mm and 13 mm, respectively, and an intraocular pressure (IOP) of 20 mmHg. In comparison, the right eye (OD) showed an AL of 17.70 mm, vertical and horizontal diameters of 10 mm and 9 mm, and an IOP of 12 mmHg. Under challenging anesthesia, a combined trabeculotomy-trabeculectomy was performed on the OS. The surgical procedure was demanding due to the infant's thin sclera, requiring precise flap creation and suturing techniques.

Results: At two months, corneal edema had resolved, and the patient showed improved light response. And Sturge-Weber skin lesions also showed a reduction. By four months, patching of the non-operated eye was started, aiding binocular visual recovery. At six months, the operated eye demonstrated normalized measurements with an axial length of 20.75 mm, corneal diameters of 11.5×10.5 mm, and an IOP of 10 mmHg, comparable to the fellow eye.

Conclusions: This case demonstrates that combined trabeculotomy-trabeculectomy can effectively manage congenital glaucoma in infants with Sturge-Weber syndrome, achieving improved vision and ocular outcomes through careful surgical technique and follow-up.

Abstract No.: 205862

Panel No.: MYO-0539

Accelerated Hyperopic Shift in Peripheral Refraction During Myopia Onset: Evidence From 3-Year Longitudinal Observation

First Author: Runtong MA

Co-Author(s): Yin HU, Zhouyue LI, Mengyi WANG, Xiao YANG, Feng ZHAO

Purpose: To investigate 3-year dynamic changes in relative peripheral refraction (RPR) and their association with axial elongation and myopia progression stages in children.

Methods: A longitudinal observational cohort study (2020–2023) of 1,008 children (mean age 9.28 ± 0.59 years; 50.0% female) from Guangzhou, China. Annual assessments included cycloplegic autorefractometry, axial length (AL) measurement, and multispectral refractive topography. RPR was calculated across eccentricities (0° – 53°) and quadrants; total RPR (TRPR) represented the mean of all regions. Analysis was stratified by baseline refractive status (myopia: $SER \leq -0.50$ D, pre-myopia: -0.50 D $< SER \leq +0.75$ D, non-myopia: $SER > +0.75$ D) and 3-year outcomes (remained non-myopia, myopia onset, established myopia).

Results: Longitudinal hyperopic RPR shifts were most pronounced in peripheral retina ($>30^\circ$). In pre-myopia, baseline peripheral RPR differences ($>30^\circ$) predicted myopia onset 2 years pre-onset. Significant differences in ΔAL were observed: myopia onset (+0.91 mm), established myopia (+0.81 mm), remained non-myopia (+0.45 mm) ($p < 0.001$). However, $\Delta TRPR$ is more pronounced in onset group (0.21D) and remain non-myopia group (0.16D), but not in established myopia (0.06D). $\Delta TRPR$ correlated with ΔAL only in the onset group ($r = 0.317, p < 0.001$), not in established myopia ($r = -0.022, p = 0.789$).

Conclusions: RPR is a critical reflection for myopia progression, especially during myopia onset. The defocus shifts may reflect morphological changes in posterior eyeball but not simple axial elongation,

highlighting the stage-specific interpretation of RPR in clinical practice.

Abstract No.: 202716

Panel No.: MYO-0511

Accommodation and Peripheral Retinal Defocus in School-Age Myopic Children

First Author: Li JINYU

Co-Author(s): Vishal JHANJI, Ng TSZ KIN, Zhang RIPING, Zhang SIMIN

Purpose: To investigate the influences of accommodation on peripheral retinal defocus in school-age children with corrective glasses before and after cycloplegia.

Methods: In total, 69 children, aged 7-12 years, with spherical equivalent between +1.75 D and -9.75 D were recruited. Peripheral retinal defocus values (RDV) before and after cycloplegia were measured using multispectral refraction tomography (MRT), and compared among different severities of myopia. The correlation between retinal defocus and axial length was also evaluated. The parameters were measured in different circular areas (15°, 30°, 45°, and 53°), annular areas (15°-30°, 30°-45°, and 45°-53°), and quadrants (superior, inferior, temporal, and nasal). Data was obtained from the right eyes of all participants. An average of three values was used for analysis.

Results: Before cycloplegia, significant variations were identified in the inferior retinal quadrant across different severities of myopia and age groups. After cycloplegia, multiple retinal areas showed significant differences among different severities of myopia, while there were no differences in each area among different age groups. After cycloplegia, retinal defocus shifted significantly towards more hyperopic across all areas, except for the RDV-15o area. Superior retinal defocus was positively correlated with axial length before and after cycloplegia, whereas inferior retinal defocus was negatively correlated with axial length before cycloplegia.

Conclusions: This study revealed various distributions of defocus across different retinal areas in school-age children. Peripheral retinal defocus can be induced with cycloplegia. Alterations in accommodation can influence peripheral retinal defocus in school-age children.

Abstract No.: 205676

Panel No.: MYO-0536

Alterations of Circumpapillary Retinal Nerve Fiber Layer and Macular Ganglion Cell Complex in Eyes With Pathologic Myopia

First Author: Nan LUO

Co-Author(s): Ying HAN, Jingjing HUANG, Yuzhou XIANG

Purpose: To evaluate alterations of circumpapillary retinal nerve fiber layer (cpRNFL) thickness, circumpapillary vessel density (cpVD), and macular ganglion cell complex (mGCC) thickness in eyes with pathologic myopia.

Methods: This cross-sectional study included participants with myopia from the Zhongshan Ophthalmic Center. Eyes were grouped by non-pathologic mild-to-moderate, non-pathologic high myopia, and pathologic myopia. The cpRNFL thickness, cpVD, and mGCC thickness were compared among groups. Factors associated with these parameters were assessed using univariate and multivariate linear regression, adjusted for age, sex, axial length, central corneal thickness, and intraocular pressure.

Results: A total of 208 myopic eyes (one per participant) were analyzed: 61 non-pathologic mild-to-moderate myopic, 97 non-pathologic high myopic, and 50 pathologic myopic eyes. There were no differences in cpRNFL thickness, cpVD, or mGCC thickness between eyes with non-pathologic mild-to-moderate and high myopia. Pathologic myopic eyes showed thinner global, superior, and inferior cpRNFL thickness; lower cpVD in the globe and all quadrants; thinner mGCC thickness in the globe, inferior hemisphere, and 1-3 mm annular area (all $P < .05$). Thinner global cpRNFL thickness was associated with pathologic myopia ($\beta = -0.178$; $P = .028$). Lower global cpVD was associated with pathologic myopia ($\beta = -0.284$; $P < .001$) and smaller ratio of axial length to fovea-to-disc distance (AL-DFD) ($\beta = 0.134$; $P = .014$). Global mGCC thickness was not associated with pathologic myopia, but was associated with AL-DFD ratio ($\beta = 0.287$; $P < .001$) and rim area ($\beta = 0.169$; $P = .022$).

Conclusions: The changes in cpRNFL thickness, cpVD, and mGCC thickness associated with pathologic myopia should be considered when analyzing optic neuropathy in myopic eyes.

Abstract No.: 202335

Panel No.: MYO-0506

Alterations of Retinal Relative Peripheral Refraction in Myopic Children Following Orthokeratology

First Author: Mengdi LI

Co-Author(s): Lihua LI, Xiaoyan YANG, Bin ZHANG, Kailang ZHANG

Purpose: To quantify the changes in the spatial distribution of retinal relative peripheral refraction (RPR) in myopic children following orthokeratology treatment and explore its association with axial length growth (ALG).

Methods: This retrospective study included 100 eyes ($SE \leq -4.00$ D) from children aged 8 to 15 years. ALG was defined as axial length change from the baseline. RPR was calculated as peripheral minus central refraction and was first quantified in quadrants. RPR values, from center to periphery, were then organized into ten rings with 2.50 width each, and decomposed into Fourier components, F0 (spherical), F1 (asymmetry), F2 (astigmatism), and F3 (higher-order irregularity). Subjects were grouped by ALG (slow, moderate, fast) and the Fourier component changes in each group were identified.

Results: At baseline, hyperopic RPR was observed nasally (0.57 ± 0.67 D), inferiorly (0.65 ± 0.74 D), and temporally (0.77 ± 0.62 D), with mild myopia superiorly (-0.09 ± 0.61 D). Temporal RPR declined at 6 months (0.29 ± 1.13 D, $P < 0.01$) and became myopic at 12 months (-0.35 ± 0.94 D), as did inferior RPR (-0.04 ± 0.97 D, $P < 0.01$); nasal RPR remained hyperopic ($P > 0.05$). In the slow group (ALG: -0.10 ± 0.08 mm), F1 increased from 1 month (1.09 ± 0.60 D) to 12 months (1.20 ± 0.67 D, $P < 0.01$), with a myopic F0 shift at 12 months (-0.09 ± 0.69 D, $P < 0.01$). The medium group (0.06 ± 0.04 mm) showed a transient F1 increase at 1 month and F0 shift to plano (0.06 ± 0.59 D) at 12 months. The fast group (0.29 ± 0.93 mm) showed no significant changes in F0 or F1.

Conclusions: Orthokeratology induced time-dependent retinal refraction, mainly in the mid-peripheral and peripheral zones, with shifts toward myopia in the temporal and inferior regions. Increased peripheral asymmetry persisted in eyes with slower axial elongation, indicating it could be a potential marker of treatment effectiveness.

Abstract No.: 200928

Panel No.: MYO-0492

An Innovative Clinical Indicator for the Refractive Development of Children: The Volume Strain Value of Peripheral Retinal Wavefront Aberration

First Author: Lili SUN

Co-Author(s): Jinling YANG

Purpose: Study the correlation between the volume strain value of peripheral retinal wavefront aberration (ϵV) and other indicators of refractive development of children.

Methods: The enrolled children were 7 to 12 years old and the refractive status were emmetropia, myopia or hyperopia. Patients undergoing visits every two months after enrollment. The ϵV was respectively calculated by data from both i.Profiler and iTrace wavefront aberrometer.

Results: The data including emmetropia group (37 eyes), myopia group (13 eyes), hyperopia group (24 eyes). The results of linear regression analysis between axial length-to-corneal radius ratio (AL/CR ratio) and ϵV (by i.Profiler) show that: $R=0.883$ ($P=0.05$) in myopia group, $R=0.765$ ($P=0.05$) in hyperopia group, $R=0.102$ ($P=0.05$) in emmetropia group; spherical power Vs. ϵV (by i.Profiler): $R=0.917$ ($P=0.05$) in myopia group, $R=0.781$ ($P=0.05$) in hyperopia group, $R=0.154$ ($P=0.05$) in emmetropia group; AL/CR ratio Vs. ϵV (by iTrace): $R=0.595$ ($P=0.05$) in myopia group, $R=0.443$ ($P=0.05$) in hyperopia group, $R=0.029$ ($P=0.05$) in emmetropia group; spherical power Vs. ϵV (by iTrace): $R=0.731$ ($P=0.05$) in myopia group, $R=0.500$ ($P=0.05$) in hyperopia group, $R=0.185$ ($P=0.05$) in emmetropia group.

Conclusions: The volume strain value of peripheral retinal wavefront aberration is a promising indicator of refractive development of children.

Abstract No.: 203180

Panel No.: MYO-0517

Association Between Clinical Visual Function Parameters and CISS Scores in Visual Fatigue Assessment of School-Aged Children

First Author: Hanqing WANG

Co-Author(s): Yanglin JIANG, Lihua LI

Purpose: This study investigated to the association between clinical visual function parameters and the Convergence Insufficiency Symptom Survey (CISS) in assessing visual fatigue, aiming to establish a quantifiable detection framework for personalized intervention strategies.

Methods: A standardized experimental design was implemented with 32 school-aged children (7-16 years; 16 boys, 16 girls) with refractive errors ranging from -0.50 D to -5.00 D, corrected with spectacles. Visual fatigue was induced by 60 minutes of sustained near

work (continuous reading). Clinical parameters were collected before and after induction, including: (1) distance/near cover test; (2) near point of convergence; (3) distance/near phoria; (4) distance/near fusional ranges; (5) accommodative response; (6) monocular accommodative amplitude; and (7) accommodative facility. Subjective fatigue was evaluated using the CISS. Statistical analysis was performed using R (4.5.1), with Spearman's correlation coefficients.

Results: The mean age of participants was 10.25 ± 2.3 years. Near positive fusional vergence (Base-Out) showed significant negative correlations with post-induction CISS scores (blur: -0.355 , $p=0.046$; break: -0.418 , $p=0.017$; recovery: -0.399 , $p=0.024$). Lower near positive fusional capacity during sustained near-visual tasks was associated with higher subjective fatigue scores, whereas other visual function parameters showed only weak correlations.

Conclusions: The study validates the differential sensitivity of clinical visual function assessment in characterizing visual fatigue. Near positive fusional vergence emerged as a key factor and should be considered in future optometric clinics. Larger studies are warranted to validate these findings and refine predictive models. Enhancing near fusional ability via vision training may alleviate fatigue symptoms and contribute to myopia control in school-aged children.

Abstract No.: 203268

Panel No.: MYO-0520

Association Between Near Phoria and Axial Elongation in School-Aged Children: A Three-Year Cohort Study

First Author: Jing WANG

Co-Author(s): Yanglin JIANG, Xiaoyan YANG

Purpose: To investigate the association between axial elongation and near/distance phoria in school-aged children and evaluate the influence of binocular visual function on axial elongation.

Methods: A total of 983 first-grade students (500 boys, 483 girls) from three Tianjin primary schools were enrolled in October 2021. Baseline mean spherical equivalent was -0.22 ± 1.13 D, and mean axial length was 22.77 ± 0.76 mm. Annual ophthalmic examinations over three years, including visual acuity, autorefraction, Maddox rod testing for near phoria, and axial length measurement. Group-Based Trajectory Modeling (GBTM) classified axial growth into high-, medium-, and low-level groups.

Results: Over the three-year follow-up, near phoria was positively associated with axial elongation. Each one-unit increase in near phoria was associated with a 4% higher risk of high-level axial growth compared to the low-level group (OR = 1.04, $p = 0.008$). Similarly, each one-unit increase in near phoria was linked to a

3% increased risk in the medium-level versus low-level group (OR = 1.03, $p = 0.018$).

Conclusions: Near phoria is significantly associated with axial elongation in children. Both greater exophoria or esophoria may accelerate axial elongation, suggesting that abnormal binocular visual function contributes to myopia progression.

Abstract No.: 208649

Panel No.: MYO-0564

Association Between Peripapillary Retinal Nerve Fiber Layer Thickness and Age in Adults With High Myopia

First Author: Tsun Hei YIP

Co-Author(s): Kai Shun Christopher LEUNG, Zirong LIU, Xiujuan ZHANG

Purpose: Changes in peripapillary retinal nerve fiber layer (pRNFL) thickness has become an important diagnostic marker for glaucoma since the advent of Optical Coherence Tomography (OCT). Thus, understanding various risk factors is critical.

Methods: Participants aged ≥ 50 years old with spherical equivalent (SE) ≤ -5 D or axial length (AL) ≥ 22.5 mm were included in this study. Average and pRNFL thickness in four quadrants (superior, inferior, temporal, nasal) were measured by OCT. Pearson correlation coefficients (r) were calculated to investigate their correlation with age.

Results: Fifty-five high myopic right eyes from 55 Chinese were included, with mean ages 61.0 ± 7.83 years, mean SE -7.37 ± 2.50 D, mean intraocular pressure (IOP) 14.96 ± 3.40 mmHg, and 18 (32.73%) males. Statistically significant correlations were revealed between age and average pRNFL thickness ($r = -0.450$, $P = 0.0006$), pRNFL thickness in temporal region ($r = -0.285$, $P = 0.0351$), superior region ($r = -0.470$, $P = 0.0003$) and inferior region ($r = -0.449$, $P = 0.0006$). No significant association was evident between pRNFL thickness in nasal region and age ($r = -0.0894$, $P = 0.516$).

Conclusions: Age-related changes in pRNFL thickness may play a major role in the progression of myopic degeneration. Understanding this relationship emphasizes the need for regular monitoring of pRNFL as part of the comprehensive eye care in aging populations.

Abstract No.: 207052

Panel No.: MYO-0547

Association of Body Mass Index and Demographic Differences With Simple Myopia in South Indian Children

First Author: Elackiya **MANIMARAN**

Co-Author(s): Sahithya **BHASKARAN**, *Kamatchi* **NAGU**, *Vijayalakshmi* **P**

Purpose: To evaluate the association between body mass index (BMI), urban-rural distribution, and simple myopia among South Indian children.

Methods: This is a retrospective hospital-based study which analysed electronic medical records (EMR) of children aged 6–15 years who attended a paediatric clinic between January 2020 and December 2024. Children were categorized as myopes or emmetropes (controls). BMI was calculated using the WHO age and sex specific growth charts. Urban–rural distribution data on children’s residence were obtained from the Local Government Directory, Government of India.

Results: A total of 10,960 children were included (myopia - 4,094 controls - 6,866). Mean age and sex distribution were similar across groups. Myopia was more prevalent among children residing in urban areas. Overweight and obesity were more common in the myopia group ($p < 0.001$). Multivariate regression showed that overweight (OR = 1.55, 95% CI: 1.35–1.77), obesity (OR = 1.98, 95% CI: 1.60–2.44), and urban residence (OR = 1.74, 95% CI: 1.59–1.90) were independently associated with higher odds of myopia.

Conclusions: Simple myopia in South Indian children was significantly associated with higher BMI and urban residency. Children with overweight and obesity had nearly double the odds of myopia compared to their normal weight peers. These findings imply that lifestyle, environmental and nutritional factors may be as critical as genetics in determining myopia risk in children.

Abstract No.: 208261

Panel No.: MYO-0554

Association of Retinal Microvasculature With Myopia Progression in Children: The Hong Kong Children Eye Study

First Author: Zixuan **LIN**

Co-Author(s): Lijia **CHEN**, *Carol Y.* **CHEUNG**, *Patrick* **IP**, *Ka Wai* **KAM**, *Kyoko* **OHNO-MATSUI**, *Chi Pui* **PANG**, *Fangyao* **TANG**, *Clement C.* **THAM**, *Jason C.* **YAM**, *Alvin L.* **YOUNG**, *Xiu Juan* **ZHANG**, *Yuzhou* **ZHANG**

Purpose: To investigate the associations between optical coherence tomography angiography (OCT-A) metrics and myopia progression in children.

Methods: This prospective, longitudinal cohort study recruited children ages 6 to 8 years for 2- to 6-year follow-ups. OCT-A captured macular images

from the superficial capillary plexus (SCP) and deep capillary plexus (DCP). Annual progression of spherical equivalent (SE) and axial length (AL) was calculated as (SE/AL at last visit – SE/AL at baseline)/follow-up duration. Multivariable linear regression analysis evaluated the associations of OCT-A metrics with SE/AL progression. Restricted cubic spline (RCS) analysis evaluated both linear and nonlinear associations. Holm–Bonferroni correction was applied to account for multiple comparisons.

Results: A total of 920 children were analyzed. Multivariable linear regression, adjusted for age, sex, baseline SE/AL, and other covariates, showed that baseline foveal avascular zone (FAZ) circularity was negatively associated with annual AL elongation ($\beta = -0.06$; 95% confidence interval [CI], -0.10 to -0.02 ; adjusted $P = 0.045$). Similarly, the baseline FAZ circularity was positively associated with annual SE progression ($\beta = 0.15$; 95% CI, 0.05 – 0.26 ; adjusted $P = 0.045$). No significant associations were found between OCT-A metrics in the DCP with annual AL/SE progression. Furthermore, RCS analysis demonstrated no significant nonlinear associations between OCT-A metrics and annual AL/SE progression (P for nonlinearity > 0.05).

Conclusions: Baseline FAZ circularity in the SCP was significantly associated with annual AL elongation and annual SE progression in children, suggesting its potential as an imaging biomarker for monitoring myopia progression.

Abstract No.: 208506

Panel No.: MYO-0559

Behavioural Patterns and Thresholds Associated With Childhood Myopia in a Large-Scale School-Based Study in China

First Author: Jingjing **WANG**

Purpose: Childhood myopia is a growing public health concern worldwide, yet the behavioural determinants and their quantitative thresholds remain uncertain.

Methods: We investigate the associations between integrated lifestyle patterns and myopia among 12,763 school-aged children in Shanghai. Using machine learning and k-means clustering based on six daily activities—doing homework, reading, computer use, television watching, sleeping, and time outdoors—we identify six distinct behavioural patterns.

Results: Children characterised by reduced sleep and intensive nearwork (clusters 3, 4, and 6) show significantly higher risks of premyopia and myopia, longer axial length, and poorer uncorrected visual acuity compared with those in the balanced behaviour group. A grid search approach further defines optimal thresholds for reducing myopia risk: doing homework ≤ 1 h/day, reading ≤ 0.5 h/day, computer use ≤ 0.5 h/day, television watching ≤ 1 h/day, sleeping ≥ 10 h/day, and

outdoor activity ≥ 2 h/day. Contour analyses suggest a compensatory relationship between sleep and outdoor time, with each additional hour outdoors equivalent to 1.86 hours of sleep in lowering myopia risk.

Conclusions: Our findings provide evidence-based behavioural thresholds and highlight integrated lifestyle patterns as key determinants of myopia development in school-aged children.

Abstract No.: 205875
Panel No.: MYO-0538

Bilateral Marcus Gunn Jaw Winking Phenomenon With High Myopia- a Unique Observation

First Author: Nithya SRIDHARAN
Co-Author(s): Smrithi Sony Thampi

Purpose: To report a unique case of bilateral Marcus Gunn phenomenon jaw winking (MGJWP) with high myopia but without ptosis. To our knowledge, this is a new observation with regard to the refractive status in this syndrome.

Methods: This is a case of a 3-year-old girl who presented to the OPD with abnormal eyelid movements since birth. The mother observed these symptoms more prominently during mastication. She was a firstborn child out of a second-degree consanguineous marriage, with an unremarkable prenatal, perinatal, and postnatal history. Family history was negative for any ocular disease or abnormalities.

Results: On examination, the child had elevation of the eyelids on contralateral jaw thrust with no associated ptosis. The anterior segment examination was found to be within normal limits. Her versions were full with no limitations and orthotropic by Hirschberg testing. Cycloplegic refraction showed high myopia of -6.00DS in BE, with BCVA in BE 6/18 (Snellen's VA Chart). Fundus evaluation showed a myopic disc with no torsion and peripheral fields within normal limits. Using A-scan, axial lengths were measured to be 24.95 OD and 24.65 OS. The sensorimotor findings were normal, and all findings were unchanged on follow-up 6 months later. The child did not require any surgical intervention.

Conclusions: This is a unique case of bilateral MGJWP with high myopia in the absence of ptosis. To our knowledge, this is the first report linking abnormal refractive status with this rare phenomenon, warranting further investigation into potential developmental associations.

Abstract No.: 200445
Panel No.: MYO-0490

Childhood Myopia and Risk Factors: Findings From an Elementary School in a Remote Indonesian Island

First Author: Safirah KHAIRUNA
Co-Author(s): Abdullah RAHMAN

Purpose: To determine the prevalence of myopia and identify its associated risk factors among school-aged children attending an elementary school in Ternate, North Maluku, Indonesia. Ternate is a remote volcanic island in eastern Indonesia, geographically isolated from major urban centers and with relatively limited access to specialized health services, representing an underserved population.

Methods: A cross-sectional study was conducted among students aged 6–16 years at one elementary school in Ternate. Visual acuity testing was used for the screening and diagnosis of myopia. Sociodemographic information and potential risk factors were obtained through a structured 22-item questionnaire. Items covered demographic characteristics, parental background, screen exposure (television, smartphones, video games), reading duration, outdoor activity, extracurricular participation, and family history of myopia (parents or siblings). Data were taken from January to March 2025.

Results: A total of 217 children were included in this study, of whom 69 (31.8%) were diagnosed with myopia. Myopia was significantly more prevalent among females ($p = 0.041$). Presence of myopic siblings was strongly associated with myopia (OR 2.42; 95% CI 1.24–4.72; $p = 0.01$). Although not statistically significant, trends suggested a lower risk of myopia with reduced screen time, shorter reading duration, and increased outdoor activity.

Conclusions: Nearly one-third of children screened at this elementary school were affected by myopia. Female gender and sibling myopia were significant risk factors. Findings from this remote island school population provide valuable preliminary insights into childhood myopia, even in a remote island setting, emphasizing the importance of early school-based screening and family-oriented education in underserved regions in Indonesia.

Abstract No.: 208538
Panel No.: MYO-0563

Clinical Study on the Effectiveness of Different Orthokeratology Lenses in Controlling Myopia Progression in Children and Adolescents

First Author: Qi ZHANG
Co-Author(s): Jianfeng ZHU

Purpose: To compare the efficacy and safety of different orthokeratology (OK) lens designs in

controlling axial elongation and myopia progression in children and adolescents with low myopia, and to identify potential predictive indicators for treatment response.

Methods: In this randomized, double-blind, controlled clinical trial, 80 participants aged ≥ 8 years with myopia ranging from -1.00 D to -3.00 D were enrolled. Subjects were randomly assigned to wear either standard design OK lenses (Control group) or specialty-designed OK lenses (Test group), the latter precision-customized by incorporating adjustments to the Base Curve (BC), Reverse Curve (RC), and Jessen Factor. Lenses were worn for approximately 8 hours per night over one year. Ophthalmic parameters were examined at 1, 3, 6, 9, and 12 months. Compliance and adverse events were monitored digitally.

Results: Axial measurements demonstrated a time-dependent treatment effect with precision-customized orthokeratology lenses. While initial differences at 1-3 months were not statistically significant ($p > 0.05$), the customized lens group showed markedly less axial growth from month 6 (0.040 vs 0.110 mm, $p = 0.002$), with the treatment effect strengthening through month 12 (0.071 vs 0.174 mm, $p < 0.001$). These findings establish the superior long-term efficacy of parameter customization in myopia control.

Conclusions: Different OK lens designs provide effective and individualized approaches for slowing myopia progression. Precision customization of key lens parameters offers a promising strategy, and monitoring of ocular parameters may help optimize personalized myopia control.

Abstract No.: 206735

Panel No.: MYO-0545

Comparative Efficacy Between Highly Aspherical Lenslets and Single Vision Lenses in Slowing Pediatric Myopia Progression: A Systematic Review and Meta-Analysis

First Author: Angelina Patricia **CHANDRA**
Co-Author(s): Ametysa **MIRANDA**, Tri **RAHAYU**,
Angelina Riadi Alim **SUPRAPTO**

Purpose: This systematic review and meta-analysis (PROSPERO-ID:CRD420251022299) of randomized controlled trials (RCTs) aim to investigate the efficacy of highly aspherical lenslets (HAL) compared to single vision lenses (SVL) in children aged 6–13 years old to control myopia progression.

Methods: Seven scientific databases were searched following PRISMA guidelines for studies published up to April 2025. Quality of studies was assessed using the Cochrane RoB Tool 2.0. A random-effects meta-analysis of standard mean differences (SMD) was calculated with STATA16. Subgroup analysis by 6 months and >12 months follow-up duration was calculated to assess study heterogeneity.

Results: The search yielded 8631 studies, in which 7 RCTs were selected ($n = 733$). Pooled SMD of SER and AL changes between the two groups were 0.39 (95% CI: -0.29 – 1.07 , $p = 0.26$) and -0.20 (95% CI: -0.40 – 0.01 , $p = 0.06$), respectively. However, sub-group analysis of studies with 6 months follow-up duration yielded a statistically significant difference in SER and AL SMD changes, being 0.17 (95% CI: 0 – 0.33 , $p = 0.04$) and -0.10 (95% CI: -0.15 – -0.06 , $p < 0.001$), respectively. However, studies with >12 months follow-up duration did not yield a significant change in SER 0.50 (95% CI: -0.54 – 1.55 , $p = 0.35$) and AL -0.23 (95% CI: -0.50 – 0.04 , $p = 0.10$). High heterogeneity between studies during overall and subgroup analysis (range $I^2 = 69.34$ – 99.97%) was identified. Despite the variability, the sensitivity analysis concluded the robustness of findings.

Conclusions: HAL was more effective compared to SVL in reducing both SER and AL in reducing myopia progression in children aged 6–13 years; however, this was not statistically significant. Subgroup analysis revealed a significant superiority of HAL over SVL at the 6-month follow-up, suggesting potential short-term efficacy. However, although the efficacy of HAL during >12 months was superior to SVL, it was not statistically significant. These findings highlight the need for more standardized, long-term RCTs to clarify the clinical efficacy of HAL in delaying pediatric myopia progression.

Abstract No.: 202076

Panel No.: MYO-0502

Comparing Clinical Outcomes of Software-Based and Trial Lens Orthokeratology Fitting in Pediatric Myopia: A Systematic Review and Meta-Analysis

First Author: Angelina Patricia **CHANDRA**
Co-Author(s): Ametysa **MIRANDA**, Tri **RAHAYU**,
Angelina **RIADI ALIM SUPRAPTO**

Purpose: To compare clinical outcomes of orthokeratology fitted with software-based fitting versus with trial lens fitting in pediatric myopia control strategies.

Methods: Six databases were searched with studies leading up to July 2025. This review had also been registered in PROSPERO (CRD420251121366). Studies were included if the population was pediatrics treated with orthokeratology fitted with either software or trials lens, report axial length (AL), spherical equivalent refraction (SER), corneal staining, and/or corneal endothelial density during 12 months follow-up. Quality of studies were assessed using Cochrane RoB Tool 2.0. A random-effects meta-analysis of standard mean differences (SMD) were calculated using STATA16.0.

Results: Initial search yielded 2,450 studies. After exclusion considering inclusion criteria, three randomized controlled trials (RCTs) were included

($n=404$). SMD of AL between software and trial lens fitting was statistically significant, -0.04 (95% CI: -0.07 – -0.00 , $p=0.05$, $I^2=0.02\%$). However, other clinical outcomes were not statistically significant, with SMD of SER and corneal endothelial density being 0.06 (95% CI: -0.10 – 0.23 , $p=0.21$, $I^2=37.53\%$) and -20.72 (95% CI: -74.90 – -33.47 , $p=0.56$, $I^2=0.00\%$), respectively. Software-fitting reduces odds of corneal staining, OR -0.64 (95% CI: -2.55 – 1.27 , $p=0.10$, $I^2=63.75\%$), although not statistically significant.

Conclusions: Software-based orthokeratology fitting significantly reduces axial length elongation in pediatric myopia after 12 months follow-up compared to trial lens fitting. Corneal staining as an adverse event was also significantly reduced with software-based fitting. These findings indicate better clinical outcomes when orthokeratology is fitted with software compared to a trial lens.

Abstract No.: 202533

Panel No.: MYO-0509

Comparing the Effects of High Order Aberration Diffusion (HOAD) Versus Defocus Incorporated Multiple Segment (DIMS) Spectacle Lenses on Myopia Control

First Author: Xiaoqin CHEN

Co-Author(s): Xingyi GUO, Lihua LI, Wenli LU

Purpose: To investigate the 12-month effectiveness of High Order Aberration Diffusion (HOAD) and Defocus Incorporated Multiple Segments (DIMS) spectacle lenses in myopic Chinese children.

Methods: A total of 138 Chinese children aged 8-13 years, with spherical equivalent refractive error (SER) -1.00 D to -6.00 D, were randomized to one of the three groups of EHOAD spectacle lenses with stronger higher-order aberrations modulation, HOAD spectacle lens with slightly higher-order aberrations modulation, and DIMS spectacle lens. Axial length (AL) and cycloplegic SER changes over 12 months were measured.

Results: A total of 129 participants completed the 12-month visit following 9 voluntary withdrawals after screening (4 in EHOAD, 3 in HOAD, and 2 in DIMS). The 12-month means for myopia progression were -0.20 (0.40) D, -0.30 (0.42) D, and -0.45 (0.34) D in the EHOAD, HOAD, and DIMS groups. The EHOAD and HOAD groups had less SER progression by a mean of 0.25 D (55%; $P = 0.002$) and 0.15 D (33%), respectively, than the DIMS group. The 12-month increase in AL was 0.10 (0.16) mm, 0.12 (0.18) mm, and 0.22 (0.13) mm in the EHOAD, HOAD, and DIMS groups. Compared with DIMS, the EHOAD and HOAD groups demonstrated significantly less axial elongation by a mean of 0.12 mm (55%; $P < 0.001$) and 0.10 mm (45%; $P < 0.001$).

Conclusions: Chinese children wearing spectacle lenses designed with HOAD had less myopia progression and

axial elongation than those wearing spectacle lenses designed with DIMS.

Abstract No.: 202918

Panel No.: MYO-0515

Control of Myopia Using Contrast Modulation Spectacle Lenses in a Chinese Population

First Author: Zhi CHEN

Purpose: Contrast modulation spectacle lenses (Diffusion Optics Technology™; DOT) are designed to slow myopia progression by reducing contrast signaling in the retina. The purpose of this study was to evaluate the myopia control efficacy of DOT spectacle lenses in a Chinese population.

Methods: The study (NCT05562622) is a 24-month, multicenter randomized (2:1 ratio), controlled clinical trial evaluating DOT spectacle lenses versus standard single vision control spectacle lenses in myopic children aged 6–13. A linear mixed-effects model for repeated measures was fitted to the data to evaluate the changes in axial length (AL) and cycloplegic spherical equivalent refraction (cSER).

Results: A total of 171 children completed the 18M visit (123 DOT; 48 Control). For DOT wearers, the least square (LS) means changes $\pm$ SE at 18M from baseline in AL was 0.17 ± 0.03 mm (95%CI: 0.12 to 0.22 , $p<0.0001$) and cSER was -0.20 ± 0.05 D (95%CI: -0.30 to -0.09 , $p=0.0004$). For the control group, AL was 0.51 ± 0.04 mm (95%CI: 0.44 to 0.58 , $p<0.0001$) and cSER was -0.89 ± 0.08 D (95%CI: -1.06 to -0.73 , $p<0.0001$). Adjusted means in AL elongation and cSER progression for DOT wearers was 0.34 mm (95%CI 0.25 to 0.42 , $p<0.0001$) and 0.70 D (95% CI 0.50 to 0.89 , $p<0.0001$) less than the control group, respectively.

Conclusions: Results from this ongoing trial demonstrate DOT spectacle lenses are effective at slowing axial elongation and myopia progression in Chinese children.

Abstract No.: 201052

Panel No.: MYO-0494

Correlation of Axial Elongation With Lens Thickness Changes in Pediatric Myopia Undergoing Orthokeratology

First Author: Huihu ZHENG

Co-Author(s): Xuehui ZHANG

Purpose: To investigate the correlation between the rate of axial elongation and changes in crystalline lens thickness in myopic children undergoing orthokeratology.

Methods: This retrospective study included 107 myopic children (aged 8–16 years) with spherical equivalent (SE) refraction ranging from -4.00 to -0.75 D who were fitted with orthokeratology lenses at Xi'an First Hospital between 2021 and 2024. All participants completed a

1-year follow-up. Axial length (AL), anterior chamber depth (ACD), crystalline lens thickness (CLT), and central corneal thickness (CCT) were measured before and after lens wear. The treatment zone area was calculated using custom MATLAB software. Statistical analysis was performed using paired t-tests and linear regression.

Results: After 12 months of lens wear, significant changes were observed, including axial elongation (AL), shallower anterior chamber depth (ACD), increased crystalline lens thickness (CLT), and reduced central corneal thickness (CCT) (all $P < 0.001$). Linear regression analysis revealed that slower axial elongation was associated with older baseline age, smaller treatment zone area, and greater increase of CLT (all $P < 0.001$). Additionally, greater increase of CLT was independently correlated with older age and smaller treatment zone area (both $P < 0.001$).

Conclusions: In myopic children undergoing orthokeratology, significant crystalline lens thickening was observed. Notably, older age, smaller treatment zone area, and greater lens thickening were associated with slower axial elongation.

Abstract No.: 208122

Panel No.: MYO-0552

Decadal Changes in Myopia Prevalence and Vision Impairment Among Children Aged 4–14 Years in Shanghai: Findings From the Shanghai Child and Adolescent Large-Scale Eye Study (SCALE)

First Author: Zikai **ZHANG**

Co-Author(s): Jun **CHEN**, Xiangui **HE**, Jingjing **WANG**, Xun **XU**, Haidong **ZOU**

Purpose: To report the prevalence of myopia, high myopia, and vision impairment among children aged 4–14 years in Shanghai based on the 2024 city-wide SCALE re-survey, using the same methodology as the 2013 baseline study.

Methods: A city-wide, school-based screening was conducted in 2024 in Shanghai. Distance visual acuity (unaided and presenting) was measured using the standard logarithmic “E” chart, and non-cycloplegic autorefractometry was performed with calibrated autorefractors. To minimize overestimation, refractive data were adjusted using the validated SCALE equation. Myopia and high myopia were defined as spherical equivalent ≤ -1.0 D and ≤ -5.0 D, respectively. Age-specific prevalence and 95% confidence intervals (CIs) were calculated and compared with the 2013 published data.

Results: Among 2,053,123 children in 2024, overall myopia prevalence was 20.9% and high myopia 1.8%. By school stage, myopia prevalence was 1.6% in preschoolers (ages 4–6), 19.8% in primary school students (ages 7–11), and 51.2% in junior middle school

students (ages 12–14). Compared with 2013, relative risks (RRs) declined most sharply in preschoolers ($RR = 0.17$) and least in adolescents ($RR = 0.79$). Vision impairment based on presenting VA (worse than 6/12) occurred in 6.7% of children, significantly lower than in 2013 (10.3%). District-level variation was evident, with higher prevalence in urban central districts and lower rates in suburban areas.

Conclusions: Myopia and high-myopia prevalence among Shanghai children declined substantially between 2013 and 2024, especially at early school ages. The improvement likely reflects strengthened public eye health initiatives, though high myopia in adolescents remains a significant concern requiring sustained preventive efforts.

Abstract No.: 208494

Panel No.: MYO-0561

Defining Critical Thresholds for Myopia Intervention in Paediatric Populations: A Review and Consensus-Based Approach

First Author: Meng **LU**

Co-Author(s): Jun **CHEN**, Xiangui **HE**, Xun **XU**

Purpose: The global rise in myopia poses a growing risk of irreversible vision loss. However, myopia control research faces major obstacles, including parental reluctance to enroll children in untreated control groups, limited industry willingness for head-to-head trials, and challenges in generalizing results across populations. These factors hinder the establishment of evidence-based intervention thresholds through traditional RCTs. This study aims to synthesize existing evidence to define the refractive change threshold for initiating effective pediatric myopia intervention.

Methods: A systematic literature review and Delphi expert consensus method were employed to analyze data from high-quality RCTs, real-world studies, and cohort studies. The analysis focused on identifying critical values of treatment response metrics, including annual axial length progression, spherical equivalent refraction (SER) changes, and other relevant ophthalmological parameters that demonstrate clinically meaningful intervention effects.

Results: Axial length progression ≤ 0.2 mm/year and SER progression ≤ 0.50 D/year were established as key indicators of treatment success. Additional ophthalmological parameters, including choroidal thickness changes and peripheral defocus metrics, were also recognized as valuable indicators for assessing intervention efficacy.

Conclusions: This study provides evidence-based efficacy thresholds for evaluating myopia control interventions in paediatric populations. The established metrics offer standardized parameters for assessing treatment response in both clinical practice and research settings. These findings facilitate more

objective evaluation of intervention outcomes and support personalized treatment approaches, ultimately contributing to improved myopia management strategies and prevention of vision-threatening complications.

Abstract No.: 204055

Panel No.: MYO-0521

Development of an Electricity-Free Highly Portable Manual Refractometer

First Author: Marina YAMAGUCHI

Co-Author(s): Toru NAKAZAWA, Makoto SUZUKI, Satoru TSUDA, Chiaki YAMAGUCHI, Katsuhiko YAMAGUCHI

Purpose: This study aimed to develop an electricity-free, highly portable manual refractometer (MR) and compare its performance with an autorefractometer (AR).

Methods: Forty phakic eyes (aged 20–80) were evenly divided into Groups A and B, with different optotypes used in each group. Agreement between MR- and AR-measured spherical equivalent refraction (SER), and the correlation between SER measured by each device and axial length (AL), were analyzed by Pearson's correlation (r_p) and Bland–Altman analysis (BAA). Optotype compatibility in the combined group was tested by Student's t-test and two one-sided tests (TOST; ± 1.00 D). In Group B, improvement in logMAR visual acuity (VA), defined as corrected minus uncorrected, was assessed by Spearman's correlation (r_s). MR-related adverse events were surveyed.

Results: MR-SER showed high reproducibility (A: $r_p = 0.96$; B: $r_p = 0.97$; A+B: $r_p = 0.96$; all $p < 0.001$). No significant difference was found between optotypes ($p = 0.956$), and equivalence was confirmed by TOST (90% Confidence Interval: -0.88 to 0.83). MR- and AR-SER correlated strongly ($r_p = 0.90$, $p < 0.001$) with minimal BAA bias (-0.12 D). AL negatively correlated with SER in both methods ($r_p = -0.65$, $p < 0.001$). Improvement in logMAR VA correlated strongly ($r_s = 0.95$, $p < 0.001$). No adverse events occurred.

Conclusions: MR performed comparably to AR. It is easy to use, optotype-compatible, cost-effective, and also suitable for underserved areas worldwide, with the potential to improve eye care accessibility and support the Sustainable Development Goals (SDGs).

Abstract No.: 207844

Panel No.: MYO-0551

Differential Three-Dimensional Posterior Pole Remodeling in Myopic Children: Comparing Repeated Low-Level Red-Light Therapy With Low-Dose Atropine

First Author: Ziwei ZHAO

Co-Author(s): Yanxian CHEN, Mingguang HE, Yue WU

Purpose: To compare longitudinal changes in three-dimensional macular morphology between repeated low-level red-light (RLRL) therapy and low-dose atropine (LDA) treatment in myopic children.

Methods: This secondary analysis of a randomized controlled trial included 50 myopic children (aged 7–15 years) randomized to receive either RLRL therapy (650 ± 10 nm) or 0.01% atropine eye drops. Spectral-domain optical coherence tomography was performed at baseline and 1, 3, 6, and 12 months. Custom software was used to perform distortion correction and quantify macular curvature (MC), macular outward scleral height (MOSH), and their respective asymmetry indices. Primary outcomes were 12-month changes in average regional macular curvature. Secondary outcomes included changes in MOSH, asymmetry indices, and retinal layer thicknesses. Linear mixed-effects models analyzed longitudinal changes.

Results: At 12 months, RLRL demonstrated significant macular flattening versus atropine across all regions (mean differences $\times 10^{-3}$): central (9.0; 95%CI: 4.4–13.6; $P < 0.01$), temporal (9.7; 6.7–12.8; $P < 0.001$), inferior (8.4; 5.2–11.6; $P < 0.001$), superior (7.0; 4.0–9.9; $P < 0.001$), and nasal (3.7; 0.8–6.7; $P < 0.05$). The inter-group difference was most pronounced centrally and decreased with eccentricity. MOSH decreased superiorly and increased inferiorly in the RLRL group at 12 months, while the LDA group showed minimal change. Both nasal-temporal and superior-inferior macular curvature asymmetry indices increased significantly more in the RLRL group ($P < 0.001$ and $P < 0.05$, respectively). No inter-group differences in retinal layer thicknesses were observed.

Conclusions: Myopic children treated with RLRL exhibited macular flattening and decreased inferior scleral height, indicating alterations in the three-dimensional ocular shape. These changes were more pronounced than those observed with low-dose atropine treatment, suggesting that RLRL therapy may achieve myopia control by increasing ocular blood flow and modulating scleral remodeling.

Abstract No.: 208408

Panel No.: MYO-0556

Effect of Low-Concentration Atropine on Myopia Prevention in Pre-myopic Children: A Randomized Clinical Trial

First Author: Jingjing WANG

Co-Author(s): Guangzhuang JING

Purpose: This study aims to evaluate the efficacy of 0.01%, 0.02%, and 0.04% atropine eye drops for preventing myopia in pre-myopic children.

Methods: A 12-month randomized, double-blind, placebo-controlled trial was conducted at the Shanghai Eye Diseases Prevention and Treatment Center from March 2023 to June 2024. Children aged 6–9 years with cycloplegic SER between -0.05 and $+0.75$ D were enrolled. Exclusion criteria included ocular/systemic diseases, orthokeratology use, or prior myopia control treatments. Participants were randomized (1:1:1:1) to placebo or 0.01%, 0.02%, or 0.04% atropine eye drops, applied once daily to both eyes. The primary outcome was 12-month cumulative myopia incidence (SER ≤ -0.50 D). Secondary outcomes included changes in SER (right eye) and axial length (AL) measured by swept-source OCT.

Results: Of 428 randomized children, baseline characteristics were comparable across groups. The 12-month myopia incidence was 22.22% (0.04%), 26.14% (0.02%), 29.21% (0.01%), and 36.59% (control), showing a significant dose-response trend ($*P^*_{\text{trend}} = 0.048$). Mean SE progression at 12 months was -0.171 ± 0.390 D (0.04%), -0.315 ± 0.526 D (0.02%), -0.377 ± 0.502 D (0.01%), and -0.456 ± 0.452 D (control) ($*P^* = 0.004$). Post hoc analysis showed a smaller SE change with 0.04% atropine than control ($\Delta 0.28$ D; 95% CI, 0.15–0.42; $*P^* < 0.001$) or 0.01% atropine ($\Delta 0.21$ D; 95% CI, 0.07–0.34; $*P^* = 0.006$). Among children aged 8–9 years, myopia incidence was 26–28% with 0.02–0.04% atropine versus 60% in controls ($*P^* = 0.023$ –0.029). All concentrations reduced SE progression, with 0.04% showing the greatest effect.

Conclusions: Our findings provide evidence-based behavioural thresholds and highlight integrated lifestyle patterns as key determinants of myopia development in school-aged children.

Abstract No.: 202294

Panel No.: MYO-0505

Effects of Anatomical Correction on Structure-Function Associations in High Myopia Eyes With and Without Glaucoma

First Author: Li Xin Hannah WONG

Co-Author(s): Rachel S CHONG, Samantha LOR, Lee Ching PHANG, Damon WONG

Purpose: Overlapping features between glaucoma and high myopia (HM) make glaucoma diagnosis in HM eyes challenging. We investigate if anatomical adjustments

to the Drasdo model improve structure-function (SF) correlation in HM eyes with and without glaucoma.

Methods: 261 HM eyes, including 138 with HM and glaucoma (HM-G) and 123 with HM without glaucoma (HM-N), were enrolled in this study. The Drasdo model, with and without anatomical correction for magnification and disc-fovea angle, was applied to the standard SF map that measures ganglion cell-inner plexiform layer (GCIPL) thickness corresponding to focal visual field (VF) locations. SF correlation between GCIPL thickness and VF sensitivity was assessed using Spearman correlation (rs). Correlations were compared between corrected and uncorrected models across all HM eyes, and separately in HM-G and HM-N subgroups using Steiger's Z-test.

Results: Anatomical correction significantly improved SF association in almost all sectors in the combined HM group, except superior and superotemporally, with strongest correlations in inferior (rs=0.66 corrected vs 0.61 uncorrected, $p=0.005$) and inferotemporal sectors (rs=0.63 corrected vs 0.56 uncorrected, $p=0.001$). Anatomical adjustment improved SF correlation in all sectors of HM-G eyes except superiorly, with minimal effect in HM-N eyes. Notably, HM-G eyes displayed strong correlations throughout (rs ≥ 0.40) compared to HM-N eyes (rs < 0.20).

Conclusions: Implementing anatomical correction for myopia significantly improves SF associations in HM eyes, especially in HM-G eyes. Strong SF concordance in HM eyes may suggest glaucomatous changes, aiding early detection and intervention.

Abstract No.: 206333

Panel No.: MYO-0542

Efficacy of Combined Surgery for Managing High Myopia with Exotropia in Children

First Author: Tong QIAO

Co-Author(s): Wangyi FANG, Zupeng LU, Kai XU, Haiyun YE

Purpose: To assess outcomes of combined posterior scleral reinforcement (PSR) and exotropia surgery in children with high myopia, evaluating axial length (AL) control, best-corrected visual acuity (BCVA), retinal vascular changes, and strabismus correction.

Methods: This retrospective study analyzed 62 children (124 eyes; mean age 9.19 years) treated at Shanghai Children's Hospital (2021–2024) with ≥ 6 -month follow-up. AL, spherical equivalent (SE), BCVA, exotropia angle and ETDRS-grid-based angio-OCT analysis of nine retinal zones were examined by standard ophthalmic assessments.

Results: Postoperatively, BCVA improved slightly and AL showed non-significant reduction. All grafts remained stable without complications. Exotropia angle decreased significantly ($p<0.05$). Contrast sensitivity (CST) improved at high spatial frequencies (12/18

cpd bilaterally; 6 cpd right eye). Foveal and superior parafoveal vessel density increased significantly in both superficial (SCP) and deep capillary plexuses (DCP) ($p < 0.05$). FAZ area decreased significantly in SCP/DCP (right SCP most pronounced). Perifoveal vessel density (300 μ m) improved significantly except in left DCP. No significant correlation existed between AL reduction and vascular improvements.

Conclusions: Our findings demonstrate that combined PSR and exotropia surgery effectively controls AL in pediatric high myopia while significantly improving retinal microcirculation. The angio-OCT detected vascular improvements appear more pronounced and immediate than AL changes, suggesting this modality may serve as a sensitive biomarker for monitoring myopia progression. Additionally, this combined approach successfully corrects ocular misalignment and enhances binocular visual function.

Abstract No.: 200919

Panel No.: MYO-0491

Exploration of Visual Perception Metrics As Indicators for Myopia Screening

First Author: Hongwei DENG

Purpose: The aim of this study is to assess and analyze the relationship between myopia screening and visual perception indicators and to explore the predictive utility of these indicators for myopia screening outcomes in children.

Methods: For 180 third-grade students aged 8-10 in Shenzhen, we conducted myopia screening and assessed ocular biometrics and visual perception. Group differences were analyzed using the Wilcoxon rank sum test. Subsequently, myopia prediction models were developed using the axial length/corneal radius ratio (AL/CR) and visual perception metrics, with their diagnostic efficacy evaluated by ROC curve analysis.

Results: Significant differences ($P < 0.05$) were found between the emmetropia and screening myopia groups for AL/CR (max), PEP-DL (max), and the 0.8mE and 1.5mE optotype parameters. Prediction models were subsequently developed using AL/CR (max) along with visual perception indicators. Model 1 was constructed exclusively on AL/CR (max), with an area under the ROC curve (AUC) of 0.779, a sensitivity of 0.605, specificity of 0.859. Meanwhile, Model 2 was solely based on visual perception indicators, resulting in an AUC of 0.709, with a sensitivity of 0.750, specificity of 0.594. Model 3 was a combination of both AL/CR (max) and visual perception indicators, which are PEP-DL (max) and E 0.8m, achieving an AUC of 0.794, with sensitivity of 0.590, specificity of 0.921.

Conclusions: The integration of visual perception indicators with AL/CR (max) substantially enhances the diagnostic capacity of myopia screening, thereby

enhancing both the precision and dependability of myopia screening initiatives conducted within schools.

Abstract No.: 205075

Panel No.: MYO-0531

From Concentric to Non-Geometric: A Paradigm Shift in Ortho-K Design to Overcome Challenging Corneas, Decentration, Under-Correction, and Axial Length Control

First Author: Maylee HUANG

Co-Author(s): Zoe WU, Yingli XU

Purpose: Myopia progression and axial elongation remain key challenges in pediatric eye care. Conventional concentric Ortho-K designs often struggle with decentration, under-correction, and limited axial control, particularly in eyes with challenging corneal shapes. This lecture introduces an innovative n-Points Ortho-K design based on point-to-point axis alignment, generating multidirectional suction forces and optimized fitting to address the limitations of concentric designs.

Methods: In a prospective cohort study, 172 subjects aged 9–18 years were recruited. Sixteen completed one-year follow-up with 374 eyes analyzed. The N-point design applied AI-derived 360° freeform fitting with an additional Best Fit Ring (BFR) forming a dual reverse curve. This configuration stabilized lens positioning and produced suction-like effects, enhancing peripheral myopic defocus and refractive reduction.

Results: Baseline axial length averaged 24.65 $\pm$ 0.87 mm. After 12 months, elongation was only 0.15 $\pm$ 0.22 mm, significantly lower than reported in conventional Ortho-K studies (0.16–0.22 mm) and far below untreated controls (0.36–0.39 mm). Uncorrected visual acuity improved to 1.00 $\pm$ 0.02 by 6 months and remained stable. Lens decentration was clinically insignificant, and no adverse corneal effects were observed. Importantly, under-correction cases seen with concentric designs achieved more effective reduction with the n-Points alignment.

Conclusions: By shifting from concentric to point-to-point axis alignment, the n-Points Ortho-K design overcomes challenges of corneal irregularity, lens decentration, and under-correction, while providing effective axial length control. This paradigm shift represents a new era in Ortho-K for myopia management.

Abstract No.: 205111
Panel No.: MYO-0530

Fundus Curvature as a Clinical Marker for Posterior Staphyloma Based on Widefield Optical Coherence Tomography

First Author: Nan LUO

Co-Author(s): Shida CHEN, Bingqian LIU

Purpose: To investigate the ability to quantify fundus curvature and detect posterior staphyloma using widefield optical coherence tomography (OCT).

Methods: This cross-sectional diagnostic evaluation included 205 highly myopic eyes of 205 participants. The Gaussian curvature map of the fundus was automatically calculated from two million scan points over an area of 24mm × 20mm, visualizing localized deformations in the posterior region. Two fovea-centered areas were designated as follows: the 6mm × 6mm was the macular region, and the 8mm × 16mm area was the posterior region. Macular mean curvature (MMC) and curvature deviation (MCD), posterior mean curvature (PMC) and curvature deviation (PCD), and maximum posterior curvature (MPC) were calculated. The relationship between curvature indices, ocular parameters, and myopic complications was investigated. The diagnostic ability of curvature indices for posterior staphyloma was evaluated.

Results: The mean (SD) age of 205 participants was 34.06 (12.74) years, with 107 being female (52.2%). Posterior staphyloma was found in 33 of 205 (16.1%) eyes. The curvature value map and curvature deviation map revealed detailed morphologic patterns of posterior staphyloma. Eyes with staphyloma had a steeper and more irregular fundus than eyes without staphyloma, with a larger MPC ($20.420 \times 10^{-3} \text{ mm}^{-2}$ vs. $10.925 \times 10^{-3} \text{ mm}^{-2}$, $P < 0.001$), PMC ($6.754 \times 10^{-3} \text{ mm}^{-2}$ vs. $5.352 \times 10^{-3} \text{ mm}^{-2}$, $P = 0.002$), MCD ($1.889 \times 10^{-3} \text{ mm}^{-2}$ vs. $1.078 \times 10^{-3} \text{ mm}^{-2}$, $P < 0.001$), and PCD ($3.894 \times 10^{-3} \text{ mm}^{-2}$ vs. $1.683 \times 10^{-3} \text{ mm}^{-2}$, $P < 0.001$). However, no difference in MMC was found between eyes with and without posterior staphyloma. Larger MPC, MCD, and PCD were associated with greater degrees of myopia, more severe myopic maculopathy, and worse best-corrected visual acuity (all $P < 0.05$). PCD demonstrated the ability to discriminate the presence of posterior staphyloma (area under the curve: 0.909 [95% CI, 0.854-0.963; $P < 0.001$]). The optimal cutoff value of PCD was $3.060 \times 10^{-3} \text{ mm}^{-2}$ (Youden's index = 0.725), with a specificity of 90.7% and a sensitivity of 81.8%.

Conclusions: Widefield OCT-based analysis of fundus curvature enhances detection and quantitative assessment of posterior staphyloma in high myopia.

Abstract No.: 204834
Panel No.: MYO-0525

Global Real-World Pilot Data on Treatment Compliance With Repeated Low-Level Red-Light (RLRL) Therapy for Myopia Control

First Author: Yuri AUNG

Co-Author(s): Lisa Zhuoting ZHU

Purpose: Treatment compliance with repeated low-level red-light (RLRL) therapy is important given its previously established dose-response relationship, where treatment compliance >75% was associated with a 76.8% efficacy in slowing axial length progression and 87.7% efficacy in slowing spherical equivalence progression. In this study, we therefore aim to evaluate real-world treatment compliance of RLRL in 7 countries outside of China.

Methods: De-identified patient data were extracted from the Eyerising International portal until 1 August 2025 from Japan (n=612), Australia (n=123), New Zealand (n=112), the United Kingdom (n=71), Vietnam (n=50), and Malaysia (n=44). All patients used the Eyerising RLRL device for 3 minutes, twice daily, 5 days per week. Compliance was defined as the proportion of prescribed sessions completed. Treatment drop-off was defined as ≥30 consecutive days of device non-use following at least one month of RLRL.

Results: A total of 1,012 patients were included, with an average of 80.7% treatment compliance. Japan contributed the largest cohort and the highest mean treatment compliance of 85.3%, with a median treatment duration of 221 days and 153 patients completing 12 months. Other countries with patients completing 12-18 months were Australia (compliance 71.6%, median 224 days), New Zealand (72.0%, 326 days), and the UK (64.9%, 430 days). Compliance was higher where RLRL had been introduced for <12 months in Vietnam (74.9%, 107 days) and Malaysia (80.0%, 107 days). Compliance was also slightly higher in patients who had been using RLRL for <12 months (81.6%) compared to 12 months or more (78.6%). Drop-off rates ranged from 2.8% to 12.7%.

Conclusions: This first multinational real-world analysis of RLRL adherence demonstrates generally high treatment compliance across diverse populations outside of China, sustained through 12-18 months in several countries.

Abstract No.: 206371

Panel No.: MYO-0541

High Myopia Prevalence in Special Educational Needs Children and Its Link With Earlier and Longer Exposure to Electronic Screens During the COVID-19 Pandemic

First Author: Cheuk Lam Cherlin LEE

Co-Author(s): Kendrick Co SHIH

Purpose: To determine myopia prevalence and electronic screen time of special educational needs (SEN) children, aged 6-8 years, during the ongoing COVID-19 pandemic.

Methods: Between July 1st and August 31st 2022, 46 SEN children and 53 controls, aged 6-8, were actively recruited into our cross-sectional study. Patients underwent best corrected visual acuity assessment (BCVA), subjective refraction and axial length assessment (IOL Master 700, Zeiss Group). Parental educational level, children's outdoor time and electronic screen use were collected by validated questionnaires.

Results: In SEN children, aged 6-8 years, 39.1% had myopia on presentation. Among myopic subjects, 33.3% had spherical error of less than -1.0D, 22.2% were between -1.0D and -1.9D, 11.1% were between -2.0D and -2.9D, 22.2% were between -3.0D and -3.9D, and 0.06% were -4.0D or more. Mean axial length was 23.7 (± 1.16) mm. Comparatively, controls had a myopia prevalence of 30.1%. For SEN children, 43.5% reported to be using electronic screens regularly before the age of 4 compared to 37.8% in controls. 58.7% of SEN children used electronic screens for 2 or more hours a day, and 65.2% used them at least 5 days a week. Comparatively, 49.1% of controls used electronic screens for 2 or more hours a day, and 58.4% used them at least 5 days a week. Parental education level and socioeconomic status were similar between groups.

Conclusions: Myopia prevalence and severity were significantly higher in SEN children than controls. This was associated with earlier and longer exposure to electronic screens in SEN children.

Abstract No.: 208301

Panel No.: MYO-0555

Higher Order Aberrations and Visual Quality After Refractive Surgeries for Adult Myopia: A Systematic Review and Network Meta-Analysis

First Author: Chen TINGTING

Co-Author(s): Wei CHI

Purpose: To compare higher-order aberrations (HOAs) and visual quality outcomes among different refractive surgical protocols for adult myopia.

Methods: This systematic review and network meta-analysis (NMA) searched PubMed, Embase, Web of Science, the Cochrane Library, and ClinicalTrials.gov for studies published up to 22 August 2025. Eligible studies included randomized controlled trials and cohort studies involving myopic patients undergoing corneal refractive surgery or phakic intraocular lens (ICL) implantation. Baseline and follow-up data for continuous indicators were extracted, and standardized mean differences (SMDs) with 95% confidence intervals (CIs) were calculated. Primary outcomes were total HOAs, spherical aberration, coma, and trefoil; secondary outcomes included vertical and horizontal coma and trefoil. Analyses were performed using R 4.5.0.

Results: Fifty studies (5141 eyes) were included. Compared with other interventions—SMILE, FS-LASIK, LASIK, PRK, LASEK, FLEX, and T-PRK—ICL showed significantly lower total HOAs (SMD range 0.61–0.80) and spherical aberration (SMD range 0.97–1.72; $P < 0.05$). ICL also significantly reduced coma aberrations (SMD range 0.31–0.87). SUCRA rankings placed ICL first in total HOAs (99.9%), spherical aberration (99.9%), coma (93.6%), trefoil (76.2%), horizontal coma (90.8%), and horizontal trefoil (97.5%), and second in vertical coma and vertical trefoil (69.2% each). No significant differences were observed among other interventions in spherical aberration or trefoil.

Conclusions: ICL implantation demonstrated superior performance in reducing HOAs compared with other refractive correction methods and appears to be the most effective option for patients requiring high visual quality.

Abstract No.: 208484

Panel No.: MYO-0562

Hyperopic Shifts of Second Baseline in Low-Concentration Atropine Random Control Trial

First Author: Zhehui LIU

Co-Author(s): Xiangui HE, Xun XU

Purpose: To explore the associated factors of hyperopic shifts at the second baseline in The Effect and Safety of Different Doses of Atropine on Myopic Progression of Highly Myopic Children: Multi-centered Randomized Clinical Trial.

Methods: Post hoc analysis. Children aged 6 to 12 years old with high myopia in Shanghai were enrolled as participants and double-blindly randomized to 0.01%, 0.04% and 0.10% atropine. Comprehensive and ocular parameters were collected at baseline, and cycloplegic spherical equivalent (SE) was mainly collected in the second baseline. A linear regression model was used to explore the association between the difference of SE from baseline to second baseline (hyperopic shifts) and the parameters collected.

Results: A total of 177 participants who completed baseline and second baseline examinations were included. The hyperopic shifts were exclusively associated with concentration group (coefficient: 0.102, 95%CI: 0.068 to 0.137, $p < 0.001$) and photopic pupil size (coefficient: -0.104, 95%CI: -0.161 to -0.046, $p = 0.001$).

Conclusions: Higher atropine concentration and smaller photopic pupil size are associated with a lower degree of hyperopic shifts. The definition of SE change needs uniformity, and a second baseline is recommended in trials involving 0.10% or higher concentration.

Abstract No.: 202724

Panel No.: MYO-0510

Intraocular Pressure Is a Promising Target for Myopia Control

First Author: Xiaoyi LIU

Co-Author(s): Jiaxuan JIANG, Kangjie KONG, Fei LI, Xiulan ZHANG

Purpose: To investigate the impact of different intraocular pressure (IOP)-lowering medications on reducing IOP, decelerating axial elongation, and influencing pressure-dependent scleral remodeling.

Methods: To explore the effects of reducing IOP to varying extents on myopia progression, three groups receiving distinct IOP-lowering medications (Brinzolamide, Latanoprost, and a combination of Brinzolamide and Latanoprost) were designed in a form-deprived myopic guinea pig model. Additionally, proteomics analyses were conducted to identify differentially expressed proteins in the sclera.

Results: Based on 24-hour and 4-week IOP monitoring, the group receiving both Brinzolamide and Latanoprost exhibited the greatest magnitude of IOP reduction and the most significant inhibition of axial length (AL) growth. Moreover, the administration of IOP-lowering medications increased choroidal thickness and induced alterations in the structure of scleral collagen fibrils. Notably, scleral proteomics revealed remodeling processes associated with key mechanisms, including proteolysis, fibrinolysis, and metal ion binding.

Conclusions: Our findings highlight that pressure-dependent scleral remodeling contributes to the deceleration of AL elongation. These results underscore the efficacy of IOP reduction in mitigating the progression of myopia, providing a promising alternative strategy for myopia management.

Abstract No.: 205462

Panel No.: MYO-0533

Investigating the Roles of Circadian Rhythm-Related Genes in Myopia Pathogenesis

First Author: Ying ZHANG

Purpose: This study employed summary data-based Mendelian randomization (SMR) to examine

associations between circadian rhythm-related gene expression and myopia risk using large-scale genomic datasets.

Methods: Circadian rhythm-related genes were retrieved from GeneCards database. Expression quantitative trait locus (eQTL) data from eQTLGen consortium ($N = 31,864$) and myopia data from UK Biobank GWAS ($N = 287,448$) were analyzed. Replication used autorefraction-measured mean spherical equivalent (MSE) data ($N = 95,619$). SMR assessed associations between gene expression and myopia risk. Significant cis-eQTLs were identified within $\pm 1,000\text{kb}$ genomic regions using $P < 5.0 \times 10^{-8}$. HEIDI test distinguished pleiotropy from linkage.

Results: Among 73 circadian rhythm genes tested, ten showed significant MSE associations. After false discovery rate correction and pleiotropy exclusion, four genes remained significant: MYBPC3, PSEN1, RORA, and PPARA. Higher MYBPC3 expression (odds ratio [OR] = 0.97, 95% confidence interval [CI] = 0.96-0.98, $PFDR = 0.002$) associated with decreased MSE, indicating increased myopia risk. Conversely, higher expression of PSEN1 (OR = 1.05, 95%CI = 1.02-1.07, $PFDR = 0.022$), RORA (OR = 1.13, 95%CI = 1.05-1.22, $PFDR = 0.023$), and PPARA (OR = 1.20, 95%CI = 1.07-1.33, $PFDR = 0.023$) associated with increased MSE, indicating lower myopia risk. The associations of MYBPC3 (OR = 0.90, 95% CI = 0.86-0.94, $PFDR < 0.001$) and PPARA (OR = 1.84, 95% CI = 1.30-2.60, $PFDR = 0.008$) were confirmed in the replication sample.

Conclusions: This study provides genetic evidence for causal relationships between circadian rhythm gene expression and myopia risk. Four identified genes substantiate that circadian dysregulation contributes to myopia pathogenesis, suggesting potential therapeutic targets for myopia prevention.

Abstract No.: 202759

Panel No.: MYO-0512

Keratoconus Masked As Myopia Progression: A Case Report

First Author: Nhi NGUYEN HUYNH YEN

Purpose: To report a pediatric keratoconus case masked as myopia progression.

Methods: This is a case report.

Results: A 10-year-old female presented for a routine eye examination. Her personal and family history were unremarkable. The prescription of her spectacle, which she had been wearing for one year was $-2.75/-1.25 \times 175$ in the right eye and $-2.50/-0.50 \times 175$ in the left eye. At the current visit, refraction showed $-4.25/-1.75 \times 175$ in the right eye and $-3.50/-1.25 \times 165$ in the left eye, with a best-corrected visual acuity of 9/10 in each eye. The marked increase in refractive error within just one year initially led to the impression of progressive myopia. Slit-lamp examination of both

anterior and posterior segments was unremarkable. However, keratometry revealed abnormally steep corneal curvatures: K1 48.19D and K2 49.87D in the right eye, and K1 48.86D and K2 50.18D in the left eye. Axial length measurements were within the normal range (22.71 mm in the right eye and 22.22 mm in the left eye), suggesting that the refractive changes could not be fully explained by axial elongation. Corneal tomography with Pentacam subsequently confirmed the diagnosis of progressive keratoconus and corneal cross-linking was indicated.

Conclusions: This case emphasizes that rapid refractive changes in children should not be attributed solely to myopia progression, particularly when the degree of refractive change is disproportionate to axial length. Corneal imaging is essential in such cases to enable early detection of keratoconus and timely treatment.

Abstract No.: 206325

Panel No.: MYO-0543

LRP2 Is a Potential Molecular Target for Nonsyndromic Pathological Myopia

First Author: Francine BEHAR-COHEN

Co-Author(s): Olivier CASES, Lasse CEHOFSKI, Kimberley DELAUNAY, Kentaro KOJIMA, Renata KOZIRAKI, Emilie PICARD, Jose Maria RUIZ MORENO, Jorge RUIZ MEDRANO, Alicia TORRIGLIA

Purpose: High myopia (HM), particularly when complicated by posterior staphyloma (PS), is a major cause of irreversible vision loss. Genetic and environmental factors, including light exposure, are implicated, but underlying molecular mechanisms remain poorly understood. LRP2 (megalin), an endocytic receptor mutated in syndromic myopia, was investigated as a potential target in nonsyndromic HM with PS.

Methods: LRP2 levels were quantified in vitreous samples from HM patients with PS and emmetropic controls by proteomics and ELISA in independent Japanese and European cohorts. Post-mortem HM donor eyes with PS were analyzed by OCT, histology, and immunohistochemistry, and compared to Foxg1-Cre-Lrp2lox/lox mice. In human iPSC-derived RPE (iRPE), LRP2 was silenced by RNA interference followed by bulk RNA-seq and pathway analysis. The effects of light exposure (red, blue, white LEDs) and cortisol on LRP2 expression were evaluated by qPCR and immunocytochemistry.

Results: LRP2 levels were significantly decreased in the vitreous of HM+PS patients versus controls in both cohorts. Human HM eyes with PS displayed severe retinal thinning, Müller cell disorganization, and RPE morphological defects with reduced LRP2 expression, paralleling Foxg1-Cre-Lrp2lox/lox mice. In iRPE, LRP2 silencing downregulated genes involved in retinol metabolism, steroid signaling, and RPE polarity, while upregulating extracellular matrix and cytoskeletal

pathways. Light exposure transiently increased LRP2 expression (most strongly with red light), whereas cortisol reduced it.

Conclusions: LRP2 is decreased in vitreous, retina, and RPE of HM eyes with PS. Its regulation by light and cortisol suggests LRP2 as a molecular link between environmental and hormonal factors in nonsyndromic HM.

Abstract No.: 204830

Panel No.: MYO-0526

Learnings From Implementing a Myopia Control Clinic in a Public Health Setting

First Author: Zeinab FAKIH

Co-Author(s): Nellie DEEN, Rumeysa DOGER

Purpose: Myopia is a growing public health concern, with Australian prevalence projected to exceed 50% by 2050. In 2021, the Australian College of Optometry (ACO) established the first known public myopia control clinic in Victoria. This study examines the challenges, limitations, and outcomes of implementing such a clinic in a public health setting.

Methods: A retrospective review of case files from January 2021 to September 2025 was conducted, involving 1,258 myopic children seen at the ACO myopia control clinic. Data on referral pathways, treatment recommendations, and factors influencing treatment compliance were analysed. Additionally, clinicians involved in the clinic completed an online questionnaire to identify trends in treatment decisions and perceived barriers to care.

Results: Referrals primarily came from existing ACO Children's Clinic patients, external optometrists, and ophthalmologists. Treatment options included single-vision spectacles, ortho-keratology, soft contact lenses, atropine, peripheral defocus lenses, and Repeated Low-Level Red Light Therapy (RLRL). Low-dose atropine (0.05%) was the most commonly initiated treatment for progressive myopia. However, barriers to compliance included limited access to compounding pharmacies and frequent prescription renewals. Clinicians identified additional challenges, particularly for patients from lower socioeconomic backgrounds, including cost and the burden of follow-up appointments.

Conclusions: This study highlights real-world barriers to childhood myopia treatment in a public health context. Health literacy and socioeconomic factors significantly impact compliance with evidence-based treatments. Targeted management frameworks are essential for supporting children from disadvantaged backgrounds in accessing effective myopia care.

Abstract No.: 204134

Panel No.: MYO-0522

Lifelong Changes in the Choroidal Thickness, Refractive Status and Ocular Dimensions in C57BL/6J Mouse

First Author: Tang TAO

Co-Author(s): Ren CHI, Wang KAI, Zhao MINGWEI, Li YAN

Purpose: To investigate the changes in choroidal thickness (ChT), refractive status, and ocular dimensions in the mouse eye in vivo using updated techniques and instrumentation.

Methods: High-resolution swept-source optical coherence tomography (SS-OCT), eccentric infrared photoretinoscopy, and custom real-time OCT were used to analyze choroidal changes, refractive changes, and ocular growth in C57BL/6J mice from postnatal day (P) 21 to month 22.

Results: The ChT gradually increased with age, with the thickest region in the para-optic nerve head (ONH) and thinning outward, and the temporal ChT was globally thicker than the nasal ChT. Retinal thickness (RT) remained stable until 4 months and subsequently decreased. The average spherical equivalent refraction error (SER) was -4.81 ± 2.71 diopters (D) at P21, which developed into emmetropia by P32, reached a hyperopic peak ($+5.75 \pm 1.38$ D) at P82, and returned to $+0.66 \pm 1.86$ D at 22 months. Central corneal thickness, anterior chamber depth, lens thickness, and axial length (AL) increased continuously before 4 months but subsequently exhibited subtle changes. ChT was significantly correlated with the ocular parameters (except for RT) before the age of 4 months, but these correlations diminished after 4 months. Furthermore, for mice younger than 4 months, the difference in the ChT, especially the temporal ChT, between the two eyes contributed most to that of AL and SER.

Conclusions: Four months could be a watershed age in the growth of mouse eyes. Large-span temporal recordings of refraction, ocular dimensions, and choroidal changes provided references for the study of the physiological and pathological mechanisms responsible for myopia.

Abstract No.: 201904

Panel No.: MYO-0499

Longitudinal Chromatic Aberration Mediates Red Light's Choroidal Targeting Mechanism

First Author: Yanqing LI

Co-Author(s): Ye SHEN

Purpose: This study uses a biomimetic mouse eye model, human eye modeling and animal experiments to explore if longitudinal chromatic aberration (LCA) mediates 630 nm red light's choroidal targeting, aiding myopia therapy.

Methods: The form-deprivation myopia model was built with 2-week-old C57BL/6J mice. After 2 weeks, 630 nm red light exposure (275 lx) was applied (white light as control), with refraction and ocular parameters measured weekly. Based on the data above, a Zemax eye model was established to verify the focal point of red light and RMS wavefront aberration. After 2 weeks, ocular parameters, choroidal blood flow density and thickness were measured. Measurement of refractive development was performed on VIP::Ai14+/+ mice (retina-specific tdTomato expression).

Results: Red light inhibited myopia in a refraction-dependent manner ($R^2=0.4691$, $P<0.001$), inducing hyperopic shift, slower axial elongation, thicker choroid, and higher choroidal blood flow vs. the white light group. Zemax simulations showed a -3.5D focal shift for 630 nm vs. 555 nm light in mice (smaller in myopic eyes) and a 122.4 μm shift in the human eye model; red light also reduced myopic eyes' higher RMS wavefront aberration. A 20D positive lens-induced defocus eliminated ocular parameter differences between red and white light groups, while VIP::Ai14+/+ mice (red filter, no LCA) had no parameter differences vs. controls.

Conclusions: This study first clarifies LCA as the key mechanism for 630 nm red light's choroidal targeting. Future red light devices should account for individual LCA variations to achieve personalized precision therapy.

Abstract No.: 201565

Panel No.: MYO-0498

Morning Administration Is More Effective Than Evening Administration of 0.01% Atropine Eye Drops Combined With Orthokeratology for Myopia Control

First Author: Xuwei LI

Co-Author(s): Kai WANG

Purpose: To assess the varying myopia control outcomes between morning (QM) and evening (QN) application of 0.01% atropine drops in conjunction with orthokeratology (ortho-K) therapy in myopic children.

Methods: A total of 163 right eyes of myopic children were included, receiving either morning or evening 0.01% atropine combined with ortho-K, with 78 in the QM group. Age, gender, spherical equivalent refraction, axial length, e-value, average K-reading (Ave-K), and pupil diameter (PD) were all documented as baseline characteristics. Follow-up assessments at 1-, 3-, 6-, 9-, and 12-month visits were centered on alterations in treatment zone diameter (TZD), decentration, PD, and axial elongation. Parental refraction and children's behavioral factors were gathered through a questionnaire.

Results: At baseline, there were no significant differences in ocular characteristics between the two

groups. After one month, the QM group exhibited a significantly larger PD compared to the QN group (4.09 ± 0.67 mm vs. 3.84 ± 0.76 mm, $P = 0.03$), while measurements for TZD and decentration showed no significant variance. Over the course of 1 year, the QM group demonstrated significantly less axial elongation than the QN group (0.13 ± 0.19 mm vs. 0.21 ± 0.16 mm, $P < 0.05$). Regression analysis revealed that the timing of atropine administration, age, PD, and reading and writing posture were significant predictors of axial elongation over the 12-month period.

Conclusions: Morning administration of 0.01% atropine eye drops combined with ortho-K shows greater efficacy in axial elongation.

Abstract No.: 204817

Panel No.: MYO-0524

Myopia Control Effect Repeated Low-Level Red-Light Therapy in Australian Children: A Multi-Ethnic Randomized Controlled Trial

First Author: Nellie **DEEN**

Co-Author(s): Yuri **AUNG**, Rumeysa **DOGER**, Zeinab **FAKIH**

Purpose: This study assessed the efficacy and safety of repeated low-level red-light (RLRL) therapy for controlling myopia progression in multi-ethnic school-aged children in Australia.

Methods: Thirty-four children aged 8–13 years with myopia (cycloplegic spherical equivalent [SE] -0.50 to -5.00 D), astigmatism ≤ 2.50 D, anisometropia ≤ 1.50 D, and monocular best-corrected visual acuity (BCVA) 20/20 or better were enrolled from Australian College of Optometry clinics and randomly assigned to RLRL or single-vision spectacles (SVS). RLRL therapy was administered 3 minutes, twice daily, 5 days a week. The SVS group continued routine activities. Assessments were performed at baseline and 1, 3, 6, and 12 months. Treatment efficacy was analysed using a longitudinal-mixed model. Safety was monitored through questionnaires, BCVA, optical coherence tomography (OCT), and dilated fundus examinations.

Results: Seventeen children were included in each group. At 12 months, axial elongation was -0.03 mm (95% CI, -0.05 to -0.01) and SE progression 0.09 D (95% CI, 0.04 to 0.14) for RLRL, compared with 0.12 mm (95% CI, 0.10 to 0.14) and -0.21 D (95% CI, -0.31 to -0.12) for SVS. Between-group differences were 0.15 mm (95% CI, 0.10 to 0.20 mm) for axial elongation and -0.31 D (95% CI, -0.51 to -0.12 D) for SE progression. No severe adverse events, BCVA loss, or OCT-detected damage occurred. One child withdrew due to mild headache at 3 months.

Conclusions: RLRL therapy is a promising, well-tolerated option for myopia control, with no functional or structural damage observed. Larger studies are required to confirm efficacy and long-term safety.

Abstract No.: 205567

Panel No.: MYO-0535

Myopia Control Efficacy of Defocus Incorporated Multiple Segments Triple Enhanced Design Spectacle Lenses

First Author: Dennis Yan-yin **TSE**

Co-Author(s): Rachel Ka Man **CHUN**, Ying **HON**, Carly Siu Yin **LAM**, Tsz Wing **LEUNG**, Chi Ho **TO**

Purpose: To Evaluate the Myopia Control Efficacy of Defocus Incorporated Multiple Segments Triple Enhanced Design (DIMS TED) Spectacle Lenses in 4 to 12 Years Old Myopic Children.

Methods: Two hundred and two Chinese children aged 4 to 12 years with myopia ≤ -0.75 diopters (D) in both eyes, and with documented evidence of myopia progression ≥ 0.50 D per year or axial length growth ≥ 0.27 mm per year in at least one eye for 7 to 12 years old, or with myopia ≤ -1.75 D in at least one eye for 4-6 years old, were enrolled in a double-masked, placebo-controlled, randomized controlled clinical trial. Participants were randomized and age-stratified into three arms (DIMS TED, DIMS, and single-vision (SV)) in an equal ratio. Cycloplegic spherical equivalent autorefraction (SER) and axial length (AL) were measured at 6-month intervals.

Results: A total of 199 subjects completed the 6-month visit ($n=68$, 66 , and 65 for DIMS TED, DIMS, and SV, respectively). Subjects in the DIMS TED and DIMS arms exhibited significantly less progression in SER and AL compared with the SV: changes in SER (D) adjusted mean (SE) — DIMS TED: 0.13 (0.04); DIMS, -0.10 (0.04); SV, -0.26 (0.05); changes in AL (mm) adjusted mean (SE) — DIMS TED, 0.01 (0.01); DIMS, 0.11 (0.01); SV, 0.18 (0.01).

Conclusions: The DIMS TED spectacle lenses demonstrated strong efficacy in controlling myopia progression and axial elongation in children over 6 months

Abstract No.: 206117

Panel No.: MYO-0540

Myopia Control With Low-Dose Atropine in Children (MYLAC) Study: Safety of 0.02% and 0.04% Doses

First Author: Shifei **WEI**

Co-Author(s): Wenzai **AN**, Shi-ming **LI**, Yunyun **SUN**, Ningli **WANG**

Purpose: To evaluate the safety of myopia control with low-dose atropine in children.

Methods: In this randomized controlled multicenter trial (CTR20212468), children aged 6-12 years with spherical equivalent (SE) from -1.00 D to -4.00 D and astigmatism ≤ 1.50 D were assigned to receive 0.02% atropine, 0.04% atropine, or placebo nightly in both eyes. Safety outcomes included pupil diameter,

accommodation amplitude, best-corrected distance visual acuity (BCDVA), intraocular pressure (IOP), tear break-up time (TBUT), and height.

Results: A total of 800 children were enrolled (300 in 0.04% atropine, 300 in 0.02% atropine, and 200 in a placebo). At 48 weeks, pupil diameter increased from baseline by 1.34 mm, 1.06 mm, and 0.04 mm ($p < 0.001$), and accommodation decreased by -1.56 D, -0.91 D, and -0.22 D (0.04% atropine vs placebo, $p = 0.006$; 0.02% atropine vs placebo, $p = 0.15$), respectively. Similar trends were observed at 96 weeks. All values returned to baseline levels at 24 weeks after discontinuation, with no significant differences among the three groups ($p > 0.05$). No significant intergroup differences were found in BCDVA, IOP, or TBUT at 48 or 96 weeks ($p > 0.05$). Height increased similarly across groups. No serious adverse events occurred. Photophobia is the most common adverse reaction and is concentration-dependent (15% in the 0.04% group; 10.1% in the 0.02% group).

Conclusions: Both 0.02% and 0.04% atropine demonstrated a favorable safety profile for myopia control in children.

Abstract No.: 202882

Panel No.: MYO-0514

Network Meta-Analysis of Pediatric Myopia Control in Asia: Methodological Framework and Baseline Progression Insights

First Author: David CHAMPION

Co-Author(s): Veni VENUSHA SAKTI, Thom DE MILLIANO

Purpose: Pediatric myopia is a major concern in Asia due to faster progression than global averages. This study aimed to evaluate the comparative efficacy of interventions for slowing myopia progression in East and Southeast Asian pediatric populations using network meta-analysis (NMA).

Methods: A systematic review of RCTs from Embase, Cochrane CENTRAL, MEDLINE, and supplementary sources identified interventions for pediatric myopia control. Eligible studies reported change from baseline in spherical equivalent refraction (SER) and axial length, and annual progression rate (APR) for NMA inclusion. A geographic subgroup analysis was performed to isolate evidence from East and Southeast Asian populations. Bayesian random-effects models were used to estimate relative treatment effects. Network meta-regression (NMR) was applied to assess the influence of prespecified effect modifiers, including age, baseline SER, and geographic region.

Results: Of 115 RCTs in the literature review, 96 were assessed. Sixty-six were conducted in East/Southeast Asia, with 42 forming the Asian evidence network. The network was well-connected via a common control node, enabling robust indirect comparisons. The mean

APR in control arms was approximately 0.89 D/year—substantially higher than in Western cohorts. NMR identified geography and baseline SER as borderline significant modifiers of treatment effect. The model demonstrated overall good fit and convergence.

Conclusions: This NMA, which indicates high APR in the Asian population, supports region-specific evidence to guide clinical and policy decisions, highlights the urgency of early interventions in myopia control, and provides a robust platform for evaluating low-dose atropine and other emerging pharmacological therapies.

Abstract No.: 207005

Panel No.: MYO-0548

OCT Choroidal Radiomic Parameters Associated With Visual Impairment and Identification of Pathological Myopia

First Author: Yixin LI

Co-Author(s): Guangqing LIN, Fan LU, Yilei SHAO, Ni WAN

Purpose: To analyze choroidal radiomic features from optical coherence tomography (OCT) in patients with high myopia and assess their association with visual acuity and diagnostic value for pathological myopia (PM).

Methods: A total of 237 myopic participants aged 18-50 years were enrolled. Utilizing the PyRadiomics platform and machine learning, we extracted and refined choroidal radiomic features from OCT images. The correlations of these features with best-corrected visual acuity (BCVA), age, spherical equivalent, and axial length were examined. A classifier developed from these features was evaluated for its efficacy in identifying PM via five-fold cross-validation, using the area under the curve (AUC), accuracy, recall, and F1-score as primary metrics. Its performance was benchmarked against a clinical parameter-based model.

Results: From 464 initial radiomic features, four choroidal intensity and shape features demonstrating significant correlation with axial length ($P < 0.001$) were ultimately identified. A smaller maximum diameter, higher coarseness, and greater perimeter-surface ratio were linked to poorer BCVA ($P < 0.05$). In the task of identifying PM, the radiomic features outperformed clinical parameters in both the internal test set (AUC = 0.970 vs. 0.938) and external validation set (AUC = 0.884 vs. 0.720). Integrating the radiomic features with risk factors further enhanced the classification performance (internal AUC = 0.990, external AUC = 0.912). SHAP analysis identified intensity features as the most decisive predictors of PM.

Conclusions: Choroidal OCT intensity and morphological features demonstrate strong correlations with axial elongation and visual

impairment, surpassing conventional clinical indicators in detecting pathological myopia, and show promise as objective biomarkers for monitoring high myopia progression.

Abstract No.: 206676

Panel No.: MYO-0544

One-Month Changes in Choroidal Vascularity Index of Medium Vessel Layer in Myopic Children Wearing Orthokeratology Lenses: A Predictor for One-Year Changes in Axial Length

First Author: Junmeng **LI**

Co-Author(s): Pei **RONG**, Liu **YANG**

Purpose: To investigate the changes in the choroidal vascularity index (CVI) of choroid sublayers after orthokeratology (Ortho-K) treatment, the association between one-month CVI changes and one-year eye elongation, and the role of CVI responses in predicting the one-year control efficacy of Ortho-K treatment.

Methods: A prospective cohort study was conducted, including 257 myopic children aged 7-16 years. The subjects continuously wore Ortho-K lenses for 12 months. Vascular volume (CVV), stromal volume (CSV), choroidal volume (CV) and CVI of the choroid sublayers was assessed using optical coherence tomography images at baseline and 1-month follow-up. The total choroid layer (TCL) includes the large-vessel choroidal layer (LVCL) and the medium-vessel choroidal layer (MVCL). The round fundus area with a 6mm diameter was divided into 9 regions using the Early Treatment of Diabetic Retinopathy Study (ETDRS) grid.

Results: The 1-month CVI of TCL and MVCL in all ETDRS grid regions were significantly lower than the baseline CVI ($P \leq 0.036$), except for TCL_S36 ($P=0.070$). After 1-month Ortho-K treatment, both CSV and CV significantly increased in all choroidal sublayers compared to baseline data ($P \leq 0.027$), while CVV also showed significant increases in half of the ETDRS grid regions (14/27). After adjusting for age and gender, the baseline TCL_T13 CVI ($\beta=0.146$, $P=0.006$), and 1-month changes of MVCL_T36 CVI ($\beta=0.337$, $P<0.001$) and MVCL_N13 CVI ($\beta=0.174$, $P=0.002$), were independently associated with one-year axial length (AL) elongation during Ortho-K treatment. Based on 1-month changes in MVCL_T36 CVI and MVCL_N13 CVI, age, and sex, the prediction model demonstrated an area under the curve (AUC) of 0.905 (95% CI: 0.870 to 0.941) for distinguishing myopic children with slow or fast AL elongation.

Conclusions: One-month of Ortho-K induces differential CVI changes in choroidal sublayers. The early CVI reduction in MVCL suggests disproportionate vascular-structural alterations, holding promise for elucidating myopia control mechanisms and predicting future axial elongation.

Abstract No.: 203001

Panel No.: MYO-0516

One-Year Myopia Control Efficacy of Hexagon Optimized Reticular Integration (HORI) Spectacle Lenses

First Author: Xingyi **GUO**

Co-Author(s): Xiaoqin **CHEN**, Junyi **HU**, Lihua **LI**, Ting **WANG**

Purpose: To investigate the 12-month effectiveness of hexagon optimized reticular integration (HORI) spectacle lenses in Chinese myopic children.

Methods: A prospective, single-aim study. A total of 38 Chinese children aged 8-13 years, with spherical equivalent refractive error (SER) of -0.50 D to -3.00 D, were enrolled in the HORI group. Patient records involving the use of single-vision lenses (SVL) were collected from the optometric center. Propensity score matching (PSM) was performed at a 1:1 ratio based on baseline characteristics, including age, gender, axial length (AL), and cycloplegic SER measurements. AL and cycloplegic SER changes over 12 months were measured.

Results: Thirty-seven participants completed the 12-month visit following 1 voluntary withdrawal after screening in the HORI group. The 12-month means for myopia progression were -0.36 (0.41) D and -0.74 (0.45) D in the HORI and SVL group. The HORI group had less SER progression by a mean of 0.38 D than the SVL group ($P < 0.001$). The 12-month increase in AL was 0.19 (0.16) mm and 0.34 (0.18) mm in the HORI and SVL group. Compared with SVL, the HORI group demonstrated significantly less axial elongation by a mean of 0.15 mm ($P < 0.001$).

Conclusions: Chinese children wearing spectacle lenses designed with HORI had less myopia progression and axial elongation than those wearing SVL.

Abstract No.: 208483

Panel No.: MYO-0558

Optometric Validation of the -0.50D Empirical Rule in Pediatric Myopia

First Author: Zhehui **LIU**

Co-Author(s): Xiangui **HE**, Xun **XU**

Purpose: To describe the relationship between uncorrected visual acuity (UCVA) and spherical equivalent (SE) and explore potential associated factors.

Methods: Cross-sectional study. Demographic and ophthalmologic data, including UCVA, cycloplegic refraction, intraocular pressure (IOP), and axial length (AL) from children and adolescents aged 3 to 19 in Shanghai, were analyzed. Kernel density estimate plot and histogram were used to describe the association between UCVA and SE. Linear regression was used to explore related factors.

Results: A total of 18,300 participants were included in the analysis. Significant vision loss was initially observed when SE decreased to -0.50D. Per 1.00 D reduction, logMAR UCVA worsened by 0.20, 0.09, and 0.03 in low, moderate, and high myopia, respectively. Over 50% participants maintained 0.1 logMAR VA or better within SE range from -0.50D to +3.00D. UCVA of 3- to 5-year-old children with non- or low myopia remained averaged 0.2 logMAR. UCVA was associated with SE (coefficient: -0.105, 95%CI: -0.108~-0.102, $P < 0.001$), AL (coefficient: -0.012, 95%CI: -0.018~-0.007, $P < 0.001$), non-dominant eye (coefficient: 0.014, 95%CI: 0.007~0.021, $P < 0.001$), IOP (coefficient: -0.003, 95%CI: -0.004~-0.002, $P < 0.001$), age (coefficient: -0.005, 95%CI: -0.007~-0.004, $P < 0.001$), female (coefficient: 0.011, 95%CI: 0.003~0.018, $P = 0.005$) and BMI (coefficient: 0.002, 95%CI: 0.001~0.004, $P < 0.001$). Only SE maintained statistically and clinically significance in stratification by myopic degree.

Conclusions: For myopia diagnosis, $SE \leq -0.5D$ represents a superior threshold compared to -0.25D, -0.75D, or $SE < -0.5D$. UCVA is not recommended to be the sole basis for judging the refractive development of children aged 3 to 5.

Abstract No.: 207107

Panel No.: MYO-0549

P2RY12-Mediated Retinal Microglial Ramification Drives Myopia Onset and Development in Mice

First Author: Pengfan CHEN

Co-Author(s): Jing JI, Longqian LIU, Xiangyi WEN

Purpose: The role of retinal microglia in myopia development remains unclear. We investigated whether microglia and their key purinergic receptor, P2RY12, respond to abnormal visual signals and drive myopia onset and progression.

Methods: Myopia was induced in postnatal mice via 4-week form deprivation (FD). We assessed refraction and axial length. Microglia were depleted using PLX5622, and P2RY12 was inhibited pharmacologically and via conditional knockout. Microglial morphology (branching, Sholl analysis) was quantified in flat-mounted retinas. Dopaminergic amacrine cells (DACs) were specifically stimulated using chemogenetics.

Results: Microglial depletion significantly suppressed FD-induced myopia (refractive shift: $-2.29 \pm 0.47 D$ vs. $-5.89 \pm 0.49 D$ in controls, $P < 0.0001$). Similarly, P2RY12 antagonism and genetic knockout inhibited myopia progression and reduced microglial ramification. Conversely, chemogenetic stimulation of DACs exacerbated myopia (refractive shift: $-8.26 \pm 0.81 D$, $P < 0.0001$) and induced complex microglial ramification, with increased total branch length ($1368.97 \pm 42.68 \mu m$ vs. $1195.27 \pm 52.99 \mu m$ in controls, $P = 0.0414$).

Conclusions: Retinal microglia and P2RY12-mediated ramification are critical mechanisms driving myopia onset and development. Our findings identify microglial morphology as a key cellular process responding to visual cues, positioning it as a potential novel therapeutic target for myopia control.

Abstract No.: 205532

Panel No.: MYO-0534

Prevalence and Machine Learning-Identified Risk Factors for Dry Eye Disease in Myopic Children: A Cross-Sectional Study

First Author: Bingqing LI

Co-Author(s): Fengju ZHANG

Purpose: To investigate the prevalence of dry eye disease (DED), characterize ocular surface features, and identify independent risk factors among myopic schoolchildren in northern China.

Methods: A cross-sectional study was conducted among 1,303 myopic children, who completed ocular surface examinations, including FBUT, Schirmer I test, and OSDI questionnaire. LipiView was used to assess lipid layer thickness (LLT) and partial blink rate (PBR). XGBoost and Random Forest were trained and evaluated on a test set to assess predictive performance. Model interpretability was explored using the SHapley Additive exPlanations (SHAP) method to identify key risk factors.

Results: The prevalence of objectively diagnosed DED was 31.2%. High myopia was significantly associated with higher OSDI scores, although objective DED prevalence did not significantly differ by myopia severity. The XGBoost model achieved an overall accuracy of 0.6858, with the Random Forest model performing similarly (accuracy 0.6935). The SHAP analysis revealed Ortho-K Lens Wear (0.1128) as the most influential risk factor, followed by FBUT $\leq 5s$ (0.0749) and Myopia Severity_Moderate (0.0533). A diagnostic score, calculated from the sum of SHAP values, showed a distinct difference between the non-dry eye group (mean -0.4217) and the dry eye group (mean -0.2323).

Conclusions: DED is prevalent among myopic children in northern China. Machine learning models can identify and rank complex risk factors, with Ortho-K lens wear emerging as the most significant predictor. The use of SHAP-based diagnostic scores provides a nuanced, continuous measure of dry eye risk, offering a valuable tool for targeted clinical management in this population.

Abstract No.: 202353**Panel No.: MYO-0507**

Prevalence and Severity of Pathologic Myopia Among Older Adults With High Myopia in Hong Kong: Hong Kong High Myopia Cohort

*First Author: Xiujuan ZHANG**Co-Author(s): Christopher K.s. LEUNG, Kendrick C. SHIH*

Purpose: To investigate the prevalence and severity of pathologic myopia (PM) among highly myopic adults in Hong Kong.

Methods: This cross-sectional, population-based study included participants aged 50 years and older who underwent comprehensive ophthalmic examinations in Hong Kong. High myopia was defined according to WHO criteria as spherical equivalent refraction (SER) ≤ -5.0 diopters or axial length (AL) ≥ 25.5 mm. Pathologic myopia was graded using the META-Analysis of Pathologic Myopia (META-PM) classification system based on colour fundus photography.

Results: Among 26,437 adults, 4,947 (18.7%) were high myopia. After them, 4,511 participants (7,819 eyes) were analyzed. The mean age was 61.2 ± 7.1 years, with 57.0% female. Mean AL was 26.50 ± 1.25 mm and mean best-corrected visual acuity (BCVA) was LogMAR 0.09 ± 0.21 . Using the META-PM classification, 2,053 eyes (26.3%) were Category 0, 3,634 eyes (46.5%) Category 1, 1,999 eyes Category 2, 101 eyes (1.3%) Category 3, and 32 eyes (0.41%) Category 4. Worse BCVA was significantly associated with higher META-PM grade ($B = 0.188$; 95% CI 0.135 to 0.241; $P < 0.001$) and a shorter distance between patchy atrophy and the macula ($B = -0.0003$; 95% CI -0.0005 to -0.00005; $P = 0.017$).

Conclusions: The prevalence of high myopia and pathologic myopia is high among older adults in Hong Kong. Higher META-PM grades and proximity of patchy atrophy to the macula are linked to worse visual acuity. These findings suggest the need for targeted, intensive follow-up in patients at higher risk of vision loss.

Abstract No.: 208227**Panel No.: MYO-0553**

Prevention Efficacy of Pre-myopia Using 0.01% Concentration Atropine Eye Drops Twice a Day

*First Author: Yinrui LI**Co-Author(s): Jie CHEN, Xiaoman LI, Jianing ZHANG*

Purpose: To evaluate the efficacy of the prevention of pre-myopia using 0.01% concentration of atropine eye drops twice a day.

Methods: A one-year randomized, placebo-controlled, clinical trial. A total of 160 pre-myopic children (cycloplegic sphere diopters: +0.75 D to -0.50D, astigmatism less than 1.50 D) aged 6 to 12 years were enrolled and randomly assigned to 4 groups: Twice a

day 0.01% atropine group (0.01%TD), 0.01% atropine per night and placebo per morning (0.01OD), 0.04% atropine per night and placebo per morning (0.04%OD), placebo twice a day (PTD). All the bottles were masked to the researchers and subjects.

Results: The mean spherical equivalent refraction (SER) change was -0.44 ± 0.55 D, -0.28 ± 0.41 D, -0.00 ± 0.46 D, and -0.69 ± 0.57 D in the 0.01% TD, 0.01% OD, 0.04%OD, and PTD groups, respectively (0.01%TD VS 0.01%OD, $P > 0.05$, 0.01%TD VS 0.04%OD, $P < 0.001$, 0.01% TD VS PTD, $P = 0.05$). The mean axial length increase was 0.30 ± 0.22 mm, 0.25 ± 0.19 mm, 0.18 ± 0.19 mm, and 0.42 ± 0.22 mm (0.01%TD VS 0.01%OD, $P > 0.05$, 0.01%TD VS 0.04%OD, $P = 0.016$, 0.01% TD VS PTD, $P = 0.023$).

Conclusions: Adopting 0.01% atropine eyedrops twice a day is efficient for myopia prevention in pre-myopia children. But using 0.01% atropine twice a day is not better than 0.01% or 0.04% once a day.

Abstract No.: 202006**Panel No.: MYO-0503**

Refractive Status and Ocular Biometry in Chinese Children Aged 3-15 Years: Before, During and After COVID-19 Lockdown

*First Author: Tao SHEN**Co-Author(s): Lin DING, Yafei MU, Yanli QIN, Bixia WEI, Wei WEI, Xiaoxiao ZHANG*

Purpose: To assess whether myopia development is affected differently by the COVID-19 lockdown among children of different ages.

Methods: This hospital-based retrospective study evaluated data from 4186 Chinese children aged 3-15. The comparative analysis of spherical equivalence (SE), axial length (AL), axial length-to-corneal radius (AL/CR) ratio, and refractive status distribution was stratified by age before, during, and after the lockdown.

Results: Comparison before and after the lockdown, the overall proportion of myopia increased from 57.8% to 65.0%, and the SE, AL, and AL/CR ratio increased by -0.267 diopters (D) ($P = 0.002$), 0.234 mm ($P < 0.001$), and 0.039 ($P < 0.001$), respectively. In preschool-aged children (aged 3-6), early myopic shifts of the refractive status and ocular biometry in 2020 were observed followed by remarkable regressions during and after the lockdown. In school-aged children (aged 7-15), myopic shifts of the refractive status and ocular biometry showed an increasing trend, which increased most rapidly in children aged 13-15 during the later period of the lockdown in 2022. In school-aged children (aged 7-15), the proportion of moderate and high myopia had nearly doubled in 2022 compared to the pre-pandemic level, followed by regression after the lockdown.

Conclusions: The COVID-19 lockdown had an earlier impact on myopia development in preschool-aged than in school-aged children.

Abstract No.: 208505

Panel No.: MYO-0560

Repeated Low-Energy Red Light Interventions to Control Myopia in Children and Adolescents: A Randomized Clinical Trial

First Author: Min TONG

Co-Author(s): Linlin DU, Xiangui HE, Xun XU, Bo ZHANG

Purpose: To evaluate the effects of repeated low-energy red light interventions on spherical equivalent (SE) and axial length (AL) in myopic children and adolescents.

Methods: A prospective randomized controlled trial was conducted. Eligible adolescent children aged 6-12 years were recruited as participants in July 2022 at the Shanghai Eye Diseases Prevention and Treatment Center, and were randomly divided into the trial group and the control group. The trial group received daily low-energy red light interventions, and the control group was treated with atropine. Follow-up visits were conducted at 3, 6, 9, and 12 months after enrollment, and information on optometric parameters such as SE and AL in both eyes of the participants was collected through questionnaires and ophthalmological examinations. The t-test was used to compare binocular SE and AL progression between the two groups at 3, 6, 9, and 12 months.

Results: A total of 104 participants were included (52 each in the trial and control groups), and there were no significant differences between the two populations in baseline characteristics ($P>0.05$). The 12-month binocular SE progression was -0.027 ± 0.539 D (right eye) and -0.125 ± 0.505 D (left eye) in the trial group and -0.761 ± 0.588 D and -0.641 ± 0.549 D in the control group, which was a significant difference between the two groups ($P<0.001$). The binocular AL progressions at 3, 6, 9, and 12 months were significantly slower in the trial group than in the control group (all $P<0.001$), with a 12-month binocular AL progression of 0.021 ± 0.203 mm and 0.036 ± 0.194 mm in the test group and 0.338 ± 0.235 mm and 0.315 ± 0.266 mm in the control group.

Conclusions: Low-energy red light therapy is an effective intervention for controlling myopia in adolescents and children, with high effectiveness in controlling SE and AL progression.

Abstract No.: 204133

Panel No.: MYO-0523

Seasonal Variation in the Effect of Controlling Myopia Progression Using Orthokeratology

First Author: Tang TAO

Co-Author(s): Wang KAI, Zhao MINGWEI, Li YAN

Purpose: To investigate seasonal variations in the effect of controlling myopia progression using orthokeratology (Ortho-K) in Chinese myopic children.

Methods: A total of 116 myopic children aged 7 to 12 years old who completed 1 year of Ortho-K treatment. Based on initial time wearing Ortho-K, subjects were classified as four groups: spring group (March-May), summer group (June-August), autumn group (September-November) and winter group (December-February). Axial length (AL) was measured every 3 months for 1 year by a partial coherence interferometer. Axial elongation over time and between groups was compared.

Results: The effect of myopia control using Ortho-K was influenced by seasonal variation. After adjusting study groups (type of Ortho-K), age, AL, spherical equivalent refractive error (SER) and ocular parameters at the baseline, the mean axial elongation over 1 year wearing Ortho-K was 0.33 ± 0.08 mm for the spring group, 0.30 ± 0.10 mm for the summer group, 0.21 ± 0.08 mm for autumn group, and 0.22 ± 0.09 mm for winter group ($p<0.001$). Statistically significantly higher mean axial elongation was observed in winter months than in summer (0.09 ± 0.06 mm vs. 0.05 ± 0.05 mm, $p<0.001$).

Conclusions: In general, axial elongation in myopic children receiving Ortho-K in the summer months was approximately 56% of that in winter. Initially, when wearing Ortho-K in the autumn/winter months, the effect of myopia control is better than in the spring/summer. Our results indicated that seasonal variation should be taken into account in studies related to Ortho-K.

Abstract No.: 205072

Panel No.: MYO-0527

Solving the Flat Cornea Challenge: Clinical Outcomes of a Novel NP Orthokeratology Lens

First Author: Maylee HUANG

Co-Author(s): Zoe WU, Xuyingli XU, Rui ZHANG

Purpose: To evaluate the clinical effectiveness and underlying mechanism of a newly designed NP orthokeratology lens in managing myopia for patients with flat corneal curvature.

Methods: A 13-year-old female with moderate myopia and flat corneal curvature was fitted with NP OK lenses (Optact, Taiwan) for overnight wear. Clinical follow-ups were performed at 1 week, 1 month, 3 months, 1 year, 2 years. Assessments included unaided visual acuity (UCVA), corneal topography, ocular health, and axial length.

Results: Conventional VST-design OK lenses showed poor fitting and limited adjustability. In contrast, NP OK lenses achieved excellent fluorescein patterns, UCVA of 1.0 after one week, and stable outcomes over two years. The NP design utilizes three synergistic forces: positive pressure from the base curve and negative pressure from the reverse curve, as well as the alignment region, which drive the redistribution

of central epithelial cells and the upward shift of peripheral fluid. This mechanism created a broader and flatter treatment zone, yielding greater myopia reduction and improved visual quality.

Conclusions: Orthokeratology lens fitting on relatively flat corneas commonly results in incomplete daytime vision correction, rapid corneal rebound, and inadequate control of axial length elongation. The NP orthokeratology lens offers a more predictable fit, stable vision, and effective myopia control, making it a valuable solution for challenging flat corneal profiles.

Abstract No.: 203245

Panel No.: MYO-0519

Spontaneous Suprachoroidal Haemorrhage in a High Myopia Patient With Rhegmatogenous Retinal Detachment

First Author: Fang CHAI

Co-Author(s): Xiquan ZHAO

Purpose: To report a case of spontaneous suprachoroidal haemorrhage in a high myopia patient with rhegmatogenous retinal detachment and successful treatment.

Methods: This is a case report of a 73-year-old female who presented with blurred vision in the left eye for fifty days. Her medical history included high myopia, but no systemic illness ever. B-ultrasound and fundus examination revealed retinal detachment with choroidal detachment. We performed combined phacoemulsification without intraocular lens implantation and vitrectomy with silicone oil injection.

Results: After phacoemulsification, 20G mixed with 23G vitrectomy cannulas were placed 3.5 mm from the limbus. The 20G cannula were left open, and the infusion line was placed in the anterior chamber through a clear corneal paracentesis with a bottle height of 40 mmHg. As soon as the infusion line was opened, a copious, thick flux of blood and occasional tiny clots flowed out of the 20G cannulas. As the blood flow continued, the choroidal detachment visibly recessed. A 1/5PD hole in the arch of the vascular arch below the macula was found, and full vitrectomy with silicone oil tamponade was performed. Undergo surgical treatment, retinal detachment and choroidal detachment were reduction. With silicone oil tamponade, the visual acuity was manual and 20/2000 (Snellen visual Acutles) on the one day and one month postoperation separately.

Conclusions: Spontaneous suprachoroidal haemorrhage is a rare but serious sight-threatening ocular condition. Appropriate operation time and thorough drainage of suprachoroidal haemorrhage during operation were the key to successful treatment.

Abstract No.: 207338

Panel No.: MYO-0550

Study of Binocular Vision Parameters and Peripheral Refraction in Children With Progressive Myopia on Low-Dose Atropine

First Author: Sowmya RAVEENDRA MURTHY

Co-Author(s): Shifa ANJUM, Kaushik MURALI

Purpose: To study the vergence, accommodation parameters in children on low-dose atropine and to note the correlation with duration of use. Also to note peripheral refraction in these children.

Methods: A prospective cross-sectional study was conducted between December 2023 and September 2024, including all children between 7 and 18 years of age on low-dose atropine for at least 3 months. Those on combination treatment were excluded. The following parameters were checked after informed consent: Detailed history of LDA usage, BCVA, phoria for distance and near, NFV, PFV, NPC, NPA, NRA, PRA, AA, and Cycloplegic refraction measured in the central, 15°, 20°, and 30 degrees in nasal and temporal meridians.

Results: We enrolled a total of 231 children within the specified study period. The mean age was 12 years (SD 2.97), with a total of 100 males and 131 females. The majority of the children had normal vergence and accommodation parameters. Mean values of Peripheral refraction show a hyperopic shift in both the nasal and temporal meridians, the shift being slightly more in the temporal meridian. There was no correlation of duration of LDA use with Vergence or accommodation parameters (chi-square test and showed no significant correlation. There was no significant correlation between peripheral refraction and NRA in our study group. A weak but significant negative correlation was found with peripheral refraction at nasal and temporal meridians and PRA, indicating a small inverse relationship in the right & left eyes (15° & 30 degrees).

Conclusions: Children on LDA showed mostly normal vergence & accommodation parameters with no correlation with duration of usage. And hyperopic peripheral refractions in nasal and temporal meridians

Abstract No.: 200443

Panel No.: MYO-0489

Targeting the ALKBH5-ERK1/2 Epitranscriptomic Axis: A Novel Therapeutic Strategy for Myopia Intervention

First Author: Jiru ZHU

Co-Author(s): Ye SHEN, Jianping TONG

Purpose: With global myopia prevalence reaching epidemic levels and treatment options remaining limited, this study investigates the pathogenic role of retinal epitranscriptomic regulation, specifically N6-methyladenosine (m6A) modification, and explores its therapeutic potential.

Methods: Peripheral blood m6A levels were measured in 38 myopic patients undergoing implantable collamer lens surgery. Murine form-deprivation myopia (FDM) models were employed to assess retinal m6A methylation and ALKBH5 expression. Mechanistic studies involved intravitreal injection of the ALKBH5 inhibitor DDO-2728 and the ERK1/2 activator Ro 67-7476. ALKBH5-knockout mice were also subjected to FDM. Outcomes included myopia progression (refraction, axial length), retinal thickness, inflammatory mediators (IL-6/8/10, MMP2, MCP-1, TGF- β 1), extracellular matrix regulation, and key signaling pathways (ERK1/2, Wnt/ β -catenin).

Results: Clinical analysis revealed significant inverse correlations between peripheral blood m6A levels and myopia severity (refraction: $r = 0.435$, $p < 0.01$; axial length: $r = -0.338$, $p < 0.05$). FDM mice exhibited retinal m6A hypomethylation and ALKBH5 upregulation. Pharmacological inhibition of ALKBH5 with DDO-2728 effectively attenuated myopia progression, mitigated retinal thinning, suppressed inflammatory responses, and modulated early extracellular matrix dysregulation. These effects were mediated through the specific suppression of ERK1/2 hyperphosphorylation, independent of the Wnt/ β -catenin pathway. The therapeutic benefits of DDO-2728 were completely abolished by co-administration of the ERK1/2 activator Ro 67-7476. Genetic ablation of ALKBH5 provided similar but weaker protection, suggesting compensatory mechanisms.

Conclusions: This study identifies the ALKBH5-ERK1/2 axis as a novel pathogenic driver and promising therapeutic target for myopia. The ALKBH5 inhibitor DDO-2728 demonstrates strong translational potential for controlling myopia progression.

Abstract No.: 210385

Taxonomic Structure and Diversity of the Ocular Surface Microbiota in Children With and Without Myopia: A 16S rRNA Sequencing Study

First Author: Gulnara REZBAEVA

Co-Author(s): Alexandr BABUSHKIN, Alexandra DANILOVA, Vasilisa DUDURICH, Olga ORENBURKINA, Karina SOGOMONIAN

Purpose: To investigate the taxonomic composition and diversity of the ocular surface microbiota in children with different degrees of myopia compared with children without clinically confirmed myopia, using 16S rRNA metagenomic sequencing.

Methods: A total of 29 children (58 eyes) with mild, moderate, or high myopia and 12 age-matched children without myopia (24 eyes) were examined. Biological samples were collected from the conjunctival surface. After quality filtration, samples with insufficient sequencing depth were excluded. Bacterial composition was analyzed at the genus level using 16S

rRNA sequencing. Alpha diversity (Chao1, Shannon) and beta diversity (Bray-Curtis NMDS) were assessed. Statistical comparisons were conducted to evaluate differences between groups and to explore the influence of myopia severity.

Results: A study of the microbiota of the ocular surface using 16S rRNA sequencing in children with myopia revealed an increase in alpha and beta diversity compared with the control group. There was a significant increase in the abundance of *Staphylococcus* sp., *Streptococcus* sp., *Corynebacterium* sp., *Cutibacterium* sp., *Pelomonas* sp. and *Bacteroides* sp. compared to the control. The control samples showed a limited but stable microbial profile with less variability. The overall structure of the microbiota in patients with myopia was characterized by a higher number of taxonomic units due to opportunistic flora, which indirectly indicates the presence of dysbiosis.

Conclusions: The microbiota of the ocular surface in children with myopia demonstrates increased diversity and taxonomic imbalance compared to healthy peers. The presence of dysbiosis correlates with the degree of myopia and may be a potential biomarker of disease progression. Further studies of microbiological and immune interactions in the eye can improve early diagnosis and individual prevention strategies.

Abstract No.: 205393

Panel No.: MYO-0532

The Dumbbells Pattern of Myopia Management Practice in Southeast Asia

First Author: Jong Mei KHEW

Co-Author(s): Mohd Zaki AWG ISA, Monica JONG, Philip MORGAN, Kah Ooi TAN

Purpose: This is a project initiated by the Asia Optometric Congress to understand the main intrinsic and extrinsic barriers in practicing myopia management amongst optometrists in Southeast Asia.

Methods: Optometrists from Malaysia, Singapore, Thailand, Vietnam, and the Philippines were recruited voluntarily through local professional associations. In-depth semi-structured live interviews up to 45 minutes were conducted with recruited optometrists, which were recorded and transcribed. A framework method was used for thematic analysis of the data.

Results: Fifty-seven optometrists with a mean age of 41.5 (± 12.1) years completed the interview. Thematic analysis revealed a dumbbell pattern with extrinsic barriers (treatment cost, accessibility, awareness of myopia management) on one end, and intrinsic barriers (limited scope of practice, lack of clinical guidelines, lack of co-management, time constraint) on the other end. The extents of these barriers vary from country to country. The main supports to narrow the gap are advocating public awareness and continuing education

to upskill clinical competencies to practice holistic myopia management more effectively.

Conclusions: This is the first in-depth qualitative study to explore the perspectives of optometrists in Malaysia, Singapore, Thailand, Vietnam, and the Philippines on practicing myopia management. It highlighted the challenges in addressing patients' understanding of myopia management and the urgency of acquiring the right clinical skill set to practice myopia management. There is a need to involve the stakeholders, including government and industry partners, for strategic advocacy for public awareness, and the need for professional development for practitioners to provide holistic myopia management practice.

Abstract No.: 201072

Panel No.: MYO-0496

The Effect of Pretreatment With Repeated Low-Level Red Laser-Light (RLRL) on Normal Refractive Development and Form-Deprivation Myopia in the Chick

First Author: Qianqian SONG

Co-Author(s): Mengtian KANG, John PHILLIPS, Wenjun XU, Zihang ZHANG

Purpose: There is significant clinical interest in using Repeated Low-level Red Laser-light (RLRL) treatment to delay childhood myopia development. We investigated pretreatment with RLRL on normal refractive development and form-deprivation myopia (FDM) in the Chick model to study mechanisms.

Methods: Three-day-old White Leghorn chicks (n=20) received monocular RLRL pretreatment (n=10: 650 nm, 2 mW, 3 minutes twice daily) or sham pretreatment (n=10) for 4 days. Ocular biometry (Lenstar) and refractions (retinoscopy) were then measured in all eyes. FDM, without further RLRL treatment, was then induced in the RLRL and sham pretreated eyes for three days, after which, refractions and ocular biometry measures were repeated. Outcomes are presented as interocular differences (treated eye minus fellow eye).

Results: Four days of RLRL pretreatment induced a hyperopic shift compared with the sham pretreatment ($+1.50 \pm 1.81D$ vs. $-0.02 \pm 0.60D$, $P=0.009$), accompanied by decreased vitreous chamber depth (VCD, $-0.10 \pm 0.07mm$ vs. $+0.02 \pm 0.03mm$, $P=0.001$), shorter axial length (AL, $-0.14 \pm 0.09mm$ vs. $+0.00 \pm 0.05mm$, $P<0.001$), and increased choroidal thickness ($+47.6 \pm 47.6\mu m$ vs. $+2.89 \pm 12.9\mu m$, $P=0.010$). FDM-induced AL elongation ($-0.04 \pm 0.05mm$ vs. $+0.07 \pm 0.07mm$, $P=0.002$) and VCD growth ($-0.02 \pm 0.06mm$ vs. $+0.05 \pm 0.07mm$, $P=0.042$) were lower in the RLRL pretreatment group compared to the sham pretreatment group, although no significant differences were observed in spherical equivalent refraction or choroidal thickness.

Conclusions: In chicks, RLRL pretreatment reduced normal eye growth, induced a hyperopic shift in refraction and protected against myopia development, potentially through increasing choroidal thickness. These findings confirm the value of the Chick model for investigating mechanisms underlying the therapeutic benefits of RLRL pretreatment in children.

Abstract No.: 204943

Panel No.: MYO-0528

The Impact of Visual Training on Myopia Progression in Myopic Children and Adolescents With Visual Impairment

First Author: Man CUI

Co-Author(s): Guanghao QIN, Xinyu TONG, Sile YU

Purpose: To investigate the effect of visual training (VT) on myopia progression in myopic children and adolescents with visual impairment (VI).

Methods: This retrospective cohort study included VT participants (63 patients) who received at least one month of VT and control participants (109 patients). All participants received single vision spectacle treatment, and were examined at baseline (T0), month 3 (T1), month 6 (T2), and month 12 (T3) for axial length (AL), spherical equivalent, and indicators of visual function test. The visual improvement rate (VIR) was calculated based on visual function test.

Results: The mean age of VT group was 8.84 ± 1.98 years (Male: 52.38%), and the control group was 8.94 ± 1.70 years (Male: 41.28%). The results showed that the changes in AL (ΔAL) in VT group at T1, T2, and T3 were significantly lower than that in the control group (T1: 0.05 ± 0.05 mm vs. 0.09 ± 0.04 mm, T2: 0.11 ± 0.07 mm vs. 0.19 ± 0.08 mm, T3: 0.2 ± 0.13 mm vs. 0.38 ± 0.12 mm, $P<0.001$). VIR in VT group at T2 and T3 was significantly higher than those in the control group (T2: 39.3% vs. 16.5%, T3: 61.4% vs. 18.2%, $P<0.001$).

Conclusions: VT not only can improve visual function, but also slow myopia progression in myopic children and adolescents with VI.

Abstract No.: 205718

Panel No.: MYO-0537

The Longitudinal Effect of Parental Myopia on Childhood Myopia Progression in Hong Kong: A Three-Year Study of 1093 Trios

First Author: Che Ching Chloe WAN

Co-Author(s): Yu Zhou ZHANG

Purpose: With an alarming onset of myopia among children aged 6 to 9 in Hong Kong, we aim to investigate the association between genetic factors and childhood myopia through the 3 year longitudinal study of trios to identify risk groups for early intervention.

Methods: This study involved 1,890 subjects from 1,093 family trios, each consisting of one child and both

parents. Strict cycloplegic autorefractive protocols were used for children. Thorough visual acuity examination has been performed on children and parental status to define results, rather than the typical approach of traditional studies that solely relies on questionnaire responses. Data on spherical equivalence, myopia incidence, axial length of the trios have been analysed. Children were classified into ten groups based on their parents' myopia levels. Regression analyses were utilized to assess the associations between these factors to monitor myopia progression within the critical age range.

Results: Parental myopia contributes to children having a more myopic baseline refractive error and longer axial length even before myopia onset. During a median follow-up of 3.45 years, 880 children developed myopia. 19.5% of participants are emmetropic with parents that are non-myopic, versus 43.4% of total myopia prevalence (OR = 1.17, 95% CI = 1.07–1.23, $P < 0.001$). Children with two highly myopic parents had a higher risk of 68.8% incidence (OR = 5.18, 95% CI = 1.15–23.43, $P = 0.03$). 74.5% of children's myopia progression is contributed by parental myopia, while 25.5% are mediated by extraneous factors. Children with at least one parent with 'High Myopia' compared to the baseline group show a 2.2-fold higher incidence.

Conclusions: Given the increasing prevalence of childhood myopia in post-covid Hong Kong, comprehensive public health strategies are critical to slow progression of myopia.

Abstract No.: 201881

Panel No.: MYO-0500

The Mediating Effect and Predictive Value of Choroidal Thickness Changes in the Prevention of Myopia by Repeated Low-Intensity Red Light Treatment

First Author: Zhuzhu LIU

Purpose: To evaluate the efficacy of repeated low-level red light (RLRL) in Chinese children with premyopia and investigate the mediating and predictive role of sub-foveal choroid thickness (SFCT).

Methods: In this multicenter, single-blind randomized trial, 175 children aged 7–12 years (104 RLRL, 71 controls) were followed for 12 months. Axial length (AL), cycloplegic spherical equivalent (SE), and OCT/OCTA were measured at baseline and follow-up. Sensitivity analysis was conducted in different SE and age groups. Interaction and mediation analysis were performed to determine if baseline SFCT was a moderator of SE/AL progression and if SFCT changes mediated SE/AL progression. Receiver operating characteristic (ROC) curves assessed the predictive value of early SFCT changes.

Results: After 12 months of RLRL, 29.8% showed hyperopic shift and 19.2% had AL reduction (>0.05

mm). Mean changes were 0.16 mm/year in AL and -0.12 D/year in SE. Children with insufficient hyperopic reserve or older age benefited more. Baseline SFCT showed no interaction with outcomes ($P > 0.05$). Mediation analysis revealed that choroidal thickening accounted for 24.5% of AL and 37.8% of SE control. Early SFCT change at 3 months significantly predicted AL outcomes, improving model accuracy.

Conclusions: RLRL effectively slowed myopia progression in premyopic children, with part of the effect mediated by choroidal thickening. Early SFCT response serves as a valuable biomarker for predicting long-term efficacy, supporting individualized myopia prevention strategies.

Abstract No.: 204960

Panel No.: MYO-0529

The Prevalence of Myopia Among Primary School Students From 2022 to 2024 in Liaoning Province, Northeast China

First Author: Yimeng

Co-Author(s): Wei HE, Xingru HE, Guanghao QIN, Sile YU

Purpose: To report the prevalence and trend of myopia among primary school students from 2022 to 2024 in Liaoning Province, Northeast China.

Methods: This cross-sectional study included 2,132,729 primary school students from Northeast China. Uncorrected distance visual acuity and non-cycloplegic autorefractive were measured. Screening myopia was defined as having both uncorrected visual acuity <5.0 and spherical equivalent refraction ≤ -0.50 D.

Results: In 2022, 481,209 students were included, with a mean age of 9.12 ± 1.72 years. The prevalence of myopia was 29.1%. In 2023, 742,782 students were included, with a mean age of 9.15 ± 1.76 years, and the prevalence of myopia was 29.0%. In 2024, 908,738 students were included, with a mean age of 9.25 ± 1.78 years, and the prevalence of myopia was 30.3%, predominantly mild myopia (59.30%). The prevalence was significantly lower in males (28.42%) than in females (32.23%) (OR = 0.81, $P < 0.05$). The prevalence of myopia increased progressively with grade level, rising from 10.01% in first grade to 48.00% in or sixth grade.

Conclusions: The overall prevalence of myopia among primary students in Northeast China is relatively high and shows an increasing trend year by year. Strengthening myopia prevention and control measures in lower grades is essential to delay the progression of myopia.

Abstract No.: 201011**Panel No.: MYO-0493****The Relationship Between Vitamin A and Myopia: A Population-Based Study***First Author: Yeo Jin LEE**Co-Author(s): Dong Hyun JEE*

Purpose: We sought to evaluate the relationship between blood vitamin A levels and myopia in adults aged ≥ 20 years in Korea.

Methods: We collected data of 15,899 participants aged ≥ 20 years from the Korean National Health and Nutrition Examination Survey. Participants underwent refraction tests to identify myopia and high myopia, and their blood pressure and obesity levels were measured. Blood tests were conducted to assess vitamin A, fasting blood glucose, triglyceride, and total cholesterol levels. Blood vitamin A levels were classified into quartiles.

Results: After adjusting for confounding variables like age, sex, income, education, hypertension, diabetes, and obesity, the odds ratio (OR) of blood vitamin A in the second quartile for myopia was 0.66, while the OR in the fourth quartile was 0.74 (P for trend < 0.001). Among women, the ORs for myopia in the second and third quartiles of blood vitamin A levels were 0.48 (95% confidence interval [CI], 0.35–0.66) and 0.67 (95% CI, 0.49–0.90), respectively (P for trend < 0.001). In men, the ORs for high myopia in the second, third, and fourth quartiles of blood vitamin A levels were 0.05 (95% CI, 0.004–0.58), 0.15 (95% CI, 0.024–0.91), and 0.05 (95% CI, 0.008–0.364), respectively (P for trend < 0.001).

Conclusions: An inverse relationship was observed between higher blood vitamin A levels and the prevalence of myopia. Notably, higher blood vitamin A levels were associated with a lower prevalence of high myopia in men and a lower prevalence of myopia in women.

Abstract No.: 201050**Panel No.: MYO-0495****Therapeutic Effect of Orthokeratology Combined With Unilateral 0.01% Atropine in Children With Unilateral Myopic Anisometropia***First Author: Xuehui ZHANG**Co-Author(s): Huihu ZHENG, Lin KANG*

Purpose: To investigate the therapeutic effect of orthokeratology combined with unilateral 0.01% atropine in children with unilateral myopic anisometropia.

Methods: This prospective study enrolled 47 children (aged 8–16 years) with unilateral myopia from Xi'an First Hospital between 2022 and 2024. The myopic eyes were treated with orthokeratology lenses, while

the non-myopic eyes received 0.01% atropine gel once nightly. A historical control group of 46 unilateral myopia children with matched baseline parameters, treated solely with orthokeratology, was included. Changes in axial length (AL) and interocular AL differences were analyzed. Statistical analyses included paired t-tests, independent samples t-tests, and linear regression.

Results: 1. Intergroup comparison: The intervention group showed significantly slower AL progression in non-myopic eyes compared to the control group ($0.45 \pm 0.25 \text{ mm/year}$ vs $0.13 \pm 0.12 \text{ mm/year}$, $P=0.003$), while no significant difference was observed in myopic eyes ($0.11 \pm 0.19 \text{ mm/year}$ vs $0.15 \pm 0.17 \text{ mm/year}$, $P=0.207$). 2. Intragroup comparison: In the intervention group, AL progression did not differ between two eyes ($P=0.335$). In controls, myopic eyes exhibited slower AL progression than non-myopic eyes ($P<0.001$). 3. Interocular AL difference: The intervention group showed no significant change in interocular AL difference ($0.92 \pm 0.57 \text{ mm}$ VS $0.94 \pm 0.57 \text{ mm}$, $P=0.117$), whereas the control group demonstrated a significant reduction ($0.99 \pm 0.56 \text{ mm}$ VS $0.66 \pm 0.53 \text{ mm}$, $P=0.001$).

Conclusions: Orthokeratology combined with unilateral 0.01% atropine effectively slows axial elongation in both eyes of children with unilateral myopia without altering interocular axial length differences.

Abstract No.: 206907**Panel No.: MYO-0546****Tilted Crystalline Lens in Children Across Different Refractive Statuses With Minimal Age-Related Changes***First Author: Ruozhen RUAN**Co-Author(s): Jian CAO, Mengyi WANG, Xiao YANG*

Purpose: To assess the morphological and tilt characteristics of the crystalline lens in children along different orientations and their correlations with age and spherical equivalent (SE).

Methods: This cross-sectional study encompassed 966 eyes of 493 children (5–15 years) with SE ranging from -6.00 to $+3.00$ diopters (D). The binocular crystalline lens biometric parameters in 16 orientations were measured using swept-source anterior segment optical coherence tomography. Parameters included the anterior radius of the lens (LAR), posterior radius of the lens (LPR), lens thickness, diameter, as well as lens tilt and decentration. Group comparisons were performed among no, low, and moderate myopic eyes.

Results: Lens tilt and decentration demonstrated semi-periodic variations ($R^2=0.984$ and 0.789 , respectively). The tilted lenses were predominantly oriented in the temporal and inferior directions, with corresponding lens decentration observed in the temporal quadrant. The emmetropic group exhibited a significantly more

curved crystalline lens, with higher LAR and LPR values compared to the low and moderate myopia groups (all $P < 0.001$). As myopia increased, lens tilt consistently increased across all refractive subgroups (all $P < 0.001$), whereas other parameters either reached a turning point at approximately -4.00 D or showed no linearity. Age-stratified polynomial analysis revealed that the positive correlation between lens tilt and SE remained strong within the SE range of -4.18 D to +3.00 D.

Conclusions: The lens tends to exhibit greater tilt toward the temporal and inferior regions in eyes with higher myopia across different age groups in children.

Abstract No.: 203206

Panel No.: MYO-0518

Tracking Myopia Development Through Axial Length Progression: A Retrospective Longitudinal Study

First Author: Zhengyang TAO

Co-Author(s): Lifei CHEN, Hongwei DENG, Guorui HU, Zongyue LV, Jiao WANG, Zhixing XU

Purpose: This retrospective cohort study analyzed longitudinal ocular biometric data from repeated measurements in a school-based population to provide personalized myopia risk assessments.

Methods: The dataset was randomly partitioned into development and validation cohorts at a 2:1 ratio, with two-thirds of the data allocated for nomogram model construction and the remaining one-third reserved for validation. The axial length-to-corneal radius (AL/CR) ratio was defined as the AL divided by the mean CR value measured in 90° meridians and 180° meridians: $AL/CR = 2AL / (CR_{90^\circ} + CR_{180^\circ})$. The primary outcome is progressive myopia, defined as an annualized SE progression rate ≥ 0.75 DS/year over 1.5 years. The key predictor, first-visit AL progression, reflects 6-month axial elongation from baseline.

Results: The baseline subjects (N=1697) were divided into the training set (N=1132) and the validation set (N=565). The first-visit AL progression showed significant correlations with annualized SE progression ($r = -0.495$, $P < 0.001$). Multivariate Logistic regression analysis indicated AL/CR in baseline (OR= 70.414, 95%CI: 22.795-217.511, $p < 0.001$) and first-visit AL progression (OR= 12845.569, 95%CI: 2915.219-56602.490, $p < 0.001$) significantly contributed to the risk of progressive myopia. Accordingly, baseline AL/CR and first-visit AL progression were treated as the main factors to build the nomogram model. The model showed good predictive performance (AUC=0.785 in training set / 0.771 in validation set) with well-calibrated slopes (approaching 1) and clinically useful thresholds (0.20-0.80).

Conclusions: This study develops a personalized and clinically actionable prediction model for progressive myopia, grounded on factors at the first visit, AL

progression, and baseline AL/CR. The model offers a dynamic and reliable foundation for selecting effective myopia control measures in future stages.

Abstract No.: 208509

Panel No.: MYO-0557

Tumbling E or HOTV Optotypes for Pediatric Vision Screening: An Observational Study

First Author: Haotian WU

Co-Author(s): Jun CHEN, Xiangui HE, Kathryn ROSE, Yanjiao WANG, Xun XU

Purpose: To compare uncorrected visual acuity (UCVA) measured by HOTV and Tumbling E tests, and assess their efficiency in pediatric vision screening.

Methods: Children aged 3–15 years were randomly selected from the Shanghai arm of a national multicenter study. Each child underwent two UCVA tests using HOTV and Tumbling E logMAR charts, with random assignment to the HOTV-first or E-first group. All participants received cycloplegia and a comprehensive examination to identify amblyopia and refractive errors.

Results: A total of 1,053 children were included. To minimize fatigue effects, only initial UCVA results were compared. Overall, mean (SD) UCVA was 0.16 (0.24) with HOTV and 0.21 (0.21) with Tumbling E (95% CI, -0.07 to -0.02; $P < 0.001$). The difference decreased with age, exceeding 3 letters in children under 8 but remaining within 3 letters in older children. In those aged 3–<4 years, the average difference reached 1 logMAR line. Using AAPOS criteria, 16.94% of preschoolers were referred via HOTV, versus 31.15% via Tumbling E (mean difference, 14.21%; $\chi^2 = 14.88$; $P < 0.001$). Using Shanghai criteria, referral rates were 32.79% via HOTV and 54.10% via Tumbling E (mean difference, 21.31%; $\chi^2 = 24.48$; $P < 0.001$). Both charts showed good sensitivity for amblyopia, with comparable performance in detecting myopia, hyperopia, astigmatism, and anisometropia.

Conclusions: Children aged 3–8 years yielded better UCVA with the HOTV test compared to the Tumbling E test, while no such difference was observed in older children. Although both charts demonstrated comparable performance for amblyopia and refractive errors, the HOTV test identified fewer children requiring referral and enhanced screening efficiency.

Abstract No.: 202095**Panel No.: MYO-0504**

Use of Low-Dose Atropine 0.025% for Childhood Myopia Control in Clinical Practice

First Author: Kaiwen **NG****Co-Author(s):** Chia Wei-lin, audrey, Aaron **GOH QI YANG**, Bryan **SIM XIANG RONG**, Hia Myint Htoon, Sri Yudah**Purpose:** Clinical audit of the efficacy of Atropine 0.025% eye drops.**Methods:** A total of 295 children (n=588 eyes) were separated into treatment naïve eyes (Group A, n=147 eyes), those progressing on 0.01% daily and started on 0.025% alone (Group B, n=287 eyes) or combined with optical treatment (Group C, n=66 eyes), and those on 0.01% twice daily converted to 0.025% once daily (Group D, n=89 eyes). Change in equivalent (SE) and axial length (AL) 6 months prior, and at 6, 12 and 24 months was recorded.**Results:** Group A children were younger (8.4 years) with lower myopia, while Group D were older (10.4 years) with higher myopia. Eyes in Groups A-C recorded significantly less myopia progression after starting Atropine 0.025% with mean SE/AL progression 6 months prior and after treatment changing from -0.97D/0.24mm, -0.46D/0.20mm and -0.64D/0.23mm to -0.14D/0.12mm, -0.07D/0.13mm, and -0.02D/0.09mm, $p < 0.001$, respectively. No change was noted in Group D (-0.22D/0.13mm to -0.14D/0.11mm, $p = 0.09$). Over the 2-year period, treatment was increased in 42%, 41%, 12% and 46% of eyes within Groups A-D, respectively. In the remaining eyes, the mean change over 2 years was not significantly different between groups, at -0.34D/0.22mm, -0.22D/0.24mm, -0.26D/0.25mm, and -0.22D/0.23mm, in Groups A-D, respectively. Multivariate analysis suggest that SE/AL change was associated with younger age, and greater progression in the 6 months prior.**Conclusions:** Atropine 0.025% was useful in slowing myopia in most children.

Neuro-Ophthalmology

Abstract No.: 201483**Panel No.: NEU-0574**

A Case Report: Wernicke's Encephalopathy Presenting as Bilateral Optic Neuropathy in a Young Woman with Recurrent Acute Pancreatitis

First Author: Baigalmaa **DOOROV****Co-Author(s):** Dovchinjamts **DAGVADORJ****Purpose:** A 27-year-old female with recurrent acute pancreatitis and hepatitis was admitted with

persistent vomiting, diarrhea, dizziness, decreased vision, diplopia, and gait disturbances. She had no history of alcohol or tobacco use. On ophthalmologic examination, she demonstrated bilateral horizontal nystagmus, decreased visual acuity (right eye: 6/60; left eye: 6/12), optic disc edema in both eyes, and optic disc hemorrhage in the left eye.

Methods: A case report.**Results:** IV thiamine 100 mg/day x 3 days. IV methylprednisolone 1 g/day x 3 days, followed by oral steroids. Outcome: Vomiting resolved, nystagmus disappeared, completely resolved from ataxia. Visual acuity returned to 6/6 in both eyes by the 23rd day of admission. OCT-ONH and the visual field test results had normalized by the 39th day of admission.**Conclusions:** Wernicke's encephalopathy should be considered in any patient presenting with prolonged vomiting, malnutrition, or neurological signs—even in the absence of alcohol use. Early recognition and treatment with thiamine can lead to complete recovery and prevent permanent damage. Visual loss due to optic neuropathy in WE is rare but potentially reversible with timely intervention. This case emphasizes the importance of interdisciplinary collaboration and prompt treatment in suspected cases of WE.**Abstract No.: 206200**

A Case of Late-Onset Leber Hereditary Optic Neuropathy (LHON) in Association With m.11778G>A Mutation

First Author: Timothy P.H. **LIN****Co-Author(s):** Carmen K.M. **CHAN**, Matthew C.W. **LAM****Purpose:** We report a case of genetically confirmed LHON in an elderly female.**Methods:** Case report.**Results:** A 71-year-old Chinese woman with good past health presented with left eye subacute visual loss. At presentation, visual acuity was 0.6 in the right eye and hand movement in the left eye with left RAPD. Examination revealed temporal disc pallor in the left eye only and otherwise unremarkable. The OCT of the macula had no obvious abnormalities. Her blood pressure was elevated at 204/94 mmHg on presentation. There were no features of giant cell arteritis. Further blood tests and neuroimaging were unremarkable and not suggestive of optic neuritis or compressive optic neuropathy. In view of the presence of left optic atrophy and cardiovascular risk factors, the initial diagnosis was left optic atrophy secondary to prior vascular insults and aspirin was started. She further developed sequential visual loss in the right eye, with deterioration of right eye visual acuity to 5/60. She completed a trial of high dose intravenous methylprednisolone without significant clinical improvement. Further ophthalmic imaging with OCT of the retinal nerve fiber layer (RNFL) and ganglion

cell inner plexiform layer (GCIPL) revealed selective thinning of the GCIPL. A review of her family history revealed unexplained visual loss at young age among her 3 siblings. The working diagnosis was revised to LHON, which was confirmed with genetic testing. Idebenone was initiated whilst her steroid tapered.

Conclusions: A high clinical suspicion is critical in atypical presentation of mature onset LHON in the presence of positive family history.

Abstract No.: 205552

Panel No.: NEU-0614

A Case of Prostate Cancer Dural Metastases Presenting With Bilateral Visual Deterioration

First Author: Ying ZHAO

Co-Author(s): Xiuli CHEN, Jiaxin MENG

Purpose: To analyze a case of prostate cancer dural metastases presenting with bilateral visual deterioration as the initial symptom, and explore its diagnosis and prognosis.

Methods: Retrospectively analyzed the clinical data of a 67-year-old male patient, including medical history, ophthalmic examination, laboratory tests, neuroimaging, pathological results, and follow-up records.

Results: The patient had 6-month vision loss, previously misdiagnosed as optic neuritis (steroids ineffective). Referral examination showed elevated ICP (330mmH₂O), dural thickening/enhancement, venous sinus stenosis, and markedly high PSA. Pathology confirmed prostate adenocarcinoma (Gleason 4+4=8). Diagnosed with prostate cancer, dural metastases, intracranial hypertension, and papilledema. Followed to 2025, vision declined (OD HM/20cm, OS 0.02) with worse metastases.

Conclusions: Unexplained papilledema in elderly males requires neuroimaging and PSA testing; multidisciplinary evaluation helps detect underlying prostate cancer and improve management.

Abstract No.: 202177

Panel No.: NEU-0582

A Challenging Case of Bilateral Optic Neuropathy in Tuberculous Meningoencephalitis: Diagnostic and Therapeutic Dilemmas

First Author: Anya Dewi NASTITI

Co-Author(s): Sita Paramita AYUNINGTYAS, Michael HARTONO, Hindun ZAKIYAH

Purpose: To report a challenging case of bilateral optic neuropathy in tuberculous meningoencephalitis (TBME), highlighting diagnostic and therapeutic complexities.

Methods: This case report describes a 33-year-old woman with TBME presenting with progressively vision loss in both eyes. Following treatment, initial improvement in visual acuity was observed, however subsequent deterioration occurred several weeks later.

Results: A 33-year-old woman presented with complaints of blurred vision in both eyes. Three months prior, she was diagnosed with TBME. The patient received high-dose steroids, which reportedly improved her visual acuity. However, weeks later, the patient was unconscious and admitted to the ICU. MRI examination revealed multiple punctate lesions in both cerebellar hemispheres. The patient experienced worsening vision to hand movement in both eyes and papilledema was observed. Lumbar puncture was performed and the opening pressure was 25 mmHg. From the cerebrospinal fluid analysis confirmed tuberculous infection. Following the lumbar puncture, the patient's visual acuity improved to 6/30 in both eyes. Two weeks after the improvement, the patient presented again with decreased visual acuity, deteriorating to hand movement in both eyes. Ethambutol was discontinued, and the patient was administered intravenous dexamethasone and acetazolamide. A repeat lumbar puncture revealed persistent elevation of intracranial pressure and MRI showed no enhancement of the optic nerve.

Conclusions: The treatment of TBME and optic neuropathy poses significant challenges, necessitating a comprehensive diagnostic and multidisciplinary approach, often resulting in a poor visual prognosis.

Abstract No.: 205828

Panel No.: NEU-0618

A Persistent Red Eye: An Alert of the Possibility of Carotid Cavernous Sinus Fistula

First Author: Miranti Laras AYU

Co-Author(s): Dianita Veulina GINTING, Antonia KARTIKA, Rusti Hanindya SARI, Prettylla YOLLAMANDA

Purpose: To report a case of carotid-cavernous sinus fistula (CCFs) initially misdiagnosed as scleritis in a patient presenting with chronic red eye at a tertiary hospital in Indonesia.

Methods: A case report of a 55-year-old woman with persistent redness, blurred vision, and intermittent ocular pain in the left eye (LE) for five months. Clinical history, ophthalmic examinations, and neuroimaging were reviewed.

Results: The patient had a history of hypertension with irregular treatment since 2022. She was previously diagnosed with scleritis and hypertensive retinopathy of the LE and had received medications without improvement. On presentation, best-corrected visual acuity (BCVA) of the LE was 0.4 pinhole 0.63, and intraocular pressure (IOP) was 30 mmHg despite ongoing antiglaucoma therapy. Examination revealed

a hyperemic corkscrew appearance of the conjunctival vessels and a grade II relative afferent pupillary defect (RAPD). Funduscopy showed mild tortuosity of retinal vessels. Computed Tomography (CT) of the orbit with contrast demonstrated dilation of the left superior ophthalmic vein (SOV), suggesting indirect low-flow CCFs. The patient was managed with external manual carotid compression, continued antiglaucoma therapy, oral citicoline, and was referred to neurosurgery for digital subtraction angiography (DSA). At 6-month follow-up, IOP was controlled at 14 mmHg with a single topical medication, the red eye had decreased significantly, and VA remained stable.

Conclusions: Indirect low-flow CCFs may mimic chronic ocular inflammation. Careful ophthalmic evaluation, recognition of clinical signs, and timely imaging are crucial to avoid misdiagnosis and irreversible vision loss.

Abstract No.: 202205

Panel No.: NEU-0584

A Rare Case of MOG-IgG-Associated Bilateral Optic Neuritis Concurrent With Psoriasis Vulgaris and Psoriatic Arthritis

First Author: Yu-ting **HSIAO**

Co-Author(s): Hsiu-mei **HUANG**, Jong-jer **LEE**

Purpose: To report a rare case of myelin oligodendrocyte glycoprotein-associated disease (MOGAD)-associated optic neuritis in an Asian patient with psoriasis vulgaris and psoriatic arthritis.

Methods: A 53-year-old female with psoriasis vulgaris and psoriatic arthritis presented with sudden onset of bilateral vision loss for one week, accompanied by retro-orbital pain that worsened with eye movements. Comprehensive ophthalmic and systemic evaluations were conducted, including fundus examination, optical coherence tomography (OCT), laboratory investigations, cerebrospinal fluid (CSF) analysis, and magnetic resonance imaging (MRI).

Results: Ocular examination revealed a best corrected visual acuity (BCVA) was 20/800 in her right eye and 20/400 in her left. The patient was unable to identify any Ishihara plates in either eye. Fundus examination showed mild bilateral disc edema with bulging discs, confirmed by OCT. CSF studies demonstrated normal intracranial pressure, with unremarkable cell cytology and biochemistry findings. Orbital MRI revealed bilateral swollen optic nerves with mild contrast enhancement. Serum anti-AQP4 antibody tested negative; however, a MOG-IgG cell-based assay was positive, with a titer of 1:10 (normal <1:10). Based on the clinical and investigative findings, a diagnosis of MOGAD-associated bilateral optic neuritis was established. She was treated with intravenous methylprednisolone 1g/day for three days, followed by a three-month oral prednisolone taper, resulting in near-complete visual recovery and no relapses.

Conclusions: Although rare, this case highlights the importance of recognizing MOGAD-associated optic neuritis in autoimmune patients. Prompt initiation of appropriate immunosuppressive therapy is crucial, as delayed or inadequate treatment may result in permanent vision loss.

Abstract No.: 204314

Panel No.: NEU-0603

A Window to the Mass: A Rare Presentation of Bilateral Neuroretinitis Unmasking a Silent Intracranial Tumor in an 18-year-old Filipino Female

First Author: Richard **VILLAMOR**

Co-Author(s): Janice **BERNARDO**

Purpose: To report a case of an 18-year-old female presenting with painless bilateral sequential blurring of vision in the left eye, then the right eye, in La Union, Philippines. The patient had symptoms of atypical optic neuritis, presenting with bilateral neuroretinitis. No neurologic deficits were elicited. No history of antecedent viral infection. Cat exposure was elicited.

Methods: Basic systemic work-up and imaging were done to determine the etiology.

Results: Optical Coherence Tomography (OCT) of the optic nerve and macula OU showed a generalized thickening of the optic nerve and intraretinal layer with hyperreflective exudate deposits and the presence of sub-Retinal Pigment Epithelium (RPE) edema. Serologic tests for Bartonella Henselae and Treponema pallidum were negative, and was also negative for Mycobacterium tuberculosis. The patient also tested negative for Anti-Nuclear Antibody (ANA). Cranial/Orbital Magnetic Resonance Imaging with contrast and fat suppressed images showed a lobulated, avidly enhancing, predominantly solid, extra-axial mass measuring approximately 7.7 x 4.9 x 6.3 cm (CC x W x AP) seen centered in the atrium/trigone of the left lateral ventricle. Radiologic primary consideration is a choroid plexus papilloma versus a choroid plexus carcinoma, which is a rare brain tumor, accounting for <1% of brain tumors, that arises from the choroid plexus. Patient was co-managed with Neurosurgery and Pediatric Oncology.

Conclusions: To the best of the researchers' literature review, this is the first documented true intracranial mass (tumors within the cranial vault) causing bilateral neuroretinitis.

Abstract No.: 208241

Panel No.: NEU-0637

Acute Vision Loss from Allergic Fungal Sinusitis: A Clinical Imposter

First Author: Divya CACULO

Co-Author(s): Disha AGARWAL

Purpose: This case emphasizes the necessity of suspecting compressive pathology—such as allergic fungal sinusitis—when optic neuritis manifestations diverge from typical presentations. Timely imaging, surgical decompression, & antifungal therapy can restore function and avert irreversible optic nerve damage.

Methods: A 26-year-old man presented with two weeks of acute, mild vision loss and ocular pain in the left eye, initially diagnosed as optic neuritis. Visual acuity was 6/6 bilaterally, color vision intact, but contrast sensitivity was reduced (1.35 log right, 1.05 log left), with trace left RAPD, mild disc hyperemia bilaterally, and scattered visual field scotomas (central in left eye). With the findings not correlating to each other, neuroimaging was advised, which revealed hyperdense soft tissue in the sphenothmoidal sinuses compressing the prechiasmatic optic nerves, consistent with allergic fungal sinusitis and secondary polyposis. Endonasal endoscopic resection confirmed septate, branching hyphae of *Aspergillus* and was followed by systemic antifungal therapy.

Results: Patient underwent a base of skull sinus surgery. One month post-surgery, visual acuity remained 6/6, contrast sensitivity improved (1.95 log right, 1.35 log left), disc appearance normalized, and most scotomas resolved, though a left central scotoma persisted.

Conclusions: Timely imaging, surgical decompression, & antifungal therapy can restore function and avert irreversible optic nerve damage.

Abstract No.: 203101

Panel No.: NEU-0593

Altered Spontaneous Brain Activity and Correlated Clinical Characteristics in Adults With Esotropia and Exotropia

First Author: Guo XUERAN

Co-Author(s): Jing FU, Jie HAO

Purpose: Esotropia (ES) and exotropia (EX) are common forms of concomitant strabismus associated with distinct visual and neural adaptations. This study aimed to investigate cortical alterations in ES and EX patients through resting-state functional magnetic resonance imaging (rs-fMRI).

Methods: Rs-fMRI signals were collected from eighteen ES, fourteen EX, and sixteen age-, sex-, and handedness-matched controls (MC). The two-sample t-test and ANOVA test were used to investigate

statistical differences in the amplitude of low-frequency fluctuation (ALFF) values. Multiple linear regression analysis was conducted to examine brain regions influencing the occurrence of EX and ES. Correlation analysis validated their relationship with clinical characteristics.

Results: Compared to MCs, ES patients exhibited significantly higher ALFF values in the primary visual cortex and dorsal pathway; whereas EX patients presented decreased ALFF values in the occipital lobe, precentral gyrus (PreCG), and precuneus gyrus (PCUN). Notably, the right superior temporal gyrus (TPOsup) displayed opposite ALFF patterns in ES (decreased) and EX (increased) patients, and multivariate regression identified it as a predictor for both EX and ES ($p = 0.012$). Correlation analyses revealed that in EX patients, the deviation angle was positively associated with ALFF values in the right middle temporal gyrus (MTG) ($r = 0.57$, $p = 0.04$), and the binocular functions were positively correlated with ALFF in the right PreCG ($p < 0.05$). The loss of simultaneous perception was correlated with reduced ALFF in the left middle occipital gyrus (MOG, $p = 0.004$) and right superior occipital gyrus (SOG, $p = 0.004$) in EX patients. The ALFF value of the inferior frontal gyrus (IFG) was associated with the preserved distance and near stereopsis, both in the ES ($p = 0.018$) and EX ($p = 0.041$).

Conclusions: Our findings reveal opposite brain activity patterns in ES and EX patients, with the ALFF values within TPOsup emerging as a key biomarker for deviation direction. These results provide new insights into the neural mechanisms underlying the direction of eye deviation.

Abstract No.: 207248

Panel No.: NEU-0634

An Atypical Presentation of Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease (MOGAD) Relapse in a Pregnant Filipino

First Author: Angelo Jud CRUZ

Co-Author(s): Katrina FELICIANO, Buenjim MARIANO

Purpose: To report an atypical presentation of MOGAD relapse in a pregnant primigravid Filipino.

Methods: Case report.

Results: A 30-year-old female primigravid at 18 weeks of pregnancy was previously diagnosed with myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD), for which she initially received intravenous methylprednisolone and oral prednisolone with a gradual taper, resulting in improved vision. After discontinuing oral prednisone for 2 weeks, she experienced recurrence of right retroorbital eye pain, blurred vision, and poor color vision. Perimetry revealed a cluster of shallow to deep inferior visual field defects compared to prior testing. The patient was

then admitted and treated with IV methylprednisolone for 3 days, leading to improvement in eye pain, color vision, and visual acuity. Work-up for MOGAD relapse causes was unremarkable; with no active infection, no uterine contractions, and no fetal abnormalities on congenital scans. She was discharged on a tapering dose of oral prednisone. Repeat perimetry one month after discharge showed no significant visual field defects. Relapses of MOG antibody disease (MOGAD) during pregnancy are considered uncommon, with most relapses reported to occur within the first three months after delivery.

Conclusions: We report a rare case of a pregnant Filipino patient who experienced an intrapartum relapse of MOGAD without identifiable triggers. This case highlights an unusual presentation of MOGAD during pregnancy and contributes to the limited literature on disease activity in this period.

Abstract No.: 200258
Panel No.: NEU-0566

Association Between Chronic Headache and Sight-Threatening Ocular Diseases: A UK Biobank Study

First Author: Yujie **WANG**
Co-Author(s): Wenyi **HU**, Zhuoting **ZHU**

Purpose: To investigate the association between chronic headache and incident sight-threatening ocular diseases in a large population-based cohort.

Methods: This prospective cohort study included 489,953 UK Biobank participants who had complete data on headache status. Chronic headache was defined as self-reported headache lasting ≥ 3 months. Incident ocular diseases were ascertained through hospital inpatient records. Cox proportional hazards models were used to estimate adjusted hazard ratios (HRs) and 95% confidence intervals (CIs).

Results: Among 489,953 participants (mean age, 56.5 $\pm$ 8.1 years; 52.6% female), chronic headache was associated with 11% increased risks of age-related macular degeneration (HR: 1.11; 95% CI: 1.01–1.22), 27% for retinal vascular occlusion (HR: 1.27; 95% CI: 1.01–1.61), 14% for glaucoma (HR: 1.14; 95% CI: 1.05–1.25), 10% for cataract (HR: 1.10; 95% CI: 1.05–1.16), and 49% for optic nerve disorders (HR: 1.49; 95% CI: 1.17–1.91). No significant associations were observed for retinal detachment or diabetic retinopathy. Sensitivity analyses excluding events diagnosed within one year of baseline showed consistent results.

Conclusions: Chronic headache is associated with increased risks of age-related macular degeneration, retinal vascular occlusion, glaucoma, cataract, and optic nerve disorders, suggesting shared vascular or neurodegenerative mechanisms.

Abstract No.: 206522
Panel No.: NEU-0627

Beyond mTOR: Rapamycin-Induced α -Crystallin Expression as a Neuroprotective Mechanism in Diabetic Retinopathy

First Author: Yipin **WANG**
Co-Author(s): Thomas Chuen **LAM**, Wai-ching **LAM**, Edmond Man Hin **LEUNG**, Amy Cheuk Yin **LO**, Tsz Chung **NG**, Ka Cheung **TAM**

Purpose: Diabetic retinopathy (DR) is a leading cause of blindness. This study investigated the protective effects of long-term, low-dose rapamycin on retinal function in diabetic Ins2Akita mice, focusing on α -crystallin, a small heat-shock protein and a molecular chaperone primarily found in the lens that prevents protein aggregation and protects against cellular stress, as a key mechanistic target in DR.

Methods: Diabetic Akita mice received long-term, low-dose rapamycin. Retinal function was assessed by electroretinography (ERG). Global protein expression was analysed using mass spectrometry, with α -crystallin findings verified by Western blotting and localised via immunohistochemistry (IHC).

Results: Rapamycin treatment significantly preserved retinal function, improving ERG a- and b-wave amplitudes. Mass spectrometry revealed that diabetes induced a complex, age-dependent dysregulation of α -crystallin, with downregulation at 26 weeks and paradoxical upregulation at 36 weeks, highlighting its inherent neuroprotective role. Rapamycin administration corrected this instability, effectively restoring and maintaining α -crystallin levels at both time points. IHC localised this restored expression to Müller cells and the retinal pigment epithelium (RPE), and Western blotting verified the protein restoration.

Conclusions: Long-term, low-dose rapamycin protected retinal function by correcting the age-dependent dysregulation of α -crystallin. This neuroprotective effect is driven by stabilising α -crystallin levels in critical retinal support cells (Müller cells and RPE). Our findings highlight stabilising α -crystallin expression as a promising therapeutic strategy for mitigating DR.

Abstract No.: 205797
Panel No.: NEU-0615

Bilateral Anti-Myelin Oligodendrocyte Glycoprotein (MOG) Antibody Positive Optic Neuritis in a Young Malay Male – a Case Report

First Author: Ker Yin **TOH**
Co-Author(s): Siddharth **SUBRAMANI**, Xiu Ling **TAN**

Purpose: To describe a case of bilateral anti-MOG optic neuritis in a 45-year-old Malay male successfully treated with steroids, with full visual recovery.

Methods: Retrospective case report.

Results: A 45-year-old Malay male, smoker with untreated type 2 diabetes mellitus of haemoglobin A1c of 6.4%, presented with a two-week history of bilateral blurring of vision, pain on eye movements, colour desaturation, inferior visual field loss, and intermittent occipital headache. Best corrected visual acuity (BCVA) was 6/20 in the right eye and 6/12 in the left eye. There was bilateral optic disc swelling, left relative afferent pupillary defect, and no diabetic retinopathy. Systemic workup was unremarkable except for positive anti-MOG antibodies. Magnetic resonance imaging (MRI) of the brain and orbits showed swelling and enhancement of the infraorbital segments of both optic nerves. Lumbar puncture revealed elevated opening pressure (25mmH2O) and positive anti-MOG antibodies, without oligoclonal bands. The patient received intravenous methylprednisolone 1g/day for 5 days, followed by tapering oral prednisolone for eight months. Treatment was complicated by right lower limb deep vein thrombosis, requiring anticoagulation. Despite transient worsening of visual fields, BCVA improved to 6/6 (right eye) and 6/7.5 (left eye), with complete resolution of disc swelling and colour vision recovery within three months with no recurrence.

Conclusions: Anti-MOG antibody positive optic neuritis, though rare in the Malay population, can mimic non-arteritic anterior ischaemic optic neuropathy, especially with vascular risk factors. Prompt recognition through careful history, targeted investigations, and timely immunosuppressive therapy is essential to ensure good visual outcomes.

Abstract No.: 204302

Panel No.: NEU-0601

Case Report: Nutritional and Toxic Optic Neuropathy in Autoimmune Disease

First Author: Diane Frances PERALTA

Co-Author(s): Marianne CARABEO

Purpose: Nutritional and toxic optic neuropathy are rare but vision-threatening complications. Autoimmune conditions leading to a dysregulated systemic state can trigger a pathophysiologic cascade of nutritional depletion and toxin accumulation.

Methods: This is a case of a 15 year-old female with Graves' disease admitted for impending thyroid storm, complicated by liver injury and severe malnutrition.

Results: She presented with sudden blurring of vision, weakness, and vomiting at the emergency room. Clinical examination showed light perception, exophthalmos, mild relative afferent pupillary defect, and yellow-orange disc. Diagnostics showed low levels of thyroid stimulating hormone, elevated thyroid hormones, liver enzymes, ammonia, and deranged electrolytes. The extraocular muscles were not enlarged on computed tomography scan. There was gradual improvement of visual acuity, maintained within 20/20-20/50 via near chart and intact color

vision during admission. However, blurring of vision recurred at 16th hospital day to hand movement with fair light projection accompanied by decreased color vision of 9/16. Patient's status eventually declined due to worsening hyperammonia. Further work-up showed increasing bilirubin and decreasing hemoglobin levels which is more consistent with autoimmune etiology of liver injury.

Conclusions: This case demonstrates the potential for optic nerve damage as an underrecognized complication of hemodynamic and metabolic derangements. The patient's dynamic vision changes can be attributed to toxic-metabolic insult from multifactorial causes of hypoxic state from liver injury, hyperthyroid state, and severe malnutrition, rather than compressive mechanism of dysthyroid optic neuropathy.

Abstract No.: 202684

Panel No.: NEU-0589

Clinical Characteristics and Visual Outcome of Optic Perineuritis in South India: A Single Center Experience

First Author: Padma Lakshmi

Co-Author(s): Olma Veena Noronha, S.Ambika

Purpose: Optic perineuritis is an inflammatory disorder primarily involving the optic nerve sheath. It could be idiopathic or secondary to underlying systemic / autoimmune diseases. Our aim is to describe the clinical features and outcomes of patients with optic perineuritis seen at a tertiary eye care center in South India.

Methods: Retrospective observational case series. We reviewed the medical records of all patients diagnosed with optic perineuritis. All patients were evaluated and managed at the Neuro-ophthalmology services and single referral neurologist during 2018-2024.

Results: 23 eyes of 20 patients were identified. Mean age was 51.7 ± 13.45 years (range: 25-70 years). 11 (55%) were males and 9 (45%) were females. 17 patients had unilateral involvement while 3 were bilateral. Mean visual acuity at presentation was 1.45 ± 1.76 log MAR. Painful vision drop was noted in 15 patients. Disc edema was seen in 19 eyes (82.6%), disc was normal in 2 eyes (8.69%), and pallor was seen in 2 eyes (8.69%). All patients underwent Magnetic Resonance Imaging of brain and orbit and perineural enhancement on MRI was seen in all of them. All patients were treated with intravenous steroids followed by oral steroid taper. 17 of the 23 eyes (73.91 %) recovered Snellen visual acuity of 20/40 or better. A statistically significant improvement between pre and post-treatment visual acuity was noted ($p=0.001$).

Conclusions: Optic perineuritis in our series has a favorable visual outcome. Disc edema and painful

vision drop were more common and anti-MOG antibody was noted in 55 % of patients.

Abstract No.: 206340

Panel No.: NEU-0624

Clinical Features, Diagnosis, and Treatment of Pediatric Idiopathic Intracranial Hypertension

First Author: Yu TIAN

Co-Author(s): Aoxiang WANG

Purpose: To analyze the clinical features, diagnosis, and treatment of pediatric idiopathic intracranial hypertension (IIH) to facilitate early recognition and intervention.

Methods: A retrospective analysis was conducted on 11 children diagnosed with IIH in our ophthalmology department from December 2022 to April 2025.

Results: The study included 11 children aged 10 months to 10 years, with 8 in the preschool group. The male-to-female ratio was 6:5, and none were obese. Potential triggers included viral infection (5 cases), trauma history (1 case), and growth hormone use (1 case). No headache was reported, but 2 cases presented with intermittent head pounding (lumbar opening pressure >400 mmH₂O). Non-projectile vomiting occurred in 3 cases, and visual impairment (diplopia or visual field defect) in 2 cases. All patients had papilledema (1 detected incidentally during routine fundus examination), and 8 had esotropia. Some infants exhibited irritability or poor appetite. Diagnosis was confirmed by elevated lumbar opening pressure (>200 mmH₂O) with normal cerebrospinal fluid composition. MRI ruled out secondary causes, with partial cases showing empty sella or optic nerve sheath distension. All patients received acetazolamide, discontinued within one month, with complete resolution of ocular alignment and papilledema. No recurrence was observed during follow-up exceeding 3 months.

Conclusions: Pediatric IIH in this cohort primarily presented with ocular signs, with rare headache complaints. Acetazolamide treatment yielded favorable short-term outcomes.

Abstract No.: 205539

Panel No.: NEU-0613

Clinical Profile and Outcomes of Patients with Sellar–Suprasellar Masses Referred to the Neuro-Ophthalmology Service of a Tertiary Hospital in the Philippines

First Author: Zadkiel VELASQUEZ

Co-Author(s): Karen REYES

Purpose: This study aims to present the number and diagnoses of patients seen by the Neuro-Ophthalmology Service from January to December 2024, describe key findings based on visual acuity,

visual fields, and OCT parameters (RNFL and GCL thickness), and correlate post-operative changes in visual acuity with baseline OCT and visual field results.

Methods: Charts of sellar-suprasellar mass patients referred to the Neuro-Ophthalmology Service from January to December 2024 were reviewed for demographics, diagnosis, interventions, and baseline and post-op visual acuity, visual fields, and OCT (RNFL and GCL) data.

Results: The average baseline mean deviation (MD) was -13.13 dB, improving to -8.26 dB post-op in 5 patients, with 4 showing visual field gains. Visual acuity improved in 6 patients but remained unchanged in 5. Baseline OCT was available in 13 patients. Average RNFL was 85.08 μ m, decreasing to 66.17 μ m post-op (6 eyes). VA improved in 6 eyes with RNFL >75 μ m and 3 with <75 μ m. GCL averaged 69.04 μ m at baseline and dropped to 59.83 μ m post-op. VA improved in 7 eyes with GCL 55–77 μ m and 1 with >77 μ m, while others showed no improvement.

Conclusions: Most patients showed improved visual acuity and visual fields post-operatively, though only a few had follow-up labs. OCT findings revealed RNFL thinning in most and GCL thinning in all cases. Many patients remain on the OR waitlist, with some experiencing vision decline while awaiting surgery.

Abstract No.: 204166

Panel No.: NEU-0600

Coil the Weak, Embolize the Threat, Stent the Stream — The Interventional Radiology Way in Securing Sight and Preserving Life

First Author: P.sangavi SAMRITHA SELVI

Co-Author(s): Virna SHAH

Purpose: Interventional Radiology (IR) is transforming Neuro-Ophthalmic care by offering minimally invasive solutions for complex, vision-threatening neurovascular disorders. By navigating critical vessels, IR opens new therapeutic frontiers. This study evaluates the clinical outcomes of IR-guided interventions in vision-related neurovascular diseases and highlights the importance of multidisciplinary collaboration.

Methods: A retrospective study was conducted in the Neuro-ophthalmology clinic between August 1, 2024, and July 31, 2025. 31 patients were included in the study and were co-managed with the IR team. Among them, 14 patients presented with diplopia, 1 with headache, 1 with Visual field defects, 1 with defective vision due to Vitreous hemorrhage. Out of 16 patients with Diplopia, 6 patients had Third nerve palsy, 5 had Sixth nerve palsy and 2 with multiple cranial nerve palsies. All patients underwent neuroimaging and tailored endovascular intervention.

Results: The cohort (31 patients) comprised 14 intracranial aneurysms (45.1%), 14 carotid-cavernous fistulas (CCF) (45.1%), and 1 Idiopathic intracranial

hypertension (IIH), 1 Dural venous fistula (DVF) and 1 Arterio-venous fistula (AVF). Among Aneurysms (14): Saccular (42.8%), Giant (7.1%) and small/others (50%). Presentations were Terson's syndrome (14.3%), third nerve palsy (14.3%), sixth nerve palsy (21.4%), Visual field defects (14.3%) and Headache (7.1%). Diplopia improved in 21.4%. Among CCF (14): Multiple cranial nerve palsies (21.4%), third nerve palsy (28.6%), and sixth nerve palsy (14.3%). Diplopia improved in 28.6%. All underwent successful interventions with symptomatic relief.

Conclusions: Included a curated video series of three representative cases illustrates these outcomes. By combining advanced endovascular techniques with neuro-ophthalmic expertise, multidisciplinary care enables timely intervention, visual preservation, and improved outcomes-effectively bridging vision and vessels.

Abstract No.: 207196

Panel No.: NEU-0631

Comparing the Effectiveness and Safety of Lumboperitoneal (LP) Shunts, Ventriculoperitoneal (VP) Shunts, and Optic Nerve Sheath Fenestration (ONSF) As Therapy of Idiopathic Intracranial Hypertension: A Systematic Review

First Author: Hindun ZAKIYAH

Co-Author(s): Salmarezka DEWIPUTRI

Purpose: Idiopathic intracranial hypertension (IIH) is defined as elevated cerebrospinal fluid (CSF) pressure without an identifiable cause, with a recurrence rate of 15–38%. It may lead to persistent headache and vision loss. While medications and lumbar puncture are first-line treatments, recurrent cases often require surgery. This review compares the outcomes of available surgical techniques for IIH.

Methods: This review was conducted in accordance with the 2020 PRISMA guidelines. Literature searches were performed in PubMed, Cochrane, and ClinicalKey using the keywords "LP shunt," "VP shunt," "ONSF," "IIH," "Pseudotumor Cerebri," and "Benign intracranial hypertension," including their synonyms. Eligible studies were critically appraised using the ROBINS-I tool for risk of bias assessment.

Results: This systematic review included 27 studies with 1,169 patients, predominantly female (84.75%). Most were retrospective cohorts, with follow-up ranging from 1 to 108 months. VP and LP shunts generally reduced postoperative headaches, though comparative results were inconsistent. All procedures improved visual outcomes, with ONSF showing more consistent visual acuity preservation. Shunting procedures achieved higher rates of papilledema resolution, but both LP and VP shunts carried risks of shunt failure and revision, with VP shunts showing slightly lower revision rates. ONSF had variable outcomes and

occasionally required repeat fenestration or additional CSF diversion.

Conclusions: ONSF, VP shunt, and LP shunt are all effective surgical options for IIH. VP shunts appear more durable than LP shunts, while ONSF provides superior visual outcomes but with variable long-term stability. Collaboration between neurosurgeon and neuroophthalmologist is important to make the best decision

Abstract No.: 202934

Panel No.: NEU-0592

Contralateral Optic Neuropathy Post-Unilateral Trauma: A Case of Sympathetic Optic Neuropathy

First Author: Yue FU

Co-Author(s): Yang HUI

Purpose: To describe a rare case of contralateral optic neuropathy presenting as painless vision loss and field defects six months after unilateral eye trauma, suggesting sympathetic optic neuropathy.

Methods: A 41-year-old male reported progressive right eye (OD) vision loss and field defects six months post-left eye (OS) trauma. OS, with no light perception, underwent reconstruction with foldable capsular vitreous body and silicone oil. OD was initially treated as idiopathic optic neuritis with corticosteroids, later suspected as sympathetic ophthalmitis. Assessments included visual acuity (BCVA), visual fields (VF), fundus photography, fluorescein angiography, optical coherence tomography (OCT), electroretinogram, visual evoked potentials (PVEP), and MRI. Laboratory tests excluded autoimmune and infectious causes.

Results: OD BCVA dropped from 1.0 to 0.01, with VF mean deviation worsening to -26.02 dB over nine months. Fundus showed OD disc atrophy; OCT revealed ganglion cell layer thinning; PVEP amplitudes initially decreased but improved post-therapy; MRI indicated bilateral optic tract demyelination (OD > OS). Treatment with methylprednisolone, cyclophosphamide, immunoglobulin, and neurotrophic agents stabilized OD function.

Conclusions: This case suggests sympathetic optic neuropathy as a delayed contralateral response to trauma. MRI-confined visual pathway demyelination and treatment response support the diagnosis. Early recognition and multimodal therapy may mitigate vision loss, emphasizing vigilance post-trauma.

Abstract No.: 201769**Panel No.: NEU-0579****Demyelinating Disease Presenting As Chronic Exotropia***First Author: Ghadeer ALARAYEDH**Co-Author(s): Reem NASER*

Purpose: To shine the light on uncommon causes of amblyopia and eye deviation, and less common presentations of demyelinating diseases in pediatric age.

Methods: The case presents a 9 year old boy not k/c/o any medical illness who was brought by his father complaining of left eye deviation since few years seeking squint correction. History, orthoptic work up, refraction and detailed eye examination did not align with the profound vision loss in the left eye. Multidisciplinary team was involved in the work up which included imagine, blood antibodies and CSF analysis to determine the diagnosis and start treatment.

Results: Investigations revealed underling demyelinating disease. He was started on Interferon beta-1a. Diganosis, prognosis, treatment and side effect were discussed with parents.

Conclusions: Periodic eye screening is essential in the pediatric age group. Knowledge of causes and limits of refractive error than can lead to amblyopia can alert to the presence of other causes. Demyelination disease in the pediatric age group is uncommon but causes sensory disability. early intervention of multidisciplinary team is crucial.

Abstract No.: 202208**Panel No.: NEU-0585****Differences of Retinal Microvascular Parameters in Patients With Acute Ischemic Stroke and Healthy Controls: An Age-Sex Matched Cross-Sectional Analysis***First Author: Varis RUAMVIBOONSUK**Co-Author(s): Ruttanabhorn CHONRAMAK, Parima HIRUNWIWATKUL, Supharat JARIYAKOSOL, Naruchorn KIIPAISALRATANA, Wasee TULVATANA*

Purpose: To investigate retinal microvascular changes in acute ischemic stroke patients using optical coherence tomography angiography (OCTA) compared with those without a history of stroke.

Methods: An age-sex-matched cross-sectional analytical study was conducted. Retinal microvascular features were collected and compared between acute ischemic stroke and those without a history of stroke. Features, such as superficial capillary plexus vessel density (SVD), deep capillary plexus vessel density (DVD), and the foveal avascular zone (FAZ) area, were obtained using Optovue RTVue. Only one eye was used in the analysis for each participant. A linear mixed

model was used to adjust the associated factors with the main outcomes.

Results: From 154 eyes of 77 cases and 77 controls, SVD and DVD were significantly lower in stroke patients compared with controls ($p=0.003$ and <0.001 , respectively). However, the FAZ area was not significantly different between the two groups. After adjusting for associated factors, including underlying diseases, fasting blood glucose, HbA1C, lipid profiles, and complete blood analysis, SVD and DVD were still significantly lower in stroke patients compared with controls ($p<0.001$ and <0.001 , respectively).

Conclusions: Retinal microvascular changes, detected on OCTA, were observed in patients with acute ischemic stroke even after adjusting with associated factors. Therefore, SVD and DVD might serve as biomarkers for acute ischemic stroke and emphasize the potential role of OCTA in these patients.

Abstract No.: 206152**Panel No.: NEU-0622****Disappearing Diplopia-Recurrent Sixth Nerve Palsy With Mysterious Recovery***First Author: Neethu PRADEEP*

Purpose: A 57-year-old female, with history of hypertension, presented with left sided headache and double vision for previous 1 week, which was more on looking to left. She had 5 similar episodes in the past. On examination, there was abduction restriction in left eye and horizontal diplopia suggestive of left lateral rectus palsy. No other focal signs were present.

Methods: Routine blood investigations, Vasculitis workup, Neurology opinion was done. MRI brain with MRA was performed and it showed a hypertrophied Left Anterior Inferior Cerebellar Artery(AICA) abutting Left 6th nerve near the root. Hence a diagnosis of RPON(Recurrent painful ophthalmoplegic neuropathy) previously known as ophthalmoplegic migraine, with probable neurovascular conflict as etiology was made.

Results: Patient was given a short tapering dose of oral prednisolone and analgesics. 2 weeks later head ache and diplopia had subsided with minimal residual abduction restriction.

Conclusions: Intermittent but spontaneously resolving diplopia as a presenting symptom should never be ignored. A neurovascular conflict causing inflammatory demyelination or compression of a single cranial nerve and resultant relapsing remitting painful ophthalmoplegic neuropathy is a rare condition and a final conclusion regarding etiology remains elusive.

Abstract No.: 201113

Panel No.: NEU-0572

Diverse Manifestations of Neurosyphilis – Our Experience of the Great Masquerader

First Author: Joyce MBEKEANI

Co-Author(s): Jessinta OSENI, Se Eun PARK, Moshe SZLECHTER, Joyce TANG, Lily YOUNG

Purpose: Syphilis cases have increased globally. We describe CSF-confirmed neurosyphilis cases.

Methods: Clinical presentations and investigations of patients with neurosyphilis were documented.

Results: Case 1: A 65-year-old African-American male presented with a left red, painful eye of 2 months' duration. Examination revealed visions of 20/30(R) and Hand motions(L), mild anterior uveitis (R), and severe hemorrhagic panuveitis with vitreous cells with cystoid macular edema (L). Positive investigations included CRP=14; ESR=108; RPR titers=1:1024. MRI was unremarkable. Lumbar puncture (LP) revealed CSF VDRL=1:4. Skin biopsy histopathology showed focal suppurative, granulomatous changes consistent with secondary syphilis. Topical and CDC-recommended systemic therapy were administered with good effect. Case 2: A 35-year-old Hispanic female was referred for mild headaches and optic disc edema. She had a one-month history of vaginal pruritus. Examination revealed bilateral normal Snellen (20/20) and color (11/11) vision. Anterior and posterior segments were normal except bilateral disc edema with OCT(RNFL) >421microns (R) and 184microns (L). Visual fields were full. MRI/MRV was unremarkable and LP opening pressure was 16cmH2O. Lacking evidence for IHH, investigations were expanded and revealed RPR titers = 1:256. CSF analysis revealed VDRL=1:1. Neurosyphilis in presumed primary syphilis was diagnosed. CDC-recommended systemic therapy was administered with a gradual reduction of disc edema. Visual functions remained intact.

Conclusions: Neurosyphilis may manifest in all stages of syphilis, have diverse manifestations, and be symptomatic or asymptomatic. Serologic and confirmatory CSF analysis are key to diagnosis, with implications for management to prevent neurologic and systemic sequelae.

Abstract No.: 206689

Panel No.: NEU-0628

Early OCT Biomarkers Predicting Visual Prognosis in Acute Syphilitic Posterior Placoid Chorioretinopathy

First Author: Angelina Patricia CHANDRA

Co-Author(s): Alia ARIANTI

Purpose: This systematic review aims to investigate optical coherence tomography (OCT) biomarkers during initial presentation as a predictor of visual acuity (VA)

in patients diagnosed with acute syphilitic posterior placoid chorioretinopathy (ASPPC).

Methods: Five databases were searched following PRISMA guidelines for studies published up to April 2025. Quality of studies were assessed using The Clinical Advances Through Research and Information Translation (CLARITY) tools for cohort and National Institutes of Health (NIH) tools for case series. Correlation analysis was conducted using Spearman's rank correlation to investigate correlation between final VA and the presence of three OCT biomarkers at initial presentation; ellipsoid zone (EZ) disruption, hyperreflective foci, and optic nerve involvement.

Results: The search yielded 499 studies, in which 4 retrospective cohorts and 5 case series were selected (n=192). Final VA showed a moderate inverse correlation with EZ disruption (Spearman's $\rho=-0.64, p=0.064$), suggesting a trend toward worse visual outcomes when EZ disruption was not present at initial presentation. No statistically significant associations were found for hyperreflective foci ($\rho=-0.18, p=0.638$) or optic nerve involvement ($\rho=+0.41, p=0.272$). Reported risk factors that may correlate with final VA include positive HIV test, smoking history, and intravenous (IV) drug use. All included patients received a regimen of IV penicillin with or without corticosteroid, with time to treatment ranging from 14 days to 12 months after initial complaint.

Conclusions: EZ disruption on OCT at initial presentation may be a meaningful predictor of visual prognosis in ASPPC, although further investigation in larger cohorts is needed to strengthen result significance and reduce confounding variables.

Abstract No.: 201608

Panel No.: NEU-0577

Elderly-Onset Bilateral Optic Neuritis: Therapeutic Challenges in Patients with Comorbid Conditions

First Author: Muhammad Khoirul HUDA

Co-Author(s): Amani Sakinah AUGIANI, Sita Paramita AYUNINGTYAS, Agnesstacia Vania LUMINTANG

Purpose: Optic neuritis in elderly with the presence of systemic comorbidities presents considerable diagnostic and therapeutic challenges. This report describes a case of bilateral optic neuritis following a presumed viral infection, complicated by multiple comorbidities, that achieved successful visual recovery.

Methods: A case report.

Results: A 63-year-old male presented with sudden vision loss in the left eye for 5 days and progressive blurring in the right eye for 1 day, following an upper respiratory infection. Past history included hypertension treated with amlodipine and peripheral neuropathy. On examination, visual acuity was no light perception in the left eye and 6/19 in the right, with a

positive relative afferent pupillary defect. Funduscopy showed bilateral hyperemic discs with indistinct margins, and Ishihara testing was 8/16 in the right eye. MRI revealed bilateral optic nerve hyperintensity with contrast enhancement, confirming optic neuritis. He received intravenous methylprednisolone (1 g/day for 5 days) followed by oral tapering. During hospitalization he was newly diagnosed with dyslipidemia and steroid-induced hyperglycemia. While on oral tapering, he developed chronic obstructive pulmonary disease exacerbation and community-acquired pneumonia requiring high-care unit admission and accelerated steroid tapering. Despite these complications, visual acuity improved to 6/6 in the left eye and 6/7.5 in the right with completely resolved visual field defect.

Conclusions: Bilateral optic neuritis in elderly patients with complex comorbidities can still yield excellent outcomes. Early recognition, timely corticosteroid therapy tailored to systemic risks, and coordinated multidisciplinary management are essential to optimize recovery.

Abstract No.: 200972

Panel No.: NEU-0571

Empty Sella Syndrome Secondary to Intracranial Hypertension From a Cortisol-Producing Adrenal Adenoma: A Case Report

First Author: Rishanne Meire ORTIZ

Co-Author(s): Jennifer Joy RAYOS

Purpose: There are only two reported cases of intracranial hypertension secondary to empty sella syndrome from a cortisol-producing adrenal adenoma. The purpose of this report is to add to the limited literature of secondary empty sella syndrome (adrenal adenoma) causing intracranial hypertension.

Methods: A 65-year-old man presented with persistent headache and vomiting accompanied with episodes of blurring of vision predominantly in the morning. A significant past medical history is the presence of adrenal adenoma. Bilateral papilledema was noted on physical examination.

Results: Cranial magnetic resonance imaging revealed an incident finding of empty sella with no other abnormalities. Laboratory work up were unremarkable except for elevated serum cortisol levels. The patient was managed with acetazolamide and intravenous high-dose corticosteroids to reduce intracranial pressure for visual improvement. Initiation of treatment leads to resolution of subjective complaints and visual improvement.

Conclusions: Cortisol-secreting adrenal adenoma causes degrees of elevated intracranial pressure and subsequent empty sella. Awareness of this disease entity is essential for timely diagnosis to give the appropriate management.

Abstract No.: 202063

Panel No.: NEU-0580

Evaluation of Quality of Life in Patients With Graves' Orbitopathy Before and After Therapy Using the Indonesian Version of the Graves' Orbitopathy Quality of Life Questionnaire: A Prospective Cohort Study

First Author: Salmarezka DEWIPUTRI

Co-Author(s): Sita Paramita AYUNINGTYAS, Ajeng Sekar KIRANA, Syntia NUSANTI, Muhammad SIDIK

Purpose: This study aims to assess changes in the quality of life of patients with Graves' Orbitopathy before and after therapy using the Indonesian version of the Graves' Orbitopathy-Specific Quality of Life Questionnaire (GO-QOL), as well as changes in clinical parameters.

Methods: A prospective cohort study was conducted at the ophthalmology clinic of a tertiary hospital in Indonesia from July 2023 to July 2025. Sixty newly diagnosed patients with Graves' Orbitopathy were recruited using consecutive sampling. Patients completed the Indonesian version of GO-QOL at their initial visit, with follow-up evaluation approximately one month after therapy. The questionnaire consists of two subscales: visual functioning (QOL-VF) and physical appearance (QOL-AP).

Results: The mean age of patients enrolled in the study was 40.91 ± 12.16 years, with 49 females (81.7%). Quality of life assessment using the GO-QOL questionnaire showed a significant improvement in QOL-AP ($p = 0.001$), while QOL-VF demonstrated a non-significant trend toward improvement ($p = 0.053$). The proportion of active GO decreased significantly after therapy ($p < 0.000$). Mean proptosis, measured by Hertel exophthalmometry, showed a statistically significant reduction ($p = 0.029$). Inflammatory signs demonstrated improvement, with reductions in conjunctival redness ($p = 0.016$) and inflammation of the caruncle or plica ($p = 0.021$).

Conclusions: Quality of life in patients with GO improved following therapy, particularly in physical appearance. This was accompanied by improvements in clinical parameters, including clinical activity, proptosis, and inflammatory signs.

Abstract No.: 206708

From A Silent Growth to a Diplopia: A Case of Abducens Nerve Palsy Due to Cerebellopontine Angle Tumor

First Author: Nathasya SUSILO

Co-Author(s): Dianita Veulina GINTING, Antonia Kartika INDRIATI, Rusti Hanindya SARI, Prettylya YOLLAMANDA

Purpose: To report a rare case of a cerebellopontine angle (CPA) tumor with abducens nerve (CN VI) involvement.

Methods: This is a case study reporting a 54-year-old male who came with double vision for the past five months.

Results: The diplopia was reported to improve when one eye was closed. Headache, tinnitus, and postural imbalance were also experienced. On examination, 15° right esotropia with an abnormal compensatory head turn to the right was demonstrated by the Hirschberg test. Limitation of right eye abduction was identified (−3), while movements of the fellow eye were found to be normal. Brun's nystagmus was observed. Additional cranial nerve evaluation revealed deficits of the right peripheral CN VII and CN VIII. Multiple cranial nerve palsies (CN VI, VII, VIII) on the right side were diagnosed, suspected to be secondary to a space-occupying lesion. Orbital and Head computed tomography (CT) with contrast revealed a cystic mass measuring approximately 2.61 × 2.21 × 3.03 cm in the right CPA.

Conclusions: Involvement of the abducens nerve is considered an uncommon but clinically important neuro-ophthalmologic manifestation of CPA tumors. It is emphasized that recognition of associated features, including Brun's nystagmus and multiple cranial nerve palsies, can facilitate early diagnosis. A favorable prognosis is more likely when timely detection and appropriate management are undertaken.

Abstract No.: 205804

Panel No.: NEU-0617

From No Light Perception to Full Vision: Dramatic Recovery of Pediatric Optic Neuritis

First Author: Rahayu OKTALIANI

Co-Author(s): Dianita Veulina GINTING, Antonia Kartika INDRIATI, Rusti Hanindya SARI, Prettylla YOLLAMANDA

Purpose: Pediatric optic neuritis is a rare inflammatory optic neuropathy, often difficult to diagnose due to limited clinical cooperation and nonspecific presentations in children. Evidence-based treatment guidelines remain limited. We report an unusual case of pediatric optic neuritis presenting with profound vision loss that achieved complete recovery following prompt corticosteroid therapy.

Methods: Case report based on detailed review of electronic health records and essential ophthalmic and neuroimaging investigations.

Results: A 12-year-old girl presented with sudden blurred vision in the right eye, rapidly progressing to no light perception over four days, preceded by febrile illness. Ocular examination revealed a positive relative afferent pupillary defect, optic disc edema with hyperemia, and peripapillary hemorrhage. Magnetic Resonance Imaging demonstrated contrast enhancement of the right optic nerve, confirming acute optic neuritis. High-dose intravenous methylprednisolone was initiated, resulting in

progressive visual improvement and complete restoration of visual acuity within one month.

Conclusions: This case highlights that even severe pediatric optic neuritis with initial no light perception can achieve full visual recovery with timely and aggressive treatment. Early recognition and prompt corticosteroid therapy are crucial, and profound vision loss at onset should not preclude intensive intervention.

Abstract No.: 203751

Panel No.: NEU-0597

Genetically Coordinated Neuroanatomical Networks Underlying Anisometropia: Evidence From Mediation Mendelian Randomization and Colocalization

First Author: Wanyi SHU

Co-Author(s): Liang HU, Meng LIN

Purpose: To test whether brain morphology and connectivity causally contribute to anisometropia and to map the neuroanatomical networks and shared variants underlying this link.

Methods: We harmonized genome-wide association study (GWAS) summary statistics from UK Biobank neuroimaging and FinnGen R12 (H7_ANISOMETROPIA; 1,141 cases, 476,776 controls), plus complementary imaging resources. Two-sample Mendelian randomization (MR) (inverse-variance weighted (IVW) primary with MR-Egger, weighted median, MR-PRESSO, Cochran's Q, leave-one-out) tested effects from 3,935 magnetic resonance imaging (MRI) phenotypes and 2,212 sex-stratified brain traits. Mediation MR evaluated 26,333 white-matter (WM) connectivity metrics and 256 latent MRI-derived dimensions. Bayesian colocalization reported posterior probability for a shared causal variant (PP.H4).

Results: Initial MR signals appeared across cerebellar, hippocampal, thalamic, and cortical measures but none survived false-discovery-rate (FDR) correction. Network-aware mediation MR yielded five significant models ($P < 0.05$) where intermediates explained 54–69% of the total effect: (i, ii) right/left hippocampal-tail volumes acting via right-hemisphere somatomotor-amygdala WM connectivity (61–69% mediated); (iii–v) sex-stratified cerebellar cortex volumes acting via a T1-derived latent MRI dimension (54–60%). Colocalization supported shared variants for cerebellar volumes with latent MRI dimensions (PP.H4 0.91–1.00) and for right thalamic mediodorsal nucleus, magnocellular part (MDm) volume with inter-hemispheric control-network connectivity (PP.H4 = 0.84); hippocampal subfields with somatomotor-amygdala connectivity showed moderate evidence (PP.H4 = 0.51–0.53). Enrichment implicated axon guidance, myelination, and synaptic plasticity.

Conclusions: Anisometropia is embedded in genetically coordinated cerebellar-hippocampal-thalamocortical

circuits. Although single-trait MR effects are modest, convergent mediation and colocalization implicate specific WM pathways and latent structural dimensions as mechanistic bridges, nominating imaging-genetic biomarkers for early risk assessment and neuroplasticity-based adjuncts to optical correction.

Abstract No.: 203882

Panel No.: NEU-0599

Hiding in Tandem: A Case Report on Atypical Optic Neuritis Secondary to Syphilis and HIV Co-infection

First Author: Allbvi Enric BASA

Co-Author(s): Miriam Louella FERMIN

Purpose: To present a case of infectious optic neuritis To discuss diagnosis, treatment, and prognosis of cases of syphilis and HIV related optic neuritis

Methods: This is a case report

Results: This is a case of 42-year-old Filipino male with progressive bilateral blurring of peripheral vision eventually involving his central vision as well, accompanied by color vision disturbances and headaches. Ocular exam revealed a visual acuity of 20/125 on the right and 20/60 on the left. Pupils were 3-4 mm sluggishly reactive to light with a grade 2 RAPD noted on the right. Ishihara testing showed 1/8 on the right and 3/8 on the left. Fundoscopy revealed indistinct disc margins bilaterally. Ancillary work up which included nontreponemal, treponemal, HIV antibody testing were all positive, with a CD4 count of 205. Patient was started on oral methylprednisolone 16mg/tab 3x daily with weekly tapering, as well as Aqueous Crystalline Penicillin G 4 million units IV every 4 hours for 14 days. He showed improvement of vision with a BCVA of 20/25 on the right eye and 20/20 on the left eye, as well as complete resolution of dyschromatopsia upon completion of antibiotic treatment for syphilis.

Conclusions: In cases of atypical optic neuritis, infectious causes should be suspected given the rise of HIV cases in the country. Ocular syphilis may be the first presentation of patients living with undiagnosed HIV infection. Early screening and treatment in these patients is not only sight saving, but may eventually be life saving.

Abstract No.: 205215

Panel No.: NEU-0609

Human Induced Pluripotent Stem Cell-Derived Extracellular Vesicles Promote Neuroprotection Effects in Rat Optic Nerve Crush Model

First Author: Yuezhu LU

Co-Author(s): Hua YAN, Yong ZHONG

Purpose: Optic neuropathies cause irreversible vision loss due to retinal ganglion cell (RGC) degeneration and axonal injury, with no effective treatments available. Human-induced pluripotent stem cell-derived extracellular vesicles (iPSC-EVs) have emerged as a promising cell-free therapeutic candidate. This study aimed to evaluate the neuroprotective and regenerative effects of iPSC-EVs in a rat optic nerve crush (ONC) model and investigate underlying mechanisms.

Methods: iPSC-EVs were isolated, characterized, and administered via intravitreal injection immediately after ONC. RGC survival and apoptosis were assessed by RBPMS immunostaining and TUNEL assay. Retinal morphology was examined with optical coherence tomography. Optic nerve regeneration and function were evaluated using cholera toxin subunit B anterograde labeling and flash visual evoked potentials (F-VEP). Transcriptomic alterations were analyzed by RNA sequencing, and PI3K/AKT pathway activation was confirmed by Western blot.

Results: Intravitreal iPSC-EVs significantly promoted RGC survival and reduced apoptosis compared to PBS-treated controls. OCT demonstrated preserved retinal nerve fiber layer and ganglion cell complex thickness, along with reduced optic nerve atrophy. Treated rats showed enhanced axonal regeneration and partial functional recovery in F-VEP recordings. RNA sequencing and protein analyses indicated that iPSC-EVs exert their neuroprotective effects through activation of the PI3K/AKT signaling pathway.

Conclusions: iPSC-EVs promote neuroprotection and regeneration in the ONC model by preserving RGCs, mitigating optic nerve damage, and enhancing functional recovery, likely via PI3K/AKT activation. These findings highlight iPSC-EVs as a promising therapeutic strategy for optic neuropathies.

Abstract No.: 202542

Panel No.: NEU-0586

Identification of RPE-Specific AAV Variants via Intravitreal Injection

First Author: Xiaolai ZHOU

Purpose: To identify an AAV variant that transduces retinal pigment epithelium (RPE) cells with high specificity and efficiency via intravitreal injection.

Methods: We conducted multiple rounds of in vivo screening in mice by intravitreal injection using a

randomized 9-mer library (with a diversity of $1.34E6$) inserted between positions 587–588 of the AAV2 capsid.

Results: We identified a novel AAV variant (AAV206) that transduces RPE cells with high specificity and efficiency, but with low retinal toxicity and immunogenicity when delivered via intravitreal injection. Moreover, we demonstrated that AAV206-based gene therapy achieves superior treatment outcomes compared to conventional AAV2 in a laser-induced wet AMD animal model.

Conclusions: Our findings suggest that the AAV206 vector represents a valuable tool for studying RPE biology and holds promise as an intravitreal delivery vector for treating RPE-related retinal degenerative diseases.

Abstract No.: 205337

Panel No.: NEU-0610

Impact of Citicoline Treatment on Enhancing Visual Function in Stroke Patients

First Author: Silvia FRANSISCA

Co-Author(s): Bobby Ramses Erguna SITEPU, Delfi

Purpose: Visual disturbances are a common and often debilitating complication following stroke, significantly impairing patients' functional independence and quality of life. Among various neuroprotective agents, Citicoline (cytidine-5'-diphosphocholine) has demonstrated multifaceted mechanisms of action, including modulation of phospholipid metabolism, reduction of oxidative stress, and enhancement of dopaminergic and cholinergic neurotransmission. These properties suggest potential benefits in promoting visual recovery post-stroke.

Methods: This quasi-experimental study employed a pre- and post-intervention design involving 30 post-stroke patients who received 1000 mg of oral Citicoline daily for 30 consecutive days. Visual function was evaluated through standard ophthalmological assessments, including visual acuity (logMAR), visual field analysis using the Humphrey Field Analyzer, contrast sensitivity (Pelli-Robson chart), and color sensitivity test (Farnsworth Munsell D-15 test), both before and after treatment.

Results: Post-treatment analysis revealed no statistically significant improvement in visual acuity or visual field parameters ($p > 0.05$). However, contrast sensitivity showed a statistically significant enhancement following Citicoline administration ($p < 0.05$). No significant changes were observed in color vision outcomes ($p > 0.05$).

Conclusions: Oral Citicoline supplementation over a 30-day period appears to exert a beneficial effect specifically on contrast sensitivity in stroke patients with visual dysfunction, while its impact on visual acuity, visual fields, and color perception remains

inconclusive. Further research involving combinations with other neuroprotective agents, larger sample sizes, or longer intervention durations is needed to confirm these findings and to explore the potential benefits of Citicoline more comprehensively.

Abstract No.: 205935

Panel No.: NEU-0620

Importance of Pattern ERG As Adjunct to Visual Evoked Potential in Ethambutol Induced Optic Neuropathy

First Author: Deepika R

Co-Author(s): Maheshkumar, Rupa Anjana Moorthy

Purpose: Pattern VEP is a standard test in analyzing functional changes due to ethambutol-induced optic neuropathy (EON). Pattern ERG complements VEP by providing insights into retinal ganglion cell function. Our study evaluates the effectiveness of combining PERG with PVEP in Ethambutol induced Optic Neuropathy, thereby enhancing diagnostic accuracy.

Methods: A prospective study of 50 patients was done. Data analyzed include visual acuity, fields, color vision, fundus evaluation, neuroimaging and VEP (P100 amplitude and peak time) with PERG (N95/P50 ratio amplitude).

Results: The Mean duration of presentation was 6.23 months. On fundus examination, 72% of our patients had a normal disc, followed by Temporal pallor in 25%. In those patients with no obvious fundus abnormality, there was significant reduction in amplitude of N95/P50 ratio in 70% of eyes (PERG), reduction in amplitude of P100 in 50% of eyes and delayed peak time of P100 (VEP) in 22%.

Conclusions: Even in cases without obvious disc changes, PERG complements VEP by detection of RGC dysfunction making it highly sensitive.

Abstract No.: 207667

Panel No.: NEU-0636

Influenza Virus Type A-Induced Multiple Evanescent White Dot Syndrome

First Author: Yalin REN

Co-Author(s): Haiyan LIN

Purpose: This is the first case reported influenza virus type A causes multiple evanescent white dot syndrome all around the world.

Methods: Clinical observation. A scanning laser ophthalmoscope (SLO) color photo of the right eye presented multifocal grey-white dots in the retina. SLO red-free photo showed multifocal white dots and plaques in the retina. OCT scanned through a grey-white dot indicating a hyper-reflective lesion in the outer nuclear layer.

Results: Influenza virus can lead to some ocular diseases, including conjunctivitis, acute macular

neuroretinopathy (AMN), acute posterior multifocal placoid pigment epitheliopathy (APMPPE), serous macular detachment (SME), optic neuritis, acute anterior uveitis, and retinitis (submacular hemorrhage without neovascularization, macular edema with exudates, perifoveal edema with star-like pattern). This is the first case reported influenza virus type A causes multiple evanescent white dot syndrome.

Conclusions: The Influenza virus can cause MEWDS, which may decrease visual acuity but does not need to be treated.

Abstract No.: 200473

Panel No.: NEU-0568

Key Predictors of Final Visual Outcome in Patients With Traumatic Optic Neuropathy

First Author: Sabarinath A

Co-Author(s): Deepika R

Purpose: To analyze the key factors influencing the final visual outcome in a patient with Traumatic optic Neuropathy.

Methods: A Retrospective study of 51 patients with TON presented to our tertiary eye care centre between July 2022 and December 2022 was conducted. Data analyzed include demographics, mode of trauma, BCVA at the time of presentation, pupillary reflex, complete ocular examination, associated orbital and cranial bone fractures, associated intracranial injuries based on CT images, and treatment initiated based on time of presentation. BCVA was analyzed at follow-up visits and taken as the primary visual outcome.

Results: Out of 51 patients, 49 were males (96.1%) and 2 patients were females (3.9%). The most common modes of injury were RTA (82.4%), fall (13.9 %), and assault(3.9%). Of the 51 patients, 33 patients (64.7%) had orbital and cranial bone fractures, with the lateral wall of the orbit fracture being the most common. 13 patients had Intracranial injury (26.3 %) of which SDH being most common (9%). The median pre-treatment BCVA (Logmar 1.78) and post-treatment BCVA (Logmar 1.3) were compared, and the difference was found to be statistically significant($P<0.0001$).

Conclusions: There is a significant improvement in BCVA from baseline in patients treated with high-dose corticosteroids. Those who presented late with loss of consciousness or cranial fractures had a poorer outcome.

Abstract No.: 204814

Panel No.: NEU-0607

Linezolid-Associated Optic Neuropathy in Drug-Resistant Tuberculosis Patients in Indonesia

First Author: Andrea SILITONGA

Purpose: To describe reversible effect of optic neuropathy due to Linezolid-induced.

Methods: A case series of two patients. The first patient is 32 year old Indonesian female complained of rapid, painless diminution of vision in both eyes for 1 month. She was under medication for MDR TB for 17 months with linezolid 600mg, levofloxacin 250mg, cycloserine 250mg, bedaquiline 100mg, and clofazimine 100mg. Visual acuity of both eyes was counting finger close to face. The second patient is 49 years old Indonesian male, with visual acuity in both eyes of counting finger at 2 meters. He had consumed MDR-TB drugs including linezolid for 14 months. Both patients had hyperaemic optic disc with blurred edges. Optical Coherence Tomography (OCT) showed thickening of the retinal nerve fiber layer (RNFL) in both eyes. Visual field examination showed a local scotoma in both eyes.

Results: After stopping Linezolid treatment and follow up monthly for 3 months, there was remarkable visual acuity and visual field improvement. The female patient had best corrected visual acuity of 20/20 in month 3. The male patient's visual acuity improved to 20/200 in both eyes and full recovery of optic disc OCT and visual field. Optic neuropathy was encountered in 13.2% of patients receiving long-term linezolid (duration 5-14 months with dose 600mg). Linezolid is thought to affect the visual nerve by interfering with oxidative phosphorylation in the mitochondria. It is reversible and the majority of cases resolved within 1–3 months after drug discontinuation.

Conclusions: Physicians need to recognize linezolid neurotoxicity to avoid permanent visual loss.

Abstract No.: 201472

Panel No.: NEU-0575

Linezolid-Induced Toxic Optic Neuropathy in Two Patients With Drug-Resistant Tuberculosis

First Author: Alec Xavier BUKUHAN

Co-Author(s): Franz Marie CRUZ, Bryan Vincent MESINA

Purpose: To describe the clinical presentation and disease course of two Filipino patients with toxic optic neuropathy from linezolid given for drug-resistant tuberculosis.

Methods: This is a small case series.

Results: Case 1 is a Filipino female in her 30s with rifampicin-resistant pulmonary tuberculosis on

bedaquiline, pretomanid, linezolid and moxifloxacin (BPALM) regimen who developed bilateral painless blurring of vision with optic disc swelling. A comprehensive laboratory and neuroimaging work-up was unremarkable and a diagnosis of linezolid toxic optic neuropathy was made. Linezolid was immediately discontinued leading to improvement of visual acuity within one month. The second case is a 14-year-old Filipino female who presented bilateral decreased visual acuities, dyschromatopsia and mild disc swelling seven months after initiating TB medications containing linezolid. Toxic optic neuropathy was suspected, and linezolid was promptly discontinued. On follow-up one year later, visual acuity and color vision had normalized, but optic disc temporal pallor was noted. Ocular diagnostics showed bilateral thinning of the retinal nerve fiber layer and persistent mild central scotoma in both eyes.

Conclusions: Linezolid is a second-line agent used in the treatment drug-resistant tuberculosis, but it can rarely cause toxic optic neuropathy. A high index of suspicion and prompt discontinuation of the drug may lead to reversal of vision loss.

Abstract No.: 202927

Panel No.: NEU-0590

Long-Term Assessment of Optic Nerve Function in Thyroid Eye Disease Treated With Intensity-Modulated Radiotherapy: A Retrospective Case-Control Study With Multidimensional Evaluation

First Author: Yue FU

Co-Author(s): Yang HUI

Purpose: To evaluate the long-term effects of intensity-modulated radiotherapy (IMRT) on optic nerve function in patients with moderate-to-severe thyroid eye disease (TED), using a multidimensional assessment.

Methods: In this retrospective case-control study, 24 patients with TED (NOSPECS stage IV) were divided into an IMRT group (n=12; 20 Gy/10 fractions, optic nerve Dmax <15 Gy) and a control group (n=12; glucocorticoid therapy followed by orbital decompression). Patients were followed for a median of 9 years (range 2-14 years). Optic nerve function was assessed via best-corrected visual acuity (logMAR BCVA), visual field mean deviation (VF_MD), optical coherence tomography for retinal nerve fiber layer (RNFL) and ganglion cell layer (GCL) thickness, pattern visual evoked potentials (PVEP) amplitude and latency, and intraocular pressure (IOP). Multiple linear regression adjusted for confounders including age.

Results: No significant differences were found between groups in BCVA (P=0.478), VF_MD (P=0.378), mean RNFL (P=0.568), GCL thickness (P=0.979), or most PVEP parameters (P≥0.07). Inferior RNFL was thinner in the IMRT group (119.00±24.46 μm vs. 135.58±16.18 μm, P=0.063), and large-checkerboard latency showed a

prolongation trend (116.23±9.58 ms vs. 109.33±8.11 ms, P=0.07). IOP was significantly higher in the IMRT group (median 19.00 mmHg vs. 14.50 mmHg, P<0.001).

Conclusions: IMRT provides long-term safety for optic nerve function in TED without evidence of radiation-induced optic neuropathy. However, elevated IOP suggests the need for ongoing monitoring. These findings affirm IMRT as a safe, non-invasive treatment option for TED. (248 words)

Abstract No.: 206039

Panel No.: NEU-0621

Mixed-Mechanism Optic Neuropathy With Wernicke Encephalopathy Following Ileal Resection: A Rare Clinical Intersection

First Author: Robbie Alyssa MALIWAT

Co-Author(s): Marianne CARABEO

Purpose: To report a case of mixed-mechanism optic neuropathy following segmental jejuno-ileal and terminal ileum resection.

Methods: A 14-year-old female developed acute, bilateral, painless visual blurring, diplopia, and agitation after repeated small bowel resections with anastomosis for obstruction due to complicated appendectomy. She required prolonged parenteral feeding, multiple blood transfusions for anemia, and had recurrent severe vomiting. Initial visual acuity was 20/200 in the right eye and hand movement with poor light projection in the left, progressing to bilateral blindness within days. Clinical findings included horizontal gaze restriction, diplopia, sluggish pupils, and nystagmus, with otherwise normal anterior segments. Visual evoked response showed bilateral conduction delay. Fluorescein angiography revealed resolving Valsalva retinopathy but was otherwise unremarkable. Optical coherence tomography revealed global thinning of the ganglion cell layer and inner plexiform layer in both eyes. Neuroimaging was consistent with Wernicke encephalopathy. The patient was treated with intravenous Vitamin B complex followed by oral supplementation.

Results: Nine days after infusion, visual acuity recovered to 20/20 bilaterally, with marked reduction in diplopia and improved visual evoked potentials.

Conclusions: Acute bilateral visual loss in patients with poor nutrition, anemia requiring transfusions, and extensive bowel resection should raise suspicion for nutritional or hypoxic optic neuropathies. Early recognition and treatment are crucial for vision preservation and recovery.

Abstract No.: 207519

Panel No.: NEU-0635

Neuroprotective Effects of Lycium barbarum Glycopeptide in a Mouse Model of Neuromyelitis Optica Spectrum Disorders Associated Optic Neuritis

First Author: Shaoying **TAN**Co-Author(s): Henry Ho-lung **CHAN**, Xiayin **YANG**, Shiqi **YAO**

Purpose: To explore the neuroprotective effects of Lycium barbarum glycopeptide (LBGP) in a mouse model of Neuromyelitis Optica Spectrum Disorders Associated Optic Neuritis (NMOSD-ON).

Methods: C57BL/6 mice, aged 8 to 12 weeks, received intracranial injections of Anti-aquaporin-4 IgG (AQP4-IgG) coupled with human complement to induce NMOSD-ON. A week before this induction, the mice received Phosphate-buffered saline (PBS) as a control. The control group had intracranial injections of normal IgG with human complement, without additional treatment. In the LBGP group, all mice were administered LBGP (50 mg/kg) daily, commencing one week before AQP4-IgG and human complement induction. This treatment persisted for one-month post-induction. Evaluation metrics included Optical Coherence Tomography (OCT), Visual Evoked Potential (VEP), and Electroretinography (ERG), all measured at baseline and weeks 1, 2, and 4. Furthermore, we collected optic nerves and eyes for histological analysis of aquaporin-4 (AQP4) protein, astrocytes, myelin sheath, and retinal ganglion cells (RGCs) at weeks 1 and 4.

Results: Findings suggest that LBGP enhances the inflammatory microenvironment by decreasing tumor necrosis factor alpha (TNF α), interleukin-1beta (IL-1 β), and IL-6 levels. Moreover, LBGP mitigates microglial activation, protects astrocytes, and promotes recovery of the myelin sheath and RGCs. OCT, ERG, and VEP evaluations revealed both functional and structural improvements after LBGP treatment.

Conclusions: LBGP treatment effectively halted progressive neuronal degeneration post-initiation. It preserved RGC density and sustained visual pathway function in an NMOSD-ON mouse model, yielding results like those observed prior to model induction.

Abstract No.: 201421

Panel No.: NEU-0573

Neuroradiologic Evidence of Cerebrovascular Ischemia in Patients Presenting With Retinal Artery Occlusion

First Author: Joyce **MBEKEANI**Co-Author(s): Behram **KHAN**, Gregory **PARNES**, Jainam **SHAH**, Joyce **TANG**

Purpose: To determine neuroradiologic evidence of pre-existing cerebrovascular ischemia at presentation of retinal artery occlusion (RAO).

Methods: Patients with CRAO, BRAO and HHP (Hollenhorst plaques) were identified using ICD-10CM diagnostic codes. Types of RAO, demographic data, intercurrent medical problems, past CVA history and neuroradiologic findings were tabulated. Descriptive and analytical calculations were performed using SPSS (29.0.2.0), with significance set at $P < 0.05$.

Results: Thirty-nine patients (28 CRAO, 7 BRAO, 4 HHP) were identified. Mean (SD) age was 62.8 (12.6) years old. Males comprised 66.7%. Race distribution was 7.7% white, 51.3% black, and 41% other. 33.3% of the total were identified as Hispanic ethnicity. Intercurrent problems included obesity (46.2%), hypertension (87.2%), diabetes mellitus (59.0%) and hyperlipidemia (53.9%). 28.2% had past cardiovascular events, and 15.4% had past CVA. MRI was performed in 5 patients (12.8%), CT in 9 (23.1%), and both in 18 (46.2%). Overall, 66.7% had evidence of cerebrovascular ischemia at presentation, mostly microvascular (46.2%) and less commonly remote/prior occult infarcts (20.5%). Chi-square analysis showed associations between ischemia on MRI or CT and black race ($P = 0.010$) and obesity ($P = 0.015$). No associations were found between ischemia and age, sex, ethnicity, diabetes, hyperlipidemia, cardiac history, or prior CVA.

Conclusions: Most patients presenting with RAO had neuroradiologic evidence of cerebrovascular ischemia, most commonly microvascular. These results support prompt neuroimaging and comprehensive stroke evaluation for all RAO cases, alongside tailored interventions to address modifiable vascular risk factors. Significant associations with black race and obesity, in this population, highlight the need for targeted prevention strategies.

Abstract No.: 204316

Panel No.: NEU-0602

Nine Syndrome in a 52-Year-Old Filipino Female: A Rare Convergence of Ocular and Neurological Deficits

First Author: Richard **VILLAMOR**Co-Author(s): Janice **BERNARDO**

Purpose: To report a case of a 52-year-old Filipino female presenting with binocular horizontal diplopia in La Union, Philippines. The right eye showed adduction

deficit on the left lateral gaze and abducting nystagmus on the right lateral gaze. Whereas, the left eye showed an abduction deficit on the left lateral gaze. Patient also presented with facial asymmetry and right sided weakness. Pertinent history includes hypertension with no history of trauma and infection.

Methods: Basic systemic workup and imaging was done.

Results: Plain Cranial MRI showed T1W/T2W hyperintense signal in the left pontine area, midbrain, capsulo-ganglionic region, indicating acute to subacute hemorrhagic infarct. Confluent T2/FLAIR hyperintensities are also seen in the periventricular and subcortical white matter of both cerebral hemispheres. Patient was co-managed with Neurology team, given neuroprotectants and occlusion patch was given for symptomatic relief of diplopia.

Conclusions: Nine syndrome is a rare clinical entity characterized by the triad of one-and-a-half syndrome, ipsilateral facial nerve palsy, and contralateral hemiparesis or hemianesthesia, localizing the lesion to the dorsal paramedian pontine tegmentum. This condition remains exceedingly rare, citing just 14 documented cases in the literature review.

Abstract No.: 205418

Panel No.: NEU-0612

Non-Arteritic Anterior Ischemic Optic Neuropathy and Cataract Surgery (Case Series)

First Author: Elena IOILEVA

Co-Author(s): Alexandra SAFONENKO, Arina ZASYPKINA

Purpose: The occurrence of nonarteritic anterior ischemic optic neuropathy (NAION) after cataract extraction varies from 0.01% to 0.1% according to published researches [1-8]. It has not yet been clearly identified, whether cataract surgery increases the risk of NAION. Whether it depends on the technique of the operation, the type of IOL, or anesthesia, it is still subject of discussion. The aim of the work is to study different cases of unilateral NAION during one year after cataract surgery.

Methods: Clinical cases of 5 patients aged 51 to 84 years (4 men, 1 woman) with unilateral NAION after phacoemulsification cataract surgery with intracapsular implantation within timeframes from 3 weeks to 1 year. The second eye of all patients has no history of NAION. An ophthalmological examination was performed, including OCT and OCT angiography (OCTA) using Solix and Cirrus HD-OCT 5000, ultrasound of the eyeball (Aviso, France). All patients had systemic vascular risk factors.

Results: All patients have decrease in visual acuity, defects in the visual field. The IOL is in a capsule bag, centered. The optic disk was swollen with

blurred boundaries. OCT and OCTA peripapillary area examination showed thickening of the retinal nerve fiber layer, decrease of capillary density in all patients, prominence of the optic disk was diagnosed by ultrasound scanning. Three of the five patients had cup-to-disk ratio <0.2 ; two patients had C/D Ratio = 0.26. The patients underwent conservative and physiotherapeutic treatment with enhanced visual functions

Conclusions: According to this dataset of clinical cases, certain anatomical characteristics of optic disc were identified in all patients. Timely performed treatment led to improved visual functions and improved quality of life for patients.

Abstract No.: 206366

Panel No.: NEU-0625

Nonarteritic Anterior Ischemic Optic Neuropathy in a 45-Year-Old Patient: Atypical Presentation and Fast Recovery

First Author: Cindy Prajna METTA

Co-Author(s): Bobby Ramses Erguna SITEPU

Purpose: To describe an atypical case of nonarteritic anterior ischemic optic neuropathy (NAION) in a relatively young patient, highlighting unusually rapid and complete visual recovery following early high-dose intravenous corticosteroid therapy.

Methods: A 45-year-old male presented with sudden, painless vision loss in the right eye upon awakening, preceded by two weeks of blurring and an inferior "curtain-like" field defect. Risk factors included untreated hypertension, hyperlipidemia, and smoking. Best-corrected visual acuity (BCVA) was 20/400 OD and 20/20 OS, with right relative afferent pupillary defect (RAPD), optic disc edema and peripapillary hemorrhage. Automated perimetry revealed an inferior altitudinal defect, and OCT showed diffuse optic disc edema with RNFL thickening. The patient was treated with intravenous methylprednisolone 1 g/day for 3 days, followed by a tapering oral regimen and systemic risk factor management.

Results: Vision improved progressively, reaching BCVA 20/20 by 2 weeks, accompanied by resolution of optic disc edema, normalization of color vision, and disappearance of RAPD.

Conclusions: This case illustrates an atypical, early-onset NAION with complete visual recovery following prompt corticosteroid therapy. While the role of steroids in NAION remains controversial, the dramatic functional and structural recovery in this patient suggests potential benefit in selected cases when administered early.

Abstract No.: 201778**Panel No.: NEU-0578****Optic Disc Edema After High-Altitude Exposure: A Case Report and Literature Review***First Author: Bo WAN**Co-Author(s): Yong ZHONG*

Purpose: To present a case of optic neuropathy associated with high-altitude exposure, highlighting the importance of recognizing and summarizing optic neuropathy related to altitude sickness.

Methods: We conducted the patient with visual acuity, fundoscopic examination, visual field testing, OCT, VEP, ERG, intracranial pressure and laboratory test for this case. Furthermore, a comprehensive review and synthesis of the relevant literature was conducted.

Results: Optometric assessment reveals the presence of high myopia in the patient. Fundoscopic examination revealed bilateral disc edema. Visual field testing demonstrated enlarged physiological blind spots in both eyes (OU). OCT indicated OD macular serous retinal (SRD) detachment and OU thickening of the optic nerve fibers. The patient reported no headaches but disclosed residence at high altitude for two months. A lumbar puncture revealed an intracranial pressure of 240 mmHg. The intracranial laboratory test results of optic neuritis and infection were negative. Albumin and immunoglobulin G levels elevated in cerebrospinal fluid (CSF) and he was treated with 4 weeks of oral acetazolamide and glycerol-sodium chloride solution. Follow-up examination at 4 weeks showed resolving OD SRD, improved OD BCVA, OU visual fields and intracranial pressure.

Conclusions: It is hypothesized that the high-altitude environment contributed to the elevation of intracranial pressure, subsequently leading to bilateral optic disc edema. Visual field examination and cerebrospinal fluid test are of great significance for diagnosis. Timely reducing intracranial pressure can achieve benefit for improving optic disc edema.

Abstract No.: 203979**Panel No.: NEU-0598****Optic Nerve Head Status Changes of Tuberculosis Patients Treated with Linezolid at Northern Mindanao Medical Center***First Author: Benedicto Juan Enrique AGUILAR**Co-Author(s): Mayjane Joan TUMULAK*

Purpose: To determine optic nerve head status changes of patients identified for linezolid treatment tuberculosis at Northern Mindanao Medical Center (NMMC) by comparing baseline and follow-up.

Methods: Prospective cohort study that compared optic nerve head status of outpatients who underwent linezolid treatment from baseline to patient's latest

follow-up after the initiation of treatment. The effects of patients' weight, medical history and comorbidities, body surface area, and duration from baseline to reassessment, were tested against the changes in visual acuity, color vision acuity, optic nerve head peripapillary retinal nerve fiber layer (PRNFL) thickness, and visual field results.

Results: Eight of nineteen patients participated in the study, with average duration from initiation of treatment being 16.25 weeks (SD = 9.38). No statistically significant change was noted in visual acuity and color visual acuity, optic nerve head PRNFL thickness on Optical Coherence Tomography (OCT), or visual field analysis results, even when considering duration of treatment, presence of comorbidities, or smoking history ($p = 0.05$). One patient developed non-arteritic anterior ischemic optic neuropathy (NAION) during the course of linezolid treatment, for which cautious continuation of linezolid treatment yielded progressive recovery and no recurrent deterioration of visual acuity.

Conclusions: No significant change in optic nerve head status was found among tuberculosis outpatients treated with linezolid at Northern Mindanao Medical Center, even when factoring in duration or patient weight, body surface area, or systemic or ophthalmologic comorbidities. Linezolid intake may have an effect on NAION and is worth further investigation.

Abstract No.: 202166**Panel No.: NEU-0583****Optic Neuritis Beyond the Typical Age: Rare Presentation and Successful Management in an Elderly Patient***First Author: Michael HARTONO**Co-Author(s): Sita Paramita AYUNINGTYAS, Anya Dewi NASTITI, Hindun ZAKIYAH*

Purpose: To report a rare case of optic neuritis in an elderly patient, highlighting diagnostic challenges, chronic pain, immunological evaluation, and visual recovery following corticosteroid therapy.

Methods: This case illustrates unilateral vision loss with persistent ocular pain in a 59-year-old woman.

Results: The patient presented with three months of chronic ocular pain and progressive vision loss in the left eye (hand movement). Fundus examination revealed optic disc swelling; magnetic resonance imaging demonstrated optic nerve enhancement along most of its length with orbital fat stranding, consistent with optic neuritis. Laboratory work-up including Infection screening and tumor marker (CEA and CA-125) were negative. Antinuclear antibody was positive at 1/100, while myelin oligodendrocyte glycoprotein (MOG, indirect immunofluorescence assay test) and aquaporin-4 (AQP4) antibodies were negative. She

was treated with intravenous methylprednisolone 1g/day for five days; then tapered orally. Pain resolved, and vision improved to 6/30 at discharge. At six weeks, visual acuity reached 6/7.5, color vision as well as contrast sensitivity were improved. Visual field mean deviation improved from -17.81 dB to -2.72 dB, and optic disc swelling resolved.

Conclusions: Optic neuritis in the elderly is rare and often atypical, necessitating thorough exclusion of infectious, infiltrative, and autoimmune causes. This case emphasizes the importance of recognizing chronic pain as a presenting feature and the value of a comprehensive diagnostic work-up. High-dose corticosteroid therapy resulted in marked visual and functional recovery, even in late-onset seronegative optic neuritis.

Abstract No.: 205816
Panel No.: NEU-0616

Orbital Apex Syndrome Secondary to Latent Tuberculosis Infection

First Author: Snehal GANATRA
Co-Author(s): Nirathya ANISHA, Virender SACHDEVA

Purpose: The study aimed to describe the clinical and radiological features of orbital apex syndrome (OAS) caused by latent tuberculosis infection (LTBI).

Methods: This is a retrospective study analysing medical records of patients with OAS at a tertiary eye care centre in southern India. Patients with OAS due to presumed LTBI were included based on clinical presentation, imaging findings, and exclusion of other potential causes.

Results: Patient profile: Eight patients (mean age 43.6 years, 50% male) were included. All had unilateral involvement. Symptoms: The primary symptom was ocular/peri-orbital pain accompanied by ipsilateral headache. Three had diplopia, and 4 presented with upper eyelid ptosis. Only 2 complained of vision loss. None had constitutional symptoms. Diagnostic tests: The tuberculin skin test was positive in 7 cases, borderline in 1 case, and a chest X-ray showed past infection in 3 cases. Visual acuity ranged from 20/20 to hand-motion. MRI revealed enhancement at the orbital apex in all, with cavernous sinus extension in 5 cases. Treatment and Outcome: Due to the diagnostic challenge, all were treated with high-dose corticosteroids under anti-tuberculous therapy. All achieved complete recovery of extraocular motility and diplopia. One of two patients with initial hand movements improved to 20/50 at the last follow-up.

Conclusions: Diagnosing LTBI at the orbital apex and cavernous sinus is difficult, as the lesion cannot be biopsied. Presuming LTBI after ruling out other causes can be a reasonable approach. Combination therapy with anti-tuberculous drugs and high-dose steroids

can lead to improvement in symptoms and visual outcomes.

Abstract No.: 202983
Panel No.: NEU-0594

Painful Ophthalmoplegia in Young Adults: Diagnostic Challenges and Complete Resolution of Tolosa-Hunt Syndrome After Prompt Corticosteroid Therapy

First Author: Mochamad Tito Aditya PRATAMA
Co-Author(s): Lukisiari AGUSTINI

Purpose: Tolosa-Hunt Syndrome (THS) is a rare inflammatory cause of unilateral painful ophthalmoplegia involving cavernous sinus or superior orbital fissure. This case highlights a young male with acute ophthalmoplegia and ptosis who showed rapid corticosteroid response, underscoring the importance of early diagnosis and treatment

Methods: A 26-year-old male presented with right eye pain, ptosis, and diplopia for five days. Examination revealed restricted right eye motility, mild proptosis, and ptosis. Magnetic resonance imaging (MRI) demonstrated a partially ill-defined lesion with regular borders, hyperintensity on T2-weighted imaging, and restricted diffusion in the right cavernous sinus, suggesting THS. Corticosteroid therapy initially produced marked improvement, though recurrence required dose adjustment. With tailored steroid therapy and tapering, the patient fully recovered visual acuity, ocular motility, diplopia, and proptosis by week 24, completing therapy successfully.

Results: Tolosa-Hunt Syndrome is a granulomatous inflammation of the cavernous sinus, often triggered by trauma, tumours, or aneurysms. It typically presents with unilateral retro-orbital pain and diplopia. Diagnosis is confirmed by MRI or biopsy. High-dose corticosteroids provide rapid pain relief, aiding diagnosis, while other diseases may take months to resolve. Patients demonstrating corticosteroid responsiveness typically require no additional therapy; immunosuppressive agents are reserved for recurrent or refractory disease, whereas steroid-unresponsive cases generally portend an unfavourable prognosis

Conclusions: Tolosa-Hunt Syndrome is a rare condition requiring a multidisciplinary approach for diagnosis, with corticosteroids as the main treatment. Timely diagnosis and management are crucial for optimal outcomes

Abstract No.: 202590

Panel No.: NEU-0587

Prevalence of Subretinal Fluid, Intraretinal Fluid, and Paracentral Acute Middle Maculopathy in Anterior Ischemic Optic Neuropathy

First Author: Akihiro **TSUTSUMINO**Co-Author(s): Eri **NAKANO**, Kenji **SUDA**, Satoshi **KASHII**, Akitaka **TSUJIKAWA**

Purpose: To determine the prevalence of subretinal fluid (SRF), intraretinal fluid (IRF), and paracentral acute middle maculopathy (PAMM) in arteritic anterior ischemic optic neuropathy (A-AION) and non-arteritic anterior ischemic optic neuropathy (NA-AION).

Methods: We retrospectively reviewed patients diagnosed with A-AION or NA-AION who underwent PLEX Elite 9000 (Carl Zeiss Meditec, Dublin, CA, USA) within 1 month of onset at Kyoto University Hospital between January 2018 and March 2025. The presence of SRF, IRF, and PAMM was assessed using 12×12 mm OCT scans centered on the optic disc.

Results: Five eyes of 5 patients (all female) had A-AION, and 26 eyes of 24 patients (14 male, 10 female) had NA-AION, with mean ages of 76.6 ± 2.2 and 63.2 ± 13.1 years, respectively. Peripapillary SRF was observed in 2 eyes (40%) with A-AION and 1 eye (3.8%) with NA-AION ($P = 0.06$). Macular SRF was observed in 0 eyes (0%) with A-AION and 1 eye (3.8%) with NA-AION ($P = 1.00$). Peripapillary IRF was present in 4 eyes (80%) with A-AION and 19 eyes (73.1%) with NA-AION ($P = 1.00$). Macular IRF was present in 0 eyes (0%) with A-AION and 1 eye (3.8%) with NA-AION ($P = 1.00$). PAMM occurred in 1 eye (20%) with A-AION and in none with NA-AION ($P = 0.16$).

Conclusions: The prevalence of SRF, IRF, and PAMM did not differ significantly between A-AION and NA-AION. Although not statistically significant, peripapillary SRF tended to be more frequent in A-AION.

Abstract No.: 202922

Panel No.: NEU-0591

Progressive Multifocal Leukoencephalopathy Manifesting As Homonymous Hemianopia in an AIDS Patient: A Case Report

First Author: Yue **FU**Co-Author(s): Yang **HUI**

Purpose: Progressive multifocal leukoencephalopathy (PML) is a rare demyelinating disease caused by JC polyomavirus (JCPyV) reactivation in immunocompromised individuals, often presenting with visual field defects. This case highlights PML as a cause of homonymous hemianopia in an AIDS patient, emphasizing the diagnostic challenges and therapeutic approaches.

Methods: A 36-year-old male with a 14-month history of painless bilateral vision loss, right homonymous hemianopia, and left-sided headache was evaluated. He had an 11-year history of hypertension and was recently diagnosed with HIV (CD4 count indicative of severe immunosuppression). Initial cerebrospinal fluid (CSF) analysis showed elevated cytomegalovirus (CMV) DNA and positive *Aspergillus fumigatus*, but antiretroviral therapy (ART), anti-CMV, anti-Toxoplasma, and antifungal treatments yielded no improvement. Ophthalmic examination revealed best-corrected visual acuity of 0.5 OD and 0.4 OS, normal fundus, and no relative afferent pupillary defect. Brain MRI demonstrated T2 hyperintensities in the left optic radiation and occipital lobe without enhancement, involving U-fibers. Further CSF next-generation sequencing (NGS) confirmed JCPyV positivity.

Results: The patient was diagnosed with PML secondary to AIDS. Treatment with ART, antivirals, and immune checkpoint inhibition using pembrolizumab led to visual field improvement, as evidenced by serial perimetry showing reduced hemianopia at 8 and 14 months post-onset.

Conclusions: PML should be considered in AIDS patients with homonymous hemianopia and non-enhancing white matter lesions on MRI. CSF NGS is crucial for early JCPyV detection. Immune reconstitution with pembrolizumab may enhance outcomes, though vigilance for PML-immune reconstitution inflammatory syndrome is essential. This case underscores the value of multidisciplinary management in immunocompromised visual impairment.

Abstract No.: 205151

Panel No.: NEU-0608

Protecting Retinal Neurons in Ischemic Retinopathy via Ferroptosis Inhibition – the Role of Alpha-Melanocyte Stimulating Hormone

First Author: Lu **XIANG**Co-Author(s): Amy Cheuk Yin **LO**, Andrew W. **TAYLOR**

Purpose: Retinal ischemia/reperfusion (RIR) injury is a leading cause of vision loss, occurring when blood flow is restored after vascular blockage. Ferroptosis, a regulated cell death involving iron-dependent lipid peroxidation, has been implicated in RIR injury. Alpha-melanocyte-stimulating hormone (α -MSH) exhibits antioxidant and anti-inflammatory properties, providing cellular protection. However, its role in RIR-induced ferroptosis remains unclear. This study investigates whether ferroptosis contributes to RIR injury and if α -MSH can exert neuroprotection via ferroptosis regulation.

Methods: In vitro, mouse 661w photoreceptor cells underwent oxygen-glucose deprivation/reperfusion (OGD/R). Ferroptosis markers (ACSL4, GPX4, xCT, iron,

MDA, GSH, and SOD) were analyzed using Western blot, immunocytochemistry, and assays. JC-1 staining assessed mitochondrial integrity. For in vivo studies, RIR was induced in C57BL/6J mice via middle cerebral artery occlusion (MCAO). Retinal function was evaluated by electroretinography (ERG). Ferroptosis-related proteins in retinal sections were examined via immunofluorescence and Western blot.

Results: In both in vitro and in vivo studies, OGD/R and RIR increased ACSL4 and decreased GPX4 and xCT expression. Besides, iron and MDA levels rose, GSH decreased, indicating ferroptosis. Notably, α -MSH treatment significantly reduced these changes in both models. Correspondingly, retinal function improved with α -MSH administration.

Conclusions: Ferroptosis mediates neuronal death and retinal dysfunction after ischemic injury. α -MSH provides neuroprotection by modulating ferroptosis pathways, highlighting its potential as a therapeutic agent for ischemic retinopathy.

Abstract No.: 206218

Panel No.: NEU-0623

Pupil Light Reflex as a Biomarker in Alzheimer's disease: A Systematic Review

First Author: Ying Hei LEE

Co-Author(s): Lok Man AU, Kelvin KI CHONG, Kenneth Kh LAI, Calvin Cp PANG, Clement Cy THAM, Yiu Man WONG

Purpose: This review aims to examine the relationship between pupil light reflex (PLR) parameters and AD, and how these non-invasive diagnostic tools can be a potential biomarker for early detection and assessment of AD.

Methods: The research scope includes case-control and cross-sectional studies using PubMed, Scite and Google Scholar search engines. The eligible criteria for articles inclusion are studies after 1990 investigating the effectiveness of using PLR parameters to diagnose AD.

Results: Using search terms, 1338 studies are identified and 19 studies (12 white light studies with 863 patients and 1202 healthy controls (HC) ; 7 chromatic stimulation studies with 202 AD patients and 160 HC) meet the inclusion criteria. There are some parameters highlighted in the studies with high diagnostic value. For white light stimuli, maximum constriction acceleration with perfect classification ability of AUC = 1.0, $p < 0.001$. For chromatic stimuli, contraction latency was most discriminative. Across all studies, for white light stimuli, 11 out of 12 studies and for chromatic stimuli 7 out of 7 studies agree there are significant differences between HC and AD patients.

Conclusions: The findings reinforce the potential of PLR parameters as biomarkers for AD. In general, diagnostic models showed discriminatory ability (AUROC range

0.74-0.81) when distinguishing patients with AD patients from HCs and other causes of dementia. Given their diagnostic accuracy, further research is essential to standardize PLR assessments and explore their utility in early AD diagnosis and disease monitoring.

Abstract No.: 200214

Panel No.: NEU-0565

Risk Factors and Clinical Findings in Hypoxic Ischemic Encephalopathy Among Children in North-East India

First Author: Damaris MAGDALENE

Co-Author(s): Phinri BLAH

Purpose: To investigate the association between Hypoxic ischemic encephalopathy and etiology, MRI findings, vision loss, perinatal causes, and gestational age.

Methods: This was a retrospective study of 40 children diagnosed with Hypoxic Ischemic encephalopathy in a tertiary eye care centre over a 1-year period. Basic demographic information was collected from the database. Categorical variables are expressed as the number of patients and the percentage of patients and compared across the groups using Pearson's Chi-Square test for Independence of Attributes/ Fisher's Exact Test as appropriate. Significance of the distributions is calculated using the Frequency Chi-Square Test. Continuous variables are expressed as Mean, Median, and Standard Deviation and compared across the groups using the Mann-Whitney U test/Kruskal-Wallis Test, as appropriate, since the data do not follow a normal distribution.

Results: Of the total 40 children, males were affected more commonly than females, and HIE was more common in children with low birth weight(1500-2499 gm) and lesser gestational age (32-36 weeks)at birth. 52.5% fell under the blindness category IV B, and Visual impairment correlated with abnormal findings on Fundoscopic examination. MRI Brain demonstrated the Cerebral cortex to be the most commonly affected part. Finally, hypoxia caused by neonatal birth asphyxia was found to be the most associated complication in children with Hypoxic Ischemic Encephalopathy.

Conclusions: Children with Low Birth weight, low gestational age at birth, and associated neonatal hypoxia are associated risk factors for HIE.

Abstract No.: 203829
Panel No.: NEU-0596

Screening for Non-Arteritic Anterior Ischemic Optic Neuropathy (NAION): Can Atherosclerotic Cardiovascular Disease (ASCVD) Risk Scores Contribute?

First Author: Bobby Ramses Erguna SITEPU
Co-Author(s): Cindy Prajna METTA, Rifhani Atthaya PUTRI

Purpose: To evaluate atherosclerotic cardiovascular disease (ASCVD) risk scores in the screening of non-arteritic anterior ischemic optic neuropathy (NAION), considering its vascular etiology and the absence of definitive treatment.

Methods: An observational analytic cross-sectional study was conducted from March 2025 until sample completion. Thirty-seven subjects with cardiovascular risk were enrolled. ASCVD risk was assessed using the WHO cardiovascular risk prediction chart. Ophthalmic examinations included visual field testing, contrast sensitivity, color vision, cup-to-disc ratio, and crowding disc index. Data were analyzed using Mann–Whitney and Kruskal–Wallis tests.

Results: The majority of subjects were in the high ASCVD risk category (37.8%). Functional visual assessment revealed mild visual field defects that may represent early ischemic optic neuropathy. Statistical analysis revealed no significant association between ASCVD risk scores and NAION incidence (Mann–Whitney $P = 0.495$; Kruskal–Wallis $P = 0.266$). However, exploratory analysis suggested that some NAION cases might be associated with smaller cup-to-disc ratios and higher crowding disc index, though these findings did not reach statistical significance.

Conclusions: ASCVD risk scores were not significantly associated with NAION incidence but may still serve as a practical adjunct in identifying individuals with systemic vascular vulnerability. Given the absence of effective therapy, early diagnosis remains central to NAION management. The observed tendency of NAION cases to coincide with higher crowding disc index highlights its multifactorial nature. Combining systemic vascular risk assessment with ocular parameters may strengthen future screening and prevention strategies.

Abstract No.: 200387
Panel No.: NEU-0567

Seeing Beyond the Blood: A Case of Leukemic Optic Neuropathy

First Author: Aneeka Rahnuma ISLAM

Purpose: To describe a rare case of leukemic optic neuropathy and to highlight the importance of considering hematologic malignancies in cases of atypical optic neuropathy.

Methods: A 42-year-old male presented with sudden vision loss in left eye for 7 days. A thorough ophthalmic examination was conducted including visual acuity, pupillary reflex assessment, colour vision, extraocular muscle motility, anterior segment examination and dilated fundoscopy. Hematological investigations were also done. MRI of the brain was performed to evaluate for optic nerve pathology. Based on the clinical, radiological, and hematological findings, a diagnosis of leukemic optic neuropathy was established.

Results: A 42-year-old male presented with painful, sudden visual loss in left eye for 7 days. He was initially diagnosed as optic neuritis. On examination, best-corrected visual acuity was 6/18 in the right eye and CF 1m in the left. RAPD was noted on the left eye. Colour vision was impaired in left eye and extraocular motility was full in all gaze in both eyes. Vitreous cells was present in left eye. Fundus examination revealed optic disc edema with blurred margins in left eye. Complete blood count revealed marked leukocytosis and thrombocytosis. Lymphopenia and the presence of immature myeloid cells were also noted. MRI of the brain demonstrated left optic nerve swelling. A diagnosis of leukemic optic neuropathy was established. The patient was referred to hematologist.

Conclusions: Leukemic optic neuropathy is a neuro-oncologic emergency and warrants immediate intervention to avoid permanent vision loss.

Abstract No.: 201599
Panel No.: NEU-0576

Seeing the Unseen: Optical Coherence Tomography and Electroretinography Reveal Hidden Retinal Changes in Chronic Progressive External Ophthalmoplegia

First Author: Cynthia VIRYAWAN
Co-Author(s): Salmarezka DEWIPUTRI

Purpose: To report optical coherence tomography (OCT) and electroretinography (ERG) findings in a patient with chronic progressive external ophthalmoplegia (CPEO) without visible retinopathy, highlighting their role in detecting subclinical retinal changes.

Methods: A 47-year-old male with a 10-year history of progressive bilateral ptosis and ophthalmoplegia presented with visual acuity of 6/6 and 6/12. He reported no blurry vision, night blindness, photophobia, or color vision problems. MRI revealed extraocular muscle atrophy. Electrophysiology showed abnormal repetitive nerve stimulation and single-fiber EMG. He had elevated lactic acid, moderate dysphagia, and premature ventricular contractions. Cholinergic testing was negative. Funduscopy was normal, consistent with CPEO plus syndrome without visible retinopathy. OCT demonstrated reduced central macular thickness with outer retinal thinning, while full-field and multifocal ERG showed rod–cone dysfunction, more pronounced in the left eye.

Results: CPEO is a mitochondrial disorder characterized by ptosis and ophthalmoplegia, with frequent retinal involvement. OCT can detect outer retinal thinning from photoreceptor loss, distinct from inner retinal thinning seen in neurodegenerative disease. In this case, OCT abnormalities correlated with ERG evidence of reduced outer retinal function. Despite variability in ERG findings, both modalities can identify subclinical dysfunction in the absence of visible retinopathy, providing complementary structural and functional evaluation.

Conclusions: OCT and ERG enable detection of subclinical retinal involvement in CPEO without visible retinopathy, supporting their use for monitoring, and differentiation from other neuro-ophthalmic disorders.

Abstract No.: 207011

Panel No.: NEU-0630

Seropositive Neuromyelitis Optica Spectrum Disorder (NMOSD)-Related Optic Neuritis in Hong Kong: Clinical Efficacy of Plasmapheresis and Immunosuppressant Therapy for Visual Recovery

First Author: Clarice SU

Co-Author(s): Carmen K.m. CHAN, Jasmine Clair CHUANG, Matthew LAM, Cherie WONG, Charlene YIM

Purpose: To review the treatment outcomes of plasmapheresis (PLEX) and immunosuppressant therapy (IST) in seropositive NMOSD-ON in Chinese patients.

Methods: In this retrospective case notes study, patients who presented to Hong Kong Eye Hospital between 2001 and 2023 with their first episode of acute ON and positive serology for NMO antibodies were identified. Demographic and clinical data were collected. Analyses were performed using multilevel linear regression modeling with adjustment for correlation between fellow eyes.

Results: 21 Chinese patients (32 eyes) were identified, with 14 patients (66.6%) developing a second episode of ON in the same eye or the fellow eye. The ON episodes of 29/32 eyes (90.6%) were treated with intravenous methylprednisolone (IVMP), and the best-corrected visual acuity (BCVA) after three days of IVMP ($P = 0.007$) and 11 days of oral steroids ($P < 0.001$) were significantly correlated with better BCVA on the latest follow-up. 12 patients (16 eyes, 50%) received PLEX, and the BCVA at latest follow-up was significantly correlated with the VA post-PLEX ($P = 0.048$). 20 patients (95.2%) were subsequently placed on second-line immunosuppressants, and a shorter time to immunosuppressant initiation was associated with better BCVA on the latest follow-up ($P < 0.001$) and longer time to the second episode of ON ($P = 0.030$).

Conclusions: Earlier initiation of second-line immunosuppressants was associated with better final

BCVA and delayed recurrence of a second episode of ON. Larger scale studies are needed to examine other factors associated with better visual prognosis in Asian/Chinese patients.

Abstract No.: 205951

Panel No.: NEU-0619

Similar Faces, Divergent Roots: Bilateral Ptosis With Distinct Genetic Etiologies

First Author: Kaveri BIRLA

Co-Author(s): Poonam, Sonali GUPTA

Purpose: To emphasize the role of detailed history taking in distinguishing between two genetically distinct causes of bilateral ptosis.

Methods: Prospective observational study. Two patients with childhood-onset bilateral ptosis were evaluated through comprehensive clinical assessment, investigations (ice pack test, CK, EMG, antibodies), and genetic testing.

Results: Case 1 had progressive, non-fluctuating ptosis, ophthalmoplegia, and facial weakness—diagnosed with mitochondrial myopathy (POLG mutation). Case 2 showed fluctuating ptosis worsening by evening, positive ice pack test, and responded well to pyridostigmine—diagnosed with congenital myasthenic syndrome (CHRNE mutation).

Conclusions: Despite similar presentations, careful history and targeted testing differentiated two distinct disorders. Clinical implications: This distinction guided appropriate treatment, informed genetic counseling, and prognosis.

Abstract No.: 204841

Panel No.: NEU-0605

The Anti-Cytotoxic Effects of Synthesized Aquaporin-4 (AQP4) Mimotope Peptides in Ex Vivo Optic Nerves

First Author: Shiqi YAO

Co-Author(s): Shaoying TAN

Purpose: To investigate the pathogenic mechanisms of neuromyelitis optica spectrum disorder (NMOSD)-optic neuritis (ON) and new therapeutic developments, we propose to test the effect of synthesized aquaporin-4 (AQP4) mimotope peptides in reducing AQP4-immunoglobulin G (IgG) cytotoxicity to ex vivo optic nerves.

Methods: We have successfully synthesized AQP4 mimotope peptides for the three extracellular loops: mLoops A, mLoops C and mLoops E. Separate experiments will be conducted on the optic nerve tissue of Sprague-Dawley rats and C57BL/6J mice. The optic nerve sections with a thickness of 10 μm were immunostained with AQP4-IgG, total IgG, and AQP4-IgG with different synthesized AQP4 mimotope peptides (mLoops A, C, E, A+C, A+E, C+E and A+C+E),

followed by the appropriate fluorescent antibody. Tissue sections were examined with a Zeiss upright confocal microscope.

Results: The co-localization of GFAP and IgG demonstrated that AQP4-IgG bound specifically to astrocytes. When the epitope peptides were added to IgG, the Loop A, C and E epitope peptide significantly reduced the human IgG-labeled area at the optic nerve ($p < 0.001$). The Loop A+C epitope peptide also eliminated the human IgG-labeled area significantly ($p < 0.01$). The Loop A+E, C+E and A+C+E peptide only reduced the human IgG-labeled area slightly.

Conclusions: Our results demonstrated that AQP4 extracellular mimotope peptides could reduce the cytotoxin by inhibit the binding of AQP4-IgG to astrocytes in ex vivo optic nerves.

Abstract No.: 203183

Panel No.: NEU-0595

The Atrophy of Gray and White Matter Volume in Concomitant Exotropia and Esotropia Adults: A Voxel-Based Morphometric Study

*First Author: Guo **XUERAN***

*Co-Author(s): Jing **FU**, Jie **HAO***

Purpose: This study employed voxel-based morphometry (VBM) analysis through resting-state functional MRI to investigate cortical structural alterations in esotropia (ES) and exotropia (EX) patients.

Methods: Gray and white matter volume (GMV, WMV) were collected from eighteen ES, fourteen EX, and sixteen age-, sex-, and handedness-matched controls (NC). Nonparametric tests assessed structural changes and clinical features across groups. Correlation analysis and multivariate linear regression validated relationships between neuroanatomical measures and clinical characteristics.

Results: Compared to controls, GMV reductions were exhibited in the occipital gyrus and cerebellum in EX patients, and the cerebellar, frontal, and precentral gyrus (PreCG) in ES patients. WMV reductions occurred in the occipital gyrus and postcentral gyrus in EX patients, whereas fusiform and frontal gyrus in ES patients. Correlation analyses identified associations between binocular functions and the GMV of the left cuneus ($r = 0.792/r = 0.736$, $p < 0.05$), left superior occipital gyrus ($r = -0.685$, $p = 0.042$), and right medial frontal gyrus ($r = 0.799$, $p = 0.010$) in EX patients. In the ES group, the near deviation angle ($r = -0.491$, $p = 0.038$) and convergence ($r = -0.517$, $p = 0.040$) were negatively correlated with WMV in the left middle occipital gyrus. Multivariate regression identified the GMV in the right PreCG as a predictor for both EX ($p = 0.005$) and ES ($p = 0.002$).

Conclusions: Concomitant exotropia and esotropia demonstrate distinct gray and white matter atrophy in visual, motor, and cognitive-related brain regions, and correlated with clinical features. PreCG appears particularly involved in strabismus occurrence. These findings provide insights into neural mechanisms underlying strabismus and inform the development of more targeted therapeutic approaches.

Abstract No.: 202089

Panel No.: NEU-0581

The Diagnostic Value of Early Serological Testing in Optic Neuritis – Lessons from Real Cases

*First Author: Yura **PRADIPTAMA***

*Co-Author(s): Salmarezka **DEWIPUTRI**, Syntia **NUSANTI**, Sita **PARAMITA**, Muhammad **SIDIK***

Purpose: Optic neuritis is a condition with overlapping clinical features. Serological testing is essential to differentiate underlying etiologies, prognosis, and optimize management strategies.

Methods: We present four patients with optic neuritis. A 19-year-old female presented with bilateral visual loss, nonspecific MRI findings, and excellent steroid response, but no serology test was performed. Second, A 10-year-old boy with unilateral visual loss and seizures. MRI revealed long optic nerve enhancement, and vision was restored post-steroids, but serology was not checked. Third, A 14-year-old boy also had unilateral visual loss with optic nerve enhancement on MRI, and anti-MOG positivity, confirming Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease (MOGAD). Lastly, A 25-year-old woman experienced recurrent optic neuritis; her first episode resolved with steroids, while recurrences showed bilateral optic nerve enhancement, and serology testing confirmed MOGAD.

Results: According to the international consensus criteria for optic neuritis 2022 (ICON), 3 patients with compatible symptoms and MRI enhancement fulfilled definite optic neuritis, while 1 patient, with nonspecific imaging, remained possible optic neuritis. However, ICON classification alone does not define etiology. Serological testing, as demonstrated in patients 3 and 4, confirmed MOGAD and supported accurate prognostication. Conversely, missed testing in patients 1 and 2 limited diagnostic certainty, delaying recognition of relapsing potential. Integrating ICON 2022 with timely serology strengthens diagnostic reasoning, enabling tailored management and counseling.

Conclusions: Integration of serological testing with ICON 2022 criteria improves diagnostic accuracy in optic neuritis, distinguishes MOGAD, and helps in long-term management while preventing relapsed disease in optic neuritis.

Abstract No.: 204846

Panel No.: NEU-0606

The Effects of Superoxide Dismutase and Methylprednisolone Administration on Histopathological Findings in a Rat Model of Optic Neuritis

First Author: Fara Haura MURADI

Co-Author(s): Bobby Ramses Erguna SITEPU, Delfi

Purpose: Optic neuritis (ON) is an idiopathic inflammatory demyelinating condition of the optic nerve, vulnerable to degeneration due to energy depletion, reactive oxygen species (ROS) accumulation, and mitochondrial dysfunction. Superoxide dismutase (SOD) may offer neuroprotective benefits by targeting redox dysregulation, helping to halt retinal and retinal ganglion cell (RGC) degeneration. When combined with methylprednisolone (MP), which reduces inflammation, this therapy may accelerate recovery and minimize optic nerve damage. The ASK1- p38 pathway further supports this combined mechanism. Aim: To evaluate the effects of SOD and MP administration on optic nerve damage in a rat model of optic neuritis.

Methods: This was a randomized, post-test only, control group laboratory experiment involving five groups: sham, control (ON only), SOD (ON + 100 mg/kg/day), MP (ON + 30 mg/kg/day), and combination therapy (SOD 50 mg/kg/day + MP 15 mg/kg/day). Data were analyzed using One- Way ANOVA or Kruskal-Wallis test.

Results: The combination group demonstrated the most favorable outcomes, with the highest average RGC count (195 cells), minimal optic nerve edema ($p < 0.001$), and demyelination levels similar to normal.

Conclusions: Combined administration of SOD and MP provided better histopathological outcomes—reflected in ganglion cell preservation, reduced edema, and minimal demyelination—than either treatment alone in this rat model of optic neuritis.

Abstract No.: 204484

Panel No.: NEU-0604

The Many Faces of Mitochondrial Dysfunction

First Author: Nishi SATISH

Co-Author(s): Sangeeta ABROL

Purpose: This prospective case series describes the various presentations of mitochondrial diseases in the eye.

Methods: Eleven patients were included in this study, broadly classified into three main presentation types - Leber Hereditary Optic Atrophy, Chronic Progressive External Ophthalmoplegia (including Kearns Sayre Syndrome) and Neuropathy Ataxia with Retinitis Pigmentosa. A thorough history, systemic and ocular examination was done in each case. With sufficient

data in the clinical examination a biopsy (where indicated) as well as genetic studies were done.

Results: Although the clinical presentation of each case seemed vastly different, a common link could be established with respect to the history and systemic findings. Sibling involvement was seen in each presentation of the disease and genetic panel testing confirmed the diagnosis of various mitochondrial gene mutations.

Conclusions: This series describes findings that should raise suspicion of mitochondrial diseases. A thorough clinical examination usually helps us arrive at a diagnosis of these mitochondrial diseases. Genetic panel testing provides the definitive diagnosis, however, it cannot be done unless one is sure of their clinical examination.

Abstract No.: 205445

Panel No.: NEU-0611

Unmasking Early Maculopathy in Short-Term Hydroxychloroquine Users

First Author: Indah SARASWATI

Co-Author(s): Salmarezka DEWIPUTRI, Anggun Rama YUDANTHA

Purpose: Hydroxychloroquine (HCQ) retinopathy often progresses silently and may evade early clinical detection. Multifocal electroretinogram (mfERG) provides an objective and sensitive method for identifying parafoveal or extramacular wave depression in the early stages of retinopathy. This study aimed to evaluate mfERG alterations in systemic lupus erythematosus (SLE) patients, stratified by HCQ treatment duration.

Methods: In this cross-sectional study, 130 eyes of SLE patients undergoing HCQ therapy were categorized into two groups: ≤ 5 years and > 5 years of treatment. Multifocal ERG was performed using a standard 61-hexagon protocol, assessing amplitude and implicit time across rings R1-R5 based on first-order kernel responses. According to established criteria, maculopathy was classified as normal, early or advanced stages. The mfERG findings was compared with spectral domain optical coherence technology (SD-OCT) and ultra-wide field fundus autofluorescence (UWF-FAF) imaging.

Results: The majority of participants were women, aged 30-45 years. Patients treated with HCQ for ≤ 5 years had significantly lower in P1 amplitudes compared with the > 5 years group, particularly in ring 2-3 ($p < 0.05$). The ring ratio of P1 amplitude in ≤ 5 years group started to decrease, and the R2:R5 amplitude ratio in this group was lower than the other group ($p = 0.046$). Early maculopathy was more prevalent in the ≤ 5 years group (58.5%) than the other group (49.2%). The outer retinal layer thinning was more prominent in the > 5 years of HCQ use, yet up to 95%

of patients with advanced maculopathy in both groups demonstrated normal UWF-FAF findings.

Conclusions: Multifocal ERG is a sensitive modality for detecting early functional changes in HCQ retinopathy and may serve as a useful adjunct to structural imaging. Screening with mfERG in combination with OCT and/or UWF-FAF imaging, might be considered particularly within the first five years of HCQ therapy.

Abstract No.: 207315

Panel No.: NEU-0632

Unmasking Metastatic Lung Cancer Through Orbital Apex Syndrome

*First Author: Nandita **TRIVEDI***

*Co-Author(s): Kanchita **PANDEY**, Pranita **SAHAY***

Purpose: Orbital apex syndrome is a rare eye disorder that can signal serious, potentially fatal systemic disease. This case underscores the need to recognize subtle ocular signs and investigate promptly, as early detection may reveal conditions like metastatic cancer.

Methods: A woman in her 60s experienced a week of worsening vision loss and limited eye movement with fever, headache, and vomiting. Examination showed fever, enlarged submandibular lymph nodes, and scalp and dorsal nodules. Vision was 20/30 in the right eye and hand movements in the left, with a left relative afferent pupillary defect, esotropia, and abduction deficit; fundus was normal.

Results: A provisional diagnosis of left eye ocular apex syndrome (OAS) was made. A comprehensive neurology and dermatology work-up was done. CE-MRI brain and orbit suggested an asymmetric enhancing lesion of the cavernous sinus, soft tissue involvement of the left orbital apex and a nodule involving the white matter of the left parietal lobe. FNAC of submandibular lymph nodes and nodules of the scalp & dorsum was suggestive of metastatic mucin-secreting adenocarcinoma. Tumor marker analysis revealed raised CEA and CA-125. Further PET scan revealed active lesions in the lungs with multi-organ spread supporting the diagnosis of primary lung carcinoma with disseminated metastases manifesting as OAS.

Conclusions: Orbital apex syndrome due to orbital metastasis can be the primary presentation in cases of lung cancer. It is associated with grave etiologies that warrant a meticulous workup. A multi-disciplinary team approach is needed in the management of these cases.

Abstract No.: 200861

Panel No.: NEU-0570

Unveiling Hidden Culprits: Posterior Ischemic Optic Neuropathy in Two Vascular-Driven Cases

*First Author: Yue **FU***

*Co-Author(s): Yang **HUI***

Purpose: To explore two rare cases of posterior ischemic optic neuropathy (PION) causing sudden monocular blindness, emphasizing advanced imaging to differentiate PION from optic neuritis.

Methods: Two patients with acute unilateral vision loss were analyzed. Case 1: A 29-year-old male with right eye no light perception post-headache. Case 2: A 41-year-old female with left eye hand motion vision post-bilateral internal carotid artery (ICA) stenting, complicated by hypotension. Evaluations included visual acuity, fundus photography, OCT, VEP, FFA, ICGA, MRI with DWI/ADC, CTA, and DSA.

Results: In Case 1, steroid-resistant vision loss and right ophthalmic artery stenosis (80% on DSA) were noted. MRI showed intracanalicular optic nerve T2 hyperintensity, enhancement, and DWI/ADC diffusion restriction. Fundus was normal initially, with optic atrophy at 1 month. In Case 2, perioperative hypotension triggered PION. MRI revealed left intracranial optic nerve DWI hyperintensity, ADC hypointensity, and mild enhancement. Both cases showed RAPD, normal initial fundus, and poor visual recovery.

Conclusions: PION, linked to intracranial vascular pathology, mimics optic neuritis but resists steroids. MRI DWI/ADC confirms ischemic diffusion restriction, while DSA/CTA reveals vascular stenoses, enhancing diagnostic precision in these vision-threatening cases.

Abstract No.: 207326

Panel No.: NEU-0633

Vision at Stake: A Multidisciplinary Steroid-Surgical Strategy in a One-Eyed Patient With Graves' Ophthalmopathy

*First Author: Hindun **ZAKIYAH***

*Co-Author(s): Anya **DEWI**, Salmarezka **DEWIPUTRI**, Michael **HARTONO**, Yunia **IRAWATI***

Purpose: To present the multidisciplinary management strategy for a one-eyed patient with sight-threatening Graves' ophthalmopathy (GO).

Methods: We report a 41-year-old man with sight-threatening active GO in his only eye, managed successfully with high-dose steroids and three-wall orbital decompression.

Results: The patient had a history of uncontrolled hyperthyroidism and right eye evisceration following severe GO-related complications 10 years earlier. At presentation, the remaining eye was markedly

proptotic, measured 28 mm by exophthalmometry, painful, red, and had reduced visual acuity to 0.70. The Clinical Activity Score (CAS) was 5. He also exhibited lagophthalmos and severe corneal exposure with diffuse punctate keratopathy and ulceration. Orbital CT demonstrated bilateral extraocular muscle enlargement, retrobulbar fat expansion, and stretched optic nerves. Corneal scraping revealed Gram-positive bacilli. A diagnosis of active thyroid eye disease with dysthyroid optic neuropathy and exposure keratitis was established. The case was deemed urgent and required immediate intervention, including tarsorrhaphy, topical antibiotics, and high-dose intravenous methylprednisolone, starting with 750 mg on alternate days followed by three cycles of 500 mg, along with immunosuppressive therapy. After the inflammation subsided, the patient underwent nasoendoscopic three-wall orbital decompression with fat removal. Postoperatively, visual acuity improved to 0.10, proptosis decreased, and corneal healing was achieved. Given the favorable functional recovery, orbital radiotherapy was scheduled to maintain long-term disease control.

Conclusions: In sight-threatening GO, particularly in one-eyed patients, combined steroid therapy and orbital decompression can preserve vision. This case highlights that early recognition of active disease, tailored immunosuppression, and planned radiotherapy within a multidisciplinary framework are essential for achieving optimal outcomes.

Abstract No.: 206654
Panel No.: NEU-0629

When Disc Swelling Isn't Papilloedema: A Pediatric Masquerade Syndrome

First Author: Nabila RAHMAN
Co-Author(s): Tasnima RAHMAN, Mostafa HOSSAIN

Purpose: To present a rare pediatric case of bilateral ODD with vitreous cells, raising suspicion of atypical retinitis pigmentosa (RP).

Methods: A 9-year-old boy presented for a routine ophthalmic checkup. His ocular history included astigmatism, corrected with spectacles for 6 months. Comprehensive ocular examination, fundus evaluation, B-scan ultrasonography, and color fundus photography were performed. Family history was obtained in detail.

Results: Fundus examination revealed bilateral disc swelling in an otherwise asymptomatic child, with no headache, vomiting, or recent systemic illness. Pupillary reactions were normal. B-scan confirmed optic disc drusen in both eyes. Unexpectedly, vitreous cells were present bilaterally, though color fundus photography showed no overt retinal pathology. Family history revealed nyctalopia in the patient, his father, and grandmother, strongly suggestive of inherited retinal dystrophy, most likely atypical RP. The

coexistence of ODD, vitritis, and hereditary nyctalopia indicated a possible masquerade syndrome.

Conclusions: This case highlights the importance of detailed evaluation in asymptomatic pediatric patients with disc swelling. Bilateral optic disc drusen associated with vitreous cells may represent more than incidental findings. The strong family history of night blindness raises suspicion of atypical retinitis pigmentosa masquerading as an inflammatory disease. Early recognition is crucial for appropriate genetic counseling, patient education, and long-term follow-up.

Abstract No.: 206531
Panel No.: NEU-0626

When Pressure Builds: A Case of Bilateral Papilledema Secondary to Medulloblastoma

First Author: Joanna Mariz MENDOZA
Co-Author(s): Stephanie Suzanne GARCIA, Maria Karina MONTESINES

Purpose: To present a case of bilateral papilledema in a pediatric patient with medulloblastoma.

Methods: Case report.

Results: A 9-year-old male presented with a 2-month history of bitemporal headaches, nausea, and vomiting associated with bilateral eye pain and gait abnormality. During initial pediatric consults, he was treated for urinary tract and gastrointestinal conditions with temporary resolution of symptoms. Due to the persistence and increasing severity of symptoms, the patient was referred to the ophthalmology service. Visual acuity of the patient was 20/20 on both eyes, and pupils were 3-2 mm briskly reactive to light, with no noted relative afferent pupillary defects. Fundoscopy revealed bilateral Frisen grade IV papilledema. Cranial CT with IV contrast showed a heterogeneously enhancing mass in the cerebellar vermis measuring 3.7 x 5.0 x 3.9 cm, compressing the fourth ventricle, causing obstructive hydrocephalus. The patient underwent emergency ventriculoperitoneal shunting, tumor excision, and biopsy. Histopathology results were consistent with medulloblastoma.

Conclusions: Papilledema is a common sign seen in children with posterior fossa tumors. This case demonstrates the role of ophthalmologists and the importance of prompt multidisciplinary management to avoid delays in definitive diagnosis and management and prevent both sight and life-threatening complications.

Abstract No.: 202663

Panel No.: NEU-0588

When Treatment Threatens Vision: A Case Series of Reversible Linezolid-Induced Toxic Optic Neuropathy in Multidrug-Resistant Tuberculosis

*First Author: Sita Paramita **AYUNINGTYAS***

*Co-Author(s): Irma **NUR FADHILAH***

Purpose: Multidrug-resistant tuberculosis (MDR-TB) is prevalent in developing countries. Linezolid is a second-line treatment option for MDR-TB. Despite its effectiveness, it may harm vision. We highlight the clinical presentation and outcomes of toxic optic neuropathy related to linezolid therapy.

Methods: We report a case series of four male patients who developed visual impairment while receiving linezolid for MDR-TB. The first patient, a 43-year-old on 7 months of treatment and 3 years of antiretroviral therapy, complained of bilateral blurred vision with best-corrected visual acuity (BCVA) 6/12 of the right eye (RE), 6/9 of the left eye (LE). The second, a 60-year-old, reported bilateral vision loss on the 7th month of therapy (BCVA 1/60 in both eyes (BE)). The third, a 30-year-old on the 18th month of therapy, developed visual impairment with BCVA of 6/24 RE and 6/9.5 LE. The fourth, a 48-year-old, developed bilateral vision loss after 5 months of linezolid with BCVA 3/60 in BE. Color vision and visual field defects were observed in all patients.

Results: The first, third, and fourth patients achieved full recovery to 6/6 BE after 8, 4, and 12 weeks, respectively, following linezolid cessation. The second patient, BCVA improved to 6/24 RE and 6/6 LE at 2 months after stopping linezolid. Visual field and color vision defects also improved.

Conclusions: Close monitoring is mandatory for patients receiving prolonged linezolid therapy. Linezolid should be discontinued in patients who develop visual impairment suggestive of toxic optic neuropathy, as early discontinuation is associated with favorable visual outcomes.

Abstract No.: 200704

Panel No.: NEU-0569

When the Orbit Whispers: Diagnostic Challenges in NeuroOphthalmology From Mongolia

*First Author: Delgerzul **BAT***

*Co-Author(s): Purevdolgor **GANSUKH**, Bilguun-ochir **GANZORIG***

Purpose: To highlight the diagnostic complexity of neuroorbital disease through three illustrative cases, underscoring the role of timely neuroimaging and multidisciplinary evaluation in optimizing visual outcomes.

Methods: A retrospective review was conducted of three consecutive patients (2022–2024) who presented with atypical neuroophthalmic symptoms. Clinical presentation, imaging findings, management approaches, and visual outcomes were analyzed.

Results: A 43-year-old woman presented with painless unilateral vision loss and optic disc pallor; subsequent MRI demonstrated optic nerve sheath meningioma (ONSM) with classic “tramtrack” and “doughnut” signs. Definitive imaging and multidisciplinary consultation were obtained after initial surgical intervention by the neurosurgery department, which unfortunately resulted in irreversible vision loss. A 67-year-old woman with unilateral proptosis was initially considered for common orbital disease; later imaging identified a sphenoid wing meningioma compressing the lateral rectus muscle. Stereotactic radiotherapy was initiated. A 49-year-old woman with intermittent vertical diplopia and subtle nystagmus underwent MRI, revealing a dorsal midbrain ring enhancing lesion. Positive syphilis serology confirmed neurosyphilis, and intravenous penicillin led to lesion resolution and symptomatic improvement.

Conclusions: ONSM characteristically presents with insidious vision loss and distinctive imaging findings; sphenoid wing meningiomas may resemble benign orbital conditions; neurosyphilis remains a treatable cause of central nervous system lesions. These cases emphasize the importance of early imaging, clinical vigilance, and multidisciplinary collaboration to reduce preventable visual morbidity, particularly in resource-limited settings.

Ocular Imaging

Abstract No.: 204440

Panel No.: OIM-0644

24–2C Grids to Detect Central Visual Field Function in Early-Stage Primary Open Angle Glaucoma: A Prospective Study

*First Author: Yu **CAI***

*Co-Author(s): Xunkai **MA**, Yanfei **ZHU***

Purpose: The recently introduced 24-2C SITA-Faster incorporates 10 testing points derived from 10-2 grid into the 24-2 grid, potentially increasing the sensitivity for initial central field evaluation in glaucoma. However, few studies have compared the visual field defects (VFDs) newly identified by 24-2C with 24-2 in early-stage of primary open-angle glaucoma (POAG) and newly detected “clusters” with their structure–function concordance.

Methods: This prospective, cross-sectional study enrolled 72 patients with POAG. Sixty-three eyes from 40 patients with a mean deviation (MD) < 6 dB by Humphrey 24-2 were subjected to 24-2C and 10-2. The

consistencies between 24-2C and 24-2, or 10-2 were evaluated using Bland–Altman figures. 24-2C newly discovered defects compared with 10-2 point-by-point. Patients were divided into groups I and II based on whether newly defective points met the “cluster” criterion. (at least three continuous points at $P < 0.05$, including a minimum of one point at $P < 0.01$). Both groups underwent optical coherence tomography Optovue RTVue-100 to determine if there were corresponding structural differences.

Results: There were good consistencies between either 24-2C with 24-2, or 10-2. Bland–Altman plots demonstrated most eyes fell within the 95% limits of agreement in MD, pattern standard deviation (PSD) and central mean sensitivity (CMS). Meanwhile higher consistency was detected between 24-2C and 10-2, as regression analysis revealed there were no significant trends in bias changing along with the above three index values variation between 24-2C and 10-2 ($P > 0.05$). Test duration was significantly shorter in 24-2C than 24-2 (24-2C, 157[139, 178] seconds; 24-2, 166[139, 202] seconds, respectively, $P < 0.05$). 96 defective points were newly detected by 24-2C. 57 (57/96, 59.38%) points were consistent with 10-2 through point-by-point comparison. It indicated a high reliability of 24-2C results in the early stage of POAG. The average Ganglion Cell Complex (GCC) thickness of Group I (with “clusters”) was significantly thinner than that of Group II (without “clusters”). GLV and FLV of Group I were also significantly greater than Group II ($P < 0.05$). Our study was the first to apply a more stringent «cluster» criterion in comparison to newly detected defective points by 24-2C. It indicated VFDs newly discovered correlated well with GCC.

Conclusions: 24-2C had good consistency with both 24-2 and 10-2, especially highly consistent with 10-2. The additional central VFDs identified by 24-2C comparing with 24-2 correlated well with 10-2. Newly identified VFDs meeting with the “cluster” criterion also corresponded well with GCC in the early stages of POAG. It suggests that 24-2C could assist in detecting central VFDs in 10 degrees, the same as 24 degrees, in the early stage of glaucoma with a shorter test duration. 24-2C may detect central VFDs to improve patients’ quality of life much earlier.

Abstract No.: 202791

Panel No.: OIM-0642

Adaptive Optics Cone Density Measurement as a Sensitive Structural Biomarker of Macular Progression in EYS-Associated Retinitis Pigmentosa

First Author: Masakazu **HIRAOKA**

Co-Author(s): Kiyoko **GOCHO**, Yasuo **KURIMOTO**, Akiko **MAEDA**, Yuki **TOGASHI**, Midori **YAMAMOTO**

Purpose: To determine whether macular cone density (CD) measured with adaptive optics (AO) sensitively

tracks disease progression in EYS-associated retinitis pigmentosa (RP) and to examine its relationships with visual function.

Methods: Prospective subset analysis of 27 patients (27 eyes) with EYS-associated RP. At 6-month intervals over 24 months, best-corrected visual acuity (BCVA), AO flood-illumination imaging (rtx1; CD at 2° and 4° along nasal and temporal meridians), and 10-2 Humphrey Field Analyzer (HFA) testing were obtained. CD was compared with BCVA and HFA mean deviation (MD).

Results: Mean age was 44.0 ± 11.5 years. At baseline, macular CD (cells/mm²; mean $\pm$ SD) was $11,156 \pm 4,331$ (2N), $9,786 \pm 3,280$ (4N), $11,514 \pm 3,385$ (2T), and $10,075 \pm 2,684$ (4T). CD showed a significant decrease across all loci by 6 months and continued to decline throughout follow-up; mean 6-month reductions were 9.8% (2N), 9.6% (4N), 7.6% (2T), and 11.3% (4T). BCVA and HFA mean deviation (MD) showed no significant longitudinal change over 24 months. Correlations were weak: CD vs BCVA $r = 0.22$ (2°) and 0.21 (4°); CD vs MD $r = 0.002$ (2°) and -0.20 (4°).

Conclusions: AO imaging detects short-interval loss of macular CD while BCVA and MD remain stable, supporting CD as a sensitive structural biomarker of RP progression and a tool to shorten observational periods in clinical studies.

Abstract No.: 208431

Panel No.: OIM-0658

An Efficient Approach to Estimate the Risk of Coronary Artery Disease for People Living With HIV Using Machine-Learning-Based Retinal Image Analysis

First Author: Mary **HO**

Co-Author(s): Marten **BRELEN**, Gabriel **LI**, Grace **LUI**

Purpose: People living with HIV (PLWH) have a higher risk of non-communicable diseases, particularly cardiovascular diseases (CVD). Current HIV management guidelines recommend regular cardiovascular risk screening, but existing risk models are not specific to PLWH. Improved tools are needed to accurately assess cardiovascular risk in this population.

Methods: We conducted a prospective study to evaluate automatic retinal image analysis in assessing coronary artery disease (CAD) in PLWH. Participants included PLWH with at least one cardiovascular risk factor. All underwent computerized tomography (CT) coronary angiogram and digital fundus photography. Coronary atherosclerosis was the primary outcome, while obstructive CAD was a secondary outcome. We compared three models: traditional cardiovascular risk factors alone, retinal characteristics alone, and a combined model using both traditional and retinal characteristics, by comparing the area under the curve (AUC) of receiver operating characteristic curves.

Results: Among 115 participants (mean age 54 years, 89% male, 95% with undetectable HIV RNA), 61.7% had coronary atherosclerosis and 20.0% had obstructive CAD. Models incorporating retinal characteristics (with or without traditional risk factors) outperformed traditional risk factors alone in detecting coronary atherosclerosis (AUC 0.987 and 0.979 vs. 0.746). The combined model showed sensitivity and specificity of 93.0% and 93.2%, respectively, for coronary atherosclerosis.

Conclusions: In this cohort of Asian PLWH at risk of CVD, retinal characteristics, either alone or combined with traditional risk factors, significantly improved the assessment of coronary atherosclerosis and obstructive CAD.

Abstract No.: 204777

Panel No.: OIM-0645

Atypical Occlusions: Unusual Etiologies of Central Retinal Vein Occlusion — A Case-Based Perspective

First Author: Sudha **RANABHAT**

Co-Author(s): Priya **BAJGAI**, Kiran **SHAKYA**

Purpose: To highlight uncommon etiologies of central retinal vein occlusion (CRVO) and emphasize the importance of systemic workup in patients without conventional risk factors.

Methods: We report three-cases of CRVO with atypical associations: hyperhomocysteinemia linked to alcohol dependancy, isolated hyperhomocysteinemia, and long-term Olanzapine therapy. Ocular examination, multimodal imaging, systemic investigations and multidisciplinary consultations were performed to establish the underlying etiology.

Results: Case 1: A 46-year male with chronic alcohol dependence presented with bilateral CRVO, non-ischemic in right eye (RE), ischemic in left eye (LE). Elevated plasma homocysteine (41.8 $\mu\text{mol/L}$) was identified as the primary cause, likely aggravated by alcohol-induced vitamin deficiency. Treatment with folate, vitamin B6, vitamin B12, and intravitreal bevacizumab improved macular edema but visual recovery was limited in the LE at three months. Case 2: A 26-year healthy male presented with non-ischemic CRVO in the RE and plasma homocysteine of 30.8 $\mu\text{mol/L}$. Patient responded favorably to vitamin supplementation and two intravitreal bevacizumab injections, with complete visual recovery at seven months. Case 3: A 67-year-old female on Olanzapine for schizophrenia* 22 years developed ischemic CRVO in RE. Systemic evaluation excluded vascular and infectious etiologies. Olanzapine was discontinued after psychiatric consultation. Despite intravitreal bevacizumab therapy, at six months, visual recovery was limited due to severe ischemia.

Conclusions: Hyperhomocysteinemia, alcohol consumption, and olanzapine therapy represent rare but important etiologies. Comprehensive systemic evaluation, including metabolic and drug history, is essential in atypical cases of CRVO. Early recognition of such associations allows targeted systemic intervention in addition to ocular therapy, potentially reducing recurrence and systemic thromboembolic complications.

Abstract No.: 206908

Panel No.: OIM-0655

Automated Identification and Quantification of Nonperfusion Area (NPA) on Ultra-Widefield Swept-Source OCT Angiography (SS-OCTA) in Diabetic Retinopathy: Development of Customized Deep Learning Algorithm in the DRIVE Study

First Author: Tai Yong **LOH**

Co-Author(s): Yue **QIU**, Wei Hing **SEAH**, Juling **SIA**, Sandy **ZHOU**, Lingyi **ZHUANG**

Purpose: To evaluate the efficacy of a customized deep learning algorithm for automated quantification of nonperfusion area (NPA) on ultrawide-field swept-source OCT angiography (UWF SS-OCTA) for diabetic retinopathy (DR) severity assessment.

Methods: A convolutional neural network (CNN) based on a multi-scale U-Net backbone with squeeze-and-excitation attention was developed to segment NPAs on en-face SS-OCTA all-retinal-layer (ARL) images acquired using three scan protocols: 6 x 6 mm, 12 x 12 mm, and 29 x 24 mm. The manual ground truth annotations of NPAs on en-face OCTA images were provided by two independent graders and adjudicated by a vitreoretinal specialist. The en-face structural OCT image was incorporated into a separate channel to aid in identification of true NPA. In addition, we implemented a novel preprocessing pipeline to exclude non-gradable regions caused by artifacts. Segmentation outputs yielded total NPA and NPA index (NPI) as the fraction of NPA over gradable area. Pixel-level accuracy was summarized with the F1 score.

Results: Our deep learning algorithms achieved a mean F1 score of 0.83 ± 0.01 in 6 x 6 mm, 0.83 ± 0.02 in 12 x 12mm, and 0.83 ± 0.02 in 29 x 24mm. F1 score was invariant across different FOVs ($p = 0.133$). NPI quantification achieved strong agreement between the algorithm and the independent human grader, indicating its clinical utility. Both AI prediction and ground truth labelling showed NPI rising significantly with increased DR severity in 6 x 6 mm ($p = 0.03$), 12 x 12 mm ($p < 0.001$), and 29 x 24 mm images ($p < 0.001$). The magnitude of increase in NPI was the most significant in 29 x 24 mm images and the least significant in the 6x6 mm images.

Conclusions: This CNN-U-Net-based algorithm enables accurate quantification of NPAs across various FOV, including UWF on SS-OCTA.

Abstract No.: 206373
Panel No.: OIM-0650

Comparative Detection of Neovascularization and Intra-Retinal Microvascular Abnormalities in Diabetic Retinopathy: Color Fundus Photography vs. Swept-Source OCT Angiography in Cataract Patients

First Author: Pavan **PANIHARAM**

Co-Author(s): Yusra **ASAD**, Ser Koon **GOH**, Sandy **ZHOU**

Purpose: To compare the detection and quantification of neovascularization (NV) and intra-retinal microvascular abnormalities (IRMA) between color fundus photography and swept-source OCT angiography (SS-OCTA) in diabetic patients, and to assess the impact of lens status on this difference.

Methods: This prospective study included 64 eyes from 39 diabetic patients. All eyes underwent color fundus photography (graded using ETDRS criteria- gold standard) and ultra-widefield SS-OCTA (26×21 mm and 29×24 mm). Two masked graders independently assessed both modalities for the presence and number of NVs and IMRAs. Both detection rates and counts were compared between imaging modalities and stratified by lens status (phakic vs. pseudophakic) as well as cataract status using Shapiro-Wilk and Wilcoxon Signed-Rank tests.

Results: SS-OCTA identified significantly more NVs and IMRAs than fundus photography and detected a higher number of lesions overall. This difference was evident in both phakic and pseudophakic eyes, but more pronounced in the phakic group. In phakic eyes, OCTA revealed a greater number of NVs and IMRAs compared to fundus photos, likely due to cataract-related media opacity. In pseudophakic eyes, the difference in NV and IRMA counts between OCTA and fundus photography was smaller but still significant.

Conclusions: SS-OCTA outperforms color fundus photography in detecting and quantifying neovascularization and IRMA in diabetic eyes, with cataracts further limiting the sensitivity of fundus imaging. Ultra-widefield SS-OCTA is an increasingly useful tool enabling efficient and timely diagnosis as well as quantification of the severity of disease in DR patients, hence facilitating prompt initiation of treatment and optimisation of individualised follow-up intervals, enhancing patient care.

Abstract No.: 203778
Panel No.: OIM-0643

Comparison of Macular Ganglion Cell Layer and Peripapillary Retinal Nerve Fiber Layer Thickness for Early Glaucoma Detection Using Optical Coherence Tomography

First Author: Ruth Lyra **YAP**

Co-Author(s): Irene **FELARCA**, Maria Imelda **YAP-VELOSO**

Purpose: To compare the diagnostic capability of macular ganglion cell layer (mGCL) thickness and peripapillary retinal nerve fiber layer (pRNFL) thickness, measured by optical coherence tomography (OCT), in differentiating normal eyes, glaucoma suspects, and early, moderate, and severe glaucomatous eyes.

Methods: A prospective cross-sectional study was conducted involving adult subjects divided into normal, glaucoma suspect, and early, moderate, and severe glaucoma groups. Mean thickness values for mGCL and pRNFL were measured using Cirrus HD-OCT. Area under the receiver operating characteristic curve (AUC), sensitivity, and specificity were calculated to determine diagnostic accuracy.

Results: Both mGCL and pRNFL thickness progressively decreased from normal to suspect to early, moderate, and severe glaucomatous eyes. For distinguishing normal from early glaucoma, mGCL achieved an AUC of 0.74 with sensitivity of 66.7% and specificity of 82.6%, while pRNFL showed an AUC of 0.72, sensitivity of 48.2%, and specificity of 91.3%. Differences in AUCs were not statistically significant across all groups. Sectoral thinning in the superotemporal and inferotemporal macula was noted early in disease progression.

Conclusions: mGCL thickness analysis may provide complementary value to pRNFL measurement in detecting early glaucomatous changes. Combined evaluation can enhance structural assessment, supporting earlier diagnosis and timely management of glaucoma.

Abstract No.: 206655
Panel No.: OIM-0653

Comparison of Ocular Parameters and Target Refractive Error in Chinese Subjects Aged 50 and Above Using CASIA2 Anterior Segment Optical Coherence Tomography and Oculus Pentacam AXL

First Author: Hoi Ching **PANG**

Co-Author(s): Kendrick Co **SHIH**

Purpose: To compare the ocular parameters and target refractive error in Chinese emmetropic, hypermetropic, and myopic eyes, obtained by two optical biometric instruments: the CASIA2 AS-OCT (Tomey, Japan) and

Pentacam AXL (Oculus, Germany), using two different IOL power calculation formulae.

Methods: The right eye of 174 consecutive subjects above 50 underwent biometric assessment using CASIA2 and Pentacam AXL devices in this random population-based cross-sectional study. Ocular parameters and target refractive error were compared using a constant IOL SEQ equal to 19.50. Measurements expressed as mean and standard deviation. Differences between devices, using Barrett UII and SRK/T formulae, and across emmetropes, hypermetropes, and myopes were determined using the Wilcoxon signed-rank test and the Kruskal-Wallis test. The agreement in ocular biometry and IOL power between the 2 devices was evaluated by the Bland-Altman method.

Results: A total of 174 eyes of 174 subjects were analyzed. Mean age was 60.49; 66.67% were female; 134 emmetropes, 7 hypermetropes, 33 myopes. No significant differences in measured ocular parameters between devices and across emmetropes, hypermetropes and myopes. For target refractive error, statistically significant differences were noted for all three groups, with the difference being highest using Barrett UII formula and in myopes (0.31 ± 0.22), followed by emmetropes (0.26 ± 0.27), then hypermetropes (0.25 ± 0.29). There were no statistically significant differences in target refractive error between the two formulae.

Conclusions: Despite using different imaging principles, the parameters obtained by the two devices are comparable across a range of axial lengths. There were statistically significant differences in target refractive error between devices, but these would be within a clinically acceptable margin of error.

Abstract No.: 202173

Panel No.: OIM-0640

Concurrent Ocular and Cerebral Toxoplasmosis: Delayed Diagnosis of HIV

First Author: Reema BANSAL

Co-Author(s): Shilpa SABU

Purpose: Concurrent ocular and cerebral toxoplasmosis are very rare. We report the role of ocular imaging in diagnosing ocular toxoplasmosis in an atypical posterior uveitis. Subsequently, cerebral imaging and serological investigations revealed cerebral toxoplasmosis and HIV.

Methods: An 18-year-old woman had decreased vision (counting fingers) in her left eye for two months. Fundus examination showed a large, creamish-yellow, subretinal lesion with exudative retinal detachment, mimicking a subretinal abscess. She reported worsening of symptoms after oral corticosteroids were prescribed elsewhere. Multimodal imaging was done. Optical coherence tomography (OCT) revealed punctate vitreous opacities, retinal thickening with loss of retinal layer details ('Smudge effect'), posterior

hyaloid thickening, choroidal shadowing, and serous retinal detachment. Ocular toxoplasmosis was suspected. Toxoplasma gondii IgG was positive and IgM equivocal. She received intravitreal and oral anti-Toxoplasma therapy.

Results: At 3 weeks, the lesion showed healing. However, the patient appeared lethargic and confused. MRI brain revealed a well-defined lesion with altered intensity in the right thalamus that was isointense on T1 and T2, suggestive of cerebral toxoplasmosis. With no known history of immunocompromised status, a detailed systemic evaluation revealed positive HIV-1. The patient was referred for Highly Active Antiretroviral Therapy. At 3 months, the fundus showed scarring, with 3/60 vision.

Conclusions: Cerebral toxoplasmosis is seen in immunocompromised individuals, particularly in HIV infected individuals without treatment or prophylaxis. In this case, a clinical diagnosis of ocular toxoplasmosis based on imaging (OCT) findings led to the diagnosis of cerebral toxoplasmosis, and a delayed diagnosis of HIV-1 in an unmarried young woman.

Abstract No.: 205037

Panel No.: OIM-0646

Detecting Visual Field Progression by Cluster MD vs Global MD Trend Analysis Among Glaucoma Patients in the Philippine National Specialty Center for Eye Care

First Author: Erick Reagan ONG

Co-Author(s): John Mark DE LEON, Daryle Jason YU

Purpose: To compare glaucomatous VF progression identified by cluster MD trend analysis versus global MD trend analysis among glaucoma patients.

Methods: This retrospective study included glaucomatous eyes with at least 4 reliable visual field (VF) tests conducted using the EyeSuite® software on the Octopus® 900 perimeter. All tests were performed with the G-standard dynamic strategy with a minimum follow-up of one year. Eyes with other ocular conditions affecting VF or those that underwent cataract surgery during the follow-up period were excluded. The perimeter software grouped VF test points into functionally related clusters, each labeled numerically for individual trend analysis. Progression analysis was performed using software-generated linear regression, identifying statistically significant changes at $p < 0.05$ and $p < 0.01$ levels for both global and cluster trends. Eyes identified with progression in at least one cluster were classified as progressing.

Results: A total of 71 glaucomatous eyes were included in the study. The mean patient age was 66 years ($SD=9.0$) and the majority were female (76.1%). The most common diagnosis was angle-closure glaucoma (32.4%), followed by normal-tension glaucoma (25.4%), and primary open-angle glaucoma (15.5%).

At baseline MD, 29 eyes (40.85%) had mild glaucoma, 31 (43.66%) had moderate, and 11 (15.49%) had severe glaucoma. Each eye had a median of 5 VF tests (IQR=4.0), with a mean follow-up duration of 11.77 ± 3.12 months between the first and last tests. The mean baseline LogMAR visual acuity was 0.096 (SD=0.175) and 0.103 (SD=0.136) at the final visit. Global MD trend analysis identified progression in 2.82% of eyes at the $p < 0.05$ level and in 1.41% at the $p < 0.01$ level. In contrast, cluster MD trend analysis detected progression in 38.03% and 19.72% of eyes at the same level of significance respectively. Among the ten clusters, cluster 5 was most frequently flagged in the uncorrected analysis at $p < 0.05$, while cluster 6 in the corrected cluster analysis. At $p < 0.01$ level, uncorrected cluster 6 showed the highest frequency of progression, whereas clusters 1 and 10 in the corrected cluster. By the end of the follow-up period, cluster analysis identified a significantly greater number of progressing visual fields compared to global analysis at both the $p < 0.05$ ($p < 0.001$) and $p < 0.01$ ($p = 0.002$) thresholds. Cluster analysis detected a higher proportion of progression in eyes with mild (55.17%) and moderate (41.94%) glaucoma compared to global analysis which identified progression in only 3.45% and 6.45% of these cases respectively ($p = 0.066$). The mean time to progression was significantly shorter in cluster analysis (6.14 ± 11.74 months) compared to global analysis (31 ± 17.32 months; $p = 0.023$).

Conclusions: Cluster-based trend analysis is more sensitive in detecting visual field progression compared to global MD trend analysis in mild to moderate glaucoma.

Abstract No.: 205597

Panel No.: OIM-0647

Diagnosis Performance of Diabetic Retinopathy Using Ultra-Wide Field Color Fundus Imaging and Artificial Intelligence: A Systematic Review and Meta-Analysis

First Author: Kunihiro HIROSAWA

Co-Author(s): Akie INOMATA, Takenori INOMATA, Ken NAGINO, Shintaro NAKAO

Purpose: To clarify the current status and diagnostic performance of diabetic retinopathy (DR) screening using ultra-wide field (UWF) color fundus images and artificial intelligence (AI)-based analysis.

Methods: We conducted a systematic review and meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Articles published up to February 9, 2025, were retrieved from PubMed, Scopus, Cochrane Library, and Web of Science. Search terms included variations of "diabetic retinopathy," "artificial intelligence," and "ultra-wide field imaging." Eligible studies that assessed AI-based DR screening using UWF color fundus images were included, and

diagnostic performance outcomes were pooled for meta-analysis.

Results: Of 523 identified studies, 17 met inclusion criteria for systematic review, and 6 were eligible for meta-analysis. All included studies (2017–2024) used images obtained with Optos®. The meta-analysis showed that AI-based DR screening with UWF color fundus images achieved 85.1% sensitivity, 72.5% specificity, and an AUC of 0.870 (95% CI, 0.838–0.897). For proliferative DR, sensitivity and specificity were higher at 94.2% and 96.9%, respectively.

Conclusions: AI-based evaluation of UWF color fundus images demonstrates high sensitivity but limited specificity compared with prior standards based on conventional color fundus photographs. Nevertheless, the broader retinal coverage of UWF imaging may provide additional advantages in assessing DR severity, particularly with the development of larger, high-quality datasets.

Abstract No.: 208433

Panel No.: OIM-0659

Long-Term Sequelae of CMV Retinitis: A Review of Macular Vasculature on OCTA

First Author: Mary HO

Co-Author(s): Lawrence IU, Andrew MAK, Posey WONG, Alvin YOUNG

Purpose: The purpose of this study was to evaluate the long-term sequelae of cytomegalovirus (CMV) retinitis on macular vasculature using optical coherence tomography angiography (OCTA).

Methods: This prospective, observational study recruited patients with a prior history of CMV retinitis from 2011 to 2020 at the Prince of Wales Hospital, Hong Kong. Patients were identified through an electronic database, and diagnosis was confirmed through clinical appearance and laboratory evidence of CMV infection. Age-matched controls were included. Subjects underwent comprehensive ophthalmic examination and retinal imaging with OCT and OCT-A. Quantitative OCT-A parameters, including vascular density (VD), skeleton density (SD), foveal avascular zone (FAZ) area, vessel diameter index (VDI), fractal dimension (FD), and macular choroidal thickness (MCT), were analyzed. Statistical comparisons between affected, unaffected, and control eyes were performed using paired or two-sample t-tests as appropriate, with $p < 0.05$ considered significant.

Results: Of 27 identified patients, 8 with gradable OCT-A images were analyzed. Six had unilateral and two had bilateral CMV retinitis. The mean age was 57.9 years, with a mean follow-up of 74 months. No statistically significant differences in VD, SD, FD, VDI, FAZ area, or MCT were found between affected and unaffected eyes, or between affected eyes and age-

matched controls. Quantitative parameters of retinal microvasculature were similar across groups.

Conclusions: Peripheral CMV retinitis may not have significant long-term detrimental effects on macular vasculature as measured by OCT-A. Although transient or reversible capillary perfusion compromise cannot be excluded, this study did not identify significant chronic microvascular changes.

Abstract No.: 205696

Panel No.: OIM-0648

Magnetic Resonance Imaging Study of Primary Inferior Oblique Overaction

First Author: Ziyuan LI

Purpose: To quantitatively determine the morphology and contractility of the inferior oblique (IO) muscle in primary IO overaction (PIOOA), to facilitate the pathogenesis and diagnosis of PIOOA.

Methods: A prospective, observational study was conducted on 7 patients (14 eyes) with PIOOA and 6 (12 eyes) healthy, orthotropic subjects. High-resolution magnetic resonance imaging (MRI) was used to obtain sets of contiguous, 2-mm-thick sagittal images of the two groups of subjects repeated in multiple vertical gaze positions. Post-processing computer image system was used to measure the IO muscle maximum cross-sectional area, maximum contractility, vertical diameter, horizontal diameter, and volume of the two groups, and to analyze the combination between the clinical grade of elevation in adduction of the inferior oblique muscle and the MR image of the case group.

Results: From the contiguous, 2-mm thick sagittal images of all subjects (23 eyes), the Inferior oblique (IO) cross-sectional area was greater in supraduction than in infraduction. The plane of IO maximum cross-sectional area lay 2mm temporal to the center of the Inferior rectus muscle (IR), while the plane of IO maximum contractility lay in the center of the IR. Compared the two groups of subjects, ipsilesional IO maximum cross-sectional area ($15.15 \pm 2.08 \text{ mm}^2$) was greater than that of the normal control group ($13.20 \pm 1.62 \text{ mm}^2$) ($P=0.023$), while ipsilesional IO maximum contractility ($5.23 \pm 1.30 \text{ mm}^2$) did not differ from that of normal subjects ($4.30 \pm 1.06 \text{ mm}^2$) ($P=0.080$).

Conclusions: High-resolution sagittal MRI technology can image the inferior oblique muscle well. In PIOOA, the ipsilesional IO is greater in size than in controls, with no difference in contractility, which suggests that IO muscle hypertrophy underlies PIOOA.

Abstract No.: 208288

Panel No.: OIM-0657

Neuroretinal Rim Width and Diabetic Retinopathy Progression: A Prospective Cohort Study

First Author: Man Wai Adrian LEE

Co-Author(s): Carol CHEUNG, Danqi FANG, Truong NGUYEN, Ka Ho SZETO, Chunwen ZHENG

Purpose: To assess whether neuroretinal rim, quantified by Bruch's membrane opening minimum rim width (BMO-MRW), predicts diabetic retinopathy (DR) progression.

Methods: This prospective cohort study included 348 eyes with either no DR or nonproliferative DR at baseline. Global and sectoral BMO-MRW thickness was measured using Spectralis OCT (Heidelberg Engineering, Heidelberg, Germany) with 24 radial B-scans. The primary endpoint was DR progression, defined as a ≥ 2 -step increase in severity according to the modified Airlie House classification. Cox proportional hazards models estimated hazard ratios (HR) per standard deviation (SD) decrease in BMO-MRW thickness, adjusting for age, diabetes duration, baseline DR severity, and axial length. Including temporal BMO-MRW improved predictive discrimination beyond established risk factors.

Results: Over a mean follow-up of 3.0 years, 33 eyes (9.5%) developed DR progression. Among all BMO-MRW sectors, only temporal sector thinning was significantly associated with increased progression risk after multivariable adjustment (HR=1.477 per SD decrease, 95% CI: 1.009-2.161, $p=0.045$). Risk stratification using a temporal BMO-MRW threshold of $\leq 183 \mu\text{m}$ (25th percentile) identified a high-risk group with a 17.0% progression rate compared to 6.9% in the low-risk group ($>183.0 \mu\text{m}$) (relative risk=2.46, $p=0.010$).

Conclusions: Temporal neuroretinal rim thinning measured by OCT independently predicts DR progression, enabling effective risk stratification and supporting personalized monitoring strategies in DR management.

Abstract No.: 200765

Panel No.: OIM-0638

OCT Biomarkers in Predicting Outcomes of Macular Oedema Secondary to Retinal Vein Occlusion Treated With Anti-VEGF Therapy

First Author: Kin Ken TSANG

Co-Author(s): Yim Lui Carol CHEUNG, Wing-ki Vivian HUI, Yuk Yau Timothy LAI, Ming Kei Christopher PANG, Ka Ho SZETO

Purpose: To investigate the role of optical coherence tomography (OCT)-based biomarkers in predicting treatment response of macular oedema (MO)

secondary to retinal vein occlusion (RVO) to anti-vascular endothelial growth factors (VEGF) therapy.

Methods: Retrospective cohort study including RVO associated MO patients who received anti-VEGF injections between January 2020 and April 2021. Visual acuity (VA) at baseline, 12, and 24 months was correlated with a panel of OCT-based biomarkers, including vitreomacular status, size of intra-retinal cysts (IRC), presence of disorganization of retinal inner layers (DRIL), hyper-reflective foci (HRF) in the retina, integrity of the external limiting membrane (ELM), ellipsoid zone (EZ), cone outer segment tip (COST) and presence of subretinal fluid (SRF).

Results: One hundred and thirty eyes were included. There were 81 and 49 eyes in the BRVO and CRVO subgroup, respectively. In both subgroups, baseline disrupted EZ/ELM were associated with worse VA from baseline through 24 months. In the BRVO subgroup, the improvement in DRIL extent and EZ/ELM integrity were associated with higher likelihood in achieving at least 5 letters gain at 12 and 24 months.

Conclusions: A comprehensive and clinician-friendly grading system of OCT-based features could predict functional outcomes of MO secondary to RVO with anti-VEGF therapy up to 24 months.

Abstract No.: 206895

Panel No.: OIM-0654

Optical Assessment of Tear Film Thickness in Healthy and Keratoconic Eyes Using Scheimpflug Ocular Coherence Tomography Imaging

First Author: Gaurav PANDE

Co-Author(s): Raghav NARASIMHAN, Abhijit Sinha ROY, Rohit SHETTY

Purpose: To quantify tear film thickness (TFT) in early keratoconus (KC) and healthy eyes and correlate it with tear biomarkers.

Methods: One hundred eyes were included, which underwent a prospective, case-control, single-centre study and were grouped into early KC (n=50) and healthy eyes (n=50). Imaging was done with Pentacam OCT, a Scheimpflug-based ultra-high resolution, widefield OCT with axial resolution of ~1.4µm and scan diameter of 12mm. Custom edge detection and segmentation software were developed to calculate TFT. 25 radial OCT B-scans were also acquired. Additionally, tear samples were analysed for 8 biomarkers. Artificial Intelligence (AI) predicted scores were derived from these biomarkers.

Results: In the central 5 mm zone of imaging, the mean TFT was found to be 3.09 µm (KC) and 3.16 µm(healthy). As the zone size increased, the mean TFT decreased in KC patients (p<0.05). It was also found that all biomarkers were elevated in KC eyes. Matrix Metalloproteinase Protein (MMP-9) strongly correlated

with the AI predicted score (Spearman correlation coefficient $r = 0.684$, $P = 0.0291$) in KC.

Conclusions: A new Scheimpflug-based optical imaging technique can be used to quantify TFT and correlate with the incidence of ocular inflammation. Routine evaluation of TFT can provide refined clinical assessment in conjunction with using AI models, one could support the treatment of patient symptoms in healthy and KC eyes.

Abstract No.: 201577

Panel No.: OIM-0639

Optical Coherence Tomography Angiography Biomarkers for Predicting Visual Outcome in Epiretinal Membrane Patients

First Author: Jeffrey LO

Co-Author(s): Ivan CHOW, Nicholas FUNG

Purpose: To compare Optical Coherence Tomography Angiography (OCTA) biomarkers in epiretinal membrane eyes (ERM) and normal eyes and to investigate the association between each biomarker and visual acuity.

Methods: A prospective cross-sectional population study of the right eye of 6011 participants aged above 50 was performed. Central subfield thickness (CST_A), foveal avascular zone (FAZ_A), mean vessel density (mVD_full) and mean capillary perfusion density (mCPD_full) were measured by OCTA. The cut-off values of significantly associated biomarkers for different best corrected visual acuity (BCVA LogMar $\geq 0 / 0.2 / 0.3$) in ERM eyes were determined using receiver operating characteristic (ROC) and Area under curve (AUC) analysis.

Results: ERM eyes had a significantly higher CST_A ($P=0.0000$) and a smaller FAZ_A ($P=0.0002$) compared to normal eyes. Both mVD_full and mCPD_full were lower in ERM eyes when compared with normal eyes ($P=0.0001$). No significant association was found between FAZ_A and BCVA LogMAR. Better visual outcome is associated with smaller CST_A (beta =0.0005858), larger mVD_full (beta=-0.0106) and mCPD_full (beta=-0.3913). Cut off values of the three significantly associated OCTA biomarkers were demonstrated, with CST_A having an acceptable diagnostic power for predicting BCVA LogMar ≥ 0.3 in 0.3 in ERM eyes (AUROC value =0.708). The AUROC values of other biomarkers were less than 0.7 in predicting BCVA in ERM eyes.

Conclusions: OCTA biomarkers such as CST_A, mVD_full and mCPD_full had a significant association with BCVA in ERM eyes. However, FAZ_A had no significant correlation with best corrected visual acuity. CST_A was found to have an acceptable diagnostic power for predicting BCVA in ERM eyes.

Abstract No.: 206344**Panel No.: OIM-0649**

Predicting Gonioscopic Angle Closure Using Optical Coherence Tomography Parameters in Chinese Individuals

*First Author: Catherine Yik Tsz LAM**Co-Author(s): Kin Pong LAU, Kendrick Co SHIH*

Purpose: To evaluate the predictive performance of optical coherence tomography (OCT)-derived angle parameters — angle opening distance (AOD), angle recess area (ARA), trabecular-iris space area (TISA), and trabecular-iris angle (TIA) — in identifying gonioscopic angle closure among Chinese subjects.

Methods: This cross-sectional, population-based study included 1,599 right eyes from 1,599 consecutive Chinese individuals aged ≥ 50 years. Anterior segment imaging was performed using CASIA2 swept-source OCT (SS-OCT) (50,000 A-scans/s; 800 A-scans/B-scan). Each eye underwent three scans under dark-room conditions (0.26s per scan). Angle parameters (AOD500, TISA500, ARA500, TIA500) were computed 500 μm anterior to the scleral spur after manual spur localization by a single observer in nasal and temporal angles. For analysis, each metric was summarized at the eye level as the minimum of the two angles. A single-threshold classifier per metric was trained with 5-fold cross-validation. In each fold, the decision threshold was derived on the training partition by maximizing Youden's index. Performance was computed from out-of-fold predictions. Sensitivity, specificity, and area under the receiver operating characteristic curve (AUROC) were reported.

Results: Gonioscopic angle-closure prevalence was 24/1,599 (1.5%). AOD500 ≤ 0.17 mm yielded 79% sensitivity and 83% specificity (AUROC=0.876). TIA500 $\leq 22^\circ$ had 79% sensitivity and 77% specificity (AUROC=0.875). TISA500 ≤ 0.088 mm² had 88% sensitivity and 67% specificity (AUROC=0.844). ARA500 ≤ 0.082 mm² had 58% sensitivity and 79% specificity (AUROC=0.776).

Conclusions: Among the OCT-derived parameters, AOD500 had the best balance between sensitivity and specificity in predicting gonioscopic angle closure. These validated thresholds support technician-friendly triage using OCT to prioritise gonioscopy and rule out angle closure in low-prevalence settings.

Abstract No.: 206668**Panel No.: OIM-0652**

Prevalence and Clinical Characteristics of Dark Without Pressure Retinal Changes in a Chinese Hospital-Based Population

*First Author: Junmeng LI**Co-Author(s): Jianchen HAO, Liu YANG, Ruilin ZHU*

Purpose: This study investigates the clinical characteristics and prevalence of dark without pressure

(DWP) retinal changes in a hospital-based Chinese population and evaluates its association with common fundus diseases.

Methods: This cross-sectional study analyzed data from 6787 eligible patients recruited from the Ophthalmology Department of Peking University First Hospital between April and July 2023. All participants underwent ultra-wide-field color fundus photography (UWF CFP) for the detection of DWP. Patients were screened by excluding those without UWF CFP images, with blurred images, or who had undergone intraocular surgery, while consolidating duplicate visits. Participants were categorized into diseased ($n = 3741$) and control ($n = 3046$) groups. Prevalence rates were compared between the control group and various disease subgroups (including age-related macular degeneration [AMD], diabetic retinopathy, high myopia, uveitis, retinal hole [RH], retinal detachment [RD], and retinal vein occlusion), as well as across demographic strata, using chi-square tests.

Results: The overall prevalence of DWP was 21.84% (1481/6787), with a prevalence of 18.55% (565/3046) in the control group. Patients with RH showed the highest prevalence (35.33%, 59/167), whereas those with AMD exhibited the lowest (19.50%, 86/441). There were significant differences in prevalence between the control group and most disease subgroups (all $P < 0.05$), except for AMD ($P = 0.632$). Additionally, DWP prevalence was inversely associated with age ($P < 0.05$) but did not differ by gender ($P > 0.05$). Longitudinal observation revealed diverse DWP patterns, including complete progression, gradual reduction, and bidirectional progression-regression.

Conclusions: DWP is common in Chinese cohorts, especially younger adults and those with retinal disorders, necessitating individualized monitoring. Its progression is a potential biomarker, warranting further study.

Abstract No.: 206569**Panel No.: OIM-0651**

Retinal Microvascular Signature and Risk of Incident Polyvascular Disease in Patients With Pan-Vascular Disease: A Population-Based Cohort Study

*First Author: Yun REN**Co-Author(s): Cong LI, Lei LIU, Xiaohong YANG, Honghua YU*

Purpose: A major limitation in pan-vascular medicine is the reliance on organ-specific assessments, which may inadequately capture the systemic risk of progression to polyvascular disease. This study aimed to determine if a quantitative retinal microvascular signature could serve as a novel biomarker for a more holistic risk stratification.

Methods: This prospective cohort study included 2,592 UK Biobank participants with prevalent single-vessel disease at baseline. A fully automated system was used to quantify the retinal microvascular signature, a multidimensional panel of metrics assessing vascular branching, calibre, tortuosity, density, and complexity, from fundus photographs. Multivariable Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for incident polyvascular disease.

Results: During a median follow-up of 10.06 years, 334 incident cases of polyvascular disease were documented. In the fully adjusted model, metrics of arteriolar branching angle (HR, 1.15; 95% CI, 1.04-1.28) and arteriolar tortuosity (HR, 1.17; 95% CI, 1.06-1.28) were significantly associated with an increased risk of incident polyvascular disease. Conversely, metrics of network density (HR, 0.84; 95% CI, 0.77-0.96) and complexity (HR, 0.84; 95% CI, 0.75-0.94) were associated with a lower risk.

Conclusions: The retinal microvascular signature is an independent predictor of incident polyvascular disease beyond conventional risk factors. These findings validate the retinal microvasculature as a source of novel biomarkers for systemic vascular risk. Quantitative retinal analysis therefore represents a promising modality to advance beyond organ-specific paradigms towards a more integrated approach to patient management in pan-vascular medicine.

Abstract No.: 202706

Panel No.: OIM-0641

The Application of Optical Coherence Tomography Angiography Examination in Preoperative Differential Diagnosis of Ocular Surface Tumor

First Author: Jing XU

Purpose: To investigate the efficiency of optical coherence tomography angiography (OCTA) in auxiliary diagnosis for ocular surface tumor.

Methods: On initial visit, detailed medical history collection, visual acuity, intraocular pressure, slit-lamp examination, and OCTA were performed. The histopathological examination was conducted for postoperative definitive diagnosis. The patient with a clear diagnosis of ocular surface tumor was recruited for the study.

Results: A 77-year-old woman presented to the ophthalmology department with a 5-year history of a painless neoplasm in her left eye. She had no history of tumors and no family history of ocular disease. On initial examination, her visual acuity was 20/40 OD and 20/50 OS. Intraocular pressures were 16.6 mmHg OD and 19.7 mmHg OS. Pupils were round and reactive without a relative afferent pupillary defect. Slit-lamp examination showed an isolated papillary tumor on the

limbal conjunctiva with prominent conjunctival blood vessels extending to the tumor. OCTA demonstrated the blood vessels of the neoplasm in the shape of "popcorn" and blood vessels extending beneath the surface of sclera.

Conclusions: Preoperative OCTA examination could contribute to distinguishing between malignant and benign tumors through the visualization of vessel depth. It can also evaluate the blood supply of ocular-surface abnormalities.

Ocular Oncology and Pathology

Abstract No.: 210367

Panel No.: OPA-0695

A Case of Orbital Solitary Fibrous Tumor Recurring With Extensive Sinonasal Invasion Following Eyeball Enucleation

First Author: Jiayin CAI

Co-Author(s): Jian LI, Jianguang ZHONG

Purpose: To describe the clinical features, differential diagnosis, management, and clinical significance of a rare case of orbital primary solitary fibrous tumor (SFT) characterized by multiple recurrences and extensive invasion into the paranasal sinuses.

Methods: A systematic case description, comprehensive data collection, and literature review were performed. The patient presented with complaints of «left periorbital swelling, frontal and facial discomfort, decreased tear secretion, and occasional headache and dizziness.» Histopathological and imaging findings confirmed the diagnosis as a recurrent orbital primary solitary fibrous tumor with extensive spread to the paranasal sinuses. Notably, this recurrence occurred after three previous episodes and subsequent enucleation of the affected eye.

Results: This case demonstrates that orbital solitary fibrous tumor can exhibit an insidious early onset, a protracted disease course, a propensity for frequent recurrence, significant invasiveness, and poses substantial challenges for disease management.

Conclusions: As a rare orbital tumor, SFT possesses a high potential for recurrence and invasion, warranting considerable clinical attention. Complete resection remains the treatment of choice for SFT. Postoperative adjuvant radiotherapy or chemotherapy should be considered, accompanied by stringent and long-term follow-up.

Abstract No.: 200403**Panel No.: OPA-0660****Against the Odds: Globe Preservation in Group D and E Retinoblastoma With Intra-Arterial Chemotherapy***First Author: Taryaba MALIK**Co-Author(s): Noor UL AIN*

Purpose: The objective of this study was to evaluate the effectiveness of IAC in Group D and E retinoblastoma, with a specific focus on globe salvage, in a retinoblastoma center in Pakistan.

Methods: It was a retrospective study in which patients with retinoblastoma of groups D and E were included. Demographic and clinical data were retrieved from the ophthalmology department of Lahore General hospital. Patients received six cycles of intravenous chemotherapy followed by IAC. Up to four IAC sessions were administered. Tumor regression was assessed one month post-IAC, and globe salvage was defined by sustained stability over six months.

Results: There were 55 eyes of 55 patients. Mean age was 20.96 ± 14.03 months. Twenty-nine eyes had group D, and 26 had group E retinoblastoma. Tumor regression was noted in most of both groups, with no significant difference. Globe salvage with vision was observed more frequently in Group D (44.8%) compared to Group E (19.2%). Enucleation and loss of visual function were more common in Group E. Ischemic toxicity was rare, signifying the relative safety of IAC.

Conclusions: IAC is an effective globe-sparing treatment for retinoblastoma, achieving high rates of tumor regression and globe salvage, even in advanced disease stages.

Abstract No.: 206819**Panel No.: OPA-0689****An Unusual Case of Retinoblastoma Masquerade***First Author: Tapashree GHOSH**Co-Author(s): Bhavna CHAWLA*

Purpose: We report a unique and interesting case of leukocoria in a child, with clinical and imaging findings suggestive of retinoblastoma, but subsequently proven otherwise on histopathology.

Methods: Case report.

Results: A 5-year-old female presented with a whitish reflex and mild proptosis in the left eye (LE). Visual acuity was 6/6 in the right eye and light perception only in LE. Examination revealed a normal right eye, while the LE showed a cataractous lens, mild proptosis, posterior synechiae, and elevated intraocular pressure (35 mmHg). Fundus visualization was not possible in LE. Ultrasound B scan demonstrated an intraocular mass with calcification in LE. MRI orbits revealed a

retinal mass extending upto the lens, hyperintense on T1, hypointense on T2 sequences, without optic nerve or coat involvement, consistent with retinoblastoma. Given the poor visual prognosis and raised IOP, enucleation was recommended. Enucleation with implant placement was performed. Histopathology unexpectedly revealed large epithelial granulomas with giant cells, consistent with ocular tuberculosis, without evidence of malignancy.

Conclusions: This case demonstrates the diagnostic complexity of pediatric ocular conditions. Despite clinical presentation and imaging findings strongly suggesting retinoblastoma, histopathological examination revealed tuberculosis infection.

Abstract No.: 204944**Panel No.: OPA-0680****Analysis of the Current Status of Stigma and Factors Affecting Parents of Children With Retinoblastoma***First Author: Wei XU*

Purpose: To understand the current status of stigma among parents of children with retinoblastoma (RB) and its influencing factors.

Methods: The fathers or mothers of 135 children with RB were selected and surveyed using the General Information Questionnaire, Social Influence Scale, Social Support Rating Scale, General Self-Efficacy Scale, and Simple Coping Styles Scale.

Results: The total score of the Caregiver Stigma Scale for children with RB was 55.00 (49.00, 63.00), the total score of the Social Support Scale was 31.00 (23.00, 37.50), the total score of the General Self-Efficacy Scale was 21.00 (16.50, 26.00), and the Positive Coping Score was (26.44 ± 8.599) , and the Negative Coping Score was (12.54 ± 5.406) points. The results of multifactorial analysis showed that total social support score, disease stage, coping tendency, and type of health insurance were the influencing factors of parental stigma in RB, which together explained 37.2% of the total variance.

Conclusions: Parental stigma in children with RB is at a high level and needs to be further improved. Clinical caregivers should pay attention to the disease stage, type of medical insurance, and coping tendency of children with RB, correctly guide and improve the use of social support, reduce the level of the sense of shame of the parents of children with RB, and comprehensively cooperate with the better treatment of children with RB.

Abstract No.: 200859

Panel No.: OPA-0661

Angiogenic Markers in Ocular Tumors: Exploring VEGF Expression and Microvascular Density in Ocular and Eyelid Malignancies

First Author: Priyanka

Co-Author(s): Apjit KAUR, Nibha MISHRA

Purpose: This study investigates the role of angiogenesis in ocular tumors by evaluating vascular endothelial growth factor (VEGF) expression and microvascular density (MVD), aiming to assess the potential utility of antiangiogenic therapy.

Methods: All patients undergoing surgical excision for ocular and eyelid tumors underwent detailed clinical examination, and immunohistochemistry for VEGF and CD105. MVD was quantified using digital image analysis by counting CD105-positive vessels per mm².

Results: A total of 53 patients with eyelid lesions were included, of which 48 (90.5%) were neoplastic and 5 (9.5%) non-neoplastic. Among neoplastic cases, 5 (10.4%) were benign and the majority were malignant, including sebaceous gland carcinoma (25.5%), squamous cell carcinoma (20.9%), basal cell carcinoma (18.6%), and others. Clinical aggressiveness was noted in 56.5% of malignant cases, with metastasis in 4%. VEGF expression in tumor-associated vessels was significantly higher in malignant tumors (60%) compared to benign tumors, and MVD was also elevated in malignancies (65%) ($p=0.023$). However, VEGF expression in tumor cells did not significantly differ between benign and malignant tumors ($p=0.15$), nor did it correlate with clinical aggressiveness. Higher MVD was strongly associated with clinically aggressive tumors ($p=0.0001$).

Conclusions: These findings suggest that increased vascular VEGF and MVD in malignant ocular tumors support the potential use of antiangiogenic therapy, which may help reduce tumor growth and mitigate the need for extensive surgical interventions. Such strategies could be particularly beneficial given the anatomical and functional challenges of eyelid tumor management. Further studies with larger cohorts are warranted to explore therapeutic implications.

Abstract No.: 205430

Panel No.: OPA-0684

Bilateral Uveal Metastases as the Initial Manifestation of Lung Adenocarcinoma

First Author: Tongtong OU

Co-Author(s): Fang LU

Purpose: To report a pioneering case of biopsy-proven bilateral uveal metastases as the initial sign of lung adenocarcinoma, highlighting how pathologic confirmation-guided targeted therapy led to exceptional systemic and ocular outcomes.

Methods: A 40-year-old male presented with unilateral blurred vision (BCVA 0.4 OD). Ophthalmoscopy revealed bilateral uveal masses. After systemic workup confirmed stage IVB lung adenocarcinoma, a transscleral biopsy of the ocular tumor was performed. Immunohistochemistry (TTF-1 positive) provided definitive pathologic confirmation of the metastatic lung origin.

Results: Guided by the pathologic diagnosis, the patient received a combination of local ocular therapy and systemic targeted treatment with the EGFR-TKI entrectinib. This strategy resulted in excellent systemic tumor control. Notably, the patient's BCVA recovered fully to 1.0 in both eyes, and he has survived with stable disease for 3 years.

Conclusions: This case is the first to provide conclusive pathologic evidence (TTF-1 positive) for bilateral uveal metastasis from lung adenocarcinoma. It demonstrates that biopsy-guided targeted therapy with entrectinib can achieve remarkable survival and visual recovery (from 0.4 to 1.0), challenging the dismal prognosis associated with this condition and advocating for a more integrated diagnostic and therapeutic approach.

Abstract No.: 204462

Panel No.: OPA-0677

Choroidal Osteoma in a Young Filipino Female

First Author: Marie Camilla GARGANTA

Co-Author(s): Gary John MERCADO

Purpose: To discuss a rare case of choroidal osteoma and describe clinical features and diagnostic findings.

Methods: Case report.

Results: A thirteen-year-old female presented with a six-year history of progressive blurring of central vision in the left eye. Fundus examination showed an elevated, calcified choroidal lesion in the macula. Multimodal ocular imaging, including Macular optical coherence tomography (OCT-M), B-scan ultrasound, fluorescein angiography (FA), fundus autofluorescence (FAF), and optical coherence tomography-angiography (OCT-A), was done. Macular Optical coherence tomography showed a hyperreflective choroidal elevated mass, disrupting the foveal contour with a lamellar pattern consistent with the appearance of bone. Ocular ultrasound showed a thick, homogenous, high-amplitude echo with posterior shadowing. FA showed early hyperfluorescence with a foveal hypofluorescence. FAF showed a hypoautofluorescent area at the level of the fovea. OCT-A showed vascular flow at the fovea. Physical examination and diagnostic findings were consistent with a choroidal osteoma with foveal decalcification, a sign of poor visual prognostication. The patient is on regular follow-up with stable ophthalmic findings.

Conclusions: Choroidal osteoma can mimic other intraocular tumors and is frequently misdiagnosed. A multimodal imaging approach is essential for accurate diagnosis and detection of secondary complications. While no standardized treatment exists, management is directed at sequelae such as choroidal neovascularization and subretinal fluid, with options including anti-VEGF therapy, photodynamic therapy, and transpupillary thermotherapy, but these have yielded mixed results. Early recognition and close monitoring are critical to maximizing visual potential.

Abstract No.: 206079

Panel No.: OPA-0686

Clinical Characteristics and Treatment Outcomes of Iris Metastasis

First Author: Vidhi **BAJPAI**

Co-Author(s): Vishal **RAVAL**

Purpose: To describe the clinical profile and management of patients with iris metastasis.

Methods: Retrospective case series of patients with clinically or histopathologically confirmed iris metastasis from systemic cancer managed at a tertiary eye care center between 2019 and 2023.

Results: A total of 6 patients with a mean age of 54 years were included. Presenting symptoms included blurred vision with pain (3), pain (2), and eye discoloration (1). All eyes had unilateral amelanotic vascularised iris mass arising from the root of the iris (except one arising near the pupillary margin), irregular anterior chamber depth, and circumferential congestion. Iris neovascularization was noted in 3 eyes with high intraocular pressure in 1 eyes. UBM (4 eyes) showed heterogenous (2)/homogenous (2) echogenic mass arising from the iris stroma, involving the ciliary body in 2 cases. Of 6 patients, 3 patients had a prior cancer diagnosis; in others, iris metastasis led to its diagnosis. The primary sites of cancer were the lung (3), the breast (2), and the renal (1). Treatment included plaque brachytherapy (1), tumor excision (1), and bevacizumab (1). All showed tumor regression and no local recurrence. At the last follow-up (mean 15.6 months), 1 patient died, 2 were alive, and 3 were lost to follow-up.

Conclusions: Iris metastases exhibit distinctive clinical features that can guide diagnosis. Biopsy is especially useful in patients without a known systemic cancer or when the primary tumor is not readily accessible for sampling. Various treatment modalities are effective and should be individualized according to the patient's systemic status and visual prognosis.

Abstract No.: 205262

Panel No.: OPA-0682

Clinicopathologic Review of 42 Cases of Ocular Adnexal Sarcoma

First Author: Yi **WU**

Co-Author(s): Weimin **HE**

Purpose: To study the clinicopathologic features and prognosis of ocular adnexal sarcomas diagnosed at a tertiary comprehensive hospital in China over 13 years.

Methods: We retrospectively reviewed cases with histopathological diagnoses of ocular adnexal sarcomas. Demographics, clinicopathologic features, treatment, and prognosis were analyzed.

Results: Forty-two cases of ocular adnexal sarcomas were found, with a mean age of 37.1 years (27 males, 15 females). The most common clinical manifestations were exophthalmos (61.9%), and the median time to diagnosis was 6 months. Fifteen different histological types were identified; rhabdomyosarcoma was the most frequent (21.4%), followed by liposarcoma and malignant solitary fibrous tumor (16.7%). The diagnosis of each subtype depends on its histomorphologic characteristics, supplemented by immunohistochemistry and molecular pathology. Among 37 patients with follow-up, 24 (64.9%) survived, 13 (35.1%) died, 19 (51.4%) relapsed (mean recurrence interval 16.8 months, up to 6 times), and 13 (35.1%) developed metastasis. Multivariate analysis showed tumor diameter > 3.5cm as a significant predictor of mortality ($P=0.025$).

Conclusions: Ocular adnexal sarcoma is extremely rare, mostly affecting young males. There are numerous histological variants; rhabdomyosarcoma is the most common in children, while liposarcoma and malignant solitary fibrous tumor predominate in adults. Pathological diagnosis requires a combination of histomorphology, immunohistochemistry, and molecular pathology. Prognosis is often poor, and there is a high risk of relapse and metastasis. Tumor diameter greater than 3.5cm is the main factor of poor prognosis.

Abstract No.: 206853

Panel No.: OPA-0688

Comparison of Topical Mitomycin-C and 5-Fluorouracil As Primary Treatment for Ocular Surface Squamous Neoplasia: A Randomized Controlled Trial Study

First Author: Khyati **ROOP**

Co-Author(s): Sima **DAS**, Namita **KUMARI**

Purpose: 1. To compare the efficacy of topical MMC 0.04% vs topical 5-FU 1% as the primary treatment for OSSN. 2. To compare the safety and tolerance of topical MMC 0.04% vs topical 5-FU 1% as primary therapy for OSSN.

Methods: This is a randomized controlled trial conducted from February 2024 to August 2025. Patients with non-invasive treatment naive OSSN were recruited for the study after taking informed consent. Participants were then randomized into 2 treatment groups, namely 5-FU(1%) and MMC(0.04%), using a computer-generated randomization sequence. Clinical history and examination, along with AS-OCT, slit lamp, and external photos, were performed, and response to therapy and side effects were noted at each visit. Participants were followed up 2 weeks till complete resolution of the tumor was noted clinically and on AS-OCT. All cases with no response to the treatment regimen and/or sight-threatening complications due to chemotherapy were removed from the group and managed with alternate treatment options.

Results: This is an analysis of 60 patients enrolled in the study. Complete resolution rates were comparable between groups with (21/28)81.2% in MMC group and (23/26)85.7% in 5-FU group ($p=0.03$) with time to resolution 9.7 ± 5.0 weeks and 9.1 ± 7.3 weeks ($P=0.72$), and number of treatment cycles 2.1 ± 1.3 vs. 2.1 ± 1.5 ($p=0.85$) in MMC and 5-FU respectively, with no statistically significant results. The 5-FU group had more side effects, with 64.2% and 76.9% of patients experiencing at least one adverse event, respectively.

Conclusions: Our study suggests that both drugs have comparable efficacy with higher occurrence of corneal epithelial toxicity is seen with 5-FU.

Abstract No.: 202839

Panel No.: OPA-0672

Congenital Uveal Malignant Melanoma: Oversight or Overreaction? Navigating the Fear of Recurrence

First Author: Shivohn Annalie DA SILVA

Co-Author(s): Pallavi M P, Shruthi TARA

Purpose: To report a rare case of congenital uveal malignant melanoma and illustrate how meticulous follow-up enabled the recognition of suspected recurrence and its distinction from benign pigmentation.

Methods: An 8-month-old male was diagnosed with congenital uveal malignant melanoma and underwent enucleation with myoconjunctivalization technique and placement of a 16-mm acrylic orbital implant at 8 months of age. Metastatic workup was done biannually with clinical examination, orbital imaging, and systemic metastatic workup, including abdominal ultrasonography, complete blood counts, and annual FDG whole-body PET scans, all of which were unremarkable. At 3 years 10 months, following an orbital implant exchange elsewhere for cosmetic concerns, the child presented with lower lid ectropion, poorly fitting prosthesis, shallow fornices, and inferotemporal implant displacement. Surgical exploration revealed dense jet-black pigmentation over

the posterior Tenon's capsule, which was excised and sent for histopathological and immunohistochemical analysis as recurrence was feared.

Results: Histopathology showed no evidence of malignancy. Immunohistochemistry demonstrated CD68 and SOX 10 positive whilst HMB-45, Melan-A and Ki 67 were negative confirming melanophages or benign melanocytes populations rather than malignant recurrence. The possibility of unrecognized congenital ocular melanocytosis was also considered.

Conclusions: This case highlights the complexity of follow-up in Congenital uveal malignant melanoma, where benign pigmentation may mimic recurrence. Careful histopathological and immunohistochemical evaluation, combined with a high clinical suspicion, is essential to distinguish true recurrence from mimickers and prevent unnecessary interventions and patient anxiety in this exceptionally rare pediatric malignancy.

Abstract No.: 201728

Panel No.: OPA-0666

Conjunctival Angiosarcoma Masquerading as Recurrent Pterygium

First Author: Asha DEVI

Co-Author(s): Sanjay BOSAK, Priyanka, Rajendra MAURYA

Purpose: Angiosarcoma is a rare, dangerous vasoformative malignant tumor. We report a rare case of primary conjunctival angiosarcoma masquerading as recurrent pterygium.

Methods: A 55-year-old male was operated on for right eye pterygium one year ago by a private ophthalmologist. After recurrence, he referred the patient to us for further management. On examination, in right eye BCVA was 6/36 and in left eye was 6/60. A diffuse, flashy sub-conjunctival mass of vascular appearance, size 3 x 2 x 1.5 cm, involving the temporal bulbar conjunctiva up to the limbus. The epibulbar conjunctival vessels were injected, and a chemosis was present. The rest of the anterior segment was normal except for early lental changes. In his left eye, he was having an immature cataract. His past medical history was otherwise unremarkable. We operated on the right eye for recurrent temporal pterygium, but the histopathology report was sclerosing haemangioma.

Results: The postoperative period was uneventful, and he underwent another eye cataract surgery. After a 7-month postoperative period, the conjunctival mass recurred and became more extensive. Anterior OCT showed sclera infiltration. Map biopsy was done and immunohistochemistry showed angiosarcoma. The patient underwent a right orbital exenteration followed by orbital irradiation. On follow-up after 6 months, the patient is alive.

Conclusions: Primary conjunctival angiosarcoma is the rarest malignant tumor; its diagnosis and management are highly challenging.

Abstract No.: 204534

Panel No.: OPA-0678

Correlation Analysis Between FGF2 With Incidence of Ocular Tumor in Medan City

First Author: Destrie Cindy **NADHILA**

Co-Author(s): Fithria **ALDY**, Rodiah Rahmawaty **LUBIS**

Purpose: Ocular tumors are rare conditions that may pose a threat to vision and life. They encompass various types, including intraocular and extraocular tumors, which may be either benign or malignant. Fibroblast Growth Factor-2 (FGF2) is a potent pro-angiogenic factor suspected to play a critical role in tumor pathogenesis, including ocular tumors, due to its ability to stimulate tumor cell proliferation and neovascularization.

Methods: This observational study employed a case-control design and was conducted at Prof. Dr. Chairuddin P. Lubis Hospital, Universitas Sumatera Utara, and its affiliated network hospitals. Study subjects consisted of patients diagnosed with ocular tumors (both benign and malignant) and healthy controls. Serum levels of FGF2 were measured using the ELISA method. Statistical analyses were performed using SPSS software version 24.0.

Results: A total of 38 patients were included in the study, with 65.8% being female. The mean age of participants was within the fifth decade of life. FGF2 levels were significantly higher in the tumor group compared to the control group ($p = 0.04$). Furthermore, FGF2 levels were significantly elevated in patients with malignant tumors compared to those with benign tumors ($p = 0.001$), indicating a correlation between elevated FGF2 levels and tumor malignancy.

Conclusions: There is a significant association between FGF2 levels and the occurrence of ocular tumors. FGF2 also has potential as a biomarker to differentiate between benign and malignant ocular tumors.

Abstract No.: 201205

Panel No.: OPA-0664

DHA Inhibits the Proliferation, Migration, and Invasion of Uveal Melanoma Cells by Targeting Ferroptosis

First Author: Yuxuan **ZHAO**

Co-Author(s): Chen **HOU**, Longqian **LIU**, Lirong **XIAO**, Naihong **YAN**

Purpose: Uveal melanoma (UM) is a rare but highly aggressive primary intraocular malignancy. Dysregulation of ferroptosis, a form of programmed cell death, has been implicated in UM progression. Dihydroartemisinin (DHA), a natural derivative of

Artemisia annua, exhibits potent antitumor activity with a favorable safety profile, yet its role in ferroptosis regulation in UM remains unclear. The aim of this study is to explore the effects and mechanisms through which DHA induces ferroptosis and its associated mitochondrial damage.

Methods: Cell viability, migration, invasion, proliferation, and apoptosis were evaluated by CCK-8, wound healing, Transwell, colony formation, and flow cytometry. RNA-seq with qRT-PCR/WB validated transcriptomic changes. Ferroptosis and mitochondrial alterations were assessed by biochemical assays, fluorescent probes, TEM, and mito stress tests.

Results: In this study, we found that DHA strongly inhibited the proliferation, migration, and invasion of both primary and metastatic UM cells in a dose- and time-dependent manner. Transcriptomic analysis indicated that DHA exerted antitumor effects by modulating the ferroptosis pathway. Specifically, it upregulated heme oxygenase-1 (HO-1) and downregulated the xCT/GPX4 axis, leading to elevated Fe^{2+} , ROS, and MDA levels; reduced GSH levels; mitochondrial shrinkage; cristae loss; decreased membrane potential; and impaired respiratory chain function. Moreover, iron chelators and pancaspase inhibitors partially reversed these effects, whereas HO-1 inducers enhanced them.

Conclusions: Collectively, these findings suggest that DHA suppresses UM progression by inducing ferroptosis and mitochondrial dysfunction through the HO-1 and xCT/GPX4 pathways, supporting its potential as a therapeutic strategy for UM.

Abstract No.: 204305

Panel No.: OPA-0676

Decoding IGLL5 Mutation-Mediated BCR Signaling: A Novel Mechanism of CD8^+ T Cell Exhaustion and Ocular MALT Lymphoma Progression

First Author: Andi **ZHAO**

Co-Author(s): Xuejuan **CHEN**, Hu **LIU**

Purpose: To elucidate the functional consequences and molecular mechanisms by which IGLL5 mutations drive the progression of ocular adnexal mucosa-associated lymphoid tissue (OAML) lymphoma, focusing on their role in B-cell receptor (BCR) signaling and immune modulation.

Methods: Transcriptomic analyses were performed on an OAML cohort to characterize the gene expression signatures associated with IGLL5 mutations. Molecular and functional assays were conducted to investigate the interaction between IGLL5 and the CD79A/CD79B complex and to assess downstream BCR signaling and immune responses.

Results: IGLL5 mutations, predominantly located in the N-terminal signaling domain, enhance binding to the

CD79A/CD79B receptor complex, leading to sustained activation of BCR signaling. This activation upregulates CXCL10 and CXCL11, promoting initial CD8⁺ T-cell infiltration but subsequently causing T-cell exhaustion within the tumor microenvironment. These effects collectively facilitate OAML progression and immune evasion.

Conclusions: IGLL5 mutations drive OAML progression through constitutive BCR signaling and CXCL10/11-mediated CD8⁺ T-cell exhaustion, establishing a mechanistic link between genetic alterations and immune dysfunction. These findings provide novel insights into the interplay between tumor genetics and immune modulation, highlighting potential therapeutic targets for OAML.

Abstract No.: 203291

Panel No.: OPA-0674

Diagnostic Value of Genetic Mutation Analysis and Mutation Profiling of Cell-Free DNA

First Author: Xiaqing CHEN

Co-Author(s): Yunwen HU, Dan LIANG

Purpose: To explore whether the ctDNA of intraocular fluid (IOF) samples of either the aqueous humor (AH) or the vitreous fluid can diagnose vitreoretinal lymphoma (VRL).

Methods: In this study, we used the cell-free DNA (cfDNA) genetic mutation analysis based on liquid biopsy to diagnose VRL. The genetic mutation analysis was performed by NGS using a panel of 446 hematopoietic tumor-related genes. We enrolled patients with VRL or uveitis who were diagnosed according to the criteria (presented in the "diagnostic criteria" subsection below), into a training cohort. The genetic mutation results were analyzed retrospectively. A validation cohort consisting of patients with VRL or uveitis from another ophthalmic center was included to verify the diagnostic value of the panel for VRL. Meanwhile, we analyzed the mutations of our patients with VRL to establish the genetic profile of VRL and to identify the genetic heterogeneity and molecular characteristics of VRL.

Results: The genetic mutation analysis for VRL diagnosis resulted in a sensitivity of 100%, a specificity of 66.7%, positive and negative predictive values of 89.5% and 100%, and a test efficiency of 91.3%. Some clonal hematopoietic mutations were detected in the patients with uveitis, which increased the false positive rate of our panel. The sensitivity and specificity of this genetic mutation analysis in the validation cohort for the diagnosis of VRL were both 100%.

Conclusions: CfDNA genetic mutation analysis of IOF samples was feasible and had 100% sensitivity for the diagnosis of VRL.

Abstract No.: 201579

Panel No.: OPA-0665

Evaluation of Macula Toxicity Following Chemoreduction in Retinoblastoma, Using Swept-Source Optical Coherence Tomography

First Author: Usha SINGH

Co-Author(s): Deeksha KATOCH, Manu SAINI, Kavita

Purpose: Intravenous chemotherapy is the mainspring treatment in majority of retinoblastomas (RB), chiefly to reduce tumor size prior to consolidation local therapy. Systemic toxicities associated though minimal, range from neurotoxicity to myelosuppression and are dose related. Reported literature on local toxicity following systemic chemotherapy lacks consensus. The aim of this study was to assess toxicity to macula by evaluating the macular thickness post chemotherapy on Swept-source optical coherence tomography (SS-OCT) in relation to cumulative dose, number of chemotherapy cycles, at different time intervals after completion.

Methods: Study was carried out in a specialty RB clinic of a tertiary care institute from July 2023 to October 2024 in 0-10 years age group. All patients received combination chemotherapy of VEC. SS-OCT was done after completion of Intravenous chemotherapy (IVC) course in Group A with ≤ 1 year (15 eyes) and Group B > 3 years (35 eyes) of follow up.

Results: There were 69 eyes of 69 patients, of which 19 were controls. The total mean macular thickness (MT) was significantly lower in group A compared to MT in group B and the control group (P-value = 0.001 each). There was significant difference, among the study groups vs control. MT was inversely related to > 6 cycles of chemotherapy vs < 6 cycles vs controls. MT was inversely related to the duration of completion of treatment follow up.

Conclusions: Macular thinning is directly affected by the number of systemic chemo-cycles, probably reflecting higher drug exposure to the globe.

Abstract No.: 202485

Panel No.: OPA-0670

Indocyanine Green Enhanced Transpupillary Thermotherapy in Circumscribed Choroidal Hemangioma

First Author: Shivayan SRIVASTAVA

Co-Author(s): Bhavna CHAWLA, Rohan CHAWLA, Neiwete LOMI, Radhika TANDON, Pradeep VENKATESH

Purpose: To evaluate tumor response, changes in visual acuity (VA), and subretinal fluid (SRF) resorption in the treatment of circumscribed choroidal hemangioma (CCH) following transpupillary thermotherapy (TTT) and ICG-TTT.

Methods: Two groups of 15 patients each with circumscribed choroidal hemangioma (CCH) were treated with transpupillary thermotherapy (TTT). One group received conventional TTT, while the other was treated with ICG-Enhanced TTT. Baseline assessments included visual acuity (VA), tumour size via B-scan ultrasonography, subretinal fluid (SRF) height using swept-source OCT, and tumour features were observed on ultra-widefield fundus photography. TTT was performed with an 810 nm diode laser through an indirect ophthalmoscope, following a standardised protocol, with treatment parameters documented. Both groups were followed monthly for four months and changes in baseline characteristics were noted. Additional treatment was given as needed based on disease activity.

Results: SRF resorption was noted in all 15 patients treated with ICG TTT and in 14 patients who received TTT. VA improvement was significantly greater in the ICG-enhanced TTT group compared with the TTT group ($p = 0.04$). A significant decrease in axial thickness and largest basal diameter was observed in both groups. Notably, the mean power used was significantly lower in the ICG TTT group compared to the TTT group (p value - 0.002). No significant difference was found in the number of TTT sessions required for treatment success.

Conclusions: ICG-enhanced TTT constitutes an efficacious therapeutic modality for circumscribed choroidal hemangioma. It yields superior visual outcomes compared to conventional TTT and necessitates substantially lower power to attain successful treatment results.

Abstract No.: 200992

Panel No.: OPA-0662

Invasive Squamous Cell Carcinoma of the Conjunctiva: A Case Report

First Author: Jamuna GURUNG

Co-Author(s): Hom GURUNG

Purpose: To describe the clinical findings and management of a patient with invasive squamous cell carcinoma (SCC).

Methods: A case report.

Results: We present the case of a patient with a conjunctival mass with progressive growth in the right eye and decreased visual acuity. He had undergone excision of a limbal conjunctival mass one month before this condition. Examination revealed a fleshy conjunctival lesion on the temporal limbus that extended intraocularly. An irregular gray mass measuring 3 x 2 mm in size was observed in the anterior chamber. Modified enucleation with the implant was performed to control local invasion. Histopathological analysis showed recurrent conjunctival SCC, well-differentiated tumors infiltrating

the sclera, choroid, and ciliary body, TNM (American Joint Committee on Cancer classification) stage: pT3Nx. The patient was treated with adjuvant chemotherapy postoperatively.

Conclusions: Invasive squamous cell carcinoma of the conjunctiva is a rare condition. The management of a locally advanced tumor is enucleation, and disease-free resection should be performed as this will impact the patient's prognosis and survival time.

Abstract No.: 203650

Panel No.: OPA-0675

Malignant Melanoma of the Lacrimal Sac: A Case Report and Review of the Literature

First Author: Danielle Colleen TIU

Co-Author(s): Annabelle DY, Waldemar SIY, Armida SULLER - PANSACOLA, Alexander TAN

Purpose: To review existing literature and to describe the presentation, diagnostic approach, and therapeutic management of lacrimal sac melanoma.

Methods: Review of related literature, case report.

Results: An 83-year-old female presented with a months-long history of palpable hard swelling at the right medial canthal area, with associated erythema, tearing, and black discharge. The patient was initially assessed as a case of dacryocystitis and was prescribed unrecalled eye drops. Further work-up, including computed tomography scan, biopsy, and immunohistochemistry, revealed malignant melanoma of the right lacrimal sac. The patient underwent wide excision, right medial maxillectomy, ethmoidectomy, middle turbinectomy via lateral rhinotomy, and orbital exenteration with frozen section. PET CT scan results showed hypermetabolic activity along the hard palate, left fossa of Rosenmuller, and right upper jugular cervical lymph node. Image-guided biopsy of the lymph node was attempted; however, no definite target for biopsy was noted. The patient is on follow-up with Plastics, Lacrimal, and Otorhinolaryngology.

Conclusions: Diagnosing lacrimal sac melanoma is challenging, as it often mimics common conditions such as dacryocystitis. In patients who present with epiphora, bloody discharge, and swelling of the medial canthal area, it is important to consider lacrimal sac melanoma. There is currently no clear consensus in the treatment of lacrimal sac melanoma, although most authors suggest tumor resection combined with radiotherapy. The patient should be followed up closely due to the possibility of recurrence and metastasis. This can lead to early diagnosis, which is critical for a favorable prognosis.

Abstract No.: 202377

Panel No.: OPA-0668

One Tumor, Two Targets: Malignant Epithelial Tumor of Extraocular Muscles and Lacrimal Gland

First Author: Nikunj GUPTA

Co-Author(s): Nehal KAPOOR

Purpose: To report an unusual presentation of a malignant epithelial tumor simultaneously involving multiple extraocular muscles and the lacrimal gland.

Methods: This is a case report of an elderly male who presented with proptosis and ocular motility restriction. Clinical evaluation, multimodal radiological imaging were found to be suspicious of non specific orbital inflammation. Further histopathological analysis was done to establish the diagnosis.

Results: Imaging revealed bulky lacrimal gland and extraocular muscles involving the medial, superior and lateral rectus with fat stranding, suggesting the possibility of orbital pseudotumor. Biopsy, however, confirmed the diagnosis of a malignant epithelial tumour in both the extraocular muscles and lacrimal gland. The dual involvement of the lacrimal gland and multiple extraocular muscles by the same tumour is exceedingly rare.

Conclusions: Malignant epithelial tumours of the orbit typically originate from the lacrimal gland; however, simultaneous primary involvement of multiple extraocular muscles is exceptionally uncommon. This case highlights the importance of considering atypical presentations of orbital epithelial tumours, careful imaging interpretation, and timely histopathological confirmation for accurate diagnosis and management.

Abstract No.: 202606

Panel No.: OPA-0671

Optic Nerve Sheath Meningioma: Clinico-radiological features and Management Outcomes

First Author: Sonam NISAR

Co-Author(s): Shahid ALAM, Varsha BAKIAVATHY, V BALASAUNDARAM, Kirthi KOKA, Bipasha MUKHERJEE, Ambika SELVARAJ, Prithvi VISHWANATHAN

Purpose: To analyze the clinico-radiological profile and management outcomes of optic nerve sheath meningioma (ONSM).

Methods: A retrospective analysis of 26 patients diagnosed radiologically with optic nerve sheath meningiomas was carried out between July 2014 to February 2023. Patients were divided into 3 groups: ONSMs observed, received external beam radiotherapy (EBRT), and those who underwent surgical debulking.

Results: The mean age of the study population was 41.96 $\pm$ 13.31 years (Range: 6-71 years) There was a female preponderance (n=18,69.23%). The most

common complaints were deterioration of vision (n=15, 57.7%) and proptosis (n=9, 34.6%). Optic disc edema was seen in 38.46% (10) cases and 46.15% (12) presented with disc pallor. Unilateral involvement was seen in 24 patients. Fifteen received EBRT and 8 patients remained under observation at the initial presentation. Three patients with no vision and disfiguring proptosis underwent surgical debulking. Amongst those under observation, five had worsening of vision and/or visual fields, as well as an increase in the size of the lesion on imaging, and eventually received EBRT. Improvement in visual fields was seen in 75% of patients and regression in the size of the lesion on imaging was noted in 53.33% of patients who received EBRT. Median follow-up was 1.8 years.

Conclusions: Optic nerve sheath meningiomas may present with decreased vision and/or proptosis. Radiotherapy is the preferred treatment modality for symptomatic ONSM. The presence of disc edema at presentation has a favorable outcome.

Abstract No.: 204756

Panel No.: OPA-0679

Orbital Mass Mystery: From Mucocele to Tuberculosis

First Author: Cecillia Apriliana WULANDARI

Co-Author(s): Prika Maulina AGARISTI, Neni ANGGRAINI

Purpose: Orbital lesions represent a diagnostic challenge due to diverse etiologies, from benign mucoceles to aggressive malignant tumors. Clinical and radiological features often overlap, making histopathological confirmation essential for accurate diagnosis and management. This poster presents an orbital tuberculosis case initially misdiagnosed as a mucocele or malignancy, highlighting the critical role of pathology.

Methods: A 50-year-old woman presented with a progressively enlarging right upper orbital mass for 2 months, associated with localized pain. She had a long-standing history of multiple cutaneous nodules consistent with Neurofibromatosis type 1. CT-scan revealed a cystic lesion with irregular thick walls, heterogeneous enhancement, and focal bony destruction extending to the frontal sinus, raising suspicion of malignancy. The patient underwent anterior orbitotomy and excision. Intraoperatively, thick yellowish-green pus and irregular masses were identified, also raising suspicion of malignancy. But, histopathological analysis demonstrated granulomatous inflammation with necrosis and nuclear debris, compatible with Mycobacterium tuberculosis infection, and excluded malignancy. The patient was referred to internal medicine and started on a 9-month course of antituberculosis therapy, with gradual resolution of the orbital mass and symptoms.

Results: This case illustrates how orbital tuberculosis can clinically and radiologically mimic mucocoeles or malignant tumors, particularly in patients with neurocutaneous disorders where suspicion for malignancy is high. Imaging alone is insufficient; histopathology remains the gold standard to establish a definitive diagnosis and prevent mismanagement.

Conclusions: Accurate diagnosis of orbital masses requires a multidisciplinary approach. Histopathology is central in distinguishing infectious from neoplastic processes, ensuring proper treatment and improved outcomes.

Abstract No.: 200990

Panel No.: OPA-0663

Pediatric Ocular Surface Squamous Neoplasia in the Absence of Known Risk Factors and Systemic Conditions

First Author: Purnima RAJKARNIKAR STHAPIT

Co-Author(s): Ashiyana NARIANI, Rohit SAIJU

Purpose: Pediatric ocular surface squamous neoplasia (OSSN) is rare, with few reported cases. We present a series of 16 pediatric and adolescent OSSN cases without known genetic or infectious risk factors.

Methods: Descriptive case series at a single tertiary eye care center in Nepal where children with histopathologically proven OSSN were identified, and their disease was characterized.

Results: Unilateral OSSN was observed in 16 pediatric patients (6–18 years old) with no identifiable risk factors. All lesions were histopathologically proven as OSSN and characterized by type. Nine (56%) were conjunctival intraepithelial neoplasia (CIN) I, 5 (31%) were CIN II, and 2 (13%) were CIN III. There were no cases of squamous cell carcinoma. None of the patients had xeroderma pigmentosum, HIV, or hepatitis B or C.

Conclusions: This work reports a case series of pediatric OSSN in the absence of risk factors and systemic conditions. More than half of the patients had mild CIN. Though rare, this case series highlights the importance of considering OSSN in the differential diagnosis of pediatric ocular surface lesions, perhaps especially in this geographic location.

Abstract No.: 206816

Panel No.: OPA-0687

Proptosis to Diagnosis: A Case of Systemic Amyloidosis Presenting As Painless Proptosis in a 75-Year-Old Male

First Author: Erika Mae GALEOS

Co-Author(s): Kristianne Chyna DABUET, Justine May TORREGOSA

Purpose: To report a rare case of systemic amyloidosis with an initial presentation of an orbital mass mimicking malignancy.

Methods: We present a case of a 75-year-old Filipino male with a four-year history of progressive right eye proptosis and vision loss. CT scan showed a non-enhancing soft tissue mass with calcifications encasing the right globe, raising suspicion for a neoplasm. He was advised to undergo further workup at a tertiary hospital. Examination revealed a firm, immobile, non-tender orbital mass causing marked proptosis, lagophthalmos, and ophthalmoplegia. Repeat CT demonstrated an ill-defined retrobulbar mass compressing the optic nerve with internal calcifications. The initial incision biopsy showed equivocal findings of pseudoepitheliomatous hyperplasia. The patient subsequently underwent lid-sparing exenteration as a palliative treatment for possible metastatic disease and to secure a definitive diagnosis. Intraoperatively, the mass was yellowish-white, firm, and friable.

Results: Histopathology revealed fibroadipose and fibromuscular tissues extensively infiltrated by amorphous, eosinophilic, acellular material involving the interstitium and vessel walls. Congo red staining confirmed amyloidosis by demonstrating characteristic apple-green birefringence under polarized light. Further systemic workup showed a partially calcified left upper lung mass, a hypodense left thyroid nodule, and irregular gastric wall thickening with calcified lymph nodes, raising concern for systemic amyloidosis or metastatic disease.

Conclusions: This case illustrates the diagnostic challenge of amyloidosis, which can closely mimic malignancy both clinically and radiographically. Definitive diagnosis relies on tissue biopsy with appropriate staining. A high index of suspicion and multidisciplinary coordination are vital, especially in elderly patients with systemic findings suggesting additional pathology.

Abstract No.: 207649

Panel No.: OPA-0693

Removing Small Cavernous Hemangioma Located in the Deep Orbital Apex Extending Into the Cavernous Sinus Under Endoscopic Transnasal Approach

First Author: Wu WENCAN

Purpose: To present a new surgical technique for the excision of cavernous hemangioma(CH) located in the orbital apex extending into the cavernous sinus.

Methods: A total of 6 patients with CH extending from the orbital apex to the cavernous sinus were enrolled. Patients were diagnosed by clinical manifestations, computed tomography (CT), and magnetic resonance imaging (MRI) of the orbit, and pathologically confirmed to be CH after surgery. The indication for surgery was visual impairment due to the CH mass, which was completely removed via the endoscopic transnasal approach. Complete ophthalmologic examinations of all patients in the preoperative and postoperative

periods were collected and compared, including visual acuity (VA), visual field (VF), eye motility and proptosis, intraocular pressure (IOP), and the thickness of the retinal nerve fiber layer (RNFL).

Results: CH masses of all patients were completely removed, and surgeries were uneventful. All patients with VA impairment experienced varying degrees of improvement after surgery, the mean VA improved from LogMAR 4.4±0.1 preoperatively to LogMAR 4.8±0.2 postoperatively ($p=0.120$). The mean deviation index of VF was -16.13±15.4 dB preoperatively and -7.96±12.80 dB postoperatively ($p=0.223$), improved in 3 patients. The VF index was 53.25±51.00% preoperatively and 77.25±43.52% postoperatively ($p=0.305$), and the pattern standard deviation was 3.64±2.60 dB preoperatively and 4.01±4.54 dB postoperatively ($p=0.913$). The preoperative and postoperative mean degree of proptosis was 13.7±3.1mm and 12.3±1.5mm, respectively ($p>0.05$). The preoperative and postoperative IOP and the thickness of RNFL were normal in all patients. Two patients occurred transitory diplopia after surgery without other serious complications observed.

Conclusions: CHs located in the deep orbital apex extending into the cavernous sinus remain a surgical challenge. The endoscopic transnasal approach seems to be a safe and feasible, less invasive surgical technique for the treatment of CHs in this area.

Abstract No.: 207286

Panel No.: OPA-0692

Synergistic Killing Effects of Melphalan and the Focal Adhesion Kinase Signaling Suppression on Retinoblastoma

First Author: Hoi Tung CHOW

Co-Author(s): Hoi Ying CHAN, Wai Kit CHU, Ivan KONG, Cheuk Sing YAM, Linbin ZHOU

Purpose: Melphalan is an effective chemotherapeutic drug for treating retinoblastoma (RB) cases with vitreous seedings, but its adverse effects impose an urgent need to develop an effective combined treatment modality with less toxicity. We previously showed that inhibiting growth hormone-releasing hormone signaling impaired RB cell viability by suppressing the focal adhesion kinase (FAK) axis. This study investigates the synergistic killing effects of Melphalan and FAK signaling suppression on RB.

Methods: Y79 and WERI-Rb1 cells were co-treated with various doses of an FAK inhibitor, PF-573228, and Melphalan for 72 hours, followed by cell viability determination via cell counting kit-8 assays. Significance of the difference between treatment groups was analyzed by an unpaired Student's t-test.

Results: PF-573228 and Melphalan respectively dose-dependently decreased Y79 and WERI-Rb1 cell viability. In Y79 cells, 10μM PF-573228 with 10μM Melphalan

resulted in a more substantial decrease in cell viability than 10μM Melphalan treatment alone ($n=3$ in each group and $p<0.05$). Notably, a remarkable reduction in cell viability was observed in 15μM PF-573228 with Melphalan (2.5μM, 5μM, and 10μM) treatment versus Melphalan (2.5μM, 5μM, and 10μM) single treatment ($n=3$ in each group and $p<0.05$ in all comparisons). In WERI-Rb1 cells, cell viability substantially decreased in PF-573228 (5μM, 10μM, and 15μM) combined with Melphalan (2.5μM, 5μM, and 10μM) treatment versus Melphalan (2.5μM, 5μM, and 10μM) treatment alone ($n=3$ in each group and $p<0.05$ in all comparisons).

Conclusions: Blocking the FAK signaling synergizes Melphalan killing effects on RB.

Abstract No.: 208204

Panel No.: OPA-0694

The Chemotherapy-Potentiating Effects of the Growth Hormone-Releasing Hormone Receptor Antagonist MIA-602 on Retinoblastoma

First Author: Linbin ZHOU

Co-Author(s): Hoi Ying CHAN, Wai Kit CHU, Jiahui LI, Chi Pui PANG, Cheuk Sing YAM

Purpose: Chemotherapy is a common treatment modality in retinoblastoma (RB). Growth hormone-releasing hormone receptor (GHRH-R) is expressed in RB cells. MIA-602, a GHRH-R antagonist, has been shown to potentiate chemotherapy effects on numerous cancers. Nevertheless, it remains unclear whether MIA-602 can potentiate chemotherapy effects on RB. This study investigates the chemotherapy-potentiating effects of MIA-602 on RB.

Methods: Y79 cells were co-treated with 10μM MIA-602 and various doses of chemo drugs, carboplatin or vincristine for 48 hours. Cell counting kit-8 assays and flow cytometry analyses were used to measure cell viability and apoptosis, respectively. Data were analyzed by an unpaired Student's t-test.

Results: In Y79 cells, 10μM MIA-602 treatment decreased the cell viability ($-0.18±0.02$, $p=0.0007$) and increased the sub-G1 population ($1.09±0.11$, $p=0.0006$). In comparison with carboplatin (10μM or 25μM) single treatment, a combined treatment with 10μM MIA-602 and carboplatin (10μM or 25μM) resulted in a more substantial cell viability impairment ($-0.14±0.03$, $p=0.0057$; $-0.16±0.02$, $p=0.0006$) and a higher proportion of the sub-G1 population ($1.96±0.27$, $p=0.002$; $5.33±0.40$, $p=0.0002$). Co-treatment with 10μM MIA-602 and vincristine (2.5nM or 10nM) led to a more significant decrease in cell viability ($-0.13±0.01$, $p<0.0001$; $-0.05±0.01$, $p=0.013$) as well as a more markedly increased proportion of the sub-G1 population ($13.70±0.52$, $p<0.0001$; $8.50±0.52$, $p<0.0001$) than vincristine (2.5nM or 10nM) single treatment.

Conclusions: GHRH-R antagonists MIA-602 can potentiate chemotherapy effects on RB.

Abstract No.: 202178

Panel No.: OPA-0667

The Enigma of Orbital Fibrosarcomatous Dermatofibrosarcoma Protuberans: Diagnostic and Management Challenges in a Rare Aggressive Case

First Author: Hindun **ZAKIYAH**

Co-Author(s): Neni **ANGGRAINI**, Michael **HARTONO**, Mutmainah **MAHYUDDIN**, Florentina **PRISCILIA**

Purpose: To describe the diagnostic and management challenges in a case of orbital fibrosarcomatous dermatofibrosarcoma protuberans (FS-DFSP).

Methods: We report the case of a 60-year-old Asian man with orbital FS-DFSP, confirmed by immunohistochemistry, who eventually underwent exenteration.

Results: The patient presented with painful progressive proptosis of the right eye following mild trauma. Orbital CT revealed a solid intraconal mass in the inferomedial orbit. Initial excision was successful, and histopathology demonstrated a low-grade spindle cell neoplasm. After an eight-month loss to follow-up, He returned with profound vision loss and a rapidly enlarging intra-extraconal mass, nearly double the original size. Second excision confirmed transformation into spindle cell sarcoma. Immunohistochemistry was positive for CD34 and EMA but negative for S100, consistent with FS-DFSP. He was started on Imatinib (400 mg daily) and considered for adjuvant intensity-modulated radiotherapy (35 × 2 Gy). Despite dose escalation, within two months, he developed a recurrent orbital mass with malignant features, accompanied by complete vision loss. CT demonstrated extensive infiltration involving the entire orbit, right ethmoid and frontal sinuses, and intracranial extension. Orbital exenteration was subsequently undertaken as the most appropriate measure for achieving local control. A systemic metastasis workup was performed thereafter.

Conclusions: Orbital DFSP is an exceedingly rare malignancy, with the FS-DFSP variant carrying a higher risk of recurrence and metastasis. Diagnosis depends on immunohistochemical and molecular analysis. Wide-margin resection remains the mainstay of treatment, while exenteration is required in aggressive infiltrative disease, supported by adjuvant therapy. Therapeutic decisions should involve an interdisciplinary team, especially when transformation to high-grade sarcoma occurs.

Abstract No.: 205402

Panel No.: OPA-0683

The Role of Lactate Metabolism in Retinoblastoma Tumorigenesis and Ferroptosis Resistance

First Author: Zhihui **ZHANG**

Co-Author(s): Rong **LU**, Junjie **TANG**

Purpose: The Warburg effect, a hallmark of cancer, describes the preference of cancer cells for glucose metabolism via aerobic glycolysis, leading to substantial lactate accumulation. However, the role of lactate metabolism in retinoblastoma, the primary intraocular malignancy in children, remains unclear. This study aims to elucidate the gene expression profiles associated with lactate metabolism in retinoblastoma and their impact on tumorigenesis and ferroptosis resistance.

Methods: The involvement of metabolic characteristics in retinoblastoma was analyzed by comparing single-cell RNA sequencing transcriptome profiles from normal retina tissues and retinoblastoma tissues from patient samples. The effects of lactate on retinoblastoma cell line activity and its mechanisms were examined both in vitro and in vivo.

Results: Single-cell RNA sequencing analysis revealed enhanced glycolysis in retinoblastoma cells and significant differences in lactate metabolism-related gene expression among various retinoblastoma cell types. Retinoblastoma cell lines with moderate lactate levels exhibited increased viability and resistance to ferroptosis induced by ferroptosis inducers. Additionally, lactate promoted the upregulation of monocarboxylate transporter 1 (MCT1), which facilitated lactate transport, in a dose-dependent manner in retinoblastoma cell lines. Knocking down MCT1 reduced both viability and ferroptosis resistance of retinoblastoma cell lines in a lactate-rich environment. In vivo, disrupting lactate transport through MCT1 inhibition suppressed retinoblastoma tumorigenesis and invasion in a mouse xenograft model, and this effect was reversed by the ferroptosis inhibitor liproxstatin-1.

Conclusions: These findings highlight the crucial role of lactate metabolism in retinoblastoma tumorigenesis and resistance to ferroptosis.

Abstract No.: 202474

Panel No.: OPA-0669

Topical Tacrolimus in the Management of Conjunctival Lymphoproliferative Disorders: A Case Series

First Author: Neeraja T G

Co-Author(s): Shruthi Tara V

Purpose: To evaluate the efficacy of topical tacrolimus 0.03% eye ointment as a monotherapy for Conjunctival Lymphoproliferative Disorders.

Methods: We report a case series of three patients (five eyes) who presented to us with classical conjunctival "salmon patch" lesion. Incisional biopsy followed by histopathological examination with immunohistochemistry confirmed Conjunctival Benign Lymphoid Hyperplasia (bilateral) in 2 patients and Extra-nodal Marginal Zone B-cell Lymphoma in 1 patient. All patients initially responded to topical corticosteroids but experienced relapse upon steroid cessation. 4 out of 5 eyes were treated with other steroid-sparing agents such as topical cyclosporine 1%, topical 5-fluorouracil 1%, topical alpha-interferon and intralesional Ranibizumab, but with either no resolution or frequent recurrences. Oncologist referral was sought to rule out systemic involvement in conjunctival lymphoma. Tacrolimus 0.03% eye ointment was prescribed twice daily till clinical resolution and then maintained on once daily dosage for 6 months.

Results: At one month review, all 5 eyes achieved complete clinical resolution. Only one out of five eyes developed a recurrence (benign lymphoid hyperplasia) at 8 months, and the dosing of Tacrolimus 0.03% ointment was increased to twice daily for one month following which remission was achieved.

Conclusions: The overall prognosis for conjunctival lymphoproliferative disorders is excellent, with high long-term survival rates. However, the potential for local and systemic relapse necessitates a paradigm shift from a short-term «cure» to a safer alternative that can provide long-term immunomodulation. Topical tacrolimus 0.03% appears to be an effective steroid-sparing monotherapy agent for conjunctival lymphoproliferative disorders, achieving sustained clinical resolution and reducing recurrence risk.

Abstract No.: 206836

Panel No.: OPA-0690

Two Decades of Kissing Nevus Management Experiences in Tertiary Eye Hospital: Unusual Cases of Nevus, From Macroscopic to Microscopic Findings

First Author: Rabiul PRIYANTONO

Co-Author(s): Niluh AYU, Shanti BOESOIRIE, Mohamad DAHLAN, Raden KARTIWA, Pradistya YUDIASARI

Purpose: To report six cases of kissing nevus in eyelids, highlighting clinical, surgical, and histopathological findings.

Methods: A retrospective review was performed on six patients who underwent treatment for a divided eyelid nevus using direct closure and skin flap procedures between 2004 and 2024. Depending on the nevus location, shape, and size of the upper and lower eyelids, reconstruction was carried out using a direct closure or full-thickness skin graft from the supraclavicular region. Histopathological analysis was performed. Postoperative outcomes were monitored for up to one month.

Results: We showed that the lesion was randomly located in both eyes, with all patients being females with a range of ages from 9 to 54 years. The lesion size varied, ranging from 1.4cm to 5 cm. About 3 of 6 patients were treated using direct closure, and the rest of them were treated using a full-thickness skin graft from the supraclavicular region. All other reconstructions demonstrated good survival. No additional complications were observed during the 1-month follow-up. All donor sites were closed primarily and healed well with minimal scarring. Histopathological findings from 4 of 6 patients show an intradermal nevus, and 2 patients show a compound nevus.

Conclusions: Kissing nevus is a rare congenital melanocytic lesion that may enlarge with age, leading to cosmetic and functional concerns. Surgical excision with direct closure or skin flap reconstruction provides effective management and favorable cosmetic results. Most cases show an intradermal nevus as histopathological findings.

Abstract No.: 203042

Panel No.: OPA-0673

Uncommon Ocular Findings in Extraconal Neurofibroma Type I: A Case Series

First Author: Andi YASMIN

Co-Author(s): Suliati AMIR, Halimah PAGARRA, Andi PRATIWI, Imeldy PURNAMA, Syukriyah SOFYAN

Purpose: To present a case series of four patients with extraconal neurofibromas (NF1), each exhibiting distinct and uncommon ocular manifestations. This series highlights the diagnostic challenges and emphasizes the importance of a multidisciplinary approach in their management.

Methods: We conducted a retrospective review of four NF1 patients presenting with uncommon ocular manifestations. All patients underwent comprehensive ophthalmologic examination, systemic evaluation for NF1 diagnostic criteria, and multimodal imaging, including computed tomography and/or magnetic resonance imaging. Histopathologic analysis utilized hematoxylin-eosin staining, with immunohistochemical studies employing S-100 and Ki-67 markers.

Results: Four NF1 patients with rare ocular manifestations, including proptosis, eyelid tumors, pulsating proptosis, and conjunctival tumors. All patients met at least 3 of the 7 NIH diagnostic criteria for NF1. Imaging studies revealed abnormalities in all cases: an inferior orbital mass in case 4 and bone erosion or sphenoid wing absence in cases 1, 2, and 3. Vascular malformations associated with pulsating proptosis were identified in case 3. Histopathologic examination revealed spindle-shaped Schwann cells, while S-100 and Ki-67 immunohistochemistry confirmed benign neurofibroma.

Conclusions: Uncommon ocular manifestations of NF1 may mimic other orbital pathologies and require careful clinical evaluation. Integration of NIH diagnostic criteria, imaging, histopathology, and molecular tools such as S-100 and Ki-67 immunohistochemistry enables differentiation from ANNBP or MPNST. Early diagnosis and multidisciplinary care are crucial for managing functional and aesthetic complications in NF1.

Abstract No.: 207070

Panel No.: OPA-0691

Unusual Pediatric Orbital Mass: A Rare Case of Solid Cystic Hidradenoma

First Author: Mutmainah MAHYUDDIN

Co-Author(s): Neni ANGGRAINI, Evelina KODRAT, Andintia Aisyah SANTOSO, Muhammad Dio SYAPUTRA

Purpose: Solid cystic hidradenoma (SCH) is a benign tumor of eccrine sweat glands, most often presenting as intradermal nodules in cutaneous sites. Orbital involvement is exceedingly rare and usually appears as a slowly enlarging solitary mass, although in some cases it may progress rapidly and mimic malignant orbital tumors. Confirmation with electron microscopy and enzymatic histochemical studies is essential to avoid misdiagnosis and inappropriate treatment.

Methods: We report the case of a 2-year-old girl presenting with a one-month history of rapidly progressive unilateral proptosis. A mass had initially been noted five months earlier and had enlarged significantly after an incisional biopsy performed at another center. Orbital imaging, including MRI, revealed a solid-cystic hypervascular mass with intracystic hemorrhage located in the superotemporal orbit, involving the lacrimal gland but without evidence of bone destruction or intracranial extension.

Results: The patient underwent complete excision through a lateral orbitotomy, with intraoperative aspiration performed to facilitate dissection. Histopathological examination confirmed the diagnosis of solid cystic hidradenoma. Postoperatively, ptosis and limited ocular motility were observed but improved gradually during follow-up. No recurrence was documented.

Conclusions: This case highlights the diagnostic challenge of orbital SCH in children, particularly when presenting as a rapidly enlarging orbital mass that clinically resembles malignancy such as rhabdomyosarcoma. Although rare, SCH should be included in the differential diagnosis of pediatric progressive proptosis. Early recognition and complete surgical excision are crucial to prevent recurrence and preserve visual function.

Abstract No.: 205832

Panel No.: OPA-0685

Unveiling the Mystery: Case of a Medial Canthal Mass and Its Management

First Author: Nidhi MUNDADA

Co-Author(s): Rekha KHANDELWAL, Gaurav PATIL

Purpose: To demonstrate a case of a squamous cell carcinoma (SCC) involving the medial canthus, detailing the diagnostic approach and management using a paramedian glabellar flap followed by radiotherapy.

Methods: A 73-year-old male presented to the OPD with a large, non-tender, and gradually progressing mass in the left lower eyelid for three months. Complete clinical assessment was performed, including ocular and systemic examination and radiological investigations. The CT scan imaging revealed a well-defined lesion with involvement of the lower and common canaliculi. The patient was planned for wide local excision with dacryocystectomy, and the reconstruction was done with a paramedian forehead flap. The patient was subjected to 30 cycles of immunomodulatory radiotherapy. There has been no recurrence.

Results: The histopathological examination features were consistent with squamous cell carcinoma without involvement of the nasolacrimal duct.

Conclusions: The medial canthal masses are difficult to treat. Early detection with a detailed clinical and radiological examination of such masses is pivotal in planning the management. The management plan includes radiotherapy to reduce the chances of systemic metastasis, closely following up the patient.

Abstract No.: 204992

Panel No.: OPA-0681

Visual and Oncological Outcomes of Cataract Surgery After Retinoblastoma: A Decade of Experience in South India

First Author: Vinitha Loganathan RASHME

Co-Author(s): Usha KIM

Purpose: To evaluate the visual and oncological outcomes of cataract surgery in patients previously treated for intraocular retinoblastoma.

Methods: A retrospective analysis was conducted on 13 eyes of children with retinoblastoma who underwent cataract surgery.

Results: The mean age at retinoblastoma diagnosis was 20.7 months (range: 1–60); 5 patients were female. Based on the International Classification of Intraocular Retinoblastoma, 5 eyes were Group E, 5 Group C, 2 Group D, and 1 Group B. All patients received intravenous chemotherapy; 9 eyes (69.2%) received external beam radiotherapy (EBRT), 2 underwent intra-arterial chemotherapy and others. The mean interval between EBRT and cataract diagnosis was

36 months (range: 2–168), and the mean duration between tumor regression and cataract surgery was 26 months (range: 0–160). Cataract extraction with intraocular lens (IOL) implantation was performed in 11 eyes, while 2 eyes underwent lens extraction alone due to suspected tumor activity; both subsequently required enucleation. At the final follow-up, 7 eyes achieved best corrected visual acuity of 20/200 or better. Postoperative complications included visual axis opacification in 2 eyes and secondary glaucoma in 1 eye. Tumor regression was maintained in all 11 eyes with IOL implantation. Globe salvage was achieved in 11 eyes (84.6%) with a mean follow-up of 49 months (range: 10–192). Germline RB1 mutation was detected in 8 patients.

Conclusions: Cataract surgery in eyes with adequately regressed retinoblastoma provides meaningful visual rehabilitation while maintaining oncological safety.

Ophthalmic Epidemiology and Prevention of Blindness

Abstract No.: 200529

Panel No.: OEP-0697

A Study of Visual Impairment Severity and Refractive Profile in Albinism Patients Using Genetic Testing

First Author: Chonglin **CHEN**

Co-Author(s): Daming **DENG**, Jun **LI**, Xinping **YU**

Purpose: The purpose of this study was to evaluate the characteristics of visual impairment severity and the refractive profile in Chinese patients with albinism.

Methods: In this study, patients with a clinical diagnosis of albinism were enrolled. Comprehensive ophthalmic examinations and whole-exome sequencing were performed.

Results: In this consecutive, cross-sectional study, 70 OCA probands were enrolled, ranging in age from 1 to 67 years. Most probands (47.1%, 33/70) had moderate vision impairment, 14.3% (10/70) had severe visual impairment, and 4.3% (3/70) exhibited blindness. Myopia predominated (61.4%) over hyperopia (38.6%), with severe refractive errors prevalent in both groups: high hyperopia affected 40.7% (11/27) of hyperopic patients, while high myopia affected 32.6% (14/43) of myopic patients. Significant astigmatism (mean 2.56 ± 1.81 D) was universally present. OCA1 demonstrated the most severe visual phenotype: blindness (10.0%, 3/30), severe (23.3%, 7/30), and moderate (53.3%, 16/30). This subtype also exhibited significant refractive heterogeneity, comprising both high myopia (18 cases; 5 high, 13 medium/low) and high hyperopia (12 cases; 4 high, 8 medium/low).

Conclusions: In our albinism cohort, over 65% exhibited moderate-to-severe visual impairment or blindness. Myopia predominated (61.4%, 43/70) over hyperopia (38.6%, 27/70). OCA1 demonstrated the most severe visual phenotype, encompassing all blindness cases and most (70%, 7/10) of the severe visual impairment. OCA1 represented 35.7% (5/14) of all high myopia cases. OCA2 exhibited pronounced myopic predominance (75%, 15/20). These novel findings could provide insight into the understanding of albinism.

Abstract No.: 201625

Panel No.: OEP-0704

Acute Blindness in an 18-Year-Old Male: A Case Study of Bilateral Optic Papilla Edema and Cryptococcal Meningitis

First Author: Zhouyu **LI**

Co-Author(s): Wenli **DENG**, Rui **YU**, Yanlai **ZHANG**

Purpose: Through the diagnostic odyssey of an 18-year-old male presenting with acute painless bilateral vision loss and chronic headache over one month, a rare etiopathological factor was ultimately identified.

Methods: Comprehensive ophthalmic assessments were conducted, including best-corrected visual acuity (BCVA) testing, fundus photography, optical coherence tomography (OCT), and optical coherence tomography angiography (OCTA). A multidisciplinary consultation involving neurology and infectious disease specialists was arranged, alongside parallel serologic testing, cerebrospinal fluid (CSF) analysis, thoracoabdominal computed tomography (CT), and cranial magnetic resonance imaging (MRI) to establish a definitive diagnosis and guide therapeutic management.

Results: Neurology consultation and cerebrospinal fluid (CSF) analysis revealed elevated CSF pressure of 230 mmH₂O, and microbiological studies confirmed positive cryptococcal antigen testing with India ink staining identifying *Cryptococcus neoformans*. The patient was diagnosed with AIDS, *Cryptococcus neoformans* meningitis complicated by elevated intracranial pressure, and secondary optic papilla edema (bilateral eyes). The treatment regimen included intracranial pressure reduction measures, combination antifungal therapy with amphotericin B and flucytosine, antiretroviral therapy (ART), and neurotrophic support. Following the treatments, there was no improvement in right eye vision, while left eye vision improved to 4/200.

Conclusions: 1. Sudden visual loss with optic disc edema in young adults, particularly when accompanied by unexplained headache, warrants vigilance for possible cryptococcal meningitis. 2. This condition often indicates underlying immunodeficiency and represents an ocular manifestation of opportunistic infection. 3. Multidisciplinary collaboration is critical for the precise diagnosis and treatment of complex cases.

Abstract No.: 203066**Panel No.: OEP-0710**

Association of Screen Time, Sleep Quality, and Its Association With Dry Eye Among Medical Students: A Study From North India

*First Author: Amandeep HANS**Co-Author(s): Vaishali RAKHEJA, Sonia VADIYA*

Purpose: To estimate the association of daily screen time and quality of sleep with Dry eyes in medical students.

Methods: A cross-sectional, observational study was conducted on 400 MBBS students at a tertiary medical college. Participants completed a pre-validated Google Form comprising the Standard Patient Evaluation of Eye Dryness (SPEED) questionnaire and the Mini Sleep Questionnaire. Data on screen time, contact lens use, and eye drop usage were also collected. Associations were analyzed using the chi-square test, and p-values <0.05 were considered statistically significant.

Results: Of the 401 participants, 59.5% were female and the most common age was 21 years. A majority (96.2%) used an iPad, and 51.8% reported daily screen time exceeding 4 hours. Mild dry eye symptoms were present in 84.7% of participants, while 8.3% and 8.3% reported moderate and severe symptoms, respectively. Sleep quality showed a significant association with dry eye severity (Chi-square = 27.838, $p < 0.001$). Moderate association was found between screen time duration and dry eye severity ($p < 0.001$).

Conclusions: Dry eye disease is highly prevalent among medical students and is significantly associated with prolonged screen time, poor sleep quality, and contact lens use. Awareness and early preventive strategies targeting modifiable lifestyle factors are critical to reduce the dry eye symptoms.

Abstract No.: 202956**Panel No.: OEP-0711**

COVID-19's Impact on Blindness and Vision Loss: Machine Learning Predicts Rising Burden and Shifting Risk Factors to 2050

*First Author: Jiaying LIU**Co-Author(s): Gengchen JIANG, Zhaohuai LI, Wenru SU, Zihan YAO, Yehong ZHUO*

Purpose: To comprehensively characterize the prevalence and disease burden of Blindness and Vision loss (BVL)—as well as specific eye diseases—over the 30 years (1990–2021), to investigate shifts in risk factors for BVL, to examine the impact of COVID-19, and to enhance projections of future ophthalmic disease burden.

Methods: Calculated the prevalence and disease burden of BVL-specific eye diseases at global, regional, and national levels. Using Joinpoint to explore the impact of COVID-19, besides, we employed descriptive

and decomposition analyses to examine the risk factors, and finally constructed time-related features to capture temporal patterns in BVL to project disease burden up to 2050.

Results: Global BVL cases nearly tripled (1990–2021), with AAPC of 0.78% (95%CI 0.62%–0.94%). Peak prevalence at 50–54 years; Near-vision loss showed highest burden. Preliminary analyses suggest that COVID-19 may have influenced the prevalence of several specific eye diseases, although the magnitude and direction of these effects vary. Strong negative SDI-ASPR ($p = -0.62$, $p < 0.05$) and SDI-ASDALY ($p = -0.78$, $p < 0.05$) correlations were observed. Population growth remains the primary driver of rising BVL. As for risk factors, during the COVID-19 period, ASDALY attributable to air pollution and tobacco declined, whereas those linked to high BMI and high FPG increased. Finally, projections to 2050 indicate that BVL burden will continue to rise, surpassing 40 million DALYs. High BMI is expected to make an increasingly large contribution, and high FPG is poised to overtake air pollution as the dominant factor. The elderly will bear the heaviest burden, yet a clear shift toward younger age groups is anticipated.

Conclusions: We predict that the disease burden caused by BVL will continue to increase and trend toward younger populations globally. Going forward, the primary risk factors for vision impairment are expected to transition to metabolic risk factors. The COVID-19 pandemic has altered the burden of eye diseases, and the leading drivers vary by country. Moreover, our study demonstrates the feasibility of using an XGBoost model to forecast disease burden, potentially improving predictive accuracy.

Abstract No.: 201229**Panel No.: OEP-0703**

Correlation of Obesity and Hyperlipidemia With Thyroid Eye Disease: A Systematic Review

*First Author: Lik San Alex CHENG**Co-Author(s): Kam Lung Kelvin CHONG, Ka Hei Kenneth LAI, Chi Pui Calvin PANG, Chee Yung Clement THAM, Tsz Hin Marcus YUNG*

Purpose: This systematic review aims to investigate the relationship between obesity and hyperlipidemia with thyroid eye disease (TED). This review seeks to synthesize existing evidence and provide insights into the clinical implications for thyroid patients with concurrent obesity and hyperlipidemia for the development of TED.

Methods: A systematic search was conducted using databases PubMed, MEDLINE, EMBASE, Web of Science, and ClinicalTrial.gov during July 2025. Two researchers independently screened abstracts and reviewed full text of relevant studies.

Results: For 968 studies identified, 17 of them met the predefined inclusion criteria. Data from 5 papers, comparing 246 Graves' Disease (GD) patients with TED and 254 GD patients without TED suggested that patients with TED had higher BMI and waist circumference than those without TED. Importantly, obesity-related factors, such as Body Mass Index (BMI), fasting plasma insulin and insulin resistance, correlated to the presence and severity of TED. BMI is also an independent factor predicting both orbital fat volume and proptosis severity. Furthermore, we analysed 6 cross-sectional studies in which 499 GD patients with TED and 481 patients without TED are included. Serum total cholesterol and low-density lipoprotein cholesterol (LDL) levels were significantly associated with TED. Hyperlipidemia may also be associated with Clinical Activity Score.

Conclusions: Both obesity and hyperlipidemia were found to be independent risk factors of TED and associated with disease activity and severity. Weight control and lipid-lowering therapy might be additional beneficial effects for TED.

Abstract No.: 200863

Panel No.: OEP-0700

Diabetic Retinopathy Screening in Australian General Practice: Geographic, Demographic, and Temporal Disparities From a National-Level Analysis

First Author: Sanil JOSEPH

Co-Author(s): Mingguang HE, Wenyi HU, Catherine JAN, Thulasiraj RAVILLA, Xianwen SHANG, Balagiri SUNDAR, Hugh TAYLOR, Zhuoting ZHU

Purpose: To examine the geographic and demographic variability in diabetic retinopathy (DR) screening uptake and factors influencing screening disparities in Australian general practice.

Methods: A retrospective, population-based observational study using Medical Benefits Schedule (MBS) claims data for DR screening using non-mydriatic fundus cameras, under items 12325 and 12326 from 2016 to 2024 across Australia. MBS data were obtained from Services Australia, and the demographic and socioeconomic indicators from the Australian Bureau of Statistics (ABS). Screening uptake was stratified by state, age, gender, and socioeconomic indicators.

Results: A total of 15,817 DR screenings were conducted, representing only 1.2% of the estimated diabetic population. MBS item 12325 (Indigenous Australian) accounted for 50.8% of screening, despite this group being a small proportion of the diabetic population. New South Wales and Western Australia had the highest total screening, while Tasmania recorded the lowest uptake. Screening uptake was highest in the <25 age group and lowest in those aged ≥75 years. Females had higher screening rates under MBS 12325, whereas males had higher rates under

MBS 12326. The COVID-19 pandemic contributed to a significant decline in screening uptake during 2020-2022, with partial recovery in 2023-2024. DR screening uptake showed no significant association with socio-demographic factors.

Conclusions: Despite national guidelines, GP-led DR screening uptake remains low, with substantial geographic, demographic and temporal disparities in Australian general practice settings. Addressing systemic barriers, strengthening GP-led screening, and implementing targeted interventions are crucial for improving DR screening uptake in Australia.

Abstract No.: 200689

Panel No.: OEP-0699

Enhancing Visual Function in Low Vision Patients Through Microperimetry Biofeedback Training: A Systematic Review and Meta-Analysis

First Author: Shafira Aulia HANIFA

Co-Author(s): Fairuziah Hetizta MAHARANI, Farhan WIRAJATI

Purpose: Microperimetric biofeedback training is an emerging neuroplasticity-based rehabilitation approach for patients with central vision loss. However, the therapeutic efficacy across various macular pathologies has not been fully characterized. This systematic review and meta-analysis evaluated the effectiveness of microperimetric biofeedback training in enhancing visual function among low vision patients with macular disease.

Methods: PubMed, Cochrane Library, CINAHL, Scopus, ScienceDirect, and Trip Database were searched following PRISMA guidelines. Randomised controlled trials and prospective comparative studies in adults with macular disorders were eligible. Primary outcomes included best-corrected visual acuity (BCVA), reading speed, and macular sensitivity changes. Standardized mean differences (SMD) were calculated using random-effects models, with heterogeneity assessed via I^2 statistics. Quality assessment employed the Newcastle-Ottawa Scale.

Results: Four studies encompassing 104 participants met the inclusion criteria and evaluated patients with Stargardt disease, age-related macular degeneration, and post-surgical macular holes. Microperimetric biofeedback training demonstrated significant BCVA improvement with SMD = -0.71 (95% CI: -1.12 to -0.31; $p < 0.01$; $I^2 = 0\%$), equivalent to 1-2 lines visual acuity gain. Reading speed showed substantial enhancement with SMD = 0.79 (95% CI: 0.32 to 1.26; $p < 0.01$; $I^2 = 0\%$). Macular sensitivity improvements were non-significant (SMD = 0.55, 95% CI: -0.18 to 1.27; $p = 0.14$) with considerable heterogeneity ($I^2 = 51\%$). Training protocols ranged from 6-16 sessions with follow-up periods of 6 weeks to 12 months.

Conclusions: Microperimetric biofeedback training achieves clinically meaningful improvements in visual acuity and reading performance across diverse macular pathologies, with consistent effects regardless of underlying etiology. The intervention addresses the most debilitating functional limitations experienced by low vision patients. Variable macular sensitivity responses suggest condition-dependent outcomes requiring individualised protocols. Standardized training guidelines and extended follow-up studies are needed to optimize clinical implementation.

Abstract No.: 202039

Panel No.: OEP-0706

Epidemiology of Rhegmatogenous, Serous, Tractional Retinal Detachment (RRD, SRD, TRD) and Associated Break or Defect: A UK Biobank Study

First Author: Edison Chak-fung HO

Co-Author(s): Philip Yawen GUO, Alexander KA NGAI LAM, Ryan Tak Chun WONG

Purpose: To investigate the epidemiology of RD and related conditions in UK adults.

Methods: The retrospective study included 502250 adults (aged 37-70 years) conducted with the UK Biobank. Baseline RD = % Had RD in first visit on 2006-2010, while incidence = RD developed in those who were free of disease in baseline/ 10000 person-year, with censored on date of death, date of losing follow-up, disease occurrence, or 2022-10-31. We calculated the prevalence and incidence of different types of RD and associated diseases in different subgroups classified by age, sex, ethnicity, and myopic state.

Results: A total of 2,078 patients (59% male) with RD and associated disease were identified in the baseline, with a prevalence of 0.414% in all and 0.538% in males. Incidence is 6.23/10000-person-year in all, while 7.82 in males. By ethnicity, White show the highest prevalence, followed by Asians and then Black (0.420%, 0.331% and 0.310%), and incidence in the same hierarchy (6.3, 5.02, 4.21/10000-person-year). Among RRD, SRD, TRD, and break, they show prevalence of 0.148%, 0.134%, 0.136% and 0.007% while incidence are 3.36, 1.65, 1.5, 0.24/10000-person years, indicating RRD is the most common, and TRD is the least common. Both prevalence and incidence of different subgroups show an increasing trend with increasing age and myopic grade.

Conclusions: RD prevalence and incidence vary with sex and ethnicity and are more common with increasing age and myopia. These findings overstate the need for investigation of underlying pathogenicity of retinal detachment and better screening in at-risk subjects for enhancing vision prognosis

Abstract No.: 201877

Panel No.: OEP-0705

Feasibility of Promotion Eye Examinations With the Smartphone Application for Children in Siem Reap, Cambodia

First Author: Hiroaki KATO

Co-Author(s): Yoshimune HIRATSUKA, Tatsukata KAWAGOE, Tean MENGHEANG, Seang POVCHAMREUN, Mayumi UETA

Purpose: In Cambodia, pediatric vision screening is virtually nonexistent. This study reports on local activities conducted to support the future implementation of vision screening programs.

Methods: A questionnaire survey was conducted among elementary school students in public schools in Siem Reap Province to assess awareness of visual impairment and prior vision testing. Visual acuity tests and basic eye examinations were then performed. Additionally, in a local orphanage, visual acuity was measured using both a standard vision chart and the Almirun application (Khmer version). Correlation and agreement between the two methods were evaluated.

Results: A total of 779 children (mean age: 8.96 years) participated in vision testing and ophthalmologic exams, with all responding to the questionnaire. While 24% reported subjective visual difficulties, unaided visual impairment was confirmed in 20.3%. Only 7.9% had prior experience with vision testing, indicating limited access. In the orphanage cohort (85 children, 170 eyes; mean age: 9.35 years), results from Almirun and the vision chart showed high correlation ($r = 0.91$, $R^2 = 0.83$). Bland-Altman analysis showed a mean logMAR difference of -0.0023 ($SD = 0.0039$) without fixed or proportional bias. Detection agreement for impaired vision ($\log MAR > 0$) was substantial ($\kappa = 0.70$).

Conclusions: Children in Siem Reap have limited access to vision screening. The Almirun app shows strong potential as an alternative screening tool and could help expand access to eye care in underserved areas

Abstract No.: 208392

Panel No.: OEP-0722

Foundation Models in Ophthalmology: A Preliminary Study on AI-Assisted Diagnosis of Pathologic Myopia Using Ultra-Widefield Fundus Images

First Author: Juzhao ZHANG

Co-Author(s): Xian XU, Tao YU, Haidong ZOU

Purpose: This study aims to detect characteristic fundus changes in pathological myopia using deep learning (DL)-based analysis of ultra-widefield (UWF) fundus imaging.

Methods: Following the exclusion of low-quality images, this cross-sectional study utilized 1,105 UWF images from 543 patients with high myopia to develop

the model, along with 293 images from 150 high myopia patients for external testing. All images were retrospectively collected from high myopia patients at Shanghai General Hospital and Shanghai Eye Diseases Prevention and Treatment Center between 2018 and 2024. We trained a DL model based on an ophthalmology foundational model to detect myopic maculopathy (MM) and posterior staphyloma (PS).

Results: The proposed RETFound-enhanced model demonstrated robust performance. For the five-category classification of MM, it achieved 65.4% accuracy and an F1 score of 0.648, outperforming other methods. In the three-category MM classification, it achieved 79.4% accuracy and an F1 score of 0.793. For PS detection, the model reached 84.1% accuracy, an F1 score of 0.814, and an AUROC of 0.886, highlighting its effectiveness as a screening tool. External validation showed consistent performance, with 64.4% accuracy for five-category MM classification, 79.8% accuracy for three-category classification, and 81.2% accuracy for PS, confirming robustness across cohorts.

Conclusions: This study presents an effective diagnostic model for pathological myopia using UWF fundus imaging and a foundation model. The integration of DL with non-mydratic UWF fundus imaging demonstrates promising potential for applications in primary healthcare, particularly in underserved areas, enabling accessible screening for high myopia-related fundus changes.

Abstract No.: 207231

Panel No.: OEP-0720

From Needle Jabs to Surgical Zen: A Safer Way to Block in Community Operation Theatres

First Author: Disha AGARWAL

Co-Author(s): Meenakshi DOGRA, Meena MENON

Purpose: To analyze the impact of shifting from peribulbar to sub-Tenon's anaesthesia in high-volume community cataract OTs.

Methods: Medical record data of 18,482 sub-Tenon's and 17,822 peribulbar cases were reviewed. Complications—globe perforation, retrobulbar hemorrhage (RBH), and occupational risks like needle stick injuries—were analyzed.

Results: No complications were reported in the Sub-Tenon's group. In contrast, the peribulbar group had 26 complications (0.15%)—3 globe perforations, 2 RBH, and 21 needle stick injuries ($z = -5.25$, $p < 0.001$).

Conclusions: Sub-Tenon's anaesthesia demonstrated a significantly safer profile than peribulbar, eliminating both surgical and occupational risks. It offers a safer alternative for high-volume community ophthalmic settings. In community OTs, sub-Tenon's anaesthesia reduces risk of serious complications, enhances safety, & improves overall surgical efficiency. It's a preferred

choice for large-scale programs, where managing adverse events is challenging due to limited resources or immediate access to specialized care.

Abstract No.: 205638

Panel No.: OEP-0717

From Retina to Nerve: Unraveling the Intricate Clinical Association of Diabetic Retinopathy With Cranial Nerve Palsy in a South Indian Cohort

First Author: P.sangavi SAMRITHA SELVI

Co-Author(s): Virna.m.shah, Aseela NAZAR

Purpose: To examine the association between Diabetic Retinopathy (DR) and Ocular cranial nerve palsies (CN III, IV, VI) in a South Indian cohort and explore relationships with DR severity, systemic factors, and sociodemographic features.

Methods: This retrospective observational study reviewed records of patients diagnosed with ocular cranial nerve palsies at a tertiary centre in South India from January 1 to April 30, 2025. Data included DR status and grade, type of cranial nerve palsy, systemic comorbidities (HbA1c, random blood sugar, hypertension, nephropathy), and socio-demographic indicators (state of residence, urban/rural background, and paid vs free care).

Results: Among 170 patients, Most patients were from Tamil Nadu (67.6%), followed by Kerala (31%) and a very small fraction from Andhra Pradesh (0.01%). A large majority (84.9%) belonged to the paying group and were predominantly urban residents. There were 68.2% Male patients and 31.8 %Female patients. Sixth nerve palsy was most frequent (51.2%), followed by Third (31.2%) and Fourth (17%) nerve palsies; Multiple nerve involvement was rare (2%). Ischemic causes accounted for 69.4% of palsies, Trauma (13%), Inflammatory causes (9.4%), Space-occupying lesions(3.5%) and ICT and IIHT (6%). Overall, 30.8% of patients with cranial nerve palsy had coexisting DR related to Diabetes mellitus.

Conclusions: Nearly one-third of diabetic patients with ocular cranial nerve palsy had DR, with stronger links to third and sixth nerve involvement and Severe NPDR with male predominance. The predominance of urban, paying patients from Tamil Nadu highlights regional referral patterns and underscores the need for early Neuro-ophthalmic screening in diabetics with advanced DR in South India. Retina Warns, Nerve Weeps—Act Early.

Abstract No.: 200154**Panel No.: OEP-0696**

Fundus Examination in Emergency Medicine: A National Survey of Practice Patterns, Barriers, and Diagnostic Confidence

*First Author: Yujie WANG**Co-Author(s): Raphael CHANG, Wenyi HU, Zhuoting ZHU*

Purpose: Fundus examination is critical for the early detection of serious ocular and neurological conditions in the emergency department (ED), yet it remains underused. This study aimed to investigate current practice, perceived barriers, and diagnostic performance related to fundus examination among ED doctors in Australia.

Methods: A national cross-sectional online survey was distributed to members of the Australasian College for Emergency Medicine. The 28-item questionnaire included multiple-choice and Likert-scale items assessing demographics, equipment availability, training on fundus examination, confidence, practice patterns, perceived barriers, and diagnostic accuracy based on five representative fundus images. Descriptive statistics and multivariable logistic regression were used for analysis.

Results: A total of 135 ED doctors participated (58.5% female; mean experience 12.3 ± 8.3 years; 25.9% from regional/remote areas). While 82% considered fundus examination important, only 51% reported performing it when clinically indicated. Commonly cited barriers included low interpretive confidence, inadequate training, time constraints, and limited equipment. Most had access to direct ophthalmoscopes (94.5%) or slit lamps (63.7%), but only 8.3% reported access to portable fundus cameras. Although 42.2% had received some training, over half reported receiving it less than once every five years. Only 26.5% expressed confidence in performing and interpreting fundus examinations. The overall diagnostic accuracy across five representative fundus images was 43.6% (95% CI, 39.4%–47.8%) and was significantly associated with perceived importance, ED training, gender, and practice location.

Conclusions: Underutilization of fundus examination in emergency care highlights gaps in training, confidence, and access. Addressing these barriers is key to improving neuro-ophthalmic triage and early detection of sight-threatening and life-threatening conditions.

Abstract No.: 205216

Gaps and Gray Zones: A Study of Non-Consensus and Clinical Outcomes in Conjunctivitis Treatment Practices

First Author: Rakhi P DCRUZ

Purpose: This study exposes the strikingly heterogeneous management of conjunctivitis among

ophthalmologists in South India, critically evaluating antibiotic overuse, inconsistent steroid and antiviral regimens, and the glaring absence of standardized steroid protocols. It further assesses the real-world consequences, including the high prevalence of complications such as superficial punctate keratitis (SPK), raised intraocular pressure (IOP), and uveitis. The investigation also highlights the underutilization of culture and sensitivity testing and contrasts private versus institutional treatment paradigms.

Methods: Responses from 77 experienced ophthalmologists (50 general and 27 cornea specialists) across Kerala, Tamil Nadu, and Telangana were collected via a structured Google Form during the peak conjunctivitis season. Analysis focused on prescribing trends, protocol adherence, and management of complications.

Results: A concerning 60% routinely prescribed broad-spectrum empirical antibiotics, irrespective of bacterial or viral suspicion, while only 30% utilized antivirals in viral cases. Steroid prescription was more prevalent among generalists and private practitioners; institutional strategies preferred initial lubricants with delayed antibiotic intervention. SPK affected over 60% of viral conjunctivitis patients, who subsequently received low-dose steroids despite lacking uniform protocols. Clinical diagnosis dominated with minimal microbiological testing. Viral conjunctivitis emerged as the most frequent subtype, with fluoroquinolones favored for bacterial infections. Steroid regimens displayed marked inconsistency in dose and timing. Supportive care and patient hygiene education were widely advocated.

Conclusions: Our study reveals critical gaps marked by protocol variability and indiscriminate antibiotic use, spotlighting an urgent need for unified, evidence-based, region-specific guidelines. This foundational study lays the groundwork for future research to refine conjunctivitis care.

Abstract No.: 208267**Panel No.: OEP-0721**

Global Burden of Blindness and Vision Loss Among Children and Adolescents: A Systematic Analysis for the Global Burden of Disease Study 2021

First Author: Yinwen LI

Purpose: This study investigates the global burden of vision impairment caused by refraction disorders, near vision loss, and other vision loss among children and adolescents from 1990 to 2021. The analysis is categorized globally by sex, age, and socio-demographic index (SDI), with a focus on predicting trends to 2035.

Methods: Data was obtained from the Global Burden of Disease Study 2021. We reported the prevalence and disability-adjusted life-years (DALYs) of vision

impairment due to refraction disorders, near vision loss, and other vision loss globally. Then, we described the prevalence and DALYs numbers and rates by sex, SDI and age. Next, we analyzed the relationship between rate and SDI. Finally, Bayesian age-period-cohort (BAPC) analysis model was used to predict the trends from 2022 to 2035 globally by sex and age.

Results: The prevalence and DALYs rates for refraction disorders had a statistically significant trend of reduction in four age groups globally and were positively associated with SDI. The prevalence and DALYs rates for near vision loss were increasing in four age groups, and were negatively associated with SDI. The BAPC model indicates that the age-specific prevalence and DALYs rates of refraction disorders and other vision loss in both men and women will remain on a downward trend until 2035, while near vision loss continues to rise.

Conclusions: The findings underscore that there are extensive variations based on the type of vision impairment, age group, sex and SDI. Policies should be tailored to specific types in order to effectively alleviate the burden.

Abstract No.: 202960

Panel No.: OEP-0709

Global, Regional, and National Burden of Age-Related Macular Degeneration From 1990 to 2021 and Projections for 2050: Findings From the Global Burden of Disease 2021 Study

First Author: Jiaying LIU

Co-Author(s): Lian HAN, Zhaohuai LI, Xingyu LIU, Wenru SU, Yehong ZHUO

Purpose: To provide a foundation for future preventative strategies against blindness caused by AMD by examining the global, regional, and national disease burden.

Methods: Trends were analyzed via joinpoint regression for Average Annual Percentage Change (AAPC). Spearman's rank correlation and LOESS regression assessed the association between AMD burden and Socio-Demographic Index (SDI), and projected 2050 AMD prevalence, DALYs, and AAPC.

Results: In 2021, the global AMD prevalence and DALYs were 102.11 (95% uncertainty interval (UI): 84.97 to 124.48) and 7.32 (95% UI: 5.08 to 10.10), respectively. From 1990 to 2021, the AMD burden increased globally, in most regions and countries/territories, and it is projected to rise further by 2050. The prevalence and disease burden of AMD were found to be higher in females ($P < 0.05$) and increased with age. World Bank low-income regions exhibited the highest burden. Negative correlations were found between SDI and AMD burden. The research also shows intensifying global population aging.

Conclusions: The rising vision impairment and disease burden due to AMD, coupled with population aging, underscore the urgent need for prevention and management, particularly for the elderly and females. AMD's global prevalence and burden show notable socioeconomic, geographical, and potential racial disparities. Targeted interventions, enhanced medical services, and international cooperation are vital to reduce AMD's burden and ensure care equity worldwide.

Abstract No.: 202615

Panel No.: OEP-0708

Global, Regional, and National Burden of Vision Impairment From 1990 to 2021, With Projections of Prevalence to 2050: A Trend Analysis

First Author: Shi-nan WU

Co-Author(s): Zuguo LIU

Purpose: This study provides a descriptive analysis of the global burden of disease for different levels of visual impairment from 1990 to 2021, focusing on health inequities and projections to 2050.

Methods: A secondary analysis of the Global Burden of Disease (GBD) Study 2021 data was conducted, focusing on Years Lived with Disability (YLDs) due to moderate and severe vision loss and blindness. A Bayesian age-period-cohort (BAPC) model was used to predict the prevalence and YLDs of vision impairment at different severity levels up to the year 2050.

Results: Among the 204 countries and regions in the GBD 2021, the top three countries with the highest number of YLDs cases of moderate vision loss, severe vision loss, and blindness are India, China, and Brazil; India, China, and Indonesia; and India, China, and Pakistan, respectively. There is a significant negative correlation between the YLDs for different levels of visual impairment and the Socio-demographic index (SDI) in 204 countries (Moderate Vision Loss: $R = -0.22$ [$P = 0.002$], Severe Vision Loss: $R = -0.46$ [$P < 0.001$], Blindness: $R = -0.73$ [$P < 0.001$]). The average annual percent change (AAPC) values of the age-standardized prevalence rate (ASPR) for moderate vision loss, severe vision loss, and blindness from 1990 to 2021 are 0.07 (95%CI: 0.06 to 0.08), -0.23 (95%CI: -0.24 to -0.21), and -1.27 (95%CI: -1.31 to -1.25), respectively. The BAPC prediction model projects that by 2050, the global ASPR for moderate vision loss, severe vision loss, and blindness will be 2879.25 (95%CI: 1113.78 to 4644.72), 292.6 (95%CI: 79.22 to 506.04), and 321.95 (95%CI: 104.53 to 539.38), respectively.

Conclusions: Subgroup analysis of vision impairment by age, gender, region, country, etiology, and SDI level was conducted to assess the differences in the disease burden caused by vision impairment at different severity levels. Epidemiological data characteristics

indicate a shift in vision impairment from blindness to moderate or severe vision loss.

Abstract No.: 206203

Panel No.: OEP-0719

Kidney Function Markers Mediate the Protective Association Between Estimated Glucose Disposal Rate and Ocular Diseases: A Cross-Sectional Study

First Author: Jian DENG

Co-Author(s): Guo HUI, Pan LIDUO, Song XI, Yu XIAOYI

Purpose: Vision impairment due to eye diseases represents a significant global public health concern. This study investigates the association between eGDR and ocular diseases and evaluates the mediating role of kidney function.

Methods: This cross-sectional study included 4877 adults aged 40 years or older from the US National Health and Nutrition Examination Survey 2005–2008. We analyzed the relationship between eGDR and ocular diseases, including cataract, glaucoma, age-related macular degeneration, diabetic retinopathy (DR), and any ocular disease using weighted multivariable logistic regression, restricted cubic spline analysis, subgroup analyses, E-value analysis, and mediation studies.

Results: Higher eGDR was associated with reduced odds of five ocular diseases in crude analysis. After fully adjusted models, the highest eGDR tertile conferred significant protection against diabetic retinopathy (OR:0.25, 95% CI: 0.12–0.53, $P = 0.002$) and any ocular disease (OR:0.81, 95% CI: 0.69–0.94, $P = 0.011$) compared to the lowest. Restricted cubic splines confirmed linear inverse associations. The protective association of eGDR with DR and any ocular disease was partially mediated by kidney function, with blood urea nitrogen and serum creatinine explaining 13.11% and 8.33%, and 22.08% and 9.09% of the effect, respectively. The robustness of these findings was supported by subgroup analyses, E-value estimation, and random forest-based multiple imputation method.

Conclusions: This study demonstrates a protective association between higher eGDR levels and a reduced risk of ocular diseases in adults aged 40 years or older, particularly DR, with kidney function playing a mediating role. eGDR is expected to serve as a target for ocular disease prediction and intervention.

Abstract No.: 204616

Panel No.: OEP-0714

Machine Learning Models for Risk Prediction of Diabetic Retinopathy in Fujian Eye Study

First Author: Yang LI

Co-Author(s): Qinrui HU, Xiaoxin LI, Bin WANG

Purpose: Diabetic Retinopathy (DR) is one of the most severe microvascular complications of diabetes,

which seriously affects the visual acuity and quality of life of patients. This study explores multiple machine learning-based models for the risk prediction of DR, providing a foundation for future research in the field of information and big data. Additionally, the optimal model is utilized to identify the associated risk factors for DR.

Methods: Utilizing the dataset from the Fujian Provincial Epidemiological Eye Disease Study, which includes 8211 records and 51 features, we constructed and evaluated five machine learning models through steps such as data preprocessing, feature selection, and model training. These models include Logistic Regression (LR), K-Nearest Neighbors (KNN), Support Vector Machine (SVM), Decision Tree (DT), and Random Forest (RF), with the aim of assessing their predictive accuracy. Moreover, we complemented Shapley Additive exPlanations (SHAP) analysis with three unsupervised and nonparametric methods: Factor Analysis (FA), Highly Variable Feature Selection (HVGS), and Spearman's rank-order correlation.

Results: This study evaluated multiple machine learning models, including LR, KNN, SVM, RT, RF, LightGBM, and XGBoost. Ultimately, the SVM model achieved the highest performance with F1-score of 92.83% and AUC of 0.99. The SHAP method revealed that history of diabetes, age, blood pressure difference, near visual acuity of the left eye, and height were the top five influencing predictors of DR.

Conclusions: The proposed integrated system is poised to serve as an invaluable tool for identifying critical predictors, enabling the early-stage prediction of patients at high risk for DR in China.

Abstract No.: 204125

Panel No.: OEP-0712

Perioperative Care Practices and Antibiotic Prophylaxis in Cataract Surgery: A Local Ophthalmology Society Survey

First Author: Abigail MONTES

Co-Author(s): Sharlene NOGUERA, George Michael SOSUAN

Purpose: This study aims to determine the perioperative care practices and antibiotic prophylaxis in cataract surgery among surgeons from a local Ophthalmology society.

Methods: A cross-sectional, web-based survey was conducted among 35 cataract surgeons from a local Ophthalmology society using a modified, validated instrument adapted from the Asian study on Peri-operative Antibiotic Prophylaxis (APAX) questionnaire. The survey assessed routine practices related to lid scrubs, lid drapes, povidone-iodine application, and antibiotic prophylaxis, including route, timing, frequency, and dosing during the preoperative,

intraoperative, and postoperative phases of cataract surgery.

Results: Routine lid scrubs and preoperative application of povidone-iodine were consistently performed in both low and high-risk cataract surgery cases. Preoperative antibiotics were used selectively in 31.4% of low-risk cases and 51.4% of high-risk cases. Intraoperatively, ~90% of surgeons administered antibiotics, with the intracameral route as the preferred method. Postoperatively, all respondents prescribe topical antibiotics, most commonly Levofloxacin 0.5% and Moxifloxacin 0.5%. In low-risk patients, antibiotics were typically prescribed for 2–4 weeks, whereas high-risk patients received higher dosing frequencies (up to eight times daily) and extended durations exceeding four weeks.

Conclusions: This study shows a strong consensus on antiseptic measures, including routine use of povidone-iodine, lid scrubs, and plastic eyelid draping, as well as using intracameral and postoperative antibiotics. While the longer courses seen in low-risk patients raise the possibility of overtreatment, extended regimens in high-risk patients demonstrate a customized, risk-based approach. These results highlight the need for evidence-based, locally tailored guidelines to improve patient outcomes, promote antibiotic stewardship, and standardize perioperative care.

Abstract No.: 201095

Panel No.: OEP-0701

Population Aging and Glaucoma-Related Vision Loss: Global vs Asia

First Author: Jianqi CHEN

Co-Author(s): Zhidong LI, Yingting ZHU, Yehong ZHUO

Purpose: As a key public health concern, population aging is closely associated with the increasing glaucoma prevalence. This study aims to assess its impact on both the Asian and global populations.

Methods: This study used data from the Global Burden of Disease Study 2021. We assessed the impact of population aging on glaucoma vision loss from 1990 to 2021 by decomposing changes in cases into contributions from population growth, aging, and epidemiological rate changes, and further calculated attributed cases and proportions. To compare the effects of epidemiological rates (reflecting the preventive effect) and population aging, we calculated the epidemiological rate change/population aging ratio (E-A ratio).

Results: From 1990 to 2021, the prevalence of glaucoma-related vision loss rose from 4,072,106.53 (95% uncertainty interval [UI], 3,204,763.73–5,131,929.57) to 7,587,672.87 (95% UI, 5,969,840.61–9,582,253.77) worldwide and from 1,980,482.59 (95% UI, 1,548,959.57–2,502,831.02) to 3,969,356.7 (95% UI, 3,114,247.84–5,026,564.23) in Asia. From

1990 to 2021, the increase in glaucoma-related vision loss attributable to population aging was 636,981.26 (attributed proportion: 15.64%) globally, and 513,516.46 (attributed proportion: 25.93%) in Asia. The global E–A ratio was –2.40, compared to –2.26 in Asia.

Conclusions: This study reveals that aging has exerted a relatively greater influence in Asia compared to the global context. However, preventive strategies have effectively offset its impact, although their effect remains slightly below the global average.

Abstract No.: 202505

Panel No.: OEP-0707

Predictors and Barriers in the Uptake of Referral Services From Secondary Eye Care to Tertiary Eye Care Centers in Southern India

First Author: Harinikrishna B

Co-Author(s): Ram SUDARSHAN

Purpose: To identify factors influencing adherence and non-adherence to referral from secondary to tertiary eye care centers.

Methods: Patient records from September 2023 to March 2024 were reviewed for those referred from a secondary to a tertiary center in southern Tamil Nadu. Structured questionnaires were used for adherent and non-adherent groups. For pilot study, we had a sample of 60 patients with 30 in each arm. A pilot study involved interviews with patients by senior data entry operators. Data was analyzed using Stata.

Results: Non-adherence was more common in patients with mild visual impairment. 33% of patients who were non-adherent were those referred to the glaucoma department. No gender differences were found. Key non-adherence factors included a lack of an accompanying attendant and time constraints. Adherence was mainly due to the consultant's recommendation, and adherent patients were generally satisfied with their experience.

Conclusions: Our study highlights areas for improving compliance, such as comprehensive counseling, follow-up calls, and telemedicine services. The study identifies areas for potential intervention to improve compliance with higher-level eye care services. Comprehensive and effective counselling, follow-up phone calls to referred patients, and a dedicated staff to handle referrals could lead to increased uptake of referral services.

Abstract No.: 205529**Panel No.: OEP-0716**

Prevalence and Clinical Correlates of Subretinal Drusenoid Deposits (SDDs) in Dry Age-Related Macular Degeneration (AMD): A Cross-Sectional Study in Hong Kong

*First Author: Wing Hei LOK**Co-Author(s): John BUCHAN*

Purpose: Age-related macular degeneration (AMD) is a leading cause of irreversible visual loss globally and in Hong Kong's ageing population. Subretinal drusenoid deposits (SDDs) are extracellular deposits above the RPE that are linked to outer-retinal dysfunction and a faster risk of progression to late AMD. East-Asian population data remain sparse, and CFP-based surveys under-detect SDD relative to SD-OCT. We therefore quantified SDD burden, staging, and clinical correlates in older Hong Kong Chinese.

Methods: Cross-sectional analysis of community participants aged ≥ 70 years from the Southern District Signature Project (Hong Kong). Spectral-domain OCT volumes were graded for SDD presence and stage (0–4). Eye-level prevalence used Wilson 95% CIs. Independent associations with SDD were estimated using multivariable logistic regression with cluster-robust SEs across pre-specified demographic, systemic and lifestyle covariates. Structure-function relationships across stages were assessed using Spearman's ρ and age-adjusted linear models for outer-nuclear-layer (ONL) thickness, subfoveal ellipsoid-zone (EZ) and EZ–RPE thickness, subfoveal choroidal thickness (SFCT), and best-corrected visual acuity (BCVA). Sensitivity analyses (GEE; one-eye sampling) and intra-observer agreement were performed.

Results: We analysed 596 participants (1,192 eyes; mean age 74.6 ± 4.2 years). SDD prevalence was 29.3% (95%CI 26.8–31.9); stage distribution (0, 1, 2, 3, 4): 70.7%, 16.6%, 10.4%, 2.2%, 0.1%, respectively. In adjusted models, age (OR 1.71 per 5 years, 95%CI 1.38–2.12; $p < 0.001$) and hyperlipidaemia (OR 1.98, 95%CI 1.30–3.03; $p = 0.002$) were independently associated with SDD. Higher SDD stage correlated with thinner ONL, EZ, EZ–RPE and SFCT ($p = -0.233, -0.799, -0.789, -0.788$, respectively; all $p < 0.0001$) and worse BCVA ($p = +0.164$; $p < 0.0001$). Per one-stage increase, mean changes were: ONL $-3.64 \mu\text{m}$, EZ $-3.44 \mu\text{m}$, EZ–RPE $-6.14 \mu\text{m}$, SFCT $-70.6 \mu\text{m}$, and BCVA $+0.020 \log\text{MAR}$ (all $p \leq 0.0016$). Repeatability was high (presence $\kappa = 0.89$; stage weighted $\kappa = 0.94$). Findings were consistent in GEE and one-eye sensitivity analyses (one-eye prevalence 30.4%).

Conclusions: In community-dwelling older Hong Kong Chinese, SDDs are common and track a graded loss of outer retinal and choroidal integrity, accompanied by modest acuity decline. Age and hyperlipidaemia are independent correlates. Findings support OCT-centred

detection and risk-stratified monitoring to anticipate late AMD trajectories.

Abstract No.: 201016**Panel No.: OEP-0702**

Prevalence of Ocular Trauma and Barriers to Use of Personal Protective Devices Among Welders in Hetauda, Nepal

*First Author: Hom Bahadur GURUNG**Co-Author(s): Dikshya BISTA, Aleena GAUCHAN, Mohini SHRESTHA, Sunil THAKALI*

Purpose: Assess ocular trauma prevalence, PPE use, and barriers among Hetauda welders.

Methods: Cross-sectional study of 111 welders via interviews and eye exams.

Results: Comprehensive eye examinations and structured interviews revealed a high ocular trauma prevalence of 62.16%, primarily caused by metal chips (60.87%) and flames (37.84%). Although 78.39% of welders reported using PPE, 72.97% relied on non-certified sunglasses, and only 1.80% used certified protective goggles. Key barriers to appropriate PPE use included the absence of workplace mandates (62.50%) and a belief that protection was unnecessary (64.52%). Significant risk factors for trauma included male gender, lack of safety training (43.48%), and age between 46 and 60 years. Common ocular morbidities were corneal opacity (20.72%) and conjunctival congestion (10.36%), with only 8.11% of welders using prescription safety eyewear.

Conclusions: Despite reported PPE usage, the continued high rate of ocular trauma highlights deficiencies in equipment quality and training. Mandating certified eye protection (e.g., shade-10 filters), enforcing workplace safety policies, and integrating occupational health education are critical steps for preventing eye injuries in Nepal's industrial sector.

Abstract No.: 204564**Panel No.: OEP-0715**

The Asia Pacific (APAC) Vision Health Survey Report: An Urgent Challenge and a Critical Conjunction

*First Author: Marten BRELEN**Co-Author(s): Andrew CHANG, Shilpka DAS, Rancy KHOSLA, Paisan RUAMMIBOONSUK, Seung-young YU*

Purpose: APAC Vision Health Survey (27 August–2 September 2024) aimed to address the region's disproportionate burden of vision impairment by exploring unmet needs, perceptions of vision health, links to ageing and diabetes, and retinal disease awareness.

Methods: A total of 4,354 individuals aged 40+ from Australia, Hong Kong, Malaysia, the Philippines,

Singapore, South Korea, Taiwan, and Thailand participated. Data self-reported via an online, multilingual questionnaire—weighted by age, gender, and education for population representation. Margins of error (4-5%) suggest reliable estimates. APAC's first region and population-wide dataset on eye health behaviours and awareness.

Results: Concern-action gaps: 91% worry about vision health, yet only 28% get yearly exams; 32% delay care until symptoms appear. Among respondents with diabetes, 32% skip yearly exams, 11% have never had one. 42% of those aged 60+ forego regular eye checks. Low retinal disease awareness (1–4 scale): DME (1.9), AMD (2.1), wet-AMD (1.7), RVO (1.6). Multi-dimensional care barriers, highlighted by respondents with diabetes: cost (37%), inconvenience/lack of time (24%), low awareness (20%), fear/anxiety (20%), no perceived need (17%), and access difficulties (16%). Anticipated vision impairment impact: daily life (68%), quality of life (49%), employment (46%), finances (41%), mental health (38%). 95% of caregivers expressed financial, physical, and emotional burdens.

Conclusions: Survey data highlights vision impairment as a pressing health and socioeconomic challenge requiring both policy and clinical responses—from early detection and accessible care for high-risk groups to public awareness, digital innovation, workforce investment, and multi-sector partnerships that scale prevention and impact.

Abstract No.: 208655

Panel No.: OEP-0723

The Association of Alcohol Consumption With Rhegmatogenous Retinal Detachment and Retinal Break: Findings From the UK Biobank

First Author: Edison Chak-fung HO

Co-Author(s): Philip Ya Wen GUO, Alexander Ka Ngai LAM, Ryan Tak Chun WONG

Purpose: To investigate the association of alcohol consumption with rhegmatogenous retinal detachment and retinal breaks.

Methods: The retrospective study included 100587 UK adults conducted with the UKBiobank database. Participants were categorized according to self-reported drinking behaviors, and alcohol intake (g/week) was estimated from touchscreen questionnaires and food composition tables. Rhegmatogenous retinal detachment is defined as ICD10: H330 + ICD9: 3610, while the subgroup analysis includes retinal detachment and break + ICD10: H333 also. We perform a 2-step analysis that first compares infrequent drinkers to never, regular, or former drinkers. While the second step is evaluating the dose-response through multivariable logistic regression adjusted for covariates, including age, sex, ethnicity, spherical equivalent

refraction, BMI, and Townsend Deprivation index, to examine the association.

Results: In all subgroup analyses, never and former drinkers show no difference from infrequent drinkers. Regular drinkers show no statistical difference to infrequent drinkers OR=1.35, P=0.056 in all participants, however, if we only consider the myopia population (SE<=-0.5, n=34416) (OR=1.58, p=0.038) and the high myopia population (SE<=-5, n=6217) (OR=3.59, p=0.013), regular drinkers increase 58% and 260% risk, respectively causing retinal break or detachment. If considering retinal detachment only in the high myopia population, there has been an increase of 190% risk (OR=2.94, P=0.037). For dose-response analysis, a per SD increase (114g/week) in intake increases 12% risk of having retinal detachment for all participants.

Conclusions: Although we cannot infer causality, the results suggest that frequent alcohol consumption are correlate of development of retinal detachment or break, especially in high myopia patient who are at risk of developing rhegmatogenous retinal detachment.

Abstract No.: 200612

Panel No.: OEP-0698

The Competency Activation and Integration Model (CAIM): Strengthening Diabetic Retinopathy Screening Through Community and Allied Health Workers

First Author: Sunita MOHAN

Co-Author(s): Govindasamy KUMARAMANICKAVEL, Albert SCHERPBIER, Fred STEVENS

Purpose: To propose and validate the Competency Activation and Integration Model (CAIM), a framework to integrate community and allied health workers (CAHWs) into diabetic retinopathy (DR) screening in underserved urban slums.

Methods: A global narrative review of 32 studies from Asia, Africa, and Latin America was conducted to examine the roles and competencies of community and allied health workers in diabetic retinopathy (DR) screening. Thematic synthesis identified recurring barriers (e.g., lack of training, poor system integration) and enablers (e.g., community trust, structured supervision). These patterns were analyzed using a competency-focused lens and mapped to health system functions. The findings were iteratively refined to derive four key domains forming the CAIM framework, ensuring both contextual relevance and theoretical robustness in model development.

Results: CAIM consists of four interdependent domains: (1) Competency Activation (recruitment, motivation, skill development); (2) System Integration (task alignment, referral coordination, supervision); (3) Environmental Enablement (community trust, infrastructure support, cultural alignment); and (4) Human Capital Reinforcement (incentives, recognition,

long-term career pathways). The model illustrates how fragmented DR screening tasks can be systematically allocated to trained CAHWs, with supportive supervision and embedded feedback loops. It also highlights the role of localized adaptation and policy engagement in sustaining CAHW performance. CAIM thus operationalizes both micro-level (worker) and macro-level (system) readiness for DR screening scale-up.

Conclusions: CAIM offers a practical, scalable model to guide people-centered DR screening programs. It bridges workforce capacity and health system integration, supporting WHO's IPEC goals in fragile urban contexts.

Abstract No.: 204464

Panel No.: OEP-0713

Unseen Barriers: Socioeconomic and Logistical Challenges to Cataract Surgery Uptake in Bangladesh

First Author: Pradipta CHOWDHURY

Co-Author(s): Anindita CHOWDHURY, Prakash CHOWDHURY, Mohammad MURAD, Altaf UDDIN

Purpose: Cataract blindness remains curable, yet surgery uptake in LMICs is strikingly low. This study reveals the hidden barriers: fear of surgery, financial strain, socio-cultural, and logistical barriers that continue to block vulnerable patients in both outreach and hospital settings from regaining sight.

Methods: A cross-sectional preoperative survey was conducted among 595 cataract patients attending hospital outpatient services ($n = 222$) and community outreach camps ($n = 373$) in Bangladesh from May to August 2025. Socio-demographic characteristics, awareness of cataracts and treatment, and barriers to surgery were assessed. To compare the baseline characteristics of the socio-demographic properties, chi-square tests were used for categorical variables, and the Mann-Whitney U test was applied for continuous variables. A linear regression was also used to examine the associations between patient characteristics and the number of reported barriers to accessing cataract surgery.

Results: The mean age was 62 years (50.3% female). Camp patients were predominantly rural (76.1%) and had lower education levels (43% with no schooling vs. 13% in OPD, $p < 0.001$). 74% of the participants presented with bilateral cataracts. While 88.6% had heard of cataracts, only 41.3% were aware of the treatment options. Key barriers included affordability (72.3%), worry about the surgical outcome (27.1%), fear of surgery (25.9%), transportation (27.7%), lack of escort (22%), and time constraints due to work or family responsibilities (18.2%).

Conclusions: Cost of surgery, socio-cultural attitudes, low literacy & geographical access hinder cataract

surgery uptake in Bangladesh. Innovative solutions such as subsidy models, gender sensitive counselling and mobile outreach are key to dismantling health inequities and protecting the vulnerable populations.

Abstract No.: 205642

Panel No.: OEP-0718

Why Rural Communities in India Delay Seeking Eye Care?

First Author: Maneck NICHOLSON

Co-Author(s): Snehal GAWADE, Radhika KRISHNAN, Ashwini ROGYE

Purpose: To assess the willingness to use eye care services among individuals with self-reported visual difficulties in rural Maharashtra, and to identify demographic and psychosocial factors influencing service uptake.

Methods: A cross-sectional survey was conducted among participants with visual complaints during rural outreach camps. Data on sociodemographic characteristics, duration of visual symptoms, and willingness to utilize various eye care services were collected. Logistic regression was used to evaluate associations between demographic variables and the desire to use each service.

Results: While willingness to undergo an eye examination was high (91.6%), the uptake of treatment services was significantly lower: 67.4% for eyeglasses, 56.7% for medications, and 58.5% for surgery. Older age, longer symptom duration, and unemployment were negatively associated with willingness to use eyeglasses. Literacy and employment status showed no consistent link with willingness to accept surgery or medications. Notably, no demographic variable strongly predicted willingness for surgery, indicating that broader awareness and perception-related barriers are influential.

Conclusions: Despite the availability of free services, a significant number of individuals with visual complaints remain hesitant to seek treatment particularly surgery and medications. These results underscore the importance of targeted educational efforts, community awareness programs, and trust-building initiatives to promote service utilisation among underserved populations.

Ophthalmic Trauma

Abstract No.: 203090

Panel No.: OTR-0729

A Retrospective Study of Ophthalmologic Presentation, Management, and Outcomes in Pediatric Patients Admitted With Abusive Head Trauma

First Author: Jiawei YIN

Co-Author(s): Xuerui ZHANG, Peiquan ZHAO

Purpose: Purpose: Abusive head trauma (AHT) is a severe form of child abuse with high morbidity and mortality. Ophthalmologic findings, though often underexplored, may provide important clues for early diagnosis and management. This study aimed to investigate ophthalmologic manifestations, management, and outcomes of AHT in a single center in China.

Methods: A retrospective case series was conducted at a single institution, involving infants diagnosed with AHT from 2019 to 2023. Data on demographics, medical histories, and clinical management were collected. Ophthalmologic examinations, including fundus photography, ocular B-scan ultrasound, and fundus fluorescein angiography (FFA), were performed to evaluate retinal vasculature and identify peripheral ischemic retina (PIR). Statistical analyses were performed using SPSS version. 26.0.

Results: Eight AHT patients (16 eyes) were included in the study. Bilateral ocular involvement was observed in all patients, with 81.25% exhibiting retinal hemorrhages (RH). Other manifestations included retinal detachment (31.25%) and optic nerve atrophy (18.75%). Clinical interventions varied, with 68.75% of patients undergoing treatments such as laser photocoagulation and anti-vascular endothelial growth factor (VEGF) injections. Among all eyes, 75% showed resolution of RH. Despite treatment, some patients progressed to severe conditions such as retinal detachment (RD) and iris neovascularization (INV).

Conclusions: This study emphasizes the importance of a multidisciplinary approach in the diagnosis and management of AHT, particularly by integrating ophthalmological perspectives into patient care. These findings contribute to the understanding of ophthalmologic presentations in AHT.

Abstract No.: 202866

Panel No.: OTR-0727

Case Report: Post-Traumatic Iris Cyst After Being Pecked by a Stork 30 Years

First Author: Y HUYNH

Co-Author(s): Trang Thanh NGHIE, Huong NGUYEN

Purpose: Epithelial iris cysts can be classified as either primary or secondary. The management of secondary iris cysts, particularly those occurring after ocular trauma, presents considerable clinical challenges. This report describes the successful surgical intervention for a post-traumatic iris cyst.

Methods: Case report.

Results: A 40-year-old male patient presented with left eye pain and blurred vision for about 5 months. Medical history: trauma to the left eye caused by a stork 30 years ago. Clinical examination: Secondary ocular hypertension, corneal scar at the 7 o'clock limbus, and a light brown, semi-translucent cyst iris cyst extending from 5 to 12 o'clock occupying nearly the entire anterior chamber, closely adherent to the posterior corneal surface, making other assessments difficult; cataract. Surgical treatment consisted of total removal of the external cyst layer following cataract extraction and intraocular lens implantation. Postoperatively, the patient demonstrated favorable visual recovery with minimal intraocular inflammation.

Conclusions: Surgical intervention should be considered as a final option when less invasive treatments fail, particularly in cases involving extensive lesions.

Abstract No.: 205607

Panel No.: OTR-0734

Clinical Management and Outcomes of Ocular Perforation Injuries Induced by Acupuncture: A Case Study

First Author: Huping SONG

Purpose: Ocular perforating injuries caused by acupuncture are serious injuries that can damage multiple tissues within the eye. We aim to report two cases of eye perforation injuries caused by acupuncture needles, which showed significant clinical improvement.

Methods: We reported two cases of eye perforation injuries caused by acupuncture. Based on the patient's condition, we chose a treatment plan combining vitrectomy with retinal laser therapy, and antibiotic treatment was provided after the operation.

Results: Puncture injury of the needle hole, with the entry and exit of the needle hole located in different quadrants of the retina, leads to retinal damage and vitreous hemorrhage. This trauma cannot be completely resolved by retinal laser treatment alone. Therefore, vitrectomy is necessary to prevent retinal

detachment, proliferative vitreoretinopathy, and endophthalmitis.

Conclusions: Ocular perforation injury caused by acupuncture is relatively rare, but the prognosis is poor. Early treatment of this kind of ocular trauma is of vital importance. Vigorously carry out standardized acupuncture operations, conduct education on ocular trauma, and reduce the incidence of ocular trauma.

Abstract No.: 209778

Panel No.: OTR-0741

Evaluating Ciliary Body Damage Induced by Blunt Low-Speed Impact Using Finite Element Simulation

First Author: Qiong CHENG

Purpose: To evaluate the ciliary body mechanical load during low-speed impact using the finite element method to explain the mechanism of angle recession and cyclodialysis cleft.

Methods: Optical Coherence Tomography (OCT) images were obtained to assess the patient's ciliary body angle recession. A finite element eye model was established based on the Virginia Tech Eye Model (VTEM) with the consideration of the dynamic impact of a projectile striking an eye. The mechanical properties of the ocular tissues were obtained from literatures. The stress and strain were evaluated.

Results: The stress distribution of the eye was calculated. The stress concentration at zonules 3.8MPa. The maximum stress at the ciliary body was 57KPa, which has a high probability of causing ciliary body injury. The maximum stress at zonules was 0.98MPa. The lateral expansion also reduces the forces transmitted along the sclera to the rear part of the eye.

Conclusions: The eye under frontal impact will result in lateral expansion, which increases the stretch force of the lens, zonules, and ciliary body. This mechanism can be seen as the protection for the retina. The boundary of the ciliary body is the most vulnerable position, where angle recession and cyclodialysis cleft will occur before the occurrence of retina damage.

Abstract No.: 200986

Panel No.: OTR-0725

Exploration of Retinal Explant Culture Model for Iron Intraocular Foreign Body Injury

First Author: Xiaoting MAI

Co-Author(s): Haoyu CHEN

Purpose: To explore the effects of iron intraocular foreign bodies on the retina through the retinal explant culture experiments.

Methods: The retinal explant culture experiments were conducted. After 24 hours of treatment with the pure iron block on the retinal explants, samples were collected for scanning electron microscopy (SEM)

and energy dispersive spectroscopy (EDS) analysis to examine the release of iron particles from the iron block and its impact on the retinal surface.

Results: In the iron block treatment group, the entire retina turned brownish-yellow, with the most obvious changes around the foreign body bed. SEM scanning showed that the retinal vessels were exposed in the foreign body bed area, and the retinal surface around was rough with scattered particles. Iron particles were also found on the retinal surface far from the foreign body bed, with extensive infiltration marks at the edges. In the blank control group, the retinal surface was tight and dense, and the vessels were not exposed. EDS analysis indicated that iron was generally present on the retinal surface after iron block treatment, with the highest concentration (high iron atom content) in the foreign body bed area and the infiltration marks around the particles. No iron was detected in the control group.

Conclusions: The iron block foreign bodies can release iron particles, causing iron infiltration on the retinal surface and inducing damage reactions.

Abstract No.: 206725

Panel No.: OTR-0738

Functional Outcomes of Early Bicanalicular Intubation in Traumatic Canaliculalaceration at a Tertiary Hospital

First Author: Prianggara Rostu PRAYOGA

Co-Author(s): Niluh Putu AYU DEWI, Shanti F

BOESOIRIE, Mohamad Rinaldi DAHLAN, Raden Angga KARTIWA, Pradistya Syifa YUDIASARI

Purpose: Traumatic canaliculalaceration represents a vision-threatening eyelid injury that, if left untreated, may lead to chronic epiphora and poor quality of life. This study aimed to describe the clinical profile and functional outcomes of patients with canaliculalaceration managed with bicanalicular silicone intubation at a tertiary hospital.

Methods: We conducted a descriptive observational study of 102 patients with confirmed canaliculalaceration who underwent surgical repair between January 2021 and April 2025 at Cicendo Eye Hospital, Indonesia. Data on demographics, etiology, mechanism of trauma, affected canaliculus, associated injuries, timing of surgery, and postoperative results were collected from medical records. Functional success was defined as the absence of postoperative epiphora following stent removal.

Results: A total of 102 patients were included, with a male predominance (83.3%) and a median age of 33 years. Road traffic accidents were the leading cause of injury (41.1%), followed by domestic accidents (30.3%). The inferior canaliculus was most frequently affected (55.8%). Most patients (78.4%) underwent surgery within 72 hours. Functional success was achieved in

97.1% of cases, while postoperative complications were rare (9.9%) and generally mild, including exposed knots or spontaneous stent dislodgement, all of which were managed successfully absence of postoperative epiphora.

Conclusions: Early surgical repair of canalicular lacerations using bicanalicular silicone intubation provides excellent functional outcomes and minimal complications. These findings reinforce the importance of timely intervention in lacrimal trauma and highlight this technique as a reliable standard of care in oculoplastic practice.

Abstract No.: 200857

Panel No.: OTR-0724

Immediate Management of Corneal Bee Sting Injury Results in Better Visual Outcome

First Author: Husnaini

Purpose: Corneal bee sting injuries are rare but can cause severe ocular complications, including toxic keratopathy, keratouveitis, secondary glaucoma, and toxic endophthalmitis. Prompt diagnosis and intervention are critical to preserving vision.

Methods: A 17-year-old male presented with severe pain, tearing, and decreased vision (hand movement) in the right eye, one day after being stung by a bee while driving. Examination revealed a corneal stinger with surrounding infiltration, stromal edema, Descemet's folds, and hypopyon. Under general anesthesia, a corneal incision was made over the sting site for removal, followed by suturing with nylon 10-0. Postoperatively, the patient received intravenous ceftriaxone and methylprednisolone, along with topical moxifloxacin and fluorometholone. By day one, hypopyon had resolved, and therapy was tapered to oral methylprednisolone and ciprofloxacin. At three weeks, corneal edema markedly improved, and visual acuity reached 20/200. At six weeks, vision improved to 20/30, though corneal scarring remained.

Results: Bee venom causes both direct tissue trauma from the stinger and toxic inflammatory damage from venom components. Management strategies vary, but literature supports urgent removal when the stinger is accessible, especially with significant inflammation or visual axis involvement. This case supports the use of immediate surgical extraction, combined with systemic and topical corticosteroids and antibiotics, to control inflammation, prevent infection, and promote visual recovery.

Conclusions: Early stinger removal with aggressive anti-inflammatory and antimicrobial therapy can result in rapid resolution of inflammation and favorable visual outcomes in corneal bee sting injuries.

Abstract No.: 207934

Panel No.: OTR-0740

Inferior Rectus Myositis After Orbital Fracture Repair With a Medpor Implant in a 38-Year-Old Male: A Case Report

First Author: Kelvin Kam Lung CHONG

Co-Author(s): Fatema ALJUFAIRI, Kenneth K.h. LAI, Chi Pui PANG, Jake SEBASTIAN, Clement Cy THAM, Thomas Ting Hei TSANG

Purpose: We report a rare case of Medpor® Orbital implant-related inferior rectus (IR) myositis post-orbital fracture repair.

Methods: A 38-year-old gentleman underwent an uneventful orbital floor fracture repair done elsewhere, using a Medpor® implant, one day after sustaining a blunt force facial trauma. The patient presented to our center, three weeks post-operatively, complaining of diplopia and marked dull ache around the region of the left orbit, with left hypotropia and intractable primary and up-gaze diplopia and extraocular muscle restriction of (-3) up-gaze and (-2) down-gaze on the left eye. A multi-parametric, dynamic orbital MRI showed focal IR myositis and entrapment due to incomplete defect coverage with restricted elevation on T2 cine sequence.

Results: The symptoms were gradually relieved after a revision surgery for the left orbital floor fracture using a biplanar, trans-orbital and trans-antral approach with release of entrapped soft-tissues, removal of the orbital Medpor® implant and replacement with an autologous dermis fat graft. Complete coverage of the fracture site and absence of any entrapped soft tissues were ascertained by direct visualization using the trans-antral view.

Conclusions: Medpor myositis is a rare complication associated with the use of the Medpor® orbital implant. Direct trans-antral visualization allows for a pressure-less, precise identification of the extent of the fracture and any soft-tissue entrapment after implant insertion without retracting the orbit. In view of myositis resulting from a possible negative reaction to a foreign material, an autologous dermis fat graft can be a suitable alternative material used for repair and to augment orbital volume.

Abstract No.: 204578

Panel No.: OTR-0731

Isolated Traumatic Non-expulsive Partial Aniridia With Iris Necrosis in a Pseudophakic Eye: a Case Report

First Author: Carmen Sze Ching LO

Co-Author(s): Gillian Denise Ji-yee SIU

Purpose: To report a rare case of isolated non-expulsive partial aniridia with iris necrosis in a pseudophakic eye after blunt trauma.

Methods: Case report.

Results: A 73-year-old woman, who underwent phacoemulsification with an intraocular lens (IOL) implanted 5 years prior, presented after a 7-foot fall with right eye pain and blurred vision. Examination revealed visual acuity of hand motion, raised intraocular pressure (IOP) of 56 mmHg, an injected right eye with Descemet folds, and grade 3 hyphema. Superior partial aniridia from 9 to 2 o'clock was observed with an exposed IOL rim. The IOL was stable; the globe intact. The initial B-scan was unremarkable. She was given topical steroids, antibiotics, and IOP-lowering agents. At 2 weeks, hyphema persisted with the development of anterior synechiae with iridocorneal touch, uncontrolled IOP, and new vitreous hemorrhage. Anterior chamber washout was performed. Intraoperatively noted near-total iris necrosis with egg-custard consistency fused with clots. No normal iris tissue for iridoplasty. The inferior iris remnant was retained to mitigate photophobia. On the latest follow-up, the inferior iris remained intact; IOP normalized with tolerable photophobia.

Conclusions: Prior studies described expulsive complete aniridia in pseudophakic eyes following blunt trauma, with the proposed mechanism being iris expulsion via phacoemulsification wounds. We present a unique case of isolated non-expulsive partial aniridia resulting in iris necrosis, illustrated by serial clinical photos. It supports an alternative mechanism of intraocular phagocytosis and liquefaction, influencing management paradigms.

Abstract No.: 205551

Panel No.: OTR-0733

Locked Jaw in the Orbit: A Rare Case of Trismus Following Intraorbital Foreign Body Injury

First Author: Shipra SINGH

Co-Author(s): Ashok PATHAK

Purpose: To present a rare case of trismus due to an intra-orbital foreign body.

Methods: A 27-year-old male sustained a trans orbital penetrating glass injury to the left orbit following a physical assault. Remarkably, the globe was spared, and the patient had no visual complaints or diplopia. His chief complaint was persistent trismus with inability to chew food, which prompted presentation to our hospital four months post-trauma. Initial treatment at a local hospital included suturing of a left zygomatic laceration. Imaging examination revealed a radiodense foreign body measuring approximately 41 x 14 mm, penetrating the posterolateral orbital wall into the intraconal space.

Results: A temporobasal approach was employed, allowing visualization and successful retrieval of the embedded glass fragment. Postoperatively, there was a significant improvement in mouth opening with only minimal residual orbicularis weakness. Ocular integrity

was preserved without visual compromise. This case highlights the unusual clinical presentation of trismus in the absence of ocular involvement following trauma.

Conclusions: Trismus is an uncommon but important manifestation of intraorbital foreign body injury. Early recognition, detailed imaging, and meticulous surgical planning are critical for safe removal and favourable outcomes. This case emphasizes that careful extraction of retained intra orbital foreign body can prevent long-term morbidity and preserve both function and cosmesis.

Abstract No.: 203259

Panel No.: OTR-0730

Mechanism Study of PI3K δ Mediated Mesenchymal Transition in Retinal Pigment Epithelial Cells

First Author: Jing LUO

Purpose: This study investigates whether vitreous humor from patients with macular epiretinal membranes (mERM) induces epithelial-mesenchymal transition (EMT) in retinal pigment epithelial cells (ARPE-19). Based on evidence that the p110 δ subunit of PI3K mediates related pathways, we aimed to elucidate the specific mechanism by which PI3K δ contributes to this pathogenic process.

Methods: P110 δ expression in mERM patients was detected by immunofluorescence. ARPE-19 cells were treated with mERM vitreous, and changes in morphology, EMT markers (E-CAD, FN, N-CAD, VIM, α -SMA), proliferation, and migration were assessed. p110 δ function was validated using CRISPR knockout and the inhibitor idelalisib. A laser-induced murine subretinal fibrosis model received idelalisib, and fibrotic lesions were quantified via RPE/choroid flatmounts stained for Collagen-1 and IB4.

Results: Vitreous humor from mERM patients induced p110 δ expression, a mesenchymal morphology, and increased proliferation and migration in ARPE-19 cells, alongside upregulating specific mesenchymal markers. These pro-EMT effects were completely suppressed by either genetic knockout or pharmacological inhibition (idelalisib) of p110 δ . Furthermore, in a laser-induced fibrosis model, idelalisib treatment significantly reduced the size of subretinal fibrotic lesions.

Conclusions: In summary, our results indicate that vitreous humor from mERM patients promotes EMT of retinal pigment epithelial cells and inhibits p110 δ to alleviate vitreous-induced EMT. These discoveries contribute to a better understanding of mERM formation mechanisms and provide innovative intervention strategies for future precision therapies based on p110 δ .

Abstract No.: 202782

Panel No.: OTR-0728

Ocular Trauma Leading to Enucleation Due to a Homemade Bamboo Gun Toy – Case Report of a Rare Ocular Trauma Incident in a 7-Year-Old Child in Papua

First Author: Janice Eloise TAN

Co-Author(s): Nyssa Alexandra TEDJONEGORO, Evander Samuel BANUA ROUW, Jannes Fritz TAN, Nathaniel Farrel TAN

Purpose: A rare case of trauma caused by a homemade gun toy in a 7-year-old boy was reported. The patient's right eye was struck by a bamboo bullet fired from a distance of 0.5 meters by his friend 5 days ago. In the right eye, visual acuity was 1/∞, there was subconjunctival bleeding, laceration of 5mm on the eyelid, sclerocorneal laceration with irregular edges measured 4mm, iris prolapse. No corpus alienum was found. Proper management, administration of local and systemic antibiotics, enucleation, and reconstructive surgical techniques were performed.

Methods: Case report on ocular trauma resulting in enucleation. Patients were reviewed for clinical history, clinical examination, and indications for enucleation.

Results: After stabilizing the patient's general condition, the ruptured right eyeball, including part of the optic nerve, was removed in the operating room. Orbital reconstruction was performed for the eye prosthesis and palpebral reconstruction. Post-operation, the patient showed no signs of developing sympathetic ophthalmia, persistent postoperative pain, hematoma, or infection, and it is regrettable that the patient was asked to go home immediately.

Conclusions: Enucleation from a homemade bamboo gun toy-related ocular damage in children is a very uncommon blunt trauma that can develop from close-range gunshots. Appropriate and prompt treatment involving enucleation and reconstruction of the eyelid and orbital cavity achieves a favorable aesthetic outcome. The distance between the patient's home and a healthcare facility worsens the prognosis.

Abstract No.: 206268

Panel No.: OTR-0736

Pattern of Ocular Trauma in Sabah, Malaysia: A Prospective Observational Study in A Tertiary Centre

First Author: Rongkai TAN

Co-Author(s): Chui Yain CHEN, Chenshen LAM, Joan MARIE PALIKAT, Chin Yee NG, Diing Sheng WONG

Purpose: To describe the sociodemographic profile and clinical characteristics of patients presenting with ocular trauma to Queen Elizabeth Hospital, Sabah.

Methods: This is a prospective observational study. All patients presenting for the first time with eye

injury from July 1st 2022 until April 30th 2023 were recruited. Clinical features, including visual acuity on arrival and types of eye injuries, were recorded. Additionally, sociodemographic data, occupation, setting of injury, duration from injury to presentation, and the application of protective eyewear were also documented.

Results: A total of 102 patients (114 eyes) were included in the study. The mean age of presentation was 39.08 ± 17.26 years old, with most cases occurring among those aged 21–40 years old, 47.1% (n=48). Most patients presented within 24 hours of injury. Men had fourfold higher rates of ocular injury than women, and the majority were of Dusun ethnicity, 19.6% (n=20). Construction and manufacturing workers constituted the largest occupational group that suffered from ocular trauma, 28.4% (n=29). Injuries most frequently occurred at home, 34.3% (n=35), followed by industrial premises, 27.5% (n=28). Surprisingly, only 2.9% (n=3) of patients reported the use of protective eyewear. The majority of patients presented with an initial visual acuity of $\geq 20/40$, 55.3% (n=63). Closed-globe injuries were more common than open-globe injuries.

Conclusions: Young adult males were found to be at high risk of ocular injuries, and the majority did not use protective eyewear at work. There should be widespread awareness of protective eyewear and strict adherence policies to its use in the workplace.

Abstract No.: 206070

Panel No.: OTR-0735

Penetrating Corneal Injury Caused by Fish Hook: A Case Report and Surgical Management

First Author: Faria Tilat TIMA

Co-Author(s): Tanvir AHMED, Ashraful ISLAM

Purpose: To report a rare case of penetrating corneal trauma caused by a fish hook, highlighting the clinical presentation, surgical removal technique, and visual outcome. This case emphasizes the importance of prompt and careful intervention in ocular trauma caused by sharp embedded foreign objects.

Methods: Patient: 32-year-old female. Presentation: Sudden eye injury while fishing; hook rebounded and penetrated the right eye. Examination Findings: • Visual acuity: Hand Movement. OS • Slit-lamp exam: Fish hook embedded in central cornea, penetrating stroma, full-thickness; no uveal prolapse, corneal rusting • No hyphema, lens damage present; anterior chamber shallow but formed • Tetanus prophylaxis given Management: • Under local anesthesia in the operating room • Eye draped and speculum placed • hook shaft retracted back through entry wound • Wound irrigated with balanced salt solution • Corneal entry wound closed with 10-0 nylon sutures • Topical antibiotics and steroids initiated

Results: No intraocular involvement confirmed on B-scan and post-op evaluation • Sutures removed after 3 weeks • Visual acuity improved in follow-up • No signs of infection, corneal opacity outside the visual axis • No complications such as endophthalmitis or cataract formation observed during 3-month follow-up

Conclusions: Penetrating corneal injury from a fish hook is a rare but potentially vision-threatening trauma.

Abstract No.: 206596

Panel No.: OTR-0737

Shattered Spectacle to Sight Saved: Pediatric Scleral Laceration, Repaired

First Author: Adi Rakhmadi **KURNIAWAN**

Co-Author(s): Muhammad **FIRMANSJAH**, Anas **JATIKUSUMA**

Purpose: To report the clinical course and management of a pediatric patient with a large scleral laceration caused by shattered spectacles.

Methods: A 9-year-old boy presented with acute pain and profound visual loss in the left eye following blunt trauma. Examination revealed a 14-mm full-thickness scleral laceration from 12 to 5 o'clock with iris prolapse. Orbital computed tomography excluded an intraocular foreign body and fracture. The patient underwent emergency surgery, including conjunctival peritomy, repositioning of viable iris tissue, layered scleral and corneoscleral suturing, and adjunctive intracameral, intravitreal, and subconjunctival antibiotics.

Results: Visual acuity improved from hand movement to 5/20 with pinhole correction after surgery. Ultrasonography confirmed an attached retina without vitreous hemorrhage. Mild trauma-related scleritis was noted and controlled with anti-inflammatory therapy. Prompt repair within 24 hours combined with intravitreal antibiotics restored globe integrity and minimized endophthalmitis risk. Preservation of viable iris tissue reduced the likelihood of secondary glaucoma and pupillary dysfunction.

Conclusions: Early recognition, timely surgical repair, and comprehensive postoperative management can achieve favorable anatomical and functional outcomes in pediatric scleral laceration. Long-term follow-up remains essential to monitor for complications such as scleral thinning, staphyloma, or secondary glaucoma.

Abstract No.: 206973

Panel No.: OTR-0739

Surgical Approaches and Outcomes in the Management of Vitreoretinal Incarceration Following Open Globe Injury

First Author: Devesh **KUMAWAT**

Co-Author(s): Ritweez **SAHU**, Pradeep **VENKATESH**

Purpose: Open globe injury (OGI) with posterior segment involvement poses significant surgical challenges. This study analysed patterns of injury, surgical interventions employed, and outcomes in cases of vitreoretinal incarceration (VRI) following OGI.

Methods: An ambispective study was conducted, including patients who underwent surgery for VRI following OGI by a single vitreoretinal surgeon at a tertiary trauma referral center in North India over 24 months (January 2023–December 2024). Demographics, type, location, and grade of injury, incarceration characteristics, preoperative visual acuity (VA), surgical details, retinal attachment status, repeat interventions, and VA at last follow-up were assessed. Statistical analysis evaluated the prognostic factors.

Results: Thirty-four eyes of 34 patients (age 30.8 ± 14.0 years; 88.2% male) were included. Types of injury were rupture ($n=8$), penetrating ($n=17$), intraocular foreign body ($n=2$), and perforation ($n=7$). Most injuries were grade 4. Indications were vitreous hemorrhage with incarceration ($n=3$) or with retinal detachment ($n=31$). Surgery included 25G vitrectomy alone ($n=19$), vitrectomy with encircling band ($n=24$), or scleral buckle ($n=1$). Relaxing retinotomy was performed in 22 eyes, and oil tamponade was used in 31 eyes. Median time to retinal surgery was 30 days (range, 7–180). With a median follow-up of 11.5 months, the retina remained attached in 32 eyes (94%), and repeat intervention was required in 5 eyes for re-detachment. Final mean VA was 1.36 ± 0.54 logMAR; $VA \geq 20/200$ and $>20/400$ was achieved in 32.4% and 61.8% eyes, respectively. Early surgery correlated with better anatomical and functional outcomes.

Conclusions: VRI after OGI can be managed successfully with timely, aggressive surgery, achieving high attachment rates and modest visual recovery. Early surgery remains a key prognostic factor.

Abstract No.: 204839

Panel No.: OTR-0732

Swift Emergency Management of Complex Orbital Trauma in a 14-Year-Old: Expedited ORIF for Suprabrow Rupture With Multi-Fragment Orbital Wall Fractures

First Author: Hisar **DANIEL**

Co-Author(s): Amirah D. **DIBA**, Yelsi **KHAIRANI**, Kindah **MAHDIYAH**, Natassha P. **WIBOWO**

Purpose: To demonstrate the critical importance of rapid assessment and immediate surgical intervention

in complex pediatric orbital trauma, we present a case of expedited management within 24 hours of hospital admission.

Methods: A 14-year-old boy presented to our emergency department 12 hours post-trauma with a 5.6 cm full-thickness suprabrow rupture and exposed bone following a sickle assault. Within hours of admission, immediate ophthalmological assessment, emergency non-contrast orbital CT with 3D reconstruction, and multidisciplinary consultations (Pediatrics, Anesthesiology, Oculoplastic) were completed. CT revealed a lateral orbital wall fracture and a comminuted zygomatic frontal process fracture with anterolateral fragment displacement. Emergency ORIF was performed within 24 hours of admission using mini-plate fixation (1.2 mm system, 4 mm depth) after thorough debridement and anatomical reduction.

Results: Swift preoperative optimization, including blood transfusion for anemia (Hb 7.8 g/dL) and immediate antibiotic prophylaxis, enabled same-day surgical intervention. Postoperative recovery was uneventful with rapid resolution of hematoma, stable visual acuity, normal intraocular pressure, and complete wound healing. The patient was discharged on postoperative day 2 with excellent functional and cosmetic outcomes.

Conclusions: Expedited multidisciplinary management and immediate surgical intervention within 24 hours of admission are crucial for optimal outcomes in complex pediatric orbital trauma. Swift decision-making, rapid preoperative clearance, and early definitive repair prevent complications and preserve both function and aesthetics.

Abstract No.: 200284

Panel No.: OTR-0726

When Blue Means Trouble: Prognostic Importance of Recognizing Blue Sclera at Presentation in Patients With Open Globe Injury

First Author: Mariya DOCTOR

Co-Author(s): Sahithi EERETI

Purpose: To study the outcomes of patients with corneal tear associated with blue sclera.

Methods: This is a retrospective descriptive hospital-based study performed at L V Prasad Eye Institute. All patients from 2004 to 2024 who presented with an open globe injury to the emergency clinic and were noticed to have blue sclera, corneal thinning, or keratoglobus during any of their follow-up visits were included.

Results: A total of 17 patients were included. Presence of blue sclera and corneal thinning along with the open globe injury was picked up in 50% cases at the first visit. 8 patients were diagnosed as Ehler-Danlos 2, Marfan's Syndrome 1, and Alport's syndrome. Intra-

operatively, corneal cheese wiring extension of corneal perforation, unable to seal the perforation, were the various complications noted. Adjunctive use of tissue adhesive was needed in 45% cases. No significant difference between the visual acuities was noted from the date of presentation to the last visit. 20% eyes went into phthisis bulbi. Early detection showed a better prognosis for the fellow eye.

Conclusions: Identifying associated blue sclera is crucial at presentation of open globe injury since the management of corneal perforation is challenging in these cases due to fragile tissues. The adolescent age group, parental consanguinity, and history of trivial trauma should raise suspicion. Surgical intervention should focus on tectonic stabilization. Special emphasis should be given to protecting the unaffected eye to avoid bilateral blindness. Use of protective eye shields during sleep should be advocated.

Orbital and Oculoplastic Surgery

Abstract No.: 206317

Panel No.: OOP-0789

A Case Report on Eyelid Reconstruction Using a Nasal Septum Graft and Upper Eyelid Flap Transposition

First Author: Isabella BONDOC

Co-Author(s): Alfonso BENGZON, Camille SISON

Purpose: Basal cell carcinoma (BCC) is the most common malignancy of the eyelid, accounting for 90% of cases. The definitive treatment would be a complete surgical excision with appropriate margins; however, this may cause functional impairment and significant disfigurement for the patient. This study aims to guide and support ophthalmologists in making the appropriate surgical decisions for patients with BCC.

Methods: This is a case of a 44-year-old female presenting with right upper eyelid drooping and tearing. She previously underwent a wide excision biopsy of the right lower eyelid 6 years prior for BCC, resulting in an ill-defined right lower eyelid with poor lid closure. In the interim, she also noted progressive drooping of the right upper eyelid. In this admission, right lower eyelid reconstruction with ptosis repair was done. A nasal septum graft and its mucosa were harvested to recreate the posterior lamella. On the other hand, an eyelid transposition flap from the incision site for the ptosis repair) was performed to recreate the anterior lamella.

Results: With the graft and flap, the patient was able to regain an improved eyelid appearance and function, in turn, alleviating the patient from their significant and chronic eye pain.

Conclusions: Lid reconstruction is a challenge in cases of BCC, especially with large defects after excision. In spite of this, there are still many innovative ways to recreate the anterior and posterior lamella in order to maintain functionality and cosmesis.

Abstract No.: 204027

Panel No.: OOP-0770

A Case of Acute Dacryocystitis Rapidly Progressing to an Orbital Cellulitis Resulting in Complete Vision Loss

First Author: Hiroki **TAN**

Co-Author(s): Tomoyuki **KAMAO**, Arisa **MITANI**, Tomoharu **SHINOZAKI**, Atsushi **SHIRAISHI**, Yoshitaka **TASAKA**

Purpose: To highlight a rare case of acute dacryocystitis progressing to orbital cellulitis with abscess formation and irreversible vision loss due to central retinal artery occlusion, emphasizing the importance of early recognition of orbital involvement.

Methods: A 48-year-old man presented with ocular pain and eyelid swelling after a one-year history of untreated epiphora and discharge. Clinical findings, imaging, treatment, and outcomes were reviewed.

Results: Initial examination showed localized swelling around the lacrimal sac with preserved vision. Computed tomography revealed lacrimal sac distension and preseptal edema, and oral antibiotics were started. Within 24 hours, eyelid swelling worsened and vision deteriorated to light perception. Fundus examination showed a cherry-red spot consistent with central retinal artery occlusion, and repeat imaging demonstrated an orbital abscess displacing the globe. Emergent orbital abscess drainage with external dacryocystorhinostomy was performed, followed by intravenous meropenem. A second drainage was required because postoperative magnetic resonance imaging revealed residual orbital abscess. Although orbital inflammation resolved, vision remained no light perception.

Conclusions: Acute dacryocystitis can rarely extend into the orbit and cause serious vision loss despite prompt management. Clinicians should pay attention to signs of orbital involvement, including ocular pain, diffuse eyelid swelling, or deterioration of vision. Early imaging, urgent surgical drainage, and systemic antibiotics are crucial to prevent irreversible complications.

Abstract No.: 206343

Panel No.: OOP-0790

A Case of Delayed Onset Retrobulbar Hemorrhage Following Anterior Orbitotomy for Orbital Hemangioma in a Pediatric Patient

First Author: Maria Gieniv **VALERIANO**

Co-Author(s): Steffani **CHUA**, Jonnah **TEOPE**

Purpose: Acute retrobulbar hemorrhage (RBH), a collection of blood in the retrobulbar space, is a rare ophthalmic emergency, usually occurring within 24 hours post-surgery. This is a case of delayed onset retrobulbar hemorrhage following an anterior orbitotomy with orbital hemangioma in a pediatric patient.

Methods: Case report.

Results: A 9-year-old female patient presented with a cystic mass in her right medial canthal area. An elective anterior orbitotomy and excision biopsy were done, revealing an orbital hemangioma. Post-operative recovery was initially unremarkable. However, on 72 hours post op, the patient developed sudden right eye pain accompanied by blurring of vision, proptosis, extraocular muscle movement limitations, and elevated intraocular pressure. Lateral canthotomy with cantholysis of the right eye was performed. An emergency cerebral angiogram with sclerotherapy using bleomycin was done by interventional radiology. On the post-operative follow-up, the vision improved, and the proptosis and intraocular pressure had decreased.

Conclusions: RBH is one of the surgical complications that may lead to irreversible vision loss. RBH can occur beyond 24 hours. Therefore, close postoperative monitoring, especially for pediatric patients, is crucial for optimal safety and recovery following surgery.

Abstract No.: 205053

Panel No.: OOP-0776

A Clinical Case of the Repair of Symblepharon Caused by Chemical Burns Using a Circular Amniotic Membrane Ring

First Author: Ariunbold **TUMENJARGAL**

Co-Author(s): Mandakh **BAYARAA**, Uyen **BOLD**

Purpose: Eye injuries represent a significant public health concern, being one of the leading causes of low vision and blindness worldwide. Annually, approximately 55 million individuals experience eye injuries, and this condition leads to 19 million people losing their ability to work due to vision impairment. Population-based studies in Asian countries reveal notable prevalence rates, with 4.4% in Singapore and 3.6% in China.

Methods: A 30-year-old man, while working on a building, encountered a notable eye injury when cement particles accidentally fell into his eye. Initially,

coworkers offered assistance, using available water sources to rinse his eye before he returned home. Medical Intervention: Recognizing the need for professional care due to his persistent symptoms and lack of improvement, Patient B sought treatment at an eye clinic. There, the medical team implemented a comprehensive approach, incorporating both medical and surgical interventions to address the complications arising from his eye injury.

Results: This approach guarantees that the surgical materials align seamlessly with the anatomical features of the patient's eye, thereby minimizing trauma and optimizing clinical outcomes. The circular configuration of the tube is instrumental in maintaining consistent pressure and stability, which contributes to improved healing and a reduction in postoperative complications. Overall, the single-use holy drop system represents a notable.

Conclusions: The circular configuration of the tube is instrumental in maintaining consistent pressure and stability, which contributes to improved healing and a reduction in postoperative complications. Overall, the single-use holy drop system represents a notable.

Abstract No.: 202079

Panel No.: OOP-0762

A Rare Syndromic Cause of Nasolacrimal Duct Obstruction Presenting As Chronic Tearing and Lash Matting

First Author: Katrina FELICIANO

Co-Author(s): Yvette SANTIAGO-GATMAITAN, Reginald Robert TAN, Sandra WORAK-TAN

Purpose: To describe the case of a patient with a rare syndrome that presents with nasolacrimal duct obstruction and chronic ocular surface abnormalities.

Methods: This is a case report of a then 13-year-old male with a chronic tearing of both eyes with recurrent periorbital swelling and lash matting, along with various systemic findings.

Results: A 13-year-old male presented with tearing of both eyes since birth with recurrent periorbital swelling, discharge, and lash matting on waking up. He also had various systemic findings, including cleft lip and palate, unilateral hearing loss, syndactyly, and oligodactyly, along with a history of cheiloplasty and palatoplasty as a child. On physical examination, the patient was noted to have erythematous eyelid margins, thick lashes with collarettes, scant mucoid discharge, papillae, and pannus bilaterally. The dye disappearance test was negative bilaterally, and a lacrimal probe could not be inserted into the lacrimal canaliculi. Dacryoscintigraphy showed a complete obstruction in both lacrimal sacs. After serial lacrimal probing, the patient was then eventually diagnosed as a case of Ectrodactyly Ectodermal Dysplasia Syndrome, presenting as complete nasolacrimal duct obstruction,

punctal stenosis, and chronic staphylococcal blepharoconjunctivitis. The patient then underwent regular follow-up to treat the ocular surface infection and obtain an otorhinolaryngology evaluation of the nasal cavity and pharynx prior to undergoing bilateral external dacryocystorhinostomy.

Conclusions: This report details the clinical presentation and course of a patient with a rare syndromic cause of nasolacrimal duct obstruction and ocular surface abnormalities, underscoring the need for long-term multidisciplinary care in such cases.

Abstract No.: 207505

Panel No.: OOP-0809

A Spectrum of Primary and Metastatic Neoplasms Arising in the Extraocular Muscles: A Case Series

First Author: Wang YI

Purpose: To characterize tumors arising within extraocular muscles (EOMs) and broaden the differential by reporting 9 cases.

Methods: Single-center, 2-year retrospective review. Eight patients with imaging-suspected intra-EOM masses underwent excision under general anesthesia for histopathology; one patient with bilateral, multifocal intra-EOM lesions had metastatic carcinoma on systemic work-up. Exclusions: secondary invasion from adjacent lesions, inflammatory pseudotumor, thyroid eye disease, and IgG4-related ophthalmic disease. Clinical, imaging, and treatment data were collected.

Results: Nine patients (3 men, 6 women; 35–72 years). Ocular motility: normal 1, paresis 6, contracture 1, fixed globe 1. Pathology: schwannoma 2 (medial rectus; inferior oblique), granular cell tumor 1 (inferior oblique), dermoid cyst 1 (lateral rectus), mesenchymal chondrosarcoma 1 (superior rectus), epithelioid sarcoma 1, PEComa 1 (lateral rectus), renal clear cell carcinoma 1 (lateral rectus). One patient had bilateral EOM metastases from breast cancer. Post-op motility was unrestricted after removal of the schwannoma, dermoid, and granular cell tumor. Adjuvant radiotherapy (50 Gy) was given for chondrosarcoma (no recurrence at 3 mo) and epithelioid sarcoma (no recurrence at 1 mo). PEComa had systemic metastases and received targeted therapy; renal clear cell carcinoma switched from a trial drug to chemotherapy; the breast cancer case received chemo-targeted therapy—systemic/ocular status remained stable.

Conclusions: Intra-EOM lesions comprise diverse benign and malignant entities, including metastases. Diagnosis typically requires histopathology. Complete excision can preserve EOM function in benign tumors; malignant disease often needs multimodal therapy (surgery ± radiotherapy, chemotherapy, targeted therapy).

Abstract No.: 204633**Panel No.: OOP-0773****A Successful Case of Refractory MRSA Infection in an Anophthalmic Socket***First Author: Ega SEKARTIKA**Co-Author(s): Sutjipto, Priyo BUDI PURWONO, Musofa RUSLI*

Purpose: Chronic discharge and recurrent infection are common in anophthalmic sockets among ocular-prosthesis users. While *Staphylococcus aureus* is a frequent colonizer, methicillin-resistant *S. aureus* (MRSA) is uncommon and may be overlooked when empiric therapy fails.

Methods: Case Report: A 28-year-old man with a right anophthalmic socket after evisceration and dermis-fat graft developed persistent mucopurulent discharge after custom prosthesis fitting. The infection proved refractory to empiric topical fluoroquinolones and oral ciprofloxacin. Conjunctival culture isolated MRSA resistant to fluoroquinolones but susceptible to chloramphenicol and doxycycline. Culture-guided treatment with topical chloramphenicol and oral doxycycline led to complete resolution within three weeks.

Results: This case highlights that refractory infections in anophthalmic sockets of prosthesis wearers may involve atypical pathogens such as MRSA. The persistence of infection may relate to biofilm formation on polymethyl-methacrylate prosthetic surfaces, which reduces the efficacy of empiric fluoroquinolone therapy. Suboptimal hygiene practices, such as cleaning the prosthesis with tap water, may further facilitate bacterial colonization. Culture-guided antimicrobial selection using agents that retain activity, specifically chloramphenicol with adjunctive doxycycline, combined with reinforced prosthesis-hygiene education, is critical to successful management.

Conclusions: In non-resolving socket infections, clinicians should consider fluoroquinolone-refractory MRSA. Early culture and susceptibility testing, biofilm-aware antibiotic choices, and standardized cleaning protocols can improve outcomes.

Abstract No.: 200881**Panel No.: OOP-0750****A Systematic Review of Direct Versus Indirect Corneal Neurotization In Neurotrophic Keratopathy***First Author: Erdenezul GANTULGA*

Purpose: Corneal neurotization (CN) surgery is indicated for moderate to severe grades of neurotrophic keratopathy when medical treatment is ineffective. We conducted a systematic review comparing direct (DCN) versus indirect corneal neurotization (ICN) surgery. In particular, we compare the improvement in visual

acuity and corneal sensitivity, as well as the surgical recovery time, after DCN and ICN.

Methods: MEDLINE and Embase were searched for studies using keywords synonymous with neurotrophic keratopathy and corneal neurotization within the last five years in English. We used the PICO format to structure our topic. We followed the PRISMA guidelines. We used synthesis without meta-analysis in accordance with systematic review reporting guidelines.

Results: We included 7 studies, 127 patients, and 134 eyes. Eighty-five percent of the patients reported an improvement in visual acuity after corneal neurotization surgery, regardless of the type of surgery. All studies reported an improvement in corneal sensitivity after corneal neurotization. Only one study reported the surgical recovery time; the DCN showed a shorter recovery time.

Conclusions: We confirmed that all of the seven studies reported an improvement in visual acuity and corneal sensitivity after both types of CN surgery. One out of seven studies reported surgical recovery time. The DCN group showed shorter recovery time compared to ICN group. However, since we don't have enough homogenous data to perform meta-analysis, further prospective studies needed to document visual acuity and corneal sensitivity in DCN and ICN groups separately to make a comparison.

Abstract No.: 201194**Panel No.: OOP-0755****A Typical Presentation of an Atypical Condition—Erdheim-Chester Disease: A Case Report From Pakistan***First Author: Rashid BAIG*

Purpose: As literature suggests, Erdheim-Chester disease (ECD) is a rare entity with a wide array of clinical presentations. So we are reporting a case of this rare disease with Atypical symptoms.

Methods: Case report. Informed Consent was taken from the patient.

Results: As we have seen in our case, the patient truly did present with a 'typical' presentation of ECD of the Orbit, the disease having a male preponderance (3:1) in middle-aged adults (mean age at diagnosis: 55 years). However, the rarity of the condition, with only about 1500 reported cases as of July 2019, together with diverse systemic involvement mimicking several other disease presentations, was a barrier to earlier diagnosis. So in our case, the biopsy proved ECD of the orbit.

Conclusions: Rare diseases can also present with atypical symptoms. Proper History Examination and Investigation are key to reaching a diagnosis. And

Management needs a multidisciplinary approach and discussion.

Abstract No.: 206833

Panel No.: OOP-0800

Adjuvant High-Dose-Rate Interstitial Brachytherapy for High-Risk Eyelid Carcinomas: Preserving the Globe, Ocular Function and Cosmesis

First Author: Kervin Luke DELLOSA

Co-Author(s): Karen Kar-wun CHAN, Kelvin Kam Lung CHONG, David JOHNSON, Kenneth Ka Hei LAI

Purpose: Interstitial brachytherapy (ISBT) has emerged as a valuable treatment modality in eyelid malignancies, offering optimal dose delivery to target tissue while mitigating dose spill to adjacent structures. This report aims to describe the use of adjuvant ISBT and its clinical outcomes in two patients with non-melanoma eyelid malignancy.

Methods: Two patients with histologically confirmed eyelid carcinoma were treated with postoperative ISBT. A 76-year-old woman presented with a left lower eyelid mass and underwent excisional biopsy, which revealed moderately differentiated squamous cell carcinoma with close margins (<0.1cm). Secondly, a 60-year-old woman presented with a right upper lid mass and underwent Moh's micrographic surgery which demonstrated sebaceous gland carcinoma with complete tumor excision, but positive conjunctival map biopsy. Both had no lymph node involvement and an unremarkable metastatic work-up. High-dose-rate brachytherapy was administered using Iridium-192 isotope with a total dose of 49 Gy, delivered at 3.5Gy per fraction twice daily for 14 fractions. Follow-up evaluation included local control, acute and late reactions, and cosmetic outcomes.

Results: The implantation and treatment course were well-tolerated. At follow-up, both achieved local control and had satisfactory cosmetic outcomes. Transient conjunctival and periocular erythema were observed. No vision-threatening complications were recorded.

Conclusions: Adjuvant high-dose-rate ISBT provides effective tumor control and excellent cosmetic outcomes without significant acute or late toxicities. This highlights ISBT as a valuable, eye-sparing alternative to invasive surgical treatment in patients with high-risk eyelid malignancies.

Abstract No.: 200477

Panel No.: OOP-0746

Age-Stratified Microbial Trends in Orbital Infections: Implications for Empirical Antibiotic Therapy

First Author: Ajeeth Samuel

Co-Author(s): Usha KIM

Purpose: To evaluate the microbiological spectrum and antibiotic susceptibility patterns of eyelid and orbital infections across age groups, and to guide empirical antibiotic therapy based on local resistance profiles.

Methods: This prospective cross-sectional study was conducted over one year at a tertiary care centre in South India. A total of 189 patients with clinically diagnosed eyelid or orbital infections, who had not received prior antibiotic therapy, were enrolled. Samples were collected from the infection site and subjected to Gram staining and culture using 5% sheep blood agar. Antibiotic susceptibility testing was performed according to CLSI (Clinical and Laboratory Standards Institute) guidelines.

Results: Out of 189 samples, 157 (83.07%) demonstrated bacterial growth on culture. Gram-positive organisms accounted for 73.8% of isolates, with *Staphylococcus aureus* being the most common in both adults and children. Among Gram-negative organisms, *Haemophilus influenzae* was predominant in children, while *Enterobacter* spp. was most frequent in adults — marking a shift from previously reported patterns. Fluoroquinolones exhibited poor sensitivity against Gram-positive isolates, while Chloramphenicol was the most effective topical antibiotic across age groups. Polymyxin B and Chloramphenicol were also effective against Gram-negative isolates, including *Pseudomonas* spp.

Conclusions: This study highlights the importance of age-specific microbial profiling and empirical antibiotics in orbital infections. The high yield from culture, even in Gram stain-negative cases, underscores the necessity of culture testing. Findings support revising empirical regimens—favouring Cefuroxime in children and continuing the use of Polymyxin B and Chloramphenicol for Gram-negative infections.

Abstract No.: 200333

Panel No.: OOP-0744

An Atypical Presentation of Pleomorphic Adenoma in the Upper Eyelid

First Author: Erika Thenese FLORO

Co-Author(s): Armida SULLER-PANSACOLA

Purpose: Early identification and management of eyelid masses are paramount to prevent further complications which may lead to a radical surgical management.

Methods: Case report.

Results: A 49-year-old female presented with a 16-year history of a progressively enlarging painless, non-ulcerating, eyelid margin-involving nodular mass on the right upper eyelid. The patient had an initial excision of a chalazion-like mass, which recurred and progressed at the same location. Incisional and wide excisional biopsies of the mass showed a benign mixed tumor with a biphasic arrangement composed of an epithelial layer with ductal elements with an eccrine appearance and spindle-shaped cells arranged in sheets surrounding a dense chondromyxoid stromal center. Full-thickness eyelid reconstruction was done via the orbicularis sandwich technique. Pleomorphic adenomas are benign tumors with a mixed cellular nature. Ophthalmologically, they commonly form at the lacrimal gland of the orbit. In this case, we have identified a mass with mixed cellular features, classically presenting as a biphasic tumor – consistent with pleomorphic adenoma. The glandular component of the epithelial layer of the tumor showed a single layer of cuboidal cells lining the ducts, pointing to a probable eccrine gland origin for the mass.

Conclusions: Pleomorphic adenoma is a common benign tumor that rarely presents at the eyelid. Given its progressive appearance, they might be mistaken for a malignant mass. Although benign, the management is still complete excision of the mass since these types of masses have a chance of recurrence and malignant transformation.

Abstract No.: 201988

Panel No.: OOP-0761

An Unusual Case of Combined Orbital and Skull Base Arteriovascular Malformation in a Child and Literature Review

First Author: Ho Lam WONG

Co-Author(s): Kristy Hiu Ching YIM, Hunter Kwok Lai YUEN

Purpose: Orbital arteriovenous malformations (AVMs) are rare congenital malformations characterized by abnormal high-flow connections between arteries and veins. We present an uncommon case of paediatric intraorbital and intracranial AVM, leading to dense amblyopia.

Methods: A review of the clinical and radiological report of the patient diagnosed with AVM along the optic pathway, together with a literature review, was performed.

Results: A 4-year-old Chinese female was treated elsewhere for right eye strabismic amblyopia. Despite maximal patching, there was no improvement in the right eye visual acuity after 6 months, which was 0.1. Therefore, magnetic resonance imaging of the brain and orbit was performed, showing serpiginous flow voids along the right optic pathway. Digital subtraction angiogram identified AVM with intra-orbital and intracranial components, with the major arterial feeder

being the hypertrophied right ophthalmic artery. On follow-up after 9 months, visual acuity of the right eye was 0.08. She developed right optic disc pallor and a right relative afferent pupillary defect. Given the limited prognosis, the parents opted for conservative management. Amongst reported cases of optic AVM from 1989 to 2024, 3 paediatric patients aged 8 to 16, in whom risk of amblyopia is lower, presented with reduced visual acuity and constricted visual field. All paediatric cases underwent craniotomy and coagulation of feeders, which improved their visual outcomes.

Conclusions: This report illustrates a rare case of optic AVM with intraorbital and intracranial components in a 4-year-old child, the youngest case ever reported. Prompt investigation and microsurgical intervention may improve the visual outcome of patients.

Abstract No.: 201496

Panel No.: OOP-0756

Autologous Fat Grafting Using Buccal Fat Harvest in a Post-Lower Blepharoplasty Fat Removal Patient: A Case Report

First Author: Brenda HAYATULHAYA

Co-Author(s): Tomoyuki KASHIMA

Purpose: The most recommended method for under-eye dark circles is the orbital fat repositioning technique, which involves releasing the Orbicularis Retaining Ligament (ORL) at the lower orbital margin and transferring orbital fat to that area. However, in cases where fat removal has been previously performed, there may be insufficient orbital fat to relocate, making treatment challenging. In this study, we report the surgical results of buccal fat for autologous fat transplantation in patients who previously had lower eyelid surgery with fat removal.

Methods: A 45-year-old patient visited our clinic one year after lower eyelid orbital fat removal surgery at another hospital, as the dark circles did not improve. Due to insufficient orbital fat volume, fat repositioning was not possible, so we removed 5.2 cc of buccal fat from both sides by an intraoral approach. We performed surgery using a transconjunctival approach, dissecting the ORL to create a pocket. We placed 0.7 cc of buccal fat into the pocket on each side, injected triamcinolone around the graft, and performed a sutureless closure. We conducted clinical evaluations, standardized photography, and postoperative follow-up to assess aesthetic outcomes and complications at the donor site.

Results: Postoperatively, the patient showed improved lower eyelid contour, symmetry, and overall appearance. No significant complications, including infection, severe hematoma, or donor site morbidity, were observed on 6-month follow-up.

Conclusions: Buccal fat transplantation has proven to be a safe and reliable method for the fat repositioning technique in patients who have lost orbital fat volume. To achieve optimal results, careful patient selection and meticulous technique are essential.

Abstract No.: 206017

Panel No.: OOP-0785

Avoidance of Orbital Exenteration in Invasive Fungal Rhino-Sino-Orbital Cellulitis With Repeated Transcutaneous Retrobulbar Amphotericin B Injections

First Author: Varan **VONGSILPAVATTANA**

Co-Author(s): Karen Kar-wun **CHAN**, Kelvin Kam Lung **CHONG**, Kervin **DELLOSA**, Kenneth Ka Hei **LAI**, Chi-lai **LI**, Emily Suhan **WONG**

Purpose: To report a rare case of invasive fungal rhino-sino-orbital cellulitis due to *Exserohilum rostratum*, successfully managed with repeated transnasal debridement and adjunctive transcutaneous retrobulbar amphotericin B (TRAMB), thereby avoiding orbital exenteration.

Methods: A 52-year-old female with ANCA-associated vasculitis previously treated with Rituximab presented with progressive nasal obstruction, facial pain, and orbital swelling. Imaging demonstrated left ethmoid and maxillary sinusitis with extension into the orbit and adjacent facial soft tissues. Nasoendoscopy and microbiological culture confirmed *Exserohilum rostratum*. The patient underwent functional endoscopic sinus surgery with serial nasal debridements. Endonasal endoscopic examination revealed fungal mold growths over the lamina papyracea, medial periorbita, and lacrimal sac. She received systemic antifungal therapy and was treated with repeated TRAMB injections (3.5 mg/ml).

Results: The infection improved with resolution of orbital signs and preservation of vision. The patient tolerated TRAMB without major complications, and fungal infection was controlled without the need for exenteration.

Conclusions: Invasive fungal rhino-sino-orbital cellulitis in immunocompromised hosts is often associated with poor prognosis and the need for radical surgery. This case illustrates that aggressive surgical debridement combined with systemic antifungal therapy and adjunctive TRAMB can preserve vision and the globe. TRAMB may serve as a valuable adjunct in selected patients with orbital involvement.

Abstract No.: 200790

Panel No.: OOP-0749

CT-Guided Biopsy via the Anterior Approach in the Diagnosis of Orbital Lymphoma: A Case Series

First Author: Shuyi **LIU**

Co-Author(s): Wei **LU**

Purpose: To evaluate the clinical efficacy of CT-guided biopsy via the anterior approach in diagnosing orbital lymphoma.

Methods: From November 2018 to July 2021, 11 patients suspected of having orbital lymphoma based on imaging were selected from the Second Hospital of Dalian Medical University. Each patient underwent a CT-guided biopsy using a semi-automatic 18G needle. Biopsies were performed under local anesthesia, and the obtained tissue samples were analyzed for a definitive diagnosis.

Results: Adequate tissue samples were successfully obtained in all 11 cases. Of these, 7 patients (63.6%) were diagnosed with lymphoma, including subtypes such as mucosa-associated lymphoid tissue lymphoma, diffuse large B-cell lymphoma, and mantle cell lymphoma. Other diagnoses included IgG4-related ophthalmic disease (9.1%), chronic inflammatory hyperplasia (18.2%), and normal tissue hyperplasia (9.1%). A small amount of subcutaneous hematoma, occurred in 1 patients (9.1%), which resolved without additional intervention.

Conclusions: CT-guided biopsy via the anterior approach is an effective technique for diagnosing orbital lymphoma. It is cost-effective, minimally invasive, allows for quicker recovery, and is associated with fewer adverse events compared to traditional surgical biopsy.

Abstract No.: 201140

Panel No.: OOP-0754

Case Report – a Rare Case of New Delhi Metallo-Beta-Lactamase (NDM-1)-Producing *Pseudomonas aeruginosa* Associated Panophthalmitis

First Author: Lexley **ONG-SY**

Co-Author(s): Wenqi **CHIEW**, Daniel **CHIN**, David **LAW**, Stephanie **SUTJIPTO**

Purpose: We report a rare case of NDM-1 *P. aeruginosa*-associated panophthalmitis in a patient who underwent evisceration with good healing of his right eye socket, resolution of infection, and restoration of his upper and lower fornices.

Methods: We describe a case of a 63-year-old Singaporean-Chinese man who developed a small corneal epithelial defect in his right eye that developed into a corneal ulcer. The patient subsequently presented with right eye periorbital swelling,

prompting him to seek emergency consultation. Assessment was panophthalmitis, which prompted evisceration. Postoperatively, the patient was administered empirical intravenous antibiotics with antibiotic eye drops. The intra-operative samples from his right eye showed growth of multi-drug resistant *P. aeruginosa*. Further antimicrobial susceptibility testing confirmed the presence of the NDM-1 gene.

Results: Although panophthalmitis caused by *P. aeruginosa* has been widely reported globally, to the best of our knowledge, this is the first documented case of NDM-1-producing *P. aeruginosa*-associated panophthalmitis. Given the multidrug-resistant nature of this bacterium and the poor visual prognosis of *P. aeruginosa* endophthalmitis and panophthalmitis, it can only be surmised that NDM-1-producing *P. aeruginosa*-associated panophthalmitis would present an even graver visual prognosis, with challenges in treatment and potential persistent implant-related infections following evisceration surgery.

Conclusions: Through multi-disciplinary team effort, early identification, appropriate antibiotic treatment, and close monitoring, patients with the highly drug-resistant NDM-1-Producing *P. aeruginosa*-associated panophthalmitis managed via evisceration and use of an orbital implant may still have favourable outcomes.

Abstract No.: 206728

Panel No.: OOP-0797

Clinical Use of Allogenic Fascia Lata for Wound Complications in Anophthalmic Patients

First Author: Seongwook SEO

Co-Author(s): Hyeonjeong JEONG, Daeun YOO

Purpose: To assess the clinical use of allogenic fascia lata for the treatment of orbital implant exposure in anophthalmic patients.

Methods: This case series included four anophthalmic patients with exposed orbital implants. Infection was controlled preoperatively with systemic antibiotics. Allogenic fascia lata, provided by the Korea Public Tissue Bank (KPTB), was harvested from cadaveric donors within 24 hours of death. The grafts were chemically treated, sterilized by γ -irradiation, and cryopreserved before use. Under general anesthesia, the exposed implant was removed and exchanged with a new implant, the anterior surface of which was covered with allogenic fascia lata and sutured with interrupted 6-0 nylon. We tried to completely cover the graft with tenon's capsule and conjunctiva, but in two cases it was partially exposed. Postoperative outcomes were assessed during a 6-month follow-up period.

Results: Stable graft integration was observed in all cases. Sutures were removed after the conjunctiva had completely covered the allogenic fascia lata, at a mean of 49.3 days (range, 29–61 days). No implant re-

exposure, recurrent infection, or major complications were observed. New ocular prostheses were successfully fitted at a mean of 58 days (range, 43–68 days). Symblepharon occurred in two cases but did not interfere with prosthesis use.

Conclusions: Allogenic fascia lata appears to be an effective option for managing orbital implant exposure associated with anophthalmic patients. Further large-scale, long-term studies are expected to validate these findings and establish their sustained efficacy.

Abstract No.: 207402

Panel No.: OOP-0807

Clinical Utility of the Phenylephrine Test in Ptosis Evaluation and Surgical Planning: A Review of Current Evidence

First Author: Fatema ALJUFAIRI

Co-Author(s): Safa ALKALAITI, Alice GOH

Purpose: To summarize current evidence regarding the use of the phenylephrine test in ptosis evaluation, including administration methods, response definitions, surgical planning implications, and its predictive value for postoperative outcomes and brow position.

Methods: A targeted review of published studies and national surveys examining phenylephrine testing in ptosis management was conducted, focusing on test protocols, MRD1 response, surgical decisions, and outcome correlations.

Results: Most studies used 5% phenylephrine, instilled as 1–2 drops of 2%, 5%, or 10% into the superior or inferior fornix. MRD1 was measured 5–15 minutes post-instillation, though some responses peaked at 30 minutes. A positive response was defined as MRD1 elevation ≥ 1 –2 mm. Resection lengths were guided by response: 8 mm for matched elevation, 9–10 mm for partial response, and 7 mm to prevent overcorrection. The test also aided in revision surgery planning. Evidence on predictive accuracy is mixed—a May 2024 study found no outcome correlation, while earlier work showed maximal response within 2 minutes lasting up to 30 minutes. Limited data suggest absence of brow depression post-test predicts minimal postoperative brow change.

Conclusions: The phenylephrine test remains a valuable adjunct for assessing ptosis and guiding MMCR. While useful for tailoring resection, its ability to predict final eyelid height and brow position remains inconsistent, underscoring the need for standardized protocols and further prospective studies.

Abstract No.: 205544

Panel No.: OOP-0781

Clinicopathological Features and Management of Caruncular Lesions: A 23-Year Retrospective Analysis in North China

First Author: Zhao YUN

Purpose: The aim of this study was to provide a comprehensive description of the clinicopathological features and management of caruncular lesions, presenting the first Chinese case series on this topic.

Methods: This was a retrospective, single-centre, observational case series, comprising a retrospective review of 276 patients with caruncular lesions at Tianjin Eye Hospital in North China between January 2002 and October 2024, as well as a review of the literature.

Results: The patients were between 6 and 85 years of age. Among the 276 patients, 161 were female, and 115 were male. Benign tumours largely predominated over malignant tumours and represented 98.2% of all cases. The three most common benign tumours were naevus, sebaceous hyperplasia, and papilloma. Five cases of malignant tumours accounted for 1.8% of all the caruncular lesions. Among the five patients with malignant tumours, two had mucoepidermoid carcinoma, one had basal cell carcinoma, one had malignant melanoma, and one had lymphoma. One case of malignant melanoma was confirmed by pathological examination as a malignant transformation of a naevus. The accuracy of the clinical diagnosis in all patients was 70.1%. A total of 226 patients completed the follow-up. The average follow-up time was 3.5 years. Postoperative recurrence occurred in 6 patients with caruncular lesions in our study.

Conclusions: A thorough understanding of the clinicopathological features of caruncular lesions can improve the accuracy of diagnosis and the timeliness of treatment. Complete resection of caruncular tumours has a good prognosis, but both benign and malignant tumours may recur and should be followed up regularly.

Abstract No.: 203981

Panel No.: OOP-0768

Closing the Gap, Facing Residual Notching: The Tenzel Flap in Goldenhar-Suspect

First Author: Arafani Putri YAMAN

Co-Author(s): Riani ERNA

Purpose: Eyelid coloboma and epibulbar dermoid are typical ocular signs of Goldenhar syndrome. It describes the surgical procedure and postoperative outcomes of the Tenzel flap technique in an infant with suspected Goldenhar syndrome, focused on restoring eyelid function.

Methods: A one-year-old girl with a suspected case of Goldenhar syndrome was referred with a coloboma

visible on her upper eyelid. The examination found a full-thickness defect in the right upper eyelid, measuring 10 × 6 mm in the medial third of the eyelid margin. Epibulbar dermoids were found at the 4 o'clock (2x2 mm) and 6 o'clock (5x5 mm) limbal position, without hair growth. A semicircular Tenzel flap was decided for reconstruction, considering it is best for mild to moderate eyelid defects (33%–50%), restoring the eyelid function, and lowering the risk of amblyopia.

Results: Following the procedure, the lids completely covered the ocular surface. In the first month's follow-up, a slight residual medial notching (4x1mm) was noticed with no sign of infection or functional impairment.

Conclusions: The semicircular Tenzel flap is a safe method for managing upper eyelid coloboma in pediatric patients, providing optimal corneal protection and preserved eyelid function. The discovered residual notching indicates the requirement for further evaluation of nutrition status, suturing control, tissue tension, and postoperative care to improve functional outcomes.

Abstract No.: 202036

Panel No.: OOP-0763

Congenital Eyelid Colobomas: Demographics, Histological Features and Surgical Outcomes in a Bangladeshi Population

First Author: Narayon Chandra BHOWMIK

Co-Author(s): Md.Golam HAIDER, Mukti Rani MITRA, Syeed Mehbub UL KADIR

Purpose: To describe our experience in the surgical management of congenital eyelid coloboma in Bangladeshi population.

Methods: A descriptive, observational, retrospective study was performed in patients with congenital eyelid colobomas between 2010 and 2024.

Results: Fifty-four eyelids were included in this study. Eyelid colobomas predominantly affected the upper lid 83.33 % (45), and were typically unilateral in 55.56 % (30) patients, isolated in 62.9% (34), and as part of a syndrome in 37.01% (20) patients. Congenital upper eyelid coloboma was commonly located in the medial upper lid (33 lids, 73.33%) and mostly involved the full thickness of the lid (38 lids, 70.37%). Corneal adhesion (25 eyes, 46.3%) and poorly formed eyebrows (29 eyebrows, 53.7%) were the most common ocular/adnexa associations. Histopathological features were epidermal acanthosis 40.74 % (22), scarred dermis 79.63 % (43), atrophic orbicularis oculi 88.89% (48) and atrophic or absent tarsus 70.37%(38). Visual acuity at the final follow-up was 20/50 or better in 18 (33.3%) eyes. Complete lid closure without lagophthalmos after one or more surgical procedures was achieved in 22 (41.1%) cases.

Conclusions: Eyelid colobomas are a potential threat to vision. In children, it requires close monitoring of the visual development. Dermal scarring and defective orbicularis muscles are common. Achieving a good cosmetic and functional success after management is always challenging.

Abstract No.: 205030

Panel No.: OOP-0777

Correlation Between the Severity of Blepharoptosis and Pathological Changes in the Levator Aponeurosis

First Author: Hideyuki **SHIMIZU**

Co-Author(s): Koji **NISHIGUCHI**

Purpose: To analyze the correlation between histological changes in the levator aponeurosis and clinical indicators in degenerative blepharoptosis.

Methods: Thirty eyelids (15 patients) underwent levator muscle shortening for degenerative ptosis. Male: 8 eyelids; Female: 7 eyelids; Age: 54–96 years (mean 79 years). Elastica-Masson staining was performed on levator aponeurosis specimens collected during surgery, and the proportion of collagen fibers was evaluated using the ImageJ Colour Deconvolution 2 plugin. A pathologist assessed the percentage of fat in the levator aponeurosis. Spearman's rank correlation was used to evaluate correlations between the percentage of collagen fibers in the levator aponeurosis, the percentage of fat, age, sex, levator function, and marginal reflex distance-1 (MRD-1).

Results: The mean collagen fiber percentage in the levator aponeurosis was $15.21 \pm 9.77\%$. A significant positive correlation was found between levator function and MRD-1 ($r = 0.42$, $p = 0.02$). A significant negative correlation was found between age and levator function ($r = -0.57$, $p < 0.001$). A significant positive correlation was found between the percentage of collagen fibers in the levator aponeurosis and being male ($r = 0.44$, $p = 0.02$). A significant positive correlation was found between the percentage of collagen fibers in the levator aponeurosis and levator function ($r = 0.42$, $p = 0.02$). A significant negative correlation was found between the percentage of collagen fibers in the levator aponeurosis and the percentage of fat ($r = -0.52$, $p = 0.003$).

Conclusions: A decrease in the percentage of fibers in the levator aponeurosis may promote laxity of the levator aponeurosis and its detachment from the tarsal plate, potentially contributing to the development of blepharoptosis.

Abstract No.: 208229

Panel No.: OOP-0810

Demographic and Clinical Manifestations of Thyroid Eye Disease in Pediatric Populations Across Different Ethnic Groups: A Systematic Review and Meta-Analysis

First Author: Fatema **ALJUFARI**

Co-Author(s): Kelvin **CHONG**, Kenneth **LAI**, Sayed **NAEMA**, Calvin **PANG**, Clement **THAM**

Purpose: To summarize the demographic patterns and clinical features of pediatric thyroid eye disease across diverse ethnic populations and geographic regions.

Methods: This PRISMA 2020–based systematic review and meta-analysis (PROSPERO: CRD420251121822) searched five databases without language or year limits, including studies on demographic and clinical features of pediatric thyroid eye disease across ethnic groups.

Results: Fifteen studies (11–115 subjects) from diverse ethnic groups—seven Western, three East Asian, two Southeast Asian, one South Asian, one Middle Eastern, and one Netherlands–Iran cohort—were included. Pediatric TED mainly affected early-to-mid adolescents (mean age 9–14 years) with a strong female predominance. Hyperthyroidism was most common, though euthyroid cases were more frequent in South Asian and Western groups. Smoking was rarely reported, while 19–69% had a family history of thyroid disease. Exophthalmos and eyelid retraction appeared in over two-thirds of patients, extraocular motility restriction in up to 30%, and dysthyroid optic neuropathy in 0–1.7%. Bilateral disease predominated (88–100%), showing overall ethnic similarity with minor regional variations in onset and presentation.

Conclusions: Pediatric thyroid eye disease most commonly presents during early-to-mid adolescence, with a strong female predominance and hyperthyroid association across all ethnic groups. While overall clinical patterns were similar worldwide, subtle regional differences were observed in age of onset, thyroid status, and specific ocular findings. These findings highlight the need for ethnicity-tailored diagnostic awareness and early recognition strategies in pediatric TED.

Abstract No.: 207304

Panel No.: OOP-0803

Diffuse, Deceptive, and Aggressive: Pagetoid Sebaceous Carcinoma of the Eye — a Case Series

First Author: Gowtham **KIM**

Co-Author(s): Vikas **MENON**

Purpose: To present a case series of 12 patients with ocular sebaceous gland carcinoma showing pagetoid spread, a rare and aggressive variant often associated with delayed diagnosis and poor outcomes.

Methods: Clinical records, histopathological findings, management strategies, and outcomes of 12 patients diagnosed with pagetoid sebaceous gland carcinoma of the eyelid and ocular adnexa were retrospectively reviewed. Emphasis was placed on presentation, diagnostic challenges, treatment modalities, and recurrence patterns.

Results: Twelve patients (mean age: 60 years; 8 male, 4 female) were included. Most presented with diffuse conjunctival involvement, clinically mimicking chronic blepharoconjunctivitis or unilateral keratoconjunctivitis. Histopathological confirmation with map biopsies was required in all cases. Management included wide excision with margin control, conjunctival map biopsies, and exenteration in select cases. Adjuvant cryotherapy and topical chemotherapy (mitomycin-C) were employed for extensive intraepithelial spread. Two patients (16.6%) developed recurrence during follow-up. Visual morbidity and systemic metastasis occurred in a minority of cases.

Conclusions: Pagetoid sebaceous gland carcinoma of the eye is a diagnostic and therapeutic challenge due to its ability to mimic benign inflammatory conditions and its tendency for diffuse intraepithelial spread. Early suspicion, meticulous use of map biopsies, and aggressive surgical and adjuvant treatment are crucial for improving outcomes. This 12-case series highlights the importance of timely recognition and multidisciplinary management in addressing this rare but potentially sight- and life-threatening malignancy.

Abstract No.: 209709

Panel No.: OOP-0813

Effect of Previous Temporary Nasolacrimal Stent Implantation on Endoscopic Dacryocystostomy

First Author: Xinyu LI

Co-Author(s): Hongfei LIAO, Wencan WU, Bo YU, Guangming ZHOU

Purpose: We compared the outcomes of endoscopic dacryocystorhinostomy (En-DCR) in patients with chronic dacryocystitis (CD), with or without previous temporary nasolacrimal stent implantation (TNLSI), then explored whether previous TNLSI influenced postoperative outcomes.

Methods: This retrospective study included consecutive patients with CD and previous TNLSI who underwent En-DCR (group A) between September 2019 and May 2022, and an age- and sex-matched control group of patients with CD who had not undergone previous implantation (group B). Lacrimal sac parameters were measured by computed tomography-dacryocystography, and surgical findings were recorded during surgeries. The surgical success rates were compared between the two groups at 12 months after surgery.

Results: There were 53 patients in group A and 106 patients in group B. In group A, the mean horizontal, sagittal, and vertical lengths were 4.94 ± 1.30 mm, 4.88 ± 1.17 mm, and 7.85 ± 2.03 mm; in group B, these three lengths were 6.16 ± 1.25 mm, 5.97 ± 1.20 mm, and 10.00 ± 2.18 mm, respectively. All three parameters were significantly smaller in group A than in group B. Scar formation in the sac was observed in all patients in group A; it was not present in group B. At 12 months after surgery, the anatomical and functional success rates were 75.47% (40/53) and 71.70% (39/53), respectively, in group A; they were 93.40% (99/106) and 91.51% (97/106) in group B. The success rates were significantly higher in group B than in group A.

Conclusions: Previous TNLSI may reduce lacrimal sac parameters and cause scar formation, thereby reducing the likelihood of success after En-DCR.

Abstract No.: 205967

Panel No.: OOP-0786

Efficacy and Safety of Sirolimus (Rapamycin) for the Treatment of Thyroid Eye Disease: A Systematic Review

First Author: Jacky Ka Kit LO

Co-Author(s): Kelvin Kam Lung CHONG, Kenneth Ka Hei LAI, Marco Shing Yan MAN, Calvin Chi Pui PANG, Clement Chee Yung THAM

Purpose: To review the efficacy and safety of sirolimus (rapamycin) for managing thyroid eye disease (TED).

Methods: We searched on PubMed, Web of Science, and Medline databases up to May 2025. Two independent reviewers selected studies with the use of sirolimus with or without combined therapy in patients with moderate-to-severe TED. We independently extracted the proportion of patients whose clinical activity score (CAS) reduced by at least 1 point, and Gorman diplopia score (GDS) improved. The quality of studies was assessed by the Risk Of Bias In Non-Randomized Studies – of Interventions (ROBINS-I).

Results: The initial search identified 831 publications, of which six were screened and assessed for eligibility. Sirolimus was used as a second-line treatment in steroid-refractory patients, with a regimen of either 2mg per day or 2-mg loading dose followed by 0.5mg daily oral dosage. In every study, around 80% of subjects at 24 weeks and greater than 70% of them at 48 weeks endpoint showed at least 1 grade of CAS reduction. Two studies conducted in Hong Kong demonstrated a resolution of at least 1 grade of GDS at 48 weeks in over half of the patients with intractable diplopia. Sirolimus may offer superior or comparable efficacy to methylprednisolone in the short term and to mycophenolate mofetil in the mid-to-long term. There were no severe adverse events reported, with mainly hyperlipidaemia and infections.

Conclusions: Sirolimus demonstrated its therapeutic potential with a promising safety profile in managing moderate-to-severe TED. A longer, randomized controlled trial is warranted to elucidate its efficacy and safety.

Abstract No.: 202435

Panel No.: OOP-0766

Endoscopic Revision of Unsuccessful Dacryocystorhinostomy Under Local Anesthesia

First Author: Ben LIMBU

Purpose: To evaluate etiological factors for unsuccessful Dacryocystorhinostomy (DCR) surgeries and surgical outcome after revisional endoscopic endonasal dacryocystorhinostomy (Re-EEDCR) surgery.

Methods: All the consecutive cases of previously failed DCRs who underwent revisional endoscopic endonasal DCR under local anesthesia were included. Patients' medical records were reviewed for demographic profile, pre- and intra-operative endoscopic findings during revisional surgery, and post-operative outcome of surgery. The potential causative factors for unsuccessful DCR were assessed, and the surgical outcome of Re-EEDCR was evaluated.

Results: A total of 15 patients, 13 (86.7%) female and 2 (13.3%) male, with failed DCR, who had undergone revisional En-DCR were evaluated. The mean age at revisional surgery was 40.53 ± 15.88 (range, 18-74 years). The mean duration from primary to Re-EEDCR was 19.93 ± 31.73 months (range, 1-120). The most common causes attributed to a failure of unsuccessful DCR were intranasal adhesion 9(60%), followed by the inappropriate site of ostium 8(53.3%), inadequate marsupialization of sac 6(40%), granuloma formation 2(13.3%), and inadequate ostium site (6.6%). The overall success rate was 93.3% (14/15) without any important intra- or postoperative complications

Conclusions: The most common cause of failed DCR was intranasal adhesions. A revision surgery with an endoscopic endonasal approach under local anesthesia can significantly reduce overall surgery time and avoid the risk of further skin scarring. It is a safe and effective option in the management of unsuccessful DCR surgery.

Abstract No.: 206408

Panel No.: OOP-0791

Evaluating Ocular and Periocular Sensory Symptoms in Thyroid Eye Disease

First Author: Hunter FISCHER

Co-Author(s): Patrick BARLOW, Keith CARTER, Rupin PARIKH, Chau PHAM, Erin SHRIVER

Purpose: Patients with thyroid eye disease (TED) experience variable signs and sensory symptoms.

Symptoms such as "pain behind the globe," "pain with eye movement," and "retrobulbar ache" "at rest" or "with gaze" have been described in validated scales; however, a broader understanding of the sensory experience is limited in the literature. This study aims to enhance the characterization and quantification of the full range of symptoms experienced by TED patients.

Methods: A retrospective review was conducted of all patients with TED seen at an academic Oculoplastic Surgery Clinic between 1/1/2020 and 12/31/2024. Ocular and periocular sensory symptoms reported in the clinic visit History of Present Illness section, with attention to descriptors and location, were recorded.

Results: A total of 562 symptomatic patients over 1,412 appointments noted 46 unique ocular and periocular sensory descriptors. Most symptoms localized to the ocular surface (88%), with tearing (316 patients, 56%) and dryness (281, 50%) being the most common. The next most frequent symptom locations were retrobulbar (19%), periorbital (12%), intraocular (10%), and eyelid (3%). 20% of patients had generalized ocular/periocular sensory symptoms without localization. Movement-evoked symptoms were noted by 27% of patients. Pain with eye movement (115, 20%) and pain behind the globe (53, 9%) were the most common non-surface descriptors. Women reported more sensory symptoms than men (2.83 vs 2.45, $p=0.02$).

Conclusions: Patients experienced a wide range of sensory symptoms in both ocular and periocular locations. Ocular surface symptoms were the most frequently endorsed, followed by retrobulbar, periorbital, and intraocular symptoms. Over a quarter of patients experienced movement-evoked symptomatology.

Abstract No.: 205793

Panel No.: OOP-0784

Everting Sutures With Lateral Canthopexy for Involutional Entropion: A Case Series of Treatment Room-Based Repairs

First Author: Daniel CHIN

Co-Author(s): Petrina TAN

Purpose: To evaluate the outcomes, complications, recurrence rates, and potential cost benefits of performing entropion repair using everting sutures combined with lateral canthopexy in a treatment room setting rather than in the operating theatre.

Methods: We conducted a retrospective case series of patients with involutional lower eyelid entropion who underwent repair using everting sutures and lateral canthopexy under local anaesthesia in a treatment room between 1st September 2024 to 1st September 2025. Data collected included patient demographics,

laterality, recurrence rates, complication rates, and costs.

Results: A total of 10 eyelids in 9 patients were treated. The mean patient age was 77.2 years. (range:67 - 87). 3 patients were male and 6 were female. At a mean follow-up of 6.7 months, 100% of eyelids remained anatomically corrected without recurrence. Minor complications included wound infection with subsequent loosening of the lateral canthopexy suture and ectropion in 1 patient. No cases required conversion to an operating theatre-based procedure. Treatment room procedures had shorter waiting times and costs compared to operating theatre cases, did not require additional anaesthesia support for sedation, and patients were not required to fast. All patients tolerated the procedure well, and no sedation or systemic monitoring was required.

Conclusions: Entropion repair using everting sutures with lateral canthopexy can be safely and effectively performed in a treatment room setting. This approach offers advantages in terms of accessibility, convenience, and potential cost savings, particularly in outpatient or resource-limited environments. Outcomes appear comparable to those achieved in operating theatre-based surgery.

Abstract No.: 206402

Panel No.: OOP-0792

Feeling Versus Seeing: Rethinking Diagnosis of Lacrimal Obstruction

First Author: Maryanne ROMERO

Co-Author(s): Blanche LIM, Gangadhara SUNDAR

Purpose: This study aimed to correlate conventional probing and irrigation diagnoses of lacrimal obstruction with findings from dacryoendoscopy.

Methods: We retrospectively reviewed 21 patients referred to a single-center lacrimal clinic who underwent dacryoendoscopy. An initial diagnosis was made following probing and irrigation, and a second diagnosis was established after dacryoendoscopy. Pre- and post-endoscopy diagnoses were then compared.

Results: A total of 21 patients underwent dacryoendoscopy by a single surgeon. Based on probing and irrigation, initial diagnoses were: partial NLDO (n=6), canalicular obstruction with partial NLDO (n=6), complete NLDO (n=5), and canalicular obstruction alone (n=4). Following dacryoendoscopy, 15 cases (71%) required revision: 8 (38%) were incomplete diagnoses, and 7 (33%) were inaccurate.

Conclusions: Dacryoendoscopy substantially improved diagnostic accuracy, with over two-thirds of initial diagnoses revised. Direct visualization of the lacrimal system provides critical insights that probing and irrigation alone may miss.

Abstract No.: 205344

Panel No.: OOP-0778

Flap or Flapless: Rethinking Endonasal DCR

First Author: Roopa HIREMATH

Co-Author(s): Roopa HIREMATH

Purpose: Endonasal dacryocystorhinostomy (DCR) has traditionally been performed with mucosal flaps to maintain ostium patency. However, flap-related complications may compromise outcomes. This study compares surgical success and complications between flap-based and flapless techniques, challenging the necessity of flap creation.

Methods: In this prospective comparative study, 52 patients with primary acquired nasolacrimal duct obstruction were randomized into two groups. Group A (n = 26; 18 females, 8 males) underwent flap-preserving endonasal DCR, while Group B (n = 26; 14 females, 12 males) underwent flapless endonasal DCR. Patients were followed for ostium patency and complications.

Results: Group A: 5 patients (19.2%) developed ostium block with postnasal bleeding due to flap dislodgement. Group B: 1 patient (3.8%) developed an ostium block from granulation tissue. Surgical success rate was 80.8% in Group A versus 96.2% in Group B. The difference in complication rates was statistically significant ($\chi^2 = 3.90$, $p < 0.05$).

Conclusions: Flapless endonasal DCR yielded significantly higher success with fewer complications compared to the conventional flap technique. Flap dislodgement was the major cause of failure in the flap group, whereas flapless surgery minimized bleeding, as we can safely pack the nose post-surgery and ostium obstruction by adhesions. These findings suggest that routine flap creation may not be essential, and flapless DCR could represent a safer, simpler, and more effective approach for modern lacrimal surgery.

Abstract No.: 201912

Panel No.: OOP-0760

Functional and Aesthetic Outcomes of a Novel Tissue-Sparing Approach for Cicatricial Ectropion Repair

First Author: Vinit TANWAR

Purpose: Cicatricial ectropion (CE) mostly requires invasive surgical modalities such as full-thickness skin graft, lateral tarsal strip procedure, etc., associated with donor site morbidity and additional scars. To the best of our knowledge, this is the first study on the use of Autologous Fat Graft (AFG) for the correction of the CE of the lower lid.

Methods: This was a prospective, interventional pilot study that included 5 patients with CE (grade I-III). Fat was harvested from the abdomen using the Coleman liposuction method and injected into the cicatricial lid.

All these patients underwent a pre-injection workup to assess anatomical outcomes (grade of ectropion, vertical palpebral aperture (VPA), lagophthalmos, and eyelid retraction), functional outcomes (dry eye status), and aesthetic outcomes (change of scar color, thickness, pain, and consistency).

Results: At 6 months, all patients had improvement in the grade of ectropion, vertical palpebral aperture, eyelid retraction, and almost complete resolution of lagophthalmos. There was a significant improvement in scar color, thickness, and consistency on the Visual Analogue Score with no donor site complications. Surgery was avoided in 4 out of 5 patients.

Conclusions: AFG transfer for CE not only eludes the need for invasive surgery but also provides satisfactory correction with a stable outcome and an improved texture of scar and has a low risk.

Abstract No.: 205725

Panel No.: OOP-0783

Functional and Cosmetic Improvement After Surgical Treatment of Three Cases of Divided Nevus of the Eyelid

First Author: Marina OGAWA

Co-Author(s): Tomoyuki KASHIMA, Ryo KIKUCHI, Shohei SUETAKE

Purpose: A divided nevus, also known as a kissing nevus, is a congenital melanocytic nevus that develops during fetal development when the upper and lower eyelids are fused and subsequently separated with the formation of the palpebral fissure. Although it is benign, it may cause both functional and cosmetic impairment, often necessitating surgical excision. Here, we report three surgically treated cases with favorable outcomes.

Methods: This case series included three patients. Patient 1 is a 52-year-old female who presented with a congenital pigmented lesion involving the medial parts of her right upper and lower eyelids, which had gradually enlarged over 5 years. Serial excisions were performed along the lid margin while preserving the eyelash roots. Patient 2 is a 31-year-old female with a congenital nevus on the left upper eyelid that gradually enlarged over a period of 10 years. Serial shaving excisions were performed. Patient 3 is a 61-year-old female who underwent bilateral ptosis repair and the excision of a divided nevus with skin grafting. Postoperatively, trichiasis developed, necessitating the additional excision of the eyelash roots.

Results: All three cases achieved significant functional and cosmetic improvement by tumor excision. No meibomian gland dysfunction was observed following eyelid margin excision, although eyelash loss occurred only in Patient 1.

Conclusions: A divided nevus can cause significant functional and cosmetic disturbances. Although

surgical excision carries risks such as trichiasis and lagophthalmos, it generally results in very high patient satisfaction. We achieved favorable postoperative outcomes in the above three cases.

Abstract No.: 200914

Panel No.: OOP-0751

Geometry-Inspired Aesthetics: Using a Rhomboid Flap for Medial Canthal Defects

First Author: Sofia IQBAL

Co-Author(s): Aleena KHAN, Bakht KHAN

Purpose: To demonstrate rhomboid flap reconstruction for medial canthal defects following excision of biopsy-proven basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) in terms of functional and cosmetic outcomes.

Methods: This case series describes three patients with lower lid medial canthal tumors (two BCC and one SCC) confirmed on histopathology. The patients included a 64-year-old male, a 52-year-old female, and a 45-year-old female. Wide local excision were confirmed for tumor-free margins, rhomboid flaps were designed and oriented along relaxed skin tension lines to optimize tissue closure and camouflage scarring. Flaps were raised in the subcutaneous plane so that their vascular integrity was maintained. Rotation and advancement were performed carefully to prevent undue tension and preserve medial canthal anatomy. Layered closure with 6-0 absorbable sutures ensured precise approximation. Postoperative outcomes were assessed for flap viability, lid position, tear function, scar aesthetics, and recurrence.

Results: All three cases showed complete flap survival without necrosis or wound breakdown. Cosmetic results were graded highly satisfactory by both surgeon and patient, with good color and texture match. Functional outcomes were preserved, with no cases of lagophthalmos, canthal distortion, or epiphora. No tumor recurrence was observed over a six-month follow-up period.

Conclusions: The rhomboid flap provides an aesthetically pleasing and geometrically sound reconstructive option for medial canthal defects. It offers excellent cosmesis and functional restoration, particularly when designed and executed with attention to aesthetic subunit boundaries and tension-free closure.

Abstract No.: 201945

Panel No.: OOP-0758

Hodgkin Disease Presenting With Bilateral Ptosis

First Author: Anna Sofia SERRANO

Co-Author(s): Felice Katrina RANCHE

Purpose: To describe an orbital lymphoma with a rare type and unusual presentation

Methods: Case report

Results: A 79-year-old male presented with gradually progressive bilateral blepharoptosis, worse on the left. After five years, a mass was palpated under the left superior orbital rim. On examination, there was resistance to retropulsion of both globes, and left proptosis with limited upgaze. CT scan showed bilateral homogeneous masses extending posteriorly from the lacrimal gland, with moulding around the globes. Bilateral tumor debulking was performed. The specimens showed atypical round cell proliferation. PAX5 and CD30 were positive, indicating B-cell lineage, with a final histopathologic diagnosis of Classic Hodgkin Lymphoma. PET CT revealed hypermetabolic nodules in the pancreas and lung. The patient underwent 4 cycles of chemotherapy (AVD regimen). Repeat PET CT will be done after six months. He is on regular follow up, with a marked reduction in proptosis and ptosis, and no signs of recurrence.

Conclusions: An adult Filipino male presenting with bilateral ptosis and orbital masses was diagnosed with Hodgkin lymphoma. Moulding of a mass around the globe on imaging indicates lymphoproliferative disease and warrants biopsy and immunohistochemistry to determine clonality and classification. PET CT is the imaging modality of choice to determine the extent of the disease. In Hodgkin lymphoma, orbital involvement is stage IV disease, and is treated with chemotherapy. In contrast, for non-Hodgkin lymphoma, orbital involvement is considered localized disease, and is treated with radiotherapy.

Abstract No.: 208449

Panel No.: OOP-0812

Increased Pupil Constriction Latency in Immunoglobulin G4-Related Ophthalmic Disease

First Author: Yiu Man **WONG**

Co-Author(s): Kar Mun Carmen **CHAN**, Chi On Andy **CHENG**, Kar Yee Joyce **CHIN**, Kam Lung Kelvin **CHONG**, Zhichao **HU**, Kin Ting Andrew **KUK**, Chi Ho **KWONG**, Ka Hei Kenneth **LAI**, Pui Fan Wendy **LAM**, Polin **LEOW**, Pok Yiu Angus **LEUNG**, Kai Wang Kenneth **LI**, Kai Chun Jeffrey **MAK**, Chi Pui Calvin **PANG**, Chenhui **TANG**, Chee Yung Clement **THAM**, Ngai Simon **YANG**, Yifei **YANG**, Kwok Foo Nelson **YIP**, Alvin Lerrmann **YOUNG**, Kwok Lai Hunter **YUEN**

Purpose: To examine the pupillary light reflex (PLR) in Immunoglobulin G4-related ophthalmic disease (IgG4-ROD) patients in comparison to healthy controls.

Methods: This study included 25 biopsy-proven IgG4-related ophthalmic disease patients without a history of optic neuropathy (aged 60.6±11.4 years, 15 males), and 50 age-, sex-, and smoking-matched healthy subjects (aged 59.7±10.1 years, 30 males). The PLR was assessed using the virtual reality head mount display. 27 pupillometry light reflex features were

extracted and analyzed. Independent paired t-test, multinomial logistic regression and backward stepwise variable selection were used to find significant group differentiating features. The performance of machine learning algorithms on group classification based on these features were also evaluated.

Results: The pupillometry results between the two groups were analyzed. The pupil constriction latency is significantly longer in IgG4-ROD eyes (0.3 ms versus 0.2 ms, P<0.05) at the third stimulus (LAT3rd). Other PLR features were comparable between the two groups. LAT3rd was also found to be significant in group classification by multinomial logistic regression (P<0.05) and backward stepwise variable selection. Machine learning on all features data showed good performance for some models (Random Forest, 0.875/0.900 for Accuracy/AUC). With LAT3rd only and bootstrapped data, more models showed good performance, including K-nearest Neighbors (0.885/0.885) and Decision Tree (0.840/0.840).

Conclusions: An increased constriction latency can result from both the afferent and efferent pathways of the pupil light reflex. The application of a virtual reality head mount display may be a useful non-invasive tool for early detection of IgG4-ROD.

Abstract No.: 208280

Panel No.: OOP-0811

Inferior Rectus Myositis After Orbital Fracture Repair With a Medpor Implant in a 38-Year-Old Male: A Case Report

First Author: Ting Hei **TSANG**

Co-Author(s): Fatema **ALJUFAIRI**, Kelvin **CHONG**, Kenneth **LAI**, Jake **SEBASTIAN**

Purpose: We report a rare case of Medpor® Orbital implant-related inferior rectus (IR) myositis post-orbital fracture repair.

Methods: A 38-year-old gentleman underwent an uneventful orbital floor fracture repair done elsewhere, using a Medpor® implant, one day after sustaining a blunt force facial trauma. The patient presented to our center, three weeks post-operatively, complaining of diplopia and marked dull ache around the region of the left orbit, with left hypotropia and intractable primary and up-gaze diplopia and extraocular muscle restriction of (-3) up gaze and (-2) downgaze on the left eye. A multi-parametric, dynamic orbital MRI showed focal IR myositis and entrapment due to incomplete defect coverage with restricted elevation on the T2 cine sequence.

Results: The symptoms were gradually relieved after a revision surgery for the left orbital floor fracture using a biplanar, trans-orbital, and trans-antral approach with release of entrapped soft tissues, removal of the orbital Medpor® implant, and replacement with an autologous dermis fat graft. Complete coverage of the

fracture site and absence of any entrapped soft tissues were ascertained by direct visualization using the trans-antral view.

Conclusions: Medpor myositis is a rare complication associated with the use of the Medpor® orbital implant. Direct trans-antral visualization allows for a pressure-less, precise identification of the extent of the fracture and any soft-tissue entrapment after implant insertion without retracting the orbit. In view of myositis resulting from a possible negative reaction to a foreign material, an autologous dermis fat graft can be a suitable alternative material used for repair and to augment orbital volume.

Abstract No.: 206838

Panel No.: OOP-0799

Intra-Lesional Bleomycin for the Treatment of Orbital and Peri-Orbital Vascular Malformations

First Author: Muhammad MOIN

Co-Author(s): Mehreen AKRAM, Sadia IMTIAZ

Purpose: To evaluate the safety and efficacy of intralesional Bleomycin in the management of orbital and peri-orbital vascular malformations.

Methods: This quasi-experimental study was conducted at the Institute of Ophthalmology, Eye Unit-III, Mayo Hospital, Lahore, over 12 months (Dec 2023–Nov 2024). Fifteen patients (ages 10–40 years; radiologically confirmed orbital/peri-orbital vascular malformations) were enrolled. Exclusion criteria included prior steroid/surgical treatment, isolated intraconal malformations, and a history of lung disease. Preoperative assessment included baselines, viral markers, orbital B-scan, CT/MRI/CTA/MRA. After informed consent, intralesional Bleomycin (0.5 mg/kg, max 10 IU/session) was administered with local anesthetic, following aspiration of intralesional fluid. Patients were monitored in emergency care settings and followed at 1 week, 1 month, and 3 months.

Results: The cohort included 10 males (67%) and 5 females (33%). Lesion types were lymphangioma (n=5, 33%), varices (n=5, 33%), capillary hemangioma (n=3, 20%), and arteriovenous malformation (n=2, 13%). Mean injections per patient were 1.5 ± 0.52 . Preoperative mean lesion size was $2.5 \times 3.0 \text{ cm} \pm 1.23$, reducing to $0.5 \times 0.6 \text{ cm} \pm 0.75$ at 1 month ($p=0.012$). Complications occurred in only 4 patients (26.6%): eyelid swelling (2 hemangioma), sore throat (1 lymphangioma), and hematoma (1 varix). No life-threatening events occurred.

Conclusions: Intralesional Bleomycin is less traumatic, inexpensive, and relatively easy to administer. This study recommends it as a first-line treatment option for peri-orbital vascular malformations due to its efficacy and favorable safety profile.

Abstract No.: 205604

Panel No.: OOP-0782

Investigation of Improvement of Eye Movement After Orbital Fracture Surgery

First Author: Shohei SUETAKE

Co-Author(s): Tomoyuki KASHIMA, Ryo KIKUCHI, Marina OGAWA

Purpose: The effectiveness of orbital fracture repair in primary versus revision cases remains debated. This study assessed ocular motility before and after surgery using the Hess Chart and the binocular single vision test.

Methods: Patients who underwent orbital fracture repair at the Oculofacial Clinic Tokyo between January 2022 and December 2023 were reviewed. They were classified into Group A (primary surgery) and Group B (revision after surgery elsewhere). Forty-five patients (mean age 38.6 ± 14.2 years) were included. Ocular motility disturbance was evaluated using the Hess Area Ratio (HAR%) and Fusion Image Area (FIA). Since all Group B patients had old fractures, Group A was subdivided into fresh and old cases for additional comparison.

Results: Forty-eight patients (32 in Group A, 16 in Group B; male: female = 31:17) were analyzed. Group A showed significant improvement in HAR% and FIA at 3 months ($p < 0.05$). Group B showed no significant change ($p > 0.05$). Outcomes in Group B were significantly poorer than in Group A ($p < 0.05$). Among old fractures, improvement was limited in both groups, but Group B consistently showed worse results pre- and postoperatively ($p < 0.05$).

Conclusions: Primary orbital fracture repair improves ocular motility, while revision cases show limited benefit. Proper initial management is critical for a favorable recovery.

Abstract No.: 201636

Panel No.: OOP-0757

Isolated Bilateral Orbital and Unilateral Conjunctival Amyloidosis: A Rare Case

First Author: Alene, Ker Hsin NG

Co-Author(s): Pimkwan JARU-AMPORN PAN, Kanograt PORN PANICH

Purpose: To report a rare presentation of isolated bilateral orbital amyloidosis with concurrent right conjunctival amyloidosis.

Methods: A 59-year-old Thai woman with diabetes mellitus and hypertension presented with an 8-month history of progressive right upper lid swelling, conjunctival growth and redness. Visual acuity was 6/30 in the right eye with no pinhole improvement, and 6/15 (pinhole 6/12) in the left eye. Examination revealed a right upper lid mass, associated with skin hyperpigmentation, mechanical ptosis, and restricted

ocular motility. A diffuse yellow-pink conjunctival mass with intrinsic vascularization was observed in the right eye, along with bilateral proptosis. Imaging demonstrated bilateral extraocular muscle and optic nerve involvement, with infiltration of the right lacrimal gland. Histopathology confirmed amyloid deposition of the conjunctiva, while further investigations excluded systemic involvement. The patient was treated with intravenous corticosteroids, followed by radiotherapy.

Results: Clinical response was favourable, with marked reduction in swelling, proptosis, and lesion size. The patient is scheduled for surgical excision of the lid mass. Literature review revealed that simultaneous bilateral orbital and conjunctival amyloidosis with muscle, optic nerve, and lacrimal gland involvement is exceedingly rare.

Conclusions: Isolated bilateral orbital amyloidosis with conjunctival involvement, in the absence of systemic disease, is an uncommon and challenging condition. This case emphasizes the importance of histopathological confirmation, systemic evaluation, and a multidisciplinary approach. The favourable response to radiotherapy suggests its potential as a therapeutic option, although long-term outcomes remain uncertain, necessitating close follow-up.

Abstract No.: 203902

Panel No.: OOP-0769

Lacrimal Gland Adenoid Cystic Carcinoma: A Case Report

First Author: Lexus Neil CAHIMAT

Co-Author(s): Maria Donna SANTIAGO

Purpose: To describe the clinical features and outcome of a 37-year-old female with adenoid cystic carcinoma (ACC) of the right lacrimal gland who underwent lateral orbitotomy with beveled osteotomies, en bloc excision of the lesion, and adjuvant radiotherapy.

Methods: This is a case report.

Results: This report details a 37-year-old Filipino female with lacrimal gland ACC, with a 4-month history of eye pain with associated proptosis. Plain orbital computed tomography scan (CT) revealed a right orbital mass. Right lateral orbitotomy with beveled osteotomies and en bloc excision of the tumor under general anesthesia was done. Frozen section revealed a malignant tumor, favoring ACC. The lateral orbital bone was not repositioned for adjuvant radiotherapy. Final histopathologic diagnosis of ACC of the right lacrimal gland was made based on the histologic features consistent with said pathology. Systemic surveillance with cranial MRI and chest CT, both with contrast, showed absence of regional and distant metastases. Patient completed adjuvant radiotherapy as part of her comprehensive treatment plan. Five months post-

operatively, vision remained excellent at 20/20 without signs of tumor recurrence.

Conclusions: ACC is the most common malignant epithelial tumor of the lacrimal gland, but it accounts for less than 2% of tumors arising in the head and neck area. It is an aggressive malignancy; hence, meticulous examination to arrive at a diagnosis cannot be overemphasized. Advances in orbital imaging correlated with clinical findings, surgical judgment, and skill should allow us to define the most efficient management. Eye-sparing surgery could significantly preserve quality of life.

Abstract No.: 205354

Panel No.: OOP-0779

Lateral Eyelid Block Technique for Ectropion Correction: Surgical Steps and Results From a Case Series

First Author: Adinda Mulya PERTIWI

Co-Author(s): Hisar DANIEL, Diannisa Paramitha SUSANTONO

Purpose: To highlight the effectiveness of the lateral eyelid block as an updated technique for ectropion correction. Explaining its surgical steps and demonstrating favourable outcomes in a case series.

Methods: This case series included three patients with horizontal eyelid laxity. Significant laxity was defined by an abnormal snap-back test in conjunction with lower eyelid malposition. Three patients, comprising two with involutional ectropion and one with paralytic ectropion, all of whom underwent correction using the same lateral eyelid block technique. The surgical technique was performed as follows. Following subconjunctival infiltration of lidocaine compositum, an inferior lateral canthal incision was performed. After determining the amount of tissue to be excised, a block resection was conducted. The lateral inferior tarsus was then sutured with 5-0 vicryl to the lateral canthal ligament and to the inferior aspect of the superior tarsus to achieve adequate eyelid support. Lastly, skin closure was completed with interrupted 6-0 prolene sutures.

Results: Surgical outcomes showed satisfactory postoperative apposition and alignment with minimal scarring. Postoperative follow-up demonstrated resolution of ocular surface exposure, improved eyelid position, and restoration of functional lid closure. No wound dehiscence or infection were found. At the final follow-up, all patients maintained stable eyelid position without recurrence of ectropion.

Conclusions: The lateral eyelid block technique provides a reliable and effective approach for correcting both involutional and paralytic ectropion, offering stable eyelid apposition, satisfactory functional outcomes, and minimal complications.

Abstract No.: 206304**Panel No.: OOP-0788****Management and Outcomes of Traumatic Globe Luxation and Dislocation — a Case Series***First Author: Kirthi KOKA**Co-Author(s): Md Shahid ALAM, Varsha BACKIAVATHY, Bipasha MUKHERJEE***Purpose:** To report a case series of traumatic globe luxation and dislocation, and their management outcomes.**Methods:** A retrospective analysis of all patients with traumatic globe luxations over 15 years, from January 2009 to January 2024, was conducted. The analyzed data included demographic profile, nature of trauma, imaging characteristics, management, and outcomes.**Results:** Fifteen patients were included in this study. The mean age of the population was 28.6 ± 15.8 years (range 8-62 years) with a male predominance ($n=13$, 86.66%). Fourteen patients (93.33%) presented with no perception of light. The most common etiology was road traffic accidents ($n=7$, 46.66%). The globe was anteriorly luxated in thirteen patients and inferiorly into the maxillary sinus in two. Optic nerve avulsion was noted in nine patients. Globe repositioning, along with tarsorrhaphy, was done for nine patients, whereas enucleation was performed for four. Two patients underwent repair of the fractured floor with repositioning of the luxated globe from the maxillary sinus. At an average follow-up of 20 ± 26 months (range 1-96 months), good cosmesis was achieved in ten patients (66.66%), and an improvement in vision was seen in two patients (13.33%).**Conclusions:** Traumatic globe luxation is a rare and challenging ophthalmic emergency resulting from blunt or penetrating injuries. It is usually associated with profound visual loss. Early recognition and prompt management result in improved cosmesis and the possibility of visual recovery.**Abstract No.: 201729****Panel No.: OOP-0759****Medial Vertical Lid Split Posterior Orbitotomy: A Case Report From Limited Resource Setting***First Author: Suresh RASAILY***Purpose:** To present a case utilizing a medial vertical lid split posterior orbitotomy approach for intraconal tumor excision in a limited resource setting.**Methods:** A single case of a patient with a posterior intraconal mass was managed using the medial vertical lid split approach. Clinical presentation, imaging, surgical technique, and postoperative outcomes were documented. Emphasis was placed on adaptations made due to resource constraints.**Results:** The approach allowed adequate exposure for complete excision of the mass with preservation of visual function and sparing deep lateral orbitotomy. No intraoperative or major postoperative complications were noticed. Despite limited resources, the procedure was safely performed with favorable cosmetic and functional outcomes.**Conclusions:** Medial vertical lid split posterior orbitotomy is a viable and effective technique for deep intraconal vascular tumors even in resource-limited settings. With careful planning and anatomical knowledge, it can offer good outcomes without the need for advanced equipment.**Abstract No.: 204107****Panel No.: OOP-0771****Not-So-Lovely Erosion and Infection of Love Band Implant***First Author: Kristy Hiu Ching YIM**Co-Author(s): Matthew Chun Wah LAM, Hunter Kwok Lai YUEN***Purpose:** Surgical augmentation of the love band, commonly referred to as "aegyo sal" in Korean, is gaining popularity in East Asian culture for its perceived youthfulness. We hereby present a case of delayed implant erosion and infection.**Methods:** Case notes were reviewed, followed by a comprehensive review of the literature on pretarsal augmentation blepharoplasty.**Results:** A 29-year-old Chinese woman presented with progressive left lower eyelid swelling and discharge for 2 years. She had undergone bilateral lower lid pretarsal augmentation by surgical implantation twice elsewhere a decade ago. Examination showed bilateral palpable lower lid hard implants, with pretarsal swelling of the left lower eyelid. Slit lamp examination revealed granulation tissues over the left lower lid palpebral conjunctiva with mucoid discharges, but no obvious implant protrusion. Her condition was unresponsive to topical and oral antibiotics. Lower lid exploration under general anaesthesia revealed an eroded conjunctival wound; 10 strips of plastic implants were removed. Microbiological culture yielded *Streptococcus pneumoniae*. Temporary (hyaluronic acid injection) and permanent methods (autogenous grafts and implants) have been reported for enhancing lower eyelid pretarsal fullness. Expanded polytetrafluoroethylene (ePTFE; i.e. Gore-tex), is a common synesthetic implant of choice for such procedures. Review of literature revealed one reported case of early infection 2 months after implantation of Gore-tex. Delayed erosion and infection, as demonstrated by our case, were not previously reported.**Conclusions:** Synthetic implant augmentation of lower eyelid pretarsal fullness can be complicated with

delayed implant erosion and infection many years after the initial procedure.

Abstract No.: 206987

Panel No.: OOP-0802

Novel Application of Biodegradable Temporising Matrix (BTM) in Exenteration of Sebaceous Gland Carcinoma (SGC)

First Author: Ryan LEE

Co-Author(s): Karen Kar-wun CHAN, Kelvin Kam Lung CHONG, Alvin Lerrmann YOUNG

Purpose: Biodegradable Temporising Matrix (BTM) is a synthetic polyurethane dermal matrix designed for complex wound reconstruction by facilitating vascularized neo-dermis formation, and is commonly used in wound reconstructions in limbs and trunk.

Methods: BTM was applied in a case of extensive sebaceous gland carcinoma (SGC) requiring orbital exenteration.

Results: A 64-year-old male presented with a 5-month history of right-eye foreign body sensation. Clinical examination revealed a 10mm x 24mm infiltrative mass involving the bulbar and palpebral conjunctiva of the right lower lid. Conjunctival incisional biopsy confirmed SGC. Due to the extensive involvement of his ocular surface limiting R0 resection margin, the patient underwent a right anterior exenteration. Contrary to reconstruction with a flap, which masks observation for tumour recurrence, and primary split-skin graft, which risks fistula formation and delayed granulation, BTM was lined over the socket for staged reconstruction. Despite the 3-dimensional configuration of the orbit, good matrix adhesion was achieved, and the socket appeared well-vascularized 1 month after surgery. A staged split-skin graft was performed, with satisfactory graft adherence without fistula, erosions, or flap necrosis. Adjuvant radiotherapy was performed due to high tumor grading (AJCC 8th edition T3bN0M0), and the socket appeared healthy at the latest follow-up, 4 months after surgery.

Conclusions: This case demonstrates the effectiveness of BTM in assisting recovery following exenteration, highlighting its novel utilization in the bony socket to avoid surgical complications in orbital exenteration reconstruction.

Abstract No.: 200335

Panel No.: OOP-0745

Ocular Dominance in Aponeurotic Ptosis: A Pilot Study

First Author: Akruti DESAI

Co-Author(s): Komal BAKAL, Jenil SHETH

Purpose: Ocular dominance, the preferential use of one eye, can influence binocular vision and adaptation to eyelid pathology. In aponeurotic ptosis, upper eyelid

drooping may obstruct the dominant eye's visual axis, potentially triggering compensatory mechanisms such as chin-up posture or frontalis muscle overaction. This pilot study investigated ocular dominance patterns in aponeurotic ptosis and changes following surgical correction.

Methods: Twenty patients (8 women, 12 men) with aponeurotic ptosis were prospectively evaluated. Laterality included 8 right-eye, 4 left-eye, and 8 bilateral cases. Dominance was assessed using Scobee's test and the hole-in-the-card test. Severity of ptosis was graded using marginal reflex distance 1 (MRD1). Patients with strabismus or poor vision were excluded from dominance interpretation. Ten patients underwent ptosis surgery and were re-evaluated postoperatively.

Results: Dominance could not be determined in 2 patients due to unstable fixation or very poor vision. Among the remaining 18, left-eye dominance was found in 14 (77.8%), and right-eye dominance in 4 (22.2%). One patient retained dominance in the severely ptotic eye (MRD1 = 0) via frontalis overaction, indicating a compensatory mechanism. Of the 10 surgical cases, one patient showed a shift in ocular dominance postoperatively.

Conclusions: Left-eye dominance was more frequent in this aponeurotic ptosis cohort. Surgical correction led to a dominance shift in one patient, highlighting the dynamic nature of ocular dominance in relation to eyelid position. Recognition of ocular dominance and compensatory strategies may help explain variability in functional outcomes after ptosis surgery.

Abstract No.: 204740

Panel No.: OOP-0774

Periorbital and Subconjunctival Ocular Dirofilaria by Dirofilaria Hongkongensis – Clinical and Radiological Presentations and the Treatment Outcomes in a Case Series of 7 Patients

First Author: Chun Wah Alex WONG

Co-Author(s): Chi On Andy CHENG, Cheuk Yin Brian WONG

Purpose: A retrospective case series to identify the different clinical presentations of this rare ocular parasitic infection: to increase the awareness of ophthalmologists for early diagnosis, and to identify the risk factors. The surgical method of removing a live «worm» intact from the subconjunctival space in 2 cases, and the final treatment outcomes were discussed.

Methods: Seven cases of ocular dirofilaria were identified from Aug 2017 to Aug 2025 in our retrospective case study. The clinical presentations, radiological findings, blood tests, diagnostic methods, surgical records, and treatment outcomes were reviewed.

Results: Two patients presented with acute conjunctivitis and chemosis with a live «worm» seen under the subconjunctival space under the slit lamp, 4 presented with painless progressive periorbital mass, and 1 presented as a red subconjunctival nodule. CT/MRI scans were done in 4 cases before operations but no worms were identified in the report. Two mobile dirofilaria were successfully paralysed and surgically removed using topical 0.5% proparacaine. Complete surgical excision of the periorbital mass cases identified the dead “worm” inside the mass. PCR was used to make the final diagnosis of *Dirofilaria hongkongensis*. Only one patient took Stromectol and Vibramycin after surgery. All 7 patients had no recurrence.

Conclusions: It is the largest case series of ocular dirofilariasis by *D. hongkongensis*. There are two presentation forms: an acute inflammatory form with acute conjunctivitis and chemosis with a living “worm” found in the subconjunctival space and an indolent form presenting with a painless progressive periorbital mass. Complete surgical removal is usually sufficient to offer a cure to ocular dirofilariasis.

Abstract No.: 206568

Panel No.: OOP-0793

Postoperative Results of Triple-Loop Everting Suture With Lower Eyelid Retractor Plication for Involutional Lower Eyelid Entropion

First Author: Miho TAKENAKA

Co-Author(s): Shuichiro AOKI, Ryo KIKUCHI, Koichiro SUGIMOTO

Purpose: The purpose of this study was to evaluate the surgical outcomes of Triple-Loop Everting Suture with Lower Eyelid Retractor Plication, a new procedure designed to correct both vertical and horizontal laxity in involutional lower eyelid entropion.

Methods: This retrospective study analyzed patients with involutional lower eyelid entropion who underwent Triple-Loop Everting Suture with Lower Eyelid Retractor Plication at Kameda Medical Center between September 15, 2021, and April 1, 2025. Only patients with a postoperative follow-up period of at least three months were included. Recurrence was defined as eyelashes touching the cornea with associated corneal epithelial damage. Recurrence rate, time to recurrence, and postoperative complications were investigated.

Results: Fifty-seven patients and sixty-nine eyelids met the inclusion criteria. The mean age was 76.7 ± 7.3 years, and the mean postoperative observation period was 12.5 ± 12.5 months. During the follow-up period, recurrence occurred in two eyelids, corresponding to a recurrence rate of 2.9%. No significant postoperative complications, including infection or granuloma formation, were observed.

Conclusions: Triple-Loop Everting Suture with Lower Eyelid Retractor Plication simultaneously corrects vertical and horizontal eyelid laxity and achieves a low recurrence rate. This minimally invasive procedure may provide more durable correction of involutional lower eyelid entropion than previously reported everting suture techniques.

Abstract No.: 200918

Panel No.: OOP-0752

Potential Complications of Using Dermal Filler in Upper Lid Retraction in TED – Two Case Reports

First Author: Pricila Tien Yan WANG

Co-Author(s): Andre MA, Hunter Kwok-lai YUEN

Purpose: Upper eyelid retraction is the most common sign in Thyroid Eye Disease (TED). It not only causes functional problems such as exposure keratopathy, but also contributes significantly to the aesthetic concerns of patients. With recent advancements, minimally invasive procedures such as injection of hyaluronic acid (HA) have become more and more popular. Local injection-related side effects, including edema, are most commonly seen. A lot of retrospective studies and case reports have demonstrated the effectiveness of hyaluronidase on the management of dermal filler-related swelling in aesthetic practice; however, there is no report on hyaluronidase use specifically for upper lid retraction filler-related swelling. Herein, we report one case of upper eyelid lump and one case of persistent upper eyelid edema following HA filler injection; both cases were successfully treated with hyaluronidase, and we also conduct a literature review on the potential complications of using dermal fillers for upper lid retraction.

Methods: Case reports.

Results: N/A

Conclusions: N/A

Abstract No.: 200318

Panel No.: OOP-0743

Precise Repair of Multiple Orbital Fractures

First Author: Wei LU

Purpose: Zygomatic-orbito-maxillary fracture is a kind of complex orbital fracture with high morbidity, which can lead to severe physical dysfunction and deformity. The orbital mechanical environment has a great influence on fracture repair and reconstruction. If the internal fixation is not consistent with the mechanical environment after the reconstruction, it is easy to lead to complications such as poor fracture healing, implant deformation, malposition, and even breakage, which not only bring trouble to patients but also increase financial burden.

Methods: This study developed finite element models of absorbable material and titanium material for repair and fixation, respectively. By applying a force of 120 N to the model to simulate the masseter muscle strength, the maximum stress and displacement of the repair materials and the fracture ends were measured.

Results: The maximum stress values of absorbable and titanium materials are less than their yield strength, and the maximum displacement values of the titanium material and fracture end were less than 0.1 mm and 0.2 mm. The maximum displacement values of absorbable material and fracture end in incomplete zygomatic fracture and dislocation were less than 0.1 mm and 0.2 mm. While in the zygomatic complex, complete fractures and dislocations, the maximum displacement values of the absorbable material and the fracture end exceeded 0.1 mm and 0.2 mm.

Conclusions: In this study, the finite element biomechanical analysis method improved the operative success ratio of zygomatic-orbito-maxillary fracture and reduced postoperative complications, which provided a new research method and objective quantitative basis for the accurate treatment.

Abstract No.: 206564

Panel No.: OOP-0795

Prevalence of Anxiety, Depression, and Poor Sleep Quality in Thyroid Eye Disease Patients and Their Impact on Quality of Life

First Author: Eric Ka Ho **CHOY**

Co-Author(s): Kelvin Kam Lung **CHONG**, Kenneth Ka Hei **LAI**

Purpose: To report the prevalence of anxiety, depression, and poor sleep quality in thyroid eye disease (TED) patients, identify predictors, and evaluate their impact on quality of life (QoL) and psychometric properties of questionnaires.

Methods: A cross-sectional study. TED patients were interviewed face-to-face with the Chinese version of Generalized Anxiety Disorder-7 (GAD-7) scale, Patient Health Questionnaire (PHQ-9), Pittsburgh Sleep Quality Index (PSQI), and Graves' Ophthalmopathy Quality of Life (GO-QoL) questionnaire. Rasch analysis was performed to evaluate the psychometric properties of questionnaires using WINSTEPS. Correlations with sociodemographic and clinical data were analysed using SPSS version 29.0.

Results: Sixty-eight patients were interviewed by the same researcher, with a mean age 53.0 ± 2.0 , 44 were female. All questionnaire subscales demonstrated satisfactory psychometric properties. The prevalence of moderate-to-severe anxiety and depression was 27.9% and 30.9% respectively. Self-harm or suicidal ideation was reported in 8% patients. The prevalence of poor sleep quality was 82.4%. Mean scores of GO-QoL total, visual functioning, and appearance subscales

were 61.6 ± 3.3 , 59.2 ± 3.7 and 63.4 ± 3.7 respectively. Younger patients had worse anxiety and depression (all $P < 0.02$, $r = 0.27$, 0.28). Patients with unemployment and higher NOSPECS scores had higher PHQ-9 scores ($P < 0.05$). The patient with conjunctival injection had worse depression and poorer sleep ($P < 0.03$). Worse visual acuity (VA), extraocular muscle (EOM) restriction, and presence of conjunctival injection correlated with poorer sleep quality ($P < 0.05$, $\rho = 0.24$, 0.28). No clinical predictors were identified for the GAD-7 scale. Higher NOSPECS but not clinical activity score correlated with GO-QoL scores (all $P < 0.03$). All GO-QoL scores correlated moderately well with GAD-7, PHQ-9, and PSQI scores (all $P < 0.01$, $\rho > 0.4$). Anxiety and depression correlated better with the GO-QoL appearance than the visual functioning subscale ($\rho = -0.60$ vs $\rho = -0.35$).

Conclusions: GAD-7, PHQ-9, and PSQI can be used in TED patients for screening purposes. Anxiety, depression, and poor sleep were common among TED patients and impaired disease-specific QoL. Young age, unemployment, more severe TED, worse VA, EOM restriction, and presence of conjunctival injection were associated with anxiety, depression, and/or poor sleep. Disfigurement might cause more anxiety and depression than visual dysfunction in TED patients.

Abstract No.: 206146

Panel No.: OOP-0787

Quantification of Clinico-radio-histopathological Correlation for Accurate Diagnosis of Orbital Tumors

First Author: Rolika **BANSAL**

Co-Author(s): Santosh **HONAVAR**, Kaustubh **MULAY**, Ravi **VARMA**

Purpose: Orbital masses present with a diverse spectrum ranging from benign to malignant, with ambiguous clinical manifestations, confounding imaging, and overlapping histopathological characteristics. Therefore, we quantified the clinico-radio-histopathological correlation for the diagnosis of orbital tumors.

Methods: Retrospective, consecutive case series of 100 orbital masses assessed clinically, imaged pre-operatively, and managed surgically with histopathological confirmation.

Results: Mean age was 39.7 ± 14.2 (range 8 to 77) years, ranging from benign (72%) to malignant (28%), primarily vasculogenic (27%); lacrimal gland tumors (26%); inflammatory lesions (11%), etc. Based on location (extraconal vs intraconal vs diffuse), accuracy was higher with clinico-radiological correlation (78.9%, 80.0%, 78.4%) than isolated clinical (75.8%, 76.7%, 72.9%) or radiological diagnosis (63.6%, 66.7%, 51.4%). Based on the nature of disease (benign vs malignant), overall accuracy was higher by clinico-radiological correlation (78.9%, 79.2%) than isolated clinical (76.3%, 70.8%) or radiological diagnosis (61.8%, 54.2%) and for

malignant tumors clinical diagnosis than radiological diagnosis had higher sensitivity (83.3% vs 66.7%) and specificity (92.1% vs 84.2%) ($p < 0.05$). However, a combination of clinico-radiologico-histopathological correlation, especially for intraconal and diffuse lesions, showed 100% accuracy ($p < 0.05$). Oncology has no room for diagnostic errors.

Conclusions: Management of orbital mass lesions can be complex. It is crucial to strike a balance between relying on clinical expertise and utilizing imaging studies to arrive at a pre-operative diagnosis to help triage the management protocol. By combining thorough clinical evaluation with judicious use of imaging, clinicians can make more accurate diagnoses and develop effective treatment plans. As ocular oncology has no room for diagnostic error, a crucial balance between clinic-radio-histopathological diagnosis is mandatory for accurate diagnosis and treatment planning.

Abstract No.: 202243
Panel No.: OOP-0765

Rebuilding the Ravaged Eyelid: A Tale of Mucosa, Cartilage, and Flap Against Extensive Defect Following Basal Cell Carcinoma Wide Excision

*First Author: Prika Maulina **AGARISTI***
*Co-Author(s): Neni **ANGGRAINI**, Yunia **IRAWATI**, Cecillia Apriliana **WULANDARI***

Purpose: Reconstructive surgical planning is influenced by the characteristics of the defect, including its size and depth, the patient's age, surrounding tissues, and the surgeon's preference and experience. Selecting the optimal repair method presents a significant challenge. We present a case of full-thickness eyelid reconstruction using a combination technique following wide excision of the tumor.

Methods: An 86-year-old female presented with a nodular, irregular, pigmented mass occupying the entire inferior tarsal plate, with ulceration and madarosis. A wide excision with a 5-mm free margin of the lower eyelid was performed, resulting in a total full-thickness lower eyelid defect measuring 12 mm vertically, extending to the lateral canthus and one-third of the lateral upper eyelid. Reconstruction consisted of a lip mucosal graft for conjunctival lining, an auricular cartilage graft for posterior lamellar support, and a modified Fricke's cheek flap for anterior lamellar coverage. Frozen section confirmed an infiltrative type of basal cell carcinoma.

Results: The combination technique successfully restored both eyelid structure and function while preserving ocular surface integrity. The lip mucosal graft provided an adequate conjunctival substitute, while auricular cartilage maintained structural support without significant donor site morbidity. The flap offered an excellent match in color and texture with minimal scarring. Postoperatively, the patient

achieved satisfactory eyelid closure, preserved corneal protection, and an optimal cosmetic outcome.

Conclusions: Complex eyelid defects following tumor excision can be effectively managed with free grafts and local flaps. The integration of vascularized anterior lamellar flap with free posterior lamellar grafts ensures both functional and aesthetic benefits, presenting a reliable approach for challenging eyelid reconstructions.

Abstract No.: 200913
Panel No.: OOP-0753

Restoring Form and Function: Full Thickness Skin Graft in Eyelid Reconstruction

*First Author: Sofia **IQBAL***
*Co-Author(s): Aleena **KHAN**, Bakht Danyal **KHAN***

Purpose: Acknowledging the functional and cosmetic outcomes of full thickness skin grafts (FTSG) in eyelid reconstruction among patients with eyelid morbidity resulting from trauma, burns, or previous surgeries

Methods: This poster presents a case series of four patients undergoing FTSG for upper or lower eyelid reconstruction between 2023 and 2025 at a tertiary burn and reconstructive center. Each patient had distinct etiologies: a 28-year-old male with upper eyelid cicatricial ectropion and lid defect following previous trauma and cosmetic concerns; a 14-year-old male with post-traumatic lower lid cicatricial ectropion secondary to a dog bite; a young female survivor of extensive burns with bilateral lower lid ectropion and exposure keratopathy; and a patient with bilateral eyelid ectropion due to contractures. FTSG was harvested from the supraclavicular or postauricular region and applied to respected defects. Outcomes were assessed based on graft survival, eyelid position, exposure symptoms, and cosmetic satisfaction over 3–6 months of follow-up.

Results: All the grafts fulfilled their intended purposes. Lid position improved significantly in all cases, with resolution of lagophthalmos and exposure symptoms in the burn and trauma-related ectropion cases. Cosmetic outcomes were graded as satisfactory by both patients and independent reviewers. No major complications were observed.

Conclusions: Full thickness skin grafting is a reliable and effective technique in the reconstruction of cicatricial eyelid defects. It offers unparalleled functional rehabilitation and cosmetic restoration, particularly in complex post-traumatic and burn-related ectropion cases.

Abstract No.: 204754

Panel No.: OOP-0775

Restoring Function and Form: An Eye-Sparing Strategy With Complex Eyelid and Periorbital Reconstruction After Wide Tumor Excision

*First Author: Cecillia Apriliana **WULANDARI***

*Co-Author(s): Prika Maulina **AGARISTI**, Neni **ANGGRAINI**, Yunia **IRAWATI***

Purpose: In eyelid carcinoma extending to the periorbital region where exenteration is refused, the goal is to achieve sufficient tumor clearance while preserving the eye. Reconstruction of extensive eyelid and periorbital defect after wide excision is highly challenging due to complex anatomy and functional-aesthetic demands. We present a case of full-thickness eyelid and periorbital reconstruction involving bone exposure and periosteal loss.

Methods: A 45-year-old woman with a 2-year history of a left medial canthal mass, recurring 8 months after excision at another hospital, refused exenteration. After two chemotherapy cycles, a wide excision was performed, leaving a large full-thickness defect of the upper and lower eyelids, involving 50% of the horizontal length with exposed bone. Reconstruction used a dermato-fat graft to fill the cavity. The posterior lamella was restored with tarso-conjunctival graft, lip mucosa, along with amnion membrane. A glabellar flap was fashioned to reconstruct the medial canthus and anterior lamella of both eyelids after orbicularis reposition, while a cheek V-flap closed the remaining lower eyelid defect. A symblepharon ring was placed to maintain fornices.

Results: Eye-sparing surgery provides an alternative to exenteration in selected eyelid carcinoma with orbital invasion, preserving the globe with oncologic clearance. Complex defects require composite reconstruction using grafts, flaps, and adjuncts to restore function and aesthetics. Careful follow-up is essential to detect recurrence, and adjuvant therapy should be considered to optimize outcomes.

Conclusions: Eye-sparing strategy can be considered in selected malignancy cases refusing exenteration. Despite reconstructive challenges, this approach is feasible and can achieve functional, aesthetic, and patient satisfaction outcomes.

Abstract No.: 207448

Panel No.: OOP-0806

Role of Tranexamic Acid and Triamcinolone Acetonide in Blepharoplasty

*First Author: Diwa **HAMAL***

*Co-Author(s): Roshani **AGRAWAL**, Pratikshya **AMATYA***

Purpose: Blepharoplasty is the surgery of the upper or lower eyelids that can be both therapeutic and aesthetic. The commonest complication of this surgery is bruising and oedema.

Methods: All patients planned for blepharoplasty were informed about the surgical procedure and possible complications. The patients were given oral 1gram of tranexamic acid before the surgery. Local anesthesia was added with 0.25ml, 10mg (40mg/ml) of triamcinolone acetonide, and was injected just 5 minutes before surgery at the surgery site. During the surgery, if there is minor bleeding, the site is dabbed with tranexamic acid mixed with Normal saline 20mg/ml. Postoperatively, patients were advised to take tranexamic acid 500mg three times daily for 2 more days, then stop. Patients contraindicated for triamcinolone acetonide, such as those with glaucoma, ocular hypertension, or allergic to triamcinolone acetonide, were not included in this study. Patient contraindicated for tranexamic acid as acquired defective color vision, Subarachnoid hemorrhage, and coagulopathy were not included in the study. The patient was followed on postoperative days 1, 7, and 30.

Results: All the patients showed satisfactory results. There was no bruising, oedema, or any other complications post-surgery. IOP was measured before surgery and on the first postoperative day, and after 1 week, none of the patients showed raised IOP.

Conclusions: Use of tranexamic acid preoperatively, intraoperatively, and postoperatively during blepharoplasty surgery gives very satisfying results. Use of triamcinolone acetonide mixed with local anesthesia reduces postoperative lid oedema.

Abstract No.: 204431

Panel No.: OOP-0772

Severe Conjunctival Papillomas as a Rare Presentation of Malignant Acanthosis Nigricans

*First Author: Warisara **PATTANAPONGPAIBOON***

*Co-Author(s): Mingkwan **LUMYONGSATIEN***

Purpose: To report a case of malignant acanthosis nigricans presenting with severe papillomatous lesions of the conjunctiva, eyelid margins, and associated paraneoplastic syndrome.

Methods: Case report.

Results: A 45-year-old Burmese woman presented with extensive, cauliflower-like, vascular core lesions affecting the eyelid margins, palpebral and bulbar conjunctiva in both eyes over a period of four months. She subsequently developed masses on the lips and anus, which progressively increased in size. She also reported abdominal discomfort, progressive dysphagia, and a weight loss of 10 kilograms over five months. On physical examination, her visual acuity was 20/40 in the right eye and 20/30 in the left eye. Multiple velvety, hyperpigmented skin lesions were observed on the posterior neck and tripe palms. Histopathological examination of conjunctival biopsy confirmed a

squamous papilloma. The lesions were managed with topical interferon alpha 2b, followed by surgical excision and interferon alpha 2b intralesional injection. Esophagogastroduodenoscopy revealed multiple papilloma-like exophytic lesions in the oropharynx and esophagus, with a rigid, diffusely thickened stomach wall containing multiple poorly demarcated erosions. Biopsy of gastric tissue showed poorly differentiated adenocarcinoma consistent with linitis plastica. The patient passed away two months after diagnosis.

Conclusions: Conjunctival papillomas are an extremely rare manifestation of malignant acanthosis nigricans, particularly in cases associated with malignancy. Rapidly enlarging conjunctival papillomas accompanied by systemic signs should prompt thorough and extensive systemic investigations to detect potential internal malignancies.

Abstract No.: 206779

Panel No.: OOP-0798

Simultaneous Versus Sequential Immunosuppressants in Progressive Thyroid Eye Disease: A Systematic Review

First Author: Venice Sze Wai LI

Co-Author(s): Kelvin Kam Lung CHONG, Kenneth Ka Hei LAI, Pak Kiu Michael LUI, Toby Siu Ki NG

Purpose: Intravenous methylprednisolone (IVMP) is considered first-line treatment for progressive Thyroid Eye Disease (TED), but optimal timing of adjuvant immunosuppressants remains controversial. This systematic review compares the efficacy and safety of simultaneous versus sequential adjuvant immunosuppressants with systemic steroids.

Methods: A systematic literature search of Embase, MEDLINE, and PubMed was conducted in August 2025. Of the 947 articles, 14 studies (2 prospective, 8 retrospective, 4 randomized controlled trials) fulfilled the inclusion criteria.

Results: Nine studies evaluated simultaneous immunosuppression (3 on methotrexate [MTX], 2 on azathioprine [AZA], 4 on mycophenolate mofetil/mycophenolate sodium), and 5 studied sequential immunosuppression (3 on MTX, 2 on sirolimus). Efficacy in terms of disease activity reduction depends on the specific immunosuppressant. Sequential sirolimus and MTX significantly improved clinical activity and proptosis. Simultaneous mycophenolate was highly effective, improving disease activity, proptosis, visual acuity, diplopia, and reversing dysthyroid optic neuropathy. Simultaneous MTX provided early improvement in clinical activity and vision. Simultaneous AZA showed no benefit over steroids alone and had a significantly higher withdrawal rate due to adverse events. The sequential approach was better tolerated with a lower discontinuation rate.

Conclusions: The choice of immunosuppressants is more critical than timing alone. Simultaneous mycophenolate is effective for severe inflammation. Simultaneous MTX may offer early efficacy benefit but may not prevent disease progression. Sequential sirolimus or MTX is effective in consolidating response after IVMP. Simultaneous AZA is not recommended due to poor efficacy and tolerability. The sequential approach had fewer side effects. Further drug-specific RCTs are needed to establish optimal timing of adjuvant immunosuppressants.

Abstract No.: 200162

Panel No.: OOP-0742

Small Flap Saving Technique for Repeat Dacryocystorhinostomy (DCR)

First Author: Ravi RANJAN

Co-Author(s): Rohan RAJ

Purpose: To report the success rate of failed DCR by the small flap saving technique.

Methods: It is a prospective study of patients undergoing management of failed DCR at my centre. A single surgeon did all the surgery and used the same method to avoid bias. Skin incision was made through the previous scar. Roughly 1-2 mm of lacrimal sac mucosa around the common canaliculi opening in the sac was saved. Osteum in the nasal bone and nasal mucosa was made using Arruga's bone trephine. The upper part of the lacrimal sac remains was sutured with subcutaneous tissue or periosteum of the medial side to avoid sagging. Sac syringing with 1 ml of 0.4mg/ml Mitomycin c was done on the 5th postoperative day. Surgical outcome was assessed.

Results: Objective success is 133 (99.2 %; 95% confidence interval: 95.9-99.9%). Subjective success is 131 (97.7%; 95% Confidence interval: 93.6-99.5%).

Conclusions: External DCR with a small flap-saving technique is easier to perform with improved success rate.

Abstract No.: 200537

Panel No.: OOP-0747

Spontaneous Bilateral Retrobulbar Hemorrhage: A Rare Complication of Carotid-Cavernous Fistula

First Author: Lorenzo Miguel TRANQUILINO

Co-Author(s): Felice Katrina RANCHE

Purpose: To present a rare complication of carotid-cavernous fistula

Methods: Case report, review of literature

Results: A 70-year-old hypertensive female developed gradually progressive bilateral eye redness and eyelid swelling. Right proptosis and bilateral corkscrewing conjunctival vessels were seen on initial examination. She was diagnosed with carotid-cavernous fistula (CCF).

During this outpatient consultation, she had sudden headache and vomiting. Blood pressure was markedly elevated. She developed bilateral tight eyelids, bloody chemosis and elevated intraocular pressure. The left eye deteriorated to counting fingers with a relative afferent pupillary defect. Bilateral lateral canthotomy and cantholysis was performed immediately, followed by transfer to emergency medicine for management of the hypertensive crisis. Blood pressure and intraocular pressure were stabilized, but vision on the left eye remained poor. Angiography later confirmed a direct-type CCF from a right cavernous internal carotid artery aneurysm with intercavernous cross-drainage. She was first advised manual carotid compression as a non-invasive treatment. On the six-month follow-up, there was no light perception on the left eye, but the rest of the eye findings were normal.

Conclusions: Bilateral spontaneous retrobulbar hemorrhage is a rare, vision-threatening complication of carotid-cavernous fistula, precipitated in this case by severely elevated blood pressure. Prompt recognition and urgent canthotomy with cantholysis are critical when signs of orbital compartment syndrome are present to improve visual outcomes. Risk factor control and definitive CCF treatment are essential to prevent recurrence. This case underscores the importance of timely, interdisciplinary management involving Ophthalmology, Emergency Medicine, and Radiology departments.

Abstract No.: 205416

Panel No.: OOP-0780

Successful Management of Odontogenic Origin Orbital Abscess

*First Author: Diannisa Paramitha **SUSANTONO**
Co-Author(s): Neni **ANGGRAINI**, Rina La Distia **NORA**,
Adinda Mulya **PERTIWI***

Purpose: Orbital abscess is a rare disease with high morbidity and vision-threatening complications. Management remains challenging due to the complex anatomy of the orbit. This study aims to report a difficult case of orbital abscess management, originating from dental infection.

Methods: A type II diabetic 53-year-old woman came with progressive left eye proptosis and pain for 3 months, worsening within 4 days before admission. She had a history of pulp gangrene extraction and sinusitis surgery, revealing an orbital subperiosteal abscess. The left eye shows nonaxial proptosis with downward displacement, with 3/60 visual acuity, ophthalmoplegia, and an undulated palpable mass at the superolateral orbit. Broad-spectrum aero and non-aero antibiotics were initially given; however, later her blood culture revealed Methicillin-resistant *Staphylococcus aureus* (MRSE) positive. Orbital abscess drainage was conducted through anterior orbitotomy with lateral canthotomy due to no improvement with

conservative treatment. Two months post-surgery, visual acuity improved to 6/7.5 with minimal eye movement restriction.

Results: First-line therapy for orbital abscess is third-generation cephalosporins and metronidazole. Surgical drainage was done as no adequate response to antibiotics was seen, which is consistent with the Garcia-Harris criteria. Endoscopic sinus surgery promises excellent results; however, this case showed persistent orbital infection, possibly due to the nature of MRSE. Thus, external surgical drainage was necessary.

Conclusions: Orbital abscess is a complex disease with a risk of vision loss. Intense monitoring of clinical manifestations is necessary to evaluate response to therapy and progression to surgical management.

Abstract No.: 200798

Panel No.: OOP-0748

Surgical Correction of Upper Eyelid Entropion With Cutaneous Orbicularis Oculi Excision and Eyelid Margin Fixation in Pierre Robin Sequence: A Case Report

*First Author: Yungang **DING**
Co-Author(s): Jianhua **CHEN**, Wei **CHEN**, Chenyang **CONG**, Baoyi **DING**, Yan **ZHANG***

Purpose: Pierre Robin sequence (PRS) is a rare congenital condition that is characterized by a combination of mandibular hypoplasia, cleft palate, and glossoptosis, and it presents with various ocular and systemic anomalies. This report describes the successful surgical correction of upper eyelid entropion in a boy with PRS, using cutaneous orbicularis oculi excision with eyelid margin fixation.

Methods: A 6-year-old boy with a diagnosis of PRS presented with persistent left eye blinking and tearing. Ophthalmic examination revealed bilateral upper eyelid entropion and trichiasis, with the eyelashes in direct contact with the cornea, more pronounced in the left eye. The surgical procedure involved partial excision of the orbicularis oculi muscle from the upper eyelid, followed by fixation of the orbicularis muscle at the eyelid margin to the tarsus, which facilitated the gentle retraction of the eyelashes away from the cornea.

Results: The surgery was performed successfully without any postoperative complications or recurrence of entropion. The patient experienced significant improvement in ocular comfort, with complete resolution of symptoms and relief from eyelash contact with the corneal surface.

Conclusions: Cutaneous orbicularis oculi excision with eyelid margin fixation is a surgical option for correcting upper eyelid entropion in pediatric patients with Pierre Robin sequence. This approach yields both anatomical and functional improvements, enhancing the patient's quality of life.

Abstract No.: 206846**Panel No.: OOP-0801**

Systematic Review of Upper Lid Retraction Management in Thyroid Eye Disease Using Injectables

*First Author: Rachel LAI**Co-Author(s): Kelvin Kam Lung CHONG, Kenneth Ka Hei LAI, Venice Sze Wai LI, Precious UNTALAN, Hunter Kwok Lai YUEN*

Purpose: Upper lid retraction (ULR) in Thyroid Eye Disease (TED) can lead to exposure keratopathy and impact patients' quality of life. While surgical options are available, non-surgical approaches using injectables like botulinum toxin A (BA), triamcinolone acetate (TA), and hyaluronic acid fillers (HA), offer promising alternatives. This systematic review discusses efficacy and safety aspects of these injectables in managing ULR in both active and inactive phases of TED.

Methods: A systematic literature search of Embase, MEDLINE, and PubMed was conducted in July 2025. Of 889 articles, 21 studies fulfilled the inclusion criteria.

Results: Twenty-one studies (9 on BA, 3 on HA, 8 on TA, and 1 on BA and TA) were evaluated. Studies using triamcinolone showed improvement in ULR in terms of marginal reflex distance (MRD), palpebral fissure height, and marginal limbal distance, both in active and inactive TED. The majority of them showed rapid improvement in the first month of therapy, despite side effects of elevated intraocular pressure, ptosis, and menstrual cycle disturbances. BA was effective in decreasing MRD in the inflammatory and fibrotic stages of TED. Side effects of BA included ptosis and diplopia. HA showed sustained improvement in MRD and upper scleral show, and its effectiveness was greatest immediately after injection with minimal side effects.

Conclusions: Nonsurgical injectables like HA, BA, and TA are effective as a primary treatment or adjunct to other therapy for ULR in TED, both in active and inactive states. Further drug-specific RCTs and comparative studies are needed to compare the efficacy and safety profile of the various injectables directly.

Abstract No.: 207374**Panel No.: OOP-0805**

Teprotumumab Treatment in Patients With Dysthyroid Optic Neuropathy: A Case Series

First Author: Jing SUN

Purpose: The aim of this study was to evaluate the efficacy of teprotumumab in treating TED patients with DON in China.

Methods: This is a retrospective observational study. The case series included 5 patients (8 eyes) with confirmed DON. Some of them were resistant to steroids. The treatment protocol was 8 intravenous

infusions of teprotumumab administered every 3 weeks. Definition of DON recovery was based on changes in best-corrected visual acuity (BCVA) and visual field mean deviation (VF-MD).

Results: At the end of teprotumumab treatment, DON recovered in 7/8 (87.5%) of affected eyes, with BCVA improvement in all patients. In all 5 patients, DON improved after two infusions. All patients showed improvements in clinical activity score and proptosis. Inflammatory relapse has been observed in two patients. Due to adverse events, one patient did not complete all infusions.

Conclusions: Teprotumumab is a promising treatment for DON patients with rapid BCVA improvement.

Abstract No.: 202214**Panel No.: OOP-0764**

The 5-Fluorouracil Advantage: Enhanced Success in External Dacryocystorhinostomy

*First Author: Anya Dewi NASTITI**Co-Author(s): Yunia IRAWATI, Diannisa Paramitha SUSANTONO, Cynthia VIRYAWAN*

Purpose: This study aims to highlight the benefit of using 5-fluorouracil (5-FU) in external dacryocystorhinostomy (EX-DCR) in patients with trauma, including improved success rates and reduced complications.

Methods: The case illustrates a 16-year-old male with nasolacrimal duct obstruction following a traumatic injury.

Results: A patient presented with complaints of tearing and discharge from the left eye (LE). The symptoms began 1 year after a motorcycle accident. Visual acuity was 6/6 in both eyes, but the LE showed limited ocular motility. Orbital CT scan revealed fracture of the left orbital floor with associated deformity and narrowing of the lacrimal canal, leading to a dacryocystocele. The irrigation test was negative in the LE, indicating nasolacrimal duct obstruction. The patient underwent EX-DCR surgery. During the intraoperative examination, it was observed that the lacrimal sac wall and nasal mucosa were friable due to the impact of fracture fragments. The formation of anterior and posterior flaps was challenging. To prevent fibroblast proliferation and scar formation, we applied a small pledget soaked with 2 mg/mL (0.2%) 5-FU to the osteotomy site and surrounding tissues for about 3 minutes, then removed and irrigated. Post-operative follow-up showed a positive irrigation test, indicating restored tear drainage. The patient experienced significant improvement in symptoms, and the surgical outcome was deemed successful.

Conclusions: The use of 0.2% 5-FU in EX-DCR resulted in a successful outcome. The application of adjuvant 5-FU helped to minimize scarring and promote optimal tear drainage.

Abstract No.: 207337

Panel No.: OOP-0808

Three-Dimensional Culture of Orbital Fibroblasts From Thyroid Eye Disease Induces In Vivo-Like Tissue Remodeling and Fibrosis

First Author: Bao XIAOLI

Purpose: This study aimed to investigate the characteristics and molecular mechanisms of orbital fibroblasts under three-dimensional(3D)-culture conditions.

Methods: Orbital connective tissue was collected from patients with Thyroid Eye Disease (TED) and normal controls. Primary fibroblasts were cultured and used to generate 3D microspheres via the hanging drop. These spheroids were cultured for 9 days, followed by biomechanical testing, transmission electron microscopy (TEM), and RNA sequencing for transcriptomic analysis. Multiplex immunofluorescence staining was used to assess fibrosis markers, and quantitative PCR validated gene expression changes. TED and NC tissues, as well as primary cultured fibroblasts, were also subjected to transcriptomic sequencing.

Results: TED-3D microspheres exhibited enhanced contractility, denser fiber deposition, and a characteristic fibrous ring at the periphery. TEM revealed more ECM deposition and stronger tissue remodeling in TED-3D. Fibrosis markers (α -SMA, COL1A1, FN1) increased significantly in TED-3D. Biomechanical testing showed higher stiffness in TED-3D compared to NC-3D. Transcriptomic analysis revealed significant differences, with genes involved in ECM remodeling and fibrosis pathways enriched in TED-3D. Transcriptomic comparison of TED-tissue, TED-2D, and TED-3D revealed that TED-3D is closer to tissue than TED-2D.

Conclusions: The 3D culture of orbital fibroblasts from TED induces vivo-like tissue remodeling and fibrosis features. Compared to traditional 2D culture, the expression pattern of TED-3D is closer to tissue, making it a more effective model for studying the mechanisms of TED-related fibrosis.

Abstract No.: 207268

Panel No.: OOP-0804

Thyroid Eye Disease in Bahrain: Demographics, Clinical Features, and Treatment Patterns in a Prospective Cohort Study

First Author: Fatema ALJUFAIRI

Co-Author(s): Kelvin, Kam Lung CHONG, Kenneth LAI, Ebrahim MATAR, Chi PANG

Purpose: To report the demographics, clinical features, and treatment patterns of Arab patients with Thyroid Eye Disease managed at government hospitals in Bahrain.

Methods: A prospective cohort study was conducted from September 2023 to September 2025. Medical records and orbital imaging were reviewed in a masked manner. All patients were examined by a single investigator to assess the presence and characteristics of Thyroid Eye Disease.

Results: A total of 114 patients were included, of whom 82 (71.9%) were female. Eighteen patients (15.8%) were smokers, and 70 (61.8%) reported a family history of thyroid disease. Graves' disease was present in 89 patients (78.1%), while dysthyroid optic neuropathy was documented in 1 patient (0.9%). Regarding treatment, 12 patients (10.5%) received intravenous methylprednisolone, 17 (19.9%) received oral prednisolone, 5 (4.4%) underwent orbital radiotherapy, and 4 (3.5%) were treated with other immunosuppressants. The most common presenting symptoms were eyelid swelling (57 patients, 50.0%), tearing (39, 31.6%), blurry vision (24, 21.1%), and diplopia (12, 10.5%). On examination, chemosis was observed in 6 patients (5.3%), caruncular edema in 3 (2.6%), eyelid edema in 4 (3.5%), conjunctival injection in 10 (8.7%), and eye redness in 3 (2.6%). The mean clinical activity score was 0.27 ± 0.77 .

Conclusions: Thyroid eye disease in Bahrain predominantly affects women and is frequently associated with Graves' disease and a positive family history. Most patients presented with mild symptoms and low clinical activity scores.

Abstract No.: 206733

Panel No.: OOP-0796

To Quantitatively Assess and Compare the Degrees of Surgical Freedom in Lacrimal Keyhole-Assisted Lateral Orbitotomy Versus the Traditional Approach (Without Marginotomy)

First Author: Andre MA

Co-Author(s): Hunter Kwok Lai YUEN

Purpose: To quantitatively assess and compare the degrees of surgical freedom in lacrimal keyhole-assisted lateral orbitotomy versus the traditional approach (without marginotomy).

Methods: Preoperative orbital CT scans from consecutive patients, acquired between January 2023 and April 2025, were analysed. Surgical freedom – measured in terms of the attack angles and volume – was compared between traditional orbitotomy and the lacrimal keyhole-assisted technique using Brainlab software. Statistical analysis included paired t-tests and linear regression.

Results: This study evaluated 12 patients (mean age: 57.3 years; 67% female). The complete keyhole-assisted approach significantly increased the volume of surgical freedom by 21% ($6.2 \pm 2.2 \text{ mm}^3$ vs. $5.1 \pm 2.0 \text{ mm}^3$; $p = 0.005$) while partial keyhole techniques

(theoretical 75%, 50%, 25% of bone removal on CT) also demonstrated significant improvements ($p < 0.05$). Horizontal and vertical attack angles increased by 62% ($20.4 \pm 7.2^\circ$ vs. $12.6 \pm 4.2^\circ$; $p < 0.001$) and 38% ($36.4 \pm 9.5^\circ$ vs. $26.4 \pm 8.4^\circ$; $p < 0.001$), respectively, with progressive gains at incremental bone removal. Each 25% bone removal increment ($\approx 1\text{mm}$) improved surgical freedom by 16% (horizontal angle), 10% (vertical angle), and 6% (volume). Keyhole size correlated strongly with surgical freedom as measured by the attack angle and working volume ($r = 0.74$, $p = 0.02$). No postoperative cosmetic or functional deficits were observed.

Conclusions: The lacrimal keyhole-assisted lateral orbitotomy is a minimally invasive alternative to standard marginotomy to enhance surgical freedom and improve access to deeper orbital lesions. Importantly, bone removal can be tailored to individual lesion while minimising globe retraction.

Abstract No.: 206594

Panel No.: OOP-0794

Transconjunctival Intra-Levator Triamcinolone for Upperlid Retraction in Thyroid Eye Disease

First Author: Shaifali CHAHAR

Co-Author(s): Santosh HONAVAR

Purpose: To evaluate the role of transconjunctival intra-levator injection of triamcinolone acetate (TA) in upper eyelid retraction in thyroid eye disease (TED).

Methods: Retrospective interventional case series of 37 eyes of 22 patients who underwent transconjunctival TA injection (40 mg/mL) into the levator palpebrae superioris (LPS) muscle for TED-related upper eyelid retraction between 2019 to 2022.

Results: The mean age was 46.2 years. Pre-treatment margin-reflex distance (MRD) 1 was 6.0 ± 1.9 mm. The mean number of TA injections was 1.77 ± 0.97 . Time to maximal response was 37.6 weeks. At a mean follow-up of 16.3 months, MRD1 was 4.5 ± 1.5 mm, showing improvement in all cases. Mean reduction in MRD1 was 1.5 ± 1.6 mm ($p=0.000$), and there was no regression from maximal response. None of the patients showed any complications associated with TA.

Conclusions: TED is a complex, challenging disease. TA injection is an effective alternative to surgical procedures for upper lid retraction but due to the heterogenous nature of TED the case selection should be proper and the treatment must be tailor made for a given patient for best outcome. The subconjunctival administration of TA has shown promising results in our study group for tackling retraction in both active and inactive stages of the disease and is an established method of treatment of lid retraction in our armamentarium for management of TED.

Abstract No.: 202443

Panel No.: OOP-0767

Use of APTOS Threads Lift Method in Facial Nerve Palsy: Two Case Reports

First Author: Pricila Tien Yan WANG

Co-Author(s): Hunter Kwok-lai YUEN

Purpose: Chronic facial nerve paralysis can lead to facial muscle degeneration and soft tissue changes on the affected side. It not only causes functional problems, such as exposure keratopathy, but also significantly contributes to the patient's aesthetic concerns. Brow ptosis often develops in patients with facial nerve palsy and may impair the patient's superior visual field by causing pseudo-ptosis. Traditional surgical approaches include direct brow lift, which may result in a visible scar, or endoscopic brow lift, which requires a high level of technical expertise. Minimally invasive thread-lifting techniques have been reported to correct facial asymmetry in facial nerve palsy. Here, we present two cases of chronic idiopathic facial nerve palsy (i.e., Bell's palsy) with brow ptosis and facial drooping, successfully treated using the APTOS thread lift method.

Methods: Case reports.

Results: N/A

Conclusions: N/A

Pediatric Ophthalmology and Strabismus

Abstract No.: 203252

Panel No.: POS-0853

A Case of Axenfeld-Rieger Syndrome With Bitot's Spot and Normal Vitamin A Levels

First Author: Mary Claudette ARCELLANA

Co-Author(s): Patricia CABRERA

Purpose: Axenfeld-Rieger Syndrome (ARS) is an autosomal dominant form of anterior segment dysgenesis that is associated with systemic abnormalities. Its ocular clinical features include corectopia, polycoria, ectropion uveae, posterior embryotoxon, and increased intraocular pressure. Systemic abnormalities may include dental issues, facial bone changes like maxillary hypoplasia, umbilical abnormalities, hypospadias, and pituitary abnormalities.

Methods: In this case report, we present a 14-year-old Filipino male diagnosed with Axenfeld-Rieger Syndrome presented with classic clinical ocular findings of posterior embryotoxon, corectopia, iris strands, and corneal opacity with associated systemic findings of developmental delay and telecanthus.

Results: The patient had not been in any medications at the time of consultation. Notably, Bitot's spot is observed in the patient's eye bilaterally in the presence of normal Vitamin A levels. Bitot's spot was also observed in the patient's mother, however Vitamin A levels were not measured. Disc photo findings also revealed tilted disc and tigroid retina. Plans include examination of family members, determination of the Vitamin A levels, and genetic testing to test the theory that Bitot spot is a feature of anterior segment dysgenesis.

Conclusions: Previous studies have reported an association between Bitot's spot among patients with normal Vitamin A levels. PAX6 and FOXC1 gene mutations found in ARS could present with Bitot's spot. Other conditions associated with Bitot's spot include aniridia, WAGR syndrome, and blepharokeratoconjunctivitis.

Abstract No.: 202909

Panel No.: POS-0847

A Case of Consecutive Cyclic Esotropia After Surgical Correction of Intermittent Exotropia

First Author: Moustafa **ABDELHAFEZ**

Co-Author(s): Mahmoud **ABDELHAFEZ**

Purpose: To record a case of cyclic esotropia developed after surgical correction of exotropia.

Methods: A six-year-old girl had intermittent exotropia X(T) 35 prism diopter PD for distance and 30 for near with full ocular motility. She had no refractive error. We did bilateral lateral rectus recession 5.5 + 4.5. After surgery, the patient showed orthophoria in all 9 diagnostic positions of gaze, for distance and near. After 6 months, she started to develop consecutive esotropia that appeared in a rhythmic manner every 24 hours. Parents recorded the appearance of esotropia every other day. Twenty-four hours, the patient showed orthophoria, and 24 hours, she showed esotropia. On the day of esotropia, she had esotropia 25PD for distance and 30 for near. While the other day she was orthophoric. After 3 months, esotropia had increased to 40 PD for distance and 50 for near. She had a V-pattern with esotropia 35 on up gaze and 55 on down gaze. She had bilateral inferior oblique overaction with fundus extorsion. After 6 months from the development of cyclic esotropia, it became constant.

Results: The patient had constant, consecutive esotropia.

Conclusions: Cyclic esotropia may develop after surgical correction of intermittent exotropia.

Abstract No.: 206749

Panel No.: POS-0899

A Rare Case Report of Crocodile Tears Syndrome Following Bell's Palsy in a Pediatric Patient

First Author: Al Farizi **SUNJAYA**

Co-Author(s): Primawita **AMIRUDDIN**, Sesy **CAESARYA**, Irawati **IRFANI**, Feti **KARFIATI**, Mayasari **KUNTORINI**

Purpose: To present a case with Crocodile tears syndrome following Bell's palsy in a pediatric patient.

Methods: This report discusses the anamnesis and physical examination of eye complications following Bell's palsy, suspected to be crocodile tears syndrome.

Results: An 11-year-old boy presented with complaints of crying every time he ate for the previous two months. The patient had a history of Bell's palsy on the left side of the face six months ago. Other complaints were denied. The results of the eyelid examination of both eyes showed that there was no orbicularis muscle weakness or eyelid laxity, and supporting lacrimation due to abnormalities in lacrimal gland secretion. The examination of the anterior and posterior segments of both eyes was within normal limits. We diagnosed the patient with Crocodile Tears Syndrome.

Conclusions: Crocodile tears syndrome is a rare case. Clinicians often overlook the symptoms, leading to their infrequent reporting. Further research on this syndrome is needed in a larger number of cases to enhance clinician knowledge, aid in diagnosis, and provide appropriate management.

Abstract No.: 204507

Panel No.: POS-0864

A Rare Case of Mobius Syndrome Presenting with Esotropia and Cranial Nerve Palsies in a Child

First Author: Subarna **BARUA**

Co-Author(s): Md.Anwarul **AZIM**, Shahnaz **MARIYEM**

Purpose: To describe a rare case of Mobius syndrome presenting with esotropia, multiple cranial nerve palsies, eyebrow elevation, adenoid hypertrophy, and refractive error in a school-aged child.

Methods: A 12-year-old boy presented with a two-year history of progressive difficulty in distant vision and inward deviation of both eyes, noted since birth, gradually worsening. Parents reported a preference for near tasks. No history of trauma, ocular surgery, or consanguinity was present.

Results: Examination revealed abnormal head posture with left head tilt, chin depression, persistent mouth opening, and compensatory eyebrow elevation. Ocular evaluation demonstrated bilateral esotropia (~15°), refractive error, lagophthalmos with preserved Bell's phenomenon, and markedly restricted ocular motility. Seventh cranial nerve dysfunction included bilateral

facial palsy with absent forehead wrinkling, incomplete eye closure, loss of nasolabial folds, and deviation of the mouth. Twelfth cranial nerve involvement was evident with right-sided tongue wasting, fasciculations, weakness, and dysarthria. Oropharyngeal findings showed unilateral tonsillar/adenoid hypertrophy. MRI brain excluded intracranial pathology. The patient was managed conservatively with spectacles, lubricants, eyelid taping at night, and was scheduled for bilateral medial rectus resection under general anesthesia.

Conclusions: Mobius syndrome is a rare congenital cranial nerve disorder with variable ophthalmic and systemic manifestations. This case emphasizes the importance of early recognition, refractive correction, and multidisciplinary management to preserve vision and improve quality of life.

Abstract No.: 201574

Panel No.: POS-0827

A Study on Cycloplegic Autorefractometry and Cycloplegic Retinoscopy in Pediatric Patients: A Prospective Study

First Author: Sreylin SIM

Co-Author(s): Guechlaing CHEA, Seiha DO, Amarin MAR, Povpronet NY, Saly SAINT

Purpose: To assess the accuracy and clinical utility of cycloplegic autorefractometry relative to standard cycloplegic retinoscopy in children.

Methods: A prospective analysis was performed on eligible children aged 3 to 16 years. Cycloplegia was induced using 1% cyclopentolate followed by a fixed-dose combination of 0.8% tropicamide and 5% phenylephrine hydrochloride. Autorefractometry was performed first, followed by cycloplegic retinoscopy. Data were analyzed using STATA version 18, with statistical significance set at P value < 0.05. Clinically significant differences were defined as >0.5 diopters (D) in sphere or cylinder, or >20 degrees in axis.

Results: Spherical power and spherical equivalent measurements did not differ significantly between the two methods. However, differences were observed in cylindrical power and axis. Cycloplegic autorefractometry produced slightly higher mean cylinder values (−1.62 D) and a different mean axis orientation (101.80°). These differences, although statistically significant, were within a clinically acceptable range for older children.

Conclusions: Cycloplegic retinoscopy remains the reference standard for pediatric refractive assessment, particularly in children younger than six years. However, cycloplegic autorefractometry provides comparable results for spherical power and spherical equivalent, making it a practical alternative in clinical settings where time and expertise are limited. These findings support its potential role in expanding access to pediatric vision screening in resource-constrained environments.

Abstract No.: 206407

Panel No.: POS-0895

A Tailored Approach for Managing Thyroid-Related Strabismus

First Author: Bhavika BANSAL

Co-Author(s): Jaspreet SUKHIJA

Purpose: This case series presents a patient-based approach for the management of thyroid eye disease using a combination of conservative and invasive approaches.

Methods: Our study included 4 patients who were known cases of thyroid and were complaining of diplopia and strabismus. Treatment included inferior rectus recession alone or combined with botulinum toxin injection, inferior rectus disinsertion, and superior rectus plication. Prisms glasses were also advised to the patient with an acute onset of diplopia with small deviation.

Results: All four patients showed relief in diplopia and ocular misalignment. Inferior rectus recession was the preferred procedure for patients presenting with hypotropia in the primary position with tight inferior rectus on the force duction test, and it was combined with botulinum toxin injection to have an add-on effect. Superior rectus muscle plication was done in recalcitrant cases. Prism glasses were used in the case of small-angle deviation with diplopia in the primary position.

Conclusions: This case series highlights that the plication procedure can be done as a staged procedure in large-angle deviations. Patient-specific approach worked well in every case of thyroid eye disease, as surgical outcomes can be unpredictable due to variation in fibrous changes in extraocular muscles.

Abstract No.: 208170

Panel No.: POS-0908

A Targeted Approach to Diplopia: Segmental Occlusion in Paralytic Strabismus

First Author: Anusha CHAWLA

Co-Author(s): Siddharth AGRAWAL, Tapan RAMAWAT, Latika TANDON

Purpose: To highlight the effectiveness of segmental occlusion as a simple, adaptable and non-invasive method to manage diplopia in patients with paralytic strabismus while preserving the functional, unaffected visual fields.

Methods: In this case series, three patients with paralytic strabismus were managed using customized segmental occlusion. Areas of diplopia were identified by assessing ocular motility, Hess charts, and patient feedback. Partial occlusion was applied to the spectacle lens corresponding to the diplopic field, sparing the diplopia-free binocular and unocular zones.

The occlusion was titrated periodically with clinical improvement.

Results: In all three cases, segmental occlusion successfully eliminated diplopia in the affected gaze while preserving diplopia-free binocular and unocular visual fields. Case 1 (sixth-nerve palsy) demonstrated stable binocular vision with progressive reduction in occlusion as recovery occurred. Case 2 (partially recovered sixth-nerve palsy) illustrated diplopia free unocular visual fields after segmental occlusion of the binocular field. Case 3 (right inferior oblique palsy) showed relief from vertical diplopia in the superonasal field with good comfort and adaptation. None reported visual discomfort.

Conclusions: Segmental occlusion provides a low-cost, patient-friendly, and effective strategy for managing diplopia in paralytic strabismus. By selectively targeting the diplopic field, segmental occlusion preserves unocular and binocular visual function, improving the quality of life and supporting recovery.

Abstract No.: 208098

Panel No.: POS-0907

An Atypical Presentation of Retinoblastoma With Unilateral Total Hyphema and Periorbital Cellulitis

First Author: Yik To HO

Co-Author(s): Cheuk Ling YIM

Purpose: To report an atypical presentation of retinoblastoma with unilateral total hyphema and periorbital cellulitis.

Methods: This is a case report.

Results: A 1-year-old boy, with no family history of retinoblastoma, presented with a sudden onset of left upper lid swelling and complete ptosis. On examination, there was left eye total hyphema, chemosis, with raised intraocular pressure of 45mmHg. Left periorbital cellulitic changes were evident. Urgent magnetic resonance imaging showed a mixture of old and new blood products filling the intraocular cavity, with no definite intraocular mass seen. Imaging features initially favored trauma as the top differential diagnosis, though there was no trauma history. 4 days after the initial presentation, examination revealed a new white, well-circumscribed tumor in the right eye. The final diagnosis was group A retinoblastoma in the right eye and presumed group E retinoblastoma in the left eye. He was treated with 6 cycles of chemotherapy, and later underwent enucleation for the left eye and focal laser therapy for the right eye tumor. Histopathology of the enucleated eyeball subsequently confirmed retinoblastoma with clear resection margins. He remained stable and has been treatment-free for more than 1.5 years thereafter.

Conclusions: Retinoblastoma typically presents with leukocoria, but on rare occasions, it can present

atypically, as in this case, with total hyphema and periorbital cellulitis, which may pose a diagnostic challenge. This case report serves as a reminder that retinoblastoma can mimic any ocular or orbital pathology and should be considered as one of the differential diagnoses in atypical presentations that do not respond to standard treatments.

Abstract No.: 207475

Panel No.: POS-0906

Analysis of Eye Axial Changes in Children With Different Refractive States

First Author: Tang YAN

Co-Author(s): Hao JINGJING, Wang YIHUI

Purpose: Analyze eye axial changes and refractive distribution in 3–12-year-olds with different refractive states to guide clinical interventions.

Methods: Retrospective cohort study of 332 children (164 males, 168 females) from Beijing Aier Yingzhi Eye Hospital (2020.09–2021.03) with ≥ 1 -year follow-up. Divided into 3 age groups: 3–5 years ($n=115$: hyperopia 23, emmetropia 16, myopia 76); 6–9 years ($n=148$: hyperopia 37, emmetropia 53, myopia 58); 10–12 years ($n=69$: hyperopia 7, emmetropia 7, myopia 56). Recorded 6-month/1-year refractive and eye axial changes; used ANOVA (AL/CR ratio) and rank-sum test (change rates).

Results: Refractive error showed negative progression (myopia deepened, hyperopia decreased, $p<0.05$); eye axis grew positively ($p<0.05$). 1-year eye axial growth rate (mm/year): 3–5 years (hyperopia 1.33, emmetropia 1.08, myopia 1.30, $p=0.164$); 6–9 years (hyperopia 1.20, emmetropia 1.78, myopia 1.40, $p=0.082$); 10–12 years (hyperopia 0.92, emmetropia 1.14, myopia 0.67, $p=0.172$). Hyperopes had no inter-age difference ($p>0.05$); emmetropes ($p=0.04$) and myopes ($p<0.01$) did, with emmetropes growing faster at 6–9 years, myopes slower at 10–12 years.

Conclusions: No inter-refractive-state difference in eye axial growth rate. Hyperopes had stable growth; myopes progressed fast at 3–5/6–9 years, slowing at 10–12 years.

Abstract No.: 201261

Panel No.: POS-0823

Analysis on the Basic Principle and Effective Exploration of Telescopic Lens for Myopia Prevention and Control

First Author: Yang LINTAO

Purpose: Exploring the effectiveness and feasibility of using a telescope for myopia prevention and control based on its basic principles.

Methods: Through research and physical analysis, it has been found that the basic principle of myopia prevention and control with a telescope is usually

to use optical elements such as concave mirrors or concave convex composite lenses to reflect or refract the image of objects at close range. This allows the eyes to simulate a distant state when looking at close objects, thereby reducing the need for excessive adjustment (ciliary muscle relaxation) and minimizing the risk of axial elongation caused by close-range use.

Results: There is controversy over the effectiveness of clinical research statistics, and there is a lack of large-scale, authoritative verification. Some studies have shown positive effects, while more studies believe that the effects are limited or unclear. Cannot replace natural prevention and control methods, such as remote outdoor activities.

Conclusions: The effectiveness of using a telescope for myopia prevention and control is theoretically reasonable, but there is currently a lack of sufficient clinical evidence to support it as a mainstream prevention and control method. For the prevention and control of myopia in adolescent students, it can be attempted as an auxiliary tool under the guidance of a doctor, but more attention should be paid to outdoor activities and bathing in sunlight. The combination of traditional Chinese and Western medicine prevention and control requires reasonable basic prevention and control measures to avoid blindly relying on equipment and neglecting core factors.

Abstract No.: 201573

Panel No.: POS-0828

Application and Outcomes of the Modified Nishida's Procedure for Various Etiologies of Incomitant Strabismus

First Author: Akila RAMKUMAR

Co-Author(s): Hennav DHILLION

Purpose: To highlight the various applications of Modified Nishida's technique and analyze its outcomes in various incomitant strabismus.

Methods: It was a retrospective analytical study. The patient with a minimum follow-up of 6 weeks post-operatively was included in the study. All clinical, demographic, pre- and postoperative strabismus deviation of the patients who underwent Modified Nishida's procedure for incomitant strabismus were studied.

Results: Eighteen eyes of 18 patients with various incomitant strabismus, like abducent palsy, monocular elevation deficit, Inferior rectus aplasia, and muscle avulsion, were included. The time from surgery to the last follow up ranged from 45-750 days. The mean $\pm$ SD preoperative horizontal deviations were 48 ± 34.46 PD, which reduced statistically significantly to 14.83 ± 15.37 PD at the first postoperative day and was 13.94 ± 14.76 PD at the last follow-up (P value 0.01 and 0.00). The mean $\pm$ SD preoperative vertical deviations were 13.33 ± 16.09 PD, which statistically significantly reduced to

4.61 ± 7.16 PD at the first postoperative day and was 3.56 ± 5.79 PD at the last follow-up (P value 0.00 and 0.00). There was statistically significant improvement in the adduction (-0.50 ± 1.20), elevation (-0.89 ± 1.32), and depression (-0.06 ± 0.99) with p value 0.00, 0.00, 0.02, respectively. There was improvement in abduction (-1.65 ± 1.96), which was not statistically significant.

Conclusions: Modified Nishida's procedure is a useful tool in the management of large-angle incomitant strabismus and provides good postoperative alignment as well as improvement in ocular motility.

Abstract No.: 205880

Panel No.: POS-0887

Association Between Hemoglobin Levels and Severity of ROP in Premature Infants: Insights From a Tertiary Care Hospital

First Author: Muhammad MOIN

Co-Author(s): Mehreen AKRAM, Nida KHALID, Lubna SIDDIQUE, Zaib UN NISA

Purpose: To evaluate the correlation between hemoglobin (Hb) levels and the severity of retinopathy of prematurity (ROP) in low-birth-weight premature infants, with emphasis on vision-threatening ROP requiring treatment.

Methods: This retrospective cross-sectional study was conducted at the ROP screening facility of Mayo Hospital, Lahore, from July 2024 to June 2025. A total of 107 preterm infants meeting ROP screening criteria and with complete blood count (CBC) reports were included; those with major anomalies or incomplete data were excluded. Infants were stratified by mean Hb levels: ≤ 12 g/dL (moderate/severe anemia) and > 12 g/dL (mild/no anemia). Primary outcomes were incidence of vision-threatening ROP (stage 2 with plus disease, stage 3, or aggressive ROP) requiring treatment. Secondary outcomes included associations with ROP zone, stage, birth weight, and gestational age.

Results: Vision-threatening ROP occurred in 50% of infants with Hb ≤ 12 g/dL versus 28.5% in the Hb > 12 g/dL group ($p=0.003$). Zone 1 ROP was significantly more frequent among anemic infants (27.6% vs. 8%, $p=0.008$). Aggressive ROP was also more common in anemic infants (80% vs. 20%, $p=0.07$). Lower Hb levels correlated with lower birth weight and gestational age.

Conclusions: Low Hb levels (≤ 12 g/dL) were significantly associated with a higher risk of vision-threatening ROP, Zone 1 disease, and aggressive ROP. Monitoring and addressing anemia in preterm infants may help reduce ROP severity. Larger studies are warranted to confirm causality and guide interventions.

Abstract No.: 206089

Panel No.: POS-0893

Association Between Short-Term Visual Plasticity and Refractive Change in Anisometropia

First Author: Wei SUN

Co-Author(s): Jin ZENG

Purpose: Visual plasticity varies among children with anisometropia, and its relationship with refractive development is not well defined. This study investigated whether short-term contrast sensitivity improvement after augmented reality (AR) dichoptic training is associated with spherical equivalent (SE) changes over six months.

Methods: Ninety anisometropic children were enrolled. All completed a 20-minute AR dichoptic training session at baseline, followed by cycloplegic refraction. Participants were classified into a plasticity group (n=20) or a non-plasticity group (n=70) based on post-training binocular contrast sensitivity improvement. All then underwent a 6-month home-based AR training program (10 minutes, twice daily). SE changes were compared between groups.

Results: Baseline characteristics were comparable between groups (mean age: 8.0 vs. 8.5 years; female: 45% vs. 50%; binocular SE: -2.14D vs. -1.78D; all $p > 0.05$). After 6 months, the non-plasticity group showed significant SE progression ($p = 0.038$), while the plasticity group maintained stable SE ($p = 0.23$). SE changes were $+0.08 \pm 0.36$ D (better eye) and -0.04 ± 0.40 D (worse eye) in the plasticity group, versus -0.37 ± 0.75 D and -0.21 ± 0.45 D in the non-plasticity group. Inter-group differences in SE change were significant for both eyes ($P < 0.05$).

Conclusions: Short-term AR training-induced contrast sensitivity improvement is associated with better refractive stability over six months in anisometropic children. Initial training response may help predict long-term refractive control outcomes.

Abstract No.: 204962

Panel No.: POS-0871

Beyond Sutures: Intraoperative Botulinum Toxin as an Adjunct in Large-Angle Strabismus Surgery

First Author: Ching Hsi WU

Co-Author(s): Wei Wei HSIA

Purpose: To evaluate the role of intraoperative botulinum toxin injection as an adjunct to conventional surgery for large-angle strabismus.

Methods: Two patients with large-angle exotropia (≥ 75 prism diopters) underwent standard strabismus surgery combined with intraoperative botulinum toxin injection (2–3 units per lateral rectus). Postoperative

alignment, ocular motility, and complications were assessed during follow-up.

Results: Both patients achieved satisfactory postoperative alignment with fewer muscle interventions (three instead of four muscles). Early recovery showed reduced residual deviation and improved motility. No major complications (ptosis, vertical deviation, globe perforation) were observed. In one case, a transient residual exophoria < 10 PD at 1 week resolved after the botulinum toxin effect onset, leading to orthophoria in both eyes.

Conclusions: Intraoperative botulinum toxin injection appears to be a safe and effective adjunct for large-angle strabismus surgery, reducing the number of muscles operated while enhancing alignment stability. This approach may minimize undercorrection and improve outcomes in deviations ≥ 75 PD.

Abstract No.: 201254

Panel No.: POS-0825

Cataract Surgery With Intraocular Lens Implantation in Pediatric Posterior Lenticonus: Visual Outcomes and Prognostic Factors

First Author: Shahrina MAHFOOZ

Co-Author(s): Quazi Sazzad IFTEKHAR

Purpose: To evaluate the clinical profile and visual outcomes of children with posterior lenticonus undergoing cataract surgery with intraocular lens (IOL) implantation in a tertiary center of Bangladesh.

Methods: This prospective interventional study included children diagnosed with posterior lenticonus and cataract who underwent lens aspiration with IOL implantation between 2020–2025. Patients with other ocular comorbidities or systemic conditions affecting vision were excluded. Preoperative evaluation included best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, fundus examination, ultrasonography (when required), and assessment for strabismus and amblyopia. Intraoperative details such as surgical technique, site of IOL implantation, and posterior capsule status were recorded. Patients were followed up for a minimum of 6 months. Postoperative assessments included BCVA, binocular vision, anterior and posterior segment evaluation, and intraocular pressure. The primary outcome was postoperative visual acuity; secondary outcomes included factors influencing visual prognosis.

Results: A total of 48 children (67 eyes) aged 2–16 years were enrolled in the study. Preoperative posterior capsule dehiscence was noted in 87% of eyes. Mean preoperative BCVA was 1.03 ± 0.56 logMAR, which improved significantly to 0.57 ± 0.5 logMAR at final follow-up ($P < 0.001$). Over 80% of eyes achieved BCVA better than 0.3 logMAR. Visual outcomes were poorer in children presenting with strabismus ($P = 0.049$),

while age at surgery ($P = 0.533$) and PC dehiscence ($P = 0.735$) had no significant impact. Binocular vision improved postoperatively. No glaucoma was observed, though one patient required reoperation for IOL dislocation.

Conclusions: Cataract surgery with IOL implantation provides significant visual and functional improvement in children with posterior lenticonus.

Abstract No.: 203051

Panel No.: POS-0850

Clinical Characteristics of Juvenile Xanthogranuloma Associated with Hyphema and Secondary Glaucoma

First Author: Di CAO

Co-Author(s): Man HU, Li LI, Tianwei LIANG

Purpose: To characterize the clinical and pathological features of juvenile xanthogranuloma (JXG) manifesting with hyphema and secondary glaucoma in infants, focusing on iris morphology documented by ultrasound biomicroscopy (UBM), and to evaluate therapeutic responses and clinical outcomes.

Methods: A retrospective analysis was conducted on the clinical records of 3 pediatric patients diagnosed with JXG accompanied by hyphema and secondary glaucoma.

Results: The cohort included patients aged 6 months, 6 months, and 1 year, exhibiting a mean initial intraocular pressure (IOP) of 37 mmHg. Two cases were unilateral, while one was bilateral. All affected eyes exhibited significant buphthalmos and enlarged cup-to-disc ratios. Anterior segment examination revealed fibrinous strands and residual hyphema. The iris showed diffuse disruption of normal architecture, including loss of crypts and stromal hypopigmentation. UBM demonstrated a characteristically irregular, bumpy iris surface. Systemic manifestations included cutaneous lesions in all patients, with one case having additional pulmonary infiltration. Management comprised topical corticosteroids for all patients, supplemented by systemic chemotherapy in the patient with pulmonary involvement. IOP normalized within 1–2 months in all eyes. At final follow-up intervals of 1, 6, and 24 months, all patients maintained normal IOP and showed no signs of recurrence.

Conclusions: JXG presenting with hyphema and secondary glaucoma typically occurs in an presents at an early age and can cause significant ocular damage. UBM reveals distinctive iris morphological alterations. Management with topical corticosteroids is effective in controlling intraocular pressure and preventing recurrence demonstrates characteristic morphological changes of the iris. Topical steroid therapy is effective in managing this condition.

Abstract No.: 206078

Panel No.: POS-0891

Clinical Outcome of Inferior Rectus Transposition in Lateral Rectus Palsy

First Author: Piyush ADCHITRE

Co-Author(s): Rebika DHIMAN, Swati PHULJHELE, Rohit SAXENA

Purpose: To prospectively report clinical outcomes of Inferior Rectus Transposition (IRT) for lateral rectus palsy.

Methods: A prospective interventional study was conducted in 10 eyes of 10 patients with lateral rectus palsy aged >8 years, without any prior ocular surgeries. All underwent IRT with posterior augmentation suture with adjustable medial rectus recession (MRC). The primary outcome was correction of esotropia in primary gaze; the secondary outcome was improvement in abduction at 6 months postoperatively.

Results: One month postoperatively, esotropia significantly improved from $46.5 \pm 13.1^\circ$ to $6.8 \pm 4.0^\circ$ ($p < 0.01$), and abduction limitation improved from -3.7 ± 0.5 to -2.4 ± 0.8 ($p < 0.01$). Additionally, an improvement in head posture from $21.9 \pm 7.0^\circ$ to $2.0 \pm 2.3^\circ$ ($p < 0.01$) was noted. Vertical palpebral aperture width was relatively unchanged from 9.6 ± 1.2 mm to 9.8 ± 1.2 mm ($p = 0.39$). A pre-existing V pattern was noted in 5 patients, which reduced postoperatively in 2 patients & an induced A pattern was seen in 3 of these patients. None had induced cyclovertical deviations or fundus torsion.

Conclusions: Inferior rectus transposition is an effective treatment option for the correction of deviation and abduction limitation in lateral rectus palsy. It may have a tendency to induce an A pattern. Therefore, it may be more suitable in cases with a pre-existing V pattern.

Abstract No.: 206570

Panel No.: POS-0896

Clinical Spectrum, Systemic Associations, and Management of Congenital Cataract: A Retrospective Observational Study From a Tertiary Eye Hospital in Indonesia

First Author: Ivany RIZKY RAHMADANI

Co-Author(s): Sesy CAESARYA, Irawati IRFANI, Feti Karfiati MEMED, Primawita OKTARIMA, Mayasari WAHYU

Purpose: This study aims to elucidate the clinical spectrum, systemic associations, and management of congenital cataract in a tertiary eye hospital.

Methods: This is a retrospective observational study conducted at the Tertiary Eye Hospital in Indonesia. This study included children aged ≤ 12 months who were diagnosed with congenital cataract between 2021 and 2023. Data were collected from electronic medical records, including age at diagnosis, gender, cataract

laterality, morphology, systemic conditions, and type of surgery. The data were further processed using the software Microsoft® Excel 2016.

Results: A total of 130 patients (238 eyes) were included. Most patients were male (56.15%) and were diagnosed between 3 and 6 months after the onset of symptoms (58.46%). Bilateral cataracts were found in 83.07% of cases, and 76.92% had nystagmus. Common associated conditions included congenital rubella syndrome (7.69%) and Down syndrome (8.46%). Ocular abnormalities such as microcornea (10.50%) and microphthalmia (7.56%) were also common. Total cataract was the most common type (37.39%). Aspiration, primary posterior capsulotomy, and anterior vitrectomy without intraocular lens implantation was the most commonly used technique in the operation (60.08%).

Conclusions: Congenital cataract can be associated with a systemic condition or idiopathic. TORCH infection must be screened to detect other manifestations besides the ocular. Surgical methods were decided by the patient's condition and the type of cataract. The timing and surgical techniques used played a crucial role in determining the prognosis of visual acuity.

Abstract No.: 202766

Panel No.: POS-0842

Comparative Evaluation of 'Combined Lateral Rectus Suture Hang-Back Recession With Medial Rectus Plication' Versus 'Medial Rectus Muscle Resection With Lateral Rectus Recession' in Extra-Large Angle Exotropia

First Author: Amar PUJARI

Co-Author(s): Devashree MOKTAN

Purpose: To compare the clinical efficacy of «Combined Lateral Rectus Suture Hang-Back Recession with Medial Rectus Plication» versus «Medial Rectus Muscle Resection with Transplant-aided or Suture-aided Lateral Rectus Recession» in extra-large angle exotropia.

Methods: A prospective comparative study was undertaken. Group one underwent medial rectus resection with transplant-aided lateral rectus muscle recession. Group two underwent medial rectus resection with lateral rectus suture hang-back recession. The third group underwent lateral rectus suture hang-back recession with medial rectus plication. The pre-operative and post-operative outcomes were compared on follow-ups at 3 months, 6 months, and 1 year.

Results: The median preoperative deviation in group 3 was 90 prism dioptre (PD) (80-110), and the net correction achieved in group 3 was 84 PD (80-90); these two results are comparable to the two previously published groups (overall p value 0.677 and 0.625). The median medial rectus plication length was 6 mm (5.5-6), which is comparable to the amount of resection

of the earlier two groups (overall p value 0.347). The median hang-back suture length in group 3 was 6 mm (5-6), which is a larger spacer as compared to resection groups 1 vs 2 (p=0.007) and 1 vs 3 (p=0.032).

Conclusions: «Combined Medial Rectus Plication with Lateral Rectus Suture Hang-Back Recession» works on par with the other two procedures in extra-large angle exotropia. This provides additional advantages of negating the need for resection, leading to notable intraoperative ease.

Abstract No.: 206176

Comparison of Surgical Outcomes Between Bilateral and Unilateral Medial Rectus Recession in Acquired Esotropia

First Author: Ayaka NOGUCHI

Co-Author(s): Toshiaki GOSEKI, Erika MITSUI, Mayuka MIYAZAKI, Hiromi ONOUCHI, Satoru YAMAGAMI

Purpose: In pediatric esotropia, a few individual reports on bilateral vs. unilateral MR recession show conflicting outcomes; however, no such reports exist for adults. Therefore, we aimed to compare the effect per millimeter of bilateral versus unilateral MR recession in adults with acquired esotropia overall and further evaluate differences within subgroups of acute acquired comitant esotropia (AACE) and sagging eye syndrome (SES).

Methods: We retrospectively analyzed 76 adult patients (mean age: 52.1 ± 18.7 ; range, 21–86 years) who underwent MR recession between April 2020 and December 2024. Fifty-five underwent bilateral MR recession (21 with AACE and 7 with SES, all without high myopia), while 21 underwent unilateral MR recession (9 with AACE and 6 with SES, all without high myopia). The effect per 1 millimeter (Δ /mm) was calculated at the first and final postoperative visits and compared between groups.

Results: Among 76 patients with acquired esotropia, the effect per millimeter at the first postoperative visit (8 ± 3.6 days) was $1.98 \pm 0.72 \Delta$ /mm for bilateral and $1.79 \pm 0.53 \Delta$ /mm for unilateral recession ($P = 0.409$); at the final visit (173 ± 90 days), it was $2.11 \pm 0.72 \Delta$ /mm and $1.68 \pm 0.85 \Delta$ /mm, respectively ($P = 0.377$), with no significant differences. In AACE, no significant differences were observed (first visit: 2.14 ± 0.76 vs. $1.92 \pm 0.40 \Delta$ /mm; final: 2.11 ± 0.72 vs. $1.68 \pm 0.85 \Delta$ /mm). In SES, no significant differences were observed (first visit: 1.41 ± 0.23 vs. $1.54 \pm 0.25 \Delta$ /mm; final: 1.40 ± 0.52 vs. $1.80 \pm 0.32 \Delta$ /mm).

Conclusions: No significant difference in effect per millimeter was observed between bilateral and unilateral MR recession in adults with acquired esotropia, including both AACE and SES subtypes.

Abstract No.: 206896**Panel No.: POS-0901**

Congenital Ectopia Lentis: Clinical Profile and Surgical Outcomes in Posterior Iris Fixated Intraocular Lens in Pediatric Age Group

*First Author: Jigna **MOTWANI****Co-Author(s): Manjushree **BHATE***

Purpose: To study the clinical profile and surgical outcomes of posterior fixated iris claw intraocular lens (IOL) implantation in congenital ectopia lentis patients.

Methods: Twenty-one eyes of 11 patients who underwent lensectomy with secondary posterior iris claw intraocular lens implant were included. The clinical profile included etiological diagnosis, nature of subluxation, pre-operative visual acuity, and refraction. Intraoperative and postoperative details of IOL centration, intraocular pressure (IOP), and the status of cornea and pupil shape were documented. All surgeries were performed by a single surgeon.

Results: Mean age was 8 ± 1.41 , male: female ratio was 1.7:1. Etiology included Ectopia lentis ($n=17$; 56.6%), microspherophakia ($n=4$; 13.3%). Follow-up period ranged from 3 months-4 years (mean 1 year). Pre-operative best corrected visual acuity (BCVA) was 1.89 ± 0.12 logMAR. Post-operatively, mean BCVA at 6 months was 0.15 ± 0.2 ($n=8$), at 2 years was 0.3 logMAR, and at 4 years was 0.3 logMAR. The mean refraction was 1.25 ± 1.76 SE. Four eyes had IOP control with anti-glaucoma medications. The pupil was circular in all except 2 eyes (D shaped). IOL was well centered and well enclaved in 18 eyes and $n=3$ had a subluxation due to slippage of one enclave needing re-positioning.

Conclusions: Our cohort demonstrated good intermediate term outcomes with regards to IOL position and post-operative visual acuity with minimal to no complications.

Abstract No.: 201142**Panel No.: POS-0822**

Corneal Biomechanical Characteristics and Correlation Analysis in Children With Different Refractive States

*First Author: Yanhua **WANG***

Purpose: To investigate the correlation between corneal biomechanical characteristics and refractive status in children.

Methods: The study involved 339 children aged 5~13 with a spherical equivalent (SE) range from -6.00D to +2.00D. Axial A cross-sectional study involved 339 children aged 5 to 13 with spherical equivalent ranging from -6.00D to +2.00D. Axial length was measured by IOL Master; corneal biomechanical parameters by Corvis ST and Pentacam. According to SE, the subjects were divided into moderate myopia, mild myopia, and

emmetropia groups. The correlation between AL, SE, and corneal biomechanical parameters was analyzed.

Results: A2V in the moderate myopia group was lower than that in both the mild and emmetropia groups ($P<0.001$). PD in the emmetropia group was lower than that in the mild ($P<0.05$) and moderate groups ($P<0.01$). SSI in the emmetropia group was higher than that in the other two groups ($P<0.001$). A2V in 11-13 years was lower than that in 5-7 and 8-10 years old group ($P<0.01$). PD in the 11-13-year-old group was higher than that in the 8-10 and 5-7-year-old groups ($P<0.01$). SSI in 5-7 years old group was higher than that in 8-10 and 11-13 years old group ($P<0.01$). AL was positively correlated with PD, negatively correlated with SSI, and A2V. SE was positively correlated with A2V and SSI, and negatively correlated with PD.

Conclusions: Corneal stiffness decreases with an increase in SE. The changes of SSI, PD, and A2V can be predictors of myopia progression in children aged 5~13 years.

Abstract No.: 201394**Panel No.: POS-0826**

Demographic Profile, Epidemiology, Management and Outcome of Pediatric Glaucoma in a Tertiary Eye Hospital in Bangladesh

*First Author: Sidratul Muntaha **NAZNIN****Co-Author(s): Mohammad Mostafa **HOSSAIN***

Purpose: To describe the characteristics, Epidemiology, management and outcome of pediatric glaucoma in a tertiary eye care center in Bangladesh.

Methods: It was a retrospective study which was conducted in a tertiary level hospital since 2021 to 2023. Study included child whose age from four months to sixteen years. The patients whose age up to sixteen years with retinal pathology and developmental delay were excluded from study. After selection age, sex, intraocular pressure combined with glaucomatous history, visual acuity (VA), abnormal signs under a slit lamp, fundus findings, syndromic association, medications, surgical options were recorded and outcomes were analyzed.

Results: Total study population was 239 cases (278 eye). Affected boy were 152(65%) where's girls' number were 80(34.5%). Mean age was 6.6 ± 4.46 . Positive family history for glaucoma was 7.5%. Primary glaucoma was 64.7% where's secondary glaucoma was 35.3%. Primary congenital glaucoma (PCG), traumatic glaucoma, juvenile glaucoma was most common glaucoma type. The most common signs and symptoms were elevated intraocular pressure (38.07%) and eye pain (28.45%). Trabeculotomy (Trab) combined with trabeculectomy were the most commonly performed surgeries. Seventy-three percent child were treated by oral medication and 26.6% patients were undergoing

surgical intervention. From urban area 66.52% patients, rural area 33.47% patients were recorded. Sixteen percent pediatric glaucoma were associated with systemic syndrome.

Conclusions: Pediatric amblyopia might require full attention during the entire treatment, especially after glaucoma surgery. Government concern, economic development, more public education on glaucoma prevention and the importance of early diagnosis and treatment is time demanding.

Abstract No.: 205341

Panel No.: POS-0882

Dichoptic Perceptual Training Based on Augmented Reality in Anisometropic Amblyopia

First Author: Yongchuan LIAO

Purpose: The study aimed to explore the effect of dichoptic perceptual training based on the augmented reality (AR) platform in anisometropic amblyopic children.

Methods: Seventy-two subjects were randomized to the occlusion group (AR0 group), the dichoptic perceptual AR training group (AR1 group), and the combined therapy in the former two groups (AR2 group).

Results: For the three groups, the best-corrected visual acuity (BCVA) was all improved after treatment ($P < 0.001$). There was no statistically significant difference in the change of visual acuity in the amblyopic eye among the three groups at the 2-month visit ($P = 0.621$) and at any best achieved acuity visit ($P = 0.745$). The stereoacuity was improved at the best achieved acuity visit for the AR1 and AR2 groups ($P < 0.01$), but not improved in the AR0 group ($P = 0.075$). At the best achieved acuity visit, the mean log contrast sensitivity function (CSF) of each spatial frequency didn't improve significantly after treatment, both in AR0 and AR1 groups ($P > 0.05$). However, in the AR2 group, the CSF value of all spatial frequencies had a significant improvement ($P < 0.05$).

Conclusions: In conclusion, this randomized controlled trial demonstrated that dichoptic perceptual training based on VR technology in anisometropic amblyopia could improve visual function such as BCVA, stereopsis and CSF. Although dichoptic AR training could not replace the traditional occlusion method to improve the visual acuity of amblyopia, it could be an alternative therapy for amblyopia, due to its effectiveness, high immersion, and interestingness, especially for amblyopes who could not accept patching. Moreover, the AR training seems to be more efficient in stereopsis and in CSF when combined with occlusion therapy.

Abstract No.: 202554

Panel No.: POS-0839

Digital Therapeutics Approach for Young Children With Myopia Using SAT-001 Study Protocol for a Randomized Controlled Trial

First Author: Hae Jung PAIK

Purpose: To evaluate the efficacy and safety of the software as a medical device, SAT-001, for the inhibition of myopia progression and treatment in pediatric patients with myopia.

Methods: This clinical trial is a two-arm, prospective, randomized, open-label study with a duration of approximately 25 months. We will enroll 110 pediatric patients with myopia aged 5 to 9 years with $-0.75D$ to $-5.75D$ SE in each eye. Eligible participants will be randomly assigned in a 1:1 ratio to either the study group using SAT001 with single vision spectacles or the control group using single vision spectacles alone. The change in the SER (spherical equivalent refractive error) at 48 weeks from baseline serves as the primary endpoint. The change in SER at 24 weeks and axial length at every 12 weeks from baseline will be the secondary endpoints. Each change will be assessed depending on the myopic severity. Treatment-emergent adverse events will be evaluated for the safety analysis.

Results: Progression of myopia might slow down via maintaining scleral integrity and biosynthesis of ECM components via adjustments of NHFs such as insulin-like growth factor (IGF), cortisol, or dopamine. To adjust NHFs, SAT-001, translated into digital tasks, has been implemented within the investigational medical device, comprising three modules. SAT-001 is a software designed to non-invasively suppress the progression of myopia in children by employing eye activity in a well-lit environment through a game format. It also provides modules that promote appropriate relaxation effects.

Conclusions: This study to confirm the efficacy and safety of SAT-001 in slowing pediatric myopia progression.

Abstract No.: 205227

Panel No.: POS-0875

Early Intravitreal Bevacizumab Monotherapy for Aggressive Retinopathy of Prematurity: A Case Series

First Author: Md.Mominul ISLAM

Co-Author(s): Md.Anwarul AZIM, Quazi Sazzad IFTEKHAR, Omar JAFARULLAH, Tanzima SIDDIKA

Purpose: To evaluate the outcomes of early intravitreal Bevacizumab as a single therapy in infants with aggressive retinopathy of prematurity (AROP), with particular emphasis on disease regression without the need for laser indirect ophthalmoscopy (LIO) and the absence of reactivation at 6 months.

Methods: This retrospective case series included 5 infants (5 eyes) with AROP who presented within the first month after delivery. All eyes received a single intravitreal Bevacizumab injection (0.625 mg/0.025 ml) under aseptic conditions. Patients were followed regularly for at least 6 months with serial fundus examinations to assess regression, recurrence, and complications.

Results: • Number of cases: 5 infants. • Mean gestational age at birth: 33.2 weeks (range 30–38). • Mean birth weight: 1,780 g (range 1,350–2,500 g). • Age at presentation: 24–30 days postnatal. • Regression: Complete regression of AROP occurred in all eyes within 12–18 weeks (mean 14.4 weeks). • Recurrence at 6 months: None of the treated eyes showed reactivation. • Final outcome: At 6 months, all eyes achieved stable anatomical outcomes with complete vascularization. No ocular or systemic complications were recorded.

Conclusions: Early single-dose intravitreal Bevacizumab monotherapy can achieve complete and sustained regression of AROP without the need for adjunctive LIO, with no recurrence observed at 6 months. Early intervention may play a key role in favorable outcomes for high-risk infants.

Abstract No.: 204832

Panel No.: POS-0866

Early Outcomes of a Paediatric Ophthalmic Collaborative Clinic: Australian College of Optometry (ACO) and the Royal Children's Hospital (RCH) Melbourne

First Author: Zeinab **FAKIH**

Co-Author(s): Nellie **DEEN**, Rumeysa **DOGER**

Purpose: This study reports early outcomes from a collaborative paediatric eye clinic established between the Australian College of Optometry (ACO) and the Royal Children's Hospital (RCH) Melbourne. The clinic aims to improve paediatric eye care pathways and reduce wait times within the public healthcare system. Children referred to or on the RCH waitlist were triaged by the RCH orthoptic team, and where appropriate, seen at the ACO Children's Clinic.

Methods: A retrospective review was conducted for the first 12 months of the clinic. Data collected included referral sources, diagnoses, time from referral to consultation, and clinical outcomes. Patient satisfaction surveys and clinical audits were also performed.

Results: The average wait time from external referral to consultation at the ACO was four weeks (range: 1–12 weeks). Most referrals came from community optometrists (28%) and general practitioners (12%). Notably, 24% of children required no active management under established protocols. Common diagnoses included refractive error (26%), pseudoesotropia (18%), esotropia (10%), and dry eye

(7%). Children needing refractive correction were prescribed glasses using subsidy schemes to reduce access barriers. Only 11% required referral to RCH ophthalmology for conditions like congenital cataract or ptosis, and were escalated directly to the paediatric registrar or triage team as needed.

Conclusions: This collaboration shows a joint optometry-ophthalmology model can safely and effectively reduce paediatric wait times while managing common eye conditions in a community setting. It enables timely identification and referral of children needing specialist care. Ongoing evaluation will assess its long-term impact on paediatric eye health services.

Abstract No.: 206302

Panel No.: POS-0894

Effect of Patient Position on the Magnitude of Horizontal Strabismus Angle Measurements: Agreement Between Supine and Upright Positions

First Author: Napat **CHAIYAKHAM**

Co-Author(s): Somkiat **ASAWAPHUREEKORN**, Raveewan **CHOONTHANOM**, Phawasutthi **KEOKAJEE**, Worapot **SRIMANAN**

Purpose: To evaluate the reliability and agreement of horizontal strabismus angle measurements between upright and supine position.

Methods: We enrolled 102 patients with horizontal strabismus. Two masked ophthalmologists independently performed, in the same patient, alternate prism cover test (APCT) twice in both upright and supine positions at both distance (2 m) and near (33 cm). Intraobserver repeatability, interobserver reproducibility, and agreement between supine and upright positions were assessed using Bland–Altman analysis (mean difference and 95% limits of agreement (LoA)) and intraclass correlation coefficient (ICC).

Results: Both Intraobserver repeatability and interobserver reproducibility were excellent for both upright and supine position at both distant and near. The agreement of measurement between upright and supine position by examiner A at distant (at near) was 0.28 (0.49) PD, 95% LoA were -6.45 to 7.02 (-6.70 to 7.68) PD, and ICC was 0.96 (0.96); and by examiner B at distant (at near) was -0.03 (0.01) PD, 95% LoA were -5.81 to 5.75 (-5.31 to 5.33) PD, and ICC was 0.97 (0.98).

Conclusions: The reliability and agreement of horizontal strabismus angle measurements in the supine position are comparable to the upright position, with marginal and no clinically significant differences. It is recommended that APCT can be done in both upright and supine positions with excellent reliability and comparability.

Abstract No.: 201880

Panel No.: POS-0829

Elevated Ocular and Visual Disorder Risk in Developmental Disabilities

First Author: Xiaoxi LIU

Co-Author(s): Xiaotong LI, Wei ZHANG

Purpose: This study aims to clarify the associations between developmental disabilities (DDs) and ocular disorders, exploring correlations and potential causal relationships, to emphasize the importance of providing focused ocular attention for these children.

Methods: A.Cross-Sectional Association Study:13,889 students from Tianjin, China, were included, of which 309 had diagnosed developmental disabilities. The prevalence of refractive errors was compared to analyze associations. B.Mendelian Randomization Analysis: A two-sample Mendelian randomization analysis was conducted to infer genetic causal relationships between DDs and ocular parameters. The data is sourced from a publicly available genome-wide association study. C.Potential Causal Relationships: we conducted brain MRIs from the database, aiming to identify shared regions implicated in both disorders.

Results: A.Cross-Sectional Findings: Children with DDs had a significantly higher prevalence of astigmatism than their typically developing peers, especially in females. B.Mendelian Randomization Findings: DDs cause increased ocular disease risk and significantly affect refraction, e.g., autism linked to astigmatism, attention-deficit hyperactivity disorder to hyperopia. C.Shared Neuroanatomical Regions: The analysis of brain MRI data identified that the genetic variants were associated with both DDs and ocular diseases.

Conclusions: The cross-sectional analysis unequivocally affirms that developmental disabilities lead to an increased risk of astigmatism, while the Mendelian randomization analysis provides evidence for a close link between both disorders. Then we leveraged the brain MRI scans to elucidate potential intrinsic mechanisms of association. The findings of this study underscore the critical importance of implementing regular vision screenings for children with developmental disabilities.

Abstract No.: 205264

Panel No.: POS-0877

Evaluation of Surgical Outcomes in Comitant Horizontal Strabismus

First Author: Surabhi SAHAY

Co-Author(s): Amar PUJARI

Purpose: To prospectively investigate the rate of re-surgery in patients of comitant horizontal strabismus by following a homogenous surgical protocol.

Methods: The authors performed a single-centre prospective interventional study on 241 patients

with comitant horizontal strabismus who underwent strabismus surgery by a single surgeon with a predefined surgical dosage formula and intervention. The patients were followed up on Day 1, 1 Week, 1 month, 3 months, and 6 months postoperatively. Surgical success was defined as final deviation within 15 PD (Prism Diopters) with corresponding patient satisfaction. An assessment of factors responsible for re-surgery was performed.

Results: The rate of re-surgery was 7.05% (n=17). The rate was higher in exotropic patients (8.44%) as compared to esotropic patients (4.59%); however, this difference was not statistically significant. (p=0.263). Exotropes with extra-large angle deviation (47.05%) and Intermittent Divergent Squint (IDS) (17.6%) had higher rates of re-surgery. Similarly, in esotropes, exaggerated plication effect (11.7%), and overshoot of planned under-correction (11.7%) had a noticeable effect on the rate of re-surgery. Post-op manifestation of oblique muscle overaction and variable sensory exotropia for distance and near were other factors found responsible for isolated cases needing resurgery.

Conclusions: The rate of re-surgery in our cohort by following a single surgeon protocol was around 7%. Further, to mitigate the need for re-surgery, we recommend thorough pre-operative counselling, stratification of patients based on their deviation, and consideration of unpredictable factors.

Abstract No.: 202042

Panel No.: POS-0832

From Tear to Repair: Surgical Management of Extraocular Muscle Injury Following Trauma: A Case Series

First Author: Akshat ARYA

Co-Author(s): Savleen KAUR, Prakriti SAINI, Jaspreet SUKHJIA

Purpose: Extraocular muscle injuries can significantly impair ocular alignment and function. While prompt diagnosis and intervention are critical for optimal recovery, standardized surgical strategies for strabismus secondary to trauma remain poorly defined.

Methods: We report a series of three patients presenting with diplopia and marked motility deficits following orbital trauma. Clinical evaluation and imaging suggested injury to one or more extraocular muscles. Detailed assessment was performed using anterior segment optical coherence tomography (AS-OCT) and dynamic magnetic resonance imaging (MRI).

Results: Imaging confirmed flap tears of the extraocular muscle in two patients. All three underwent exploratory strabismus surgery, during which the affected muscles were identified and repaired. Notably, trauma to the inferior rectus muscle was the most common finding. At six-month follow-up, all patients were free of diplopia and demonstrated significant

improvement in ocular motility, without requiring muscle transposition procedures.

Conclusions: Inferior rectus is the most frequently affected muscle in traumatic strabismus. This series highlights a distinctive pattern of post-traumatic muscle flap tears that can be effectively managed with timely surgical exploration and direct muscle repair. Advanced imaging modalities such as AS-OCT and dynamic MRI are valuable tools for diagnosis and surgical planning, contributing to improved functional outcomes.

Abstract No.: 205290

Panel No.: POS-0879

Genetic Landscape of Ectopia Lentis Over Three Years in a Single Tertiary Eye Care Centre

First Author: Bhargavi **PIDUGU**

Co-Author(s): Goura **CHATTANAVAR**, Rachana **MARAGANI**, Vyshnavika **MUPPARAPU**

Purpose: Ectopia lentis involves partial or complete lens dislocation and shows both autosomal dominant and recessive inheritance. Due to its genetic heterogeneity, genetic testing offers high diagnostic value and aids management. In this study, we describe the genetic characteristics of patients with ectopia lentis referred to a tertiary ocular genetics clinic in South India, with a focus on variant distribution.

Methods: All patients with ectopia lentis referred to the Ocular Genetics clinic in South India from January 2023 to August 2025 were included. Detailed phenotyping followed a standardized protocol, and whole-exome sequencing was recommended for all.

Results: Ectopia lentis was identified in 100 patients (59 males, 59%). Genetic testing was performed in 70 (70%) patients. FBN1 (41%) followed by LTBP2 (8%) were the commonest genes identified in our cohort. Among them, pedigree analysis showed 43 (61.5%) had autosomal dominant (AD) inheritance and 27 (38.5%) had probable autosomal recessive (AR) inheritance. In the AD group, FBN1 was the most common gene (41 patients, 95%), followed by FBN2 (1 patient, 2.3%), COL2A1 (1 patient, 2.3%), while three patients (11%) had no identifiable pathogenic variant. Among the 24 autosomal recessive cases, implicated genes included LTBP2 (8, 33.3%), ADAMTSL4 (6, 25%), ADAMTS17 (3, 12.5%), ADAMTS10 (2, 8.3%), ASPH (2, 8.3%), and 1 patient (4.1%) each of ADAMTS10, CBS, ZNF469, and GHR deletion.

Conclusions: These findings highlight the predominance of FBN1 variants in autosomal dominant ectopia lentis, even within a genetically constrained population, and the marked genetic heterogeneity among autosomal recessive cases.

Abstract No.: 205992

Panel No.: POS-0889

Incidence and Risk Factors for Retinal Detachment After Anti-VEGF Therapy for Retinopathy of Prematurity: A Systematic Review and Meta-Analysis

First Author: Guina **LIU**

Co-Author(s): Jiazhi **LI**, Hongtao **LIU**, Wei **XU**

Purpose: To investigate the incidence of retinal detachment (RD) after anti-vascular endothelial growth factor (anti-VEGF) therapy in retinopathy of prematurity (ROP) to identify associated risk factors.

Methods: We searched PubMed, Ovid_embase/Medline, and Web of Science databases until September 2025 in accordance with PRISMA guidelines. Data were synthesized using a random-effects model, and subgroup analyses were performed to identify significant risk factors.

Results: Eleven retrospective studies, involving 3,013 eyes, were included. The pooled incidence of RD in ROP patients after receiving anti-VEGF therapy was 3% (95% CI -0.01-0.06), with negligible heterogeneity ($I^2=0.0\%$, $p=0.999$). Subgroup analysis revealed that a higher incidence of RD was significantly associated with greater disease severity (Zone I/AROP), lower gestational age (GA <27 weeks: 3% vs. >27 weeks: 2%), lower birth weight (BW <1000g: 3% vs. >1000g: 2%), and lower postmenstrual age at treatment (PMA <35.5 weeks: 6% vs. >35.5 weeks: 3%). Furthermore, the incidence was higher in single-center studies (3% vs. 2%) and was geographically highest in Europe (8%), followed by Asia (3%), then in North America (2%).

Conclusions: The 3% incidence of RD after anti-VEGF therapy, while low overall, is significantly stratified by patient-intrinsic and systemic factors. This finding mandates vigilant clinical oversight for high-risk infants, requiring close collaboration between neonatologists and pediatric ophthalmologists.

Abstract No.: 202503

Panel No.: POS-0838

Incidence of Microbial Keratitis in Aphakic Children Using Elastofilcon a Extended Wear Versus Rigid Gas Permeable Lenses: A Retrospective Study

First Author: Helen **KEARNS**

Co-Author(s): Cheefoong **CHONG**, Shaun **DAI**, Leanie **LEESON**

Purpose: To compare the incidence of microbial keratitis in aphakic children fitted with elastofilcon A (EA) extended wear versus rigid gas permeable (RGP) contact lenses after lensectomy.

Methods: A retrospective multicentre study of 154 aphakic children (235 eyes), aged 3 weeks to 13.9 years, treated at two tertiary ophthalmology centres

in Australia and New Zealand. Records were reviewed for age at lensectomy, lens type (EA or RGP), visual outcomes, and incidence and treatment of contact lens associated microbial keratitis.

Results: Microbial keratitis occurred in 5 eyes (3.3%) in the EA group (n=121 eyes) and 6 eyes (5.2%) in the RGP group (n=114 eyes). Clinical diagnosis was based on corneal infiltrates with or without epithelial defects. No hypopyon, corneal oedema, or neovascularisation was observed. Age at onset ranged from 1.3 to 7.8 years. Average duration was 25.2 days (EA) and 11.4 days (RGP). No cases resulted in visually significant sequelae. Visual outcomes between the two groups were not statistically different ($p=0.11$).

Conclusions: There is ongoing debate on the optimal contact lens choice in paediatric aphakia. Our study found no significant difference in the incidence or visual impact of microbial keratitis between aphakic children fitted with EA or RGP contact lenses. These findings suggest that both lens types may offer similar safety profiles in this population.

Abstract No.: 204704

Panel No.: POS-0869

Incidence, Risk Factors, and Screening Sensitivity of Retinopathy of Prematurity in a Semiurban District in South India Using a Telemedicine Approach

First Author: Hema DURAICHAMY

Co-Author(s): Sreeramya PALANISAMY

Purpose: To determine the incidence of Retinopathy of Prematurity (ROP) and to investigate the associated risk factors for its development in a cohort of preterm infants who were assisted in two neonatal care units in a semi-urban district in South India, and to analyse the sensitivity and specificity of screening.

Methods: A prospective, observational, cohort study was conducted at two neonatal care units for a period of 6 months. According to the National screening guidelines, eligible babies were screened and stratified into subgroups of infants who developed ROP and those who did not. Informed consent taken from the parents and fundus images was taken with 3 Nethra-Neo camera, images graded and report obtained through Telemedicine.

Results: A total of 369 infants were screened, and the sensitivity and specificity of screening were found to be 98.64%, 100 % respectively. ROP was identified in 65 infants with an incidence of 17.62%. Log binomial regression analysis was done to find the relative risk of different risk factors on incidence. Thirty-three (50.77%) infants who were born with lower gestational age developed ROP ($P < 0.0001$). Of the total ROP, 38 (58.46%) infants with lower birth weight developed ROP ($P < 0.0001$), and 39 (60%) infants who received oxygen developed ROP ($P < 0.046$). Univariate and

multivariate regression analysis identified low birth weight, preterm births, and oxygen usage as significant risk factors for developing ROP with a statistical significance ($P < 0.05$).

Conclusions: The ROP trend is towards a rise in developing countries like India. In our study, the incidence of ROP was 17.62%, with screening demonstrating a high sensitivity (98.64%) and specificity (100%), underscoring the reliability of the national screening guidelines. Low gestational age, low birth weight, and oxygen supplementation emerged as significant risk factors for the development of ROP. Early detection through effective screening and timely intervention can substantially reduce the complications of ROP and the risk of irreversible vision loss.

Abstract No.: 201947

Panel No.: POS-0830

Initial Strabismus Surgery in Patients With Thyroid Eye Disease: Outcomes and Dose-Response in Various Types of Procedure

First Author: Shiyu TANG

Co-Author(s): Minghao CHEN, Mengya HAN, Jianhua YAN, Wen YUN

Purpose: This study aimed to assess outcomes and dose-response in initial strabismus surgeries using a large TED sample.

Methods: A retrospective review of TED patients undergoing initial strabismus surgery (2013–2023) at Zhongshan Ophthalmic Center included data on demographics, ocular deviation, motility, surgical techniques, and outcomes. Surgeries involved rectus recession and tenotomy, with traction sutures (TS) applied for deviations >35 prism diopters (PD). Success was defined as no diplopia and deviation ≤ 10 PD horizontally, ≤ 5 PD vertically. Dose-response (deviation change per mm rectus recession, DPR) and influencing factors were analyzed.

Results: Among 104 patients, rectus recession had a 70.65% success rate, while tenotomy achieved 12.5%. Success was highest for superior rectus (SR) recession (88.00%), followed by inferior rectus (IR) (70.00%) and medial rectus (MR) (38.46%). Two-muscle recessions succeeded in 55.56%. In single rectus recession with TS, DPR for IR, SR, and MR was 6.96 ± 2.18 , 5.92 ± 1.14 , and 9.78 ± 5.80 PD/mm, respectively, versus 4.26 ± 0.78 , 3.95 ± 0.83 , and 3.86 ± 0.29 PD/mm without TS. Preoperative deviation significantly affected DPR, especially in IR/SR surgeries ($P < 0.001$). Simultaneous MR recession did not alter IR/SR DPR in TS ($P = 0.266$) or non-TS ($P = 0.138$) groups. However, in non-TS cases, IR/SR recession impacted MR DPR ($P = 0.034$), but this effect was absent with TS ($P = 0.741$).

Conclusions: Single rectus recession achieves high success for TED vertical strabismus, with TS enhancing correction. Preoperative deviation is key to dose-

response, while vertical recession influences horizontal dose-response when deviation is <35PD.

Abstract No.: 203050

Panel No.: POS-0848

Insertional Anatomy of Horizontal Rectus Extraocular Muscles in Patients With Esotropia and Exotropia

First Author: Yun **WEN**

Co-Author(s): Tao **SHEN**, Jianhua **YAN**

Purpose: Strabismus, including esotropia and exotropia, significantly affects binocular vision and presents challenges in clinical management and surgical correction. Although previous studies have explored the anatomical characteristics of horizontal rectus extraocular muscles (EOMs) in strabismus, large-scale analyses of insertional anatomy remain limited. This study investigates anatomical variations in the insertions of horizontal rectus EOMs in patients with esotropia and exotropia, aiming to understand their impact on strabismus management.

Methods: A retrospective case-control study was conducted using clinical records from 4,781 patients diagnosed with strabismus who underwent surgery at the Zhongshan Ophthalmic Center, Sun Yat-sen University, from June 2014 to August 2020. Anatomical measurements of horizontal rectus EOM insertions were taken using a Castroviejo caliper. Statistical analyses, including regression analysis, were performed to examine the relationship between EOM characteristics and clinical outcomes.

Results: Significant anatomical differences were observed among the esotropia, exotropia, and control groups. Esotropia patients exhibited shorter medial rectus (MR) insertion distances (mean: 4.81 mm) than both exotropia (5.09 mm) and controls (5.08 mm, $p < 0.001$), with moderate effect sizes. Exotropia subtypes showed wider MR and lateral rectus (LR) insertions, particularly in constant and pattern types (MR width $p = 0.001$, LR width $p = 0.002$). Regression analysis indicated that shorter MR insertion distance was significantly associated with greater esodeviation at both near ($\beta = -13.60$, $p < 0.001$) and distance ($\beta = -12.76$, $p < 0.001$), though with small effect sizes. Refractive error (SE) and age were also significant predictors of deviation magnitude and AC/A ratio.

Conclusions: Anatomical variations in the horizontal rectus EOMs are significantly associated with esotropia and exotropia. These findings enhance our understanding of strabismus pathophysiology and may help guide surgical strategies for severe cases, though further research is needed to refine clinical applications.

Abstract No.: 201256

Panel No.: POS-0824

Interobserver Variability in Retinopathy of Prematurity Grading: Implications for Rural Equity in Teleophthalmology

First Author: Emmanuel **RAMLI**

Co-Author(s): Brenda **BREIDENSTEIN**, Chee Foong **CHONG**, Steve **DAKIN**, Jack **JIAO**, Andrew **THOMPSON**, Anne-marie **YARDLEY**

Purpose: Retinopathy of prematurity (ROP) grading is fundamental to determining treatment, yet variability in clinician interpretation threatens consistency of care. For rural New Zealand communities, where geographical isolation and workforce shortages necessitate reliance on teleophthalmology, grading inconsistency risks compounding existing health inequities. This study aims to assess the degree of interobserver variability in ROP image grading and explore whether such variability influences treatment recommendations.

Methods: This cross-sectional observational study analysed 40 anonymised image sets of both eyes from infants screened for ROP using the 3nethra Neo camera. Four consultant ophthalmologists independently graded each set via a standardised pro forma, recording stage, zone, plus disease, image quality, and treatment recommendation. Graders were masked to each other's assessments. Data were collated by a non-grading investigator and analysed using Fleiss' kappa for multi-rater agreement, with interpretation guided by Landis and Koch criteria.

Results: Preliminary analyses indicate substantial interobserver variability in grading plus and pre-plus disease, moderate variability in zone classification, and higher agreement in staging. Image quality assessment demonstrated minimal variability, suggesting limited influence from technological factors such as resolution and file rendering. Variability in grading translated into differences in treatment recommendations in selected cases.

Conclusions: This study underscores the pressing need for improved standardisation of ROP grading in teleophthalmology. Without addressing interobserver variability, telemedicine risks perpetuating inequities in access and outcomes for rural communities most reliant on it. Findings highlight an opportunity to refine guidelines and strengthen reproducibility in remote ROP care.

Abstract No.: 208561
Panel No.: POS-0910

Investigation of the Novel Variants and Genotype-Phenotype Correlations in a Cohort of Chinese Patients With Infantile Nystagmus Syndrome

First Author: Mo WANG

Co-Author(s): Cong DUAN, Shiheng LU, Lei WANG

Purpose: Genotype-phenotype correlations in a cohort of Chinese patients with Infantile Nystagmus Syndrome (INS).

Methods: Ten unrelated INS families and three sporadic cases were included. All participants underwent comprehensive ophthalmic examinations. Demographic and clinical data were collected, and variants were identified via next-generation sequencing (NGS). Genotypic and phenotypic differences were further characterized.

Results: We identified 17 mutations across five genes: FRMD7 (n=5), GPR143 (n=4), HPS3 (n=2), HPS6 (n=2), TYR (n=2), and AIPL1 (n=2). Eleven of these variants were novel. FRMD7 (5/13, 38%) was the most frequently mutated gene, followed by GPR143 (4/13, 31%). Patients with GPR143 mutations exhibited significantly worse visual acuity compared to those with FRMD7 mutations ($p = 0.0261$). Higher grades of foveal hypoplasia, often accompanied by macular atrophy, were associated with visual impairment in patients carrying GPR143 variants. No significant differences were observed in other clinical manifestations across mutation types.

Conclusions: Our findings broaden the mutational spectrum of INS and confirm that FRMD7 and GPR143 are the two predominant mutational hotspots in both familial and sporadic INS cases. GPR143 mutations are associated with more severe ocular phenotypes. Early molecular diagnosis in infants with INS is recommended to facilitate accurate genetic counseling and improve clinical management.

Abstract No.: 204228
Panel No.: POS-0860

Late-Onset Retinoblastoma in a 13-Year-Old Male: A Diagnostic Challenge

First Author: Nguyen Quynh Huong DAO

Co-Author(s): Dung PHAM

Purpose: To describe a rare case of late-onset retinoblastoma (RB) in a 13-year-old male presenting with atypical features mimicking uveitis.

Methods: We retrospectively reviewed the clinical history, imaging, and histopathology of the patient. He presented with one week of painless blurred vision and ocular redness in the left eye. Initial treatment for presumed uveitis with topical antibiotics and corticosteroids was ineffective. Ophthalmic

examination, multimodal imaging (B-scan, OCT, MRI), and laboratory tests were performed.

Results: At admission, left eye visual acuity was 3/10 with intraocular pressure of 48 mmHg. Slit-lamp examination showed corneal edema, anterior chamber cells (3+), and iris nodules. B-scan revealed a peripheral subretinal mass without calcification, while MRI suggested Coats disease. Blood tests were positive for Toxocara IgG. Despite anti-inflammatory and anti-parasitic therapy, there was minimal improvement. Examination under anesthesia demonstrated a creamy-white peripheral retinal mass with surface vessels and anterior chamber seeding. Enucleation was performed, and histopathology confirmed Group E RB.

Conclusions: This case highlights the diagnostic challenge of RB in older children, where clinical signs may mimic uveitis. Failure to respond to standard therapy should prompt consideration of intraocular malignancy. Early use of multimodal imaging and prompt referral are crucial to avoid delays and optimize outcomes.

Abstract No.: 206762
Panel No.: POS-0900

Late-Recognized CFEOM With Severe Restrictive Esotropia: Case Report and Surgical Considerations

First Author: Ronik H. KAMAL

Co-Author(s): Rozalina LOEBIS

Purpose: Congenital Fibrosis of the Extraocular Muscles (CFEOM) is a rare, non-progressive cranial dysinnervation disorder that poses diagnostic and therapeutic challenges, particularly in atypical adult-onset cases without ptosis or family history. This report describes the clinical course, imaging findings, surgical management, and outcomes of an adult patient with atypical CFEOM.

Methods: A 38-year-old woman presented with a ten-year history of right-eye esotropia and bilateral abduction difficulty. Examination revealed 50 prism diopter esotropia deviation, compensatory chin elevation, and severe symmetric motility restriction, most marked in vertical gaze. Orbital MRI showed bilateral superior rectus atrophy, right superior oblique atrophy, and bilateral inferior oblique atrophy. Diagnosis was based on clinical features, imaging, and intraoperative forced-duction testing.

Results: Bilateral medial rectus recession (6 mm) was performed, yielding significant improvement in ocular alignment. At four months, residual esotropia (30 prism diopters) and persistent motility limitations remained. Postoperative MRI excluded thyroid eye disease and intracranial pathology but reaffirmed extraocular muscle atrophy. Despite incomplete motility recovery, cosmetic alignment improved, and symptoms were alleviated.

Conclusions: This atypical adult-onset case emphasizes the importance of considering CFEOM in adults with restrictive esotropia even without ptosis. Diagnosis requires integration of clinical, imaging, and intraoperative data. Surgery enhances alignment and quality of life but is limited by irreversible fibrosis, underscoring the need for individualized surgical planning, multidisciplinary management, and realistic expectations.

Abstract No.: 203217

Panel No.: POS-0854

Long-Term Efficacy of BTXA Injection With Reduced Volume for Acute Acquired Comitant Esotropia With Small- to Moderate-Angle

First Author: Bingbin MA

Co-Author(s): Jingchang CHEN

Purpose: To evaluate the long-term efficacy of Botulinum Toxin A (BTXA) injection with reduced volume for acute acquired comitant esotropia (AACE) with small- to moderate-angle.

Methods: We reviewed the medical records of 57 patients with AACE who received BTXA injection and completed a follow-up period of more than 6 months. All patients were injected with 3.75 to 6.25 U BTXA in 0.04 ml saline into the bilateral medial rectus muscles under topical anesthesia. Success was defined as the deviations $\leq 10 \Delta$ assessed with the prism and alternate cover test (PACT) at both distance and near fixations and with resolution of diplopia. Sensory success was defined as stereopsis $\leq 63''$.

Results: The mean age at treatment was 35.05 ± 13.09 years, the median disease duration was 18 (6.50, 40.50) months, and the mean follow-up time was 9.13 ± 4.76 months. Before treatment, the mean distance deviation was 15.32 ± 7.48 PD. At the last visit, the overall success rate of a single injection of BTXA was 52.6% (30/57); the sensory success rate was 49.1% (28/57). The mean distance deviation at the last visit was 7.23 ± 6.90 PD. 14.0% (8/57) of patients had a deviation $\leq 10 \Delta$, but had distance diplopia. Of the patients who did not achieve success, 66.7% (18/27) opted for re-injection, 11.1% (3/27) for surgery, and the remaining patients for observation or Fresnel glasses. 0.88% of the injected eyes (1/114) developed complicated ptosis.

Conclusions: BTXA injection with reduced volume is a simple, safe, and effective treatment for AACE patients with small- to moderate-angle, but the recurrence is the main potential disadvantage.

Abstract No.: 200199

Panel No.: POS-0816

Long-Term Efficacy of a Perceptual Learning Technique to Improve and Maintain Vision: A Five-Year Study

First Author: Damaris MAGDALENE

Co-Author(s): Phinrikerbha BLAH

Purpose: To evaluate the long-term efficacy of RevitalVision's perceptual learning vision training software program in improving best corrected visual acuity in occlusion therapy-resistant adult amblyopic subjects.

Methods: This prospective observational study was conducted at a tertiary eye care centre in northeast India with 89 subjects who previously showed no visual improvement after six months of occlusion therapy. The main outcome assessed was the improvement in best corrected visual acuity (BCVA) and its maintenance over a 5-year follow-up.

Results: A total of 109 eyes of 89 subjects were assessed at presentation and reviewed at 1 year, 2 years, 3 years, and 5 years. Due to the loss of follow-up, the number of eyes decreased to 49 at the end of 2 years, and to 26 and 24 eyes at the end of 3 years and more than 3 years, respectively. The mean LogMAR acuity at presentation was 0.56 ± 0.27 . At 1 year, 0.42 ± 0.26 , 1-2 year visit 0.36 ± 0.26 , 2-3 years 0.32 ± 0.24 , and more than 3 years being 0.30 ± 0.24 . An improvement in the Mean LogMAR acuity was seen in each follow-up visit. The statistical analysis of bilateral and unilateral amblyopia shows significant improvement in acuity between the five follow-up visits, with a very low probability of a type I error.

Conclusions: Revital vision's perceptual learning improve vision and maintain it long-term by activating neural plasticity.

Abstract No.: 202916

Panel No.: POS-0844

Long-Term Visual, Refractive, and Safety Outcomes After Pediatric Cataract Surgery: A Retrospective Study

First Author: Phatchisa MEKHAAMNUAYCHAI

Co-Author(s): Narisa RATTANALERT, Penny SINGHA, Supaporn TENGTRISORN

Purpose: To evaluate long-term visual acuity (VA), refractive changes, and complications after pediatric cataract surgery.

Methods: Retrospective cohort at a tertiary center of children <16 years with congenital or developmental cataract who underwent cataract extraction with or without intraocular lens (2007–2023), with ≥ 2 years of follow-up. Best-corrected VA (BCVA) was recorded at 5 years and at the last visit. Refractive outcomes were analyzed by age at surgery: <2 , 2–5, and >5 years.

Results: A total of 345 eyes from 211 patients (268 bilateral, 77 unilateral) were included. Median age at surgery was 5.4 years, and median follow-up was 6.4 years. At 5 years (160 eyes) and final visit, mean logMAR BCVA was 1.31 ± 0.78 and 1.16 ± 0.88 in unilateral pseudophakia, 0.61 ± 0.48 and 0.65 ± 0.57 in bilateral pseudophakia, and 1.09 ± 0.78 and 1.07 ± 0.52 in bilateral aphakia. Overall spherical equivalent (SE) change in pseudophakia and aphakia was -10.94 diopters (D) and -5.78 D (<2 years), -6.46 D and -2.87 D (2–5 years), and -8.51 D and -0.37 D (>5 years). Annual SE change (D/year) in the first 5 years post-surgery was -1.38 D and -0.86 D (<2 years), -0.75 D and -0.34 D (2–5 years), and -0.38 D and -0.09 D (>5 years). Common complications were visual axis opacification in pseudophakia (16%) and glaucoma in aphakia (16%).

Conclusions: Bilateral pseudophakia achieved better BCVA than unilateral. Aphakia showed less myopic shift compared with pseudophakia.

Abstract No.: 202907

Panel No.: POS-0845

Medial Rectus Insertion Site in Surgical Candidate Children With Esotropia

First Author: Moustafa ABDELHAFEZ

Co-Author(s): Mahmoud ABDELHAFEZ

Purpose: To study the site of medial rectus (MR) insertion in surgical candidate children with esotropia and its relation to the angle of deviation.

Methods: A prospective study that had been done on 110 children scheduled for surgical management of esotropia. We divided them, according to age, into 3 groups: below 2 years, from 2 to 6, and from 6 to 12. We documented the angle of deviation. During surgery, we measured the distance between the MR insertion and the limbus using the caliber viewing by microscope. We created similar control age groups of 98 non-strabismic children. They were admitted to the operating theatre for other reasons. After written permission, we measured the MR insertion site.

Results: The mean insertion site in control group 1 (age below 2) was 4.33 ± 0.39 . While it was significantly less in patient group 1 ($P < 0.001$), 3.81 ± 0.48 and 3.78 ± 0.56 for right and left eyes. For group 2, it was 4.63 ± 0.48 in the control group. While it was significantly less in esotropia ($P < 0.001$), 3.99 ± 0.38 and 3.98 ± 0.40 for right and left eye. For group 3 (6 to 12 years), it was 5.27 ± 0.24 in control and 4.91 ± 0.46 and 4.26 ± 0.47 in esotropia ($P < 0.001$). There was a significant negative correlation between the angle of deviation and the MR insertion site ($P < 0.001$) in all age group patients.

Conclusions: From this study, we can conclude that the medial rectus is significantly closer to the limbus in children with esotropia than in non-strabismic individuals. Also, there is a negative correlation

between the MR insertion site and the severity of esotropia.

Abstract No.: 202911

Panel No.: POS-0846

Mirror Image Esotropia, Amblyopia and Refractive Error in Monozygotic Identical Twins

First Author: Moustafa ABDELHAFEZ

Co-Author(s): Mahmoud ABDELHAFEZ

Purpose: To record esotropia, amblyopia, and refractive error in identical twins.

Methods: Our patients are 7-year-old boys, identical twins. They had esotropia of 25 to 30 prism diopters. Child number (1) showed esotropia in the right eye. Meanwhile, child (2) showed esotropia in the left eye. Visual acuity, without correction, was 20/150 in the right eye and 20/40 in the left eye in child (1) and 20/30 in the right eye and 20/150 in the left eye in child (2). Cyclorefraction was $+4.00/-3.00 \times 10$ in the right eye and $+1.50/-1.50 \times 165$ in the left eye. In child (2), it was $+1.25/-1.00 \times 10$ in the right eye and $+3.75/-3.00 \times 170$ in the left eye. Vision with glasses, for child (1), was 20/80 in the right eye and 20/28 in the left eye. While in child (2), it was 20/25 in the right eye and 20/80 in the left eye. We started patching the left eye in child (1) and the right eye in child (2). We diagnosed child (1) as esotropia, astigmatism, and amblyopia in the right eye and the same diagnosis for child (2) in the left eye.

Results: Twins are receiving the same treatment for glasses and treatment of amblyopia. But it happens in the opposite eye.

Conclusions: Monozygotic twins may have mirror-image eye disorders, such as esotropia, amblyopia, and refractive error.

Abstract No.: 204420

Panel No.: POS-0862

Mitigating Severe Myopia: The Synergistic Effect of Medicago Sativa Extract and Low-Dose Atropine on Oxidative Stress and Axial Length Progression

First Author: Aryani Atiyatul AMRA

Co-Author(s): Aznan LELO, Rodiah Rahmawaty LUBIS, Lambok SIAHAAN

Purpose: Severe myopia, characterized by excessive axial elongation of the eyeball, poses significant risks to vision. This condition is closely linked to oxidative stress, where reactive oxygen species damage ocular tissues, exacerbating disease progression. Malondialdehyde (MDA) serves as a key biomarker for lipid peroxidation and oxidative damage. This study evaluates the impact of Medicago sativa extract (EMS)

combined with 0.01% atropine eyedrops on MDA levels and axial length progression in severe myopia

Methods: A double-blind randomized controlled trial involved 40 adolescents (aged 13-18) with severe myopia (n=20 EMS group; n=20 placebo). EMS (or placebo) was given orally for 6 months alongside atropine. Plasma MDA was measured at baseline, 3 months, and 6 months using ELISA. Axial length was assessed via optical biometry. Data analyzed with repeated ANOVA and post-hoc tests ($p < 0.05$ significant)

Results: Baseline MDA was higher in EMS ($28.81 \pm 6.85 \mu\text{mol/L}$) vs. placebo ($24.05 \pm 6.00 \mu\text{mol/L}$; $p = 0.025$). At 6 months, EMS MDA decreased to $17.16 \pm 3.77 \mu\text{mol/L}$ ($p < 0.001$), while placebo increased to $29.96 \pm 5.03 \mu\text{mol/L}$ ($p < 0.001$). Axial elongation was minimal in EMS (0.05 mm OD/OS) vs. significant in placebo (0.45-0.49 mm)

Conclusions: The combination of EMS and 0.01% atropine significantly reduce plasma MDA levels. These findings highlight EMS as a promising adjunctive therapy, offering a dual approach to managing myopia by addressing both structural and biochemical aspects

Abstract No.: 205738

Panel No.: POS-0885

More than Meets the Eye: Ocular Manifestations of Toxoplasmosis in Costa Rican Children

First Author: Leslie ARGUELLO

Co-Author(s): Otana JACKPOR, Carlos VILLALOBOS

Purpose: We aim to characterize the presentation of pediatric ocular toxoplasmosis in Costa Rica. To our knowledge, this is the first study to do so.

Methods: Chart review was performed to identify patients <12 years old with positive Toxoplasma IgG or IgM, seen by the ophthalmology service of a Costa Rican tertiary hospital from 2020 to 2023. Hospital protocol is to refer all toxoplasmosis patients for eye exams, though this does not always take place. Patients were excluded if they had prior eye trauma or malignancy, other congenital disease, other positive TORCH serology, or excess missing data.

Results: Out of 80 patients, 32 (40%) had abnormalities on initial eye exam, half of whom had active lesions. The most common abnormal exam finding was chorioretinitis/posterior uveitis (30%, 24 patients). Though 31 patients were asymptomatic, 6 of these (19%) had exam abnormalities. 17 patients received treatment, 14 of whom (82%) had active lesions on initial exam. In 8 of these patients (57%), active lesions resolved by follow-up about 1-3 months later.

Conclusions: There is likely a high rate of eye findings in Costa Rican children with toxoplasmosis. The absence of symptoms does not rule out eye involvement.

Abstract No.: 203214

Panel No.: POS-0851

Muscle Transplantation in Large-Angle Sensory Exotropia: A Case Report

First Author: Katherine Marl FERRER

Co-Author(s): Fay Charmaine CRUZ

Purpose: Large-angle sensory exotropia presents a significant surgical challenge, necessitating correction involving three to four horizontal rectus muscles. Despite adherence to maximal correction parameters, results are frequently suboptimal. Muscle transplantation has emerged as a promising alternative, particularly in revision cases. This technique enables greater muscle lengthening and stronger recession effect while preserving ocular motility. In contrast to supramaximal recessions—where the muscle is reinserted posterior to the equator, potentially restricting movement—transplanted segments are positioned anterior to the equator, maintaining full range of motion. Moreover, using autologous grafts avoids complications associated with synthetic materials, such as foreign body reaction or rejection.

Methods: We present the first locally documented case of muscle transplantation for strabismus correction. A 38-year-old woman presented with longstanding right eye outward deviation following congenital cataract extraction via lensectomy without intraocular lens implantation. She was lost to follow-up, resulting in progressive exotropia. Initial surgery involved secondary IOL implantation, followed by an 11.0mm supramaximal right lateral rectus recession and 6.5mm right medial rectus plication to address a 65PD exotropia. Due to residual exotropia (18–65 PD), re-operation was performed.

Results: In the second procedure, a 2.0mm autologous graft—harvested from a 6.0mm left medial rectus resection—was transplanted to the right lateral rectus. This was combined with a 6.0mm left lateral rectus recession and a 3.0mm right medial rectus resection. The patient achieved stable orthophoria at 2.5 and 6 months postoperatively.

Conclusions: This case supports muscle transplantation as an effective and safe approach for managing large-angle exotropia.

Abstract No.: 205683

Panel No.: POS-0884

Myopia Progression Patterns in Filipino Children and Adolescents Wearing Single Vision Lenses in a Single Center

First Author: Kimberly Amanda COMIA

Co-Author(s): Joanne BOLINAO, James Abraham LEE

Purpose: The aim of this study is to describe the progression of myopia in Filipino children who received single-vision lenses.

Methods: This study analyzed the electronic medical records of children aged 5 to 18 years old between 2010 to 2024 who received single vision lenses for myopia in this single-center retrospective cohort study. Included patients had at least 5 visits throughout the observation period. Myopia progression rates were calculated based on age, sex, refractive status, and severity at baseline, and whether the patient was seen before the COVID-19 lockdowns or after. The cumulative risk of progression and the correlation between age at first consultation and the rate of progression were calculated.

Results: Myopia progression rates were most rapid in the youngest (5-7 years old) age group (mean progression rate -0.84 D/year, SE 0.03, [-0.90, -0.79], $p < 0.0001$), as well as in females (mean progression rate -0.82 D/year, SE 0.04, [-0.89, -0.75], $p = 0.044$). Progression was fastest among patients who were emmetropic and hyperopic at baseline, and there was no statistically significant difference between the nonpandemic and pandemic cohorts. A direct but weak correlation between age at first consult and myopia progression rate was observed.

Conclusions: The mean progression rates of myopia observed may help clinicians better predict refractive outcomes and manage myopia among Filipino children. Younger children below 10 years old exhibiting continued myopia progression may benefit from early intervention, regardless of refractive status at baseline.

Abstract No.: 204632

Panel No.: POS-0865

Ocular Manifestations in Children With Acute Leukemia Undergoing Chemotherapy and Their Correlation With Hematological Parameters

*First Author: Yunanda Rizki Amalia **HARAHAP**
Co-Author(s): Fithria **ALDY**, Bobby Ramses Erguna **SITEPU***

Purpose: Acute leukemia, the most common childhood cancer, frequently causes ocular manifestations due to hematological abnormalities or direct leukemic infiltration. This study aimed to determine the relationship between hematological parameters (hemoglobin, leukocytes, platelets) and ocular manifestations in children with acute leukemia undergoing chemotherapy.

Methods: A cross-sectional study was conducted on 50 children (5–18 years) with acute leukemia receiving chemotherapy at Medan Pediatric Oncology Foundation (August 2024–January 2025). Data were collected through interviews and comprehensive ophthalmologic examinations that assessed both the anterior and posterior ocular segments. Hematological parameters measured hemoglobin levels, leukocyte counts, and platelet counts.

Results: Twenty-seven (54%) were male, and 23 (46%) were female, with a mean age of 10.48 years. Forty-one children (82%) had acute lymphoblastic leukemia (ALL), and nine (18%) had acute myeloid leukemia (AML). The most frequent anterior segment manifestation was subconjunctival hemorrhage (8%), while the most common posterior segment findings were Roth spots and retinal exudates (7%). The median levels of hemoglobin, leukocytes, and platelets among patients with posterior segment involvement were 7 g/dL, $12 \times 10^3/\mu\text{L}$, and $69.5 \times 10^3/\mu\text{L}$, respectively, and with anterior segment involvement were 8g/dL, $13 \times 10^3/\mu\text{L}$, and $100 \times 10^3/\mu\text{L}$. A statistically significant association was found between ocular manifestations and hemoglobin and platelet levels, but not leukocyte count.

Conclusions: Hemoglobin and platelet levels are critical predictors of ocular complications in pediatric leukemia. Routine ophthalmic evaluations should be integrated into leukemia management protocols to prevent vision-threatening outcomes.

Abstract No.: 200532

Panel No.: POS-0818

Orthokeratology in Children With Myopia and Intermittent Exotropia: The Nanjing Strabismus Cohort

*First Author: Tianxi **LI**
Co-Author(s): Hu **LIU**, Zijin **WANG***

Purpose: To assess the impact of orthokeratology on myopia progression, exotropia conditions and visual function in children with myopia and intermittent exotropia.

Methods: This prospective cohort study recruited 60 children aged 7-12 years with myopia and intermittent exotropia who chose to wear either orthokeratology lenses or single-vision spectacles between February 2023 and December 2023. The primary outcome was change in axial length from baseline at 1 year. Secondary outcomes included changes from baseline in exotropia conditions, monocular function, and binocular vision at 1 year.

Results: At 1 year, the Ortho-K group had slower axial length elongation than the SVS group (0.22 mm vs. 0.42 mm; $P < .001$). In the Ortho-K vs. SVS group, respectively, the mean change was -4.78 PD vs. 1.50 PD ($P < .001$) in distant exodeviation, -4.28 PD vs. 0.57 PD ($P = .02$) in near exodeviation, -0.19 vs. 0.15 ($P = .22$) in distant control, and -0.23 vs. 0.23 ($P = .04$) in near control at 1 year. Improved accommodative functions were observed in the Ortho-K group at 1 year, including monocular accommodative facility ($P = .007$), negative relative accommodation ($P = .03$), and positive relative accommodation ($P = .04$). Ortho-K exhibited no significant effect on binocular vision or adverse effects over 1 year ($P > .05$).

Conclusions: In children with myopia and intermittent exotropia, orthokeratology may be recommended for its efficacy in controlling myopia progression, and for its potential to improve or maintain exotropia conditions.

Abstract No.: 202258

Panel No.: POS-0833

Outcomes of Botulinum Toxin for Thyroid Eye Disease Strabismus: A Retrospective Review

First Author: Maverick Wenhao **WONG**

Co-Author(s): Janice **LAM**, Maria **THEODOROU**

Purpose: To evaluate outcomes of botulinum toxin injections for Thyroid Eye Disease (TED)-related strabismus.

Methods: Retrospective notes review of TED-strabismus patients who underwent botulinum toxin injection in a tertiary referral centre. Eyes were grouped into horizontal (medial/lateral rectus) or vertical (inferior rectus) injections. Primary outcomes were reduction in deviation and motility improvements. Deviation analysis was restricted to the plane of injection, and motility limitation was documented in four directions. Responders were defined as patients with any reduction in deviation magnitude.

Results: We analysed 29 patients (33 injected eyes). 21 patients (24 eyes) had horizontal injections, and 8 patients (9 eyes) had vertical injections. Horizontal injections reduced deviation by a mean of 25 Prism Dioptres (PD) at near (range 2-70PD) and 20PD at distance (range 2-80PD). 24% overcorrected for near and 16% for distance. Vertical injections reduced deviation by a mean of 9PD at near (range 2-18PD) and 17PD at distance (range 5-31PD). There were 12.5% overcorrections for near and 25% for distance. There were minor improvements in motility. There were no significant adverse events. Initial analysis suggested that patients with smaller baseline deviations were more likely to benefit, while demographic variables showed no consistent association.

Conclusions: Botulinum toxin has not been traditionally used in TED-strabismus due to its restrictive nature in severe disease. We demonstrated that this is a safe treatment option, with documented improvements in deviation and motility in our cohort. Our findings support its consideration as an alternative treatment option where surgery is contraindicated/undesired, or as adjunct to treat residual deviations post-surgery.

Abstract No.: 205975

Panel No.: POS-0888

Outcomes of Early Delivery and Retinal Screening at Birth in Siblings of Patients With Familial Exudative Vitreo-Retinopathy (FEVR)

First Author: Subhadra **JALALI**

Co-Author(s): Akash **BELNJE**

Purpose: To report phenotypes and treatment outcomes of a novel protocol of early delivery and early retinal screening, in siblings of familial exudative vitreoretinopathy (FEVR) probands.

Methods: Once a proband was diagnosed clinically to have FEVR, the family was counselled regarding the risk of blindness in the next child. Elective delivery was planned at 37 weeks of gestational age in consultation with an experienced obstetrician after strict antenatal monitoring. Retinal screening was advised to be done within 1-2 days of delivery. Fundus details were evaluated, and appropriate treatments were done in case FEVR was detected. Patients were divided into group 1: compliant with protocol and group 2: non-compliant with protocol. Treatment outcomes were evaluated at the last follow-up.

Results: Twelve families with probands with significant low vision adopted the protocol. 24 eyes of 12 siblings were included. Six eyes (50%) in group 1 were diagnosed to have FEVR (66.6% had stage II, 0% had Stage V) as compared to 10 eyes (83.3%) in group 2 (33.3% had stage II, 33.3% had stage V). Treatment was required in all eyes diagnosed with FEVR in both groups. Anatomical outcome was classified as good (attached retina without drag or folds) in 83.3% (n=4/6) in group 1 and 40% (n=4/10) in group 2.

Conclusions: Delivery earlier by 3-4 weeks of the expected date and immediate retinal management provided a window of opportunity to treat a rapidly progressive blinding disease of newborns. Our protocol will need validation with larger cohorts.

Abstract No.: 203480

Panel No.: POS-0856

Outdoor Artificial Light at Night Exposure and Risk of Myopia: A Cross-Sectional and Prospective Cohort Study Among Hong Kong Children

First Author: Yingan **LI**

Purpose: Outdoor artificial light at night (ALAN) has emerged as a significant source of environmental pollution, yet epidemiological evidence on its impact in childhood myopia development remains limited. Therefore, this study aimed to investigate the association between outdoor ALAN exposure and myopia development.

Methods: Data were obtained from the Hong Kong Children Eye Study (HKCES), a population-based cohort

with a 3-year follow-up. Outdoor ALAN exposure (nW/cm²/sr) within 500 m of each residence was estimated using time-varying satellite data. Multivariable logistic regression models were employed in cross-sectional and prospective cohort analyses.

Results: A total of 19,114 children (mean [SD] age, 7.40 [1.10] years; 52.8% boys) were included, of whom 5,153 (27.0%) had myopia at baseline. In the cross-sectional analysis, each interquartile range (IQR) increase in outdoor ALAN exposure was associated with an 8% higher myopia rate (OR, 1.08; 95% CI, 1.02-1.15). In the prospective cohort (n=2,558 without baseline myopia and completed follow-up), each IQR increase was associated with a 37% higher risk of incident myopia over 3 years (OR, 1.37; 95% CI, 1.16-1.61). Compared with the lowest quartile, children in the highest quartile of outdoor ALAN exposure also had a greater risk of developing myopia in both cross-sectional (OR, 1.16; 95% CI, 1.03-1.29) and prospective cohort analyses (OR, 1.56; 95% CI, 1.14-2.12). Restricted cubic splines further indicated linear associations for both myopia rate and incidence.

Conclusions: Outdoor ALAN exposure is positively associated with childhood myopia development, identifying it as a modifiable environmental risk factor to target in future prevention strategies.

Abstract No.: 206099

Panel No.: POS-0892

Paediatric Cataract Surgery in Small Eyes: Preoperative Predictors and Outcomes

First Author: Kavitha KALAIVANI

Co-Author(s): Satya Swapnika Y

Purpose: To evaluate the clinical profile, surgical outcomes, and refractive predictability of cataract surgery in short axial length eyes in children.

Methods: This retrospective study included 123 eyes of 70 patients with small eyes undergoing cataract surgery over the last 5 years. Demographics, ocular biometry, surgical technique, ocular/systemic associations, and refractive outcomes were analysed.

Results: Zonular cataract (39.84%) is the most common presentation, and 19 eyes (15.45%) presented with total cataract. (71%) presented within 1 year of age. Ocular associations (ROP, PHPV) were noted in 22% of eyes. The mean axial length was 18.5 ± 1.1 mm, horizontal corneal diameter 11.0 ± 0.8 mm, and vertical keratometry 10.7 ± 0.8 mm. Surgical procedures were lensectomy with anterior vitrectomy in 53% (65 eyes) and primary intraocular lens implantation in 47% (58 eyes). Refractive analysis in 58 eyes with primary intraocular lens implantation, 42 eyes (72.4%) achieved refraction more hyperopic than the intended target. Glaucoma was a complication in 7.3 % (9 eyes) at the final follow-up.

Conclusions: Paediatric cataract surgery in small eyes is characterized by early presentation, biometric variability, and frequent ocular associations. Despite surgical modifications, refractive outcomes often overshoot the intended hyperopic target. Glaucoma remains a significant postoperative concern, underscoring the need for careful planning and vigilant follow-up.

Abstract No.: 202421

Panel No.: POS-0837

Paediatric Non-Infectious Uveitis – Retrospective Review From a Local Tertiary Eye Center

First Author: Yik To HO

Co-Author(s): Emily Suhan WONG

Purpose: To describe the demographics, clinical features, treatment, and visual outcomes of paediatric non-infectious uveitis at a local tertiary eye center in Hong Kong.

Methods: A retrospective cohort study was conducted on patients aged ≤ 18 years with non-infectious uveitis managed at the Hong Kong Children's Hospital joint ophthalmology-rheumatology clinic from November 2020 to February 2025. Inclusion required a minimum follow-up duration of 6 months (median 36 months). Data on demographics, uveitis classification, etiology, treatments, complications, and visual outcomes were extracted.

Results: The study included 37 patients (71 eyes), with a mean age of uveitis onset of 10±3.6 years (range 3–17) and a male-to-female ratio of 1:1.18. Anterior uveitis, with or without intermediate uveitis, was most common (73.0%), followed by panuveitis (24.3%). Most cases were idiopathic (89.2%). Steroid-sparing agents were required in 91.9% of patients, in which methotrexate was most commonly prescribed (86.5%). 51.4% of patients received adalimumab. More than two-thirds of patients (67.6%) experienced raised intraocular pressure requiring treatment. Cataract was another common complication (45.9%), followed by posterior synechiae formation (29.7%) and band keratopathy (10.8%). At the latest follow-up, 94.6% of patients maintained visual acuity ≥0.5, and 48.6% achieved steroid-free remission.

Conclusions: This study describes the clinical characteristics and management approach of paediatric non-infectious uveitis. Steroid-sparing agents are often required for disease control. With effective management, most patients were able to achieve favorable visual outcomes.

Abstract No.: 201858**Panel No.: POS-0831****Pediatric Vitreoretinal Surgery in Mongolia***First Author: Tsengelmaa CHULUUNBAT***Purpose:** To study of the outcome in the pediatric vitreoretinal surgery in Mongolia.**Methods:** Clinical History, diagnosis, age, sex, jurisdiction, eye examination, surgical details and indications, other tests, and information in medical history. Pre-and post-operative visual acuity was checked using a standard visual acuity chart with Log MAR.**Results:** A total of 59 surgeries in 48 cases were included in the study; 32 (67%) were male, and 16 (33%) were female. The mean age was 8.05 ± 4.79 (min years was 2 months of age, max years was 17 years of age). The more frequent clinical diagnoses were penetrating trauma in 15 (31.3%) patients, and 13 (86.7%) patients were male. The mean age of diagnosis in penetrating trauma patients was 9.8 ± 5.98 years of age. Thirty seven (77%) eyes were unilateral, 11 eyes (30%) were bilateral, preoperative visual acuity was 0.8-0.1 on the Logmar table in 4 cases (8.3%), improved postoperatively to 10 cases (20.8%), preoperative visual acuity was 0.01-0.09 in 11 cases (22.9%), postoperatively 15 cases (31.3%), which was statistically significant ($p=0.02$). A total of sixteen cases (27.1%) had pars plana vitrectomy and lensectomy surgery, while 43 (72.9%) had other combined vitrectomy surgeries performed, and the anatomical success and globe salvage rate was 58 eyes (98.3%).**Conclusions:** We have established the pediatric retinal surgery in NCMCH, Mongolia, and the anatomical success and globe salvage rate were 58(98.3%), and preoperative visual acuity was 15 (31.2%), while the postoperative visual acuity improved to 25 (52.1%), which was statistically significant ($p=0.02$).**Abstract No.: 207161****Panel No.: POS-0903****Plication-Augmented Modified Nishida's Procedure for Large-Angle Esotropia in Post-Traumatic Sixth Nerve Palsy- a Case Series***First Author: Disha AGARWAL**Co-Author(s): Vidhya***Purpose:** To report a series of three cases with large-angle esotropia (ET) secondary to chronic post-traumatic sixth nerve palsy corrected in a single stage with a plication-augmented modified Nishida's procedure.**Methods:** A retrospective case series reporting three cases with large-angle ET (>50 PDs) secondary to traumatic sixth nerve palsy corrected in a single stage with a modified Nishida's procedure and an MR recession augmented with an LR plication.**Results:** All three patients had a successful surgical outcome (ortho or ET <10 PD) with no evidence of anterior segment ischemia (ASI).**Conclusions:** The primary procedure of choice for a large-angle ET in sixth nerve palsy cases, nowadays, is a modified Nishida procedure, which is a no-split, no tenotomy transposition procedure. However, even with transposition surgeries, achieving a complete correction becomes a challenge in large-angle ETs with more than 50 PDs. If intraoperative tight MR is noted, the procedure can be combined with an MR recession or botulinum toxin injection. However, it does not give a single-staged correction for more than 50 PDs. Plication is safer in such cases to prevent ASI. Therefore, in our cases, we tried to minimize the risk of resurgery and ASI with an LR plication-augmented modified Nishida's procedure with MR recession. Thus, with a single procedure, the double vision was relieved, the abduction limitation improved, and the ocular alignment improved. We will, however, need prospective studies with a larger sample size to study the long-term effects of this modified surgical approach.**Abstract No.: 208526****Panel No.: POS-0909****Predictors of Chlamydia trachomatis Conjunctivitis in Neonates: A 10-Year Retrospective Study***First Author: Saadia FAROOQUI**Co-Author(s): Silpi BISWAS, Shazia KHAN***Purpose:** Ophthalmia neonatorum (ON) is a common neonatal ocular condition with potentially serious ocular and systemic complications. The spectrum of causative organisms varies by geographical regions, maternal health practices, and over time. This study aims to assess the local burden of Chlamydia trachomatis and identify clinical predictors.**Methods:** A 10-year retrospective review (2014–2023) of neonates with suspected ON at a tertiary paediatric eye centre in Singapore was conducted. Clinical and microbiological data were analysed to determine etiological trends and identify predictors of C. trachomatis conjunctivitis. Diagnostic methods included Gram stain, culture, immunofluorescence, and PCR testing. Multivariate logistic regression was used to assess associations.**Results:** A total of 797 neonates were included; 140 (17.5%) tested positive for Chlamydia trachomatis, followed by Staphylococcus aureus (10.2%) and MRSA (4.1%), while Neisseria gonorrhoeae was rare (0.75%). Ten-year trend showed a consistent pattern with Chlamydia trachomatis followed by Methicillin-sensitive Staphylococcus aureus. The presence of bloody discharge was the strongest predictor for Chlamydia infection (OR = 20.99, 95% CI: 6.09–72.29, $p < .001$), followed by vaginal delivery (OR = 17.63,

95% CI: 5.59–55.51, $p < .001$). Eyelid swelling and conjunctival redness were also significant.

Conclusions: Chlamydia trachomatis remains the leading cause of ON in our cohort. Key clinical predictors—bloody discharge, eyelid swelling, conjunctival redness, and unilateral involvement can assist clinicians in early recognition and timely initiation of targeted testing and therapy. These findings support the development of predictive diagnostic frameworks in settings with limited access to molecular diagnostics.

Abstract No.: 202641

Panel No.: POS-0841

Preferred Practice in Non-Surgical Management of Myopia by Indian Ophthalmologists and Optometrists: A Questionnaire-Based Study

First Author: Shweta **DHIMAN**

Co-Author(s): Raj **KENIA**, Chitaranjan **MISHRA**, Jitendra **SAHOO**, Prolima **THACKER**

Purpose: To assess practice patterns, awareness, and barriers in non-surgical myopia management among Indian ophthalmologists and optometrists.

Methods: A cross-sectional, web-based study was conducted (May–July 2025). A 45-item questionnaire was completed by 300 respondents (70% ophthalmologists, 30% optometrists). Additionally, 142 ophthalmologists completed a supplementary 14-item survey providing deeper insights into clinical practice. Domains included pharmacological, optical, behavioral, monitoring, and digital strategies. Data were analyzed descriptively.

Results: Most respondents reported that 10–25% of pediatric patients were myopic, with therapy typically initiated before 8 years of age (78%). Pharmacological: Atropine 0.01% was prescribed by 85% and rated as the most effective and affordable treatment in the supplementary survey. Optical: Orthokeratology was prescribed by 21%; HALT/DIMS lenses were available to 34% but prescribed by only 26%, primarily due to cost and availability barriers. Multifocal contact lenses were used by 16%. Monitoring: 65% monitored axial length, while others relied on refraction. Typical follow-up was every 3–6 months. Lifestyle & Counseling: >95% recommended outdoor activity and >90% provided digital device counseling. Digital/AI Awareness: Only 23% were aware of AI-based prediction tools. Community Initiatives: 44% of ophthalmologists reported conducting school screenings or parental counseling.

Conclusions: Indian ophthalmologists and optometrists predominantly rely on low-dose atropine and lifestyle modification. Adoption of advanced optical interventions (HALT/DIMS, Ortho-K, multifocals) and digital/AI tools is limited, particularly among non-pediatric ophthalmologists, due to awareness, cost,

and access barriers. The dual-survey design offers both a broad overview and deeper insight, underscoring the need for training, national guideline implementation, and affordable technologies in non-surgical myopia management.

Abstract No.: 202846

Panel No.: POS-0843

Prevalence of Refractive Errors Among Primary School Students Who Failed Vision Screening in the Philippines From 2022–2023

First Author: Jo Michael **MANIWAN**

Co-Author(s): Joanne **BOLINAO**, Patricia **CABRERA**, Anna Karen **LEE-ONG**

Purpose: The general objective of this study is to determine the prevalence of refractive errors among primary school children who failed vision screening from schools in the Philippines.

Methods: This is a retrospective, cross-sectional prevalence study on kinder and grade 1 students from schools in Marikina and Rizal from 2022 to 2023 who failed the vision screening using the vision screening kit with a LEA chart. The students were examined in the Rizal Medical Center for eye evaluation and cycloplegic refraction. The prevalence of undetected errors of refraction was computed for the sample population and for selected demographic variables (age, gender and location).

Results: Among 1,293 students, the prevalence for vision-screening failure was 23.36%. The most common refractive error among the subjects was hyperopia with astigmatism (43.11%). Among the 283 subjects who failed the vision screening, 168 (59.36%) were prescribed glasses.

Conclusions: Under one-fourth of kinder and grade 1 students from Marikina and Rizal failed vision screening. Hyperopia with astigmatism was the most common refractive error among the subjects, consistent with current data in the Philippines.

Abstract No.: 203269

Panel No.: POS-0855

Profile of Retinopathy of Prematurity in North India: A Tertiary Care Experience

First Author: Nikita **DASH**

Co-Author(s): Deepak **CHOUDHURY**

Purpose: To study the demographics, risk factors, and pattern of retinopathy of prematurity (ROP) at a tertiary care center in North India.

Methods: This was a prospective, non-randomized, hospital-based study where neonates meeting screening criteria were screened for ROP from July 2023 to June 2025. Diagnosed cases were followed up till spontaneous regression or complete regression following treatment. Cases requiring treatment were

treated with laser photocoagulation and/or anti-VEGF injections as per the early treatment of ROP guidelines.

Results: Majority of the neonates screened were males (65.2%) and inborn babies (64.3%). ROP was detected in 125 neonates (38.5%) of which 81(64.8%) were males and 44(35.2%) were females. In the multivariate binary logistic regression analysis, three factors were identified as statistically significant independent predictors. Lower gestational age at birth was significantly associated with an increased risk of ROP (OR=0.83, 95% CI:0.71-0.97, $p=0.022$). Outborn status was a strong risk factor (OR=3.21, 95%CI: 1.77-5.81, $p<0.001$) with pre-term neonates born outside the center having a threefold higher odds of developing ROP. Neonates maintained on room air had substantially lower odds of developing ROP than those requiring assisted ventilation (OR=0.26, 95% CI: 0.13-0.50, $p<0.001$).

Conclusions: Higher incidence and disease severity are markers of subpar NICU practices that result in severe ROP in extremely premature and outborn cases. Factors that might cause pre-term births should be studied in depth to help identify at-risk cases and curb disease burden.

Abstract No.: 205285

Panel No.: POS-0878

Prognostic Value of Fixation Stability for Functional Outcomes and Recurrence in Exotropia Surgery

First Author: Jingsen CHEN

Co-Author(s): Shuai CHANG, Junyi LIU, Jiangtao LOU, Xin MA, Jiahe NIE, Tong WU, Xinping YU

Purpose: This study aims to investigate the effect of strabismus surgery on fixational stability and evaluate whether any improvement in fixational stability correlates with the long-term stability of the surgical outcome and enhancement in visual function.

Methods: Fifty patients (31 intermittent exotropia, 19 constant exotropia; age 10–30) and 36 controls were studied to evaluate the effects of strabismus surgery on fixation stability, contrast sensitivity, prism diopter, stereoacuity, and binocular fusion. Postoperative assessments were conducted 2 months after surgery. Fixational stability was recorded with an eye tracker during monocular fixation, and quantified as the bivariate contour ellipse area (BCEA). Contrast sensitivity was tested across six spatial frequencies. Patients were subgrouped by BCEA improvement (post $\geq$ pre) and recurrence status (exodeviation $\leq 10^\Delta$, esodeviation $\leq 8^\Delta$).

Results: Preoperatively, fixation stability (BCEA) was significantly worse in the dominant eye than controls, with the non-dominant eye showing a near-significant reduction. Postoperatively, BCEA of both eyes was comparable to controls. Though not statistically

significant, the dominant eye tended to improve while the non-dominant eye tended to deteriorate. Patients with improved BCEA postoperatively showed better contrast sensitivity at 3 CPD and stereopsis at near, without differences in deviation angles or binocular fusion between improved and non-improved BCEA groups. Recurrence patients exhibited significantly worse preoperative dominant-eye BCEA than non-recurrence patients, whereas postoperative BCEA did not differ between groups.

Conclusions: Strabismus surgery improved fixation stability. Patients with postoperative BCEA gains showed better functional outcomes, while poor preoperative stability predicted recurrence, suggesting BCEA as a prognostic marker and linking fixational instability with reduced contrast sensitivity.

Abstract No.: 207270

Panel No.: POS-0905

Rapidly Progressive Proptosis in a 2-Month-Old Infant With Capillary Hemangioma Mimicking As Rhabdomyosarcoma

First Author: Jill GENUINO

Co-Author(s): Ma.Rebecca ABES-SERVERA, Alex SUA, Clarissa Marie TADY, Honeylen Maryl TEO

Purpose: To report a case of a 2-month-old male preterm infant with retinopathy of prematurity who presents with a rapidly progressive protrusion of the left orbit mimicking an orbital rhabdomyosarcoma.

Methods: This is a case report.

Results: A 2-month-old preterm male infant sought consult due to rapid progressive protrusion of the left orbit. Clinical examination showed bluish discoloration on the middle 1/3 of the upper eyelid and axial proptosis exposing the lower palpebral conjunctiva. Contrast computed tomography (CT) scan of the brain and orbits requested by the previous attending physician described it as optic nerve glioma. However, contrasted magnetic resonance imaging (MRI) of the brain and orbits with fat suppression revealed more to be an orbital hemangioma measuring 2.5 cm. Oral propranolol 2.8mg/tablet was administered daily (at 1-2 mg/kg/day). The infant was monitored by the Pediatrics service. No side effects such as bradycardia were noted. A significant reduction of the proptosis was seen as early as one week, and a significant resolution was noted after six months of completion of oral propranolol.

Conclusions: This case report aims to describe that there are unusual presentations of the capillary hemangioma. We presented a 2-month-old infant with rapid progression of unilateral proptosis and contrast-enhancing retroorbital mass mimicking a malignant tumor like rhabdomyosarcoma. We should bear in mind that vascular lesions may also present acutely, and a therapeutic trial of propranolol is valuable in

the management of these vascular tumors, such as capillary hemangioma.

Abstract No.: 204768

Panel No.: POS-0868

Research on Audiovisual Attention Function in Patients With Intermittent Exotropia

First Author: Tong WU

Co-Author(s): Jinsen CHAN, Shuai CHANG, Junyi LIU, Jiangtao LOU, Xin MA, Jiahe NIE, Xiping YU

Purpose: To investigate attentional resource allocation during audiovisual dual-tasking in intermittent exotropia (IXT) patients and evaluate attention functional improvement after strabismus surgery.

Methods: Thirteen IXT patients (preoperative and 2-month postoperative) and ten healthy controls performed auditory n-back tasks while maintaining fixation on a central target. Accuracy rates and reaction times were recorded. Three comparative analyses were conducted: 1) preoperative IXT vs controls, 2) IXT preoperative vs postoperative, and 3) postoperative IXT vs controls.

Results: Compared with the normal control group, preoperative IXT patients showed significantly lower accuracy in all levels of auditory tasks (0-back: 90.71% vs 99.17%, $P < 0.001$; 1-back: 76.60% vs 92.50%, $P < 0.001$; 2-back: 31.77% vs 55.57%, $P = 0.001$; 3-back: 22.12% vs 32.91%, $P = 0.04$), with no statistically significant differences in reaction times. Postoperatively, accuracy improved in 0-back to 2-back tasks (0-back: 90.71% $\rightarrow$ 94.55%, $P = 0.04$; 1-back: 76.60% $\rightarrow$ 85.26%, $P = 0.01$; 2-back: 31.77% $\rightarrow$ 45.05%, $P = 0.03$), while the 3-back task also showed an improving trend (22.12% $\rightarrow$ 32.69%, $P = 0.05$). No significant differences were found in reaction times. Compared with the normal group, postoperative IXT patients still had lower accuracy in 0-back to 2-back tasks (0-back: 94.55% vs 99.17%, $P = 0.01$; 1-back: 85.26% vs 92.50%, $P = 0.03$; 2-back: 45.05% vs 55.57%, $P = 0.02$), but no significant difference in the 3-back task (32.69% vs 32.91%, $P = 0.96$). No significant differences in reaction times were observed between the two groups.

Conclusions: IXT patients exhibit auditory attention deficits. Strabismus surgery effectively improves auditory attention function for low-to-moderate cognitive load tasks, but gaps persist compared to normal populations, suggesting that some auditory attention deficits may be persistent.

Abstract No.: 204999

Panel No.: POS-0872

Restoration of Binocular Single Vision in a Child With Residual Intermittent Exotropia and Secondary Convergence Insufficiency: A Case Report of Structured Orthoptic Training

First Author: Tsz Hin MAK

Co-Author(s): Kam Chuen CHAN, Sze Lok CHONG, Simon Tc KO, Peter Kc LEUNG, Ho On WONG, Patrick Kw WU

Purpose: Managing intermittent exotropia (IXT) with convergence insufficiency (CI) is clinically challenging. Although surgery can reduce deviation, functional binocular outcomes may remain suboptimal. This report describes the progression from absent to functional binocular single vision (BSV) in a child who underwent surgery followed by structured orthoptic training.

Methods: A 4-year-old female presented with IXT and secondary CI (20 Δ exo near, 25 Δ exo distance). Baseline findings included a Newcastle Control Score (NCS) of 7, visual acuity of 0.5 in each eye, absent stereopsis, alternating suppression, no fusional reserves, and convergence failure. At age 5, she underwent left lateral rectus recession and medial rectus resection, reducing deviation to 6 Δ exo near and 12 Δ exo distance. However, binocularity remained unchanged, with persistent suppression and convergence failure. She subsequently underwent 20 monthly sessions of structured orthoptic training, incorporating anti-suppression, convergence, and fusional vergence exercises.

Results: Sensory fusion (Worth 4 Dot) was first demonstrated at session 6, with measurable stereopsis emerging at session 8 (340" Frisby; 50" FD2). At age 7, deviation measured 12 Δ exo near and 10 Δ exo distance. Visual acuity improved (0.7 in each eye). Stable BSV was demonstrated at near and distance (85" Frisby, 240" TNO, 20" FD2). Fusional reserves improved (near: 4 Δ BO/4 Δ BI; distance: 2 Δ BO/2 Δ BI), convergence to 7 cm, and NCS reduced to 2.

Conclusions: Structured orthoptic training may achieve functional outcomes in cases where surgery alone is insufficient. This case represents one of the successful outcomes within our service, supporting the need for prospective studies to explore the effectiveness and optimal timing of intervention.

Abstract No.: 202384

Panel No.: POS-0836

Results of the Analysis of Visual Functions in Children Who Have Had Brain Tumors

First Author: Igor **AZNAURYAN**Co-Author(s): Karmen **ARTENIAN**, Satenik **AGAGULIAN**, Victoria **BALASANYAN**, Elena **GLEBOVA**, Natalia **KURYSHEVA**, Alexander **LAVER**, Svetlana **RYCHKOVA**, Natalia **SHESTAK**, Alina **TOLMACHEVA**

Purpose: To study the structure of ophthalmopathology and the state of visual functions in patients with operated brain tumors in the period of remission.

Methods: The results of ophthalmological examination and outpatient card data of 224 children aged 7 to 17 (average 11.7 ± 0.6) years with operated brain tumors in remission were analyzed.

Results: Among children with PONA, there was a comparable proportion of emmetropic (33,3% of cases) and myopic (37,3% of cases) refractions. The predominant type of refraction in children without PONA was emmetropia (49,3% of cases). The number of children with strabismus was higher in the group of children with PONA than without PONA (39,2% vs 16,9% of cases, $p < 0.001$). Strabismus was most often observed in children with operated tumors of the cerebellum and the IV ventricle, probably as a symptom at a distance due to intracranial hypertension. The number of children with nystagmus was higher in the group of children with PONA (15,7 of cases) than without PONA (4,2% of cases). Pupillary disorders in the form of anisocoria and decreased pupillary reaction were detected in 9 (5,9%) children with PONA and were not observed in children without PONA. Retinal angiopathy and lagophthalmos with facial nerve insufficiency were observed in several children in both groups.

Conclusions: The results of the study indicate the need for regular, long-term and detailed monitoring of the state of visual functions (including visual memory and spatial perception) in children who have had a brain tumor.

Abstract No.: 205758

Panel No.: POS-0883

Risk Factors Associated With Early Recurrence Following the Recession-Plication Procedure for the Management of Basic Type Intermittent Exotropia in Children

First Author: Jingjing **JIANG**Co-Author(s): Di **CAO**, Li **LI**, Yuanyuan **REN**

Purpose: The study aimed to identify risk factors associated with early recurrence (within 6 months) following unilateral lateral rectus recession combined with medial rectus plication (RP) procedure for children with basic type intermittent exotropia (IXT).

Methods: The cohort study enrolled children with basic type IXT who underwent unilateral RP procedure between January 2022 and December 2023. Based on the postoperative ocular alignment at near (33 cm) 6 months postoperatively, patients were divided into the early recurrence group (exodeviation >10 PD) and the early success group (exodeviation or esodeviation ≤ 10 PD). Preoperative, early (1 week), mid-term (6 months), and long-term (>12 months) assessments included deviation at distance and near, fusion, and stereopsis. Multivariate logistic regression and ROC curve analyses identified predictors of recurrence and long-term motor outcomes.

Results: Ninety-one patients were enrolled, with a mean age of 8.10 ± 3.06 years and a mean follow-up of 16.81 months. At 6 months postoperatively, 31 patients were in the early recurrence group and 60 in the early success group. Univariate analysis showed significant differences in deviation at near and distance within 1 week postoperatively between the two groups ($P=0.004$ for distance; $P<0.001$ for near). Multivariate logistic regression identified deviation at near within 1 week postoperatively as an independent predictor of early recurrence (OR=0.738, 95% CI: 0.609–0.895, $P=0.002$). ROC curve analysis revealed a moderate predictive value of deviation within 1 week for early recurrence (AUC=0.7315, optimal cutoff value: -1.00 PD, sensitivity=67.74%, specificity=80.00%). For long-term outcomes, deviation at nearly 6 months postoperatively showed high predictive accuracy (AUC=0.8461, optimal cutoff value: -7.50 PD, sensitivity=85.71%, specificity=82.54%). At final follow-up, the patients in the early success group had a significantly higher proportion of fusion (95.00% vs. 77.42%, $P=0.011$).

Conclusions: Deviation at near within 1 week postoperatively is a predictive indicator of early recurrence following RP for basic type IXT in children, with mild overcorrection associated with a lower risk of early recurrence. Deviation at near 6 months postoperatively is a robust predictor of long-term motor outcomes. Follow-up within 6 months postoperatively is crucial for IXT patients.

Abstract No.: 204417

Panel No.: POS-0861

Risk Factors and Predictors of Botulinum Toxin Type A Re-Injection in Acute Acquired Concomitant Esotropia Patients

First Author: Jiayu **CHEN**Co-Author(s): Jing **FU**, Jie **HAO**

Purpose: To identify independent risk factors and predictors for repeat botulinum toxin type A (BTA) injections beyond 6 months in acute acquired concomitant esotropia (AACE) patients, providing a scientific foundation for risk-stratified clinical management.

Methods: A case-control study enrolled AACE patients treated at Beijing Tongren Hospital (July 2021–January 2025). All received initial BTA injections with 6-month follow-up; subset underwent reinjection post-6 months. Comprehensive ophthalmic examinations and questionnaires were administered at all timepoints. Binary logistic regression analyzed reinjection risk factors.

Results: Fifty-six (47.9%) required a second injection within 6 months. Although baseline characteristics were largely similar between groups, the presence of anisometropia (≥ 1.00 D) was significantly higher in the re-injection group. Multivariable analysis identified baseline anisometropia (OR=2.789) and postoperative distance deviation at 3 months (OR=1.315) as independent risk factors for re-injection. A prediction model incorporating the distance deviation at 3 months achieved an AUC of 0.810, with a cut-off value of >5.23 PD providing 82.0% specificity.

Conclusions: Anisometropia is a robust baseline predictor for repeat BTA injections in AACE. Residual distance deviation at 3 months postoperatively serves as a critical dynamic indicator of treatment response and reinjection risk, enabling early identification of high-risk patients.

Abstract No.: 200164

Panel No.: POS-0814

Safety and Efficacy of Atropine 0.05% Versus 0.01% for Prevention of Myopic Progression in Children: A Randomized Clinical Trial

First Author: Siddharam JANTI

Co-Author(s): Kalpana MALI, Bhushan, Srividya, Hari Kumar S

Purpose: This study aimed to evaluate the effectiveness and safety of 0.01% and 0.05% atropine eye drops in managing myopia progression in children compared to a placebo.

Methods: This randomized interventional study was conducted from March 2022 to May 2023 at the Institute of National Importance, India. A total of 272 children aged five to 16 years, with myopia between -1.0 D and -6.0 D and annual progression greater than 0.5 D, were enrolled. Participants were randomly assigned into three groups: Group A ($n=88$, atropine 0.01%), Group B ($n=90$, atropine 0.05%), and Group C ($n=94$, placebo). Comprehensive ophthalmic examinations, including cycloplegic refraction, axial length measurement, and fundus evaluation, were performed at baseline, six weeks, 12 weeks, and at one year. Changes in refractive error, axial length, accommodation, and pupil size were analyzed.

Results: Both atropine treatments effectively slowed myopia progression compared to placebo. Atropine 0.05% significantly reduced refractive progression (0.263 ± 0.03 D) and axial elongation (0.138 ± 0.22

mm) versus placebo (0.759 ± 0.34 D and 0.367 ± 0.33 mm, respectively). The 0.01% atropine group showed a less pronounced but still significant reduction (0.319 ± 0.05 D and 0.241 ± 0.22 mm, respectively). Both atropine groups experienced increased near point of accommodation and pupil size, more notably in the 0.05% group. Mild adverse effects, including near vision difficulties and photophobia, were reported but did not significantly impact patient compliance.

Conclusions: Atropine 0.05% is more effective than 0.01% atropine and placebo in slowing myopia progression.

Abstract No.: 206636

Panel No.: POS-0897

Seeing the Difference: A Comparative Case Report on Clinical Characteristics of Unilateral and Bilateral Retinoblastoma in Children

First Author: Atika ANDIANTI

Co-Author(s): Primawita Oktarima AMIRUDDIN, Sesy CAESARYA, Irawati IRFANI, Feti KARFIATI, Mayasari Wahyu KUNTORINI

Purpose: Retinoblastoma is the most common malignant ocular tumor of childhood and one of the most common pediatric malignant tumors, which is associated with mutations in the RB1 gene. Retinoblastoma could be unilateral or bilateral. These case reports aim to explain the differences in clinical manifestations of unilateral and bilateral retinoblastoma.

Methods: The first case involved a 2-year-old boy who presented with a chief complaint of leukocoria of the right eye. He was diagnosed with Intraocular Retinoblastoma Group D Advanced in the right eye. The patient was planned to have enucleation of the right eye and staging. Second case presents a 2-month-old boy with chief complaint of leukocoria of right eye and esotropia, he was diagnosed with Intraocular Retinoblastoma Group D of right eye and Group B of left eye, the patient was planned for chemotherapy and followed by focal therapy.

Results: Hereditary cases of retinoblastoma are diagnosed in children under 1 year of age and mostly present with bilateral retinoblastoma. Sporadic cases are diagnosed between 1 and 3 years of age and usually present with unilateral retinoblastoma, even though bilateral cases are also possible. Bilateral cases present with multifocal tumors, while unilateral cases mostly present with a unifocal tumor. International Classification of Retinoblastoma (ICRB) of Shields/Philadelphia and Murphree/CHLA are used to determine retinoblastoma severity.

Conclusions: Cases without a family history have a chance to manifest unilateral or bilateral retinoblastoma. Clinical manifestations and adequate examinations are important to determine the severity

and management of retinoblastoma. Treatment in the early stages holds a good prognosis for survival and salvage of visual function.

Abstract No.: 205780

Panel No.: POS-0886

Sequential Surgical Management of Unilateral Dissociated Vertical Deviation With Exotropia in an Adult With Anisoamblyopia

First Author: Rizqi Suryani PUTRI

Co-Author(s): Rozalina LOEBIS

Purpose: To describe diagnostic nuances and staged surgical management of unilateral dissociated vertical deviation (DVD) associated with exotropia in an anisoamblyopia adult patient.

Methods: A 36-year-old female with a history of upward and outward misalignment of the left eye (LE) since the age of four, with reduced vision in the LE but no diplopia. Best corrected visual acuity was 6/6 in the right eye (RE) and 6/9.5 in the LE. Examination revealed left exotropia and hypertropia with upward drift on occlusion. Prism cover test at distance (6m) showed 40 prism diopters (PD) exotropia and 14 PD vertical deviation. Initial horizontal alignment was addressed with left lateral rectus recession (8 mm) and medial rectus resection (6.5 mm). One month later, residual measured 20 PD vertical deviation and 8 PD exotropia, prompting planned superior rectus (SR) recession. Intraoperatively, dense cicatricial tissue was found on the superior rectus and released. A shorter SR recession of 7 mm was performed instead of the intended 9 mm. This was followed by a 4 mm inferior rectus resection.

Results: Staging the horizontal correction clarified the magnitude of the vertical dissociation. Postoperatively, the patient was attaining near orthophoria and a minimal residual distance deviation of 6 PD. This result made a tremendous psychosocial impact on the patient (Adult Strabismus Questionnaire score = 82.5).

Conclusions: DVD associated with exotropia in anisometropic amblyopia is uncommon. A sequential approach can unmask and more accurately quantify vertical dissociation after horizontal alignment, guiding tailored vertical muscle surgery. As a result, it significantly improve ocular alignment, visual function, patient's confidence and quality of life.

Abstract No.: 205988

Panel No.: POS-0890

Single Muscle Nishida's Procedure for Large Angle Combined Horizontal and Vertical Deviations

First Author: Sowmya RAVEENDRA MURTHY

Purpose: To present a case series of paralytic squints (large angle combined horizontal and vertical

deviations) treated by the Single Muscle Modified Nishida's (SMN) procedure.

Methods: Retrospective analysis of 6 cases of paralytic strabismus treated with SMN procedure. This included two Cases of MED presenting with XT and hypotropia, and 4 cases of IR palsy with hypertropia (HT) with exotropia (XT) treated with a single muscle modified Nishida procedure were analysed. Four cases of IR palsy with hypertropia ranging from 40-55 pd and exotropia of 20-45 pd. Both underwent superior rectus recession with single muscle (LR or MR) modified Nishida's procedure and recession or plication of (LR or MR) to correct the XT. Two cases of MED with hypotropia of 16-20 and XT of 16-55 pd. Both underwent LR SMN procedure with unilateral or bilateral MR plication to correct XT and HoT.

Results: Lateral rectus SMN was done in 5 cases, and Medial rectus in one case. The vertical deviation reduced from 16-45 pd to 0 to 12 pd with the correction obtained from SMN ranging between 20 to 25 pd. Further, it spared one horizontal recti that could be used in the correction of horizontal deviation (XT) in the same sitting. The SMN procedure used one horizontal rectus muscle to correct the vertical and the other to correct the horizontal deviation.

Conclusions: This is the first case report of SMN procedure for vertical deviation in paralytic strabismus. Seems to be useful option in cases where there is a higher risk of anterior segment ischemia

Abstract No.: 205218

Panel No.: POS-0876

Six-Year Evolution of Paediatric Optic Disc Drusen-Associated Anterior Ischaemic Optic Neuropathy

First Author: Ka Lam Janice WU

Co-Author(s): Tin Kin Jonathan CHAN, Gerard LYDON

Purpose: To describe a six-year clinical course of optic disc drusen-associated anterior ischaemic optic neuropathy (ODD-AION) in a paediatric patient, emphasising the value of longitudinal structural and functional monitoring. Paediatric ODD-AION is extremely rare, and this case provides insight into its early evolution, progression, and management.

Methods: A 9-year-old girl was referred to ophthalmology with asymptomatic right optic disc swelling. She underwent serial ophthalmic assessments over six years, including visual field testing, optical coherence tomography (OCT), magnetic resonance imaging (MRI), and fundus autofluorescence.

Results: Between ages 11-13, progressive inferior arcuate scotoma and retinal nerve fiber layer thinning developed in the right eye, with stable vision. At age 15, she presented with sudden right visual loss, an inferior altitudinal defect, and a relative afferent pupillary defect. Bilateral optic disc drusen were

confirmed on autofluorescence and ultrasound. OCT demonstrated diffuse retinal nerve fiber layer and ganglion cell layer thinning in the right eye. MRI and blood investigations were unremarkable. Hydration counselling and observation were advised. At six months, visual acuity partially recovered (LogMAR 0.6 right, 0.1 left) with a stable field defect.

Conclusions: This case demonstrates that paediatric ODD-AION may follow a prolonged, clinically silent course before acute vision loss. Serial OCT and perimetry are essential for detecting progressive optic nerve damage, even in asymptomatic patients. Careful long-term monitoring is warranted, as apparent visual stability may mask ongoing structural change and risk of ischaemic events.

Abstract No.: 206638

Panel No.: POS-0898

Social Impact of Strabismus

First Author: Tasnima RAHMAN

Co-Author(s): Mostafa HOSSAIN, Nabila RAHMAN

Purpose: This study aims to explore the social and psychological consequences of untreated squint and to highlight the importance of timely intervention through the combined efforts of parents, teachers, and healthcare providers.

Methods: A review of multiple case scenarios was undertaken to assess the challenges faced by individuals with squint. The cases illustrated the impact of untreated squint on education, career opportunities, interpersonal relationships, and self-image. Information was gathered through clinical encounters, focusing on both the social difficulties and the improvement observed after medical and surgical management.

Results: The findings revealed that untreated squint often leads to low self-esteem, social isolation, and bullying during childhood. Many patients reported limitations in career prospects and challenges in forming social or marital relationships. Case examples included unemployed adults, students with reduced confidence, and homemakers experiencing social stigma. Conversely, individuals who received timely diagnosis and treatment demonstrated improved psychological well-being, enhanced social acceptance, and better professional opportunities. The supportive roles of parents in early recognition, teachers in addressing classroom challenges, and doctors in dispelling myths and providing effective treatment were identified as crucial in improving outcomes.

Conclusions: Squint, if left untreated, imposes significant social, psychological, and professional burdens. Early detection and timely management, combined with strong emotional and social support systems, are essential to improving the lives of affected individuals. Raising awareness and encouraging prompt medical consultation can transform the long-term

social impact of squint into positive and fulfilling life outcomes.

Abstract No.: 204996

Panel No.: POS-0873

Structured Orthoptic Binocular Vision Training in Pediatric Intermittent Exotropia: A Four-Year Retrospective Analysis

First Author: Ho On WONG

Co-Author(s): Kam Chuen CHAN, Sze Lok Gabriela CHONG, Simon Tc KO, Peter LEUNG, Tsz Hin MAK

Purpose: Intermittent exotropia (IXT) is a prevalent childhood strabismus with varied management approaches. Historically, surgery has been the mainstay of treatment, particularly for patients with poor control or significant deviations. However, evidence supporting the efficacy of structured orthoptic training remains limited, especially among Asian populations. This study evaluated the clinical outcomes of a 4-year structured orthoptic training program in children with IXT.

Methods: A retrospective analysis was conducted on 120 patients (aged 3–18 years) diagnosed with basic IXT who completed structured orthoptic training between 2020 and 2024. Outcomes were compared with 120 age-matched controls who declined training and received monitoring only. This program comprised anti-suppression, convergence, and fusional vergence exercises delivered in the clinic and at home. Primary outcome measures included Newcastle Control Score (NCS), angle of near deviation (AoND), angle of distance deviation (AoDD), and fusional vergence ranges.

Results: Significant improvements were observed across all measured parameters in the training group. Mean NCS improved from 4.2 ± 1.95 to 2.0 ± 1.97 ($p < 0.001$). AoND reduced from 15.2 ± 7.4 PD to 10.9 ± 6.3 PD ($p < 0.001$), and AoDD from 20.5 ± 7.2 PD to 13.0 ± 7.2 PD ($p < 0.001$), with 59.8% achieving a reduction of >5 PD. Near base-out fusional reserves increased from 10.5 ± 7.1 PD to 19.6 ± 8.9 PD ($p < 0.001$), while distance base-out reserves improved from 2.5 ± 4.6 PD to 13.0 ± 7.7 PD ($p < 0.001$).

Conclusions: Structured orthoptic training was associated with meaningful improvements in IXT control, deviation magnitudes, and fusional reserves. Importantly, over two-thirds (69%) of patients reported no intention to pursue surgery, indicating a potential role in reducing surgical demand. Larger prospective studies are warranted to confirm the long-term stability and effectiveness of this program.

Abstract No.: 203022**Panel No.: POS-0849****Study on the Impact of Early Intervention on Retinopathy of Prematurity***First Author: Yamei LIN*

Purpose: Exploring the impact of early intervention on retinopathy of prematurity, providing evidence for early intervention in premature infants.

Methods: A total of 207 cases from our hospital in the past two years were randomly selected as the premature follow-up group, and an early intervention plan using ranibizumab injection was adopted. These cases were compared with 69 premature children who were lost to follow-up and 138 premature children who were similar to the follow-up group. The incidence of adverse reactions, screening duration, and follow-up compliance during the screening period were observed in the three groups.

Results: The differences between the premature intervention group and the premature loss-to-follow-up group were significant ($P < 0.05$), and the premature follow-up group was significantly better than the premature loss-to-follow-up group ($P < 0.05$).

Conclusions: Early intervention can significantly promote the recovery of retinopathy of prematurity and improve the health of affected infants.

Abstract No.: 204091**Panel No.: POS-0859****Subconjunctival Versus Combined Subconjunctival and Subscleral Flap Mitomycin C in Pediatric Trabeculectomy: A Randomized Clinical Study***First Author: Ahmed ALI*

Purpose: To compare the safety and efficacy of trabeculectomy augmented by subconjunctival application of Mitomycin C (MMC) versus combined subconjunctival and subscleral flap MMC application in primary congenital glaucoma (PCG).

Methods: This prospective, randomized, interventional study included children aged Results: At 12 months, the percent IOP reduction for group A was 45.6% and for group B 46.8%. Qualified success was achieved in 68% and 72% of eyes in groups A and B, respectively. Failure tended to occur earlier in group B. Kaplan-Meier analysis for complete success showed a cumulative probability of survival of 53% for group A and 40% for group B (P -value=0.38). Needling was more successful in group B with 60 % total success compared to 33.3% in group A (P -value=0.39).

Conclusions: The subscleral flap application of MMC in conjunction with subconjunctival MMC application in pediatric trabeculectomy does not appear to result in additional benefit regarding safety or efficacy, when compared to subconjunctival application alone.

Abstract No.: 206874**Panel No.: POS-0902****Successful Inferior Rectus Advancement for Managing Vertical Diplopia in Traumatic Extraocular Muscle Rupture: A Case Report***First Author: Gusti Gede SUARDANA**Co-Author(s): Devina Nur ANNISA, Hasiana LUMBAN GAOL*

Purpose: To report a successful inferior rectus (IR) muscle advancement to manage vertical diplopia in traumatic IR rupture.

Methods: A 43-year-old woman presented with a chief complaint of binocular vertical diplopia and a higher position of her left eye (LE) that had persisted for nine months prior to admission. She reported a history of ocular trauma preceding the onset of symptoms. Ophthalmological examination revealed 20 degrees of hypertropia in the LE, along with a limitation of downward gaze. Intraoperative exploration revealed a new insertion of the IR muscle located approximately 3.5 mm posterior to its original insertion site. The IR muscle was then sutured 3 mm posterior to its new insertion point, disinserted, and advanced to 6.5 mm behind the limbus.

Results: Postoperatively, the patient achieved orthophoria in primary gaze and reported no residual diplopia.

Conclusions: Extraocular muscle rupture can result from trauma or injury and may presents as incomitant strabismus. Thorough examination and intraoperative assessment are essential to identify the affected muscles and achieve good surgical outcomes to manage patient's symptoms.

Abstract No.: 200650**Panel No.: POS-0819****Surgical Approaches to Secondary Gaze Diplopia: A Case Series***First Author: Juan Lorenzo SIMPAO**Co-Author(s): Toshiaki GOSEKI, Hiromi ONOUCHI*

Purpose: We report a series of cases in which residual diplopia in secondary gaze persisted despite successful alignment in the primary position following strabismus surgery. These cases required additional surgical intervention to address the diplopia in secondary gaze.

Methods: Case series.

Results: Case 1: A 70-year-old female with right superior oblique palsy underwent a 2mm recession with nasal transposition of the left inferior rectus, which improved diplopia in primary gaze. Residual diplopia in left gaze persisted postoperatively and was resolved with 4mm recession of the right medial rectus. Case 2: A 57-year-old female with both thyroid eye disease and myasthenia gravis underwent steroid therapy and orbital decompression. To treat

residual diplopia, 4.5mm inferior rectus recession and 6.5mm medial rectus recession on the right eye were performed, resolving diplopia in primary gaze. Persistent diplopia in right gaze improved after 4mm medial rectus recession in the left eye. Case 3: A 42-year-old male underwent bilateral lateral rectus recession and medial rectus resection on the right eye for intermittent exotropia. Although ocular alignment in primary gaze improved, diplopia was noted in right gaze postoperatively. Medial rectus recession 3.5mm on the left eye was performed, leading to symptomatic improvement.

Conclusions: Diplopia limited to secondary gaze is not typically considered an indication for surgical intervention when alignment in the primary position is satisfactory. However, in selected cases where residual symptoms interfere with daily activities, additional surgery targeting the secondary gaze deviation can be beneficial. Accurate assessment of ocular motility and individualized evaluation of visual needs are essential for optimal management.

Abstract No.: 200274

Panel No.: POS-0817

Surgical Considerations for the Management of Unilateral Pediatric Cataract

First Author: Rebecca MURTAZA

Purpose: Cataract surgery in younger children possesses different challenges and potential complications compared to those encountered in the adult population. To discuss the clinical profile and presentation of children with unilateral cataract.

Methods: A video will be presented of different unilateral cataract surgeries.

Results: Video presentation.

Conclusions: The pediatric age group with unilateral cataract requires special surgical considerations.

Abstract No.: 204837

Panel No.: POS-0867

Surgical Outcomes of Two-Muscle Versus Three- or Four-Muscle Procedures in Large-Angle Exotropia: A Systematic Review and Meta-Analysis

First Author: Christy MAGDALENA

Co-Author(s): Anna Puspitasari BANI

Purpose: Large-angle exotropia (XT) significantly impairs binocular vision and quality of life, and surgical correction remains the mainstay of treatment. Two-muscle procedures are commonly performed but may be insufficient for large deviations, prompting the use of three- or four-muscle surgeries. This review compares the outcomes of these approaches in large-angle XT.

Methods: A systematic search of PubMed, ProQuest, Scopus, and ScienceDirect was conducted through July 2025. Eligible studies included case series or cohorts reporting primary XT of at least 50 PD managed with two-, three-, or four-muscle procedures. The primary outcome was motor success, with complications as secondary outcomes. Pooled success rates were calculated using meta-analysis in R.

Results: Nine studies met the inclusion criteria: six evaluated two-muscle procedures (261 patients) and three evaluated three- or four-muscle procedures (80 patients). Two-muscle surgeries yielded a pooled success rate of 71% (95% CI: 62%-81%) with substantial heterogeneity ($I^2 = 62\%$, $p = 0.02$). Sensitivity analysis improved the success rate and heterogeneity to 77% (95% CI: 71%-82%; $I^2 = 0\%$, $p = 0.95$). Three- or four-muscle surgeries showed a higher success rate, 83% (95% CI: 75%-91%; $I^2 = 0\%$, $p = 0.55$). Abduction deficit was the most common complication following two-muscle surgeries.

Conclusions: Both approaches are effective. Two-muscle surgery is a practical first-line option for deviations up to ~60 PD, especially in resource-limited settings. Three- or four-muscle procedures offer higher success for larger deviations. Surgical planning should be individualized, balancing deviation magnitude, risk of abduction deficits, and available resources.

Abstract No.: 203244

Panel No.: POS-0852

Surgical Treatment Experience of a Case of Childhood Acute B-Lymphoblastic Leukemia Complicated With Bilateral Vitreous Hemorrhage

First Author: Fang CHAI

Co-Author(s): Xiquan ZHAO

Purpose: Cases of childhood acute leukemia complicated with bilateral vitreous hemorrhage are clinically rare. Through a retrospective study of one case and a review of recent literature reports, we systematically analyzed the pathogenesis and clinical manifestations of fundus hemorrhage associated with acute leukemia in children.

Methods: A female patient, 3 years old, presented to the Ophthalmology Department of Xi'an People's Hospital (Xi'an Fourth Hospital) due to the inability to see with both eyes for 1 month. Examinations, including binocular visual acuity, intraocular pressure, slit-lamp examination, and ocular B-scan ultrasound, were performed to confirm the diagnosis.

Results: One month prior, the child was diagnosed with Acute B-lymphoblastic leukemia. Ocular B-scan suggested: Bilateral vitreous hemorrhage; retinal detachment could not be ruled out. Staged surgeries were scheduled: the right eye underwent vitrectomy combined with silicone oil tamponade, and the left

eye underwent vitrectomy combined with sterilized air tamponade. Silicone oil removal was performed in the right eye 8 months postoperatively. At a follow-up visit 1 year after oil removal, the child's visual acuity was 0.6 in both eyes, and the fundus condition was stable.

Conclusions: The clinical symptoms of leukemia infiltrating the eye are becoming increasingly diverse. Tumor cells can invade almost all ocular structures. Understanding the ocular manifestations of leukemia is of great significance for the diagnosis and treatment of eye diseases. Under stable systemic conditions, ocular vitrectomy can effectively control the ocular condition and restore the patient's vision.

Abstract No.: 203885

Panel No.: POS-0858

The Association Between Refractive Error and Control in Intermittent Exotropia: A Prospective Cross-Sectional Study

First Author: Tsz Him YAU

Co-Author(s): Gabriela Sze Lok CHONG, Ka Wai KAM, Wai Hing TAM

Purpose: Intermittent exotropia (IXT) is a prevalent pediatric eye condition. Although refractive errors are common among children, their association with IXT control remains unclear. Previous research focused on convergence and stereopsis, few studies have directly examine the direct relationship between IXT control and refractive error types and magnitude. This prospective, cross-sectional and observational study aims to determine how refractive error of the participants with IXT is associated with the control of their deviation.

Methods: This study recruited 60 children with IXT from two orthoptic clinics in Hong Kong. Participants underwent a comprehensive orthoptic assessment. Habitual refractive corrections were assessed using focimetry, and IXT control was measured using the office-based control score. Spherical equivalent (SE) were used to classify participants into hypermetropia, emmetropia, and myopia groups. The Kruskal-Wallis test, correlation and multiple linear regression analyses were used to explored associations between SE and IXT control, adjusting for potential confounders.

Results: No significant differences in total, near, or distance control scores among the refractive error groups. SE also showed no significant correlation with office-based control scores. Multiple linear regression confirmed no association between refractive error and IXT control. Conversely, older age was significantly correlated with improved control scores ($p=0.44$, $p=.003$; $B=-0.33$, $p=0.04$).

Conclusions: In this Chinese cohort, types and severity of refractive error were not associated with IXT control, whereas older age predicted better control. These findings address a notable gap in Asian IXT literature

and suggest future research should prioritise other prognostic factors.

Abstract No.: 205390

Panel No.: POS-0881

The Binocular Visual Imbalance in Preoperative Intermittent Exotropia

First Author: Jiangtao LOU

Co-Author(s): Shuai CHANG, Jingsen CHEN, Rong JIANG, Junyi LIU, Xin MA, Jiahe NIE, Tong WU, Xinping YU

Purpose: To quantify and characterize the binocular visual imbalance in patients with intermittent exotropia (IXT) prior to surgical intervention.

Methods: This prospective study included 34 preoperative IXT patients and 19 matched healthy controls. A binocular orientation combination task was used to assess binocular visual imbalance across central, nasal, and temporal visual fields referenced to the sensory dominant eye at two spatial frequencies (1.5 and 6 cycles/degree, cpd). The sensory dominant eye was confirmed in the central visual field at two spatial frequencies. Binocular visual imbalance was quantified using the log contrast ratio between the non-dominant and dominant eyes, denoted as lgBP. The extent of binocular imbalance was quantified with the absolute value of lgBP, denoted as |lgBP|.

Results: In the central visual field, both controls and IXT patients tended to be dominated by the dominant eye, with IXT patients experiencing more pronounced imbalance at 1.5 cpd (0.15 vs. 0.22, $P=0.024$). In the nasal visual field, both controls and IXT patients favored the non-dominant eye. In the temporal visual field, controls still favored the non-dominant eye, whereas IXT patients favored the dominant eye (1.5cpd: -0.07 vs. 0.09, $P=0.036$; 6cpd: -0.20 vs. 0.01, $P=0.031$). Additionally, IXT patients showed significantly greater binocular visual imbalance than controls in the peripheral visual fields at the low spatial frequency (1.5 cpd, all $P<0.05$).

Conclusions: The eye dominance pattern in the temporal visual field of IXT patients was different from that of healthy controls. Patients with IXT exhibit more pronounced binocular visual imbalance at low spatial frequencies.

Abstract No.: 202399

Panel No.: POS-0835

The New Method for Calculating Surgical Treatment of Nystagmus Using the Computer Modelling System

First Author: Igor **AZNAURYAN**

Co-Author(s): Victoria **BALASANYAN**, *Evgenii* **MORDYUKOV**, *Magomed* **UZUEV**

Purpose: Nystagmus, characterized by involuntary rhythmic eye oscillations, is a severe pathology with a prevalence of 1:2000. It leads to significantly reduced visual acuity, oscillopsia, abnormal head posture, and serious social limitations, necessitating the development and refinement of effective treatment strategies. To present a novel comprehensive approach to the diagnosis and treatment of patients with nystagmus, focusing on modern surgical techniques aimed at reducing oscillation amplitude and improving visual functions.

Methods: The diagnostic algorithm included a comprehensive examination: standard and null-zone visual acuity assessment, cycloplegic refraction, videonystagmography for quantitative analysis of nystagmus parameters and precise identification of the null zone, as well as OCT and electrophysiological testing (VEP, ERG). Surgical intervention was performed using the proprietary "STRABO" mathematical modeling program to calculate the precise dosage of the operation on the extraocular muscles.

Results: The application of mathematical modeling enabled the precise dosing of surgery on the extraocular muscles to create a new null zone in the primary position. This resulted in a significant reduction in nystagmus amplitude, elimination of abnormal head posture, improvement of visual acuity, and, consequently, a marked enhancement in the patients' quality of life.

Conclusions: The proposed comprehensive approach, based on meticulous diagnostics and personalized surgical planning utilizing the «STRABO» software, represents a highly effective method for managing nystagmus. It allows for achieving stable functional and cosmetic outcomes, offering new possibilities for treating patients with this challenging condition.

Abstract No.: 204961

Panel No.: POS-0870

The Potential of Lutein-in-Extra-Virgin-Olive-Oil as an Oral Intervention for Retinopathy of Prematurity

First Author: Xiaoyuan **YE**

Co-Author(s): Wai-ching **LAM**, *Amy Cheuk Yin* **LO**

Purpose: Retinopathy of prematurity (ROP) is a leading cause of childhood blindness driven by oxidative stress and inflammation. While lutein shows therapeutic potential due to its antioxidant and anti-inflammatory

properties, its clinical efficacy remains controversial. We proposed that extra virgin olive oil (EVOO) could enhance lutein absorption and aimed to evaluate the effects of lutein-in-EVOO (LEVOO) in a mouse ROP model.

Methods: The mouse oxygen-induced retinopathy (OIR) model was employed. Neonatal C57BL/6J mice were exposed to 75% oxygen from postnatal day 7 (P7) to P12, followed by daily gavage of LEVOO (0.4, 1.8, and 3.6 mg/kg). Retinal function was evaluated on P17 using scotopic electroretinography (ERG). Retinal vasculature and microglia were assessed via immunohistochemistry. Proteomic analysis was performed to investigate changes in the retinal proteome.

Results: LEVOO at 3.6 mg/kg significantly improved retinal function, increasing b-wave amplitudes, and reduced both avascular and neovascular areas compared to those receiving EVOO alone. The number of activated microglia in avascular regions significantly decreased. GO enrichment analysis of differentially expressed proteins (DEPs) revealed clusters related to angiogenesis and cell adhesion between the OIR-challenged and control groups. DEPs between LEVOO-treated and OIR-challenged groups primarily focused on the negative regulation of macrophage chemotaxis.

Conclusions: LEVOO administration improved retinal function, suppressed pathological neovascularization, and reduced inflammation in the OIR model. Proteomic findings provided mechanistic insights into LEVOO's benefits, reinforcing lutein's anti-inflammatory as well as neuro- and vascular-protective roles. This study supported LEVOO as a promising intervention for ROP.

Abstract No.: 200754

Panel No.: POS-0820

Topical and Oral Carbonic Anhydrase Inhibitor Combination Therapy in Juvenile Retinoschisis: A Case Report

First Author: Maria Christine **DY**

Co-Author(s): Michelle **DAGTA**, *John Vyle* **PASCARAN**

Purpose: To report a clinically diagnosed case of juvenile retinoschisis managed with short-term topical and oral carbonic anhydrase inhibitor combination therapy.

Methods: A ten-year-old male with chronic progressive blurring of vision of the left eye was seen at a Philippine tertiary government hospital. Medical and family histories were unremarkable. Visual acuity was 20/25 on the right and counting fingers on the left. Cyclorefraction showed anisometropia of +0.50 and +6.50 spherical equivalents, respectively. 30 prism diopter left exodeviation was also noted. Anterior segment findings were normal. Spoke-wheel foveal streaks and a dome-shaped inferotemporal retinal elevation with atrophic edges consistent

with retinoschisis were seen on each eye on clinical exam. These were further confirmed with diagnostic procedures. The patient was referred for genetic counseling; gene and electrophysiologic tests are pending.

Results: Dorzolamide eyedrops and oral acetazolamide were started thrice a day with regular follow-ups and electrolyte monitoring. Three months on treatment, vision on the left improved to 20/200 with no reported side effects. Repeat diagnostic imaging showed a relative decrease in central subfield thickness with smaller cystic spaces. Long-term response to medications, regular funduscopy, and serial refraction were continuously monitored.

Conclusions: Juvenile retinoschisis is an X-linked recessive disorder and is the most common macular dystrophy among young males. Since there is no proven effective treatment, amblyopia and low vision rehabilitation are important. Despite its progressive nature, studies have shown the potential efficacy and safety of carbonic anhydrase inhibitors in terms of visual and anatomical improvement.

Abstract No.: 200187

Panel No.: POS-0815

Unilateral Retinopathy of Prematurity: Rare Cases Challenging Bilateral Assumptions

First Author: Khushbakht PETERS

Purpose: To highlight the occurrence and clinical course of unilateral retinopathy of prematurity (ROP), a rare presentation, through two distinct case studies. This report aims to emphasise the importance of vigilant follow-up in cases with seemingly initial symmetric retinal vascular development.

Methods: Two preterm infants undergoing routine ROP screening were reviewed. Case 1: A preterm infant with bilateral immature retinal vascularisation till Zone 2 was observed at baseline. On subsequent follow-up, he progressed to Stage 2 Zone II ROP in one eye while the fellow eye showed complete vascularisation. Case 2: A preterm infant presented with Stage 1 Zone II ROP unilaterally on the first screening, with the contralateral eye showing only immature vascularisation till Zone 2. Both infants were followed at regular intervals, and fundus findings were documented using indirect ophthalmoscopy.

Results: Case 1: Progression to ROP occurred unilaterally despite initial bilateral immature vascularisation, with no subsequent disease development in the fellow eye. Case 2: ROP was noted only in one eye from the first screening visit, with the opposite eye showing no signs of disease throughout follow-up. Neither case progressed to Type 1 ROP. Both cases showed spontaneous regression.

Conclusions: Although ROP is typically a bilateral disease, unilateral presentations can occur and may be

under-recognized. These cases underscore the need for vigilance during screening and follow-up.

Abstract No.: 205281

Panel No.: POS-0880

Unveiling Cerebrotendinous Xanthomatosis Through the Eye: Clinical and Genetic Insights

First Author: Bhargavi PIDUGU

Purpose: Cerebrotendinous Xanthomatosis (CTX) is a rare autosomal recessive lipid storage disorder caused by biallelic pathogenic variants in the CYP27A1 gene, leading to defective bile acid synthesis and accumulation of cholestanol in multiple tissues. Early diagnosis is essential, as treatment with chenodeoxycholic or cholic acid can prevent or reverse disease progression.

Methods: This case series presents three children (ages 5, 9, and 10 years) who presented with bilateral posterior subcapsular granular cataracts. Systemic clues included recurrent diarrhoea, ataxia, and jaundice. Based on the distinctive cataract morphology and clinical history, CTX was suspected and confirmed by genetic testing.

Results: Two patients carried homozygous pathogenic variants in CYP27A1 (c.526del and c.380G>A), while one had compound heterozygous variants (c.526delG and c.1263+1G>A). All were started on oral ursodeoxycholic acid. Five of six eyes underwent cataract surgery, while one showed spontaneous resolution with supplementation. Postoperative visual improvement was significant, with one patient's vision improving from 20/200 to 20/20.

Conclusions: Bilateral developmental cataracts, particularly granular posterior subcapsular types, should prompt suspicion for CTX when accompanied by systemic signs such as diarrhea or tendon xanthomas. Genetic confirmation enables timely intervention, potentially halting or reversing systemic and ocular manifestations

Abstract No.: 202636

Panel No.: POS-0840

Use of Soft Contact Lenses in Anisometropia Amblyopia Treatment: A Case Series

First Author: Nguyet Anh NGUYEN

Purpose: Anisometropia is a leading cause of amblyopia in children. Optical correction plays a crucial role in the management of anisometropic amblyopia. Moreover, soft contact lenses can minimize image size differences caused by anisometropia. This study aimed to evaluate the effectiveness of soft contact lenses in the treatment of amblyopia and related factors.

Methods: A retrospective case series was conducted on 7 amblyopia children who wore soft contact lenses at VIVISION KID – Children's Eye Clinic System

(2022–2024), after amblyopia therapy of spectacles and occlusion therapy had been tried. Data collected included demographics, refractive error, best-corrected visual acuity (BCVA) before and after soft contact lens wear, duration of lens wear, and reasons for discontinuation.

Results: Seven children (5 females, 2 males), aged 5–12 years (mean age: 6.8 years), were included. Six had anisometropic myopia (anisometropia ranging from 7.00 to 11.75 D), and one had anisometropic hyperopia (anisometropia of 5.00 D). Baseline BCVA ranged from 0.8 to 1.1 logMAR. After treatment with soft contact lenses, visual acuity improved on average by 0.254 logMAR after 6 months and 0.19 logMAR after 1 year. Two children improved by 4–5 logMAR lines after 1.5 years of contact lens wear. Regarding compliance, one child discontinued after 6 months due to keratitis, and three discontinued after 1 year for geographic or financial reasons.

Conclusions: Soft contact lenses provided significant improvement in visual acuity for the treatment of anisometropic amblyopia. However, risks of infection and compliance issues require long-term monitoring.

Abstract No.: 202365

Panel No.: POS-0834

Video-Oculography vs. Standard Diagnostic Methods in Binocular Vision Assessment: A Comparative Study

First Author: Igor **AZNAURYAN**

Co-Author(s): Satenik **AGAGULIAN**, Victoria **BALASANYAN**, Evgenii **KUZNETSOV**, Evgenii **MORDYUKOV**

Purpose: To retrospectively analyze and compare the angle of deviation measurements obtained from the videooculograph, non-contact autorefractor, and synoptophore in a cohort of non-amblyopic patients with divergent strabismus.

Methods: This study retrospectively analyzed data from 22 patients (aged 5–38 years, mean age 12.2 ± 7.1 years, 12 females/10 males) with divergent strabismus (type 2) to compare angle measurements across three diagnostic devices: videooculograph, non-contact autorefractor, and synoptophore. All patients had a cyclotropia value ranging from -7 to -40 prism diopters. Best-corrected visual acuity was normal (0.0 logMAR) in both eyes for all subjects, and no amblyopia was documented.

Results: The mean angle of deviation measured by the videooculograph was -16.0 ± 6.2 degrees, the non-contact autorefractor showed -14.8 ± 5.4 degrees, and the Synoptophore measured -15.6 ± 6.7 degrees. Differences between devices were not statistically significant ($p > 0.05$), though individual variability was observed, particularly in cases with higher cyclotropia. Refractive errors, expressed as spherical equivalents,

varied widely among patients (range: -6.875 to +2.125 D), with anisometropia present in 8 cases.

Conclusions: The results indicate good overall agreement between the three methods in quantifying divergent strabismus angles in non-amblyopic patients. However, device-specific discrepancies highlight the importance of standardized measurement protocols in clinical practice. This study supports the use of multiple complementary techniques for accurate strabismus assessment, especially in patients with significant cyclodeviation or anisometropia. Further research with larger samples is warranted to evaluate device reliability in more complex clinical scenarios.

Abstract No.: 207165

Panel No.: POS-0904

Visual Rehabilitation Outcomes in Pediatric Patients with Multiple Disabilities and Visual Impairment (MDVI): A Retrospective Study in a Tertiary Eye Hospital

First Author: Aura **ARIAPUTRI**

Co-Author(s): Joan Sherlone T. **HUTABARAT**, Ine Renata **MUSA**, Karmelita **SATARI**, Susanti Natalya **SIRAIT**

Purpose: To present the rationale, methods, and outcomes of visual rehabilitation in pediatric patients with multiple disabilities and visual impairment (MDVI) at Cicendo Eye Hospital in 2023, emphasizing the importance of early intervention in this vulnerable group.

Methods: A retrospective cross-sectional study was conducted using medical records of pediatric patients with MDVI who underwent visual rehabilitation at the Pediatric Ophthalmology and Strabismus Clinic and Low Vision Clinic at the National Eye Center, Cicendo Eye Hospital, from January to December 2023. Inclusion criteria were all MDVI-diagnosed pediatric patients who completed rehabilitation. Exclusion criteria included incomplete records, absence of visual acuity or objective refraction data, and loss to follow-up.

Results: Seventy-one patients (142 eyes) were included. Most patients were male (60.56%), aged 0–3 years (71.83%), and residing in West Java (95.77%). Common ocular diagnoses included nystagmus (32.29%), strabismus (19.71%), and cortical visual impairment (16.90%). Systemic comorbidities were global developmental delay (29.57%), cerebral palsy (21.12%), and epilepsy (19.71%). Visual stimulation was the primary rehabilitation method (74.65%). Improvements in visual function were observed, with 6/24 visual acuity increasing from 9.86% to 23.94%, and fix-and-follow ability from 22.4% to 36.62% after therapy.

Conclusions: Structured visual rehabilitation led to meaningful improvements in functional vision among children with MDVI. These findings support the implementation of early, comprehensive rehabilitation

to enhance visual and developmental outcomes in this population.

Abstract No.: 205152

Panel No.: POS-0874

"10-10" Monocular Surgical Correction in Moderate to Large Angle Exotropia: A Case Series

First Author: Ashfaque Rahman KHAN

Co-Author(s): Syeed Mehbub Ul KADIR

Purpose: Exotropia is a form of strabismus characterized by outward deviation of one eye. This condition may result in impaired binocular vision, cosmetic disfigurement, and psychosocial issues. To evaluate the outcomes of the <10-10> monocular surgical technique for correcting moderate-to-large angle alternative exotropia.

Methods: Alternate exotropia can be challenging to correct in moderate-to-large angle deviations. Traditional surgical options vary, but the need for a precise, balanced technique has led to interest in the <10-10> monocular resection-recession approach. This involves recessing the lateral rectus and resecting the medial rectus by 10 mm in the deviating eye.

Results: A total of thirty-five patients (ages 12–36 years) with alternative exotropia >60 PD and absent binocular single vision were included. Preoperative evaluation involved visual acuity testing, prism cover testing, cycloplegic refraction, orthoptic evaluation, and fundus examination. All patients underwent 10 mm recession of the lateral rectus and 10 mm resection of the medial rectus in the deviating eye (monocular correction). Postoperative outcomes revealed successful alignment in all cases, with no major complications or resurgeries needed.

Conclusions: The 10-10 monocular resection-recession technique offers a reliable and balanced surgical approach to correcting large-angle alternate exotropia. It minimizes the risks of over- or undercorrection and is effective for the patient's visual outcome, cosmesis, and helps overcome the social stigma.

Abstract No.: 204437

Panel No.: POS-0863

"Beyond-the-Bag" Intraocular Lens Capture in Complicated Pediatric Cataract Surgery

First Author: Rabeeah ZAFAR

Purpose: To compare the learning curve of two surgeons performing lensectomy and posterior optic capture of a multipiece intraocular lens (IOL) in complicated congenital cataracts in children.

Methods: A retrospective comparative analysis was performed on the first 50 cases of posterior optic capture of IOL in pediatric eyes with anterior chamber

abnormalities, carried out by two surgeons: Surgeon 1 (S1), a proficient senior pediatric ophthalmologist, and Surgeon 2 (S2), a trainee pediatric ophthalmologist. The outcomes of the surgery were measured in terms of successful posterior capture of IOL, perioperative and postoperative complications, as assessed by an independent observer using SPSS version 26.0.

Results: The mean age of the patients was 4 ± 2.7 years for S1 and 5 ± 3.1 years for S2. S1 completed the first 50 cases in 5 months, while S2 completed them in 7 months. Successful optic capture was achieved in 48 (96%) cases by S1 and 45 (90%) cases by S2. Complications were observed in 2 cases (4%) for S1 and 5 (10%) cases for S2 ($P < 0.05$). Statistically, there was no significant difference in the learning curve between the surgeons in terms of duration and surgical outcomes ($p < 0.05$).

Conclusions: Posterior optic capture of IOL is an effective and promising modality in pediatric cataracts with anterior segment abnormalities, requiring meticulous tissue handling in small eyes. Despite a steep learning curve noted in existing literature, junior surgeons can quickly learn and master this technique with minimal complications when performing under the direct supervision of an experienced senior surgeon.

Refractive Surgery

Abstract No.: 202364

Panel No.: REF-0917

Amblyopia Treatment Efficacy in Children: The Advantage of Early Refractive Management

First Author: Igor AZNAURYAN

Co-Author(s): Karmen ARTENIAN, Satenik AGAGULIAN, Victoria BALASANYAN

Purpose: Amblyopia is a neurodevelopmental disorder of vision and a leading cause of preventable monocular visual impairment in children. While conventional treatments such as optical correction, patching, and pharmacological penalization remain standard, emerging evidence emphasizes the critical importance of early refractive management as a foundational therapeutic step.

Methods: Timely optical correction alone can resolve amblyopia in a significant proportion of patients, especially when implemented during the critical period of visual development. Studies demonstrate that providing accurate glasses or contact lenses before initiating occlusion or penalization allows the visual cortex to begin processing clearer input, thereby enhancing neural plasticity. This approach often reduces the duration and intensity of additional therapies required. In cases where amblyopia persists

despite refractive adaptation, subsequent patching or atropine treatment tends to be more effective due to the established optical foundation.

Results: Key outcomes supporting early refractive intervention include improved binocular visual acuity, greater stereoacuity gains, and higher long-term stability of visual function.

Conclusions: Moreover, early correction mitigates the risk of persistent amblyopia and promotes better compliance with combined treatment regimens. The evidence underscores that refractive management should not be regarded merely as a preliminary step, but as a core, active component of amblyopia therapy. Thus, prioritizing early and precise optical correction is essential for maximizing visual outcomes and reducing the burden of care in children with amblyopia.

Abstract No.: 208345

Panel No.: REF-0936

Analysis of Preoperative Risk Factors for Corneal Ectasia After Small Incision Lenticule Extraction (SMILE)

*First Author: Tie Pei **ZHU***

*Co-Author(s): Hongying **JIN**, Hai Xiu **WU***

Purpose: To investigate the preoperative characteristics and risk factors of corneal ectasia after small incision lenticule extraction (SMILE) through a case series analysis.

Methods: A retrospective case series study was conducted on 9 patients (13 eyes) diagnosed with corneal ectasia following SMILE surgery at the Eye Center of the Second Affiliated Hospital of Medical College of Zhejiang University between January 2014 and December 2022. The study consisted of 5 males and 4 females, with a mean age of 19.9 ± 3.7 years (range: 17–28 years). Preoperative corneal topographic parameters, including mean keratometry (Km), Belin/Ambrosio Deviation (BAD-D) value, and corneal diameter, were collected. Intraoperative parameters such as lenticule thickness (LT), residual stromal bed (RSB) thickness, and optical zone diameter were recorded. Percentage tissue altered (PTA), lenticule thickness index (LTI), and Ectasia Risk Score System (ERSS) score were calculated to summarize the preoperative and intraoperative characteristics of these cases.

Results: Among the nine patients, 75% were younger than 21 years. The mean preoperative spherical equivalent was -5.58 ± 1.64 D. The mean corneal diameter was 11.87 ± 0.22 mm, LT was 106.2 ± 28.3 μ m, RSB thickness was 310.8 ± 26.2 μ m, and LTI was $20.0 \pm 5.2\%$. Some cases presented with large corneas (≥ 12 mm, 4/13 eyes), thin corneas (< 510 μ m, 4/13 eyes), and mildly elevated BAD-D values (1.59 ± 0.46). According to the ERSS, 76.9% (10/13) of eyes were classified as high risk. Compared with previously

reported international cases, this study demonstrated a significantly younger mean age ($u = 8.6$, $P = 0.0065$).

Conclusions: Post-SMILE ectasia was observed predominantly in younger patients, often accompanied by features such as large corneal diameter, thin cornea, and high ERSS scores, even in the absence of typical topographic abnormalities. Preoperative screening should carefully consider the possibility of concurrent risk factors, including large cornea, thin cornea, potentially false-negative BAD-D, and high ERSS scores.

Abstract No.: 204976

Panel No.: REF-0925

Analysis of the Effects of Perioperative Intervention With Quguang Jueming on Ocular Surface Inflammatory Factors Following TransPRK Surgery

*First Author: Dian **ZHAO***

Purpose: To analyze the effect of perioperative administration of Quguang Jueming on postoperative changes in ocular surface inflammatory factor levels during TransPRK, and to explore the potential mechanism of action of traditional Chinese medicine (TCM) intervention based on the “liver-lung theory” during the perioperative period of laser refractive corneal surgery.

Methods: Prospective study. Cases undergoing TransPRK surgery at the Refractive Surgery Department of Ineye Hospital of Chengdu University of Traditional Chinese Medicine between January 1, 2024, and January 31, 2025, meeting inclusion criteria were enrolled. Subjects were assigned to Group A or Group B based on receipt of TCM intervention. Group A (TCM intervention group) received standard perioperative management for TransPRK plus additional TCM intervention: daily oral administration of Quguang Jueming from 1 day preoperatively to 7 days postoperatively. Group B (non-intervention group) followed routine perioperative management. Patient demographics, preoperative refractive error, preoperative best-corrected visual acuity (BCVA), and uncorrected visual acuity (UCVA) at postoperative 1 week, 1 month, and 3 months were collected. Tear samples were obtained preoperatively and at postoperative 1 day, 4 days, and 7 days. Changes in postoperative UCVA and tear levels of TGF- β 1, PGE2, IL-6, and TNF- α were compared between groups.

Results: Both groups showed significant postoperative improvements in uncorrected visual acuity (UCVA) compared to preoperative levels (all $P < 0.001$). TGF- β 1 levels exhibited a decreasing trend at 1 day, 4 days, and 1 week postoperatively in both groups. TGF- β 1 levels at all postoperative time points were significantly lower in Group A than in Group B, while the change in TGF- β 1 levels (Δ TGF- β 1) at all postoperative time points was higher in Group B than in Group A (all $P < 0.001$). Group B showed increased IL-6 levels at 1

day, 4 days, and 1 week postoperatively compared to preoperative levels ($P < 0.001$). Both groups exhibited a decreasing trend in IL-6 at these time points, with Group A showing significantly lower IL-6 levels than Group B at each postoperative time point (all $P < 0.001$). Group B's Δ IL-6 at postoperative days 1, 4, and 1 week was higher than Group A's ($P < 0.001$). PGE2 levels in both groups showed a decreasing trend at postoperative days 1, 4, and 1 week, with Group A's PGE2 levels at these time points significantly lower than Group B's (all $P < 0.001$); Group B's Δ PGE2 at postoperative day 1 was significantly higher than Group A's. Group A's Δ PGE2 reduction at postoperative week 1 was significantly greater than Group B's. Δ PGE2 in both groups decreased at postoperative days 4 and week 1 compared to day 1 (all $P < 0.001$). Group A showed elevated TNF- α levels at 1 day and 4 days postoperatively compared to preoperative levels, while TNF- α decreased at 1 week postoperatively ($P < 0.001$, $P < 0.001$, $P = 0.007$). TNF- α levels at all postoperative time points in Group A were significantly lower than those in Group B ($P < 0.001$). The change in TNF- α levels at all postoperative time points in Group B was greater than that in Group A ($P < 0.001$).

Conclusions: The perioperative use of Quguang Jueming in TransPRK effectively reduces postoperative levels of inflammatory mediators such as TGF- β 1, PGE2, IL-6, and TNF- α in the ocular surface, thereby alleviating postoperative complications, including pain, haze, and dry eye.

Abstract No.: 204972

Panel No.: REF-0927

BIOPTIC Technique to Treat High MYOPIC Refractive Errors

First Author: Sami ALRABIAH

Purpose: To evaluate the refractive surgery outcome for patients who have relative corneal thickness insufficiency to correct a relatively high refractive myopic error, using the Biopic technique.

Methods: This study includes 22 patients, 14 female, 8 male, who had refractive error ranging from -7.50 to -9.50 diopters, Corneal thickness ranging from 505-542 microns, and all clinical examinations were within normal limits (Topography, Tomography, Pachmetry, Corneal Biomechanics, and best corrected vision). 1- First step is Femtolasik treatment to correct as much as possible without jeopardizing safety and quality 2- Second step after 6 months, Transepithelial wave front guided PRK on the flap surface, aiming for correction A- residual refractive error as well as B- induced high-order aberrations

Results: All patients could reach the best corrected vision, with almost no or minimal higher-order aberrations.

Conclusions: Biopic technique is not only a method to correct the total refractive power on two stages, but safety is also kept in mind. As second stage is on the flap that has no influence over corneal stability and power. So no harmful effect regarding the stromal thickness, but also it reduces all wave front errors that were induced by regular femto-Lasik, and gives us a much better quality of vision that is comparable to a single treatment for lower degrees of refractive errors

Abstract No.: 204218

Panel No.: REF-0921

Binocular Vision Across All Distances: Six-Month Results of PRESBYOND Laser Vision Correction

First Author: Olesia ZIIATDINOVA

Co-Author(s): Chun Chun HE, Lina ZHOU

Purpose: To evaluate the visual and refractive outcomes of PRESBYOND laser vision correction in patients with presbyopia.

Methods: A retrospective analysis was conducted on 32 patients with presbyopia who underwent bilateral PRESBYOND laser vision correction. Inclusion criteria included age within the presbyopic range, mean spherical error and astigmatism within the treatment range, and adequate corneal thickness. All patients tolerated a -1.50 D anisometropia test prior to surgery. Femtolasik flaps were created using the VisuMax 500 femtosecond laser, and excimer ablation was performed with the MEL 90 using the PRESBYOND software module. Postoperative assessments were performed at 1 day, 1 week, 1 month, 3 months, and 6 months, including autorefractometry, uncorrected visual acuity (UCVA), manifest visual acuity (MVA), and Pentacam measurements.

Results: A high percentage 89% of patients achieved the targeted postoperative refraction. Mean postoperative sphere ± 0.65 D and cylinder ± 0.56 D were within of target at all follow-up visits. The majority of patients reached their target refraction within the first few months after surgery. No patients required enhancement procedures during the 6-month follow-up. Postoperative corneal spherical higher-order aberrations (HOAs) increased within an acceptable range, with a stable mean value at 6 months.

Conclusions: PRESBYOND laser vision correction provides effective binocular vision across all distances in presbyopic patients without signs of cataract, demonstrating good safety, predictability, and stability.

Abstract No.: 207410

Panel No.: REF-0934

Can Biomechanics Be a Surrogate Marker for Lysyl Oxidases Expression in Patients Undergoing Lenticular Extraction?

First Author: Shweta DEV

Co-Author(s): Apurva BANSOD, Abhijit SINHA ROY, Nimisha

Purpose: Lysyl oxidases (LOXs) are enzymes that enhance corneal tissue strength by cross-linking collagen. This study aimed to identify biomechanics parameters that correlated with LOXs expression as potential surrogate markers.

Methods: In these prospective eyes, 106 eyes undergoing lenticular extraction were included. Each patient underwent scans using Pentacam, Corvis, and polarization-sensitive OCT (PSOCT). The lenticule extracted during surgery was analyzed for LOXs expression using quantitative PCR. Patients were divided into three groups based on LOXs levels. Random Forest AI models were used to correlate LOXs with 24 corneal biomechanics and PSOCT parameters.

Results: LOXs and Cola1 increased from group 1 to 3. In group 3, CBI and SP-A1 values showed significant correlation.

Conclusions: This study aids in determining the need for the Xtra procedure based on biomechanics values alone.

Abstract No.: 204767

Panel No.: REF-0924

Clinical Outcomes of RIL: A No-Central Hole Unique Model Phakic Intraocular Lens

First Author: Ankeeta THALI

Co-Author(s): Jagadeesh REDDY, Vandhana SUNDARAM

Purpose: To evaluate the clinical outcomes of a novel refractive implantable lens (RIL) in patients with refractive error, corneal ectasia, and post-deep anterior lamellar keratoplasty (DALK).

Methods: This retrospective analysis included 60 eyes of 40 patients who underwent implantation of RIL with four peripheral holes and no central hole, eliminating the need for peripheral iridotomy and avoiding potential glare from a central hole. The lens is available in a wide range of powers (-1 to -23 diopters [D], up to +10 D, and cylindrical powers up to 16 D). Clinical records were reviewed over 12 months. Parameters assessed included uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), intraocular pressure (IOP), vault, lens rotation, and endothelial cell count.

Results: Significant improvement was observed in visual and refractive outcomes from preoperative values to 1 month postoperatively ($P < 0.05$). Mean

logMAR UCVA improved from 1.1 ± 0.1 to 0.3 ± 0.1 . Spherical error reduced from 5.4 ± 3.8 D to 0.3 ± 0.1 D, and cylindrical error reduced from 5.4 ± 3.2 D to 0.8 ± 0.7 D. Postoperative complications occurred in only 3 of 60 eyes: one cataract, one case of severe inflammation (resolved with treatment), and one IOL rotation (repositioned). No other complications were noted.

Conclusions: This unique RIL design provides effective visual rehabilitation and appears to be a safe and reliable option for correcting high ametropia, including in complex corneal conditions.

Abstract No.: 202612

Panel No.: REF-0918

Comparison of the Correction Effects of Different Corneal Laser Surgeries for Asymmetric Corneal Astigmatism

First Author: Riping ZHANG

Co-Author(s): Yi ZHANG

Purpose: To compare optical zone decentration and corneal high-order aberrations (HOAs) after selective corneal wavefront aberration-guided femtosecond laser-assisted in situ keratomileusis (CW-FS-LASIK), aberration-free FS-LASIK (AF-FS-LASIK), and small incision lenticule extraction (SMILE).

Methods: A retrospective analysis included 58 eyes treated with CW-FS-LASIK, 67 with AF-FS-LASIK, and 106 with SMILE at Joint Shantou International Eye Center between 2018 and 2024. Patients had myopia (-1.00 to -6.00 D) and asymmetric corneal astigmatism (corneal topography with inferior-superior dioptric difference ≥ 1.00 D within the central 3 mm). Visual acuity, refraction, and corneal topography were evaluated preoperatively and 1 month postoperatively. HOAs were measured over 4 mm and 6 mm zones using Pentacam, and tangential curvature difference maps were processed in ImageJ for effective optical zone diameter (EOZ) and decentration. Statistical comparisons used ANOVA and Kruskal-Wallis tests.

Results: Preoperative parameters and HOAs were comparable. Postoperative visual acuity was comparable. The SMILE group showed a larger EOZ than both FS-LASIK groups ($P < 0.001$) with no significant difference in decentration. At 4 mm zone, CW-FS-LASIK showed the lowest HOAs, vertical and total coma. At 6 mm zone, CW-FS-LASIK had the lowest vertical and total coma ($P < 0.001$), while SMILE demonstrated the lowest spherical aberration ($P < 0.05$).

Conclusions: In asymmetric corneal astigmatism, CW-FS-LASIK reduces HOAs and coma, whereas SMILE better controls spherical aberration and enlarges EOZ. Surgical choice should consider astigmatism patterns and visual quality.

Abstract No.: 206685

Panel No.: REF-0932

Comparisons of Visual Function Under Different Optical Zone Ranges in TransPRK Surgery

First Author: Fanfei MA

Purpose: To evaluate the efficacy of large optical zones (OZ) in TransPRK for correcting low-to-moderate myopia in patients with large dark pupil diameters (≥ 7 mm).

Methods: A retrospective study included 145 myopic eyes (-0.50 to -6.00 D) from 80 patients (17–36 years) undergoing TransPRK. Eyes were divided into Group A (pupil diameter ≥ 7 mm, $n = 72$) and Group B (< 7 mm, $n = 73$). OZ sizes (6.5–7.3 mm) varied between groups, with Group A having more eyes treated with OZ ≥ 7.0 mm (40/72 vs. 11/73 in Group B). Preoperative and 3-month postoperative assessments included visual acuity, intraocular pressure (IOP), corneal spherical aberration (SA), corneal higher-order aberrations (HOAs), total higher-order aberrations (THOAs), total coma (T.Coma), and modulation transfer function (MTF). Statistical analyses included linear mixed-effects models (LMMs, random intercepts for patient ID and eye nested within patient) for within-group (preoperative vs. postoperative) and between-group comparisons. Exploratory cluster-robust Pearson correlation analyses were performed within the Generalized Estimating Equations (GEE) framework with Benjamini–Hochberg false discovery rate (BH-FDR) correction. Exploratory backward stepwise multivariate linear mixed-effects regression (patient ID as random intercept) suggested factors associated with postoperative HOAs, with variance inflation factor (VIF) tests ($VIF < 5$) to exclude multicollinearity.

Results: Both groups showed significant improvements in MTF(Total) postoperatively (Group A: 15.47% vs. 43.67%, $P < 0.001$; Group B: 15.84% vs. 45.95%, $P < 0.001$). In group B, MTF(HO) decreased (76.28% vs. 63.20%, $P < 0.001$), while T. Coma increased (Group A: 0.18 vs. 0.27 μm , $P = 0.004$; Group B: 0.19 vs. 0.30 μm , $P < 0.001$). Cluster-robust correlation analyses showed HOAs were strongly correlated with THOAs ($r = 0.432$, BH-FDR $q = 0.0008$), T.Coma ($r = 0.389$, BH-FDR $q = 0.0008$), and MTF(HO) ($r = -0.295$, BH-FDR $q = 0.0008$). MTF(HO) was positively associated with OZ size ($r = 0.218$, BH-FDR $q = 0.024$), while THOAs showed no significant association with OZ after FDR correction ($r = -0.172$, BH-FDR $q = 0.082$). Exploratory multivariate linear mixed-effects regression confirmed OZ size was negatively associated with postoperative HOAs in Group A ($\beta = -0.215$, robust SE = 0.084, BH-FDR $q = 0.0195$; adjusted $R^2 = 0.386$), but not in Group B ($\beta = -0.082$, BH-FDR $q = 0.3725$).

Conclusions: TransPRK effectively corrects low to moderate myopia in patients with large pupils, with stable postoperative visual function. Within the scope

of this study, the postoperative objective optical indicators (e.g., MTF, HOAs) in Group A treated with larger OZs show no statistically significant difference from those in Group B.

Abstract No.: 205364

Panel No.: REF-0929

Corneal Asphericity Preservation via Spatially-Selective Peripheral Stromal Volume Ablation Following Ray-Tracing-Guided LASIK

First Author: Bo YUAN

Co-Author(s): Jingwen CHAI, Xuzhao GUO, Xia HUA, Bo ZHAO

Purpose: To quantitatively appraise postoperative visual quality and to delineate the spatial corneal morphological changes occurring within the central and pericentral optical zones subsequent to ray-tracing-guided laser-assisted in situ keratomileusis (RT-LASIK) compared to Q-value-guided LASIK (Q-LASIK).

Methods: Sixty patients were enrolled. The means of preoperative spherical equivalent (SE) were -5.029 ± 1.532 D in the RT-LASIK group and -5.279 ± 1.779 D in the Q-LASIK group ($n=30$ each). The cornea was partitioned into three vertex-centered concentric regions: a central 0–3 mm optical zone, a paracentral 3–5 mm annulus, and a pericentral 5–7 mm annulus. The corneal ablation ratio (CAR) was calculated as the quotient of the preoperative-to-postoperative reduction in either corneal thickness (tCAR) or stromal volume (vCAR) divided by the absolute value of the preoperative SE.

Results: The RT-LASIK group exhibited significantly superior UDVA, SE, and 3-mm Strehl ratio post-operatively. Concurrently, RT-LASIK yielded markedly steeper corneal curvature in the nasal and temporal sectors of the 3–5 mm paracentral annulus. vCAR within the same 3–5 mm zone was also significantly elevated in the RT-LASIK group, whereas tCAR did not differ between groups. Furthermore, RT-LASIK was associated with a significantly attenuated post-operative change in Q-value within the 5-mm zone, a more pronounced reduction in spherical aberration across the 3-, 5-, and 7-mm optical zones, and a comparatively greater increase in coma aberration within the 5-mm zone.

Conclusions: RT-LASIK conferred superior post-operative visual performance by conserving native corneal asphericity and reducing SA. This optical advantage was mediated by a proportionally greater ablation of stromal volume within the paracentral 3–5 mm annulus.

Abstract No.: 207832

Panel No.: REF-0935

Design of Progressive Addition Lens for Presbyopia: A Systematic Review

First Author: Jijing LI

Co-Author(s): Mingguang HE, Yue WU

Purpose: This systematic review synthesizes recent evidence (2015 - 2025) on the technical design of Progressive Addition Lenses (PALs) for presbyopia, focusing on key developments in design methodologies, performance evaluation, and emerging lens concepts.

Methods: A systematic search of six databases (PubMed, Embase, Web of Science, Cochrane Library, Scopus, SPIE Digital Library) was conducted following PRISMA guidelines. Eligible studies included original research on PALs' design principles, optimization algorithms, evaluation techniques, or novel optical concepts. Study quality was assessed using a customized 12-dimensional framework.

Results: The review included 17 eligible studies. Three major thematic areas of advancement were identified: the maturation of freeform surface design as the primary method for creating complex optical surfaces; the development of advanced optical evaluation techniques enabling objective quantification of lens performance; and the emergence of novel lens concepts expanding design possibilities beyond conventional refractive approaches. Key progress was noted in algorithmic optimization for astigmatism control and the shift from subjective assessment to data-driven performance validation.

Conclusions: PALs design has evolved significantly toward customized, algorithm-driven solutions. However, challenges remain in standardizing clinical fitting, understanding neural adaptation, and developing personalized designs for diverse presbyopic subpopulations. Future progress will hinge on deeper interdisciplinary integration to evolve PALs from standardized corrections into adaptive visual wearables.

Abstract No.: 201269

Panel No.: REF-0913

Diagnosis and Management of Bacterial Keratitis Following Transepithelial Photorefractive Keratectomy: A Case Report

First Author: Aiqin NIE

Purpose: To describe the clinical presentation, diagnostic approach, and management of bacterial keratitis following transepithelial photorefractive keratectomy (TransPRK), and to highlight strategies for improving outcomes in this serious postoperative complication.

Methods: A retrospective case analysis was performed on a 36-year-old male who developed acute bacterial

keratitis in the left eye 18 days after undergoing bilateral TransPRK. The patient presented with a sudden onset of ocular redness, pain, and decreased vision. Diagnosis was established based on clinical history, examination findings, and ancillary testing. Upon admission, the patient received intensive topical and systemic antimicrobial therapy, anti-inflammatory agents, and mydriatics. Treatment was adjusted according to clinical response.

Results: At presentation, the left eye exhibited central corneal stromal opacity with hypopyon. Intensive topical vancomycin (50 mg/ml), levofloxacin, tobramycin, subconjunctival vancomycin injection, and systemic ceftazidime were administered. Hypopyon resolved within two days, visual acuity improved to 0.15 by day four, and reached 1.0- by day ten. At 1.5 months post-treatment, both eyes achieved good visual acuity, with a residual central corneal opacity in the left eye.

Conclusions: Bacterial keratitis following TransPRK is characterized by rapid onset and progression. Early recognition and prompt, standardized antimicrobial therapy are critical for favorable outcomes. While medical management is the first-line approach, surgical intervention should be considered in refractory or severe cases. Postoperative care should emphasize corneal epithelial healing and mitigation of infection risk factors.

Abstract No.: 204946

Panel No.: REF-0928

ELITA vs VisuMax 800: A Clinical Comparison for Astigmatic Keratorefractive Lenticule Extraction

First Author: Chen-cheng CHAO

Co-Author(s): Chao-kai CHANG, Chien-cheng CHIEN, Yu-hsuan LU, You-ci OU

Purpose: To compare the clinical outcomes of astigmatism correction following keratorefractive lenticule extraction (KLEx) performed with the VisuMax 800 (Carl Zeiss) and ELITA (Johnson and Johnson).

Methods: This was a retrospective, non-randomized, multi-center clinical study of patients undergoing KLEx surgery for myopic astigmatism using the VisuMax 800 and ELITA. Patients with moderate to severe astigmatism (≥ 1.50 D) were included. The data were collected from one eye of each patient. The uncorrected visual acuity, best-corrected visual acuity, and residual refractive error were measured 1 month postoperatively.

Results: A total of 50 and 58 eyes were categorized into the ELITA and VisuMax 800 groups, respectively. Visual acuity, refraction, topographic parameters, and surgical indices were recorded. Independent t-tests were used to compare the postoperative uncorrected distance visual acuity (UDVA), spherical equivalent (SE), and residual astigmatism between the two groups. The

difference in UDVA was not significant 1 month after KLEx surgery ($p = 0.513$), and the SEs 1 month after surgery were also similar between the two groups ($p = 0.440$). There was also no significant difference in residual astigmatism between the groups ($p = 0.341$).

Conclusions: ELITA and VisuMax 800 provided excellent visual and refractive outcomes for subjects with myopic astigmatism. The VisuMax 800, using Oculign and Centralign aids, demonstrated similar accuracy when correcting cylinder ≥ 1.50 D compared to the ELITA using manual cyclotorsion compensation.

Abstract No.: 201266

Panel No.: REF-0914

Early Corneal Epithelial Thickness Changes in the Optical Zone Following Small Incision Lenticule Extraction for High Myopia

First Author: Aiqin **NIE**

Co-Author(s): Xingtao **ZHOU**

Purpose: To investigate the early changes in corneal epithelial thickness in the optical zone after small incision lenticule extraction (SMILE) for myopia correction.

Methods: A total of 60 patients (24 males, 36 females; aged 18–40 years) who underwent SMILE for myopia or myopic astigmatism since April 2023 were enrolled. Patients were divided into two groups based on refractive error: Group A (high myopia, 30 eyes) and Group B (mild to moderate myopia, 30 eyes). Preoperative and postoperative examinations included visual acuity, refraction, Pentacam, and anterior segment optical coherence tomography (OCT; RTVue, Optovue) to measure corneal epithelial thickness in the central 0–2 mm, 2–5 mm, 5–7 mm, and 7–9 mm zones. All patients underwent standard SMILE and were followed for 3 months. Statistical analysis was performed using SPSS 26.0, with $P < 0.05$ considered significant.

Results: Preoperatively, corneal epithelial thickness did not differ significantly between groups. At 3 months postoperatively, Group B showed significant epithelial thickening in the central 0–2 mm, 2–5 mm, and 5–7 mm zones ($P < 0.05$), while Group A exhibited more pronounced thickening in these zones ($P < 0.05$). The increase in epithelial thickness was significantly greater in the high myopia group compared to the mild to moderate group ($P < 0.05$).

Conclusions: Corneal epithelial remodeling occurs after SMILE, with significant thickening in the optical zone. The degree of thickening is more pronounced in eyes with higher myopia.

Abstract No.: 207139

Panel No.: REF-0933

Efficacy and Safety of Toric Implantable Collamer Lens Implantation in Myopic Eyes with Asymmetric Bow-Tie Corneal Astigmatism: A Prospective Comparative Study

First Author: Xue **DING**

Co-Author(s): Shaowei **LI**, Wenjuan **WANG**, Dan **WEI**

Purpose: To evaluate the efficacy and safety of toric implantable collamer lens (Toric ICL) implantation for myopia with asymmetric bow-tie corneal astigmatism.

Methods: In this prospective cohort study, 25 eyes of 16 patients with asymmetric bow-tie astigmatism and 41 eyes of 24 patients with symmetric bow-tie astigmatism underwent Toric ICL implantation. Pentacam HR was used for corneal topography. Uncorrected and corrected distance visual acuities (UDVA and CDVA), refraction, astigmatic changes (vector analysis), and higher-order aberrations (HOAs) were evaluated preoperatively and at 1, 3, and 6 months postoperatively.

Results: Preoperative astigmatism was -2.24 ± 0.85 D in the asymmetric group and -2.11 ± 0.92 D in the symmetric group. Postoperatively, 100% of eyes in both groups achieved UDVA $\geq 20/20$ and UDVA equal to or better than preoperative CDVA. Spherical equivalent within ± 0.50 D was achieved in 80% (asymmetric) and 83% (symmetric) of eyes. Mean residual astigmatism at 6 months was -0.60 ± 0.41 D (asymmetric) and -0.47 ± 0.35 D (symmetric) (both $P < 0.01$ vs. baseline), with no significant inter-group difference. Vector analysis showed correction indices of 0.87 ± 0.26 and 0.95 ± 0.19 , respectively ($P > 0.05$). HOAs increased comparably in both groups. No complications occurred.

Conclusions: Toric ICL implantation effectively and safely corrects asymmetric bow-tie corneal astigmatism, with refractive and visual outcomes comparable to those in symmetric bow-tie astigmatism.

Abstract No.: 202295

Panel No.: REF-0916

Epithelial Regrowth and Epithelial Refractive Outcomes After cTen™: A Ray-Tracing

First Author: Yue **FENG**

Co-Author(s): Mule' **GIULIO**, Xue-min **LI**, Aleksandar **STOJANOVIC**

Purpose: To evaluate the morphological and refractive changes in the corneal epithelium following cTen™ customized TPRK and assess the role of a constant gradient of curvature in promoting homogeneous epithelial regrowth.

Methods: This study analyzed patients with regular corneas undergoing TPRK using the iVis laser Suite (iVIS Technologies, Taranto, Italy) for myopic/astigmatic

refractive error. Preoperative and postoperative epithelial thickness and ray-tracing refractive power were measured within the central 6.0 mm diameter using the Preciso® 2 tomographer at 1, 3, and 6 months.

Results: Thirty-one eyes in 31 patients were included in this study, with a mean age of 36.6 ± 7.98 years, with average refractive error: spherical -3.25 ± 1.88 D; cylinder -1.17 ± 1.14 D. Postoperatively, the average epithelial thickness decreased by $5.6 \mu\text{m}$ (11%) at 1 month but nearly returned to preoperative values by 6 months. A transient hyperopic shift of 0.4 D (37%) was observed at 1 month, resolving completely by 6 months. The standard deviation of epithelial thickness and refractive power increased at 1 month but trended toward preoperative values over time, indicating reduced variability and improved predictability. UCVA improved significantly, with 19 eyes achieving 20/20 or better at 1 month and 26 eyes at 6 months.

Conclusions: The study demonstrates that cTen® surgery, combined with a customized ablation profile ensuring a constant gradient of curvature, facilitates smooth epithelial regrowth and restoration of preoperative epithelial properties within 6 months. This contributes to stable refractive outcomes and long-term success, underscoring the importance of epithelial remodeling in optimizing visual results.

Abstract No.: 202032

Panel No.: REF-0915

Improved Surgical Efficiency and Vision With Optimized Phacoemulsification Settings

First Author: Cindy Prajna **METTA**

Co-Author(s): Ruth **ANASTASIA**, *Clarissa* **LISTER**, *Laksono Bagus* **SASMITO**

Purpose: Efficient phacoemulsification requires minimizing surgical time and ultrasound energy while preserving optimal visual outcomes. Refinement of phaco modulation parameters may directly influence both intraoperative performance and postoperative recovery. This study compared two modulation settings in mature cataract surgery.

Methods: Twenty eyes with mature cataracts that underwent phacoemulsification between February and March 2025 were included. Patients were randomized to Group 1 (power 50%, vacuum 400 mmHg) or Group 2 (power 50%, vacuum 350 mmHg, DC 70%, PPS 50). Outcomes included surgical duration, absolute phaco time (APT), effective phaco time (EPT), and one-week postoperative visual acuity (VA, logMAR). Independent t-tests were used, with significance defined as $p < 0.05$.

Results: Group 1 achieved significantly shorter surgical duration (4.62 vs. 6.03 minutes, $p = 0.005$) and better postoperative VA (0.25 vs. 0.56 logMAR, $p = 0.006$). Although differences in APT (67.17 vs. 68.17 seconds, $p = 0.48$) and EPT (19.62 vs. 24.70 seconds, $p =$

0.09) were not statistically significant, both favored Group 1. These findings indicate that higher vacuum with standard duty cycle can improve efficiency and accelerate early visual recovery without increasing ultrasound energy use.

Conclusions: Phaco modulation parameters significantly influence both surgical efficiency and visual outcomes. A higher-vacuum setting enhanced intraoperative performance and postoperative vision in mature cataracts. Optimizing phaco settings may represent a simple yet effective strategy to enhance surgical outcomes in mature cataracts.

Abstract No.: 205979

Panel No.: REF-0930

Integrative Transcriptome and Machine Learning Identify Molecular Drivers of Corneal Epithelial Hyperplasia in Postoperative Refractive Regression and Novel Therapeutic Candidates

First Author: Chuzhi **PENG**

Co-Author(s): Xi **CHEN**, *Keming* **YU**, *Jing* **ZHUANG**

Purpose: Postoperative refractive regression following corneal laser surgery is frequently associated with aberrant corneal epithelial hyperplasia (CEH), yet its underlying molecular mechanisms remain poorly elucidated. This study aims to delineate the transcriptomic landscape and identify key pathogenic drivers and potential therapeutic agents for this condition.

Methods: We performed comprehensive transcriptome sequencing on corneal epithelial samples from patients exhibiting regression versus controls. Bioinformatic analyses, including differential expression, pathway enrichment, and network analysis, were integrated with advanced machine learning algorithms to pinpoint core regulatory genes. Candidate small-molecule therapeutics were predicted via computational drug repurposing platforms and validated through a series of in vitro and ex vivo functional assays.

Results: Transcriptome profiling identified a signature of 152 significantly dysregulated genes in the regression cohort. Critical pathways were markedly enriched, including p53 signaling, cell cycle progression, and ECM-receptor interaction. Machine learning pinpointed a core regulatory network centered on genes such as CDK1, CCNB1, AURKB, and ITGA2. A top-ranked predicted compound, Toceranib, effectively suppressed hyperproliferation and downregulated these key targets in validation assays. Subsequent animal experiments confirmed its efficacy in suppressing pathological epithelial hyperproliferation in relevant models.

Conclusions: This study delineates the molecular characterization of CEH-driven postoperative refractive regression, uncovering critical pathogenic networks and regulatory hubs. The identification and preliminary

validation of candidate therapeutics provide a foundational framework for developing novel strategies to prevent or treat this postsurgical complication.

Abstract No.: 200582

Panel No.: REF-0911

Late Sterile Subflap Inflammation After FS-LASIK Treated With 0.05% Cyclosporine Eye Drops: A Case Report

First Author: Luo HUI HUI

Co-Author(s): Qu HAO KUN, He JING XIN, Liang XIAN JUN, Lin YING JIE

Purpose: A 27-year-old man had bilateral FS-LASIK on 20 Dec 2024. Surgery revealed bilateral epithelial erosions and heavy surface lipid. Careful subflap irrigation and bandage lenses were applied. 1st day after surgery, visual acuity (VA): 1.5 OD, 1.0 OS. Moderate lipid lay beneath the mid-lower left flap, sharply demarcated. Bandage lenses were removed; both eyes received tobramycin-dexamethasone and hyaluronate 4 times/day. 1 week after surgery, VA: 1.5 OU, and the patient was satisfied. Left flap lipid unchanged. Tobramycin-dexamethasone stopped; both eyes switched to 0.1 % flumetholone 3 times/day (TID), tapered weekly, and ceased 1 month after surgery. 1.5 months after surgery, the patient complained a decrease VA in the left eye, with VA 1.5 OD, 0.8 OS. The left cornea showed mild, diffuse lipid-related turbidity, causing sterile inflammation and vision loss.

Methods: Left eye received 0.05% cyclosporine TID. 3 months after surgery, the left-eye vision remained poor, with VA 1.5 OD, 1.0 OS, and the left mid-lower flap turbidity unchanged. The epithelial thickness of the left eye was checked with intalight OCT, and the result showed central-lower epithelium thinned, worse temporally. Irrigation was advised but refused due to prior epithelial erosion; cyclosporine TID continued.

Results: Six months after surgery, VA was 1.5 OU, and the patient was pleased! Left flap turbidity resolved, and lipid margins cleared.

Conclusions: Late sterile FS-LASIK subflap inflammation with vision loss may respond to 0.05 % cyclosporine drops, the recommended course is 3–6 months.

Abstract No.: 205026

Panel No.: REF-0926

Long-Term Clinical Outcomes of Posterior Chamber Phakic Intraocular Lenses Implantation for the Treatment of Refractive Errors Patients

First Author: Tuan VU-ANH

Co-Author(s): Quynh Anh NGUYEN PHUONG, Trang PHAM- THU

Purpose: To describe the clinical demography and the long-term efficacy, safety outcomes, and the adverse

events after implanting the posterior chamber phakic intraocular lenses.

Methods: This study evaluated 122 eyes of 62 patients who underwent posterior chamber phakic intraocular lens implantation from 1/2017 to 12/2018. The results were recorded before surgery, after surgery 1 day, and after surgery 7 years. The data collected included: the uncorrected distance visual acuity (UDVA); best-spectacle corrected visual acuity (BCVA) in Snellen and Logmar scale; efficacy index (post-operative UDVA/preoperative CDVA); spherical equivalent (SE); endothelial cell density (ECD), and intra-ocular pressure (IOP) and incidences of adverse events.

Results: The mean age of patients in surgery is 24.89 ± 5.2 . The mean preoperative SE was $-8.51 \pm 2.91D$, the mean preoperative sphere was $-7.90 \pm 2.91D$. After 1 day postoperative, 94% of the patients had UDVA better than 20/30 (Snellen scale). The means of UDVA after surgery on day 1 and the BCVA before surgery do not differ. The mean UDVA after 7 years and BCVA before surgery are 0.14 ± 0.2 and $0.03 \pm 0.1 \log MAR$, respectively. So the mean logMAR UDVA after 7 years decreased by 1 line than the mean BCVA before surgery. These comparisons pair test demonstrated significant differences with $p < 0.001$. The mean endothelial cell density loss was $3.89\% \pm 5.78$. The mean vault is $465 \pm 217 \mu m$. After 7 years, there are no patients who need to exchange lenses because of the rotation of lenses. Increased intraocular pressure was found in 3 eyes (2.34%) that need to do laser iridectomy, and two out of three eyes (1.6%) require additional eye drops to lower eye pressure. Two eyes (1.6%) were found to have cataract and oval iris. The mean efficacy index is 0.84.

Conclusions: Over 7 years of follow-up, the Implantation of posterior chamber phakic intraocular lenses is an effective surgery for the treatment of high myopia and has stable efficacy.

Abstract No.: 204669

Panel No.: REF-0922

Navigating Femtosecond LASIK in the Presence of Bilateral Asteroid Hyalosis: A Case Report Highlighting Surgical Planning and Intraoperative Challenges

First Author: Tommy TRI ATMAJA

Co-Author(s): Chairunnisa KARIM CHAN

Purpose: To report a rare case of high myopia with bilateral asteroid hyalosis (AH) undergoing femtosecond LASIK, emphasizing preoperative planning, intraoperative considerations, and postoperative outcomes.

Methods: A 38-year-old female with high myopia and bilateral AH presented for refractive surgery to achieve spectacle independence. Preoperative assessment included uncorrected distance visual acuity (UCVA),

best-corrected distance visual acuity (BCVA), manifest refraction, corneal tomography and topography using the Schwind Sirius, and a comprehensive fundus examination to evaluate asteroid body density and location. Measurements were repeated to ensure accuracy and stability. The procedure utilized the Victus femtosecond laser for flap creation and the Schwind Amaris 750s for excimer laser ablation. Preoperative and postoperative UDVA, BCVA, and intraoperative observations were documented.

Results: Preoperatively, UCVA was 3/60 in both eyes. The BCVA was 20/20 with a manifest refraction of -5.00 sphere in the right eye (OD) and -4.50 sphere with -0.50 cylinder at 90° in the left eye (OS). Fundus examination revealed mild-to-moderate asteroid deposits with clear visualization of the optic disc and retinal vasculature. Corneal imaging remained accurate and reproducible despite AH. The surgery proceeded uneventfully with no suction loss, flap irregularities, or pupillary tracking errors. At one week postoperatively, UDVA improved to 20/15 in OD and 20/20 in OS. The patient reported excellent visual satisfaction, stable refraction, and rapid recovery with no intraoperative or postoperative complications.

Conclusions: Femtosecond LASIK can be safely performed in mild-to-moderate AH with careful planning and monitoring. Dense asteroid deposits may reduce image quality, affecting surgical precision and outcomes, requiring thorough evaluation and technique adjustments.

Abstract No.: 204757

Panel No.: REF-0923

Prediction of Ultrasound Biomicroscopy-Based Horizontal Sulcus-to-Sulcus Distance Using Non-Contact Anterior Segment Parameters

First Author: Ruofan LI

Co-Author(s): Xuemin LI, Haocheng XIAN

Purpose: To develop and validate a formula for predicting Horizontal Sulcus-to-Sulcus (H-STs) measured via Ultrasound Biomicroscopy (UBM) using non-invasive optical parameters to facilitate preoperative planning.

Methods: This study enrolled high myopia patients scheduled for intraocular lens implantation at Peking University Third Hospital. Preoperative UBM and multimodal imaging parameters from anterior segment optical coherence tomography (AS-OCT), IOL-Master, and Sirius were collected. A prediction model was developed through multiple linear regression and evaluated by the coefficient of determination (R^2), root mean square error (RMSE), and mean absolute error (MAE).

Results: The data analysis was based on 1,946 high myopia patients (3,892 eyes). Seven parameters were

incorporated into the final model: angle-to-angle distance (ATA) and crystalline lens rise (CLR) from AS-OCT; corneal volume, iridocorneal angle (IC angle), and flat keratometry (K1) from Sirius; axial length (AL) and white-to-white distance (WTW) from IOL-Master. The model achieved an R^2 value of 0.501. Bootstrap validation yielded an RMSE of 0.370 (95% CI: 0.370–0.372) and an MAE of 0.288 (95% CI: 0.286–0.289). External validation on 1,166 eyes indicated consistent performance ($R^2=0.496$, RMSE=0.378, MAE=0.292). Bland–Altman analysis demonstrated excellent agreement with a mean difference of 0.010 mm.

Conclusions: The prediction model based on seven routinely measured optical parameters provides an accurate and clinician-friendly method for estimating post-operative H-STs before surgery. This approach may reduce unnecessary UBM examinations and refine intraocular lens selection.

Abstract No.: 201076

Panel No.: REF-0912

Rotational Stability, and Visual Outcomes of Toric Implantable Collamer Lenses (EVO-TICL) in Eyes With Non-Horizontal Implanting Orientation: A Prospective Observational Study

First Author: Xiaoe FAN

Co-Author(s): Teruko Fukuyam

Purpose: To evaluate the short-term rotational stability and visual outcomes of EVO-TICL with non-horizontal implantation orientation.

Methods: Seventy-seven eyes of 51 patients were enrolled in this prospective study. There were 36 eyes with non-horizontal orientation and 41 eyes with horizontal orientation of the TICL. Visual acuity, refractive parameters, and axial position of the EVO-TICL were measured preoperatively at 1week, 1month, and 3 months postoperatively.

Results: Postoperatively, there were no statistically significant differences between the two groups in UDVA ($p = 0.940$), spherical equivalent ($p = 0.283$), cylinder ($p = 0.156$), or rotation degree ($p = 0.385$). In the non-horizontal group at final follow-up, the safety index was 1.22 ± 0.21 , and the efficacy index was 1.17 ± 0.15 . The best-fitting curve of attempted versus achieved correction was $y = 1.02x + 0.01$. Mean spherical equivalent improved from -8.74 ± 3.17 D preoperatively to -0.14 ± 0.50 D at 3 months postoperatively, with mean surgically induced astigmatism of -0.33 ± 0.32 D. The absolute rotation was $2.69 \pm 2.11^\circ$ (range $0-10^\circ$) at 1 month and $3.15 \pm 2.85^\circ$ (range $0-11^\circ$) at 3 months. Expected astigmatism was -0.11 ± 0.03 D compared to actual astigmatism of -0.33 ± 0.32 D at 3 months. For refractive outcomes, 88.89% of eyes were within ± 0.50 D of expected SE and 100% within ± 1.00 D, while 71.7% had astigmatism correction within ± 0.50 D and 96.22% within ± 1.00 D of attempted correction.

Conclusions: EVO-TICL with non-horizontal implantation orientation demonstrates good safety, efficacy, predictability, and stability, with a relatively stable axial position postoperatively.

Abstract No.: 202623

Panel No.: REF-0919

Seven-Year Clinical Outcomes of Implantable Collamer Lens Implantation Versus KLEx for Myopia Correction: A Contralateral Eye Analysis

First Author: Mingrui **CHENG**

Co-Author(s): Xiaoying **WANG**

Purpose: This study aims to compare the seven-year clinical outcomes of Implantable Collamer Lens (ICL) implantation and Keratorefractive Lenticule Extraction (KLEx) for the correction of myopia in patients with anisometropia, with a focus on evaluating long-term refractive stability, visual quality, and patient satisfaction.

Methods: A contralateral eye analysis was conducted on 25 patients with stable myopia. Comprehensive preoperative evaluations included assessments of visual acuity, refractive error, corneal topography, and endothelial cell density. ICL V4c implantation and KLEx were performed following standardized surgical protocols. Postoperative follow-up evaluations at 1 month and 7 years included measurements of visual acuity, refractive stability, wavefront aberrations, retinal image quality, and patient-reported visual disturbances.

Results: A contralateral eye analysis was conducted on 25 patients with stable myopia. Comprehensive preoperative evaluations included assessments of visual acuity, refractive error, corneal topography, and endothelial cell density. ICL V4c implantation and KLEx were performed following standardized surgical protocols. Postoperative follow-up evaluations at 1 month and 7 years included measurements of visual acuity, refractive stability, wavefront aberrations, retinal image quality, and patient-reported visual disturbances.

Conclusions: Both ICL and KLEx are effective for long-term myopia correction, with ICL offering superior visual quality and stability, particularly in patients with high myopia. The combination of these techniques in anisometropic patients is feasible and provides a personalized treatment approach, ultimately enhancing overall visual outcomes and patient satisfaction.

Abstract No.: 202855

Panel No.: REF-0920

Toric Versus Non-toric Implantable Collamer Lens Implantation for Low Myopic Astigmatism: 12-month Follow-up

First Author: He **HAIYAN**

Purpose: To evaluate and compare the visual and refractive outcomes of TICL and ICL implantation in patients with low myopic astigmatism.

Methods: This retrospective study included 64 eyes of 64 patients with low myopic astigmatism who underwent TICL or ICL implantation. Visual acuity, refractive outcomes, visual quality, and ocular parameters were assessed at baseline, 3 months, and 12 months postoperatively. The surgical results were evaluated using statistical and astigmatism vector analysis methods.

Results: The safety index was 1.24 ± 0.17 for TICL and 1.21 ± 0.17 for ICL ($p = 0.534$). The efficacy index was 1.19 ± 0.18 for TICL and 1.07 ± 0.16 for ICL ($p = 0.003$). The uncorrected visual acuity at 12 months was -0.07 ± 0.06 in the TICL group and -0.02 ± 0.07 in the ICL group, respectively ($p = 0.006$). The postoperative astigmatism was -0.05 ± 0.18 D in the TICL group, and -0.44 ± 0.38 D in the ICL group ($p < 0.001$). Both groups exhibited good predictability ($R^2 > 0.98$) and long-term stability for postoperative refraction, as well as a significant increase in visual quality ($p < 0.001$). The correction index was 0.95 and 0.48 in the TICL and ICL groups, respectively.

Conclusions: TICL and ICL demonstrated favorable safety, predictability, and comparable improvement in visual quality for low astigmatic patients in the long term. Nevertheless, compared to ICL, TICL presented superior efficacy, stability, postoperative visual acuity, as well as better astigmatism correcting outcomes.

Abstract No.: 206210

Panel No.: REF-0931

Visual, Refractive and Satisfaction Outcomes Following Myopic Presbyond Treatment in the Philippines: A Retrospective Cohort Study

First Author: Cristina Erika **ELAZEGUI**

Co-Author(s): Nicolette **CHUA**, Reginald **TAN**

Purpose: To evaluate the visual, refractive, and patient satisfaction outcomes of Presbyond laser blended vision (LBV) in Filipino myopic presbyopes.

Methods: This retrospective cohort study included 46 eyes from 23 patients who underwent Presbyond femtosecond LASIK at a tertiary hospital in the Philippines between August 2023 and January 2025. Patients were ≥ 39 years with preoperative corrected distance visual acuity (CDVA) of 20/25 or better. Outcomes at 6 months included uncorrected distance visual acuity (UDVA), CDVA, predictability, stability,

and astigmatic correction. Patient satisfaction was measured using a validated 0–100 scale.

Results: At 6 months, 96% of eyes achieved UDVA of 20/20 or better, and UDVA was within 1 line of preoperative CDVA in 96% of cases. No eye lost >2 lines of CDVA, and 15% gained 1 line. Predictability was high, with 91% of eyes within ± 0.50 D and 100% within ± 1.00 D of target refraction. Astigmatic correction was precise, with 96% of eyes ≤ 0.50 D and 92% aligned within $\pm 15^\circ$ of the intended axis. Refractive stability was achieved by 6 months. Overall satisfaction scores were high, with most patients reporting spectacle independence at distance and near.

Conclusions: Presbyond LBV is a safe, effective, and predictable option for presbyopia correction in myopic Filipino patients, demonstrating excellent refractive accuracy, stability, and high patient satisfaction.

Retina (Medical)

Abstract No.: 205158

Panel No.: RME-1004

A Case Report of Late-Onset Alström Syndrome

First Author: Zhen FANGYUAN

Co-Author(s): Zhou XIAOLAI, Hu

Purpose: Alström syndrome is a rare autosomal recessive genetic disorder characterized primarily by retinal dystrophy, with a wide range of accompanying systemic manifestations. This paper reports a patient with a compound heterozygous variant in the ALMS1 gene (c.10831_10832del, p.Arg3611AlafsTer and c.1238-20A>G). This variant combination has not been reported previously, and the patient was diagnosed with Alström syndrome.

Methods: Ophthalmic assessments included visual acuity examination, refraction, slit-lamp examination, optical coherence tomography (OCT), and electroretinography (ERG). Genetic analysis was performed using whole-exome sequencing.

Results: The patient experienced vision loss at age 50 and became blind at age 60. Ophthalmic assessments revealed diffuse bilateral retinal pigmentary changes, and ERG results showed cone-rod dystrophy. However, rod cell function was only mildly affected, while cone cell function was completely lost. Genetic testing of this patient revealed a compound heterozygous variant in the ALMS1 gene, which includes a known pathogenic variant (c.10831_10832del) and a variant of uncertain significance (c.1238-20A>G).

Conclusions: The age of onset in this case is different from typical Alström syndrome, presenting as a rare late-onset phenotype. Although the second variant is classified as a variant of uncertain significance, the

clinical and electrophysiological data from this case strongly support its co-pathogenic role with the known pathogenic variant, giving rise to a unique late-onset phenotype. This provides new insights into the genetic and phenotypic heterogeneity of the disease.

Abstract No.: 203178

Panel No.: RME-0980

A Cohort Study on Prepartum and Postpartum Changes in Retinal Choroidal Microcirculation in Patients With Hypertensive Disorders of Pregnancy

First Author: Jiulin NI

Co-Author(s): Shuting LI, Wan LI, Min QIU

Purpose: To investigate changes in choroidal microcirculatory blood flow and structure in patients with hypertensive disorders of pregnancy (HDP) before and after delivery using swept-source optical coherence tomography angiography (SS-OCTA).

Methods: Thirty-seven women with HDP (64 eyes) underwent SS-OCTA in late pregnancy and at 6 weeks postpartum. Choroidal thickness (CT) and choriocapillaris vascular density (CCVD) in macular and peripapillary regions were analyzed. Paired t-tests and Pearson correlations were applied to observe changes in choroidal parameters and their correlations with various clinical indicators.

Results: Patients had a mean age of 29.03 ± 3.66 years and gestational age of 36.93 ± 2.59 weeks. Postpartum, blood pressure and body weight decreased significantly. Macular CT was higher prepartum in the central and inferior regions, while peripapillary CT was reduced only in the superior quadrant. Central macular CCVD was higher prepartum, whereas inferior macular CCVD was lower; peripapillary CCVD showed no significant changes. Correlation analysis revealed associations of inferior macular CCVD with diastolic pressure change, 24h urinary protein, and PI, and of superior macular CCVD with 24h urinary protein. The outer macular CT correlated with 24h urinary protein, RI, and biparietal diameter.

Conclusions: HDP patients predominantly demonstrated postpartum reductions in CT and increases in CCVD, with region-specific correlations to systemic and obstetric indicators. SS-OCTA provides valuable insights into ocular changes associated with HDP.

Abstract No.: 204647**Panel No.: RME-0998**

A Diagnostic Dilemma: Ischemic Maculopathy or Macular Dystrophy in a Post-Preeclampsia Patient

*First Author: Kaveri BIRLA**Co-Author(s): Prince ABU AAMIR, Neha CHAWLA GULIANI, Afsana IDRISHI*

Purpose: To highlight the diagnostic challenge in differentiating ischemic maculopathy secondary to pre-eclampsia from heredomacular dystrophies in a patient with bilateral long-standing visual impairment.

Methods: We report the case of a 41-year-old female who developed sudden, painless, bilateral diminution of vision during the ninth month of pregnancy 18 years ago. Visual function worsened initially, prior to delivery. Partial recovery was documented two weeks postpartum, and it has been stable thereafter. There were no systemic comorbidities or family history of ocular disease. Comprehensive ocular examination, multimodal imaging including fundus photography, OCT, and OCTA were performed.

Results: Fundus evaluation revealed arteriolar attenuation, collateral vessels, flecks at the macula with pigmentary changes, and Elschnig's spots. OCT demonstrated severe inner retinal atrophy with markedly reduced central macular thickness (117–126 μm). Hence, differential diagnosis of ischemic maculopathy related to pre-eclampsia versus macular dystrophies such as Stargardt disease or pattern dystrophy was incorporated. However, the acute onset during pregnancy, presence of hypertensive complications, and fundus features of choroidal ischemia favour a vascular etiology. Therefore, we suggest a final diagnosis of post-pre-eclampsia bilateral ischemic maculopathy.

Conclusions: Ischemic maculopathy is an uncommon but vision-threatening sequelae of pre-eclampsia. Its fundus findings can mimic macular dystrophies, especially in chronic stages with macular flecks and atrophy. Detailed obstetric history, including sequential timeline and multimodal imaging, is essential to distinguish vascular ischemic damage from hereditary macular disorders and interim guide prognosis.

Abstract No.: 201763**Panel No.: RME-0955**

A Probable Case of Bullous Central Serous Chorioretinopathy Treated with Intravitreal Bevacizumab

*First Author: Robbie Alyssa MALIWAT**Co-Author(s): Kristine CORPUS-VELASQUEZ, Juan LOPEZ*

Purpose: To present a probable case of bilateral bullous central serous chorioretinopathy (bCSCR) treated with

intravitreal injection of bevacizumab (IVB) in one eye in a patient with multiple comorbidities.

Methods: This is a case report.

Results: A 50-year-old male with diabetes and chronic kidney disease presented with sudden-onset painless blurring of vision on the right eye then subsequently the left eye. Initial best corrected visual acuity (BCVA) was counting fingers at 1 foot on the right and 20/150 on the left. Fundoscopy revealed a broad-based shallow retinal detachment and a doughnut-shaped subretinal patch in the macula of the right eye and an inferior bullous retinal detachment with positive shifting fluid sign but no visible breaks, and an ovoid-shaped yellow subretinal patch on the left eye. Macular optical coherence tomography (OCT-M) revealed exaggerated neurosensory retinal detachment in both eyes disproportionate to fundoscopic findings. Trial of IVB was done on the right eye. One-month post IVB revealed significant improvement of BCVA 20/40 on the right and 20/120 on the left. There was significant resolution of the retinal detachment and subretinal patches in both eyes. Fluorescein angiography and OCT-M showed pooling and prominent resolution of retinal detachment, respectively. Uveitis referral and work-up revealed incidental positive interferon-gamma release assay without other findings pertinent to ocular tuberculosis.

Conclusions: In cases of bilateral non-rhegmatogenous, noninfectious, exudative retinal detachment, bCSCR should be in the differential diagnoses. Multi-modal imaging and multi-specialty collaboration is paramount. IVB may have a potential role in the treatment of bCSCR.

Abstract No.: 204636**Panel No.: RME-0999**

A Rare Case of Ocular Sarcoidosis Presenting as Chronic Granulomatous Conjunctivitis

*First Author: Faouzia SULTANA**Co-Author(s): Hasan JAWAD*

Purpose: To report a rare case of ocular sarcoidosis initially presenting as chronic granulomatous conjunctivitis, highlighting the diagnostic challenges in tuberculosis-endemic regions.

Methods: A case report of a 60-year-old Bangladeshi male with persistent conjunctival redness, swelling, and nodules in the left eye. Clinical findings, laboratory investigations, imaging, histopathology, and multidisciplinary management were reviewed.

Results: Initial treatment as idiopathic conjunctivitis failed. Examination revealed conjunctival granulomas, cataract, and secondary glaucoma without posterior uveitis. Systemic workup excluded tuberculosis with negative Mantoux and QuantiFERON-TB Gold tests. Chest imaging revealed basal consolidation and inflammatory changes. Conjunctival biopsy confirmed

non-caseating granulomas, consistent with sarcoidosis. The patient was treated with systemic corticosteroids, topical anti-inflammatory and antiglaucoma medications, and supportive systemic therapy. Atrial fibrillation and poorly controlled diabetes required cardiology and endocrinology input. Clinical improvement was noted under a multidisciplinary approach.

Conclusions: Ocular sarcoidosis rarely presents as chronic granulomatous conjunctivitis. In TB-endemic regions, it is often misdiagnosed, delaying appropriate management. Histopathology remains the cornerstone of diagnosis in distinguishing sarcoidosis from infectious granulomatous disease. This case emphasizes the importance of clinical suspicion, biopsy confirmation, and coordinated multidisciplinary care to prevent vision loss and systemic complications.

Abstract No.: 201669

Panel No.: RME-0953

A Rare Glimpse into Darkness: A Devastating Ocular Complication of Systemic Lupus Erythematosus in a 23-year-old Filipino Female

First Author: Richard VILLAMOR

Co-Author(s): Karen CABRERA

Purpose: To report a case of a 23-year-old Filipino female presenting with sudden, painless vision loss in the left eye. Examination revealed a cherry-red spot, RAPD, and OCT showed inner retinal thickening, which is consistent with diagnosis of Central Retinal Artery Occlusion (CRAO). CRAO is a rare ophthalmic emergency in young patients, typically linked to non-atherosclerotic causes.

Methods: Systemic workup was done to determine possible etiology.

Results: Systemic workup revealed positive ANA and anti-dsDNA, confirming a diagnosis of systemic lupus erythematosus (SLE). CRAO is an uncommon ocular manifestation of SLE, especially without a known hypercoagulable state. Patient underwent hyperbaric oxygen therapy and resulted into improvement of visual acuity.

Conclusions: This case highlights the importance of considering autoimmune diseases in young patients with CRAO and the need for early multidisciplinary intervention to manage systemic involvement.

Abstract No.: 200751

Panel No.: RME-0940

Altered m6A Epitranscriptome of mRNAs in Retinal Ischemia-Reperfusion

First Author: Jingying LIANG

Co-Author(s): Yingting ZHU, Yehong ZHUO

Purpose: Retinal ischemia-reperfusion (RIR) injury, characterized by irreversible degeneration of retinal ganglion cells, underlies the pathological mechanisms of glaucoma and diabetic retinopathy. Epitranscriptomic regulation by N6-methyladenosine (m6A) has emerged as a key modulator of RNA stability and translation, yet its role in pathological retinal ischemia-reperfusion remains unclear. Here, we investigated transcriptome-wide m6A modifications of mRNAs in a mouse model of RIR.

Methods: Retinal tissues from RIR and sham mice were subjected to Methylated RNA Immunoprecipitation sequence and RNA-seq analysis.

Results: RT-qPCR demonstrated that the expression of the m6A methyltransferase Mettl3 was elevated on day 3 after RIR injury, suggesting an active involvement of the m6A modification in pathogenesis. A total of 7,495 mRNAs (3,871 hypermethylated and 3,624 hypomethylated) exhibited significant alterations in m6A methylation. A total of 7495 mRNAs (3871 hypermethylated, 3624 hypomethylated) showed significant alterations in m6A methylation. Gene ontology analysis revealed that hypermethylated transcripts were enriched in cellular process, cellular anatomical entity, binding, whereas hypomethylated transcripts were associated with regulation of synaptic signaling, synapse, gated channel activity. KEGG pathway analysis indicated that hypermethylated mRNAs were involved in tight junction, Hippo signaling pathway, and PI3K-Akt signaling pathways, while hypomethylated mRNAs were linked to neuroactive ligand-receptor interaction and glutamatergic/cholinergic synapses.

Conclusions: Our study suggested that m6A methylation levels are significantly altered in retinal ischemia-reperfusion. The possible roles of m6A modification in RIR were predicted by bioinformatics analysis. The results implied that the m6A modification might be involved in RIR and considered as potential therapeutic targets.

Abstract No.: 204925

Panel No.: RME-1002

Anatomical and Patient-Reported Outcomes of Bevacizumab Versus Ranibizumab in Wet Age-Related Macular Degeneration: A Multi-Center, Randomized, Double-Blind, Active-Controlled, Phase III Trial (AURA-1)

First Author: Jingjing **SHEN**Co-Author(s): Paul **CHANG**, Malcolm **NGIAM**, Na **XU**, Qi **XUE**

Purpose: High-level evidence from large randomized controlled trials (RCTs) on bevacizumab for wet age-related macular degeneration (wAMD) in the Chinese population has been lacking. AURA-1, as the first and only large-scale RCT in Chinese wAMD patients, aimed to address this gap by providing robust evidence on the efficacy of bevacizumab. The current research compared the anatomical and patient-reported outcomes of bevacizumab versus ranibizumab in patients with wAMD.

Methods: In this multicenter, randomized, double-blind, active-controlled, phase III trial, 407 patients were randomized to receive intravitreal injections of bevacizumab (1.25 mg/eye) or ranibizumab (0.5 mg/eye) every 4 weeks for 48 weeks. Statistical analyses included t-tests and mixed-model repeated measures (MMRM). AURA-1 was registered (NCT05003245).

Results: Bevacizumab demonstrated significant improvements from baseline in anatomical and patient-reported outcomes, with no statistically significant differences compared to ranibizumab. Bevacizumab showed robust efficacy from baseline: fluorescein angiography (FA) leakage area reduction of -3.32 mm^2 ($p < 0.001$), choroidal neovascularization (CNV) total area reduction of -0.99 mm^2 ($p = 0.001$), central retinal thickness (CRT) reduction of $-129.8 \mu\text{m}$ ($p < 0.001$), and Visual Function Questionnaire-25 (VFQ-25) score improvement of $+2.60$ points ($p = 0.0036$). The differences between the bevacizumab and ranibizumab groups were not significant for FA leakage area (0.468 mm^2 , $p = 0.544$), CNV total area (-0.40 mm^2 , $p = 0.196$), CRT ($14.80 \mu\text{m}$, $p = 0.333$), and NEI VFQ-25 scores (-1.58 points, $p = 0.207$). Sensitivity analyses using MMRM showed similar results.

Conclusions: Bevacizumab demonstrated significant efficacy in reducing anatomical lesions and improving the quality of life in Chinese wAMD patients. Its comparable profile to ranibizumab supports its use as a cost-effective alternative treatment.

Abstract No.: 202786

Panel No.: RME-0973

Anti-VEGF Combined With Ocular Corticosteroids Therapy Versus Anti-VEGF Monotherapy for Diabetic Macular Edema: Meta-Analysis and OCT-Based Biomarkers in Response to Treatments

First Author: Jing **HAN**

Purpose: Anti-VEGF is the first-line treatment for diabetic macular edema (DME), a key pathological condition of DR, and also a major cause of visual impairment in the global working population. As anti-VEGF monotherapy shows suboptimal efficacy in some DME patients and requires frequent administration, other therapeutic options, including corticosteroids alone or in combination with anti-VEGF, might produce a beneficial effect in these patients. The purpose of the study is to compare the effect and OCT-based biomarkers between the anti-VEGF combined with ocular corticosteroids therapy and anti-VEGF monotherapy for the treatment of DME.

Methods: 1) Meta-analysis: Databases were searched up to April 5, 2023, data were extracted and analyzed using STATA 15.1 according to the PROSPERO protocol (CRD42023408338). Best corrected visual acuity (BCVA) and central macular thickness (CMT) were compared between the groups. 2) Retrospective analysis: Medical records of DME patients at the Ophthalmology Department of Tangdu Hospital (2018–2025) were reviewed, divided into a combined group and a monotherapy group, with OCT image differences analyzed via SPSS 26.0.

Results: Meta-analysis outcomes revealed that combined therapy was superior in improving BCVA and reducing CMT at 1–3 months (peak at 3 anti-VEGF injections) but not at 6–12 months, with higher adverse event risks. In retrospective analysis, combined therapy better reduced HRF, restored ELM/EZ, decreased SRF and DRIL (3–6 months).

Conclusions: Anti-VEGF combined with ocular corticosteroids demonstrates superior efficacy within 3 months of DME treatment (but not after 6 months), and is more effective in the change of OCT biomarkers, including reducing HRF, restoring EZ integrity, and alleviating SRF accumulation.

Abstract No.: 202304
Panel No.: RME-0968

Assessing a 36-Week Refill-Exchange Regimen for Port Delivery Platform With Ranibizumab in Patients With Up to Two Years' Diagnosis of Neovascular Age-Related Macular Degeneration: Phase-3b Sightspire Trial

First Author: Christopher Seungkyu LEE
Co-Author(s): Richard H. FOXTON, Frank G. HOLZ, Thanapong SOMKIJRUNGROJ, Kailin TIAN

Purpose: PDS (Port Delivery Platform with ranibizumab), a drug delivery system continuously delivering ranibizumab into the vitreous, is approved in the US for nAMD (neovascular age-related macular degeneration) with refill exchanges Q24W (every-24-weeks). We report the study design of the ongoing, global, phase-3b Sightspire trial assessing PDS Q36W in nAMD patients.

Methods: The single-arm Sightspire (NCT06847542) trial assesses the effectiveness, safety, and PROs (patient-reported outcomes) of PDS Q36W and Q24W in nAMD patients. Eligibility criteria: nAMD diagnosis ≤ 24 months, prior anti-vascular endothelial growth factor response, BCVA (best-corrected visual acuity) ≥ 34 -letters (20/200 Snellen). At W24 (week 24), disease activity (BCVA: ≥ 5 letter decrease vs last 2 measures, ≥ 10 letter decrease from best recorded, CST [central subfield thickness]: $\geq 75\mu\text{m}$ increase vs last 2 measures, $\geq 100\mu\text{m}$ increase vs lowest measure, or new macular hemorrhage) will be assessed; patients without activity are assigned to Q36W cohort; patients with activity are assigned to Q24W cohort.

Results: Primary endpoint: change from baseline in BCVA, averaged over W68 and W72 (Q36W cohort). Secondary outcomes: change in BCVA scores, center point thickness, CST over time, treatment, and visit burden (Q36W cohort). PROs: patient preference for PDS vs intravitreal injections and recovery experience. Sightspire also explores caregiver burden and whether PDS can help reduce it. Safety: incidence and severity of ocular and systemic adverse events.

Conclusions: Sightspire uniquely evaluates PDS treatment adaptability, visit flexibility, and clinical outcomes across a diverse patient population, supporting individualised treatment for patient and caregiver benefit.

Abstract No.: 201198
Panel No.: RME-0946

Assessment of Outcome Measures to Detect Disease Progression in Bietti Crystalline Dystrophy

First Author: Yusuke MURAKAMI
Co-Author(s): Manabu MIYATA, Akio OISHI, Koh-hei SONODA, Kazushige TSUNODA, Huanyu ZHAO

Purpose: To characterize the natural history of Bietti crystalline dystrophy (BCD), and to identify sensitive outcome measures for detecting disease progression.

Methods: This multi-center, prospective study included patients with BCD carrying biallelic pathogenic variants in the CYP4V2 gene, recruited from four academic centers in Japan. Multimodal imaging and functional assessments included best-corrected visual acuity (BCVA), static perimetry (Humphrey 10-2), fundus autofluorescence (FAF), and optical coherence tomography (OCT). The primary outcome was the longitudinal changes in BCVA. Secondary outcomes included changes in the hypo-autofluorescent (hypo-AF) area, and static perimetry parameters, such as mean deviation (MD), absolute scotoma points (ASP), and transitional zone retinal sensitivity (TZRS).

Results: Thirteen patients with genetically confirmed BCD were followed prospectively over a median of 2.5 years (range: 2.5-3 years). Longitudinal analysis showed progression in hypo-AF area ($11.8 \text{ mm}^2/\text{year}$, 95% CI: 5.25–18.34, $P = 0.003$) and TZRS decline (-2.32 dB/year , 95% CI: -4.06 to -0.59 , $P = 0.015$) and BCVA decline (0.04 logMAR/year , $P = 0.008$). Hypo-AF area showed the biggest annual change rate (18.4%) and highest SNR (1.10; signal-to-noise ratio) among all parameters. LMM revealed that hypo-AF area progression was significantly associated with faster loss of MD ($P = 0.011$) and ASP ($P = 0.017$), but not with BCVA or TZRS changes.

Conclusions: This prospective natural history study suggests that hypo-AF area may serve as a useful structural measure for detecting disease progression in BCD clinical trials, warranting further validation in larger prospective studies.

Abstract No.: 203370
Panel No.: RME-0984

Association Between Mean Ocular Perfusion Pressure and Proliferative Diabetic Retinopathy in a Northern Chinese Population

First Author: Juping LIU
Co-Author(s): Han BO, Chen CHEN, Fei GAO, Liying HU, Xiaorong LI, Emmanuel Eric PAZO, Yu SHI, Xiuqing ZHU

Purpose: To evaluate the association between mean ocular perfusion pressure (MOPP), pulse pressure (PP), systolic blood pressure (SBP), and the proliferative

diabetic retinopathy (PDR) in patients with type 2 diabetes in a northern Chinese population.

Methods: A retrospective cross-sectional study was conducted using 1,119 patient data from the Beichen Eye Study and 204 electronic medical records from the Tianjin Medical University Eye Hospital. The participants were categorized into no diabetic retinopathy (NDR), non-proliferative diabetic retinopathy (NPDR), PDR groups. SBP, diastolic blood pressure (DBP), and intraocular pressure (IOP) were measured. MOPP was calculated using the formula: $MOPP = 2/3 [DBP + 1/3 (SBP - DBP)] - IOP$.

Results: When the PDR group was set as the reference, the odds ratio (OR) value of MOPP (NDR: OR, 0.92, 95% confidence intervals [CI], 0.89-0.95; NPDR: OR, 0.94, 95% CI, 0.91-0.98) was lower than that of SBP and PP. In a model with MOPP, SBP, and PP simultaneously as covariates, the OR value of MOPP (NDR: OR, 0.83, 95% CI, 0.77-0.89; NPDR: OR, 0.89, 95% CI, 0.83-0.96) was lower than PP, while SBP was not statistically significant. The OR trend for these three parameters remained consistent following tertile classification. Except for PP (P for likelihood test = 0.046), MOPP and SBP have no threshold effects for the association of PDR.

Conclusions: MOPP outperforms SBP and PP in predicting PDR risk, underscoring the synergistic role of IOP and blood pressure in disease development.

Abstract No.: 201913

Panel No.: RME-0954

Atypical Retinitis Pigmentosa Associated With CERKL Mutation Mimicking Gyrate Atrophy

First Author: Vinit TANWAR

Co-Author(s): Manasi TRIPATHI

Purpose: To report the unique multimodal imaging findings in a genetically confirmed case of Atypical Retinitis Pigmentosa (RP) due to a CERKL mutation, which presented with a rare phenotype mimicking Gyrate Atrophy, and to highlight the diagnostic importance of genetic testing.

Methods: A case report. A patient presenting with features of a progressive retinal dystrophy underwent a comprehensive ophthalmic evaluation. This included color fundus photography, fundus autofluorescence (FAF), and spectral-domain optical coherence tomography (SD-OCT). Subsequent genetic testing was performed via next-generation sequencing to identify the underlying causative mutation.

Results: Fundus examination revealed widespread, well-circumscribed chorioretinal atrophic patches in the periphery, along with significant pigmentary changes involving the macula, a pattern highly suggestive of Gyrate Atrophy. FAF imaging showed hypofluorescence corresponding to these atrophic

areas. SD-OCT demonstrated severe outer retinal atrophy, loss of the ellipsoid zone, and foveal thinning. Contrary to the clinical appearance, genetic analysis identified a homozygous pathogenic variant in the CERKL gene (c.967_968del, p.Met323ValfsTer20), confirming a diagnosis of Atypical Retinitis Pigmentosa (RP26).

Conclusions: Retinal dystrophies associated with CERKL mutations exhibit significant phenotypic variability. This case demonstrates a rare presentation that can masquerade as other chorioretinal degenerations like Gyrate Atrophy. Multimodal imaging is essential for characterization, but genetic testing is indispensable for reaching a definitive diagnosis, which is critical for accurate prognostication and patient counseling.

Abstract No.: 203857

Panel No.: RME-0986

Baseline Associations Between Visual Function and Inflammatory Markers in the Registry of Retinitis Pigmentosa

First Author: Kaho YAMAMOTO

Co-Author(s): Takahiro HISAI, Yasuhiro IKEDA, Kazunori MIYATA, Yusuke MURAKAMI

Purpose: To examine the relationship between visual function and inflammatory markers at baseline in the Retinitis Pigmentosa Progression and Inflammatory Marker Registry (RP-PRIMARY Study); a prospective registry of moderate-stage RP.

Methods: Sixty-seven patients with moderate-stage RP were analyzed cross-sectionally. Examinations included ETDRS best-corrected visual acuity (BCVA), Humphrey Field Analyzer 10-2 mean deviation (MD), retinal sensitivity (RS Cent 4'/12'), ellipsoid zone (EZ) length, central fovea thickness (CFT), and hyper-autofluorescence (AF) ring area. Aqueous flare was quantified by laser flare photometry, and systemic markers were measured by blood tests. Associations were analyzed using correlation and multiple linear regression models.

Results: Aqueous flare correlated negatively with BCVA ($p = -0.35$, $p = .004$), RS Cent 12' ($p = -0.32$, $p = .008$), EZ length ($p = -0.28$, $p = .023$), and AF ring area ($p = -0.31$, $p = .016$). No systemic associations were found. Intraocular lens (IOL) eyes showed higher flare (15.6 vs. 8.0 pc/ms, $p < .001$) and worse visual outcomes, including lower BCVA ($p = .004$), RS Cent 12' ($p = .005$), RS Cent 4' ($p = .010$), reduced CFT ($p = .001$), and shorter EZ length ($p = .011$). In multivariate regression, IOL implantation remained an independent predictor of increased aqueous flare ($\beta = 0.262$, $p < .001$).

Conclusions: At baseline, aqueous flare was inversely correlated with visual function, and IOL implantation was most strongly associated with increased aqueous flare in patients with moderate-stage RP.

Abstract No.: 204612

Panel No.: RME-0996

Biallelic Heterozygous Mutations in Crumbs Homolog-1 Gene Associated With Macular Retinoschisis and Angle-Closure Glaucoma

First Author: Xu HOU

Co-Author(s): Dan HU, Xiaojin SONG, Jiaying SUN, Yusheng WANG, Jian ZHOU

Purpose: To investigate clinical features, including macular retinoschisis, Coats-like vasculopathy, short axial length, and angle-closure glaucoma (ACG) in a patient with mutations in the crumbs homolog-1 (CRB1) gene.

Methods: A girl with a complaint of poor visual acuity of both eyes was admitted and had both general physical examination and ocular examination on her first visit at 7 years old. Clinical features, including BCVA, IOP, OCT, AF, FFA, ERG, and VEP were performed. DNA samples were screened to detect mutations in the most frequently involved genes in retinal diseases. Initial treatment involved the combined medications and LPI. Trabeculectomy and secondary surgery, including phacoemulsification, intraocular lens implantation, and anterior vitrectomy, were performed in both eyes during the next 10-year follow-up.

Results: The abnormal ocular phenotype included bilateral anterior angle closure, short axial length, optic atrophy, macular retinoschisis, and Coats-like response in the peripheral retina. The genetic testing showed a combined heterozygous missense mutation (paternal p.C469G and maternal p.R905Q) in CRB1 in the affected girl. The BCVA was 20/400 in both eyes, and the IOP was 18 mmHg in the right and 17 mmHg in the left at the last follow-up. OCT revealed more serious cystoid changes and disrupted structures of the outer retina within the macula, as well as excavation of the optic disk.

Conclusions: CRB1 mutations could result in a combined manifestation in the anterior and posterior segments. It also highlights the crucial role of CRB1 in eyeball development.

Abstract No.: 206403

Panel No.: RME-1022

Bilateral Central Retinal Vein Occlusion in Young Adults With Hypertensive Retinopathy: A Rare Case Report

First Author: Andika Adiputra WITONO

Co-Author(s): Eugeni SUMANTI, Salam SURBAKTI, Dyana WATANIA

Purpose: To report a rare case of bilateral central retinal vein occlusion (CRVO) in a young adult with uncontrolled hypertension and hypertensive retinopathy, emphasizing diagnostic findings, management, and treatment outcomes.

Methods: A 20-year-old female with a 10-year history of uncontrolled hypertension presented with blurred vision in her left eye. Clinical evaluation included visual acuity testing, fundus examination, and optical coherence tomography (OCT), confirming bilateral CRVO. Management consisted of systemic anti-hypertensive therapy and intravitreal Ranibizumab injection in the left eye, followed by close monitoring.

Results: On presentation, visual acuity was 1/300 in the right eye and 1/60 in the left eye, with characteristic funduscopic findings of bilateral CRVO. After intravitreal Ranibizumab injection, the patient remained stable at one-week follow-up, with unchanged visual acuity, controlled intraocular pressure, and no reported complications. Further injections were planned for continued management.

Conclusions: Although uncommon in young adults, bilateral CRVO can occur in association with chronic uncontrolled hypertension. Early recognition and timely initiation of anti-vascular endothelial growth factor therapy, combined with systemic blood pressure control, are crucial to preserve vision and prevent disease progression. Continuous follow-up is mandatory to optimize long-term outcomes.

Abstract No.: 205715

Panel No.: RME-1009

Bilateral Serous Retinal Detachment As the Initial Presentation of HELLP Syndrome in an Undiagnosed Pregnancy: A Case Report

First Author: Rinprapa CHUCHAROEN

Co-Author(s): Taniya BHOOPAT

Purpose: To describe a rare case of HELLP syndrome initially presenting with bilateral serous retinal detachment (SRD) in a previously undiagnosed pregnancy.

Methods: A 33-year-old woman presented with progressive bilateral blurred vision for three weeks. Initial examination showed bilateral SRD, leading to a misdiagnosis of Vogt-Koyanagi-Harada disease and initiation of high-dose corticosteroid therapy. She was subsequently referred to a tertiary center for further evaluation.

Results: At referral, fundus examination revealed optic disc and macular edema with retinal arteriolar narrowing and serous retinal detachment. Hypertensive retinopathy was suspected. Blood pressure was markedly elevated at 227/125 mmHg. Systemic evaluation unexpectedly identified a 33-week intrauterine pregnancy with laboratory findings consistent with HELLP syndrome. An emergency cesarean section was performed.

Conclusions: Bilateral SRD may represent the initial ocular manifestation of HELLP syndrome and can mimic VKH disease. In women of reproductive age presenting with bilateral SRD, hypertensive disorders of pregnancy

should be included in the differential diagnosis. Early recognition and multidisciplinary management are critical to optimize maternal and fetal outcomes.

Abstract No.: 204304
Panel No.: RME-0993

Calcium Signaling Dysregulation in Aged Retinal Pigment Epithelium: Therapeutic Potential of Calmodulin Inhibition

First Author: Junying WU

Co-Author(s): Xiuxing LIU, Wenru SU, Yehong ZHUO

Purpose: Age-related retinal pigment epithelium (RPE) degeneration is central to dry age-related macular degeneration (AMD). This study aimed to elucidate molecular mechanisms of aged RPE vulnerability and to assess the therapeutic potential of targeting calcium signaling and oxidative stress.

Methods: Single-cell RNA sequencing of young and aged mouse retinæ was analyzed using Seurat, focusing on RPE subpopulations. Differential gene expression and pathway enrichment highlighted signaling abnormalities. Functional validation was performed in cultured RPE cells treated with lipopolysaccharide (LPS), with or without W-7 hydrochloride (calmodulin inhibitor) or pyrroloquinoline quinone (PQQ). Cytotoxicity, apoptosis, reactive oxygen species (ROS), and inflammatory cytokines were quantified. In vivo, a sodium iodate-induced retinal degeneration model was used to evaluate W-7 delivered via intraperitoneal injection and topical eye drops.

Results: Aged RPE cells showed upregulation of calcium signaling genes (Calmd1), oxidative stress mediators (Nox4, Hmox1), and pro-inflammatory factors (Il1b, Tnf). W-7 significantly reduced LPS-induced apoptosis, ROS accumulation, and ERK/p38 activation, thereby decreasing IL-6, IL-1 β , and TNF- α expression. PQQ exhibited antioxidant protection but less pronounced anti-inflammatory effects. In vivo, W-7 preserved retinal architecture and RPE layer integrity against NaIO₃-induced damage, indicating functional protection.

Conclusions: This study demonstrates that aberrant calcium signaling, oxidative stress, and inflammation collectively drive age-associated RPE degeneration. Pharmacological inhibition of calmodulin by W-7 confers robust protection both in vitro and in vivo, supporting its therapeutic promise for dry AMD. PQQ may serve as an adjunct antioxidant strategy.

Abstract No.: 205148
Panel No.: RME-1003

Clinical Association of Diabetic Neuropathy With Diabetic Retinopathy and Choroidopathy

First Author: Kiyoun KIM

Purpose: This study aims to investigate the clinical correlation between diabetic retinopathy (DR), choroidopathy, and neuropathy through a longitudinal follow-up in a diabetic cohort.

Methods: Participants were patients diagnosed with diabetes and no DR or mild NPDR, who had available ophthalmologic follow-up for at least five years. Autonomic nerve function was scored from 0 to 10 based on five standardized tests. Peripheral nerve function was assessed using nerve conduction velocities. The annual rate of macular GCIPL thinning was obtained using the OCT's built-in software. We also quantified choroidal circulation using choroidal thickness maps and CVI maps, and tracked changes over 5 years.

Results: A total of 312 patients were included, with a mean age of 59.1 and a mean diabetes duration of 13.5 years. DR progression was observed in 25.5%. The average mGCIPL thickness decreased from 78.5 μ m to 76.4 μ m over the study period. In regression analysis, the autonomic nerve function score was significantly associated with DR progression ($B = 0.463$, $P = 0.004$). The rate of mGCIPL thinning was significantly correlated with sural sensory nerve conduction velocity ($P = 0.03$). Notably, both the 12x12mm field mean CVI and the DCP vessel density significantly declined over 5 years. Worse autonomic nerve function was significantly associated with greater decreases in CVI over 5 years, but not with retinal vessel density.

Conclusions: Peripheral neuropathy is associated with retinal neurodegeneration in the posterior pole. Autonomic neuropathy reduces choroidal vascularity, which accelerates DR progression. Choroid and photoreceptors are likely key players in early pathogenesis, highlighting the need for further imaging research.

Abstract No.: 205815
Panel No.: RME-1012

Clinical Indications and Outcomes of Intravitreal Faricimab in Indian Eyes: A Real-World Experience

First Author: Vishal RAVAL

Co-Author(s): Shreeya JAIN

Purpose: To study the patient demography, clinical indications, and treatment outcomes of patients treated with intravitreal faricimab injection in Indian patients.

Methods: This retrospective hospital-based study included all patients with treatment-naïve or refractory retinal disease who received faricimab from January to December 2024. Patient demographics, treatment indications, change in LogMAR BCVA, and central macular thickness (CMT) were the primary outcomes. Secondary outcomes included the mean number of injections, the mean interval between injections, and OCT biomarkers.

Results: A total of 68 patients (80 eyes) with a mean age of 69 +/- 11 years and 74% males were included. Treatment indications included choroidal neovascular membrane (34, 43 %), diabetic macular edema (DME) (23, 29%), polypoidal choroidal vasculopathy (8, 10%), retinal vascular occlusion (13, 16%), and pseudophakic macular edema and vasculitis (one each). Of the 80 eyes, 27 (34%) were treatment-naïve. The switch to faricimab was prompted by recurrent subretinal fluid (19, 24%), non-resolving intraretinal fluid (14, 17.5%), recalcitrant DME (16, 20%), and chronic cysts (4, 5%). Mean LogMAR BCVA improved by -0.11 units ($p = 0.002$), and the mean CMT reduced by 125 (+/- 181) microns, ($p < 0.05$) across all study groups, reflecting a significant anatomical response. Patients received a mean of 1.80 +/- 0.91 injections with a mean interval of 9.60 +/- 5.91 weeks. No adverse events or endophthalmitis were reported.

Conclusions: Real-world use of faricimab in Indian eyes demonstrated significant visual and functional improvement with a favorable safety profile highlighting its durability and potential to lower the treatment burden.

Abstract No.: 202883

Panel No.: RME-0977

Clinical Observation of Retinal Vasoproliferative Tumor

First Author: Panpan YE

Co-Author(s): Mingzhi SU, Weixin ZHENG

Purpose: To investigate the clinical and imaging characteristics of retinal vasoproliferative tumor (RVPT) and evaluate the efficacy of individualized treatment strategies.

Methods: Twelve RVPT patients from two centers (February 2022-May 2025) underwent comprehensive examinations (fundus photography, fundus fluorescein angiography (FFA), optical coherence tomography (OCT)) with histopathological analysis in two cases. Individualized treatments included anti-vascular endothelial growth factor (anti-VEGF) injections, laser photocoagulation, and vitrectomy based on lesion characteristics.

Results: The cohort included nine females and three males (mean age 52, range 17-78 years). Eleven cases were primary RVPT; one was secondary to uveitis. Lesions were predominantly solitary, located in the

inferotemporal retinal periphery as irregular masses. FFA demonstrated abnormal surface capillaries with early hyperfluorescence and late leakage. OCT revealed ill-defined nodular lesions with hyperreflective foci, without choroidal excavation; secondary macular detachment occurred in three eyes, retinal detachment in two eyes, and pseudocyst formation was detected by B-Scan in one eye. Treatments included local laser photocoagulation ($n=9$), transpupillary thermotherapy ($n=1$), combined intravitreal anti-VEGF for macular detachment ($n=2$), pars plana vitrectomy with tumor excision for complicated cases including macular hole, retinal detachment, and uveitis-associated RVPT ($n=3$). All lesions regressed or stabilized post-treatment, with improved or maintained visual acuity.

Conclusions: RVPT is typically a unilateral, primary peripheral retinal tumor in middle-aged adults, presenting with diverse manifestations. Key indicators of activity include vascular engorgement and exudative changes. A thorough assessment of imaging findings, lesion activity, and systemic health is essential for developing effective, individualized treatment.

Abstract No.: 204605

Panel No.: RME-0997

Clinico-Demographic Characteristics of Patients With Optical Coherence Tomography-Detected Macular Thickening and Thinning in a Level Three Private Hospital

First Author: Eric Nathaniel REYES

Co-Author(s): Carlo LADORES

Purpose: This study aims to analyze the clinico-demographic characteristics associated with OCT-detected macular thickening and thinning among Filipinos in a tertiary hospital in Manila.

Methods: A retrospective observational study was conducted using OCT macular scans and corresponding medical records of patients at the University of Santo Tomas Hospital from January 2022 to December 2024. A minimum sample size of 84 patients was used. Descriptive and inferential statistical analyses, including t-tests, ANOVA, multiple linear regression, and correlation analysis, were used to determine associations between macular thickness and demographic/clinical variables.

Results: Sex showed a significant difference in distribution, with thinning more common among females and thickening more common among males ($\chi^2 = 4.268$, $p < 0.05$). Atherosclerotic cardiovascular disease was noted in 8 patients (4.3%), all of whom fell under the thinning category, producing a significant association with macular thinning. ($\chi^2 = 5.424$, $p < 0.05$). Other comorbidities such as hypertension, diabetes, dyslipidemia, chronic kidney disease, and autoimmune disease showed no significant associations with macular thickness ($p > 0.05$). ANOVA showed that

LogMAR differed ($p < 0.05$) and signal strength differed ($p < 0.05$), while CFT ($p > 0.05$) and IOP ($p > 0.05$) did not; group means by age bracket were not present in the output.

Conclusions: Macular thinning is the more common OCT phenotype in a Filipino tertiary population and that it carries functional consequences, particularly in women and in patients with cardiovascular disease. Thickening, though less frequent, tended to preserve visual acuity and aligns with processes such as macular edema. Intraocular pressure and co-morbidities such as hypertension, diabetes, dyslipidemia, chronic kidney disease, autoimmune conditions, thyroid disease, and pulmonary tuberculosis were not statistically linked to macular thickening or thinning.

Abstract No.: 204325

Panel No.: RME-0994

Clinico-Microbiological Profile and Treatment Outcomes of Endophthalmitis Following Intravitreal Injection – a Retrospective Analysis of 27 Eyes

First Author: Bhavani **SANKARAN**

Co-Author(s): Naresh Babu **KANNAN**, Kim **RAMASAMY**, Muthukrishnan **VALLINAYAGAM**

Purpose: To evaluate the incidence, clinical characteristics, microbiological profile, and management outcomes of endophthalmitis following intravitreal injections of various AntiVEGF drugs (Bevacizumab, Ranibizumab and its biosimilars, Aflibercept, Brolucizumab) and corticosteroids (Triamcinolone acetonide and Dexamethasone implant) in a tertiary care eye hospital in South India over a 7-year period.

Methods: Retrospective single-centre study involving the review of medical records of 66,999 intravitreal injections that were administered over a period of 7 years between January 2017 and December 2023. 27 patients with clinical signs of acute endophthalmitis were included. 3 eyes underwent vitreous tap with intravitreal antibiotics, and 24 eyes underwent core vitrectomy with intravitreal antibiotics. The incidence, clinical and microbiological characteristics, and treatment outcomes of endophthalmitis following various intravitreal injections were analysed over a minimum follow-up period of 3 months.

Results: Intravitreal injections were administered in 66,999 eyes, of which 27 developed endophthalmitis. This accounts for an overall incidence of 0.04%. 26 patients (96.3%) presented within 7 days of the onset of symptoms. The mean follow-up after diagnosis was 473.48 days (range 3 months to 6 years). Mean visual acuity (logMAR) at the time of presentation was 1.75 ± 0.49 , which improved to 0.88 ± 0.59 at 3 months follow-up period ($p < 0.001$, Paired t-test). Culture positivity was observed in 18 subjects (66.67%) and revealed Gram-positive bacteria in all cases. The most

common organisms isolated were Staphylococcus haemolyticus and Staphylococcus epidermidis. Staphylococcus arlettae was a unique organism isolated in 1 patient. 3 eyes (11.11%) underwent vitreous tap with intravitreal antibiotics, and 24 eyes (88.89%) underwent core vitrectomy with intravitreal antibiotics.

Conclusions: There was no difference in clinical outcome based on the type of intravitreal injection. All the culture positive cases revealed gram positive bacteria and most were Staphylococci. Staphylococcus arlettae has never been reported hitherto, as a causative of endophthalmitis in extant literature. Poor visual outcome can be attributed to cataract, epiretinal membrane and macular hard exudates.

Abstract No.: 205887

Panel No.: RME-1013

Combination Therapy of Intravitreal Ranibizumab and Sub-Tenon Triamcinolone for the Treatment of Diabetic Macular Edema: A Systematic Review and Meta-Analysis

First Author: Julsyawiah Novthalia

Co-Author(s): Nihayah Lukman, Safira Nurfadila **HARAHAP**

Purpose: This study aimed to evaluate the efficacy of intravitreal ranibizumab (IVR) combined with posterior sub-Tenon injection of triamcinolone acetonide (PSTA) for the treatment of diabetic macular edema.

Methods: This study employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. PubMed, Scopus, Google Scholar, and ScienceDirect were searched for systematic reviews of randomized controlled trials (RCTs). Primary outcomes were changes in central macular thickness (CMT) and best corrected visual acuity (BCVA). Risk of bias was assessed using the Cochrane risk assessment tool. Meta-analysis was performed using RevMan version 5.4.1, generating pooled effect estimates for mean difference (MD) and risk ratio (RR), two-sided p-values, and 95% confidence intervals (CIs).

Results: Nine RCTs including 611 participants were included. Combination therapy with intravitreal ranibizumab and posterior sub-Tenon injection of triamcinolone acetonide showed no significant reduction in CMT compared with intravitreal ranibizumab alone (MD = 42.10; 95% CI: -121.65 to 205.84; $p = 0.61$; $I^2 = 100\%$). Similarly, the combination therapy did not result in a significant improvement in BCVA compared with ranibizumab monotherapy (MD = 0.01; 95% CI: -0.03 to 0.06; $p = 0.59$; $I^2 = 58\%$). Funnel plots showed symmetrical distribution, suggesting a low risk of publication bias, and no evidence of publication bias was observed based on the funnel plot and Egger's test.

Conclusions: Combined intravitreal ranibizumab and posterior sub-Tenon triamcinolone acetonide does not

appear to provide additional benefit in improving BCVA or CMT compared with intravitreal ranibizumab alone in patients with diabetic macular edema.

Abstract No.: 200471
Panel No.: RME-0938

Comparison of 0.1% Nepafenac and 0.3% Nepafenac Eye Drops in Reduction of Macular Thickness and Improvement of Visual Acuity in Patients with Diabetic Macular Edema – A Randomized Controlled Trial

First Author: Amit Kumar DEB
Co-Author(s): Sandip SARKAR

Purpose: Topical NSAIDs are the preferred treatment for patients with diabetic macular edema (DME) and good visual acuity. Among all NSAIDs, Nepafenac exhibits the highest penetration ability. This study aimed to compare the efficacy of Nepafenac 0.3% ophthalmic solution with Nepafenac 0.1% ophthalmic solution in terms of reducing central sub-field (CSF) macular thickness and improvement of visual acuity.

Methods: We conducted a prospective randomized controlled study involving 73 patients diagnosed with DME and good visual acuity. After randomization, group 1 received Nepafenac 0.1% eye drops three times a day, while group 2 received Nepafenac 0.3% eye drops once daily. BCVA and central sub-field foveal thickness (CSF) were recorded using. Patients were followed for 6 months.

Results: At baseline, the mean BCVA was 40.74 (± 2.98) letters and 40.83 (± 3.49) letters for the Nepafenac 0.1% and Nepafenac 0.3% groups, respectively. At the last follow-up at six months, BCVA improved to 42.37 (± 2.88) letters and 43.03 (± 2.22) letters ($P > 0.005$) for the Nepafenac 0.1% and Nepafenac 0.3% groups, respectively. The mean baseline CSF was 391.71 (± 121.02) microns and 324.77 (± 75.60) microns for the Nepafenac 0.1% and Nepafenac 0.3% groups, respectively, and reduced to 287.11 (± 92.97) microns and 233 (± 25.63) microns ($P > 0.005$) for the Nepafenac 0.1% and 0.3% groups, respectively. No adverse effects were found in our study.

Conclusions: Nepafenac 0.3% topical eye drops are equally effective in reducing the central sub-foveal thickness and improving best-corrected visual acuity compared to Nepafenac 0.1% eye drops.

Abstract No.: 202139
Panel No.: RME-0964

Comparison of Subretinal Fibrosis Development Between Aflibercept and Faricimab Treatment in Neovascular Age-Related Macular Degeneration

First Author: Kenichiro MORI
Co-Author(s): Keijiro ISHIKAWA, Shoji NOTOMI, Satomi SHIOSE, Koh-hei SONODA

Purpose: To compare the incidence of subretinal fibrosis (SF) one year after initiation of intravitreal aflibercept (IVA) or intravitreal faricimab (IVF) in treatment-naïve patients with neovascular age-related macular degeneration (nAMD).

Methods: This retrospective study included 320 eyes of 320 nAMD patients who received IVA or IVF between January 2013 and October 2023 at Kyushu University Hospital. Patients had no evidence of subretinal fibrosis before treatment and were followed for at least one year. Baseline variables assessed for association with SF were age, sex, logMAR visual acuity, central retinal thickness (CRT), macular neovascularization (MNV) subtype, retinal hemorrhage, subretinal hyperreflective material (SHRM), intraretinal fluid (IRF), subretinal fluid (SRF), and retinal pigment epithelium (RPE) disruption. Propensity score matching (PSM) was applied to balance baseline characteristics, and SF incidence was compared between IVA and IVF groups.

Results: At 1 year, SF developed in 17% (53 eyes). Significant risk factors in univariate analysis included baseline logMAR visual acuity, CRT, MNV subtype, retinal hemorrhage, SHRM, IRF, and RPE disruption. After 1:1 PSM, 35 eyes were analyzed in each group. The IVF group showed a lower incidence of SF compared with the IVA group (8.6% vs. 20.0%; odds ratio: 0.38; 95% CI: 0.088–1.59; $p = 0.17$).

Conclusions: The incidence of subretinal fibrosis after anti-VEGF therapy for nAMD may differ between agents. Faricimab tended to reduce the risk of fibrosis compared with aflibercept, suggesting that the drug choice should consider the fibrosis risk.

Abstract No.: 210338
Panel No.: RME-1047

Comparison of the Efficacy of Subthreshold Micropulse Laser Versus Intravitreal Anti-VEGF Therapy for Central Serous Chorioretinopathy

First Author: Li JINYU
Co-Author(s): Chen ZHIQING

Purpose: To compare the therapeutic ability between 577-nm subthreshold micropulse laser (SML) and intravitreal anti-VEGF injection (IVA) in the central serous chorioretinopathy (CSCR) treatment.

Methods: The medical records of 50 eyes of 49 patients who underwent IVA injection (30 eyes) or SML (20 eyes) for the treatment of CSCR were reviewed. All participants were followed up for six months. The changes in best-correct visual acuity (BCVA), central retinal thickness (CRT), subretinal fluid (SRF) and subfoveal choroidal thickness (SFCT) values from OCT at 1st month, 3rd month and 6th month of follow-up visit were evaluated among the groups.

Results: The baseline characteristics (age, gender, type of leakage in FA, BCVA, CRT, SRF, SFCT) of the patients were not significant between the groups (all $p > 0.05$). The mean $\pm$ SD of SML sessions and IVA injection were 1.67 ± 0.80 and 1.75 ± 0.97 , respectively ($p > 0.05$). In comparison to the baseline values, the BCVA at the 6th months after treatment showed considerable improvement in both groups ($p < 0.05$), while the CRT, SRF and SFCT values prominently decreased at the final evaluation visit (all $p < 0.05$). No statistically significant difference was revealed in the BCVA and CRT data of all time points between the two groups (all $p > 0.05$). At baseline, 1st, and the 3rd month, there was no statistically significant difference for the SRF and SFCT values between the two groups ($p > 0.05$). However, at the 6th month, the SRF in the SML group was noticeably lower than in the IVA group ($p < 0.05$), while the SFCT in the SML group was markedly higher than in the IVA group ($p < 0.05$). No complication was observed during follow-up period in both groups.

Conclusions: The effectuality of SML and anti-VEGF treatment has been confirmed both functionally in terms of BCVA and anatomically through OCT. During the follow-up period, it has been observed with a greater reduction of SFCT in the IVA group, and more absorption of SRF in the SML group.

Abstract No.: 202170

Panel No.: RME-0965

Correlation Between Choroidal Thickness and Photoreceptor-Retinal Pigment Epithelium Layer Thickness: Analysis in Emmetropia and Myopia

First Author: Tsania Rachmah RAHAYU

Co-Author(s): Dewi FRISKA, Anggun Rama YUDHANTA

Purpose: The choroid plays a critical role in supporting photoreceptor and retinal pigment epithelium (RPE) metabolism and serves as the primary blood supply for the outer retina. In myopic eyes, axial elongation is often associated with a reduction in choroidal thickness, which may impact retinal structure and visual function. This study aimed to investigate the relationship between choroidal thickness, degree of myopia, and photoreceptor–RPE layer thickness.

Methods: A cross-sectional study was conducted on 102 eyes, classified into emmetropia, mild, moderate, and high myopia groups. Spectral-domain optical coherence tomography (SD-OCT) with enhanced depth

imaging (EDI) was used to acquire macular scans using the HD 1-Line 100 $\times$ protocol. Manual measurements of choroidal and photoreceptor–RPE thicknesses were performed, then categorized based on the Early Treatment Diabetic Retinopathy Study (ETDRS) grid.

Results: Significant differences in choroidal thickness were observed across refractive error groups. The highest choroidal thickness values were found in the subfoveal or superior regions, depending on the group, while the lowest values were consistently noted nasally. A statistically significant correlation between choroidal thickness and photoreceptor–RPE thickness was identified only in the inferior region of the inner ring ($r = 0.34$, $p < 0.001$).

Conclusions: Choroidal thickness varies significantly with the degree of myopia and demonstrates a weak but significant correlation with photoreceptor–RPE thickness, particularly in the inferior macular region.

Abstract No.: 202024

Panel No.: RME-0961

Diagnostic Aqueous Tap in Viral Anterior Uveitis: An Unknown Trigger for Dendritic Ulcer Formation

First Author: Disha CHETANI

Co-Author(s): Reema BANSAL, Singh(malhotra)

CHINTAN, Surya Prakash SHARMA

Purpose: To report diagnostic aqueous tap as an unknown risk factor causing dendritic ulcer formation in eyes with suspected viral anterior uveitis (AU).

Methods: Three patients presented with corneal edema, keratic precipitates, AU, and raised intraocular pressure. A diagnostic aqueous tap was done for viral PCR testing. A dendritic ulcer was noted subsequently.

Results: All were males (62, 61, and 29 years old), with VZV positive PCR, negative PCR, and HSV positive PCR, respectively. Dendritic ulcer was noted on days 1, 6, and 8, respectively. After antiviral therapy, the corneal ulcer healed in 2 eyes, while the third patient underwent therapeutic penetrating keratoplasty.

Conclusions: Aqueous tap may be an unknown risk factor for dendritic ulcer formation in eyes with viral AU, possibly by causing iatrogenic direct viral invasion or local immunosuppression. Whether it triggers the natural course of dendritic ulcer formation in some eyes also needs to be considered. An aqueous tap is a minimally invasive and routinely done procedure. However, when performed in eyes with viral anterior uveitis, it may trigger dendritic ulcer formation, which can be sight-threatening. Clinicians need to be vigilant about this possible temporal causal relationship

Abstract No.: 204075

Panel No.: RME-0988

Do Pegcetacoplan and Avacincaptad Pegol Offer a Viable Therapeutic Approach for Dry Age-Related Macular Degeneration?

First Author: Wing Yi Chilli LAU

Purpose: Dry age-related macular degeneration (AMD) is characterised by atrophic areas on the retina and leads to gradual central vision loss, affecting millions globally. To date, only pegcetacoplan and avacincaptad pegol are approved for treating dry AMD in the United States, targeting complement C3 and C5, respectively. However, these drugs are not approved in the United Kingdom and Europe, leaving no treatment options in these regions. This critical review aims to explore the clinical value of these two drugs in dry AMD management.

Methods: A systematic literature search was conducted using the keywords 'pegcetacoplan', 'avacincaptad pegol' and 'age-related macular degeneration'. Sixteen papers were included following the PRISMA flow diagram.

Results: Pegcetacoplan was evaluated in the FILLY, OAKS, and DERBY trials, while avacincaptad pegol was evaluated in the GATHER1 and GATHER2 trials. Most trials reported statistically significant delay of lesion growth between drug treatment and sham groups, except the DERBY trial. However, secondary outcomes assessing change in visual function did not demonstrate significant results. Post hoc analyses supported anatomical benefits, and additional studies evaluated their cost-effectiveness and the impact of patient baseline characteristics.

Conclusions: Despite showing a delay in lesion growth, the lack of visual function benefits, and the increased risk of exudative AMD have sparked controversy in their use. Limited ethnic diversity in trials and potential funding bias also add uncertainty to their true effectiveness. Ongoing phase 4 clinical trials are essential in assessing their real-world efficacy and value.

Abstract No.: 206817

Panel No.: RME-1028

Does Glycemic Control Influence Macular Thickness and Vessel Density in Adolescents With Short-Duration Type 1 Diabetes? An OCT/OCTA Analysis

First Author: Nadia DEWI

Co-Author(s): Harjoedi AJI CAHYONO, Nanda ANANDITA, Fatina QONITA, Lely WULANDARY

Purpose: Subclinical macular changes in short-duration type 1 diabetes mellitus (T1DM) without retinopathy are poorly quantified. Optical coherence tomography (OCT)/OCT angiography (OCTA) analysis was performed to investigate whether glycemic control (HbA1c) has an

effect on macular thickness as well as vessel density on a per-eye basis.

Methods: Cross-sectional eye analysis of 56 eyes from 28 adolescents with short-duration T1DM (mean age 16.25 ± 2.01 years; duration 5.32 ± 2.81 years) was performed. Eyes were classified as HbA1c controlled ($\leq 7\%$, $n=20$) or uncontrolled ($>7\%$, $n=36$). Spectral-domain OCT measured central subfield thickness (CST) and macular average cube, while OCTA (6×6 mm) measured central and full macular vessel density. The differences between groups, percent change, Cohen's d (unequal-N pooled SD), and correlations with HbA1c and diabetes duration were calculated.

Results: Mean HbA1c was 7.98 ± 1.75 . HbA1c correlations to central vessel density $r=0.070$ ($p=0.607$), full vessel density $r=-0.060$ ($p=0.659$), CST $r=-0.048$ ($p=0.725$), average cube $r=-0.186$ ($p=0.170$). Between two groups, CST: $242.5 \pm 18.41 \mu\text{m}$ vs $230.7 \pm 22.39 \mu\text{m}$ (difference $11.8 \mu\text{m}$, -4.87% ; $d=0.56$; $p \approx 0.067$). Average cube: 283.3 ± 14.03 vs $275.7 \pm 14.86 \mu\text{m}$ (-2.68% ; $d=0.52$; $p \approx 0.088$). The differences of macular vessel density were trivial (central: -2.27% , $d \approx 0.08$; full: -1.29% , $d \approx 0.14$).

Conclusions: In adolescents with short-duration T1DM, OCT/OCTA evaluation reveals uncontrolled HbA1c related to mild macular thinning (~ 2.7 – 4.9% , moderate d), while macular vessel density variances are insignificant. Larger longitudinal studies are needed to confirm clinical relevance.

Abstract No.: 201792

Panel No.: RME-0956

Early Efficacy Observation of Faricimab Monoclonal Antibody in the Treatment of Neovascular Age-Related Macular Degeneration in the Real World

First Author: Rongrong

Purpose: To observe the early clinical efficacy and safety of intravitreal injection of faricimab monoclonal antibody in the treatment of nAMD in the real world.

Methods: A retrospective analysis was conducted on 26 patients (30 eyes) with nAMD who received intravitreal injection of faricimab injection (6mg/0.05ml) in our hospital from March to September 2024. 19 patients (20 eyes) were initially treated, and 7 patients (10 eyes) were treated. Paired t-tests were used to analyze the changes in BCVA, CRT, intraocular pressure, and adverse reactions before and one month after injection.

Results: One month after injection, 15 eyes (50%) responded well, including 12 eyes (80%) treated initially and 3 eyes (20%) treated after treatment; 14 eyes (46.66%) had low response, including 8 eyes (57.14%) in initial treatment and 6 eyes (42.86%) in post-treatment; One eye (3.33%) did not respond, indicating a treated patient. The average number of

letters in BCVA after injection was (57.50 ± 22.511), which increased by (2.433 ± 5.847) letters compared to before injection (55.07 ± 22.405), and the difference was statistically significant ($t=-2.280$, $P<0.05$); The average CRT value after injection was (220.54 ± 46.786) μm , which showed a statistically significant difference compared to before injection (352.62 ± 113.962) ($t=4.999$, $P<0.001$). All patients did not experience any adverse reactions.

Conclusions: In the real world, Faricimab monoclonal antibody has good efficacy and safety in the treatment of nAMD.

Abstract No.: 205397

Panel No.: RME-1007

Early-Onset Retinal Degeneration Associated With CCT2: Case Report and Literature Comparison With the Only Previously Described Family

First Author: Mohamed **SHERIF**

Co-Author(s): Hiok Hong **CHAN**, *Beau J.* **FENNER**, *Mathieu* **QUINDOZ**, *Carlo* **RIVOLTA**, *Peijun* **ZHANG**

Purpose: To report early-onset retinal degeneration associated with biallelic variants in CCT2 and to compare these findings with the only previously published family.

Methods: Comprehensive ophthalmic examination, multimodal retinal imaging, full-field and multifocal electroretinography, and next-generation sequencing (NGS) of inherited-retinal-dystrophy genes were performed.

Results: A 13-year-old female of Malay descent and history of early-onset myopia presented with worsening nyctalopia and field loss, her sister reported similar symptoms. BCVA was 6/24 OU, fundus examination disclosed subtle bilateral RPE granularity, while photoreceptor function was undetectable on ERG. By age 29 her BCVA had declined to 6/60 OD and 6/120 OS, progression of myopia to -11D OU. Multimodal imaging revealed complete outer retinal degeneration and a distinct hyperautofluorescent ring extending from the macula to the mid-periphery, speckled hypoautofluorescence at the macula. Exome sequencing did not identify any common genetic causes of LCA or early-onset retinal degeneration, though a secondary analysis uncovered two novel heterozygous variants in the chaperonin containing TCP1 subunit 2 gene (CCT2), namely CCT2 c.526A>C p.(Lys176Gln) and CCT2 c.841C>T p.(Arg281Cys), which were in trans and predicted to be pathogenic. Our case appears phenotypically like a previously reported individual with CCT2-associated Leber congenital amaurosis and likely represents the second such individual identified to date.

Conclusions: This case represents the second report of early-onset autosomal recessive retinal degeneration

associated with CCT2. These findings broaden the molecular and phenotypic landscape of early-onset retinal degenerations and establish CCT2 disease as phenotypically distinct disease. They also highlight the importance of including CCT2 in diagnostic gene panels for inherited retinal disease.

Abstract No.: 207340

Panel No.: RME-1036

Effect of Vitreomacular Adhesion on Anti-VEGF Therapy Outcomes in patients with Macular Edema

First Author: Bhavya **ANEJA**

Co-Author(s): Shreyangshi **DIPTA**, *Bhumika* **SHARMA**, *Meenakshi* **THAKAR**

Purpose: To evaluate the effect of vitreomacular adhesion (VMA) on the efficacy of intravitreal anti-vascular endothelial growth factor (anti-VEGF) therapy in patients with macular edema.

Methods: A prospective, interventional study was conducted on 32 eyes with treatment-naïve macular edema secondary to diabetes or retinal vein occlusion. Based on spectral domain optical coherence tomography (SD-OCT), patients were categorized into 2 groups: VMA-positive ($n = 16$) and VMA-negative ($n = 16$) group. All eyes received three consecutive monthly intravitreal anti-VEGF injections. Outcome measures included best-corrected visual acuity (BCVA, ETDRS letters), central macular thickness (CMT), and OCT morphological changes, assessed at baseline and monthly until week 16.

Results: At baseline, BCVA and CMT were comparable between the groups. After three injections, a significant improvement in BCVA was observed in both the groups, with greater gains in the VMA + group (57.56 ± 15.22 in VMA+ vs. 47.44 ± 11.3 ETDRS letters in VMA-group, $p = 0.041$). Mean CMT reduction was 323.81 ± 99.44 μm in the VMA + group and 374.75 ± 127.78 μm in the VMA - group ($p = 0.218$), which was not statistically significant. OCT morphology analysis showed no overall significant intergroup difference ($p = 0.183$), although eyes with VMA demonstrated a better morphological response with a higher likelihood of foveal contour restoration ($p = 0.022$).

Conclusions: Epiretinal membranes and vitreomacular traction are established negative prognostic factors for anti-VEGF therapy, whereas the role of VMA has been unclear. This study shows that VMA does not adversely affect treatment outcomes; rather, eyes with VMA may experience superior visual improvement and should not be excluded from anti-VEGF treatment.

Abstract No.: 205343

Panel No.: RME-1005

Effectiveness of Suprachoroidal Injection of Triamcinolone Acetonide in Resistant Macular Edema With Different Retinal Diseases Using a Modified Microneedle

First Author: Mohammad Aminur RAHMAN

Purpose: The present study evaluated the effectiveness of suprachoroidal injection of triamcinolone acetonide (TA) in resistant macular edema secondary to various retinal diseases using a modified microneedle.

Methods: This is a retrospective nonrandomized interventional study that was conducted on 30 eyes of 25 patients with macular edema secondary to various retinal diseases resistant to previous anti-vascular endothelial growth factor (VEGF) agents. All patients received suprachoroidal injection of triamcinolone acetonide 4 mg/0.1 mL by a modified specialized microneedle.

Results: Suprachoroidal injection of triamcinolone acetonide was used in various aetiologies such as resistant DME(PDR/NPDR) (n=14;46.7%), resistant CME (BRVO/CRVO)(n=10;33.3%), uveitic macular edema(n=2;6.7%), Irvine-Gass syndrome with resistant CME(n=2;6.7%), post-vitrectomy macular edema(n=1;3.3%), and resistant CNVM(n=1;3.3%). The mean central macular thickness (CMT) decreased significantly from 516.53±116.53 µm before injection to 349.50±171.10 µm after 12 months, with a p-value <0.006. Significant improvement of the mean best corrected visual acuity (BCVA) from 0.85±0.3 by logMAR at the baseline to 0.53±0.3 by logMAR was achieved after 12 months with a p-value <0.000. The IOP change was not significant. Eyes with more baseline CMT and worse baseline BCVA achieved worse final BCVA 12 months after injection.

Conclusions: Suprachoroidal injection of TA using this new modified microneedle resulted in marked anatomical and functional results in cases of macular edema resistant to previous anti-VEGF drugs, with no serious ocular or systemic side effects.

Abstract No.: 208208

Panel No.: RME-1038

Effects of Long-Term Intravitreal Aflibercept Treatments in Mouse Retina

First Author: Linbin ZHOU

Co-Author(s): Hoi Tung CHOW, Wai Kit CHU, Jiahui LI, Chi Pui PANG, Chee THAM

Purpose: Long-term treatment with anti-vascular endothelial growth factor (VEGF) agents by frequent intravitreal injection is effective in inhibiting choroidal neovascularization (CNV) leakage in exudative age-related macular degeneration (AMD) patients. Previous clinical studies found repeated injection of anti-VEGF agents increased geographic atrophy (GA) development

risk in exudative AMD patients. This study investigated effects of repeated injection of anti-VEGF agents in mouse retina.

Methods: Female C57BL/6J mice of 14 weeks old were intravitreally treated with 2µL aflibercept (40mg/mL) or sterile phosphate-buffered saline (PBS) weekly (n=8 per group) for 8 consecutive weeks. After the treatment, the retina and choroid were separately isolated to study the expression of multiple genes linked to AMD pathogenesis by quantitative real-time polymerase chain reaction (qRT-PCR). Unpaired Student's t-test was performed for statistical analysis.

Results: In comparison with the PBS group, the retina with intravitreal aflibercept treatment for 8 weeks showed a marked increase in the expression of multiple AMD risk genes, including Dcn, Apoe, Cx3cr1, Cfh, Sod2, Ccl2 and Ccr2 (all with a P value < 0.05), while no significant alterations were observed in VEGF, Mmp2 and Vtn (all with a P value > 0.05). Conversely, in the choroid, intravitreal aflibercept treatment remarkably decreased the expression of Apoe (p<0.0001), while no pronounced changes were observed in Ccr2, Cfh, Ccl2, Cx3cr1, Vtn and VEGF (all with a P value > 0.05) with Sod2, Dcn, and Mmp2 remaining undetectable.

Conclusions: Long-term intravitreal anti-VEGF agents injection may contribute to the expression changes in AMD associated genes.

Abstract No.: 207831

Panel No.: RME-1037

Efficacy of Photobiomodulation in Diabetic Macular Edema: A Systematic Review and Meta-Analysis

First Author: Jijing LI

Co-Author(s): Yanxian CHEN, Mingguang HE, Yue WU

Purpose: Diabetic macular edema (DME) is a major cause of vision loss in diabetes. Photobiomodulation (PBM), a non-invasive low-intensity light therapy, has shown potential for DME treatment. This systematic review and meta-analysis evaluated PBM's efficacy in reducing central retinal thickness (CRT) and improving best-corrected visual acuity (BCVA) in DME patients.

Methods: We searched PubMed, EMBASE, Cochrane Library, and Web of Science up to January 2025 for randomized controlled trials (RCTs) and single-arm studies on PBM's effects on CRT and BCVA in DME. Data were analyzed using random-effects models.

Results: Five studies (251 eyes) were included. Pooled analysis showed a non-significant trend toward CRT reduction and slight BCVA improvement. Single-arm studies indicated greater CRT reduction and BCVA improvement than the RCT. Significant CRT reduction was seen at 6 months, and BCVA improvement at 12 months. No serious adverse events were reported.

Conclusions: PBM's overall effects in DME remain inconclusive, but single-arm studies and longer follow-up suggest possible benefits. Further rigorous research is needed.

Abstract No.: 201925

Panel No.: RME-0958

Epidemic Post-Fever Retinitis Due to Rickettsial Infection: A Case Series From Nepal

First Author: Sanjib Kumar **CHAUDHARY**

Co-Author(s): Santosh **CHAUDHARY**

Purpose: Post-fever retinitis (PFR) is a vision-threatening condition reported after systemic infections. Rickettsial infection, though often under recognized, is an emerging cause in endemic regions. This is the first report from Nepal describing an epidemic cluster of PFR due to rickettsial infection. This study will underscore the need for coordinated response from clinician, public health authorities and researchers for management and prevention.

Methods: We conducted a case series of patients presenting with retinitis following recent febrile illness. Diagnosis of rickettsial etiology was based on compatible systemic history, fundus features, and positive serology (Weil–Felix test). Clinical profile, treatment, and outcomes were documented.

Results: Nineteen patients presented in a cluster over a two-month period (October–November) from the same geographic area, all with history of fever about one month earlier and severe visual impairment. Fundus examination revealed cotton wool spots in posterior pole, retinal hemorrhages, and severe macular edema. The anterior segment was normal with minimal vitritis. Fourteen patients had positive Weil–Felix serology. All were treated with oral doxycycline and oral prednisolone. A dramatic therapeutic response was observed, with resolution of macular edema, healing of retinal lesions without scarring, and significant improvement in visual acuity.

Conclusions: PFR due to rickettsial infection may mimic other infectious or immune-mediated retinitis, often presenting with severe vision loss. Despite the absence of gold-standard confirmation of the preceding fever, simple and timely therapy resulted in excellent visual recovery. Greater awareness of rickettsial retinitis is essential in endemic areas to enable early diagnosis and treatment.

Abstract No.: 206227

Panel No.: RME-1020

Ethnic Variations in Neovascular Age-Related Macular Degeneration: Optical Coherence Tomography-Based Subtype Analysis Across Singaporean, Canadian Asian, and Canadian Caucasian Populations

First Author: Antoine **HUANG**

Co-Author(s): Gemmy **CHEUNG**, Lisa **GEORGE**, Noa **GILEAD**, Zehua **JIANG**, Wataru **KIKUSHIMA**, Waiching **LAM**, Jennifer **LING**, Mohamed **SHERIF**, Kelvin **TEO**, Chenxi **ZHANG**

Purpose: To compare the prevalence and optical coherence tomography (OCT) characteristics of neovascular age-related macular degeneration (nAMD) subtypes among Singaporean Asians and Caucasians. Further, to evaluate the potential influence of environmental factors, we compared Singaporean Asians with Asians residing in Canada.

Methods: This retrospective, multicenter study analyzed consecutive treatment-naïve nAMD patients from Singapore and Canada. Patients were stratified into three groups: Singaporean (n=181), Canadian Caucasian (n=89), and Canadian Asian (n=57). Polypoidal choroidal vasculopathy (PCV) diagnosis was based on modified Asia-Pacific Ocular Imaging Society non-indocyanine green angiography criteria. OCT features, including pigment epithelial detachments (PED), subretinal hyperreflective material, drusen types, and choroidal thickness, were systematically analyzed.

Results: PCV prevalence differed significantly across groups: Singaporean 42.0%, Canadian Asian 43.9%, and Canadian Caucasian 16.9%. Singaporean patients were younger (70 ± 8.9 years) with higher male predominance (66.9%) compared to Canadian Caucasian (80 ± 9.3 years, 37.1% male) and Canadian Asian patients (77 ± 10.3 years, 50.9% male). Among PCV cases, sharp-peaked PED was most frequent in Canadian Asian patients (96.0% vs 75.0% Singaporean, 80.0% Canadian Caucasian). Extensive subretinal hemorrhage was highest in Canadian Asian PCV patients (20.0%). Soft drusen prevalence in PCV was greater in Canadian Caucasians (20.0%) compared to Asian populations (4.0–6.6%). Reticular pseudodrusen were more common in Canadian Caucasian typical nAMD patients (37.8%).

Conclusions: Significant ethnic variations exist in nAMD subtype prevalence and morphological characteristics, with Asian populations demonstrating higher PCV rates and distinct OCT features compared to Caucasians. Clinical characteristics of Asians residing in Singapore and Canada were largely similar.

Abstract No.: 205382

Panel No.: RME-1006

Evaluation of Macular Thickness in Children With Type 1 Diabetes Mellitus Without Retinopathy

First Author: Fatina QONITA

Co-Author(s): Nanda Wahyu ANANDITA, Haryudi Aji CAHYONO, Nadia Artha DEWI, Lely Retno WULANDARI

Purpose: Limited data exist regarding macular thickness in type 1 diabetes mellitus (T1DM). We investigated macular thickness in children with T1DM without retinopathy using Spectral-Domain Optical Coherence Tomography (SD-OCT) as a potential marker for early subclinical neurodegenerative and microvascular complications.

Methods: This descriptive cross-sectional study included children aged 6–20 years with T1DM without diabetic retinopathy. Macular thickness was measured using SD-OCT, the central subfield thickness (CST) and total macular volume (TMV) were analysed. Associations between macular parameters, diabetes duration, and HbA1c levels were assessed using appropriate statistical methods.

Results: We evaluated 43 children with type 1 diabetes mellitus (T1DM) (mean age 13.5 years; 62.8% female; mean duration 4.6 years; mean HbA1c 8.2%). Central subfield thickness (CST) was significantly thinner in children with diabetes duration ≥ 5 years and HbA1c $\geq 7\%$, while TMV was significantly lower with HbA1c $\geq 7\%$. CST correlated negatively with both diabetes duration and HbA1c, whereas TMV correlated only with HbA1c. Our studies highlights early macular changes in pediatric T1DM without retinopathy, supporting evidence of subclinical neurodegenerative and microvascular involvement. However, the cross-sectional design, lack of a normative control group, reliance on point HbA1c values, and single-center sampling represent limitations that may restrict the accuracy and external validity of the results.

Conclusions: Macular thickness in children with T1DM is influenced by diabetes duration and glycemic control. OCT screening plays a valuable role in the early detection of neurodegenerative and microvascular retinal changes in this population.

Abstract No.: 205888

Panel No.: RME-1014

Evaluation of Retinal and Choroidal Biomarkers During Treatment of Polypoidal Choroidal Vasculopathy

First Author: Colin TAN

Purpose: To evaluate changes in retinal and choroidal biomarkers following treatment of patients with polypoidal choroidal vasculopathy (PCV).

Methods: Review of 32 consecutive patients diagnosed with PCV treated at the medical retina clinic at Tan Tock Seng Hospital, Singapore. 18 patients were treated with photodynamic therapy (PDT) combined with anti-vascular endothelial growth factor (anti-VEGF) agents, while 14 patients were treated with anti-VEGF monotherapy. The optical coherence tomography (OCT) scans were reviewed on presentation (baseline) and following a course of treatment using standardized grading protocols.

Results: Visual acuity improved following treatment in all patients. Polyp regression was achieved in 90% of patients in the PDT group, compared to 33.3% of patients receiving anti-VEGF. Among all patients, the mean choroidal thickness (CT) on presentation was 248.4 μm , and decreased to 224.8 μm ($p=0.141$) after treatment with either PDT or anti-VEGF. The decrease in CT in the group treated with PDT combined with anti-VEGF was larger compared to the group treated with anti-VEGF monotherapy (55.4 μm vs. 0.25 μm , $p=0.072$). Central subfield retina thickness was 439.3 μm at baseline compared to 303.7 μm after treatment. Retinal thickness decreased by a larger amount (200.1 μm) in the combination therapy group compared to 87.3 μm in the anti-VEGF group.

Conclusions: There is a greater decrease in both choroidal and retinal thickness following treatment of PCV with PDT combined with anti-VEGF, compared to anti-VEGF monotherapy, which correlated with differences in poly regression rates.

Abstract No.: 200811

Panel No.: RME-0941

Evaluation of Sodium-Glucose Cotransporter 2 Inhibitors and Dipeptidyl Peptidase-4 Inhibitors in Modulating the Progression of Diabetic Retinopathy and Development of Proliferative Diabetic Retinopathy

First Author: Ziqi TANG

Co-Author(s): Carol CHEUNG, Timothy LIN, Ka Ho SZETO

Purpose: To investigate whether there are associations between the use of sodium-glucose cotransporter-2 inhibitors (SGLT-2i), dipeptidyl peptidase-4 inhibitors (DPP-4i), or both and the development or progression of diabetic retinopathy (DR) and proliferative DR (PDR).

Methods: This prospective cohort, new-user design study included individuals with diabetes who had at least three years of follow-up at the Chinese University of Hong Kong. Participants were categorized into four groups: SGLT-2i only (Group 1), DPP-4i only (Group 2), both SGLT-2i and DPP-4i (Group 3), and neither medication (Group 4). Patients who used glucagon-like peptide-1 receptor agonists were excluded. Cox regression models were used to estimate hazard ratios, adjusting for age, age at diabetes diagnosis, duration of diabetes, HbA1c, estimated glomerular filtration rate,

body mass index, exposure window, and baseline DR severity.

Results: The study included 4,968 visits from 724 eyes across 369 patients (mean age [SD]: 60.0 [12.8] years; 54.0% male), with a mean follow-up duration of 4.68 (2.73) years. A total of 75, 161, 178, and 310 patients were recorded for Groups 1 through 4, respectively. Compared to Group 4, Groups 1 through 3 did not exhibit significantly lower risks for DR development or progression. However, Group 2 (3.44 [1.47–8.07]) and Group 3 (4.25 [1.52–11.9]) showed an increased hazard for developing PDR.

Conclusions: Use of SGLT-2i, DPP-4i, or both was not associated with a lower risk of DR development or progression. However, DPP-4i use may be linked to a higher risk of developing PDR.

Abstract No.: 207430
Panel No.: RME-1034

Evaluation of Treatment Response to Intravitreal Biosimilar Ranibizumab in Severe Clinically Significant Macular Edema in Diabetes

First Author: Nikita MINOCHA

Co-Author(s): Yashi GUPTA, BhumiKA SHARMA, Meenakshi THAKAR

Purpose: To evaluate anatomical and functional outcomes following intravitreal biosimilar ranibizumab in patients with severe clinically significant macular edema (CSME; central macular thickness [CMT] >500 μ m).

Methods: In this prospective interventional study, 25 eyes of treatment-naïve patients with non-proliferative diabetic retinopathy with severe CSME received 3 monthly intravitreal injections of biosimilar ranibizumab (0.5 mg/0.05 mL). CMT and best-corrected visual acuity (BCVA) were measured at baseline and at 4, 8, and 12 weeks. Optical coherence tomography (OCT) morphology and biomarkers, including disorganization of retinal inner layers (DRIL) and ellipsoid zone (EZ) integrity, were analyzed.

Results: Mean baseline CMT ($642.9 \pm 106.8 \mu$ m) decreased significantly to 328.5μ m at 12 weeks ($P < .0001$). Mean BCVA improved from 36.4 ± 8.8 to 52.5 ± 13.6 ETDRS letters ($P < .0001$), with ≥ 10 -letter gain in 76% and ≥ 15 -letter gain in 52% of eyes. A normal foveal contour was achieved in 32%. Diffuse retinal thickening showed the greatest functional gain (+25 letters). Presence of DRIL and EZ disruption was associated with significantly poorer visual outcomes ($P = .013$ and $P = .021$, respectively).

Conclusions: Intravitreal biosimilar ranibizumab provides significant anatomical and functional improvements even in severe CSME. OCT biomarkers, particularly DRIL and EZ integrity, strongly predict visual prognosis. Biosimilar ranibizumab represents

an effective and affordable alternative to innovator molecules in resource-limited settings.

Abstract No.: 202704
Panel No.: RME-0972

Exosome-Loaded Microcapsules for Sustained Intravitreal Treatment of Vitreoretinal Diseases

First Author: Han BAO

Purpose: Cell-based therapies have shown potential in treating ocular diseases but face major limitations, including poor cell survival, unstable phenotypes, and safety concerns. Since paracrine exosomes mediate much of the therapeutic benefit of cells, we developed a “pseudo-cell” strategy by encapsulating exosomes into biodegradable microcapsules to preserve the therapeutic advantages of cell therapy while avoiding its limitations.

Methods: Exosomes derived from mesenchymal stem cells (MExo) or regulatory T cells (TrExo) were encapsulated into biodegradable poly(lactic-co-glycolic acid) microcapsules (Cap) using a self-healing process. Following intravitreal injection, the distribution, retention, and therapeutic efficacy were assessed in retinal ischemia-reperfusion injury (RIRI) mouse model, primed mycobacterial uveitis (PMU) mouse model, and non-human primate PMU model.

Results: ExoCap settled in the inferior vitreous cavity and continuously released bioactive exosomes for over one month. In the RIRI model, MExoCap significantly reduced retinal cell apoptosis, preserved retinal thickness, and restored visual function effectively. In PMU models, TrExoCap markedly suppressed intraocular inflammation and preserved retinal clarity and electroretinographic responses. Non-human primate studies further confirmed the anti-inflammatory efficacy and safety of ExoCap.

Conclusions: ExoCap provides a novel “pseudo-cell” strategy for sustained intravitreal exosome delivery, demonstrating potent therapeutic efficacy in ischemic and inflammatory vitreoretinal diseases. Its favorable safety and translational potential support further investigation as a promising alternative to current treatments.

Abstract No.: 204795
Panel No.: RME-1000

Exudative Retinal Detachment as a Hallmark of Acute Vogt-Koyanagi-Harada Disease

First Author: Woan Shian SEE

Co-Author(s): Sheena Mary ALEXANDER, Rajasudha Sawri RAJAN

Purpose: Exudative retinal detachment (ERD) is a common manifestation of Vogt-Koyanagi-Harada (VKH) disease but may mimic other ocular inflammatory

diseases. ERD reflects acute choroidal inflammation; its prognostic implications in Southeast Asian cohorts remain underreported. This study aimed to determine the prevalence of ERD at presentation in VKH and to evaluate its association with one-year visual outcomes following immunosuppressive therapy.

Methods: This retrospective, cohort study included 42 VKH patients (84 eyes). Patients were stratified into early presenters (≤ 4 weeks) or delayed presenters (> 4 weeks). ERD at baseline was confirmed by clinical examination and optical coherence tomography (OCT). All received high-dose corticosteroids, with immunosuppressants added when indicated. Best-corrected visual acuity (VA) at baseline and one year was converted to logMAR. Primary outcomes were the final mean logMAR and the proportion achieving $\geq 6/12$.

Results: ERD was observed in 80% of Early and 18.2% of Delayed eyes ($p < 0.001$). Bacillary layer detachment was frequently observed on OCT in early presenters' eyes. Although ERD eyes presented with worse vision, they showed greater mean improvement (0.75 logMAR) and nearly half achieved $\geq 6/12$ at one year. On multivariable adjustment for baseline VA and treatment, ERD was not an independent predictor of poor final vision.

Conclusions: ERD is a hallmark of acute VKH, highly prevalent in early presenters but uncommon in delayed disease. Despite association with poorer presenting acuity, ERD did not predict worse long-term visual outcomes when treated promptly, supporting its role as a marker of acute disease activity rather than prognosis.

Abstract No.: 205913

Panel No.: RME-1016

Eye as a Window to Systemic Disorder: A Case of Unilateral Anaemic Retinopathy

First Author: Swati SAHU

Purpose: To describe a rare case of unilateral anaemic retinopathy presenting with sudden painless diminution of vision, and to emphasize the importance of early ophthalmic recognition as a clue to underlying systemic disease.

Methods: A 32-year-old female presented with a 4-day history of sudden painless diminution of vision in the right eye. There was no history of trauma or ocular surgery. She reported systemic complaints of fatigue and breathlessness. Ocular examination showed best-corrected visual acuity of 6/9 in the right eye and 6/6 in the left eye. The anterior segment was normal bilaterally. Fundus examination of the right eye revealed multiple intraretinal hemorrhages with Roth spots involving the fovea and posterior pole, while the left fundus appeared normal. Laboratory evaluation revealed hemoglobin of 6.9 g/dl, and peripheral

smear demonstrated marked microcytic hypochromic anemia. A provisional diagnosis of unilateral anaemic retinopathy was made.

Results: The patient was referred to a physician for systemic management and received one unit of whole blood transfusion. On follow-up, her hemoglobin improved to 9.4 g/dl, and her systemic symptoms resolved. Ocular findings showed resolving retinal hemorrhages with improved visual acuity to 6/6 in the affected eye, indicating a favorable response to systemic therapy.

Conclusions: Although anaemic retinopathy typically presents bilaterally, this case highlights its potential to present unilaterally. Ophthalmologists play a crucial role in identifying ocular signs that may be the first manifestation of systemic disease. Early recognition and timely referral for systemic treatment are essential to prevent further complications and ensure full visual and systemic recovery.

Abstract No.: 205522

Panel No.: RME-1008

From Bilateral Coats' Disease to Coats Plus Syndrome: A Case Report Highlighting the Importance of Systemic Diagnosis

First Author: Kejia YUAN

Co-Author(s): Yun LI

Purpose: To report a case of a child initially diagnosed with bilateral Coats' disease but finally confirmed as Coats Plus syndrome through comprehensive evaluation and genetic sequencing, underscoring the critical role of systemic evaluation in differential diagnosis.

Methods: A case report of a 2-year-old boy who presented with reduced visual acuity in the right eye. Diagnostic workup included serial fundus imaging and angiography, brain MRI (magnetic resonance imaging), and genetic sequencing.

Results: Retcam fundus examination revealed bilateral retinal telangiectasia and exudation, leading to an initial diagnosis of Coats' disease. The patient's condition achieved stabilization following a combined treatment regimen of multiple retinal laser photocoagulation and intravitreal aflibercept injections over three years. Systemic investigation revealed cerebral white matter lesions on MRI (Fazekas Grade 1). Genetic testing identified a pathogenic mutation in the CTC1 gene, which is associated with Coats Plus syndrome. A separate variant of uncertain significance was found in the COL18A1 gene. The definitive diagnosis of Coats Plus syndrome was made based on the characteristic ocular findings, a poor response to therapies, neurological abnormalities, and the confirmed CTC1 pathogenicity.

Conclusions: This case demonstrates that bilateral, treatment-resistant Coats' disease-like retinopathy

in young children can be a hallmark of Coats Plus syndrome. Clinicians should maintain a high index of suspicion and pursue prompt genetic testing and multidisciplinary systemic evaluation to reach a correct diagnosis, which is crucial for management and prognostic counseling.

Abstract No.: 202322

Panel No.: RME-0967

Genetic Variants Associated With Central Serous Chorioretinopathy in Chinese

First Author: Xintian **ZHU**

Co-Author(s): Li-jia **CHEN**, Mary **HO**, Danny Siu-chun **NG**, Jason Cheuk-sing **YAM**

Purpose: To identify susceptibility variants associated with central serous chorioretinopathy (CSCR) in Chinese.

Methods: We enrolled a Chinese cohort of 247 patients with CSCR and 695 unrelated controls. CSCR was confirmed by multimodal imaging, with other maculopathies excluded. After quality control filtering, 24 single-nucleotide polymorphisms (SNPs) were analyzed. Additive logistic regression models adjusted for age and sex were used to estimate odds ratios (ORs) and 95% confidence intervals (CIs). Multiple testing correction was performed using the Benjamini-Hochberg false discovery rate (FDR) and the Bonferroni method.

Results: In our cohort of 247 CSCR cases and 695 qualified controls, the C allele of CASP10 rs11674246 was significantly associated with an increased risk of CSCR after Bonferroni correction (OR = 1.8; $P < 0.001$). Additionally, rs13255394-C in the TNFRSF10A region reached FDR significance (OR = 1.45; $P < 0.01$) but did not pass Bonferroni correction. The associations remained consistent in both unadjusted and age-adjusted models. No significant association was detected for the remaining 22 SNPs.

Conclusions: This study identifies an association for CASP10 rs11674246-C and implicates the TNFRSF10A region in CSCR susceptibility. These findings reveal candidate loci and reinforce previous evidence. Further investigation into the functional roles of these variants, as well as their potential shared genetic pathways with age-related macular degeneration (AMD) and polypoidal choroidal vasculopathy (PCV), may elucidate common mechanisms underlying macular diseases.

Abstract No.: 206202

Panel No.: RME-1019

Guarding the Vulnerable Fellow Eye: A Systematic Review and Meta-Analysis of Prophylactic Anti-VEGF in Neovascular Age-Related Macular Degeneration

First Author: Tsabita **ANNISA**

Co-Author(s): Gitalisa Andayani **ADRIONO**

Purpose: Age-related macular degeneration (AMD) is a leading cause of irreversible vision loss, with neovascular AMD (nAMD) often causing rapid deterioration. Patients with unilateral nAMD face a high risk of fellow-eye involvement. Prophylactic intravitreal anti-vascular endothelial growth factor (anti-VEGF) therapy has been suggested as a preventive strategy, but its benefit remains uncertain. This systematic review and meta-analysis evaluated efficacy and safety.

Methods: PubMed, Scopus, and Google Scholar (2004–2025) were searched for studies on prophylactic anti-VEGF in unaffected fellow eyes. The primary outcome was conversion to nAMD; secondary outcomes included best-corrected visual acuity (BCVA), geographic atrophy, and adverse events. Data were pooled using random-effects meta-analysis, with heterogeneity assessed by I^2 .

Results: Of 419 records, three randomized controlled trials ($n = 235$) met criteria. Anti-VEGF did not significantly reduce fellow-eye conversion compared with placebo (OR 0.93, 95% CI: 0.42–2.07, $p = 0.86$) or BCVA change (letter score in ETDRS Chart) at 24 months (MD -1.24 letters, 95% CI: -3.43 to 0.96, $p = 0.27$). Safety outcomes showed no significant differences in mortality or adverse events (OR 0.38, 95% CI: 0.09–1.68, $p = 0.20$). Heterogeneity was negligible ($I^2 = 0\%$).

Conclusions: Current evidence does not support prophylactic anti-VEGF for preventing fellow-eye nAMD or improving vision, though trends favoring treatment were observed. Given the clinical importance of delaying bilateral involvement, larger multi-centre trials with diverse populations are required to clarify potential preventive benefits.

Abstract No.: 202665

Panel No.: RME-0971

Gyrate Atrophy With Foveoschisis and Full-Thickness Macular Hole in a Sibling Cohort

First Author: Vinit **TANWAR**

Purpose: To report the rare co-occurrence of foveoschisis and full-thickness macular hole (FTMH) in siblings with genetically confirmed Gyrate Atrophy of the choroid and retina (GACR). This report highlights the severe impact on central vision and explores a potential pathogenic sequence from foveoschisis to FTMH in this inherited retinal dystrophy.

Methods: This is a descriptive case series of three siblings from a non-consanguineous family. All patients underwent a comprehensive ophthalmic examination. Multimodal imaging included ultrawide-field fundus photography, fundus autofluorescence, and swept-source optical coherence tomography (SS-OCT). Diagnosis was confirmed with serum ornithine level testing and genetic analysis for OAT gene mutations in one affected sibling.

Results: All three siblings displayed characteristic peripheral chorioretinal atrophy of GACR. The two older siblings (ages 13 and 20) presented with a unilateral FTMH and contralateral foveoschisis, resulting in profound vision loss (PL to FCCF). The youngest sibling had preserved macular structure. SS-OCT confirmed the macular pathologies. Genetic testing revealed a homozygous missense mutation in the OAT gene.

Conclusions: Gyrate Atrophy can be complicated by severe macular pathologies, leading to early and devastating central vision loss. Foveoschisis appears to be a direct precursor to macular hole formation in this condition. Early diagnosis and management are crucial to monitor and potentially mitigate these vision-threatening complications.

Abstract No.: 202888

Panel No.: RME-0976

Imaging Study of OCTA After Fasirizumab Intervention for Recurrent Type 1 MNV

First Author: Wei ZHOU

Co-Author(s): Wenqi SU

Purpose: Type I macular neovascularization (MNV) is often resistant to conventional anti-VEGF therapy. Faricimab, a bispecific antibody targeting both VEGF-A and Ang-2, offers a potential therapeutic option. This study aimed to evaluate the efficacy of intravitreal faricimab in treatment-resistant Type I MNV.

Methods: All patients received intravitreal faricimab injection and were followed for 14 days. Best-corrected visual acuity (BCVA), intraocular pressure (IOP), and multimodal imaging parameters from OCT and OCTA were compared before and after treatment. Quantitative metrics included MNV perfusion area, MNV vessel area, trunk and capillary MNV area, MNV vessel density, foveal avascular zone (FAZ) area and perimeter, central foveal thickness, choroidal thickness, pigment epithelial detachment (PED) height, subretinal fluid (SRF) volume, and central foveal volume. OCTA analysis of MNV before and after treatment with faricimab was conducted using ImageJ software. Paired t-test compared these parameters at baseline and after treatment.

Results: The case series study of 11 eyes with unresponsive CNV, despite monthly intravitreal treatment (mean number of pre-faricimab injections:

16.9 ± 6.1). At Day 14 post-treatment, significant reductions were observed in MNV perfusion area (p=0.004), trunk MNV area (p=0.0107), capillary MNV area (p=0.0107), central foveal thickness (p=0.0431), and choroidal thickness (p=0.020). MNV vessel area (p=0.0511), vessel density (p=0.0828), mean retinal thickness (p=0.0619), and central foveal volume (p=0.0579) showed a trend toward reduction but did not reach statistical significance.

Conclusions: Intravitreal faricimab led to a significant reduction in MNV lesion size and associated retinal structural biomarkers in treatment-resistant Type I MNV.

Abstract No.: 205784

Panel No.: RME-1011

Intraocular Pressure (IOP) Changes After 8mg Aflibercept Intravitreal Injections in a Chinese Population- a Real-World, Non-Sponsored Study

First Author: Shing Yee Steffi CHONG

Co-Author(s): Chi Lik AU, Po Lin LEOW

Purpose: 8mg Aflibercept has been introduced with the possible advantage of reducing the overall burden of injections for patients and healthcare systems. However, concerns regarding the intraocular pressure have arisen in view of the extra volume of drug needed to be injected intraocularly. This is the first cohort study looking into the IOP changes after 8mg Aflibercept (0.07ml) intravitreal injections in a Chinese population.

Methods: This is a single-centred, observational cohort including all Chinese eyes with 8mg Aflibercept intravitreal injections between June and September 2025. The control group included the same eyes with data of other anti-vascular endothelial growth factor (anti-VEGF) (0.05ml) injections available, which were age- and gender-matched. Data were analyzed using the SPSS software. Statistical tests used included the Wilcoxon Signed Rank test, Mann-Whitney U test, and Chi-square test.

Results: A total of 120 eyes with 8mg Aflibercept injections were included in this study. The mean age of the patients was 77.8 ± 11.9 years old. 56 eyes (46.7%) belonged to female patients, while 64 eyes (53.3%) belonged to male patients. The mean pre-injection IOP for the 8mg Aflibercept group was 15.4 ± 3.2 mmHg compared to post-injection IOP of 18.9 ± 4.4 mmHg (p< 0.001). There was a positive correlation between the pre- and post-injection IOP (p<0.001, r=0.518). Sixty-eight eyes were included in the control group. The mean age of the patients was 76.8 ± 13.1 years old. 26 eyes (38.2%) belonged to female patients, while 42 eyes (61.8%) belonged to male patients. The mean pre-injection IOP was 15.6 ± 3.5 mmHg compared to post-injection IOP of 19.0 ± 5.3 mmHg (p<0.001). The IOP changes after injections were not statistically different between the 8mg

Aflibercept and control groups ($p=0.219$). 31 out of 120 eyes (25.8%) in the 8mg Aflibercept group had post-injection IOP >21 mmHg without pre-existing ocular hypertension (i.e. pre-injection IOP ≤ 21 mmHg) compared to 19 out of 68 eyes (27.9%) in the control group, which was not statistically significant ($p=0.887$). Timing of injections (i.e., morning versus afternoon) and phakic status of the eyes did not affect the IOP changes after 8mg Aflibercept injections ($p=0.190$ and $p=0.953$, respectively).

Conclusions: There was no increase in rate of ocular hypertension after 8mg Aflibercept injections compared to other anti-VEGF with injection volume of 0.05ml.

Abstract No.: 208765

Panel No.: RME-1044

MMP2 (1575 G/A) and MMP9 (1562 C/T) Gene Polymorphism Might be a Predictive Genetic Marker of CRVO

First Author: Zhongping **CHEN**

Co-Author(s): Shengnan **LIANG**, Hengwei **LIU**

Purpose: To analyze the association between matrix metalloproteinase 1 (MMP1), matrix metalloproteinase 2 (MMP2), matrix metalloproteinase 9 (MMP9), and complement factor H (CFH) gene polymorphisms and the occurrence of Retinal vein occlusion (RVO).

Methods: This study enrolled 67 patients with RVO, classified into BRVO and CRVO groups. Single-nucleotide polymorphisms in MMP1, MMP2, MMP9, and CFH were analyzed utilizing the SNaPshot method.

Results: In the CRVO cohort, the A genotype of the MMP2 (c.-1575 G>A, rs243866) polymorphism was significantly more prevalent compared to controls ($p = 0.004$). The T allele of the MMP9 (c.-1562 C>T, rs3918242) polymorphism was also significantly more common in the CRVO group than in the control group ($p = 0.009$). Additionally, comparison with BRVO indicated higher mutation rates for MMP2 (c.-1575 G>A) and MMP9 (c.-1562 C>T, rs3918242) in CRVO patients (GA+AA:GG, OR = 4.71, $p = 0.015$; CT+TT:CC, OR = 5.56, $p = 0.008$).

Conclusions: The presence of the A allele in the MMP2 (c.-1575 G>A, rs243866) gene and the T allele in the MMP9 (c.-1562 C>T, rs3918242) gene may contribute to increased susceptibility to CRVO and are linked with a less favorable prognosis. These findings may be particularly relevant for clinicians and researchers seeking to better understand genetic risk factors associated with CRVO outcomes.

Abstract No.: 204102

Panel No.: RME-0990

Macular Degeneration Associated With Cobalamin C Deficiency: A Case Report

First Author: Yumeng **LI**

Co-Author(s): Hashimoto **KINJI**, Wenbo **LIU**, Xuan **SHI**, Chengyue **SUN**, Wenzhou **XIAO**

Purpose: To report the macular degeneration in a patient with Cobalamin C Deficiency (cblC).

Methods: Case report.

Results: A 28-year-old male diagnosed with cblC deficiency was referred for a comprehensive ophthalmic evaluation. Genetic analysis confirmed compound heterozygous mutations in the MMACHC gene: c.467G>A (p.Gly156Asp) and c.46C>A (p.Arg16Gln). His best-corrected visual acuity was 20/20 in the right eye (OD) and 20/30 in the left eye (OS). Fundus examination revealed macular degeneration of both eyes. Optical coherence tomography (OCT) revealed bilateral macular atrophy of the outer segment of the photoreceptor layer and structural disorder. Fundus autofluorescence imaging of both eyes demonstrated the area of hypoautofluorescence in the macula. Fluorescein angiography (FFA) revealed window defects at the foci bilaterally. Automated perimetry confirmed bilateral central scotomas, with Visual Field Index (VFI) values of 68% (OD) and 74% (OS). The macular pathology was attributed to his underlying systemic disorder.

Conclusions: This case underscores the importance of conducting routine, comprehensive ophthalmic examinations for cblC deficiency patients, regardless of the presence or absence of visual symptoms. Early detection of ocular pathology is critical for timely intervention and management to potentially mitigate long-term visual impairment.

Abstract No.: 200965

Panel No.: RME-0943

Macular Mayhem: Could Vitamin Deficiency Be the Culprit? Role of Serum Homocysteine, Vitamin B12 and Folic Acid in Patients With ARMD

First Author: Kusha

Co-Author(s): Vinod **KASHYAP**

Purpose: To assess serum levels of homocysteine, vitamin B12, and folic acid in patients with ARMD, and compare these biomarkers across dry and wet subtypes.

Methods: This prospective cross-sectional study included 84 patients aged >45 years with clinically diagnosed ARMD attending a tertiary care center in North India. Detailed ophthalmologic evaluation was followed by biochemical testing of fasting serum homocysteine, vitamin B12, and folic acid. Data were

analyzed using appropriate statistical tests, with $p < 0.05$ considered significant.

Results: Elevated serum homocysteine was observed in 51.19% of patients, with significantly higher levels in wet ARMD ($33.85 \pm 9.63 \mu\text{mol/L}$) versus dry ARMD ($26.7 \pm 17.23 \mu\text{mol/L}$; $p = 0.033$). Vitamin B12 deficiency was prevalent in 77.38% of participants, with median levels significantly lower in wet ARMD (135.1 pg/mL vs. 198.5 pg/mL ; $p < 0.0001$). Folic acid levels were lower in wet ARMD but not statistically significant ($p = 0.079$).

Conclusions: This study underscores the metabolic dimension of ARMD, particularly the association of hyperhomocysteinemia and vitamin B12 deficiency with wet ARMD. As the first such study in a North Indian cohort, it highlights the potential role of nutritional screening and B-vitamin supplementation in mitigating ARMD progression.

Abstract No.: 205873

Panel No.: RME-1015

Management of Visual Rehabilitation on Oculocutaneous Albinism

First Author: Eka Apriani LUBIS

Co-Author(s): Nanda Wahyu ANANDITA, Nadia Artha DEWI, Wino Vrieda VIERLIA

Purpose: To report the management of visual rehabilitation in a 20-year-old man diagnosed with Oculocutaneous Albinism (OCA). This condition is rarely reported in Indonesia; therefore, a comprehensive examination was conducted, with the focus of this case directed toward the use of low vision aids.

Methods: A comprehensive ophthalmic evaluation was conducted, including uncorrected and best-corrected visual acuity (BCVA), refraction, slit-lamp biomicroscopy, fundus examination, Optical Coherence Tomography (OCT), and Visual Evoked Potentials (VEP). The patient was further evaluated by the low vision division.

Results: A 20-year-old man presented with blurred vision and difficulty performing daily activities. Visual acuity of the right eye was 6/60 correction with S-5.00 D C-2.75 D $\times 10^\circ$ improved to 6/30, while visual acuity of the left eye was 6/30 with S-4.00 D C-2.75 D $\times 170^\circ$ improved to 6/24. A 3 $\times$ telescopic low vision aid was trialed on this patient, resulting in an improvement of visual acuity to 6/19 in the right eye and 6/15 in the left eye. An 8 $\times$ telescopic low vision aid was also tried in this patient, but the patient does not feel comfortable. Compared with spectacles alone, the 3 $\times$ telescopic aid provided a significant enhancement in visual performance, particularly for distance viewing. The patient was also trialed with tinted filter lenses, which resulted in subjective improvement in visual comfort.

Conclusions: Management of visual rehabilitation in OCA requires a personalized, multidisciplinary

approach. Telescopic devices are effective low-vision aids for this patient, providing significant improvement in distance visual acuity and functional vision.

Abstract No.: 208551

Panel No.: RME-1041

Methylation Status of Insulin-Like Growth Factor Binding Protein-Related Protein 1 in the Early Stage of Diabetic Retinopathy

First Author: Yuanyang HUANG

Co-Author(s): Tao SUN, Leilei WANG, Yan XU, Zhaojun ZHANG

Purpose: To investigate the expression and promoter methylation status of insulin-like growth factor binding protein-related protein 1 (IGFBP-rP1) in the early stage of diabetic retinopathy (DR), and to examine the potential role of DNA methyltransferase 1 (DNMT1) in regulating its epigenetic modifications.

Methods: Aqueous humor from DR patients at different disease stages and retinal tissues from streptozotocin (STZ)-induced diabetic mice (C57BL/6J) were collected to analyze IGFBP-rP1 expression levels. Müller cells cultured under high-glucose conditions were used to assess IGFBP-rP1 expression and promoter methylation levels by western blot, qRT-PCR, and methylation-specific PCR (MSP). Müller cells and diabetic mice cultured in high glucose treated with demethylation were applied to evaluating changes in IGFBP-rP1 promoter methylation and subsequent IGFBP-rP1 expression in vitro and in vivo.

Results: IGFBP-rP1 protein levels in the aqueous humor of DR patients significantly decreased with disease progression. IGFBP-rP1 mRNA expression in the retinas of diabetic mice showed time-dependent downregulation. High-glucose-induced time-dependent downregulation of IGFBP-rP1 protein expression and upregulation of DNA methylation in Müller cells. Demethylation agent 2'-deoxy-5-azacytidine (DAC) effectively reduced IGFBP-rP1 promoter methylation and upregulated IGFBP-rP1 expression in the retinas of diabetic mice. Knockdown of DNA methyltransferase 1 (DNMT1) significantly restored IGFBP-rP1 expression in vitro and in vivo.

Conclusions: Alterations in IGFBP-rP1 expression during the early stage of diabetic retinopathy may be associated with promoter methylation, an epigenetic regulation potentially mediated by DNMT1.

Abstract No.: 202229**Panel No.: RME-0966**

Microglia Disulfidptosis Contributes to Worsening of Diabetic Retinopathy Induced by Acute Hypoglycemia

*First Author: Xueying LOU**Co-Author(s): Aimin SANG, Ying YU*

Purpose: Concerns arise regarding the early worsening of diabetic retinopathy (DR) due to rapid decreases in blood glucose levels during diabetes treatment, but its pathogenesis is not well understood. This study aims to investigate the role of acute hypoglycemia (AH) in microglial disulfidptosis and the underlying mechanisms during DR progression.

Methods: Streptozotocin (STZ)-induced diabetic C57BL/6J mice and in vitro microglial models (HMC3 cells) were subjected to glucose deprivation conditions. Single-cell RNA sequencing (scRNA-seq) identified SLC7A11^{high} retinal cells. Flow cytometry, CCK-8 assays, and immunofluorescence evaluated microglia death and cytoskeletal changes. ROS detection and NADPH/NADP⁺ analysis assessed redox imbalance. Rac1-WRC pathway activity was analyzed via Western blot and inhibitors. Retinal damage was quantified using Evans blue leakage, H&E staining, and immunofluorescence. RT-qPCR detected inflammatory cytokine expression.

Results: Glucose deprivation upregulated SLC7A11 expression in retinal microglia, triggering disulfidptosis via excessive cystine uptake, NADPH depletion, and disulfide stress, which induced pro-inflammatory cytokine elevation (IL-1 β , IL-6, IL-8, TNF- α , and HIF-1 α). This process induced F-actin contraction, plasma membrane detachment, and irreversible cell death, unaltered by apoptosis/ferroptosis inhibitors but rescued by disulfide reductants. Glucose deprivation activated Rac1-WRC signaling, driving cytoskeletal collapse. SLC7A11 knockdown or Rac1 inhibition mitigated these effects. In vivo, AH exacerbated retinal vascular leakage, structural disorganization, and microglial cell death in the retinas of STZ-induced diabetic mice.

Conclusions: Glucose deprivation triggers microglial disulfidptosis via SLC7A11 redox imbalance and Rac1-WRC activation, worsening diabetic retinopathy. This highlights hypoglycemia risks and identifies treatment targets.

Abstract No.: 202664**Panel No.: RME-0970**

Natural Evolution of CRVO

First Author: Vinit TANWAR

Purpose: To present a unique photographic timeline documenting the rapid, sequential evolution of an impending Central Retinal Vein Occlusion (CRVO) to an ischemic state, and to underscore the critical

role of timely anti-VEGF intervention in managing complications, particularly when definitive diagnostics are limited.

Methods: A 44-year-old hypertensive male presented with impending CRVO. He was started on systemic anticoagulants, and his hypertension was managed. The patient's condition was monitored with serial fundus photography. Despite initial therapy, the condition progressed through distinct stages: from vascular sheathing and congestion to non-ischemic CRVO, and ultimately to ischemic CRVO with extensive hemorrhages and macular edema. Intravitreal anti-VEGF injections were administered at the onset of macular edema. Fluorescein angiography, though planned, was declined by the patient.

Results: Serial imaging effectively captured the disease's aggressive natural history. While systemic management failed to halt the progression, intravitreal anti-VEGF therapy resulted in the complete resolution of macular edema and a significant improvement in the patient's visual function.

Conclusions: This case illustrates that CRVO can follow a rapid and progressive course despite conventional systemic management. It highlights that close clinical and photographic monitoring is essential for tracking disease activity. Prompt intervention with anti-VEGF therapy is the cornerstone for managing vision-threatening macular edema and can be effectively guided by clinical findings, even in the absence of fluorescein angiography.

Abstract No.: 201001**Panel No.: RME-0942**

Novel Therapeutic Perspectives for Wet Age-Related Macular Degeneration: RGD-Modified Liposomes Loaded With 2-Deoxy-D-Glucose as a Promising Nanomedicine

First Author: Xirui CHEN

Purpose: To develop a novel targeted nanomedicine delivery system for wet age-related macular degeneration (AMD) by loading RGD peptide-modified liposomes with 2-deoxy-D-glucose (RGD@LP-2-DG) and evaluate its anti-angiogenic effects on choroidal neovascularization (CNV).

Methods: RGD@LP-2-DG nanoliposomes were synthesized using thin film hydration method and characterized for particle size, zeta potential, and encapsulation efficiency. In vitro studies assessed cellular uptake, proliferation, migration, and tube formation using human umbilical vein endothelial cells (HUVECs). A laser-induced CNV mouse model was established to evaluate therapeutic efficacy through fluorescein angiography and immunostaining. Mechanistic studies investigated VEGFR2 protein expression and downstream signaling pathways via Western blotting and immunofluorescence.

Results: RGD@LP-2-DG displayed uniform spherical morphology with a mean diameter of 133 ± 3.06 nm and demonstrated superior targeting performance toward endothelial cells compared to unmodified liposomes. In vitro assays revealed significant inhibition of HUVEC proliferation, migration, and tube formation. In the CNV model, RGD@LP-2-DG achieved a 76.47% reduction in neovascular leakage, outperforming free 2-DG (45.95%) and LP-2-DG (61.05%). Mechanistic studies revealed that 2-DG interfered with N-glycosylation, leading to VEGFR2 accumulation in the endoplasmic reticulum and suppression of downstream Erk1/2 and p38 signaling. Safety evaluations confirmed excellent biocompatibility.

Conclusions: RGD@LP-2-DG represents a promising nanomedicine with exceptional targeting efficacy and anti-angiogenic properties for wet AMD treatment, particularly beneficial for patients unresponsive to current anti-VEGF therapies through novel metabolic intervention mechanisms.

Abstract No.: 208606

Panel No.: RME-1040

Nurse-Delivered Intravitreal Injection (N-IVI) of Anti-Vascular Endothelial Growth Factor (Anti-VEGF): Results From a Tertiary Eye Centre in Hong Kong

First Author: Lai Kuen NG

Co-Author(s): Jennifer HUNG, Monica LEE, Kenneth LI, Samuela TANG

Purpose: To evaluate the safety and efficacy of nurse-delivered intravitreal injections of anti-VEGF in a tertiary eye centre in Hong Kong.

Methods: This is a retrospective review of all consecutive cases that received N-IVI of anti-VEGF from February 2022 to September 2025 at the Department of Ophthalmology, Kowloon East Cluster, Hospital Authority. Cases are identified through the electronic patient record system. All clinical information documented after each injection was meticulously reviewed and analyzed for any documented injection-related adverse events.

Results: A total of 748 cases received the N-IVI from February 2022 to September 2025 were included. No serious adverse events, including infective endophthalmitis and retinal detachment, were encountered. Minor adverse events, including irritation (5.23%), air bubble (2.42%), subconjunctival hemorrhage (1.28%), and corneal abrasion (1.02%), were observed. No long-term complications were observed.

Conclusions: The N-IVI of anti-VEGF was successfully introduced to Hong Kong. This initiative aimed to improve patient access to sight-saving treatments for conditions such as AMD and diabetic retinopathy, while also optimizing physicians' time. Results of the present

study demonstrate a favorable safety profile of nurse-delivered intravitreal injections of anti-VEGF in Hong Kong.

Abstract No.: 206680

Panel No.: RME-1024

OCT-Based Diagnostic Biomarkers of Age-Related Macular Degeneration in a Mongolian Population

First Author: Anarsaikhan NARMANDAKH

Co-Author(s): Nomin CHADRAABAL, Altanzul TUMURPUREV

Purpose: To investigate OCT characteristics and choroidal thickness in Mongolian AMD patients and age-matched healthy controls in a Mongolian population to identify population-specific patterns.

Methods: This retrospective study included patients ≥ 50 years with dry AMD, wet AMD, or PCV, and matched controls. High-quality SD-OCT scans were analyzed for structural features, and subfoveal choroidal thickness was manually measured and compared across subtypes and age groups.

Results: We analyzed 164 patients (296 eyes: 39 dry AMD, 41 wet AMD, 64 controls; mean age 72.9 years). Dry AMD showed drusen, RPE irregularities, and EZ loss; wet AMD showed SRF, IRC, PED, and frequent combined lesions; and PCV had peaked PEDs, sub-RPE hyperreflective lesions, and double-layer signs, indicating high prevalence. Retinal thickness was greatest in PCV, while SFCT declined from controls to dry AMD to wet AMD, with an age-related inverse correlation, highlighting choroidal atrophy in AMD.

Conclusions: OCT biomarkers vary across AMD subtypes, reflecting disease severity and phenotype. The high prevalence of PCV-specific features among wet AMD suggests PCV is a common neovascular subtype in Mongolians, consistent with other Asian populations. Age-related choroidal thinning and population-specific OCT assessment may aid early diagnosis, subtype differentiation, and treatment planning.

Abstract No.: 206277

Panel No.: RME-1021

Observational Study of Series of Non-Exudative Treatment-Naive Polypoidal Choroidal Vasculopathy (PCV) on Swept-Source Optical Coherence Tomography and Angiography (SS-OCT/ OCTA)

First Author: Pei Qi LO

Co-Author(s): Tangnuo, Wang Min, Gloria SONG WENJUN, Wenghang WONG, Sandy ZHOU

Purpose: To investigate short-term changes in different parameters on SS-OCT/OCTA among patients with treatment-naive PCV.

Methods: A prospective longitudinal observational study including patients who met the diagnostic criteria of treatment-naïve non-exudative PCV. Diagnosis of PCV was made using SS-OCT/OCTA according to APOIS criteria and indocyanine green angiography (ICGA) according to Everest criteria. All patients underwent 6x6 mm SS-OCTA at baseline and follow-up visits. Multiple OCTA imaging features of the study eye were evaluated, including the size of the branching vascular network (BVN), the height and internal structure of the polypoidal Pigment Epithelial Detachment (PED), and the subfoveal choroidal thickness (CT). Clinical features of contralateral eyes were assessed to interpret the prognosis of non-exudative PCV and explored as a potential biomarker.

Results: Twelve non-exudative PCV patients were included in the study. All patients were asymptomatic in the study eye. The follow-up duration is 1 to 18 months. 5 patients developed exudation from 9 to 12 months after onset. The SS-OCT/OCTA on the latest follow-up showed enlargement of PED and increased numbers of polyps. The 5 patients also had higher polypoidal PED and larger BVN size among 12 patients at the first scan. The rest of patients remained unchanged throughout the follow-up period.

Conclusions: Non-exudative PCV patients can be monitored without treatment if they remain asymptomatic. The larger size of BVN, PED in initial visits may indicate higher risk of exudation onset, necessitating more frequent follow-ups.

Abstract No.: 204536
Panel No.: RME-0995

Occupational Hazard to Vision: Phototoxic Maculopathy From A Gold Laser Welding – A Case Report

First Author: Yunneke R. XAVERINA
Co-Author(s): Martin HERTANTO

Purpose: Phototoxic maculopathy is a retinal condition resulting from excessive exposure to intense light sources for a variable period, causing possible permanent visual injury, particularly affecting central vision. This case study aims to illustrate incidental phototoxic maculopathy resulting from exposure to a gold laser welding machine.

Methods: A 32-year-old male began complaining of central blurred vision in both eyes, the right eye started 1.5 years ago and the left eye was 1 month before the patient's visit. He saw a blurry gray shadow in his central vision, still and unmoving as the patient glanced. The visual acuity of his right eye was 0.9, and that of his left eye was 1.0; the anterior segments were within normal limits. Fundus examination reveals foveal changes, yellow-white spots with a reduction of the foveal reflex. Optical coherence tomography (OCT) findings reveal disruption of the ellipsoid zone and irregularity of the retinal pigment epithelium (RPE)

in both eyes. The patient reported that he worked as a gold laser welder and often did not use protective glasses.

Results: Phototoxic maculopathy is a retinal injury caused by excessive exposure to high-powered lasers without adequate eye protection. Patients typically present with bilateral but asymmetric symptoms, including blurred vision, visual distortion or central scotomas. Fundus photography reveals a characteristic small yellow spot surrounded by a faint gray granular color. OCT shows the ellipsoid zone and RPE disruption, indicating direct photothermal or photochemical damage.

Conclusions: Phototoxic maculopathy is an avoidable condition, particularly with the use of appropriate protective gear.

Abstract No.: 208426
Panel No.: RME-1039

Outcomes of Brolucizumab Injections in Treatment-Resistant nAMD and PCV Cases

First Author: Mary HO
Co-Author(s): Marten BRELEN, Victor CHAN, Li Jia CHEN, Andrew MAK

Purpose: This series reviews the outcomes of Brolucizumab injections in the treatment of nAMD and PCV cases and evaluates the rate of intraocular inflammation (IOI).

Methods: This retrospective study was conducted from September 2024 to September 2025 at a tertiary eye centre. Patients who failed primary treatment with Eylea, Faricimab, Lucentis, or Avastin were switched to Brolucizumab as a second-line therapy.

Results: Fourteen patients received Brolucizumab injections during the study period. The mean age was 70.6 ± 7.9 years, with a female-to-male ratio of 6:9. The baseline VA was 0.82 ± 0.38 logMAR, improving significantly to 0.70 ± 0.33 at 4.5 months ($p = 0.012$). Baseline CMT was 433.5 ± 180.6 μ m, which decreased to 270.6 ± 87.4 μ m ($p = 0.009$). Six cases (42.8%) showed complete PED regression, with the maximum PED height reducing from 584 ± 420.1 μ m to 247.3 ± 212.8 μ m ($p = 0.028$). One case (1/14) developed IOI, presenting with vitritis and 1+ anterior chamber inflammation, which was resolved after a single subtenon steroid injection. The inflammation subsided, the PED regressed, and PCV responded well.

Conclusions: Brolucizumab demonstrated a role in controlling PED and PCV in treatment-resistant cases in our series, serving as an effective second-line therapy with significant functional and anatomical improvement. A substantial portion of cases demonstrated marked reduction in PED extent and height.

Abstract No.: 210083

Panel No.: RME-1046

Pathogenesis and Evolutionary Modeling of Myopic Macular Retinoschisis Induced by Saccadic Eye Movements

First Author: Luyun L IANG

Co-Author(s): Yiqin DUAN

Purpose: Quantify the vitreous-induced forces acting on the retina across varying saccadic amplitudes in highly myopic eyes with posterior scleral staphyloma, and elucidate how staphylomatous morphology modulates vitreous dynamics and retinal stress distribution.

Methods: Using a dynamic-mesh approach, this study quantified the dependence of vitreoretinal traction on saccadic amplitude. Orbital CT volumes were first segmented, labeled, multi-planar-reconstructed and visualized in Mimics; the resulting surface was optimized and exported. An unstructured grid was generated over the ocular globe, and the unsteady continuity equation coupled with the fifth-order polynomial saccadic profile proposed by Repetto et al. was solved numerically to map wall shear stress at the vitreoretinal interface.

Results: The study revealed that, within the vitreous cavity, the maximal wall shear stress (WSS) increases monotonically with saccadic amplitude. For all amplitudes examined, the peak WSS precedes the instant of maximum angular velocity. Notably, the highest WSS colocalizes with the indentational rim produced by the lens and the periretinal surface; both the optic-disc and macular regions experience shear stresses exceeding 1 Pa.

Conclusions: Ocular motility-driven vitreous fluid-dynamics exert a pronounced influence on the retinal stress distribution in highly myopic eyes.

Abstract No.: 204064

Panel No.: RME-0989

Peripapillary Retinoschisis – the Expanded Spectrum and New Insights From Multimodal Imaging

First Author: Lucy Yi YANG

Co-Author(s): Caroline BAUMAL, Devin BESTCH, Michael BRANLEY, Diogo CABRAL, Fred CHEN, Jay CHHABLANI, Michael CHILOV, Netan CHOUDHRY, Shanil DHANJI, Andrew FARAG, Bailey FREUND, Adrian FUNG, Rishi GUPTA, Jenny IP, Rachael JEFFERY, David KALATZIS, Ananda KALEVAR, Andrew KAM, Marco LUPIDI

Purpose: To establish a comprehensive classification system for peripapillary retinoschisis (PPRS) and standardize its nomenclature through detailed characterization of its various associated conditions.

Methods: A retrospective, multicenter case series of peripapillary retinoschisis was conducted from August 2021 to September 2024. The study protocol included standardized imaging with EDI or SS-OCT of the optic nerve and macula, colour fundus photography, and fundus autofluorescence. Selected cases underwent additional fundus fluorescein and indocyanine angiography when clinically indicated. The retinoschisis was characterised by the location and relation to the optic disc, and the layer(s) of the retina affected.

Results: Forty-seven eyes from 41 patients with PPRS were identified, comprising 22 (54%) females and a mean age of 56 years (range 14-92 years). These were classified into nine etiologies: Congenital Disc Abnormalities (CDA, n=16 eyes), peripapillary chorioretinal coloboma (n=1), peripapillary atrophy (n=3), glaucoma (n=7), Peripapillary Pachychoroid Syndrome (PPS, n=4), Peripapillary Choroidal Neovascularization (PP-CNV, n=3), myopia (n=5), Vitreopapillary Traction (VPT, n=4) and idiopathic (n=4). A new entity (Focal Optic Disc Dome, FODD) associated with PPRS is described. The main pathogenic mechanisms of PPRS include anatomical weaknesses around the optic nerve, increased fluid entry from the choroid, and mechanical traction.

Conclusions: The identified nine etiologies of PPRS can be systematically categorized into five distinct groups. This classification framework enhances diagnostic accuracy and treatment planning, particularly for conditions with established therapeutic protocols (CDA, glaucoma, PPS, PP-CNV, and VPT). Key contributions include the identification of truly idiopathic PPRS and the characterization of FODD.

Abstract No.: 208766

Panel No.: RME-1043

Probucol Inhibits High Glucose-Induced Ferroptosis in Human RPE Cells by Down-Regulating BACH1

First Author: Zhongping CHEN

Co-Author(s): Shengnan LIANG

Purpose: Diabetic retinopathy (DR) is a major cause of blindness with poor prognosis and limited treatment efficacy, particularly in its advanced stages. Recent studies have highlighted a close association between ferroptosis and DR progression. This study investigates the protective mechanisms of the antioxidant compound probucol (PB) in a human DR cell model.

Methods: High glucose (HG) induced ARPE-19 cells to establish a diabetic retinopathy (DR) cell model, with PB employed for intervention. Western blotting was utilised to determine the protein expression of BACH1 and ferroptosis-related factors. The CCK8 cell counting assay kit was employed to assess cell viability. Commercial kits for ROS and MDA measured lipid peroxidation and oxidative stress-related factors. Prussian blue staining and iron content assays assessed

ferroptosis. Cells were transfected to overexpress BACH1, with subsequent measurement of changes in ferroptosis-related factor expression.

Results: HG exposure resulted in increased levels of reactive oxygen species (ROS), cellular lipid peroxides such as malondialdehyde (MDA) and 4-hydroxynonenal (4-HNE), and fluorescence intensity of Fe²⁺ in ARPE-19 cells, along with a decrease in glutathione (GSH) levels. Treatment with PB mitigated these effects. Moreover, HG upregulated the expression of BACH1 and downregulated the expression of solute carrier family 7 member 11 (SLC7A11), glutathione peroxidase 4 (GPX4), and ferroptosis suppressor protein 1 (FSP1), which are critical in counteracting ferroptosis. PB treatment reversed these changes. Mechanistically, PB countered HG-induced cellular damage by reducing BACH1 expression in RPE cells and activating the GPX4/FSP1 pathway. Upon knockdown of BACH1 expression, ferroptosis-related alterations were restored.

Conclusions: HG-induced ferroptosis in RPE cells leads to cellular damage. PB successfully inhibited BACH1 expression and enhanced cellular antioxidant capabilities, thereby reducing ferroptosis and cell death.

Abstract No.: 201445

Panel No.: RME-0950

Punctate Inner Choroidopathy With Choroidal Neovascular Membrane in a Young Emmetropic Female

First Author: Aditi **BANSAL**

Co-Author(s): Shagun **KORLA**, Gian Chand **RAJPUT**, Rhibhu **SONI**

Purpose: To report an uncommon case of bilateral Punctate Inner Choroidopathy (PIC) with secondary Choroidal Neovascular Membrane (CNVM) in an emmetropic, middle aged female.

Methods: A 45-year-old, emmetropic, chronic alcoholic female presented with bilateral, painless diminution of vision. Ocular examination showed best corrected visual acuity of 6/18 in both eyes. Intraocular pressure, axial length, and anterior segment were unremarkable. Fundus showed yellowish chorioretinal lesions with subretinal hemorrhage in the posterior pole with a subfoveal neovascular membrane with no signs of vitritis in both eyes. Spectral domain-OCT demonstrated bilateral elevation of RPE with disruption of the outer retina corresponding to active lesions.

Results: The presence of choroidal neovascularization (CNV) can be as high as 75% in eyes with PIC, making the detection of an underlying CNV critical in the management of this disease. The patient was treated with an intravitreal injection of aflibercept (2.25mg/0.05ml) in both eyes and is scheduled for close follow-up.

Conclusions: Given the rarity of PIC with CNVM in an emmetropic middle-aged female, where it typically occurs in young myopic women, this case underscores the importance of maintaining a high index of clinical suspicion and utilising prompt imaging even in atypical demographics.

Abstract No.: 202299

Panel No.: RME-0969

Rare Presentations in Ocular Albinism: Diagnostic Challenges and Genetic Complexity

First Author: Yiliu **YANG**

Co-Author(s): Licong **LIANG**, Fang **LU**

Purpose: Albinism involves genetic disorders impairing melanin synthesis, with diverse ocular and systemic features. This case series aims to expand the recognized phenotypic and genotypic spectrum by documenting four rare presentations, highlighting diagnostic intricacies.

Methods: We present a case series of four patients with unusual clinical manifestations of different ocular albinism types. Diagnostic workup included detailed ophthalmic evaluation, ultra-widefield imaging, and genetic testing.

Results: Case 1: A pair of female twins born via surrogacy (owing to maternal systemic lupus erythematosus) presented with «mud-splatter» fundus changes and were found to carry a pathogenic GPR143 mutation inherited from their biological mother. Case 2: A 61-year-old female with diabetic retinopathy showed atypical «mud-splatter» changes on autofluorescence screening; she was identified as a carrier of a pathogenic GPR143 mutation. Case 3: A 4-year-old girl with a complex family history exhibited asymmetric ocular albinism features despite having normal hair, skin, and iris pigmentation. Genetic analysis identified a homozygous mutation in the HPS6 gene, consistent with Hermansky–Pudlak syndrome type 6. Case 4: A 5-month-old infant with severe macular dysplasia and familial exudative vitreoretinopathy (FEVR) phenotype carried a paternally inherited SLC45A2 mutation (oculocutaneous albinism type 4, OCA4), suggesting potential genetic interaction.

Conclusions: These cases illustrate significant heterogeneity in ocular albinism and emphasize the importance of genetic testing, detailed phenotyping, and family history in diagnosis. Uncommon presentations can unmask carrier states or reveal novel genetic interactions, aiding clinical understanding and management.

Abstract No.: 201208

Panel No.: RME-0945

Real-World Effectiveness of Faricimab in Chinese Patients With Diabetic Macular Edema: Three-Month Results From the Farseeing Study

First Author: Xufang SUN

Co-Author(s): Xiaorong LI, Kun LIU, Xun XU

Purpose: The Farseeing study (NCT06439576) is a non-interventional real-world study conducted in 50 sites in China, collecting primary data of approximately 1000 patients with nAMD, diabetic macular edema (DME), or macular edema secondary to retinal vein occlusion (RVO) to assess the effectiveness and safety of faricimab. Here we report the first interim analysis in DME patients.

Methods: This interim analysis included data from April 2024 to January 2025 and included DME patients from 22 sites across China. Management was as per usual care, with no mandated scheduled visits or imaging protocol requirements. Visual acuity (VA), central subfield thickness (CST), and the proportion of eyes with retinal fluid were evaluated at baseline and 3 months. Incidence of safety events was collected with any duration of follow-up. Descriptive analyses were performed.

Results: A total of 25 DME patients (35 eyes) were included in this analysis. In switched eyes with DME, mean VA (standard deviation [SD]) change from baseline to month 3 was +8.0 (11.6) letters, mean CST (SD) change was -83.29 (201.25) μ m. Investigator-determined subretinal fluid (SRF) was present in 30.4% of eyes at baseline, decreasing to 9.5% by Month 3; intraretinal fluid (IRF) was present in 91.7% of eyes at baseline, decreasing to 78.3% by Month 3.

Conclusions: The results of the cohort of DME patients in the Farseeing study will show the real-world effectiveness and safety of faricimab in the treatment of Chinese DME patients.

Abstract No.: 206766

Panel No.: RME-1027

Real-World Evidence on Diabetic Macular Edema: Three Years' Experience From a Tertiary Eye Hospital in Indonesia

First Author: Putri PAMULANI

Co-Author(s): Rova VIRGANA, Niluh WARDHANI, Made WIDYANATHA, Nina RATNANINGSIH

Purpose: To describe treatment patterns and outcomes of diabetic macular edema (DME) patients at a tertiary eye hospital in Indonesia over a 3-year period.

Methods: A descriptive observational study was conducted using medical records of patients with DME who attended a tertiary hospital in Indonesia between January 2021 and December 2023. Data collected

included central macular thickness (CMT) from optical coherence tomography and visual acuity at baseline, 6 months, and 12 months.

Results: A total of 191 patients (281 eyes) were included. As many as 223 eyes (79.4%) received intravitreal bevacizumab (IVB). The mean number of IVB injections was 3.2 ± 1.3 at 6 months and 4.2 ± 1.8 at 12 months. Laser photocoagulation was performed in 223 eyes (79.4%), and vitrectomy in 12 eyes (4.3%). Despite fewer injections compared to clinical trials, at endpoint, 43–44% of eyes achieved visual improvement at 6 and 12 months, while central macular thickness reduction occurred in >60% of eyes.

Conclusions: In this real-world setting, DME patients received substantially fewer anti-VEGF injections than trial protocols yet still achieved meaningful visual and anatomical benefits. These findings highlight the gap between trial evidence and routine practice and emphasize the need for strategies to optimize DME care in resource-limited settings.

Abstract No.: 209434

Panel No.: RME-1045

Relation Between Peripheral Blood Inflammatory Indices and Severity of Central Retinal Artery Occlusion

First Author: Weiwen HU

Co-Author(s): Qiong ZHOU

Purpose: Central retinal artery occlusion (CRAO) has been identified as an acute emergency resulting in vision loss, with its pathogenesis potentially involving systemic inflammation and abnormal lipid metabolism. Over recent years, it has been established that peripheral blood inflammatory indices, including the neutrophil-to-lymphocyte ratio (NLR), the systemic immunoinflammatory index (SII), and the monocyte-to-high-density lipoprotein ratio (MHR), play significant roles in assessing systemic inflammation and lipid metabolism. However, the role of these indices in assessing the severity of CRAO has rarely been explored. This study aimed to investigate the relationship between these inflammatory indices and the severity of CRAO.

Methods: This was a retrospective clinical study with a total of 49 CRAO patients and 50 age- and sex-matched controls involved. The patients with CRAO were divided into three groups (13 with incomplete CRAO, 16 with subtotal CRAO, and 20 with total CRAO). Data were compared across these groups, and additionally, correlation analysis, restricted cubic spline plots, and receiver operating characteristic curve analysis were performed.

Results: The values of NLR, SII, and MHR were significantly higher in the CRAO group compared to controls (NLR: $2.49(1.71, 3.44)$ vs $1.60(1.24, 1.97)$, $P < 0.001$; SII: $606.46(410.25, 864.35)$ vs

403.91(332.90,524.31), $P=0.001$; MHR: 0.33(0.26,0.44) vs 0.25(0.21,0.34), $P<0.001$). MHR was also significantly higher in total CRAO than in incomplete CRAO and subtotal CRAO (0.41(0.32,0.60) vs 0.29(0.21,0.43), $P=0.036$; 0.41(0.32,0.60) vs 0.29(0.23,0.38), $P=0.017$). Significant positive associations were found between MHR, NLR, SII and both the incidence (all $P<0.001$) and severity ($P<0.001$, $P<0.001$, $P=0.003$, respectively) of CRAO. MHR had a linear relationship with both the occurrence and severity of CRAO (P -overall=0.013, P -non-linear=0.427 and P -overall=0.013, P -non-linear=0.825). Combining MHR and NLR significantly improved diagnostic efficacy for CRAO and total CRAO, with an area under the curve of 0.816 and 0.827, respectively, compared to using MHR alone (0.705 and 0.816).

Conclusions: Elevated levels of peripheral blood NLR, SII, and MHR are positively associated with CRAO incidence, highlighting their potential as early predictive markers. The combined NLR and MHR index further enhances diagnostic accuracy and may facilitate timely assessment of CRAO severity by ophthalmologists and internists.

Abstract No.: 206937

Panel No.: RME-1029

Retinal Light Chain Deposition and Retinal Necrosis in Multiple Myeloma on Bortezomib Therapy: A Case Report

First Author: Anna Victoria **SAN PEDRO**

Co-Author(s): Oscar **ACOPIADO**, *Jose Carlo* **ARTIAGA**, *Fabian Arnel* **DE JESUS**, *Maria Florentina* **GOMEZ**, *Harvey* **UY**

Purpose: To report a rare case of bilateral retinal pigment epithelial (RPE) light chain deposition and retinal necrosis in a patient with multiple myeloma and light chain nephropathy, following Bortezomib therapy despite antiviral prophylaxis.

Methods: A 57-year-old female with multiple myeloma and light chain nephropathy presented with a two-year history of blurring of vision in the right eye. A comprehensive ophthalmologic examination was performed.

Results: Initial visual acuity was 20/50 in the right eye, with a significant posterior subcapsular cataract, and 20/20 in the left eye with a mild nuclear cataract. Fundoscopy revealed multiple nummular hyperpigmented lesions in a leopard spot pattern at the posterior pole of both eyes. The right eye showed a large area of fibrosis and atrophy at the inferonasal periphery, suggestive of an old retinal necrosis. Fundus autofluorescence revealed hyperautofluorescence of the lesions, while fluorescein angiography showed blocked hypofluorescence and late staining. OCT demonstrated globular hyperreflective deposits along the RPE-Bruch's membrane complex with posterior

shadowing. After cataract extraction in the right eye, visual acuity improved to 20/21.

Conclusions: This is the first reported case of bilateral RPE light chain deposition with concurrent retinal necrosis in a patient with multiple myeloma. Awareness of this rare ocular manifestation may aid in earlier detection, management, and counseling of patients undergoing treatment with Bortezomib and related therapies.

Abstract No.: 204891

Panel No.: RME-1001

Retinal Microvascular Changes Observed in Pre-Operative Sarcopenic Cancer Patients

First Author: Kenric **FAN**

Purpose: To assess the retinal microvascular changes in pre-operative sarcopenic cancer (SaC) patients against normal controls from the Singapore Imaging Eye Network (SIENA).

Methods: This was a single-centre, prospective study of 25 SaC patients undergoing elective colorectal cancer surgery from March 2022 to January 2024. Sarcopenia was diagnosed at the time of recruitment using the Asian Workgroup for Sarcopenia (AWGS) 2019 diagnostic criteria. Optical coherence tomography (OCT) of the optic nerve and macula, and OCT angiography (OCTA) were performed within 1 month prior to surgery. Imaging parameters were compared to age and gender matched normal controls from the SIENA database.

Results: Fifty eyes of 25 SaC subjects were compared to 90 eyes of 45 controls. No significant differences in demographics were noted (mean age 63.4 (SD=9.7) versus 55 (SD=13.5) years, 15 (60%) versus 36 (80%) were male, and 23 (92%) versus 37 (82%) were of Chinese ethnicity ($p>0.05$). At baseline, SaC versus normal controls had a higher optic disc cup volume of (0.25mm³vs 0.13mm³, $p=0.005$), thicker superior disc thickness (118.33um vs 76.46um, $p<0.001$), and thinner nasal disc thickness (66.46um vs 120.07um, $p<0.001$). OCTA showed a reduction in macular full thickness and inner vessel density (14.59mm/mm²vs 17.42mm/mm², $p<0.001$ and 14.76mm/mm² vs 18.58mm/mm², $p<0.001$, respectively), a reduction in foveal avascular zone (FAZ) area and perimeter (0.24mm²vs 0.57mm², $p<0.001$ and 2.03mm vs 3.12mm, $p<0.001$ respectively), and increased FAZ circularity (0.68 vs 0.56, $p<0.001$).

Conclusions: This is the first study to assess retinal microvascular correlates of SaC patients, showing significant reductions in microvasculature density and FAZ parameters compared to normal controls, indicating potential systemic effects of sarcopenia and cancer on the retinal microvasculature.

Abstract No.: 207017

Panel No.: RME-1031

Retinochoroidal Manifestations in Idiopathic Intracranial Hypertension - An Observational Study With Multimodal Imaging

First Author: Sreelakshmi PALLIAN

Co-Author(s): Rafeeka HASHIM, George MANAYATH

Purpose: To document the different retinal and choroidal manifestation in patients IIH with multimodal imaging techniques.

Methods: Patients with IIH diagnosed as per Modified Dandy's Criteria at a tertiary ophthalmic hospital were included in this cross-sectional observational study. Fundus photographs, OCT, FFA and ICGA were done.

Results: Ocular symptoms were present in 66.27% of eyes. Crescent sign was observed in 97.6% of eyes. The following fundoscopic features were observed-venous tortuosity (26.7%), intraretinal hemorrhages (16.3%), Pigment epithelial detachments (4.65%), and subretinal hemorrhages (10.5%). The various optical coherence tomographic features seen were intraretinal fluid(18.6%), outer retinal irregularities (30.2%), subretinal hemorrhages (9.3%), and choriocapillaris compression (58.1%). A total of 70 eyes had subfoveal choroidal thickness (SFCT) greater than 350 microns. 1 in 5 eyes had delayed choroidal flush and ICGA confirmed vascular networks in 7 eyes of choroidal neovascular membrane. Branched vascular network was seen in 2 eyes and pachyvessels and choroidal vascular hyperpermeability (CVH) was observed in 75% and 85% of the eyes respectively. We were able to ascertain a positive association with CSF opening pressure with CVH ($P < 0.03$), grade of disc edema with SFCT ($P < 0.03$). The duration of disease had a positive association with SFCT, CVH and pachyvessels.

Conclusions: The concept of venous overload choroidopathy is pivotal in establishing retinochoroidal changes in papilledema. The flow within a tube is inversely influenced by the pressure in the surrounding tissue- also known as the Starling's resistor effect- and hence in patients with IIH the increased CSF pressure leads to slowing of circulation within dural venous sinuses which in turn leads to venous congestion within the choroidal system through ophthalmic veins resulting in pachychoroid and associated features.

Abstract No.: 206112

Panel No.: RME-1018

Rivaroxaban to the Rescue: CRVO Resolution in Factor V Leiden Mutation

First Author: Neethu PRADEEP

Purpose: A 46-year-old female with no systemic history presented with sudden blurring of vision in the right eye for 3 days. On examination, best corrected visual acuity right 6/12, left eye 6/6, pupil brisk. Fundus examination of the right eye showed dilated tortuous

veins with hemorrhages in all quadrants, with a normal macula, suggestive of Non-Ischemic Central Retinal Vein Occlusion (CRVO). Left eye examination within normal limits.

Methods: Routine blood investigations, cardiac workup, ANA profile, carotid doppler, Serum homocysteine levels, and thrombophilia workup were done.

Results: Patient tested positive for Factor V Leiden mutation -heterozygous variant. She was referred to a hematologist who started her on Rivaroxaban 20 mg.. 2 months later, her visual acuity improved to 6/6, with resolution of her fundus findings in the right eye.

Conclusions: CRVO in younger patients is often more than just an eye disease-it can be a window into hidden systemic thrombophilia. Our case of factor V Leiden-associated CRVO that spontaneously resolved after rivaroxaban therapy illustrates the diagnostic importance of systemic evaluation and the therapeutic potential of novel anticoagulants.

Abstract No.: 203087

Panel No.: RME-0979

Role of Faricimab In Refractory Neovascular Age-Related Macular Degeneration: Multicenter Real-World Evidence From India

First Author: Jay SHETH

Co-Author(s): Rupak BISWAS

Purpose: To evaluate the anatomical and functional outcomes of faricimab in eyes with refractory neovascular age-related macular degeneration (nAMD) in a real-world Indian cohort over six-months.

Methods: In this retrospective multicenter study, 24 eyes with refractory nAMD were switched to faricimab on a PRN regimen. BCVA, central foveal thickness (CFT), and the presence of IRF, SRF, and PED were assessed monthly for three months, then as clinically indicated.

Results: The cohort's mean age was 68.1 (± 10.6) years, and prior to switching had received an average of 11.4 (± 9.1) anti-VEGF injections. During the six-month period, eyes underwent a mean of 2.63 (± 1.34) faricimab injections (range, 1–5): 25.0% received one injection, 29.2% two, 16.7% three, 16.7% four, and 12.5% five. Mean BCVA improved from 0.66 (± 0.4) logMAR at baseline to 0.47 (± 0.34) at month 1, 0.35 (± 0.32) at month 2, and 0.27 (± 0.27) at months 3 and 6 ($P \leq 0.0003$). Mean CFT decreased from 471.1 (± 246.4) μm to 337.3 (± 198.3) μm (month 1), 265.1 (± 90.7) μm (month 2), 217.7 (± 41.3) μm (month 3), and 209.4 (± 36.0) μm (month 6) ($P < 0.0001$). SRF resolved in 90.9% of affected eyes ($P < 0.001$), IRF in 87.5% ($P = 0.0006$), and PED in 54.5% ($P = 0.32$), with complete fluid resolution in 83.3% of eyes ($P = 0.00002$). No ocular or systemic adverse events occurred.

Conclusions: In this real-world Indian cohort of refractory nAMD, faricimab delivered robust visual

gains, significant CFT reduction, and high rates of fluid resolution, with over half of eyes requiring ≤ 2 injections over six months, supporting its role as an effective switch therapy.

Abstract No.: 204103

Panel No.: RME-0991

SPECTRUM: Early Data From a Global Real-World Study of Aflibercept 8 mg in Diabetic Macular Edema

First Author: Nicholas FUNG

Co-Author(s): Helmut ALLMEIER, Clare BAILEY, Brian BALLIOS, Varun CHAUDHARY, Clemens LANGE, Paolo LANZETTA, Tobias MACHEWITZ, Peter MORGAN-WARREN, Marion R. MUNK, Hassiba OUBRAHAM

Purpose: To present early data from the global phase 4 SPECTRUM study of aflibercept 8 mg in patients with diabetic macular edema (DME).

Methods: SPECTRUM (NCT06075147) is an ongoing, 24-month, prospective observational study. In the treatment-naïve (TN) and previously treated (PT) DME cohorts, patients aged ≥ 18 years, who have been prescribed aflibercept 8 mg by their physician, are eligible for enrollment. Data are collected during routine visits. All analyses are exploratory.

Results: To date, 283 and 470 patients have been enrolled in the TN and PT DME cohorts across a total of 12 countries; 14 months is the longest treatment duration thus far. Among the first 150 patients enrolled in the TN and PT DME cohorts, the mean age at baseline (BL) was 66.3 and 65.3 years, 61% and 69% were male, and the mean time from DME diagnosis was 2.2 and 55.0 months; 67% of patients with PT DME had received aflibercept 2 mg as their last treatment. At BL in the TN and PT DME cohorts, visual acuity was 63.5 and 70.2 letters, and central retinal thickness was 420 and 364 μm .

Conclusions: These early data provide insights into the DME cohorts in the first global real-world study of aflibercept 8 mg.

Abstract No.: 207219

Panel No.: RME-1032

Seeing the Unseen: Imaging the Mizuo Phenomenon in Oguchi Disease Among Indian Patients

First Author: Debolina DEB

Purpose: Oguchi disease, a rare form of congenital stationary night blindness predominantly reported in East Asians, is sparsely documented in Indian populations.

Methods: We present 8 Indian patients across different age and gender groups, diagnosed through clinical history, family history, and slit-lamp examination. Fundus images, OCT and ERG were documented.

Results: Fundus images before and after dark adaptation, captured with Clarus 700, demonstrated a characteristic golden metallic sheen disappearing post-dark adaptation. OCT (Spectralis) revealed intact outer retinal layers with subtle ellipsoid zone irregularities during the Mizuo phenomenon. Full field ERG shows the classic “electronegative B wave”.

Conclusions: These cases highlight the critical role of precise timing and multimodal imaging in accurate diagnosis, preventing misinterpretation of retinal changes. Documenting the Mizuo phenomenon meticulously is vital for recognizing Oguchi disease, especially in diverse populations, and enhances our understanding of its phenotypic spectrum. It is crucial to differentiate Mizuo phenomenon in Oguchi from commotio and JXLR. Multimodal imaging enhances accurate diagnosis of Oguchi disease, especially in diverse populations, preventing misdiagnosis. Precise timing and visualization of the Mizuo phenomenon facilitate early recognition, guiding appropriate management and advancing understanding of this rare condition.

Abstract No.: 201812

Panel No.: RME-0957

Severity of Retinopathy of Prematurity and Mental Health of Parents

First Author: Harshita GARG

Co-Author(s): Rahul BHATIA, Neha CHAWLA GULIANI, Dinesh KATARIA, Piyush RAMAVAT, Aditya SHARMA, Sarita BERI

Purpose: To assess the association of severity of retinopathy of prematurity (ROP) with depression, anxiety, and stress in parents of babies with ROP.

Methods: One hundred parents of babies with ROP undergoing treatment at Lady Hardinge Medical College, New Delhi, India, a tertiary care setting, were assessed for their mental health status using the Depression, Anxiety, and Stress Scale-21 (DASS-21) at the 3-month postnatal outpatient assessment visit.

Results: Parents of babies with severe ROP, that is, ROP requiring intervention, had more mental health problems as compared to parents of babies with non-severe ROP, that is, ROP not requiring intervention.

Conclusions: ROP not only affects children but also has various psychological effects on caregivers, which are often underestimated. Repeated screenings and follow-ups, apprehension regarding the need for treatment, fear of disease progression, and uncertainty regarding the final outcome often lead to depression, anxiety, and stress symptoms in parents, thus affecting their caregiving ability. ROP has broader family aspects and may lead to economic burden; chronic stress among parents may strain marital relationships, while the siblings may feel overlooked due to disproportionate attention given to the ROP baby. Thus, integrating

mental health screening and psychological support in ophthalmological and neonatal care through proper counselling, education, parental involvement, and long-term follow-up can help families cope better and can help reduce trauma and strengthen family resilience, hence promoting a holistic environment.

Abstract No.: 202144

Panel No.: RME-0962

Short-Term Outcomes of Switching to Aflibercept 8mg in Patients With Neovascular Age-Related Macular Degeneration

First Author: Yusuke MAEHARA

Co-Author(s): Kumiko KANO, Shoji NOTOMI, Satomi SHIOSE, Koh-hei SONODA, Keijiro ISHIKAWA

Purpose: To evaluate treatment outcomes after switching to aflibercept 8mg for neovascular age-related macular degeneration (nAMD).

Methods: Patients with nAMD who visited our facility between August and December 2024 and received switching to aflibercept 8mg from another anti-vascular endothelial growth factor (anti-VEGF) therapy were enrolled in this study. We retrospectively analyzed changes in best corrected visual acuity(BCVA), central macular thickness(CMT) after once aflibercept 8mg injection.

Results: A total of 106 eyes from 114 patients were included. Their nAMD subtypes were Type 1 MNV (n = 101), Type 2 MNV (n = 3), mixed Type 1 and Type 2 MNV (n = 6), and Type 3 MNV (n = 4). Patients had received a mean of 21.8±24.5 other anti-VEGF therapies, and the average treatment interval before switching was 9.2±3.0 weeks. The immediate previous anti-VEGF agents were aflibercept in 91 eyes, faricimab in 22 eyes, and brolocizumab in 1 eye. After one administration of IVA 8 mg, the mean BCVA was significantly improved after the switch (pre-switch: 0.34±0.40 and post-switch: 0.32±0.39, p = 0.028), and mean CMT was also significantly reduced (pre-switch: 268.4 ± 92.3 and post-switch: 246.2 ± 76.7, p < 0.0001). In the subgroup analysis according to the prior anti-VEGF agent, switching from aflibercept 2mg resulted in a significant CMT reduction (pre-switch: 269.4±98.3 and post-switch: 242.8±77.9, P < 0.001), whereas switching from faricimab remained statistically unchanged (pre-switch: 267.3±64.7 and post-switch: 262.0±72.8, P = 0.074).

Conclusions: Aflibercept 8mg demonstrates particularly superior efficacy compared to aflibercept 2mg.

Abstract No.: 202779

Panel No.: RME-0974

Six-Month Outcomes of Half-Fluence Photodynamic Therapy Combined With Intravitreal Aflibercept Injection for Pachychoroid Neovascularopathy

First Author: Satomi SHIOSE

Co-Author(s): Keijiro ISHIKAWA, Kumiko KANO, Shoji NOTOMI, Koh-hei SONODA, Fukuda YOSUKE

Purpose: To investigate the six-month outcomes of patients with pachychoroid neovascularopathy (PNV) treated with a single anti-VEGF drug injection with half-fluence photodynamic therapy (IVI-PDT) and to identify factors linked to persistent or recurrent subretinal fluid (SRF).

Methods: The consecutive treatment-naïve PNV patients, who received initial treatment with IVI-PDT from 2019 to 2024 at Kyushu University Hospital and followed up for at least 6 months, were examined retrospectively. Patient data, including sex, age, and baseline best-corrected visual acuity (BCVA), and imaging data, including optical coherence tomography (OCT), OCT angiography, and fundus autofluorescence, were collected. The pre-/post-treatment BCVA, central macular thickness (CMT), and central choroidal thickness (CCT) were compared. The factors associated with persistent or recurrent SRF were investigated.

Results: Sixty-three eyes of 63 patients were included in this study. The mean BCVA before treatment was 0.13 ± 0.23 logMAR, which improved to 0.04 ± 0.18 after six months. The CMT and CCT significantly decreased after treatment. Persistent SRF was observed in 21 patients (33%), who were older (66.5 ± 9.6 vs. 59.9 ± 10.2; p=0.02), had poorer baseline BCVA (0.21 ± 0.31 vs. 0.08 ± 0.17; p=0.03), larger macular neovascularization area (0.90 ± 0.57 vs. 0.42 ± 0.36; p<0.001) and wider hyper fluorescence area (6.60 ± 4.17 vs. 3.44 ± 4.17; p=0.008).

Conclusions: The IVI-PDT improved BCVA, CMT, and CCT in patients with PNV. One-third of patients required additional treatment due to persistent SRF. Older age, larger MNV, wider hyperfluorescent area, and worse baseline BCVA were linked to persistent SRF.

Abstract No.: 201079

Panel No.: RME-0944

Six-Month Real-World Outcomes of Faricimab in Treatment-Naïve Diabetic Macular Edema

First Author: Xiaoe FAN

Purpose: To evaluate short-term real-world effectiveness and safety of faricimab in treatment-naïve diabetic macular edema (DME), with attention to dosing intervals and anatomic recovery.

Methods: Prospective consecutive case series. Treatment-naïve DME eyes receiving intravitreal faricimab from June–December 2024 were followed for ≥ 6 months. A 3-loading-dose plus pro re nata (3+PRN) regimen was used; panretinal photocoagulation (PRP) was added based on fluorescein fundus angiography (FFA). Monthly visits collected baseline and month 1, 2, 3, and 6 data: best-corrected visual acuity (BCVA, logMAR), central subfield thickness (CST), subretinal fluid (SRF) status, fasting glucose, and hemoglobin A1c. Statistics used paired t-test or Mann–Whitney U test (two-sided, $\alpha=0.05$).

Results: Eleven patients (9 male, 2 female; 17 eyes; mean age 54.5 ± 7.5 years) were included. Over 6 months, eyes received a mean of 3.23 injections; 76.47% stabilized after three loading doses, while 23.53% required one PRN injection at month 5. BCVA improved from 0.15 ± 0.18 at baseline to 0.12 ± 0.14 at month 3 and 0.08 ± 0.10 at month 6. CST decreased from $378.5 \pm 66.8 \mu\text{m}$ to $303.5 \pm 91.7 \mu\text{m}$ at month 3 and $270.0 \pm 86.5 \mu\text{m}$ at month 6. SRF resolved in 49.36% at month 3 and 61.11% at month 6 (denominator: eyes with baseline SRF).

Conclusions: In a 6-month real-world setting, faricimab achieved sustained visual gains and meaningful CST reduction in treatment-naïve DME, with extended treatment intervals in most eyes. Larger, controlled studies with longer follow-up are warranted.

Abstract No.: 201327

Panel No.: RME-0949

Structure–Function Link of Ellipsoid Zone Integrity and Low-Luminance Deficit in Avacincaptad Pegol-Treated Eyes with Geographic Atrophy

*First Author: Kelvin **TEO***

*Co-Author(s): Rachel **DOWNES**, Karen **MATAR**, Reem **AMINE**, Asmita **INDURKAR**, Amy **TANG**, Lyndsey **DELLA VECCHIA**, John **MAMONE**, Katherine **TALCOTT**, Janet **KIM**, Don **LUO**, Olga **CERON**, Dina **ABULON**, Justis **EHLERS***

Purpose: A better understanding of the structure–function relationship in geographic atrophy (GA) is needed. Low-luminance deficit (LLD), a measure of visual function, and ellipsoid zone (EZ) integrity, a measure of photoreceptor health, are markers of disease severity. The purpose of this study was to assess the relationship between structure and function by analyzing EZ integrity and LLD in eyes with GA treated with avacincaptad pegol (ACP) 2 mg.

Methods: This is a post hoc analysis of pooled 18-month data from the GATHER1 and GATHER2 trials. Study eyes with non–center point involving GA were grouped by baseline LLD quartiles. LLD was calculated as the difference between normal-luminance best corrected visual acuity (BCVA) and low-luminance BCVA. EZ degeneration and loss were measured as

the percentage of the macular area with EZ to retinal pigment epithelium (RPE) thickness of $\leq 20 \mu\text{m}$ (partial EZ attenuation) and $0 \mu\text{m}$ (total EZ attenuation), respectively, using spectral-domain optical coherence tomography.

Results: At baseline, eyes with the greatest LLD had the highest partial and total EZ attenuation. At month 18, ACP 2 mg reduced the progression of partial and total EZ attenuation vs sham, with the most pronounced benefit in eyes with greater baseline LLD (partial: 4.9% vs 11.0%; total: 9.1% vs 12.9%, respectively).

Conclusions: These results support a structure–function relationship in GA. ACP treatment was associated with reduced progression of EZ attenuation vs sham, particularly in eyes with greater baseline LLD, suggesting an increased treatment benefit in those eyes.

Abstract No.: 201640

Panel No.: RME-0952

Study on the Efficacy of Faricimab in the Treatment of Retinal Vein Occlusion

First Author: Wei

Purpose: This review systematically evaluates the efficacy, safety, and clinical application value of bispecific antibody Faricimab in the treatment of macular edema (ME) secondary to retinal vein occlusion (RVO).

Methods: Through a comprehensive search and analysis of relevant literature, including pharmacological studies, key registered clinical trials, real-world evidence, and comparative study data, a systematic review was conducted on the therapeutic mechanism, efficacy indicators, safety features, and pharmacoeconomic evaluation of faricimab in RVO-ME.

Results: Faricimab significantly improved vision and reduced central retinal thickness in the short term (≤ 3 months), with a high initial response rate; Maintaining visual stability in the medium to long term (≥ 6 months), the injection interval can be extended to 3–4 months, which is superior to ranibizumab and aflibercept. There is no significant association between systemic adverse events (cardiovascular events), and long-term database updates support good tolerability. Pharmacoeconomic evaluation shows that extending the interval can reduce medical costs by 20–30%, which is consistent with real-world research and clinical trial results.

Conclusions: Faricimab effectively improves visual function and anatomical outcomes in RVO-ME patients through a dual target mechanism.

Abstract No.: 203304
Panel No.: RME-0983

Study on the Mechanism of Phenylacetylglutamine Activating Microglia to Participate in the Inflammation of Diabetic Retinopathy

First Author: Kun LIU

Co-Author(s): Junwei FANG, Yan JIANG, Hanying WANG

Purpose: Diabetic retinopathy (DR) is considered a chronic inflammatory disease in which retinal microglia are key participants. The gut-derived metabolite phenylacetylglutamine (PAGln) is elevated in both blood and vitreous of DR patients. This study aimed to investigate the role of PAGln in DR-associated inflammation.

Methods: Fecal samples from 6-month-old db/db and db/m mice were analyzed by metagenomic sequencing to identify differential taxa. Microglia (BV2) adapted to low glucose were stimulated with PAGln (25 mmol/L), and phagocytic capacity was assessed by flow cytometry. Interleukin-1 β (IL-1 β) expression was measured by Real-time fluorescence quantitative polymerase chain reaction (qRT-PCR) and Western blot (WB). PAGln-activated BV2 were co-cultured with human retinal microvascular endothelial cells (HRMECs) to evaluate migration, tube formation, and ZO-1 expression. C57 mice received intraperitoneal PAGln (50 mg/kg) for 4 weeks, followed by metabolomic analysis, retinal immunofluorescence, Evans blue leakage, qRT-PCR, and WB assays. Adrenergic receptor β 2 (ADRB2) inhibition was applied to explore the mechanism.

Results: Db/db mice showed increased Enterobacteriaceae. Systemic PAGln crossed the blood-retinal barrier and accumulated intraocularly. PAGln activated BV2 both in vitro and in vivo, enhancing phagocytosis and upregulating IL-1 β . Activated BV2 impaired HRMEC barrier function, decreased ZO-1, and promoted migration and angiogenesis. Inhibition of ADRB2 reduced BV2 activation and inflammation.

Conclusions: PAGln promotes retinal inflammation by activating BV2 and disrupting vascular barrier integrity, thereby facilitating neovascularization. ADRB2 mediates PAGln's effects and may represent a therapeutic target. These findings highlight PAGln as an important inflammatory driver in DR and a potential intervention target.

Abstract No.: 206418
Panel No.: RME-1023

Targeting Hypoxia Inducible Factors Pathway in Laser-Induced Choroidal Neovascularization Mouse Model

First Author: Ziyi ZHENG

Co-Author(s): Mårten Eric BRELÉN, Priscilla FERNANDEZ LOAIZA, Tony Tsz Chun MAN, Yolanda Wong Ying YIP

Purpose: This study aimed to investigate the role of HIF (hypoxia inducible factors) and its signaling pathway in pathological CNV (choroidal neovascularization) in neovascular age-related macular degeneration (nAMD). It also evaluated the potential therapeutic effects of R59949, a diacylglycerol kinase inhibitor, and Dactolisib, a PI3K/mTOR dual inhibitor, on the laser-induced CNV mouse model.

Methods: A laser-induced CNV mouse model was used, involving 6–8-week-old C57BL/6J mice treated with either R59949, Dactolisib, Eylea (Aflibercept), or a control sham injection. FA (fluorescein angiography) and OCT (optical coherence tomography) were performed on Days 7 and 14 to assess CNV leakage area and retinal thickness. Statistical analysis included one-way ANOVA for significance.

Results: A total number of 40 eyeballs were included for statistical analysis (1% DMSO, n=8; Eylea, n=8; R59949, n=12; Dactolisib, n=12). Compared to the control group, both R59949 and Dactolisib demonstrated statistically significant reduction in FA leakage area on Day 14 ($p<0.01$), as well as statistically significant reduction in retinal thickness on Day 14 ($p<0.01$), while on Day 7 R59949 also showed statistically significant reduction in FA leakage area ($p<0.005$) as well as retinal thickness reduction ($p<0.005$). The treatments also exhibited comparable efficacy to Eylea in mitigating CNV progression ($p>0.05$).

Conclusions: The findings suggest that targeting HIF and its signaling pathway offers a promising alternative to anti-VEGF therapies for managing CNV in nAMD. The study highlights the need for further exploration of novel inhibitors and their pharmacological profiles to advance therapeutic strategies in retinal angiogenesis.

Abstract No.: 203976
Panel No.: RME-0987

The Changes of Intraocular Cytokines in Patients With Retinal Vascular Diseases Are Obviously Correlated With the Occurrence and Development of the Disease

First Author: Xia JIANPING

Purpose: Diabetic retinopathy (DR) is a serious complication of diabetes and the main cause of blindness in diabetes patients. Metabolic and inflammatory actors may play important roles in the pathogenesis of DR. FDCN5 and Irisin can be used as biomarkers of Diabetic retinopathy (DR) progression

and recovery. Analyze the levels of FNDC5 and 4 cytokines in DR aqueous humor to evaluate the effects of FNDC5 and inflammatory factors.

Methods: The study included patients with Diabetic macular edema DME eyes (n=39) and collected aqueous humor samples (n=118). ELISA (ELISA) kits were used for FNDC5, and RT-qPCR kits were used for 4 cytokines (VEGF, interleukin-6, interleukin-8) to detect the level of anti-VEGF treatment for DME five times, and optical tomography (OCT) was used to measure the macular thickness (CMT) of all patients. SPSS and χ^2 is used for intergroup classification data comparison. Results of Pearson correlation analysis and post-hoc multiple comparison analysis.

Results: The CMT of the DME treatment group was significantly lower than before treatment. The levels of FNDC5 in DME aqueous humor were significantly increased after three consecutive injections. After the fourth and fifth injections, the FNDC5 values tended to stabilize. The value of VEGF gradually decreased and tended to stabilize after five consecutive injections. The CMT value gradually decreases to normal. There is a negative correlation between VEGF and FNDC5. There is no correlation between FNDC5 and interleukin-6, interleukin-8.

Conclusions: There is a negative correlation between FNDC5 and VEGF. There is a negative correlation between FNDC5 and CMT. FNDC5 can regulate the level of oxidative stress and inflammatory reaction in Diabetic retinopathy. Five loading doses can control the edema of diabetic macular edema.

Abstract No.: 206700

Panel No.: RME-1025

The Correlation Between Axial Length Variation and Choroidal Thickness Change Before and After Cataract Surgery

First Author: Jaeha KIM

Co-Author(s): Jaehwan CHOI, Kiyoun KIM, Seungyoung YU

Purpose: This study investigated the relationship between axial length (AXL) changes and choroidal thickness in highly myopic eyes following cataract surgery. Subfoveal choroidal thickness is a key determinant of visual outcomes in high myopia, yet regional patterns of change remain underexplored.

Methods: We retrospectively reviewed 18 eyes (baseline AXL ≥ 26 mm) that underwent cataract surgery at Kyung Hee University Medical Center. Exclusion criteria included macular pathology, prior intraocular surgery, moderate or worse diabetic retinopathy, or poor imaging quality. AXL was measured with optical biometry and standardized to mm/year. Choroidal thickness was quantified using swept-source OCTA with the Zeiss ARI network algorithm, applying the ETDRS grid and normalized to $\mu\text{m}/\text{year}$. Eyes were

classified into AXL increase vs. no increase groups, with intergroup comparisons by the Mann-Whitney U test.

Results: A significant intergroup difference was found in the rate of choroidal thinning. Eyes with AXL elongation showed less overall choroidal thinning, and even superior sector thickening. By contrast, eyes without AXL increase exhibited accelerated thinning, particularly in the superior choroid.

Conclusions: These findings suggest that superior choroidal thickness changes may reflect localized compensatory remodeling associated with axial elongation. Sector-specific patterns, especially superior thickening, could serve as novel biomarkers for predicting myopia progression after cataract surgery.

Abstract No.: 207379

Panel No.: RME-1035

The Effect of Thyroxin on the Biological Effects of High Glucose-Induced Human Retinal Endothelial Cells and B-Cell Lymphoma 2/Bcl-2 Associated X

First Author: Lei LIU

Purpose: This study intends to assess the biological effect of TTR on human retinal endothelial cells under high glucose.

Methods: Cells were assigned into a normal group, a high glucose (HG) group, and a TTR intervention group, followed by analysis of cell biological activity and protein expression.

Results: The retinal endothelial cell proliferation rate was significantly promoted in the HG group ($P < 0.05$) and inhibited in the intervention group ($P < 0.05$). The HG group had significantly higher cell migration number than the normal group ($P < 0.05$). However, the migrated cell number in the intervention group was reduced significantly ($P < 0.05$). In addition, high glucose also significantly enhanced the invasion of retinal endothelial cells ($P < 0.05$), which was inhibited after TTR intervention ($P < 0.05$). Moreover, Bcl-2 protein was significantly downregulated, and Bax was upregulated in the HG group compared to the normal group ($P < 0.05$). Interestingly, their levels were normalized after TTR intervention without difference compared to their levels in the normal group ($P < 0.05$). Consistently, the mRNA level of Bcl-2 and Bax showed similar expression profiles to the protein expression in different groups ($P < 0.05$).

Conclusions: TTR can inhibit the retinal endothelial cell proliferation, migration, and invasion ability and regulate Bcl-2/Bax expression.

Abstract No.: 201360

Panel No.: RME-0948

The High Cost of Sight: Navigating the Financial Impact of Diabetic Retinopathy at a Tertiary Care Centre in South Asia

First Author: Vaishnavi

Purpose: This is a qualitative analysis to study the knowledge, attitude, financial burden, and vision-related quality of life of patients with diabetic retinopathy.

Methods: A total of 350 patients were given a standard questionnaire to understand the financial burden of the patient and vision-related quality of life due to diabetic retinopathy. The questionnaire was later analyzed to know what was the major cause of the financial burden.

Results: Severe non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) had 2-6 times higher costs than mild/moderate cases. Anti-VEGF injections and vitrectomy were the largest direct cost drivers. Travel and lost wages accounted for 30-40% of total expenses. PDR patients reported the worst VRQoL (eg, difficulty reading, mobility. Financial stress exacerbated mental health issues (15% reported severe anxiety/depression).

Conclusions: Diabetic retinopathy poses significant financial burdens on patients, impacting both direct and indirect costs and profoundly affecting their visual-related quality of life. This study examines the economic implications and quality of life consequences for individuals suffering from Diabetic retinopathy. Direct costs include medical expenses and logistics for frequent ophthalmologic exams, advanced treatment modalities like laser therapy and anti-VEGF injections, and ongoing management of diabetes-related health issues. Indirect costs encompass lost productivity due to visual impairment and associated disabilities, as well as potential long-term care needs. Thus government should take necessary steps not only to create awareness but also to reduce the economic blindness due to diabetic retinopathy.

Abstract No.: 203300

Panel No.: RME-0982

The Molecular Mechanism Study of Egr1 in the Degenerative Retina of Rd10 Mice

First Author: Kun-chao WU

Purpose: The aim of this study is to explore the regulatory molecular mechanism of egr1 within the Rd10 mice model of retinitis pigmentosa.

Methods: Several bioinformatics algorithms were used to identify the role of Egr1 involved in the degenerative retina of Rd10 mice. Further, its expression characterizations were evaluated through a single-cell sequencing dataset, qPCR, and immunofluorescence

staining. The TTRUST database was utilized to analyze transcription factors that interact with Egr1. The potential molecules targeting Egr1 were predicted by the DGIdb database. Financially, the molecular docking was performed to evaluate the binding capacity between them.

Results: GESA analysis indicated a significant activation of multiple biological pathways in the retinas of Rd10 mice. A systematic bioinformatics analyses identified several hub genes degenerative retina, including Egr1. Results of qPCR showed that the expression of Egr1 in the retinas of Rd10 mice was significantly upregulated. Analysis of the single-cell dataset from Rd10 mice indicated that the expression of Egr1 was significantly higher in rods and cones when compared to the control group. Immunofluorescence staining results suggested that Egr1 is mainly localized in the outer nuclear layer of the Rd10 mice retina. Predictions from the TTRUST database suggested interactions between Egr1 and 76 genes, including Makp8, Cxcl2, and Pten. The DGIdb database predicted that Genipin has the potential to regulate Egr1 gene expression, and molecular docking indicated a high binding affinity between the them.

Conclusions: Our study may suggest that Egr1 has great potential for the therapeutic study of retinitis pigmentosa.

Abstract No.: 205646

Panel No.: RME-1010

The Observational Study of the Efficacy of Eylea High Dose

First Author: Yin-zhi LEE

Co-Author(s): Zachary ANGUS, Manishka JAYASUNDERA, Sukhpal SANDHU, Robyn TROUTBECK, Sanjeeva WICKREMASINGHE

Purpose: Eylea High Dose (EHD) is purported to allow for extended dosing intervals, whilst maintaining efficacy. This study investigated the potential of EHD in extending treatment intervals in patients with nAMD.

Methods: Patients who were either inadequately controlled or who needed high frequency of anti-VEGF therapy were switched to EHD. Eligible patients were required to have received a minimum of 3 consistent anti-VEGF treatments prior to transitioning to EHD. The average injection interval of the 3 most recent anti-VEGF injections before switching to EHD were compared to the last 3 consecutive EHD injections following the switch. Best-corrected Visual Acuity (BCVA) and central subfield thickness (CST) were also collected at baseline and after EHD treatment.

Results: 42 eyes of 38 patients met the inclusion criteria. 83.3% were switched from 2mg Aflibercept, 14.3% from Faricimab and 2.4% from Ranibizumab. The mean treatment interval prior to the switch was 7.44 weeks. Following the switch to EHD, the mean treatment interval was extended to 8.64 weeks. A

significant reduction in CST was also noted from 325 μ m to 303 μ m at the end of the follow-up. However, this improvement did not translate to an improvement in BCVA which only improved from 68 to 71.2 letters which was not statistically significant.

Conclusions: On average, the treatment interval was extended 1.2 weeks or 8.4 days following the switch to EHD. There was a concurrent improvement in CST, but this did not translate to significant improvement in BCVA.

Abstract No.: 201878

Panel No.: RME-0960

The X Factor: A Familial Case Series of Retinitis Pigmentosa in Female Carriers

First Author: Josh **KUMAR**

Co-Author(s): Vinod **KUMAR**

Purpose: To report symptomatic retinitis pigmentosa (RP) in three females of a single family due to heterozygous mutation in the RPGR gene.

Methods: Three members of the same family - a 42 year old mother and her two daughters (14 and 10 years of age respectively) underwent detailed ophthalmic evaluation. Ultra wide field fundus photography, fundus autofluorescence, optical coherence tomography, electroretinography (ERG) and clinical exon sequencing.

Results: All three patients presented with progressive diminution of vision in both eyes, more pronounced under scotopic conditions (nyctalopia). Imaging suggested clinical findings of retinitis pigmentosa. Clinical exon sequencing revealed a heterozygous mutation in the RPGR gene in each patient. Full-field ERG demonstrated extinguished dark-adapted and light-adapted waveforms consistent with Retinitis Pigmentosa. Third daughter (5 years of age) though positive for the same mutation in RPGR gene, was asymptomatic.

Conclusions: RPGR mutations are associated with X-linked retinitis pigmentosa and clinical manifestations are typically seen in hemizygous males. Female carriers typically remain asymptomatic or display mild changes due to lyonization. This case series reports symptomatic and clinically detectable retinitis pigmentosa in three females with heterozygous RPGR within the same family, highlighting the variable expressivity and potential disease burden in carrier states.

Abstract No.: 202797

Panel No.: RME-0975

Therapeutic Potential of Allogeneic iPS Cell-Derived RPE Transplantation for RPE65-LCA

First Author: Akiko **MAEDA**

Co-Author(s): Yasuo **KURIMOTO**, Tadao **MAEDA**,

Michiko **MANDAI**, Daiki **SAKAI**, Masayo **TAKAHASHI**

Purpose: To evaluate the safety and therapeutic effects of induced pluripotent stem (iPS) cell-derived retinal pigment epithelium (RPE) transplantation for RPE65-associated Leber congenital amaurosis (RPE65-LCA).

Methods: A 46-year-old male patient with RPE65-LCA underwent allogeneic iPS cell-derived RPE transplantation. The patient's best-corrected visual acuity (VA) prior to treatment was 2.0 (logMAR). A suspension of these cells (5×10^5 cells in 0.15 ml) was transplanted into the subretinal space.

Results: On day 15 post-transplantation, intraocular pressure (IOP) increased to 46 mmHg due to local steroid treatment, resulting in a decrease in VA to light perception (LP). Retinal imaging on day 71 revealed that most transplanted cells had migrated and formed an epiretinal membrane (ERM). The ERM was surgically removed on day 112. Two years post-transplantation, the patient reported improved vision, with VA improving to 1.4 (logMAR) from LP. Full-field stimulus testing (FST) and microperimetry demonstrated increased retinal sensitivity. These improvements have been maintained for up to 4 years post-treatment.

Conclusions: This case demonstrated the challenges associated with RPE transplantation. However, the transplanted RPE cells stayed and maintained their function, contributing to improved visual function two years post-transplantation. RPE transplantation may serve as a potential therapeutic option for patients with RPE65-LCA, particularly those who are not eligible for RPE65 gene therapy.

Abstract No.: 207118

Panel No.: RME-1030

To Study the Clinical Profile of Pachychoroid Spectrum Disease Presenting to a Tertiary Care Centre in Northeast India

First Author: Ankit **AHIR**

Co-Author(s): Manabjyoti **BARMAN**, Harsha **BHATTACHARJEE**, Madhusmita **MAHAPATRA**

Purpose: To evaluate the imaging features of OCT/ICGA in patients with Pachychoroid disease spectrum and to study the demographic profile of patients presenting with pachychoroid spectrum.

Methods: The study was carried out for 15 months in 170 volunteered patients as a Retrospective study for 6 months and a Prospective study for 9 months. In patients, OCT using the Spectral domain was done

using the HRA and HRA-OCT with Enhanced depth imaging.

Results: More than 50% of the subjects obtained retinal pigment epithelium (RPE) and central serous chorioretinopathy (CSCR). In contrast, moderate value was obtained on polypoidal choroidal vasculopathy (PCV) followed by Pachychoroid pigment epitheliopathy (PPE), pachychoroid neovasculopathy (PCN), and peripapillary pachychoroid syndrome (PPS). In contrast, the very least value was found on focal choroidal excavation (FCE) during the Pachy types study.

Conclusions: This study emphasizes recent imaging techniques for the diagnosis of the disease. Earlier, very few studies have been conducted on the treatment of this disease and this is also an important part of the present study to prevent Pachychoroid spectrum disease with more sample size.

Abstract No.: 201802

Panel No.: RME-0959

Topical Interferon as a Newer Modality for Treatment of Uveitic Macular Edema: A Tertiary Centre Study of Northern India

First Author: Apurva **BAGLA**

Co-Author(s): Kshama **DWIVEDI**, Santosh **KUMAR**, Arti **SINGH**

Purpose: The aim of this study was to study the efficacy of topical interferon alpha-2b (IFN) as an adjunctive therapy in the treatment of uveitic macular edema (UME).

Methods: This is a prospective, interventional, randomized study on patients with UME. 16 eyes of 16 patients (one eye/patient) who were diagnosed with UME were randomly assigned to get topical IFNa2b 1MIU/ml (Case group) or placebo drop (Control group) as an adjunct to conventional treatment. Central macular thickness (CMT) and best corrected visual acuity (BCVA) were measured at the baseline and on each review visit until complete resolution of UME.

Results: Sixteen eyes of 16 patients were taken (8 cases and 8 controls). The Vision between Groups in UME was statistically significant at 2 Months at $p < 0.01$ level. The CMT between Groups in UME by an Independent sample t-test showed that all the time durations showed no statistical significance difference, except for 2 months, which showed a statistical significance difference. The mean time taken for complete resolution of CMT in the case group in UME was 6.5 weeks, whereas it was 10.8 weeks in the control group. No ocular or systemic side effects related to the topical IFN therapy were noted clinically, except papillary conjunctivitis in one patient.

Conclusions: Topical IFN therapy can be a noninvasive, economical, and effective adjuvant choice of treatment for UME, resulting in earlier resolution of CMT than conventional treatment.

Abstract No.: 207353

Panel No.: RME-1033

Transthyretin-Regulated Diabetic Retinopathy Through the VEGFA/PI3K/AKT Pathway

First Author: Lei **LIU**

Purpose: Transthyretin (TTR) plays a regulatory role in a variety of diabetes-related diseases. The objective of this work was to probe whether TTR affects diabetic retinopathy (DR) through the VEGFA/PI3K/AKT pathway.

Methods: High glucose (HG, 25 mM) was used to treat human retinal microvascular endothelial cells (hRMECs), and C57BL/6J mice were intraperitoneally injected with STZ (50 mg/kg) to construct a DR model. In vitro, the effect of TTR on DR was evaluated by measuring hRMEC proliferation, migration, and angiogenesis. The changes in retinal tissue were observed by hematoxylin and eosin staining in vivo. ELISA, immunohistochemistry, and immunofluorescence staining were used to measure VEGFA or CD31 levels. The levels of all proteins were evaluated through Western blot.

Results: The increase of proliferation, migration, and angiogenesis and decrease of apoptosis in hRMECs caused by HG were notably reversed by TTR. TTR greatly impeded HG-raised VEGFA, PI3K p-p85, and p-AKT in hRMECs. Inhibition of TTR further exacerbated the effect of HG-induced hRMECs. Inhibition of VEGFA reversed the effect of HG-induced hRMECs. VEGFA neutralized the function of TTR on cell proliferation, apoptosis, migration, and angiogenesis in HG-triggered hRMECs. It was further confirmed in vivo that TTR can alleviate the occurrence of DR in diabetic mouse models.

Conclusions: TTR significantly restrained the progression of DR via molecular modulation of the VEGFA/PI3K/AKT axis.

Abstract No.: 202159

Panel No.: RME-0963

Treatment of DME/NPDR With Combination Therapy of Intravitreal Avastin (Bevacizumab)/ Patizra (Ranibizumab) and Eylea (Aflibercept) Using Subthreshold Modified Grid Laser

First Author: Dr M Afzal **BODLA**

Co-Author(s): Arfa **AHSAN**

Purpose: Diabetic macular edema (DME) is one of the primary causes of serious central vision loss, largely driven by excessive vascular leakage. In our study, we aimed to evaluate the efficacy of different Anti-Vascular Endothelial Growth Factors (Anti-VEGFs) with a combination of sub-threshold focal/ modified grid laser. The goal was to reduce the number of anti-VEGF injections while improving best corrected visual acuity

(BCVA), reducing central macular thickness (CMT), and minimizing systemic side effects.

Methods: This randomized interventional trial was conducted at the Eye Department of CMH Institute of Medical Sciences and Bodla Eye Care, Multan, from July 2022 to June 2024. Purposive sampling was used to choose 30 eyes of 30 patients aged 40-70 years, including both genders. The anti-VEGF first dose was given after macular cube and raster OCT. The study was based on three different groups: Group A (Avastin), Group B (Patizra), and Group C (Eylea), followed by sub-threshold focal/modified grid photocoagulation in 3-4 weeks.

Results: Our studies indicate that focal/grid laser photocoagulation can reduce moderate vision loss from DME by 50% or more. Historically, laser therapy has been the gold standard for DME treatment. With the advent of anti-VEGF agents, improved visual acuity outcomes and greater reductions in macular thickness have been achieved.

Conclusions: In our study, we combined anti-VEGF agents with subthreshold laser therapy, resulting in superior outcomes in the treatment of DME. This combined approach may help to reduce treatment burden while delivering improved visual and anatomical results.

Abstract No.: 203086

Panel No.: RME-0978

Twelve-Month REsponse and Safety of Intravitreal Dexamethasone Implant in Treatment-Naïve and Recalcitrant Diabetic Macular Edema (TREAT-DME Study)

First Author: Jay **SHETH**

Co-Author(s): Somnath **CHAKRABORTY**

Purpose: To compare twelve-month visual, anatomical, safety, and inflammation biomarker outcomes of intravitreal dexamethasone implant (DEX) in treatment naïve versus recalcitrant center involving diabetic macular edema (CI-DME) eyes.

Methods: In this multicenter, retrospective cohort study (January 2020–December 2024) at two tertiary centers, diabetic patients with CI-DME were stratified into treatment naïve or recalcitrant cohorts. All eyes underwent DEX therapy, with pro-re-nata retreatment for recurrent fluid, ≥ 5 letter BCVA loss, or ≥ 50 μm CMT increase. Visits at baseline and periodic intervals up to 12 months included BCVA, IOP, slit lamp and fundus exams, and OCT quantification of CMT and hyperreflective foci (HRF). Safety outcomes included IOP elevations, cataract progression, and other ocular events.

Results: We analyzed 102 eyes (30 naïve, 72 recalcitrant) from 74 patients (mean age 61.7 ± 8.8 years). Mean injections per eye were 1.83 ± 0.73 , higher in recalcitrant eyes (1.87 vs.

1.73 ; $P=0.02$). At 12 months, mean BCVA improved from 0.73 ± 0.26 to 0.62 ± 0.28 logMAR ($P=0.002$), with no intergroup differences ($P>0.05$). Mean CMT decreased from 520 ± 144 to 462 ± 192 μm ($P=0.03$), similarly across cohorts ($P>0.10$). Hyperreflective foci declined from 58% to 26% ($P<0.001$). Safety outcomes included cataract progression in 39% of phakic eyes (26% underwent surgery) and transient IOP elevations >21 mmHg in 9.8%, all managed medically; no glaucoma surgery was required.

Conclusions: In real-world practice, intravitreal DEX implant delivers sustained visual and anatomical benefits in both treatment naïve and recalcitrant CI DME eyes. Although cataract progression and transient IOP rises occur, they are predictably manageable. Its extended durability and acceptable safety profile underscore DEX implant as a practical, valuable option across diverse DME populations.

Abstract No.: 203438

Panel No.: RME-0985

UCP2 Alleviates RPE Injury via Vitamin B5 Metabolism-Mediated Mitochondrial Function Improvement

First Author: Chuanhe **ZHANG**

Co-Author(s): Ning **AN**, Dongcheng **LIU**, Ziling **LIU**, Bo **QIN**

Purpose: Dry age-related macular degeneration (dry AMD) is a major cause of vision loss, characterized by retinal pigment epithelium (RPE) dysfunction and mitochondrial impairment. This study aimed to investigate the role of mitochondrial uncoupling protein 2 (UCP2) in regulating mitochondrial function and oxidative stress responses in RPE, with the goal of clarifying key molecular mechanisms and identifying potential therapeutic targets for AMD.

Methods: Transcriptomic datasets from AMD patients and NaIO_3 -induced experimental models were analyzed to detect the expression of UCP2. Functional assays were performed to reveal the role of UCP2 in RPE injury using in vitro models. Metabolomic analysis was performed to identify the targets of UCP2. The impact of UCP2 overexpression on retinal structural integrity and visual function was verified in animal models.

Results: • A significant downregulation of UCP2 was identified in both transcriptomic data from AMD patients and NaIO_3 -induced experimental models. Reduced UCP2 expression exacerbated mitochondrial damage, ROS production, and calcium imbalance, ultimately leading to RPE injury. UCP2 was found to regulate mitochondrial homeostasis through a previously unreported interaction with PANK2, thereby influencing vitamin B5 metabolism. Supplementation with vitamin B5 rescued mitochondrial function, reduced oxidative stress, and protected RPE cells from damage.

Conclusions: These results establish the UCP2–PANK2–vitamin B5 axis as a novel metabolic regulatory pathway in AMD pathogenesis. This finding not only enhances the understanding of the molecular mechanisms underlying dry AMD but also highlights the therapeutic potential of targeting this axis for the treatment of mitochondrial-driven retinal diseases such as dry AMD.

Abstract No.: 201292

Panel No.: RME-0947

Unexpected Acute Macular Edema on the First Day After Phacoemulsification Surgery in Five Patients: Case Series

First Author: Nora Kusuma DAHLIA

Co-Author(s): Iqbal HILMI

Purpose: To report five unexpected cases of acute macular edema with serous macular detachment occurring on the first day after uneventful phacoemulsification surgery with intraocular lens implantation by the same surgeon on the same day.

Methods: Diagnosis was based on best-corrected visual acuity (BCVA), anterior segment examination, intraocular pressure (IOP), fundus examination, and optical coherence tomography (OCT) were performed at first and seventh day postoperative.

Results: Five patients without pre-existing fundus or systemic diseases underwent phacoemulsification surgery. BCVA on the first day was 3/60 in three patients and 6/45 in two patients. Postoperative anterior segment examination in all patients appeared normal. IOP in all patients is within normal limits. OCT showed serous macular detachment with significant intraretinal fluid accumulation. After seven days of treatment with standard postoperative drugs and additional topical nonsteroid anti-inflammatory drugs (NSAIDs), intraretinal and subretinal fluid were fully reabsorbed, and BCVA improved.

Conclusions: Acute macular edema with serous detachment should be considered in cases of poor visual acuity on the first day postoperative. Rapid diagnosis and medical treatment can provide significant improvement.

Abstract No.: 208621

Panel No.: RME-1042

Unusual Central Retinal Artery Occlusion following Neck Massage in a Nasopharyngeal Carcinoma Patient With Post-Radiotherapy Carotid Stenosis

First Author: Raymond Lai-man WONG

Co-Author(s): Thomas LAM, Wing-yi Chilli LAU, Shaheeda MOHAMED

Purpose: To report a case of central retinal artery occlusion (CRAO) following neck massage in a patient

with a history of nasopharyngeal carcinoma (NPC) who developed post-radiotherapy carotid stenosis.

Methods: Case report.

Results: A 54-year-old man with known carotid stenosis following external radiotherapy and brachytherapy for NPC presented with sudden right eye vision loss after neck massage. Best-corrected visual acuity in the right eye was hand motion at presentation. Fundus examination revealed a cherry red spot at the macula, multiple visible emboli, and retinal whitening. He was immediately treated with anti-glaucoma eye drops and instructed to perform carbon dioxide rebreathing exercises. Given the high risk of cerebrovascular accident, his aspirin was switched to clopidogrel, and simvastatin was initiated. The patient demonstrated progressive improvement, with subsequent disappearance of emboli and restoration of normal fundal appearance. His visual acuity returned to 20/20 ten days after presentation and remained stable during his follow-up.

Conclusions: Neck massage can trigger embolic events such as CRAO in patients with underlying carotid stenosis. Patients with NPC or head and neck cancers treated with radiotherapy are particularly vulnerable. Secondary prevention of embolic events is crucial in CRAO management. All patients with carotid stenosis should be warned of the risk of embolic events associated with neck manipulation.

Abstract No.: 200474

Panel No.: RME-0939

Utility of Ultrawide Field Imaging and UWF FFA in Diabetic Retinopathy Patients to Detect Peripheral Lesions

First Author: Sabarinath A

Purpose: To analyze distribution of various lesions in peripheries in DR patients using UWF imaging.

Methods: This is a Prospective observational study. A total of 150 patients with DR who presented to our retina clinic were included.

Results: Images of 150 patients were analyzed .39.7% were graded as predominantly peripheral lesions (PPL), while 60.3% graded to have predominantly central lesions (PCL). Comparison of ICDR with the S7F grading, shown for moderate NPDR, of 182 cases, (11.5%) graded as mild, (86.8%) as moderate, (1.1%) as severe, and (0.6%) classified as PDR. The severe NPDR comprised 73 cases, with 4 classified as mild, 66 as moderate, and 3 (4.1%) as severe. In PDR, out of 35 cases, 1 was classified as mild, 24 as moderate, 4 as severe, and 6 as PDR. 35% had more than 3 fields of involvement. The assessment of retinal CNP areas and NV in the peripheries indicated that 26.0% of participants (n = 78) exhibited while 74.0% (n = 222) did not show such findings. Capillary non-perfusion (CNP) and neovascularization (NV) revealed that 18.7%

(n = 56) had CNP, 4.7% (n = 14) had NV, and 3.3% (n = 10) had both CNP and NV in the peripheries.

Conclusions: PPL were present in 40% of eyes. S7F images missed 9% of PDR cases that were identified by UWF images. The evaluation of pathology only outside the 7 fields using UWFFA found that 17.3% (n = 52) of participants had lesion only in peripheries.

Abstract No.: 200270

Panel No.: RME-0937

Valsalva Retinopathy in Pregnancy: An Obstetric Dilemma — A Case Report

First Author: Md.Anwarul **AZIM**

Co-Author(s): Arup Krishna **CHOUDHURY**, Sheikh Md.Arafat **RAHMAN**

Purpose: To highlight the clinical course, management, and eventual resolution of Valsalva retinopathy during pregnancy, a rare condition that can pose diagnostic and therapeutic dilemmas for both ophthalmologists and obstetricians.

Methods: We present a case of a 22-year-old pregnant woman (G1P1) with sudden, unilateral deterioration of vision during labor. Detailed history, fundus examination, imaging, and follow-up were performed. Nd:YAG laser hyalodotomy was used to aid faster resolution of preretinal hemorrhage. The patient was subsequently kept under observation following delivery by Cesarean section.

Results: Slit lamp evaluation was normal, but funduscopy revealed subhyaloid preretinal hemorrhage in the macular region of the left eye. Nd:YAG laser hyalodotomy resulted in resolution of the preretinal hemorrhage within 5 days, and the patient's visual acuity improved to 6/6. At follow-up, there were no further complications or abnormalities in the retina. The patient successfully delivered a healthy neonate by Cesarean section.

Conclusions: Awareness and understanding of Valsalva retinopathy and its management are crucial for optimizing visual outcomes in affected pregnant women. Conservative observation is frequently appropriate; however, Nd:YAG laser hyalodotomy can aid faster resolution when the hemorrhage is large or persistent. Proper multidisciplinary care involving both obstetrics and ophthalmologists is recommended in these cases.

Abstract No.: 205916

Panel No.: RME-1017

Vision Lost and Regained: A Case of Steroid-Responsive Purtscher-Like Retinopathy Associated With Systemic Lupus Erythematosus

First Author: Faiz Nurboston **FAUZI**

Co-Author(s): Muhammad **FIRMANSJAH**

Purpose: To report a case of Purtscher-like retinopathy (PLR) associated with macular edema in a young woman with systemic lupus erythematosus (SLE), showing a satisfactory outcome after systemic corticosteroid therapy.

Methods: A 27-year-old woman with previously diagnosed SLE presented with acute visual loss in the right eye after discontinuing SLE medications two months prior. The Initial VA was one meter CF on the right eye and 20/20 on the left eye. Fundus examination revealed bilateral Purtscher flecken, cotton-wool spots, and intraretinal hemorrhages. A visual field defect was noted in the right eye. Optical coherence tomography (OCT) showed macular edema with intraretinal fluid, subretinal fluid, and paracentral acute middle maculopathy (PAMM) on the right eye. Laboratory tests showed elevated ESR, high-titer antinuclear antibodies, and high disease activity. The patient was treated with intravenous methylprednisolone (250 mg twice daily for three days) followed by oral corticosteroids.

Results: PLR is a rare, vision-threatening occlusive microvasculopathy that is associated with systemic conditions, including SLE. There are no established guidelines for PLR treatment, and visual outcomes are variable. Systemic corticosteroid therapy has been correlated with improvements in visual acuity. This patient was given high-dose systemic corticosteroids resulted in an improvement of VA to 20/30 within five months. OCT showed resolution of macular edema with no presence of subretinal or intraretinal fluid. There was an improvement in the visual field.

Conclusions: Systemic corticosteroids can lead to significant visual improvement and resolution of retinal findings in PLR. Multidisciplinary collaboration is essential for optimal management and satisfactory outcomes.

Abstract No.: 204207

Panel No.: RME-0992

Visual Function Assessment in Geographic Atrophy – A Review

First Author: Ye **LI**

Co-Author(s): Lauren **AYTON**, Adrian **FUNG**

Purpose: Fundus autofluorescence (FAF) is the gold-standard of structural assessment of geographic atrophy (GA) but is only a surrogate marker for vision loss. Best corrected visual acuity (BCVA), the most

commonly used visual function test in ophthalmology, is a poor metric for assessing GA progression. This review studies the importance of tests of visual function and functional vision and their correlation with FAF in the setting of GA.

Methods: A comprehensive review was conducted across PubMed, Medline, and Embase using the keywords 'age-related macular degeneration', 'geographic atrophy', 'visual function', 'low luminance visual acuity', 'reading speed', 'contrast sensitivity', and 'microperimetry', with Boolean operators.

Results: Seventy-five of 3229 identified articles were reviewed in detail. Low luminance VA, reading speed, and contrast sensitivity are inexpensive and have a short testing time; these tests show a weak correlation with FAF but are superior to BCVA. More time-consuming tests include microperimetry, flicker perimetry, and dark adaptation, which showcase photoreceptor function in GA. Microperimetry exhibits the strongest correlation with FAF, providing an overlay of structure and function. Flicker perimetry and dark adaptation can provide prognostic information regarding GA progression.

Conclusions: Visual function tests have variable correlations with FAF, with the strongest correlation being shown with microperimetry. Structural biomarkers require further standardisation and validation against functional tests, which are impractical to implement in clinical practice due to their lengthy testing time, limited availability, and ceiling effect. Future GA treatment clinical trials should include targeted endpoints of visual function, which is critical for jurisdictions that require demonstration of visual function improvement for treatment approval.

Abstract No.: 206809

Panel No.: RME-1026

When a Red Eye Isn't Just a Red Eye: A Case of Ocular Tuberculosis

First Author: Mariya Banu Ranjini SRIDHARAN

Co-Author(s): Vivek REDDY

Purpose: This case presentation serves to highlight the diagnostic complexities of ocular tuberculosis, particularly when it manifests with various clinical signs.

Methods: A 26-year-old female with complaints of redness and watering in the right eye for 3 days. BCVA OD 6/12, OS 6/6. On examination of right eye conjunctival congestion present. The patient was started on Moxifloxacin eye drops. One month later, the patient presented with a drop in vision: BCVA OD 6/24, OS 6/6. Examination of the right eye showed a swollen lid, tenderness, deep scleral congestion, non-pigmented keratic precipitates, 1+ cells, a 4mm dilated pupil sluggishly reacting to light, disc edema, subretinal exudates, scleral nodules, and a choroidal

granuloma. B scan showed findings suggestive of posterior scleritis with positive T sign. Patient was subjected to detailed evaluation including CBC, ESR, HIV, Mantoux, VDRL, RA FACTOR, HLA B27, and Serum Angiotensin converting enzyme, c ANCA, and p ANCA. Patient was started on Systemic steroids and subjected to Quantiferon TB Gold Assay IGRA. 15 days later, the patient presented with an improvement in visual acuity BCVA OD 6/12 OS 6/6 and deep scleral congestion, disc edema, and scleral nodules resolved. One week later patient presented with pain in left eye BCVA OD 6/18 OS 6/12. Examination of the right eye showed nodular episcleritis, and the left eye showed temporal congestion. OCT OU showed Multifocal choroiditis. All investigations were negative except for IGRA, which was 0.37 (>0.35 positive). The patient was started on ATT after consultation with a pulmonologist for HRCT Chest. Patient is being followed up.

Results: This is a case of ocular tuberculosis masquerading initially as a seemingly straightforward conjunctivitis, which underscores the insidious and polymorphic nature of the disease.

Conclusions: These variable presentations reinforce the imperative for a meticulous diagnostic evaluation in cases refractory to conventional treatment.

Abstract No.: 201464

Panel No.: RME-0951

When the Yolk Cracks Late: Adult-Onset Vitelliform Maculopathy

First Author: Nehal KAPOOR

Co-Author(s): Nikunj GUPTA

Purpose: To present a case of Adult-Onset Vitelliform Maculopathy (AOVM) and highlight the role of multimodal imaging in differentiating it from the mimicking macular diseases.

Methods: An elderly female patient with central visual complaints underwent a detailed ophthalmic examination. Multimodal imaging, including fundus photography, fundus autofluorescence, fluorescein angiography, spectral-domain OCT, and electrooculography was performed to evaluate macular morphology and establish the diagnosis.

Results: Examination revealed a yellowish subfoveal lesion with preserved retinal contour. Imaging demonstrated hyper autofluorescence on fundus autofluorescence, late staining without leakage on fluorescein angiography, and subfoveal hyperreflective material on OCT, consistent with AOVM. Visual acuity remained stable with observation during follow-up.

Conclusions: AOVM is an important clinical entity that can mimic age-related macular degeneration and inherited dystrophies. Recognition of its characteristic imaging features allows accurate diagnosis, prevents mismanagement, and emphasizes the value of conservative observation in most cases.

Abstract No.: 203203

Panel No.: RME-0981

Whiplash Macular Oedema: A Case Report and Literature Review

First Author: Anson Chun Long WU

Co-Author(s): Mary HO, Wilson Wai Kuen YIP, Alvin Lerrmann YOUNG

Purpose: To report a case of bilateral whiplash macular oedema following a car crash involving acceleration-deceleration injury, without direct head or ocular trauma, and to document its natural course through serial imaging.

Methods: Case report with literature review.

Results: A 64-year-old lady presented with bilateral acute painless visual blurring after a road traffic accident without direct head or eye trauma. She had a history of breast cancer, being treated with letrozole for over four years. Examination revealed bilateral macular oedema without retinal haemorrhage or commotio. Optical coherence tomography confirmed macular oedema with a cystoid pattern and foveal ellipsoid zone disruptions. With conservative treatment, macular oedema resolved after one week, with gradual improvement in ellipsoid zone disruption after one month. However, microperimetry demonstrated residual localised relative scotomas at two months. Visual recovery was completed in four months. Differential diagnosis of letrozole-induced macular oedema was considered, but the acute onset and spontaneous improvement point against this diagnosis.

Conclusions: Whiplash macular oedema occurs after whiplash injury involving rapid acceleration-deceleration with or without direct trauma. It is important to have a high index of suspicion of indirect retinal injuries and rule out differential diagnoses. Spontaneous resolution of macular oedema occurs after 1-4 weeks, but complete or near-complete recovery of vision may lag behind up to 1-4 months due to resolving foveal ellipsoid zone disruptions. Our report is the first to show that residual localised scotomas can be demonstrated on microperimetry, which may be considered as a monitoring tool. Patient reassurance should be offered regarding the relatively benign recovery course.

Retina (Surgical)

Abstract No.: 206124

Panel No.: RUS-1076

A Case Report of Acute Anterior Chamber Hypopyon and Posterior Segment Occlusive Retinal Vasculitis Following Vitrectomy With Silicone Oil Tamponade

First Author: Qian GUI

Co-Author(s): Quanyong YI

Purpose: To report a rare case of acute aseptic anterior chamber hypopyon and posterior segment occlusive retinal vasculitis following vitrectomy with silicone oil tamponade.

Methods: A 59-year-old male presented with rhegmatogenous retinal detachment and macular hole for which pars plana 25G vitrectomy with silicone oil injection was done. Within 24 hours postoperatively, he developed acute anterior chamber hypopyon and occlusive retinal vasculitis. The patient was treated aggressively with intravenous dexamethasone and periocular injection of methylprednisolone acetate, resulting in complete resolution of hypopyon. All signs of vasculitis resolved over a period of three months after which the silicone oil was removed and the patient's vision stabilized at 2/20. There was no recurrence of hypopyon or vasculitis observed thereafter.

Results: The complications resolved after aggressive anti-inflammatory treatment, and the visual acuity remained stable without recurrence after silicone oil removal. This is a rare manifestation of silicone oil-related toxic anterior and posterior segment syndrome, which is of great reference value to ophthalmologists, helping to improve their understanding and management of rare postoperative inflammatory reactions.

Conclusions: Acute sterile inflammatory reactions involving both the anterior and posterior segments occur following vitrectomy with silicone oil tamponade. Silicone oil induced manifestation of acute toxic anterior and posterior segment syndrome is a rarely described entity. Early recognition and aggressive anti-inflammatory treatment are crucial for the healing outcome.

Abstract No.: 204019

Panel No.: RUS-1064

A Case of Persistent Retinal Detachment Following Foldable Capsular Buckle Surgery: Management and Outcome

First Author: Yuanfei ZHU

Co-Author(s): Tiejing ZHAO

Purpose: To describe a case of rhegmatogenous retinal detachment initially treated with a foldable capsular buckle (FCB), which was complicated by persistent subretinal fluid and recurrence, necessitating subsequent conversion to conventional scleral buckling.

Methods: We present the case of a 45-year-old female with a two-month history of metamorphopsia and visual field shadowing in the right eye. The patient had previously undergone FCB implantation accompanied by laser photocoagulation and C3F8 gas injection at an outside facility. Due to unresolved symptoms, she was referred to our clinic for further management. Diagnostic workup included multimodal retinal imaging with spectral-domain optical coherence tomography (OCT) and wide-field scanning laser ophthalmoscopy (SLO).

Results: Postoperative imaging demonstrated a diminished buckling effect, persistent subretinal fluid, and a new retinal break. Despite supplemental laser treatment and repeat gas injection, retinal re-detachment ensued. The patient, therefore, underwent surgical removal of the FCB, cryopexy, and placement of a conventional scleral buckle, which achieved anatomical success and functional visual improvement.

Conclusions: This case highlights that while FCB represents a minimally invasive option for repairing RRD, it may be limited by issues such as inadequate chorioretinal adhesion, regression of the buckling effect, or the presence of multiple retinal breaks. Conventional scleral buckling remains a dependable and effective technique for attaining durable retinal reattachment when temporary buckling procedures are unsuccessful.

Abstract No.: 203210

Panel No.: RUS-1058

A Novel Non-Inverted, Single-Layer ILM Flap Approach for Pediatric Macular Hole

First Author: Dian JIAO

Co-Author(s): Tian TIAN, Peiquan ZHAO

Purpose: Pediatric macular hole (MH), a rare condition affecting central vision in children, presents unique challenges in surgical treatment. This study aimed to test the effectiveness of a novel non-inverted, free single-layer internal limiting membrane (ILM) flap combined with sub-perfluorocarbon ophthalmic viscoelastic device injection fixation in treating pediatric MH.

Methods: A retrospective case series of 22 eyes with pediatric MH that underwent pars plana vitrectomy (PPV) combined with single-layer non-inverted ILM flap coverage. The main outcomes were best-corrected visual acuity (BCVA) and spectral domain optical coherence tomography (SD-OCT).

Results: The 22 patients (mean age: 11.2 ± 3.65 years) underwent either two-pedicle free (59.1%) or one-pedicle rotational (40.9%) ILM flap covering, with a median follow-up period of 4.15 (IQR, 1.70-8.12) months. BCVA improved significantly from 0.70 (IQR, 0.52-1.08) logMAR preoperatively to 0.52 (IQR, 0.49-0.70) logMAR postoperatively ($P = 0.0004$). All cases achieved successful MH closure, including 17 (77.3%) U-shaped closure, 3 (13.6%) V-shaped closure, and 2 (9.1%) flat closure, with no ILM flap dislocation.

Conclusions: The single-layer, non-inverted ILM flap covering technique demonstrates safety and efficacy in achieving MH closure and improving visual outcomes. Our findings provide new insights and directions for the treatment of pediatric MH.

Abstract No.: 206770

Panel No.: RUS-1083

Addressing the Dual Challenge: Temporary KPro-Assisted Posterior Segment Surgery With Concurrent Penetrating Keratoplasty

First Author: Nawazish SHAIKH

Co-Author(s): Neiwe LOMI, Pranita SAHAY

Purpose: To evaluate the anatomical and visual outcomes of temporary keratoprosthesis (TKP)-assisted vitreoretinal surgery combined with penetrating keratoplasty (PK) in eyes with coexisting corneal opacities and posterior segment pathologies.

Methods: A retrospective review was conducted at a tertiary eye care centre involving patients who underwent combined TKP-assisted pars plana vitrectomy and PK between January and June 2025. Clinical records were analysed for demographics, preoperative diagnoses, surgical indications, visual acuity, intraoperative findings, and postoperative outcomes. Surgical parameters included adequacy of intraoperative visualization, feasibility of posterior segment interventions, and final anatomical and functional outcomes.

Results: Six eyes of six patients were included. Indications were failed corneal graft with retinal detachment ($n=2$), corneal decompensation with dropped nucleus ($n=1$), corneal decompensation with IOL drop ($n=2$), and perforated corneal ulcer with endophthalmitis ($n=1$). All eyes had preoperative vision limited to hand movements close to the face. TKP provided a stable globe configuration and clear visualization, allowing complete vitrectomy and endolaser photocoagulation. ILM peeling was performed in 2 eyes, and scleral-fixated IOLs

were implanted in 2 eyes during the same sitting. Postoperatively, 5 of 6 patients achieved best-corrected visual acuity of at least 6/60, and anatomical success (retinal reattachment with clear graft) was achieved in all eyes.

Conclusions: TKP-assisted vitreoretinal surgery combined with PK provides adequate intraoperative visualization and enables the successful management of eyes with dual corneal and posterior segment pathology. This combined approach is effective for achieving favorable anatomical and functional outcomes in complex cases.

Abstract No.: 206385

Panel No.: RUS-1081

Anatomical and Functional Outcomes of Vitrectomy for Secondary Macular Holes

First Author: Vinod **KUMAR**

Co-Author(s): Rohan **CHAWLA**, Rajpal **VOHRA**

Purpose: To evaluate the anatomical and functional outcomes of vitrectomy for secondary macular holes (excluding trauma and high myopia).

Methods: This retrospective observational study included all eyes with secondary macular holes that underwent vitrectomy at a tertiary eye care centre in North India. Macular holes secondary to trauma and high myopia were excluded. In addition to patient demographics, preoperative and postoperative best-corrected visual acuity (BCVA), macular hole diameter (MHD), aetiology, type of surgical approach, and anatomical closure were assessed. Follow-up duration and incidence of second surgeries and postoperative complications were also recorded.

Results: A total of 28 eyes of 27 patients with mean age of 35 years were included in the study. The most common underlying causes were retinal degenerative (retinitis pigmentosa, x-linked retinoschisis, familial exudative vitreoretinopathy), retinal vascular (proliferative diabetic retinopathy, coat's disease, retinal vasculitis, venous occlusion, retinopathy of prematurity), and others (intravitreal cysticercosis, choroidal coloboma, circumscribed choroidal haemangioma, etc). Mean macular hole diameter was 733 microns. The mean preoperative BCVA improved from 0.15 to 0.33 (Snellen fraction) postoperatively at 3 months. Most patients underwent the inverted flap technique and achieved Type 1 closure. 3 eyes required a second surgery. Postoperatively, RPE atrophy and outer retinal lucency were noted in eight eyes, which were the main factors limiting the visual outcome.

Conclusions: Most secondary macular holes present with poorer visual acuity and are larger at presentation. While these close after vitrectomy and result in modest visual gain, the health of the underlying retinal pigment epithelium is a major visual-limiting factor.

Abstract No.: 203764

Panel No.: RUS-1061

Anterior Capsular Fibrosis: A Potential Clinical Indicator of Chronic Retinal Detachment in Mature Cataracts

First Author: Vinit **TANWAR**

Purpose: To report an observed association between a specific pattern of anterior capsular fibrosis and chronic retinal detachment (RD) in eyes with mature cataracts. The aim is to highlight this finding as a potential clinical clue for preoperative prognostication, particularly in resource-limited settings.

Methods: A retrospective, observational case series of three patients who presented with mature cataracts was conducted. Preoperative assessment included slit-lamp examination, intraocular pressure (IOP) measurement, and B-scan ultrasonography. The key finding investigated was a pattern of fibrotic wrinkling on the anterior lens capsule.

Results: All three patients presented with mature cataracts and a distinct pattern of anterior capsular fibrosis. Intraocular pressure was normal in all cases, and there were no overt signs of hypotony. In this small cohort, B-scan ultrasonography confirmed a chronic, total retinal detachment in each eye, correlating with the anterior segment finding.

Conclusions: The presence of anterior capsular fibrosis may be a useful indicator of underlying chronic RD in eyes with mature cataracts. While this finding is not definitive, its presence could prompt a higher index of suspicion for posterior pathology. Further studies with a larger case series are required to establish the predictive value of this observation.

Abstract No.: 206205

Panel No.: RUS-1077

Application of Multifocal Intraocular Lens Before and After Surgery for High Myopic Macular Hole: A Case Report

First Author: Weihong **ZHAO**

Co-Author(s): Tieying **ZHAO**, Yuanfei **ZHU**

Purpose: To investigate the indications for MIOL implantation following surgery for HMMH and the impact of MIOL on the performance of 27GPPV with ILM peeling for HMMH.

Methods: A case is presented with the following preoperative data: Vod:0.02 (-18.00 DS/-0.50 DC $\times$ 155 $^{\circ}$ $\rightarrow$ 0.15), AL 30.5 mm, OCT revealing a macular hole with a diameter of 610 μ m; Vos:0.02 (-17.25 DS/-0.25 DC $\times$ 80 $^{\circ}$ $\rightarrow$ 0.7), AL 30.8 mm. OD "27GPPV + epiretinal membrane and ILM peeling + gas tamponade". Six months postoperatively, cataract progression was observed in both eyes. OCT of the right eye showed a well-restored macular structure. The patient subsequently underwent "P/I (Zeiss 809)

“in the right eye, followed by “P/I (Zeiss 839)” in the left eye two weeks later. Two years later, the left eye experienced a decline in VA over one month. OCT showed a macular hole with a minimum diameter of 77 μ m and a base diameter of 209 μ m. The left eye then underwent “27GPPV + epiretinal membrane and ILM peeling + filtered air tamponade”.

Results: After combined HMMH and cataract surgery, the right eye achieved uncorrected distance, intermediate, and near VA of 0.8. The left eye attained 1.2 (distance), 1.0 (intermediate), and 1.0 (near) VA. Following the second HMMH surgery in the left eye using a plano-concave contact lens, uncorrected VA recovered to 1.0 within one week.

Conclusions: MIOL implantation is feasible in HMMH patients with restored macular microstructure post-vitreotomy, providing satisfactory full-range vision. ILM peeling in MIOL eyes can be effectively performed using plano-concave or biconcave contact lenses targeting the central 1 mm zone of the IOL.

Abstract No.: 201739

Panel No.: RUS-1053

Bleb-like Retinal Detachment in Aggressive ROP: Risk Factors, Treatment & Outcomes

First Author: Bhavik PANCHAL

Co-Author(s): Subhadra JALALI, Harshitha KANISSETTY, Tapas PADHI

Purpose: To analyse the risk factors, treatment strategies, and outcomes in eyes with bleb-like retinal detachment (BRD) in Aggressive Retinopathy of Prematurity (AROP).

Methods: We retrospectively reviewed 10 eyes of 5 infants with AROP presenting with BRD between March 2023 and February 2024. Data collected included gestational age, birth weight, systemic comorbidities, and risk factors. Serial fundus photographs were analysed. Treatment strategies were individualised; all cases received intravitreal bevacizumab (half adult dose) 5 days before surgery. Lens-sparing vitrectomy was performed by a single surgeon in eyes with significant traction, with the primary aim of reattaching the posterior pole and preventing progression to total retinal detachment.

Results: Mean gestational age was 30 weeks (range 28–34), mean birth weight 1.08 kg (1.0–1.4), and postmenstrual age at presentation 34 weeks. All infants were from low socioeconomic backgrounds with limited healthcare access, and all had a history of oxygen supplementation. Two required blood transfusions, and one survived septic shock. Traction >6 clock hours was present in all eyes. Eight eyes underwent vitrectomy, and complete posterior vitreous detachment could be achieved in only three of them. Two eyes were successfully managed with bevacizumab monotherapy, avoiding surgery or laser.

All eyes showed regression of plus disease within 1 day post-injection. Two eyes avoided surgery and laser after bevacizumab monotherapy. Mean follow-up was 5.4 months (1–8). One case had ROP recurrence and required laser.

Conclusions: AROP-BRD is linked to low birth weight, multiple risk factors, and poor socioeconomic status. Early anti-VEGF followed by timely vitrectomy offers favourable outcomes.

Abstract No.: 207074

Panel No.: RUS-1084

Choroidal Osteoma: A Case Series of Diverse Presentations

First Author: Apurva STHAPAK

Purpose: To illustrate the diverse clinical presentations of choroidal osteoma through a case series.

Methods: Three patients with choroidal osteoma were reviewed. Case 1 was asymptomatic, Case 2 presented with choroidal neovascular membrane (CNVM), and Case 3 exhibited central serous chorioretinopathy (CSCR). Clinical examinations, imaging studies, and treatment outcomes were analyzed.

Results: Case 1 showed a stable osteoma without visual impairment. Case 2 developed CNVM, managed with intravitreal anti-VEGF injections, leading to visual stabilization. Case 3 presented with CSCR and was monitored with spontaneous resolution.

Conclusions: Choroidal osteoma can present asymptotically or with complications like CNVM and CSCR. Early detection and appropriate management are crucial to preserving vision. Awareness of its varied presentations can aid clinicians in timely diagnosis and treatment, minimizing visual morbidity.

Abstract No.: 207153

Panel No.: RUS-1086

Clinical Characteristics, Effect of Adjuvant Intrasceral Amikacin, Surgical and Visual Outcomes post Scleral Deroofing in Fungal Scleritis

First Author: Nikita CHAUDHARY

Co-Author(s): Vishal SANJAY JADHAV

Purpose: To evaluate clinical features, the effect of adjuvant intrasceral amikacin, surgical and visual outcomes post-scleral deroofing in fungal scleritis.

Methods: This retrospective interventional study included patients with microbiologically confirmed fungal scleritis presenting to a tertiary eye care centre. Demographic data, predisposing factors, and clinical features were documented. All patients received standard antifungal therapy (topical and systemic) along with scleral deroofing and targeted intrasceral amikacin injections at the site of infection. Treatment

response, anatomical outcome, and complications were assessed over a minimum follow-up of 6 months.

Results: A total of 4 patients diagnosed with fungal scleritis were included. The most common predisposing factors were trauma with vegetative matter. A variety of causative isolated fungi included *Aspergillus*, *Scedosporium*, and *Colletotrichum* species. Resolution of scleral inflammation was achieved in 75% of cases with adjunctive intrascleral amikacin after around 3 months of follow-up. Visual improvement was limited, with final BCVA $\geq 6/36$ in 80% of patients. Minimal local adverse effects related to amikacin were noted, with no systemic toxicity.

Conclusions: Infective fungal scleritis is a severe and vision-threatening disease. It requires aggressive medical as well as surgical management for maintaining globe tectonicity and control of infection. We found adjunctive intrascleral amikacin, when combined with antifungal therapy, enhances local disease control and improves globe salvage rates.

Abstract No.: 203238

Panel No.: RUS-1057

Clinical Diagnosis and Treatment of Macular Hole in Children

First Author: Fang CHAI

Co-Author(s): Xiquan ZHAO

Purpose: To investigate the etiology distribution, clinical characteristics, and treatment options for macular holes in children, evaluate the efficacy and prognosis of different interventions, and provide a reference for clinical diagnosis and treatment.

Methods: A retrospective analysis of the clinical course of 1 case of pediatric macular hole was conducted, combined with a review of literature and clinical case data. This included: Etiology statistics: integrating traumatic causes (e.g., sports injuries, explosives), congenital diseases (e.g., X-linked retinoschisis, retinopathy of prematurity), idiopathic factors, etc.; Treatment strategies: comparing the efficacy of observation/follow-up, anti-inflammatory therapy, and vitrectomy (Page efficacy assessment: postoperative visual acuity, hole closure rate, and spontaneous closure time data).

Results: Etiology distribution: Trauma was predominant (80.4%), commonly from sports injuries (soccer/baseball), explosives (firecrackers), etc. Other causes included congenital anomalies (12.5%), inflammation (3.6%), and idiopathic factors (3.5%). 21 cases of traumatic holes closed spontaneously within 15-365 days (average 90 days), with visual acuity improving from logMAR 1.1 to 0.4. Holes with a diameter $\leq 360\mu\text{m}$ had a higher closure rate. The closure rate for vitrectomy combined with internal limiting membrane peeling reached 77.7%-100%. Postoperative average

visual acuity improved from logMAR 1.01 to 0.48, with an improvement rate $>85\%$.

Conclusions: Macular holes in children are primarily traumatic; the possibility of spontaneous closure is high. Surgical intervention (PPV + ILMP) is significantly effective for persistent holes, with notable visual improvement. Prognosis is closely related to etiology, hole size, and the presence of complications (e.g., macular detachment).

Abstract No.: 203573

Panel No.: RUS-1060

Clinical Features and Surgical Outcomes of Various Scleral Buckle Techniques in Rhegmatogenous Retinal Detachment

First Author: Aziz Jan BASHIR

Purpose: To evaluate the clinical features, primary anatomical Success, visual outcome, and complications in patients with rhegmatogenous retinal detachment (RRD) undergoing Scleral Buckle (SB) surgery.

Methods: Retrospective, Cross-Sectional, Interventional study of 466 eyes with RRD who underwent SB surgery by a single surgeon at a tertiary care hospital in Pakistan.

Results: The mean age was 38.98 ± 20.7 years with phakia ($n=367$, 78.8%). Total RRD ($n=222$, 47.6%), with mostly macula off status ($n=443$, 95.1%), was present. Round holes ($n=270$, 57.9%) and single breaks ($n=258$, 55.4%) were standard. Among the various types of buckles, 4-2 Band was the most commonly utilized. Our data found the SB surgery's primary success rate is 84.1 %. Detachment rate was significantly decreased in the consecutive years from 2016 to 2020 ($p<0.001$). The complication rate was 4.7 % ($n=22$), among which transiently raised IOP was the most common ($n=11$, 2.4%). No significant difference was found in the primary attachment rate in phakic, pseudophakic, and aphakic lens status ($p=0.5$) or buckle configuration ($p=0.3$). A significant difference was found among the types of buckle used ($p<0.05$), with 506 sponges having the maximum attachment rate ($n=95$, 93.1%) followed by the 4-2 band ($n=253$, 82.4%). There was a significant improvement in mean preoperative visual acuity from 1.52 ± 0.4 logMAR to postoperative 0.24 ± 0.10 logMAR ($p<0.001$).

Conclusions: Our study indicates that SB surgery is a safe procedure for RRD and has an excellent success rate.

Abstract No.: 203803

Panel No.: RUS-1062

Correlation Between Visual Acuity and Central Macular Thickness in Patients of Retinal Vein Occlusion Before and After Intravitreal Anti-VEGF Injection

First Author: Delvi SASWITA

Co-Author(s): Weni HELVINDA

Purpose: To present and analyze the correlation between visual acuity and central macular thickness in patients with retinal vein occlusions (RVO) before and after injection with anti-vascular endothelial growth factor (VEGF) agents.

Methods: This research is an analytic retrospective study based on medical records of patients with RVO who had been injected with intravitreal bevacizumab in January-December 2024. The total sampling technique was applied, thus including 6 respondents in the population as the research sample. Data were statistically analyzed using the Shapiro-Wilk test and the Paired T-test, with $p < 0,05$ considered significant.

Results: The results of this study were obtained from six eyes of 6 patients diagnosed with retinal vein occlusion with macular edema who received bevacizumab therapy. The mean visual acuity before therapy was $0.88 \log\text{MAR} \pm 0.48$ and decreased to $0.33 \log\text{MAR} \pm 0.27$ ($p=0.004$) after therapy. Meanwhile, the mean macular thickness before therapy was $497.16 \mu\text{m} \pm 78.89$ and decreased to $302.33 \mu\text{m} \pm 44.70$ ($p=0.002$) after therapy.

Conclusions: There was significant difference in the proportion of visual improvement and decrease macular thickness after Intravitreal bevacizumab injection.

Abstract No.: 205835

Panel No.: RUS-1074

Dislocated Intraocular Lens in a Microphthalmic Eye: What Next?

First Author: Rosshini KUMMARARAJ

Co-Author(s): Divyalakshmi KAIYOOR SURYA

Purpose: To report a case of successful management of a dislocated intraocular lens in a microphthalmic eye with chorioretinal coloboma, hypotony, and retinal detachment.

Methods: A 51-year-old female presented with diminution of vision in the right eye for three months with a history of cataract surgery done six years back. On examination, the best corrected visual acuity in the right eye was counting fingers close to the face, and in the left eye, 6/9. Anterior segment showed right eye microphthalmos with complete coloboma, Ida Mann type 1, with Aphakia, with total retinal detachment, with grade D Proliferative vitreoretinopathy. Intraocular pressure was unrecordable. The left eye showed

an incomplete coloboma, Ida Mann type 4, with pseudophakia. She underwent right eye 240 encirclage with vitrectomy, with intraocular lens explantation, with iris claw IOL, with 5000 centistoke silicon oil tamponade.

Results: Post operative day one Retina was on with intraocular pressure at 24mmHg. At one month follow up patient maintained a vision of counting fingers at one metre with retina being attached and maintained intraocular pressure.

Conclusions: Dislocated intraocular lens in a microphthalmic eye with chorioretinal coloboma with hypotony and retinal detachment pose a significant challenge. Meticulous planning helps in successful anatomical outcome.

Abstract No.: 204881

Panel No.: RUS-1069

Early Detection and Prompt Surgery Improve Outcome in Macula-On Retinal Detachment Associated with Posterior Vitreous Detachment: A Case Report

First Author: Ratna NOVIANTARI

Co-Author(s): Ari ANDAYANI, Gek Ayu KRISMAYOGI

Purpose: To report that early detection and prompt surgical intervention improve anatomical and visual outcomes in patients with posterior vitreous detachment leading to rhegmatogenous retinal detachment with macula on status.

Methods: We report a 51-year-old male who presented with sudden blurring and a shadow-like curtain in the right eye for one week. Visual acuity was 1/60 (right) and 2/60 (left), improving to 6/7.5 and 6/12 with correction, respectively. Fundus examination optic nerve head is round, well-defined, the cup disk ratio 0,3, the artery to vein ratio 2/3 with retinal tear at 11 o'clock and retinal detachment in the superotemporal region with macula on status, confirmed by OCT showing Posterior Vitreous Detachment (PVD). The patient underwent pars plana vitrectomy with C3F8 gas tamponade.

Results: Postoperatively, serial evaluations demonstrated progressive anatomical recovery with attached retina and barely visible laser marks, although transient intraocular pressure elevation was observed. Visual acuity gradually improved to 6/7.5 with optimal correction, accompanied by a reduction of intraocular gas volume and resolution of retinal detachment.

Conclusions: This case highlights the importance of early detection and prompt surgical intervention in PVD-related Rhegmatogenous Retinal Detachment (RRD), especially in middle-aged patients presenting with acute visual symptoms. Vitrectomy with gas tamponade remains an effective modality to achieve retinal reattachment and visual rehabilitation. Continuous follow-up is essential to monitor intraocular

pressure fluctuations and ensure long-term anatomical and functional success.

Abstract No.: 206326

Panel No.: RUS-1079

Early Versus Delayed Pars Plana Vitrectomy for Complications of Proliferative Diabetic Retinopathy: A Systematic Review and Meta-Analysis

First Author: Chi Kit YAN

Co-Author(s): Tsveta IVANOVA, Assad JALIL, Aimee LLOYD

Purpose: The optimal timing of pars plana vitrectomy (PPV) in proliferative diabetic retinopathy (PDR) remains uncertain. Early surgery may accelerate recovery and reduce complications, yet risks and variable evidence have prevented consensus. This review aimed to evaluate visual and functional outcomes of early versus delayed PPV.

Methods: Following PRISMA guidelines (PROSPERO CRD420251122358), MEDLINE, Embase, CENTRAL, and trial registries were searched to July 2025. Twelve eligible studies were included: randomised trials, observational cohorts, and methodological/economic analyses. Best-corrected visual acuity (BCVA) was analysed on the logMAR scale. Comparative studies of early versus delayed PPV were pooled using DerSimonian–Laird random-effects meta-analysis of mean differences (MD). Early PPV single-arm cohorts were pooled separately. Dichotomous outcomes from the Diabetic Retinopathy Vitrectomy Study (DRVS) were summarised as risk ratios. Qualitative data were synthesised using a thematic framework.

Results: Two comparative studies yielded a pooled MD favouring early PPV but not statistically significant (MD -0.12 logMAR; 95% CI -0.42 to 0.19 ; $p=0.45$; $I^2=84\%$). Three early-PPV cohorts demonstrated a typical 12-month BCVA of 0.41 logMAR (95% CI 0.36 – 0.47 ; $I^2=0\%$). DRVS reported a higher proportion achieving logMAR ≤ 0.30 with early PPV (RR 1.67 ; 95% CI 1.20 – 2.31). Qualitative findings highlighted faster functional recovery, reduced treatment burden, and improved confidence with modern micro-incision techniques, balanced against perceived surgical risk.

Conclusions: Evidence trends toward early PPV delivering earlier or superior visual recovery, with typical post-operative vision around 0.4 – 0.5 logMAR. However, heterogeneity and sparse randomised data limit certainty. Adequately powered RCTs incorporating patient-reported and economic outcomes are needed to define optimal timing.

Abstract No.: 206096

Panel No.: RUS-1075

Familial Exudative Vitreoretinopathy in a Young Male: A Case Report

First Author: Nurita TRI WIJAYANTI

Co-Author(s): Wimbo SASONO, Ima YUSTIARINI

Purpose: To present a rare case of Familial Exudative Vitreoretinopathy (FEVR) in a young male patient, highlighting clinical findings, diagnostic work-up, and management to prevent progressive retinal detachment.

Methods: A case report of a 13-year-old boy presenting with decreased vision. Ophthalmic examination included best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, and indirect ophthalmoscopy. Fundus photography and optical coherence tomography (OCT) were used to assess peripheral vascular abnormalities and macular involvement. Family members underwent fundus screening to evaluate hereditary patterns.

Results: BCVA of the right eye $20/400$, while BCVA of the left eye was $20/50$. Fundus examination on the right eye revealed peripheral retinal avascular zones, tractional retinal detachment with macular ectopia, and retinal folds. The left eye revealed peripheral avascular retina and macular dragging. OCT of the left eye demonstrated a macular hole. Family screening revealed no retinal abnormalities. For the treatment, we elected to perform an encircling buckle procedure on the right eye.

Conclusions: FEVR is a rare inherited vitreoretinal disorder. Multimodal imaging and family history are critical for diagnosis, while timely intervention can preserve visual function. Screening of family members is strongly recommended to allow early detection and management in affected relatives. We elected to proceed with this surgical technique as a preventive intervention to reduce the risk of progression toward tractional retinal detachment.

Abstract No.: 207119

Panel No.: RUS-1085

Foveal Bump as a Predictor of Early Postoperative Visual Outcome in Lamellar Macular Hole

First Author: Rokuki KIYOSAWA

Co-Author(s): Motohiro KAMEI, Kotaro TUBOI, Iori WADA

Purpose: To investigate whether the presence of a foveal bump in lamellar macular holes (LMH) is associated with preoperative visual acuity and whether this difference persists postoperatively.

Methods: A foveal bump was defined as a central bulge of retinal tissue nearly surrounded by foveal cavities. We retrospectively reviewed LMH patients who underwent vitrectomy at Aichi Medical University.

Hospital. Eyes were divided into bump-positive and bump-negative groups. Age, axial length, best-corrected visual acuity (BCVA, logMAR), central foveal thickness (CFT), and ellipsoid zone (EZ)/external limiting membrane (ELM) continuity (“continuous,” “indistinct,” or “disrupted”) were assessed preoperatively and at 1 and 3 months postoperatively.

Results: Twenty-six eyes (25 patients) were analyzed: 5 with a foveal bump and 21 without. Preoperative BCVA was significantly worse in the bump-positive group (0.46 ± 0.13 vs. 0.26 ± 0.19 , $p=0.023$). This difference persisted at 1 month (0.30 ± 0.12 vs. 0.04 ± 0.08 , $p=0.048$) and showed a trend at 3 months. Visual improvement, age, axial length, CFT, EZ, and ELM did not differ between groups.

Conclusions: Eyes with a foveal bump showed worse BCVA preoperatively and at 1 month. The presence of a foveal bump appears to be associated with poorer baseline vision and may predict early postoperative visual outcome.

Abstract No.: 205404

Panel No.: RUS-1071

From Perception of Light to 6/12: A Rare Case of Sympathetic Ophthalmia with Visual Recovery

First Author: Swati SAHU

Co-Author(s): Rahul SAHU

Purpose: To present a rare case of sympathetic ophthalmia with exudative retinal detachment and severe vitritis, and to emphasize the importance of early systemic and intravitreal corticosteroid and immunomodulatory therapy for visual recovery.

Methods: A 36-year-old female presented with bilateral diminution of vision, reporting sudden loss of vision in the right eye over two months and a history of trauma to the left eye. Examination of the right eye revealed intraocular pressure (IOP) of 4 mmHg, keratic precipitates, iris neovascularization, posterior synechiae, dense vitritis, and exudative retinal detachment. The left eye showed a healed perforated corneal ulcer. Based on clinical findings, a diagnosis of sympathetic ophthalmia was established. The patient received three doses of intravenous methylprednisolone (1 mg/kg), followed by tapering oral prednisolone. She was co-managed with a rheumatologist and commenced on azathioprine. Subsequently, an intravitreal dexamethasone implant (Ozurdex) was administered.

Results: Initial intravenous therapy led to improvement of vision from perception of light to counting fingers, with reduction in vitritis. At one-month follow-up, visual acuity improved to 6/60, IOP normalized to 14 mmHg, and optical coherence tomography (OCT) showed partial resolution of exudative retinal detachment with subretinal fibrosis. With continued

oral steroids, immunomodulators, and intravitreal Ozurdex, vision further improved to 6/12, accompanied by complete resolution of subretinal fluid and detachment on OCT. The patient remained stable on low-dose oral steroids and azathioprine at subsequent follow-up

Conclusions: Early diagnosis and prompt treatment of sympathetic ophthalmia. Aggressive therapy with systemic corticosteroids, intravitreal dexamethasone, and long-term immunomodulators can restore functional vision, even in monocular patients.

Abstract No.: 205719

Panel No.: RUS-1073

From Slippage to Stability: Video-Based Analysis of the Yamane Technique Learning Curve

First Author: Stefenie

Co-Author(s): Cindy Boru SEMBIRING

Purpose: Managing eyes with insufficient capsular support remains a surgical challenge. The Yamane flanged intrascleral fixation has become a popular option because it provides IOL placement in a physiological posterior chamber position. However, its learning curve remains underreported. This study evaluated the learning curve of Yamane fixation by documenting intraoperative events and postoperative outcomes from the perspective of a vitreoretinal surgeon.

Methods: Retrospective study of 24 eyes (24 patients) undergoing Yamane scleral-fixed IOL implantation at SMEC Eye Hospital (Nov 2024–Feb 2025). All surgeries were performed by a single vitreoretinal surgeon. Surgical videos were reviewed with a structured checklist to record intraoperative events. Postoperative outcomes (UCVA, BCVA, refraction, and IOP) were assessed at 1 week, 1 month, and at the last follow-up. Early and late complications were analyzed.

Results: Indications included aphakia (25%), dislocated IOL (25%), dislocated nucleus (20.8%), posterior capsule rupture (4.2%), subluxated IOL (8.3%), and subluxated nucleus (16.7%). Intraoperative events comprised broken haptic (4%), haptic slippage (21%), scleral re-tunneling (33%), vitreous hemorrhage (8%) and suprachoroidal hemorrhage (4%). At final follow-up (median 7 months, range 1–10), median UCVA improved from logMAR 1.48 (range 0.54–2.48) preoperatively to 0.54 (range 0.18–1.78) ($p<0.001$). Early complications included optic capture (4%) and one suprachoroidal hemorrhage requiring drainage with poor final vision (1/60). Late complications included IOL tilt (4%, BCVA 20/20) and macular OCT abnormalities in 5 eyes (23%). No retinal detachment, glaucoma, endophthalmitis, or bullous keratopathy occurred.

Conclusions: The Yamane technique can be performed safely by vitreoretinal surgeons, though the early learning phase carries intraoperative challenges. Structured video-based assessment provides an objective means of documenting the learning curve and may support surgical training and competency development.

Abstract No.: 206351

Panel No.: RUS-1082

Full-Thickness Laser-Induced Macular Hole From a Semiconductor Laser Cleaner

First Author: Jose Antonio **DE GUZMAN**

Co-Author(s): Albert **BROMEIO**, Marc Alfred **MANGAHAS**

Purpose: Ocular injury may result from laser devices used in non-medical settings represent a potentially vision-threatening occupational hazard. We report the diagnosis and management of a rare case of a macular hole secondary to injury from a semiconductor laser.

Methods: Case report.

Results: A 28-year-old male factory worker presented with sudden blurring of vision, reported as the sensation of "bubbles" in the left eye immediately after accidental exposure to a handheld laser used to clean metal probes for semiconductors. The laser had a wavelength of 1064 nm and a pulse energy of 800 mJ. BCVA was 20/125 on the affected eye. Initial examination revealed a discrete hypopigmented patch at the fovea. OCT showed subfoveal disruption of the RPE and disorganization of the overlying retinal layers. The patient was initially managed conservatively. At 2 months, OCT revealed development of a full-thickness macular hole with subfoveal hyperreflectivity from RPE atrophic changes with a widest diameter of 404 μ m. Pars plana vitrectomy with internal limiting membrane peeling and C3F8 tamponade was done. Postoperatively, closure of the macular hole was observed, and BCVA was at 20/32, possibly owing to the limited damage to the RPE and photoreceptor layer.

Conclusions: Accidental retinal injury from laser devices can result in significant vision loss. Laser-induced macular holes can be managed with vitrectomy with anatomic closure, but visual prognosis is affected by the degree of sustained RPE and photoreceptor damage. Prevention with the use of safety goggles should be advised.

Abstract No.: 201637

Panel No.: RUS-1052

Gene Therapy for Neovascular Age-Related Macular Degeneration by Suprachoroidal Delivery of KH658: a Phase I Study (NCT06458595)

First Author: Hua **YAN**

Co-Author(s): Xiao **KE**

Purpose: KH658 is a gene therapy drug administered by suprachoroidal injection, aimed to treat the patient with neovascular age-related macular degeneration (nAMD). A multicenter, open-label, dose-escalating, phase I clinical study in China was designed to explore the safety and tolerability of suprachoroidal injection of KH658 in participants with nAMD in four cohorts.

Methods: The 36-week data of safety and tolerability of cohort 1 (5.0×10^{11} vg/eye, n=3), 28-week data of cohort 2 (1.0×10^{12} vg/eye, n=3), 12-week data of cohort 3 (2.0×10^{12} vg/eye, n=3), and 4-week data of cohort 4 (4.0×10^{12} vg/eye, n=3) post KH658 administration were analyzed.

Results: No dose-limiting toxicity (DLT) was observed. No serious adverse events (AEs) were reported. Common adverse events (>10% AEs) included conjunctival haemorrhage (25%), conjunctivitis (25%), conjunctival hyperaemia (16.67%), scleral hyperaemia (16.67%), eye pain (16.67%), vitreous floaters (16.67%). All the AEs were reported as mild, most of the AEs were not determined to be related to KH658 and resolved within days with standard treatment.

Conclusions: KH658 is well tolerated to date in four cohorts at dose levels of 5.0×10^{11} vg/eye to 4.0×10^{12} vg/eye.

Abstract No.: 202411

Panel No.: RUS-1056

Haptoglobin Regulates Retinal Vascular Barrier and Mediates Inflammatory Response to Promote the Progression of Diabetic Macular Edema

First Author: Yue **ZHANG**

Purpose: Diabetic macular edema (DME) is a major complication of diabetic retinopathy (DR), severely affecting patients' visual function and quality of life. This study aims to analyze the proteomic profile of aqueous humor from DME patients to identify key regulatory proteins and explore their underlying mechanisms, providing new therapeutic targets for DME.

Methods: Aqueous humor samples were collected from 7 patients with non-proliferative diabetic retinopathy (NPDR) and 7 patients with DME. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) was used for proteomic analysis to identify differentially expressed proteins. Protein-protein

interaction analysis was performed using the STRING database, and the expression of the key protein, haptoglobin (HP), was validated using ELISA, ROC curve analysis, and the GEO database. A streptozotocin (STZ)-induced diabetic rat model was established, and HP2-2 expression was downregulated via intravitreal injection of lentivirus Lv-shHP.

Results: Proteomic analysis identified 425 quantifiable proteins, with 84 showing significant differences between DME and NPDR groups. HP, as a hub protein, was significantly upregulated in the aqueous humor of DME patients ($p < 0.05$). ROC curve analysis demonstrated high diagnostic accuracy of HP for DME (AUC = 0.9863, $p < 0.0001$). In the STZ-DR rat model, downregulation of HP2-2 significantly improved retinal vascular leakage.

Conclusions: HP is significantly upregulated in the aqueous humor of DME patients and the retinas of STZ-DR rats, potentially participating in retinal inflammatory responses and vascular barrier dysfunction through the HMGB1 signaling pathway. This study provides new theoretical insights for personalized treatment of DME.

Abstract No.: 204205

Panel No.: RUS-1066

Macular Buckling – A Review of Indications, Types, and Outcomes

First Author: Ye **LI**

Co-Author(s): Hung Da **CHOU**, Stanley **POH**, Gavin **TAN**, Andrew **TSAI**, Pei Chang **WU**

Purpose: In the rising myopic epidemic, there is a need to improve surgical outcomes for the treatment of the sequelae of pathological myopia. Macular buckling (MB) is an increasingly important surgical technique for managing such complex posterior pole pathologies, including myopic traction maculopathy, macular hole retinal detachment, and optic disc pit maculopathy. In this review, we aim to outline the current state of MB, including its evolution, indications, types, and the utility of multimodal imaging.

Methods: A comprehensive review was conducted across Pubmed, Medline, and Embase using 'macular buckling', 'myopic traction maculopathy', 'macular hole retinal detachment' with Boolean operators.

Results: Since its initial introduction in 1957, MB techniques and materials have undergone exponential evolution over the past few decades. Twelve techniques were identified for MB, including Ando Plomb, Illuminated Ando Plomb, T-Shaped buckle, L-shaped buckle, NPB, adjustable macular buckle, snail-tipped explant, three-armed silicone capsule, wristwatch buckle, 3D custom-printed buckle, donor sclera, and Gore-Tex vascular graft. The main indications for MB included myopic foveoschisis, macular hole with or without retinal detachment, either as a primary procedure or in conjunction

with vitrectomy. Multimodal imaging is necessary to optimise MB placement, anatomical, and functional outcomes.

Conclusions: The use of MB, either as primary treatment or adjunct to vitrectomy, offers satisfactory outcomes for the management of myopic macular pathologies, particularly for patients with a posterior staphyloma component. Standardisation of MB techniques and devices should be further developed. The role of MB in the treatment paradigm of these condition needs to be better defined.

Abstract No.: 204791

Panel No.: RUS-1068

Macular Hole Surgery Without Post-Operative Posturing – a Comparative Study

First Author: Rachel Ka Ying **CHEUNG**

Co-Author(s): Chi Lik **AU**, Shing Yee Steffi **CHONG**, Po Lin **LEOW**, Ting **WANG**

Purpose: The aim of this study is to evaluate the anatomical success and safety of full-thickness macular hole (FTMH) closure without post-operative posturing compared to post-operative prone posturing.

Methods: This is a multicenter, multi-surgeon, retrospective cohort study of all idiopathic FTMH patients who underwent pars plana vitrectomy (PPV) with internal limited membrane (ILM) peeling with gas tamponade in 2024-2025 with at least 3-month follow-up data. The primary outcome was the rate of FTMH closure without post-operative prone posturing compared to prone posturing. Secondary outcomes included safety outcomes and surgical outcomes, including visual acuity and central macular thickness on optical coherence tomography (OCT).

Results: Twenty-six eyes of 26 patients were included, of which 11 eyes (42.3%) had no post-op posturing, and 15 eyes (57.7%) had post-operative prone posturing. The rate of macular hole closure was similar – 9 eyes (81.82%) in the non-posturing group compared to 11 eyes (73.3%) in the posturing group ($p > 0.9999$). The post-operative visual acuity in the non-posturing group was better than the prone posturing group at 3 months (0.207 vs 0.205) and 6 months (0.217 vs 0.144), although not statistically significant. There were no statistically significant differences in ILM peel or ILM flap technique or type of gas tamponade on the rate of closure.

Conclusions: Macular hole surgery without postoperative posturing could achieve the same anatomical success rates as cases with postoperative prone posturing, whilst avoiding the physical and psychosocial complications associated with prone posturing. Further studies and randomised controlled trial are needed to further investigate the functional and visual benefit to patients.

Abstract No.: 206283**Panel No.: RUS-1078**

Macular Holes Following Pars Plana Vitrectomy: Observation of Conservative and Surgical Treatment Efficacy

*First Author: Tiewing ZHAO**Co-Author(s): Weihong ZHAO, Yuanfei ZHU*

Purpose: To analyze and summarize the characteristics and treatment efficacy of macular holes following PPV and to provide a theoretical and practical basis for research on the pathogenesis, progression, and management of such macular holes.

Methods: A retrospective case series analysis was conducted to investigate the characteristics, progression, and spontaneous healing time of macular holes after PPV. Surgical treatment methods and their outcomes were observed.

Results: Five cases: 2 cases occurred following silicone oil removal combined with P/I after initial PPV for RD. One RD case had an undetectable macular area preoperatively, and OCT revealed a macular hole one week after PPV with fluid-air exchange and scleral buckling. One case with vitreous hemorrhage showed normal macular structure on preoperative OCT, but one day after PPV revealed a foveal neuroepithelial defect with an intact ILM. One case occurred 13 months after PPV for high myopia with vitreomacular traction. Spontaneous closure occurred in two macular holes, with one case reopening one year after initial closure. Four cases were accompanied by a significant epiretinal membrane. Four patients underwent 27G minimally invasive PPV with epiretinal membrane and ILM peeling plus gas tamponade, resulting in successful macular hole closure. Postoperative visual acuity recovered to 0.6–1.0.

Conclusions: Both immediate and long-term postoperative macular holes after PPV are attributed to centrifugal tractional forces. The mechanism of immediate-onset holes resembles that of traumatic macular holes and they tend to close spontaneously. Long-term postoperative holes require epiretinal membrane and ILM peeling surgery to relieve traction and promote healing, leading to favorable visual function recovery.

Abstract No.: 201282**Panel No.: RUS-1051**

Novel 80/20 PFCL-Silicone Oil Sandwich Tamponade for Complex Retinal Detachments

*First Author: Obuli Ramachandran NANDHAKUMAR**Co-Author(s): Gauri KHARE, Kritika SINGH, Lalit VERMA*

Purpose: Evaluate the safety and efficacy of innovative 80% PFCL with 20% silicone oil sandwich tamponade in staged vitreoretinal surgery for complex retinal

detachments, combining PFCL's retinal flattening power with silicone oil's protective barrier.

Methods: Retrospective study of 32 consecutive eyes with complex retinal detachments (chronic RD >1 month, multiple/inferior breaks, failed surgery, severe PVR). Stage 1: vitrectomy with 80% PFCL injection followed by 20% silicone oil creating sandwich tamponade; 14-day supine positioning. Stage 2: PFCL removal with complete silicone oil fill. Mean follow-up: 8 months. OCT and ERG assessed retinal integrity.

Results: Primary anatomical success: 30/32 eyes (93.75%) with 2 redetachments salvaged surgically. Mean BCVA improved from logMAR 2.1±0.4 to 0.82±0.35 ($p<0.001$). 22 eyes (68.75%) gained ≥3 lines; 15 eyes (46.9%) achieved ≥20/200 vision. No PFCL-related retinal toxicity on OCT/ERG. Silicone oil barrier prevented direct PFCL-retina contact in all cases. Complications: transient IOP elevation (15.6%), cataract progression in phakic eyes (66.7%). Patient compliance with supine positioning: 100% vs. historical 30% for prone positioning.

Conclusions: This novel sandwich tamponade represents a paradigm shift, preventing PFCL toxicity while maintaining superior tamponade effect. Excellent anatomical and functional outcomes with enhanced patient comfort make this technique a significant advancement for complex retinal detachments.

Abstract No.: 204778**Panel No.: RUS-1067**

Peeling Back the Layers: X-Linked Retinoschisis Presenting as Retinal Detachment in a Young Child

*First Author: Pauline Andrea WONG**Co-Author(s): Danilo CONSTANTINO*

Purpose: To report a case of X-linked retinoschisis that was diagnosed as retinal detachment along with its clinical features and management.

Methods: This is a case report of X-linked retinoschisis in a child presenting with leukocoria and initially diagnosed with retinal detachment.

Results: A two-year-old Filipino male presented with leukocoria in the left eye. He had no history of trauma or other systemic diseases. Birth, prenatal history, and family history were unremarkable. On B-scan ultrasonography of the same eye, a concurrent retinal detachment was noted. Pars plana vitrectomy was performed on the left eye, wherein chronic traction and presumed exudative retinal detachment with thick subretinal fibrosis were noted intraoperatively. Examination of the right eye revealed bullous retinoschisis around the vascular arcades. Due to the aggressive disease course in the left eye, a prophylactic barrier laser indirect ophthalmoscopy was performed on the right eye. A retinal dystrophy panel was performed, which revealed a hemizygous mutation for

the RS1 gene. Macular optical coherence tomography of the right eye showed macular retinoschisis. At 5 years of age, the best-corrected vision of the right eye is 20/30, and the left eye is hand motion. There is no recurrence of retinal detachment in both eyes three years post-operation.

Conclusions: Retinal detachment in a 2-year-old child is uncommon, and etiologies such as X-linked retinoschisis should be considered when evaluating vitreoretinal pathology in this age group. This study shows that prophylactic laser photocoagulation can be considered for young children with monocular status. Early recognition is essential to avoid unnecessary intervention and ensure timely genetic counseling.

Abstract No.: 202878

Postoperative Outcomes and Prognostic Factors of High Myopia Epiretinal Membrane Associated with Retinoschisis After Vitrectomy

First Author: Xiaohan YANG

Co-Author(s): Xiao FENG, Wu LIU

Purpose: To analyze the impact of retinoschisis on the recovery of macular configuration and visual acuity following ERM removal in eyes with HM and to explore the prognostic factors.

Methods: A retrospective study of 73 consecutive patients with HM-ERM who underwent PPV with ERM peeling. According to the optical coherence tomography images, eyes were classified into 4 groups: group A without retinoschisis, group B with outer retinoschisis, group C with inner retinoschisis, and group D with both inner and outer retinoschisis.

Results: In Groups A, B, C, and D, there were 17, 21, 22, and 16 eyes, respectively. Retinoschisis of 44 eyes (74.6%) disappeared postoperatively, including 11 eyes in group B, 20 in group C, and 8 in group D. No correlation was found between retinoschisis resolution and baseline factors. The mean best-corrected visual acuity (BCVA) significantly improved at the final follow-up ($P < 0.001$). The final BCVA was associated with baseline BCVA ($P=0.001$), the presence of epiretinal proliferation preoperatively ($P=0.014$), and the postoperative integrity of the ellipsoid zone (EZ) ($P=0.001$) and interdigitation zone (IZ) ($P=0.008$).

Conclusions: After surgery, the inner retinoschisis usually resolved completely. Retinoschisis was not the main factor influencing final BCVA. Preoperative BCVA and disruption of EZ and IZ were associated with good visual recovery in long-term follow-up.

Abstract No.: 205614

Panel No.: RUS-1072

Preserving Ocular Structural Integrity by Prompt Surgical Intervention in a Post-Traumatic Case

First Author: Sundaram NATARAJAN

Co-Author(s): Pac Cristina PATRICIA

Purpose: To report a case that best illustrates the need for a prompt and complex approach in treating post-traumatic cases in order to achieve the best long-term outcome.

Methods: A 12-year-old girl presented with a corneal laceration, scleral wound, and traumatic cataract after being accidentally struck by a stone. A corneoscleral tear suture, anterior chamber (AC) reformation, and intravitreal antibiotic injection had been performed one week earlier. Biomicroscopic examination revealed an irregularly shaped cornea due to multiple sutures, a flat AC, and a traumatic intumescent cataract. Ultrasound B-scan showed an echo-free vitreous cavity with an attached retina. Visual acuity was limited to hand-movement perception. Surgical Technique: Corneal resuturing, restoration of the AC with removal of prolapsed vitreous, synechiolysis, lensectomy, and 25-gauge pars plana vitrectomy under general anesthesia were performed.

Results: A secure corneal wound with no leakage and a stable anterior chamber was achieved. The eye was left aphakic with a stable posterior segment. The rate of complications (inflammatory, infectious, and retinal post-traumatic) was significantly decreased. Visual acuity improved from hand-movement perception to 2/60 within a few months, despite corneal opacification.

Conclusions: By performing all the necessary procedures as early as possible, even under limited visualization, ocular structural integrity was preserved, the rate of retinal complications was reduced, and globe stability was achieved prior to corneal opacification. A future keratoplasty combined with a scleral-fixated intraocular lens could significantly improve the patient's visual performance.

Abstract No.: 207240

Panel No.: RUS-1087

Retinal Displacement and Functional Outcome After Pars Plana Vitrectomy for Primary Rhegmatogenous Retinal Detachment

First Author: Mei Kwan YIU

Co-Author(s): Marten BRELEN, Mary HO, Andrew MAK, Alvin YOUNG

Purpose: To study the incidence and associated factors of retinal displacement, and the consequential functional outcomes with the presence of retinal

displacement after standard pars plana vitrectomy with internal tamponade.

Methods: This is a prospective observational study. Patients suffering from primary rhegmatogenous retinal detachment pending pars plana vitrectomy would be identified from the operation list and clinical records from June 2023 to Apr 2024. Postoperative functional outcomes, including visual acuity, retinal displacement by fundus autofluorescence, grading of metamorphopsia by M-CHARTS Score, and macular sensitivity by microperimetry, were assessed.

Results: A total of 30 eyes were included in the study. Retinal displacement is seen in 13.3% of the eyes. All cases with retinal displacement were presented with macula off temporal or inferior retinal detachment. The mean age of the cases with retinal displacement was 65.0 ± 8.7 . They had longer symptom to operation time (45.3 ± 65.6 days, $p=0.90$), poorer preoperative visual acuity (1.2 ± 0.6 logMAR, $p=0.96$), more severe postoperative metamorphopsia (M-CHARTS Score vertical $1.1^\circ \pm 0.9$, $p=0.36$; horizontal $1.1^\circ \pm 0.9$, $p=0.24$), and reduced macular sensitivity on microperimetry ($p=0.37$). Retinal displacement was not associated with the location of retinal detachment (inferior, superior, or temporal, $p=0.36$), the use of intraoperative adjuncts, especially perfluorocarbon liquid ($p=1.0$), types of internal tamponade ($p=0.45$), or postoperative visual acuity ($p=0.97$).

Conclusions: Retinal displacement is not uncommon after surgical repair of primary retinal detachment. From our study, it was related to longer symptom duration from presentation to operation time, and lower baseline preoperative visual acuity; and it would lead to more severe postoperative metamorphopsia and reduced macular sensitivity.

Abstract No.: 207420

Panel No.: RUS-1089

Scleral-Fixated Black Diaphragm Intraocular Lens in Traumatic and Congenital Aniridia: Long-Term Visual and Structural Outcomes

First Author: Raj Shri HIRAWAT

Co-Author(s): Gulam Ali KAMDAR

Purpose: To evaluate intervention rates and visual acuity improvement. To observe intraoperative and long-term postoperative complication rates.

Methods: Consecutive eyes with severe ocular trauma and congenital aniridia needing posterior segment surgery followed by rehabilitation procedures are reviewed from 2017 to 2023. All traumatic eyes underwent primary globe repair after injury and secondary surgeries if needed, before planning for aniridia Intraocular lens (IOL) implantation. Complete vitrectomy with suture fixation of 'QV Aniridia IOL' (Rigid, PMMA-Lens; care group; Gujarat; India) was

performed in all eyes and followed up for a minimum of 5 years.

Results: Total 14 eyes of 14 patients underwent intervention, and had follow-ups ranging from 36 to 72 months. Among them, 3 eyes had endophthalmitis, 3 vitreous hemorrhage, and 4 retinal detachment at the time of presentation. Average 1.2 interventions before and 0.5 interventions post IOL implantation was done. Five eyes had simultaneous IOL implantation. All traumatic eyes had light perception vision and improved to a mean Best corrected visual acuity (BCVA) of 6/18 Snellen lines. Five out of 14 eyes needed anti-glaucoma medication to control intraocular pressure. No intraocular inflammation persisted beyond 6 weeks.

Conclusions: Post IOL implantation interventions were insignificant, favouring Aniridia IOL in severely traumatised as well as in congenital eyes. Post-op inflammation is insignificant, and secondary glaucoma can be managed conservatively without compromising outcomes. Despite these encouraging findings, we would advise caution in careful patient selection and close follow-ups to manage postoperative vision-threatening complications. To our knowledge, this is the first single-surgeon case series from India.

Abstract No.: 207400

Panel No.: RUS-1088

Scleral-Fixated Toric Intraocular Lenses: A Novel Approach for Post-Traumatic Astigmatism and Aphakia

First Author: Raj Shri HIRAWAT

Co-Author(s): Gulam Ali KAMDAR

Purpose: To describe a novel idea and report visual outcome after suture-fixation of a single-piece toric Intraocular lens (IOL) for managing traumatic aphakia with concurrent corneal astigmatism.

Methods: The consecutive eyes that had high corneal astigmatism secondary to corneal repair scar or high regular corneal astigmatism with poor or no capsular bag support are selected for toric IOL placement. The toric axis, IOL power calculation, incision site, incision type, and position of IOL placement are all documented using an online toric calculator. EnVista Toric IOL, having fenestration at the optic-haptic junction on either side, is used for suture fixation. 4-point scleral fixation done using 10-0 polypropylene or Gore-Tex suture. Patient followed up on day 1, 7, 28, 3 months, 6 months, and 1 year. Postoperative UBM was done to look for tilt or subluxation.

Results: A total of seven patients underwent scleral suture fixation of Toric IOL. The mean age: 34.2 years. Pre-op mean Uncorrected and Best corrected visual acuity were: 1.95, 0.74 LogMAR, respectively; mean astigmatism: 4.57 D. Post-op Uncorrected Visual Acuity (UCVA): 0.356, Best Corrected Visual Acuity (BCVA):

0.192 LogMAR; cylinder reduced to 1.00 D. No IOL tilt/subluxation seen in 6–40 months follow-up.

Conclusions: Scleral fixation of toric IOLs is a novel, stable solution for post-trauma aphakia with astigmatism. Toric IOLs are conventionally implanted in the bag. We report the first Indian series using scleral fixation in post-trauma eyes with astigmatism, improving UCVA and BCVA. Surgeons may adapt it using standard IOLs and familiar suturing, offering a practical solution in challenging cases.

Abstract No.: 201951

Panel No.: RUS-1054

Seasonality of Adult Idiopathic Rhegmatogenous Retinal Detachment: 10-Year Data From Two Tertiary Public Hospitals

First Author: Chun On LEE

Co-Author(s): Chi Lik AU, Po Lin LEOW

Purpose: Seasonality of rhegmatogenous retinal detachment (RRD) with summer peaks has been observed in some northern countries. During the warmer period, ultraviolet light-induced injury and accelerated vitreous liquefaction could be the predisposition for RRD. We aim to examine the seasonal variability of the incidence of RRD in Hong Kong.

Methods: Records of adults who underwent RRD repair surgery in two tertiary hospitals in the Hong Kong East Cluster of the Hospital Authority from 2015 to 2024 were reviewed. Cases with re-detachment, combined tractional retinal detachment, macular hole, history of recent eye trauma, recent or complicated cataract surgery, or unknown symptoms duration were excluded. The month of incidence was recorded based on symptom onset.

Results: Among the 440 cases, 39% were females, 57% involved the right eye, 39% were macula-on RRD, and 85% were phakic. The average age was 57.19 ± 11.02 . Incidence was highest in summer (119; 27%), followed by autumn (109; 25%), spring (106; 24%), and winter (106; 24%). However, no statistically significant difference was observed between seasons ($p=0.792$). There was no difference in seasonal variability for male ($p=0.272$) or female ($p=0.448$) subgroups, and age ≤ 60 ($p=0.546$) or age > 60 ($p=0.614$) subgroups. No drop or surge in incidence was observed in the pre-, peri-, or post-COVID-19 period.

Conclusions: Incidence of RRD in Hong Kong peaks in summer, but no statistically significant seasonal variation was observed. Hong Kong's subtropical climate has less apparent seasonal temperature differences. A highly urbanised lifestyle with more indoor activities and less ultraviolet exposure suggests a lesser effect on the vitreous.

Abstract No.: 204011

Panel No.: RUS-1065

Spontaneous Retinal and Choroidal Detachment in a Child with Suspected FLNA-related Otopalatodigital Syndrome

First Author: Lorenzo Miguel TRANQUILINO

Co-Author(s): Jose Carlo ARTIAGA, Miguel Antonio PASCUAL, Anna Victoria SAN PEDRO

Purpose: To report a rare case of spontaneous retinal and choroidal detachment in a pediatric male with suspected FLNA-related otopalatodigital syndrome.

Methods: Case report.

Results: A 7-year-old male with high clinical suspicion of otopalatodigital syndrome complained of blurred vision at a distance. He presents with multiple congenital anomalies, and a sibling with similar systemic symptoms was molecularly diagnosed with FLNA mutation. Initial funduscopy revealed myopic fundus changes and refraction consistent with pathologic myopia. Two months later, his mother noted sudden right eye ptosis and hypotonia, with blurring of vision to hand movement. Examination revealed choroidal and total retinal detachment of the right eye. He immediately underwent pars plana vitrectomy and oil tamponade, with multiple retinal tears noted intraoperatively barricaded with laser. Laser indirect ophthalmoscopy was also done for an incidental horseshoe tear of the left eye. Best-corrected vision of the right eye returned to baseline. However, new-onset retinal detachments were noted bilaterally one week later, and he was scheduled to undergo bilateral encircling band and pars plana vitrectomy.

Conclusions: Retinal and choroidal involvement are not well-established in otopalatodigital syndrome. The role of Filamin A in the retina and consequent FLNA-associated connective tissue fragility in the setting of pathologic myopia presents a theoretical predisposition to rare ocular complications such as spontaneous retinal and choroidal detachment. Genetic testing is recommended to confirm the diagnosis to help in the management, prognostication, and monitoring of patients.

Abstract No.: 205313

Panel No.: RUS-1070

Staged Surgical Approach in Complex Rhegmatogenous Retinal Detachment With Closed Funnel Configuration

First Author: Chakpram PRIYALAXMI

Co-Author(s): Naresh Babu KANNAN, Kim RAMASAMY, Muthu Krishnan VALLINAYAGAM, Toshit VARSHNEY

Purpose: To evaluate outcomes of short-term perfluorocarbon liquid (PFCL) tamponade in rhegmatogenous retinal detachment (RRD) eyes with closed funnel configuration.

Methods: This study is a retrospective case series. RRD eyes with a closed funnel configuration (PVR D2 or D3 as per Retina Society Classification) undergoing surgical intervention were included. These eyes underwent staged surgery with short-term PFCL—silicone oil tamponade (double fill) for 7-10 days. Retinal reattachment rate and best corrected visual acuity were assessed until the 12-month follow-up. Absolute success was defined as a completely attached retina in the absence of any tamponade, while relative success was defined as retinal attachment (macula on) under silicon oil tamponade.

Results: Thirty-nine eyes from patients aged 3 to 81 years were included and analysed in paediatric (n=19) and adult (n=20) groups. Overall retinal re-attachment rate was 53.8% (21/39): 31.6% in paediatric and 75% in adults. In eyes with anatomical success, median BCVA improved from 2 [1.9–2.5] to 1.1 [0.6–2.5] LogMAR ($p < 0.001$). Absolute and relative success were observed in 10 (25.6%) and 11 (28.2%) eyes, respectively. Younger age at diagnosis was significantly associated with anatomical failure. No complications were noted. No baseline variables predicted the success or failure of surgery within subgroups.

Conclusions: Short-term PFCL tamponade is safe and effective in RRD eyes with a closed funnel configuration.

Abstract No.: 203945

Panel No.: RUS-1063

Surgical Outcomes in Myopic Traction Maculopathy at a Tertiary Care Centre in North India

First Author: Swati SHARMA

Co-Author(s): Ramandeep SINGH, Sumedha VATS

Purpose: To highlight the role of PPV with ILM peel/flap with gas tamponade in cases of Myopic Traction Maculopathy (MTM).

Methods: A retrospective observational study was done in which 10 eyes of nine patients were recruited with a minimum 12-week follow-up, having 1c, 2c, 4a, and 4b stages of MTM described by Parolini B et al. and managed by Pars Plana Vitrectomy and ILM Peel/Flap, with gas tamponade during the last 3 years at a tertiary care centre. The primary outcome was restoration of foveal contour OCT, i.e., anatomical success (AS), and the secondary outcomes were best corrected visual acuity (BCVA), need for re-surgery, and complications, if any.

Results: Nine of 10 eyes with MTM had anatomical success with significant improvement in Snellen's BCVA by a mean of 1.74 ($P < 0.005$). One eye required re-surgery (10%) of Stage 4b. Mean follow-up was 56+/-6 weeks.

Conclusions: PPV and ILM Peel/flap with gas tamponade is effective in managing patients of stages 1c, 2c, and 4a of MTM.

Abstract No.: 200381

Panel No.: RUS-1048

Surgical Repair of Retinal Detachment in Ocular Coloboma: Overcoming Anatomical Challenges

First Author: Francis Ezra LAXAMANA

Co-Author(s): Jesus Jacinto BAUTISTA

Purpose: To report the surgical challenges and adaptive techniques employed in repairing rhegmatogenous retinal detachment (RRD) in an eye with iris and retinal coloboma, highlighting the impact of knowledge of anatomy on vitreoretinal surgery.

Methods: A 28-year-old female with bilateral iris and retinal colobomas presented with sudden vision loss in the right eye due to total RRD with an unidentified break. Pars plana vitrectomy revealed absent nasal pars plana, abnormal rectus muscle insertions, and distorted vitreous base anatomy. Surgical adaptations included modified sclerotomy placement, perfluorocarbon-assisted break localization, endolaser around the coloboma margin, and silicone oil tamponade.

Results: Retina was attached post operatively. Key challenges included limited peripheral access due to abnormal muscle anatomy and iatrogenic break risk in atrophic coloboma-adjacent retina. Silicone oil provided effective stabilization despite these constraints.

Conclusions: Coloboma-associated RRD demands tailored surgical strategies to address anatomical variants. Preoperative planning for pars plana anomalies, intraoperative flexibility in sclerotomy placement, and long-term tamponade are critical for success. This case underscores the need for heightened awareness of ocular malformations in young patients presenting with retinal detachment.

Abstract No.: 203504

Panel No.: RUS-1059

The Flooded Choroid: Subscleral Sclerectomy With Mitomycin C for Type 3 Uveal Effusion Syndrome Having Suboptimal Response to Medical Therapy

First Author: Dhwanee AGARWAL

Co-Author(s): Vishal Sanjay JADHAV, Anup KELGAONKAR, Avinash PATHENGAY

Purpose: To report successful surgical management of type 3 UES having a suboptimal response to medical therapy, with subscleral sclerectomy.

Methods: A gentleman in his early thirties presented with bilateral diminution of vision for three months and a recent onset of right-eye blurring. Previous bilateral

peripheral iridectomies had been performed elsewhere in view of suspected angle closure. Clinical evaluation and multimodal imaging were performed.

Results: Examination revealed bilateral exudative retinal and peripheral choroidal detachments with macular involvement. OCT showed Retinal pigment epithelium (RPE) undulations, multiple neurosensory detachments, and inner choroidal involvement with intact choriocapillaris. FFA demonstrated pinpoint hyperfluorescent spots and pooling. Initial management with periocular corticosteroids and oral steroids led to transient improvement, followed by recurrence of exudative detachment. Subscleral sclerectomy of 5X 4 mm each with topical mitomycin C in two quadrants of the right eye was performed 2 mm away from the spiral of Tillaux, which resulted in sustained resolution of subretinal fluid and improved visual acuity.

Conclusions: This case underscores the diagnostic challenges of type 3 UES and highlights subscleral sclerectomy as an effective therapeutic option in steroid-refractory presentations.

Abstract No.: 200427

Panel No.: RUS-1049

The Outcome of Intravitreal Injection of Bevacizumab in Treatment of Polypoidal Choroidal Vasculopathy in Cambodia

First Author: Channath LENG

Co-Author(s): Piseth KONG, Marin LY, Chenda SOK, Leng UN

Purpose: To investigate the features and treatment response in patients with polypoidal choroidal vasculopathy (PCV), initially treated with Bevacizumab.

Methods: Nine eyes of nine treatment-naïve patients with PCV were included in this retrospective study, all uniformly initially treated with three Bevacizumab injections monthly. Optical coherence tomography (OCT) characteristics and clinical parameters were recorded and analyzed at presentation, after the initial 3 injections of Bevacizumab, and at the final follow-up period.

Results: Following 3 monthly Bevacizumab injections, visual acuity (VA) significantly improved with a mean gain of at least one line of vision. Central macular thickness (CMT) significantly improved from a mean of $374.00 \pm 164.50 \mu\text{m}$ at presentation to $214.11 \pm 23.76 \mu\text{m}$ ($p\text{-value} = 0.003$). Subretinal fluid, intraretinal fluid and submacular hemorrhage significantly improved (all $p\text{-values} < 0.001$). No correlation was found between the presence of pachyvessels or increased choroidal thickness and the improvement in VA or CMT.

Conclusions: Fixed first-line treatment with intravitreal Bevacizumab monotherapy in PCV patients achieves satisfactory visual and anatomical outcomes.

Abstract No.: 206269

Panel No.: RUS-1080

The Retilight: A Novel Innovative 3D Printed Portable LED Endoilluminator for Vitreoretinal Surgery

First Author: Prithvi CHANDRAKANTH

Co-Author(s): Shishir VERGHESE

Purpose: To present the development and potential clinical applications of the «Retilight», a portable, 3D-printed LED endoilluminator designed for use in vitreoretinal surgery as a backup or supplemental light source.

Methods: The Retilight was developed through an iterative prototyping process focused on optimising light intensity, heat management, and system compatibility. Three prototypes were tested. The initial version utilised a smartphone LED, which proved insufficient. The second incorporated a dedicated LED with a modular 3D-printed adapter, powered via USB. The final prototype addressed heat issues by adding a heat sink and a small exhaust fan to ensure consistent performance during extended use.

Results: The final design provided adequate illumination for vitreoretinal procedures and was compatible with existing surgical endoilluminator systems. Its ability to connect to a power bank via USB made it both portable and practical. The Retilight could be used in emergency scenarios, such as bulb failure or power outages, and offered supplemental lighting when using chandelier systems for bimanual surgeries. Its compact, ergonomic design supported ease of use and integration into clinical workflows.

Conclusions: The Retilight is a reliable, low-cost, and portable LED endoilluminator offering a practical solution for supplemental or backup lighting in vitreoretinal surgery. It enhances surgical flexibility and may be particularly valuable in settings with limited access to traditional lighting systems. It can be used in corneal cases to identify the endothelial graft, spotlight in orbit surgeries, retroilluminating device for cataract surgeries in corneal opacities. endoilluminator in a wet lab setup to teach vitreoretinal fellows. The cost of making it was 60USD.

Abstract No.: 202193

Panel No.: RUS-1055

Ultrasound Biomicroscopy-Based Diagnosis and Cryotherapy for Rhegmatogenous Retinal Detachment Secondary to Schwartz-Matsuo-Like Syndrome: A Case Description

First Author: Yuedong HU

Co-Author(s): Siyu WANG, Rui HUA

Purpose: Rhegmatogenous retinal detachment (RRD) with breaks in the pars plicata is rare. Most cases occur in patients with atopic dermatitis or Schwartz-Matsuo syndrome. We reported a case of RRD with a break of

non-pigmented epithelium (NPE) at pars plicata, which was diagnosed and treated under the guidance of ultrasound biomicroscopy (UBM).

Methods: A 24-year-old Chinese female presented with a blurry vision in her left eye for three weeks without a history of trauma or systemic disease. Dilated fundus examination demonstrated retinal detachment, but no breaks were found. Fortunately, the UBM revealed a small NPE break at about 2 o'clock at the pars plicata. For the break could not be observed directly, we performed a combination of transconjunctival cryotherapy and pneumatic retinopexy under the guidance of UBM.

Results: One week later, the retina was reattached successfully, and UBM showed the NPE reattached with break closed two weeks postoperatively. Two new breaks in the inferior retina were found and sealed by laser photocoagulation.

Conclusions: UBM is an essential method for diagnosing and guiding the treatment of NPE breaks located at the pars plicata. Cryotherapy and pneumatic retinopexy have been proven to treat this condition successfully.

Abstract No.: 208667

Panel No.: RUS-1090

Vision and Metamorphopsia Outcomes of Macular Buckling for Foveoschisis-Associated Macular Detachment in Highly Myopic Eyes

First Author: Qi ZHANG

Purpose: To assess the functional outcomes in visual acuity, metamorphopsia, and vision-related quality of life (VR-QOL) and to evaluate prognostic factors after macular buckling (MB) surgery in eyes with high myopia and foveoschisis (FS)-associated macular detachment (MD).

Methods: Thirty-nine eyes of 39 patients with FS-associated MD who underwent MB surgery were enrolled. Measured outcomes comprised best-corrected visual acuity (BCVA), metamorphopsia, VR-QOL, axial length (AL), macular reattachment, and resolution of foveoschisis. In addition, factors affecting final BCVA and metamorphopsia were analyzed.

Results: At 12 months postoperatively, 36 eyes (92.31%) achieved macular reattachment, 37 eyes (94.87%) achieved complete resolution of foveoschisis, and metamorphopsia diminished in 31 eyes (79.49%). LogMAR BCVAs at baseline and months 1, 3, 6, and 12 postoperatively were 0.62 $\pm$ 0.35 (20/83), 0.65 $\pm$ 0.3 (20/89), 0.59 $\pm$ 0.31 (20/77), 0.54 $\pm$ 0.31 (20/69), and 0.46 $\pm$ 0.27 (20/57) (P , 0.001), respectively. Metamorphopsia scores by M-CHARTS were 1.36° $\pm$ 0.51°, 1.04° $\pm$ 0.51°, 0.74° $\pm$ 0.47°, 0.59° $\pm$ 0.47°, and 0.13° $\pm$ 0.29° (P , 0.001). All Visual Function Questionnaire-25 subscales demonstrated significant improvement postoperatively, with the exception of

“general health” (P = 0.08) and “driving” (P = 0.111). Preoperative BCVA was an independent risk factor for postoperative BCVA at month 12 (r = 0.638, P = 0.001), and the preoperative M-score was an independent risk factor for postoperative M-score at month 12 (r = 0.187, P = 0.045).

Conclusions: MB surgery significantly improved BCVA, metamorphopsia, and VR-QOL in patients with FS-associated MD. Preoperative BCVA and metamorphopsia score were prognostic factors for postoperative BCVA and metamorphopsia score at month 12.

Abstract No.: 201085

Panel No.: RUS-1050

Vitrectomy With Intraoperative Direct Endolaser Photocoagulation for TelCaps in the Fovea

First Author: Hiroshi TANAKA

Co-Author(s): Takanori AOKI, Yusuke KOGA, Kohsaku NUMA, Chie SOTOZONO, Hokoru YOSHIOKA

Purpose: Telangiectatic capillaries (TelCaps) are large capillary aneurysms secondary to diabetic retinopathy (DR) or branch retinal vein occlusion (BRVO). They are often refractory to anti-VEGF therapy and can cause significant visual decline. We report two cases of foveal TelCaps successfully treated with vitrectomy combined with intraoperative direct endolaser photocoagulation.

Methods: Eyes with foveal TelCaps unsuitable for conventional photocoagulation due to foveal involvement and resistant to multiple anti-VEGF treatments were included. Pars plana vitrectomy (PPV) with internal limiting membrane (ILM) peeling was performed, and the TelCaps were gently lifted into the vitreous cavity with microforceps and directly photocoagulated with endolaser. Pre- and postoperative evaluations included best-corrected visual acuity (BCVA), optical coherence tomography (OCT), and indocyanine green angiography (ICGA).

Results: Case 1: A 79-year-old female with BRVO developed foveal TelCaps. Despite multiple anti-VEGF injections, BCVA declined from 20/20 to 20/200 over 9 years. After surgery, BCVA improved to 20/67 at 3 months postoperatively. Case 2: A 61-year-old female with diabetic macular edema and multiple TelCaps showed poor response to anti-VEGF therapy, with BCVA decreasing to 20/100. Using the same surgical approach, BCVA improved to 20/33 at 3 months postoperatively. In both cases, postoperative OCT showed a reduction of macular edema, and ICGA confirmed complete closure of the TelCaps.

Conclusions: This novel technique provides an effective treatment option for refractory foveal TelCaps, enabling closure of TelCaps and promoting visual recovery by restoring foveal anatomy.

Translational Research in Ophthalmology

Abstract No.: 203417

Panel No.: TRO-1100

A Synergistic Therapeutic Nano Eyedrop for Dry Eye Disease Based on Ascorbic Acid-Coupled Exosomes

First Author: Jing FENG

Co-Author(s): Fang MA, Yong TAO

Purpose: In this study, we report on the creation and use of an advanced eyedrop composed of AA-coupled mExo (mExo@AA) towards the treatment of DED.

Methods: We prepared a multiple-functional eyedrop based on the deposition of gold nanoparticles (AuNPs) reduced by ascorbic acid (AA) onto the exosomal phospholipid membrane of mesenchymal stem cell (mExo)-derived exosomes in situ (mExo@AA). The therapeutic value of mExo@AA for DED was demonstrated in a mouse DED model. Moreover, assessments of its cell toxicity and tissue biocompatibility after topical application confirmed its safety

Results: Characterization of the mExo@AA product showed that AA was successfully loaded onto the mExo with a maximum loading efficacy of about 509 nM/mg. Further experiments indicated that mExo@AA showed good biosafety even at a high concentration of 1 mg/mL. Additionally, the in vitro and in vivo experiments indicated that mExo@AA had a superior capacity to promote corneal cell growth, scavenge ROS, and inhibit inflammation compared to either of its components alone. Thus, we provide convincing evidence that mExo@AA can be used as an effective therapeutic agent for DED. Notably, mExo@AA not only ameliorated DED symptoms but also reversed DED-associated pathological changes at both the cellular and tissue levels.

Conclusions: In conclusion, mExo@AA is presented as a potential new class of drugs for the treatment of DED.

Abstract No.: 203894

Panel No.: TRO-1101

AAV-Delivered Sup-tRNAs As Novel Therapeutic Strategies for Inherited Retinal Diseases

First Author: Chengda REN

Co-Author(s): Fang LU

Purpose: Nonsense mutations change a sense codon into a premature termination codon (PTC) in mRNA and account for approximately 18.5% of human inherited retinal diseases (IRDs)-related mutation. While sup-tRNA-based therapies have shown promising results

in suppressing nonsense mutations in vitro, challenges remain for in vivo delivery, particularly regarding efficacy, stability, and safety. Our study aims to engineer the body sequence of sup-tRNA to enhance the therapeutic efficacy and evaluating its therapeutic potential in a clinical relevant PTC in vivo.

Methods: The anticodon-stem and TΨC-stem of sup-tRNA were engineered and the efficacy of each variants were evaluated by a dual-luciferase reporter containing the RPE65-R44X sequence contexts. The most efficient sup-tRNA was selected and used for further in vivo assessment. The AAV.sup-tRNA was subretinally injected into rd12 mouse and both the efficacy and safety were evaluated at 12 and 36 weeks post treatment.

Results: By using the adeno-associated virus (AAV), we achieved restoration of RPE65 protein expression in up to 50.2% RPE cells in a mouse model carrying the RPE65-R44X nonsense mutation. Notably, the engineered sup-tRNA significantly restored retinal function in mice, with effects lasting for at least 36 weeks. Furthermore, AAV.sup-tRNA exhibited minimal retinal toxicity and had negligible effects on global readthrough at native termination codons as revealed by ribosome profiling.

Conclusions: Our findings demonstrate AAV-delivered sup-tRNA is a translatable therapeutic intervention for IRDs caused by nonsense mutations in RPE65 gene

Abstract No.: 207023

Panel No.: TRO-1106

Cold-Chain Duration Alters Ultrastructure and Optical Clarity of Banked Corneal Lenticules

First Author: Andri RIAU

Co-Author(s): Evelina HAN, Jodhbir MEHTA, Jenetta SOO, Gabriel TAN

Purpose: To determine how 4°C transport duration after long-term cryopreservation affects the optical clarity, ultrastructure, and early postoperative outcomes of keratorefractive lenticule extraction (KLEx)-derived corneal lenticules destined for implantation.

Methods: Patient-donated corneal lenticules were cryopreserved for 12 months in Cordlife Singapore (a licensed lenticule bank), thawed, and transported/stored at 4°C in phosphate-buffered saline (PBS). Visible-light transmittance (380–780 nm) was measured daily to identify the latest day before clinically meaningful transparency loss. Lenticules sampled at day 1 and day 6 underwent histochemistry (collagens, glycosaminoglycans, and glycoproteins) and transmission electron microscopy (TEM) to quantify interfibrillar distance (IFD) and fibril diameter (FD) distributions. Fresh, day 1, and day 6 lenticules were then implanted into rabbit corneas. Postoperative assessments at week 1 and week 4

included slit-lamp lenticular haze grading and AS-OCT pachymetry. After euthanization, the corneas were excised for immunofluorescence staining (fibrosis and inflammation markers) and TEM of host vs implant ultrastructure.

Results: Lenticule transparency was preserved up to 5 days at 4°C but declined by day 6 (fresh: $94.8 \pm 2.9\%$ vs day 6: $87.0 \pm 4.0\%$; $p=0.002$). Collagen and glycosaminoglycan staining were unchanged, while glycoproteins trended lower without significance. Ultrastructurally, IFD and FD distributions shifted toward smaller values by day 6 (IFD shift: $Z=4.419$, $p<0.001$). In vivo, day 6 lenticules showed greater early slit-lamp haze and slower clarity recovery versus fresh and day 1 samples, despite absent neovascularization, fibrosis (α -SMA, fibronectin, and tenascin-C negative), or inflammation (CD18 negative). By week 4, IFD and FD of fresh and day 1 lenticules approximated host stroma, whereas day 6 implants remained significantly lower with persistently shifted distributions.

Conclusions: After 12-month cryopreservation, KLEx lenticules remain suitable for implantation if implanted within 5 days of 4°C transport in PBS. Delays beyond 5 days compromise fibrillar ultrastructure, prolong early haze, and may delay visual recovery. While transportation in Optisol may extend usable duration, the higher cost must be weighed against the benefits.

Abstract No.: 202837

Panel No.: TRO-1094

Comparative Analysis of the Fecal Microbiome and Blood Metabolome in OIR Mice

First Author: Yuhang YANG

Co-Author(s): Lijun DONG, Hui QI, Guoming ZHANG, Yulin ZHANG

Purpose: Provide a comprehensive overview of the altered gut microbiota and metabolic profile in OIR mice, offering insights into the gut-retina axis and its potential role in ROP pathogenesis.

Methods: 16S rRNA amplicon sequencing and non-targeted metabolomics (LC-MS/MS and GC-MS) were employed to perform a comparative correlation analysis. QIIME 2. PICRUST2 and LEfSe were then applied.

Results: The gut microbiome of OIR mice underwent significant compositional changes compared to controls. Multivariate statistical analyses of the microbial data identified the top 10 differentially abundant amplicon sequence variants. LEfSe analyses conducted at multiple taxonomic levels further revealed Lactobacillales were significantly enriched in the OIR group. In contrast, Muribaculaceae exhibited higher relative abundance in the control group, whereas Lactobacillus showed higher specificity in the OIR group. Random forest analysis highlighted

the importance of Muribaculaceae, Lactobacillus, and Hungatella as key taxa capable of distinguishing OIR from control groups. Lipids and lipid-like molecules were notably elevated in OIR mice. KEGG pathway enrichment analysis indicated significant alterations in pathways such as D-amino acid metabolism, alanine, aspartate and fatty acid biosynthesis at the metabolic level. Integrated correlation analyses using mixOmics highlighted the top 5 key microbial taxa and metabolites. Muribaculaceae exhibited a negative correlation with fatty acyl. Lactobacillus showed a positive correlation with o-Oxycarbanil and 6-(2-Hydroxyethoxy)-6-oxohexanoic acid. Hungatella was negatively correlated with fatty acyl.

Conclusions: The observed changes in the fecal microbiome and metabolome of OIR mice support the notion that ROP pathogenesis may be associated with gut microbiota-induced metabolic disturbances.

Abstract No.: 207416

Panel No.: TRO-1107

Emotional Retina: OCTA-Based Retinal Microvascular Biomarkers as Early Indicators of Subclinical Emotional Distress

First Author: Rohith Reddy YEDDULA VENKATA

Co-Author(s): Harshitha C, Mohan Reddy M, Sanjana MARIAM JIJI VARGHESE, Sri Satviki POSINA, Sangeetha T

Purpose: To evaluate whether optical coherence tomography angiography (OCTA)-derived retinal microvascular parameters can objectively identify young adults with subclinical emotional distress and to validate a novel composite screening metric — the Emotional Retina Index (ERI).

Methods: This case-control study enrolled 120 participants (18–35 years), including 60 with subclinical emotional distress (moderate-severe Depression Anxiety Stress Scale-21 and/or Pittsburgh Sleep Quality Index > 5, without psychiatric diagnoses) and 60 age- and sex-matched controls (scores within normal range). All underwent 3×3 mm macular OCTA to quantify superficial and deep capillary plexus vessel density (VD), foveal avascular zone (FAZ) area, and perfusion symmetry. Ocular biometry (axial length, central corneal thickness, anterior chamber depth) was measured to exclude anatomic confounders. Masked graders analyzed OCTA images. Statistical analysis included group comparisons, Pearson correlations, and ROC curve construction using SPSS v26.

Results: Distress cases had significantly lower deep plexus VD ($44.5 \pm 2.9\%$ vs $48.4 \pm 2.5\%$, $p < 0.001$) and larger FAZ areas (0.49 ± 0.06 mm² vs 0.42 ± 0.04 mm², $p < 0.001$) than controls. Perfusion asymmetry was greater in the distress group ($p = 0.01$). Deep VD correlated inversely with stress scores ($r = -0.56$, $p < 0.001$). The ERI demonstrated an AUC of 0.91, with

90% sensitivity and 85% specificity for identifying high-risk participants.

Conclusions: OCTA-derived retinal microvascular metrics provide a non-invasive, objective biomarker for early detection of emotional dysregulation. The Emotional Retina Index represents a pioneering psych-ophthalmic tool with the potential to transform mental health screening and guide timely preventive interventions.

Abstract No.: 202596

Examining Vegetables Rich in Lutein and Searching for Various Conditions That Affect Lutein Content

First Author: Akihiro OHIRA

Co-Author(s): Mari SUGIYAMA

Purpose: To evaluate lutein content in spinach and various leafy vegetables from Shimane Prefecture, Japan, focusing on "Asukko," a local Brassica, and to examine organ-, seasonal-, and environmental influences with potential implications for age-related macular degeneration (AMD) prevention.

Methods: Lutein levels were quantified by HPLC in 11 spinach cultivars (3 Japanese, 8 foreign) and 21 other vegetables. In Asukko, lutein distribution was analyzed across plant parts (leaf, stem, bud, flower) and harvest seasons. Effects of light quality (natural, fluorescent, UV) on lutein content were also assessed.

Results: Spinach cultivars contained 35–65 mg lutein/100 g DW, with Japanese and foreign varieties showing no major difference. Among vegetables, Chinsai had the highest lutein (76 mg/100 g DW), while Setsuhaku Taisai was lowest (25 mg). Asukko leaf blades contained lutein comparable to spinach, with middle leaves highest. Flowers and buds had similar lutein, but flowers exhibited fivefold higher β -carotene. Seasonal variation was observed, with December harvests showing highest levels. Light effects differed by species: spinach lutein decreased under UV exposure, while Asukko lutein increased under fluorescent/UV light.

Conclusions: Lutein content varies by species, organ, season, and light environment. Asukko, a local Shimane vegetable, is a promising lutein-rich food source, and currently discarded leaves/flowers may be nutritionally valuable. These findings support the potential of local vegetables as functional foods for AMD prevention and sustainable agriculture.

Abstract No.: 202223

Panel No.: TRO-1091

Fluoroalkylated Peptide Nanoparticles for Transretinal Delivery in Dry Age-Related Macular Degeneration

First Author: Zihan ZHENG

Co-Author(s): Weiyi XIA, Chen ZHAO

Purpose: Peptide-based therapeutics represent a promising strategy for dry age-related macular degeneration (AMD) owing to their high specificity and biocompatibility. However, their clinical translation is severely limited by the challenges of transretinal penetration and efficient cytosolic delivery. This study aimed to develop a fluoroalkylated peptide formulation to establish a peptide-based therapeutic platform capable of overcoming retinal barriers and protecting retinal function.

Methods: A fluoroalkylated peptide (FNBP) was engineered to self-assemble into nanoparticles with enhanced transretinal and intracellular delivery properties. Its distribution, therapeutic activity, and safety were evaluated in a murine model of dry AMD.

Results: FNBP penetrated retinal layers efficiently, accumulated in retinal pigment epithelium, and preserved retinal structure and function. Treatment reduced oxidative damage, limited inflammatory responses, and mitigated photoreceptor degeneration, while showing good ocular and systemic safety.

Conclusions: FNBP represents a promising peptide-based nanomedicine for dry AMD, addressing key barriers to retinal drug delivery and offering a potential disease-modifying strategy with translational relevance for clinical application.

Abstract No.: 208133

Panel No.: TRO-1109

Genetic Association in Immunoglobulin G4-Related Disease: A Systematic Review

First Author: Yuen Tsing Adeline HO

Co-Author(s): Li Jia CHEN, Kelvin Kam Lung CHONG, Kenneth Ka Hei LAI, Chi Pui PANG, Pancy Oi Sin TAM, Tung TANG, Clement Chee Yung THAM

Purpose: Genetic studies have investigated the association of genetic variants with Immunoglobulin G4-related disease (IgG4-RD). In this study, we summarize the results of genetic association in IgG4-RD.

Methods: We performed a literature search in MEDLINE, EMBASE via the OVID platform, Cochrane Central Register of Controlled Trials (CENTRAL), ClinicalTrials.gov (www.clinicaltrials.gov) and World Health Organization International Clinical Trials Registry Platform (WHO ICTRP) for genetic studies on IgG4-RD on 20/1/2023.

Results: We identified a total of 431 articles published between 1975 and 2023. After removing all the duplicates, we evaluated the abstract and selected 65 articles for full-text review. Among them, 17 fulfilled the eligibility criteria, including 15 original case-control studies, and two genome-wide association studies (GWAS). Autoimmune pancreatitis (AIP) was reported in 15 of the 17 articles, the other 2 articles included IgG4-related periaortitis /periarteritis and general IgG4-RD subjects. A total of 52 polymorphisms in 25 genes were evaluated, including 13 polymorphisms in the 4 genes of the MHC complex. The other genes are involved in different pathways.

Conclusions: While MHC associations remain the strongest and most consistent across studies, our review identifies emerging non-MHC genetic loci such as KCNA3, CTLA4, PRSS1, and VPS13B, suggesting distinct immune and tissue-specific pathways in different IgG4-RD phenotypes.

Abstract No.: 203336

Panel No.: TRO-1098

Genetic and Lipid Pathways Linking Ocular Traits to Neuropsychiatric Disorders: Evidence From Integrative Mendelian Randomization and Colocalization

First Author: Wanyi SHU

Co-Author(s): Lin FU

Purpose: To test causal links between retinal morphology, common eye diseases, circulating lipids, and neuropsychiatric disorders, and to identify lipid mediators and shared causal variants.

Methods: We conducted two-sample Mendelian randomization integrating optical coherence tomography retinal layer thickness, ophthalmic phenotypes, plasma lipidomics, and neuropsychiatric genetic datasets. Inverse variance weighted models were primarily used with weighted median and MR Egger sensitivity analyses. Mediation MR estimated indirect effects; Bayesian colocalization reported posterior probability H4 (PP.H4).

Results: Reduced inner nuclear layer to external limiting membrane (INL to ELM) and ganglion cell inner plexiform layer (GCIPL) thicknesses were genetically associated with a higher risk of Alzheimer's disease (AD) and persistent mood disorders, whereas greater central external limiting membrane to inner and outer segment junction (ELM to ISOS) thickness was related to early AD and depression. Genetic liability to pseudoexfoliation glaucoma and senile cataract increased neuropsychiatric risk, whereas visual impairment and macular or posterior pole degeneration were inversely associated with AD. Mediation identified triacylglycerols TAG(51:3), TAG(52:4), and TAG(52:5) as suppressor mediators of the glaucoma to AD link explaining 27% to 34% of the total effect, and phosphatidylcholine 16:1_18:2

mediating 14% of the glaucoma to depression association. Colocalization supported shared variants with PP.H4 100% for central ELM to ISOS and AD, 93% for GCIPL and persistent mood disorders, and 90% for central ELM to ISOS and depression.

Conclusions: Ocular structure and circulating lipids appear to mechanistically link eye and brain health; imaging and lipid biomarkers may support early risk stratification and pathway-targeted intervention.

Abstract No.: 203423

Panel No.: TRO-1099

Growth Hormone Releasing Hormone Signaling Promotes Autoimmune Inflammation Through Histone Lactylation

First Author: Jian LI

Co-Author(s): Wai Kit CHU, Lin DU, Jingna HE, Jiabei XIONG, Yijia ZHANG

Purpose: This study aims to investigate whether growth hormone-releasing hormone (GHRH) signaling regulates Th17 cell differentiation and autoimmune inflammation through histone lactylation.

Methods: Native CD4⁺ T cells isolated from C57BL/6 mice were differentiated under Th17-polarizing conditions with or without a GHRH receptor (GHRH-R) antagonist. Histone lactylation levels (e.g., H3K14la) and intracellular lactate were measured. Exogenous lactate was supplemented to rescue lactylation. Multi-omics integration (Cut&Tag and RNA-seq) was performed on Th0, Th17, and antagonist-treated Th17 cells to identify downstream genes.

Results: Th17 cells exhibited elevated histone lactylation (H3K14la) and intracellular lactate levels compared to Th0 cells ($p < 0.01$). GHRH-R antagonist treatment suppressed both lactylation and lactate production ($p < 0.01$), which were restored by exogenous lactate. Integrated multi-omics analysis revealed downstream targets such as CSF1, linking GHRH signaling to lactylation-driven transcriptional regulation.

Conclusions: GHRH signaling promotes Th17 differentiation and autoimmune inflammation by enhancing histone lactylation via lactate metabolism modulation. Targeting GHRH-R may represent a novel therapeutic strategy for autoimmune ocular diseases.

Abstract No.: 205023

Panel No.: TRO-1102

Highly Efficient and Minimally Variable Photo-Sensitive Multi-Zone Ocular Organoids Serve as an In Vitro System for Studying Inherited Retinal Dystrophies

First Author: Fan ZHANG

Co-Author(s): Wang LI, Baoyuan QU

Purpose: The objective of this study is to develop a directional, standardized, and efficient method to generate multi-zone ocular organoids, which is suitable for a preclinical drug efficacy study.

Methods: hiPSCs at approximately 70% confluency were digested into single cells with Accutase (07920, StemCell). On D1~D2, the cells were half-refreshed every day with progenitor cell induction medium (PIM). On D3, transferred onto Laminin-511-coated T25 culture bottles containing PIM. On D4~D14, the cellular aggregates were refreshed every day with PIM. On D15, the mzOPCs, including NR, SE, and RPE, appeared and were mechanically separated with a sterile tip or by pipetting up and down and transferred into a low-attachment 10-cm dish containing PIM containing retinoic acid. On D16~D30, the mzOPCs were refreshed daily with PIM. On D31~D60, the PIM was replaced with multi-ocular organoid induction medium (MOIM, PIM plus 10 μ M retinoic acid), and then multi-zone ocular organoids were formed until D60. On D91~D120, the MOIM was replaced with multi-zone ocular organoids maturation medium (MOMM).

Results: Size and shape of a large number of hiPSC aggregates controlled by using AggreWell™ 400 device. Maximizing the efficiency of 3D multi-zone ocular organoid generation and enhancing the reproducibility and scalability of individual organoids. Establishing complex 3D multi-zone ocular organoid models associated with inherited retinal disease. Electrophysiological properties of ocular organoids derived from RHO-adRP and BCD disease models verified by using a microelectrodes array.

Conclusions: Our results showed that the minimally variable method developed for generating multi-zone ocular organoids lays a solid foundation for drug development and pharmacodynamic validation.

Abstract No.: 203094

Panel No.: TRO-1096

Investigating Umbilical Cord Endothelial Cells for Corneal Endothelial Replacement

First Author: Anmol SANDHU

Co-Author(s): Salim ISMAIL, Judy LOH, Jennifer Jane MCGHEE, Trevor SHERWIN, Jie ZHANG

Purpose: Corneal endothelial cell (CEC) dysfunction leads to impaired corneal transparency and vision loss. Currently, the primary treatment option is corneal transplantation; however, a global shortage of donor

corneal tissue restricts accessibility, with only 1 in 70 patients able to receive a transplant, creating an urgent need for alternative therapies. Human umbilical vein endothelial cells (HUVECs) sourced from the umbilical cord are a promising source for a CEC replacement therapy.

Methods: HUVECs were isolated from umbilical cords ($n = 10$) and were differentiated into CEC-like cells using a CEC-conditioned medium. Differentiation was evaluated through morphology, polymerase chain reaction (PCR), immunocytochemistry (ICC), and flow cytometry. Functional properties of differentiated CEC-like cells were assessed using electric cell-substrate impedance sensing (ECIS) and the dye-leak assay.

Results: Differentiated HUVECs exhibited a polygonal morphology typical of CECs and expressed key CEC markers, notably zonula occludens-1 (ZO1) and sodium-potassium adenosine triphosphatase (ATP1A1). They demonstrated higher electrical resistance compared to control cells and effectively prevented fluorescein isothiocyanate-dextran flow across the cell membrane, indicating robust barrier function. Moreover, the cells showed presence of key CEC pumps.

Conclusions: These findings demonstrate successful differentiation of HUVECs into functional CEC-like cells, offering a promising therapeutic approach for treating corneal endothelial disorders.

Abstract No.: 206327

Panel No.: TRO-1105

Mathematical Modeling Validation for Predicting Intraocular Glucose Sensor Response

First Author: Ka Yiu LUI

Co-Author(s): Mårten E BRELÉN, Priscilla FERNANDEZ LOAIZA, Tony Tsz Chun MAN, Yolanda Wong Ying YIP

Purpose: A mathematical model was applied in simulation software to predict the resonance response of the intraocular glucose sensor. This study aims to validate the mathematical model applied in simulation software by comparing the resonance response of the simulated models and bench test models with various parameters.

Methods: Three sensors were made to compare the effect of inner diameter and thickness on the resonance response and test whether the simulation model could respond to the change of these variables accurately. The first sensor was 1mm thick with 10mm inner diameter. The second sensor was 1mm thick with 11mm inner diameter. The third sensor was 0.5mm thick with 11mm inner diameter. Prototypes underwent bench testing, with resonance frequencies compared to simulations done in Ansys High Frequency Simulation Software.

Results: For 1 mm thick, 10 mm inner diameter sensor, the bench test resonance frequency was 347

MHz, while the simulated one was 349 MHz. For 1 mm thick, 11 mm inner diameter sensor, the bench test resonance frequency was 423 MHz, while the simulated one was 453 MHz. For 0.5 mm thick, 11 mm inner diameter sensor, the bench test resonance frequency was 313 MHz, while the simulated one was 309 MHz. The root mean square error was 17.5MHz and relative root mean square error was 4.85%.

Conclusions: The root mean square error suggested that the simulated model had moderate accuracy. Future work includes comparing more simulated models and bench test models to evaluate the mathematical model accuracy and validate the mathematical model.

Abstract No.: 202273

Panel No.: TRO-1092

PLOD3 Suppression Exerts Anti-Angiogenesis Effect via STAT3 Pathway in Oxygen-Induced Retinopathy Animal Model

First Author: Manhong XU

Co-Author(s): Xiaoe FAN, Xiaorong LI, Shaojie REN

Purpose: Retinal neovascularization, a hallmark of proliferative diabetic retinopathy (PDR) and retinopathy of prematurity (ROP), leads to vision loss through pathological angiogenesis and fibrovascular proliferation. Although anti-VEGF therapy is widely used, its limitations underscore the need for new therapeutic targets. This study aimed to identify proteins associated with pathological angiogenesis and clarify the role of procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3 (PLOD3).

Methods: An oxygen-induced retinopathy (OIR) mouse model was established. Proteomic profiling (LC-MS/MS) with bioinformatic analysis identified angiogenesis-related proteins. PLOD3 expression was evaluated in vitreous from PDR patients, OIR retinas, and hypoxia-induced human retinal endothelial cells (HRECs). Functional studies included intravitreal injection of lentivirus-mediated PLOD3 shRNA (LV-shPLOD3) in OIR mice and transfection in VEGF-induced HRECs. Western blotting was performed to assess STAT3, AKT, and ERK signaling.

Results: PLOD3 was significantly upregulated in OIR retinas, PDR vitreous, and hypoxia-induced HRECs. LV-shPLOD3 reduced retinal neovascularization and vaso-obliteration in OIR mice. In vitro, PLOD3 knockdown inhibited VEGF-induced proliferation, migration, and tube formation of HRECs. Mechanistically, suppression of PLOD3 attenuated phosphorylation of STAT3, AKT, and ERK in OIR retinas.

Conclusions: Proteomic analysis identified PLOD3 as a novel pro-angiogenic factor in retinal neovascularization. Its knockdown exerts anti-angiogenic and vascular-protective effects through STAT3 pathway inhibition, suggesting PLOD3 as a

potential therapeutic target for angiogenesis-related retinal diseases.

Abstract No.: 202551

Panel No.: TRO-1093

Preclinical Models of Corneal Fibrosis for Clinical Translation

First Author: Haiming LI

Co-Author(s): Gink YANG

Purpose: Corneal fibrosis, characterized by excessive and disorganized secretion of extracellular matrix proteins by the resident corneal cells leading to scarring, is the final manifestation in various progressive corneal diseases. At present, no antifibrotic therapies against corneal scarring exist clinically, resulting in empirical and off-label treatments being prescribed with little evidence of effectiveness. The mechanisms leading to corneal fibrosis are highly complex and dependent on the exact pathogenesis of the corneal disease. To further understand these mechanisms, preclinical models using cells and laboratory animals have been established. The strengths and shortcomings of these models vary, both due to the regenerative capacity of the model and the way the model is induced. Most importantly, results from the experimental analysis of these preclinical models are often used to demonstrate the safety and efficacy of emerging therapies in readiness for clinical translation.

Methods: In this review, we delineated recent advances in understanding the cornea from a cellular and molecular perspective and mechanisms involved in the pathogenesis of corneal fibrosis.

Results: We then used this knowledge to introduce the different preclinical models for investigating corneal fibrosis and discuss the regulatory guidance in using these models according to the guideline from the International Council of Harmonization.

Conclusions: Ultimately, this review aims to educate ophthalmic researchers to use the appropriate preclinical models and rationale in the development of corneal anti-fibrotic therapies for clinical translation.

Abstract No.: 206097

Panel No.: TRO-1104

RIDE: A Reprogrammable Delivery Platform for Cell-Type-Specific In Vivo CRISPR-Cas9 Genome Editing

First Author: Xujiao ZHOU

Co-Author(s): Jiaxu HONG

Purpose: The transformative potential of in vivo CRISPR-Cas9 gene therapy is hampered by the lack of delivery systems that are simultaneously efficient, cell-type-specific, and temporally controlled. We aimed to develop a versatile and programmable platform that

enables precise tropism-defined delivery of CRISPR ribonucleoproteins (RNPs) to target cells in vivo.

Methods: We engineered a virus-like particle (VLP)-based system, termed RIDE (Cell-tropism Programmable CRISPR-Cas9 RNP Delivery System). The key innovation lies in the programmable design of the VLP surface, which allows for facile redirection to specific cell types (e.g., dendritic cells, T cells, neurons) by modifying its tropism. The system packages pre-assembled Cas9 RNPs for direct genomic action upon delivery.

Results: RIDE demonstrated editing efficiency comparable to adeno-associated virus (AAV) and lentiviral vectors, and superior to lipid nanoparticles (LNPs). Its versatility was confirmed by successful reprogramming and highly efficient gene editing in diverse cell populations both in vitro and in vivo. In disease models, RIDE-mediated cell-specific editing significantly alleviated pathology in both ocular neovascularization and Huntington's disease. Notably, RIDE efficiently edited the mutant huntingtin gene in patient-derived iPSC neurons and exhibited a favorable safety profile in non-human primates.

Conclusions: RIDE represents a robust, customizable, and efficient platform for targeted in vivo CRISPR-Cas9 delivery. Its ability to be reprogrammed for cell-specific targeting, coupled with high efficacy and preliminary safety, positions RIDE as a promising therapeutic modality with broad applicability for treating genetic disorders. This study provides a foundational framework for the next generation of in vivo CRISPR therapeutics.

Abstract No.: 203016

Panel No.: TRO-1097

Subtype-Specific Plasticity of Bipolar Cells in Non-Human Primates Following Human iPSC-Derived Retinal Organoid Transplantation

First Author: Atsuta OZAKI

Co-Author(s): Mineo KONDO, Yasuo KURIMOTO, Michiko MANDAI, Tomohiro MASUDA, Masayo TAKAHASHI

Purpose: We previously reported that host bipolar cells (BCs) form synapses with transplanted stem cell-derived photoreceptors in the eyes with non-human primate (NHP) retinal degeneration. However, the subtype-specific BC plasticity after transplantation remains to be elucidated. Here, we used clinically comparable genome-edited human induced pluripotent stem cell (iPSC)-derived retinal organoid (RO) sheets lacking ON-BCs for transplantation to investigate the plasticity across BC subtypes in NHP.

Methods: Islet-1-/- human iPSC-derived RO sheets were transplanted in the eye with a laser-induced retinal degeneration model of close to macula and

periphery. After 1 year, the eye was processed for immunohistochemistry using antibodies for photoreceptors and BCs. We quantified the rate and length of dendritic regrowth in the host OFF- (diffuse bipolar 1 [DB1], DB3a) and ON- (rod bipolar, DB4, DB5) BCs. The cut-off for dendritic regrowth was defined as beyond the 95% upper limit of dendritic length in the laser-induced region.

Results: The RO sheets survived for 1 year in both regions and developed rosette-like photoreceptor layers. In the presence of grafted photoreceptors, the dendritic regrowth was observed in 52.4% of DB1, 37.8% of DB3a, and 79.1% of PKC α -positive BCs. The median dendritic length was significantly longer in PKC α -positive bipolar cells (15.24 μ m [0.84-70.05]) than in DB1 (10.02 μ m [1.40-32.90]) and DB3a (7.50 μ m [0.84-36.79]; $p < 0.01$, Dunn-Bonferroni test).

Conclusions: These results indicate that BC plasticity may differ among subtypes, providing important insights into potential regenerative capacity of host retinal network in stem-cell based therapies.

Abstract No.: 202776

Panel No.: TRO-1095

The Neuroprotective Effect of Riluzole in Age-Related Macular Degeneration

First Author: Ping BU

Co-Author(s): Shaunt ABNOUS, James F. MCDONNELL, Ria RAVI, Alexis STEFANIAK-CLARK, Zhiquan TAN

Purpose: Age-related macular degeneration (AMD), a primary cause of blindness worldwide, currently has limited treatment options. Riluzole, an FDA-approved neuroprotective agent used for amyotrophic lateral sclerosis (ALS), was evaluated for its potential to protect against retinal degeneration in a mouse model of AMD.

Methods: In vivo study: BALB/c albino mice were exposed to 6,000 lux of cool, white, fluorescent light for 2 hours to induce light injury. The control group or the riluzole-treated group (8 mg/kg/day) was administered intraperitoneally after retinal light injury for 6 days. Electroretinography (ERG) was recorded 1 week after retinal light injury. The TUNEL assay was performed 48 hours after light injury. In vitro study: ARPE-19 cells were cultured in DMEM/F12 medium supplemented with 10% fetal bovine serum. ARPE-19 cells were pretreated with or without riluzole overnight and then exposed to sodium iodide (SI) for 24 hours. Cell viability and cellular reactive oxygen species (ROS) levels were assessed using the MTT and DCFDA assay kits, respectively, according to the manufacturer's instructions.

Results: Riluzole treatment significantly attenuated light injury-induced retinal functional impairment compared to the control-treated mice. The number of TUNEL-positive cells in the retinal outer nuclear layer

were significantly lower with riluzole treatment 48 hours after light injury. Pretreatment with riluzole in ARPE-19 cells resulted in significantly increased viability and ROS when exposed to SI.

Conclusions: Riluzole treatment protects against retinal functional loss and decreases apoptosis in the retinal outer nuclear layer following light injury. These initial findings suggest that riluzole may serve as a novel therapeutic agent for AMD.

Abstract No.: 205248

Panel No.: TRO-1103

Virus-like Particle Delivering CRISPR Treatment of Myocilin-associated Glaucoma in Mice, Non-human Primates and Patients

First Author: Yufei **TENG**

Co-Author(s): Ningli **WANG**

Purpose: MYOC mutations are responsible for 3–4% of POAG patients and 10% of patients with juvenile open-angle glaucoma (JOAG). We developed a gene editing therapy for MYOC mutation-associated glaucoma via virus-like particle (VLP) which delivers ribonucleoprotein delivery, and proved its translation potential in mice and non-human primates and in IIT clinical trial.

Methods: A glaucoma mouse model was established via knockin human N450Y myocilin mutation, which exhibited glaucoma phenotype, such as IOP elevation, retinal ganglion cell loss and visual impairment. We engineered lentiviral virus-like particles loaded with MYOC-targeting CRISPR-Cas9 ribonucleoprotein (RNP) using our VLP-based ribonucleoprotein delivery platform (RIDE).

Results: We found VLP efficiently and specifically transduced the trabecular meshwork in mice, whereas conventional AAV and LNP preferentially dispersed to the cornea. Notably, VLP-based ribonucleoprotein delivery (RIDE) could significantly enhance aqueous fluid outflow, reduce intraocular pressure, and protect Retinal Ganglion Cells (RGCs) from degeneration in the MYOC mutation knockin mice model. No notable side effects were detected during the 10-month follow-up. Efficient editing (35%) was demonstrated in cynomolgus macaques despite pre-existing anti-Cas9 immunity. In a first-in-human trial, RIDE led to sustained IOP reduction in a glaucoma patient with no ocular or immune adverse events.

Conclusions: These findings establish RIDE as a clinically relevant strategy for CRISPR-based glaucoma therapy and support its application to ocular diseases.

Abstract No.: 207356

Panel No.: TRO-1108

Vitamin D SNPs and Retinopathy of Prematurity: A Genetic Insight from an Indian Cohort

First Author: Debolina **DEB**

Purpose: This study aimed to investigate the association between common Vitamin D pathway gene polymorphisms (FokI, BsmI, Apal, and TaqI) and the development of retinopathy of prematurity (ROP) in preterm infants.

Methods: A cohort of 97 preterm infants (<34 weeks gestation) admitted to a tertiary neonatal intensive care unit was prospectively analyzed over one year. Genomic DNA extracted from blood leukocytes was genotyped for four VDR SNPs: rs2228570 (FokI), rs1544410 (BsmI), rs7975232 (Apal), and rs731236 (TaqI) using PCR-RFLP. Clinical data and the occurrence of five major prematurity complications, including ROP, were recorded. ROP was diagnosed and staged according to the International Classification of Retinopathy of Prematurity.

Results: ROP developed in 25.5%, predominantly in those born <30 weeks' gestation and with birth weight <1500 g ($p < 0.05$). FokI and BsmI had significant associations with ROP ($p < 0.05$).

Conclusions: Vitamin D, via its nuclear vitamin D receptor (VDR), influences angiogenesis and retinal vascular development. Single nucleotide polymorphisms (SNPs) in the VDR gene may alter receptor function and affect susceptibility to prematurity-related complications.

Visual Sciences

Abstract No.: 204306

Panel No.: VSC-1111

Altered Topological Organization of Brain Functional Networks in Adults With Acute Acquired Concomitant Esotropia

First Author: Jiayu **CHEN**

Co-Author(s): Jing **FU**, Jie **HAO**

Purpose: To investigate alterations in functional brain networks associated with acute acquired concomitant esotropia (AACE) and examine their topological reorganization patterns, with the goal of advancing neuroscientific understanding of the pathophysiological mechanisms underlying this disorder.

Methods: A total of 32 AACE patients (15 males, 17 females) and 31 healthy controls (HCs, 10 males, 21 females) underwent resting-state functional magnetic resonance imaging (rs-fMRI) scans. Using graph-theoretical analysis, we investigated the topological

properties and functional connectivity of brain functional connectomes at both global and nodal levels, along with their correlations with ophthalmic clinical characteristics.

Results: There were no statistically significant differences in the demographic characteristics of the two groups (age, gender and level of education). Both groups demonstrated small-world topology, with no global metric differences. At nodal levels, AACE patients showed elevated betweenness centrality in REC.R ($t=2.252$, $p=0.029$) and STG.L ($t=2.009$, $p=0.049$), but reduced in PHG. R ($t=-2.077$, $p=0.042$). REC.L displayed decreased clustering coefficient ($t=-2.192$, $p=0.033$) and local efficiency ($t=-2.076$, $p=0.043$). Altered functional connectivity involved four enhanced and three reduced pairs ($p<0.01$). Global and nodal network metrics correlated with several clinical variables, such as disease duration and angles of deviation, and psychometric scale scores ($p<0.05$).

Conclusions: This graph theory study reveals AACE patients' brain networks exhibit global topology preservation with nodal reorganization: right-hemispheric dominance in centrality/path anomalies drives visual compensation, accompanied by bidirectional FC changes. Abnormal σ elevation, synchronized with parahippocampal/temporal abnormalities, marks neuroplasticity thresholds. Redefining AACE as brain network-mediated neuro-ophthalmopathy, σ -guided surgery timing offers neural circuit insights for transcending empirical treatments.

Abstract No.: 200243

Panel No.: VSC-1110

Combined Treatment of Human Mesenchymal Stem Cells and Green Tea Extract on Retinal Ganglion Cell Regeneration in Rats After Optic Nerve Injury

First Author: Tsz Kin NG

Co-Author(s): Qichen YANG

Purpose: Retinal ganglion cell (RGC) death and axonal loss cause irreversible vision loss upon optic nerve (ON) injury. We have independently demonstrated that mesenchymal stem cells (MSCs) and green tea extract (GTE) promote RGC survival and axonal regeneration in rats with ON injury. Here, we aimed to evaluate the combined treatment effect of human bone marrow-derived MSCs (hBM-MSCs) and GTE on RGC survival and axonal regeneration after ON injury.

Methods: Combined treatment effect of hBM-MSCs and GTE on RGC survival and axonal regeneration was evaluated using the rat optic nerve crush and retinal explant culture models. The effects of GTE on hBM-MSCs and the possible mechanisms were also investigated.

Results: Combined treatment of hBM-MSCs and GTE promoted RGC survival and neurite outgrowth/axonal

regeneration in ex vivo retinal explant culture and in rats after ON injury. GTE increased Stat3 activation in the retina after combined treatment and enhanced brain-derived neurotrophic factor secretion from hBM-MSCs. Treatment of GTE would not induce hBM-MSC apoptosis, but inhibited their proliferation, migration, and adipogenic and osteogenic differentiation in vitro by reducing matrix metalloproteinase secretions.

Conclusions: This study revealed that GTE can enhance the RGC protective effect of hBM-MSCs, suggesting that stem cell priming could be a prospective strategy enhancing the properties of stem cells for ON injury treatment.

Abstract No.: 208616

Panel No.: VSC-1118

Dyslipidemia Drives Choroidal Thinning via JNK-Dependent Ferroptosis Signaling Pathway

First Author: Minjie ZHANG

Purpose: Dyslipidemia has emerged as a substantial global public health concern. The involvement of choroidal changes in the pathophysiology of various ocular diseases has been postulated. The study aims to assess the effects of dyslipidemia on the choroid.

Methods: All participants enrolled in the research were grouped as the dyslipidemia group and the control group according to the serum lipid levels. The thickness of the retina or choroid was compared between the two groups. RNA sequencing (RNA-seq) was performed, followed by quantitative real-time polymerase chain reaction (qRT-PCR) and western blotting (WB), to validate expression changes in both in vitro and vivo hyperlipemia models.

Results: The research included 2,029 left eyes from 2,029 participants with dyslipidemia and 2,029 left eyes from age- and sex-matched normal subjects. The choroidal thickness was significantly thinner in the dyslipidemia group compared to the control group, while the retinal thickness only in the outer nasal sector indicated statistically significant differences between the two groups. RNA-seq revealed that the dyslipidemia-induced effects on the choroid were mediated by the vital involvement of ferroptosis and the MAPK signaling pathway. Specifically, dyslipidemia led to the induction of choroidal ferroptosis through the enhancement of ferrous ion (Fe^{2+}), reactive oxygen species (ROS), and malondialdehyde (MDA), the downregulation of SLC7A11, GPX4, and glutathione (GSH), and the upregulation of COX2. Furthermore, the JNK signaling pathway was significantly activated in this process.

Conclusions: Compared with the retina, the choroid exhibits a greater vulnerability to lipid metabolism disorders. Dyslipidemia stimulates choroidal ferroptosis through the activation of JNK signaling.

Abstract No.: 209753**Panel No.: VSC-1119****EasyEyes: Crowded Dynamic Fixation for Online Psychophysics***First Author: Fengping HU**Co-Author(s): Joyce Y. CHEN, Denis G. PELLI, Jonathan WINAWER*

Purpose: Online vision testing enables efficient data collection from diverse participants but often requires accurate fixation. When needed, fixation accuracy is traditionally ensured by using a camera to track gaze. That works well in the lab, but tracking during online testing with a built-in webcam is not yet sufficiently precise. Kurzwski, Pombo, et al. (2023) introduced a fixation task that improves fixation through hand-eye coordination, requiring participants to track a moving crosshair with a mouse-controlled cursor. Their dynamic fixation task greatly reduces peeking at peripheral targets relative to a stationary fixation task, but does not eliminate it. We introduce a better task that does.

Methods: Our new crowded dynamic fixation task further enhances fixation by adding clutter around the fixation mark to leverage crowding. We assessed fixation accuracy during peripheral threshold measurement.

Results: Relative to the RMS gaze error during the stationary fixation task, the dynamic fixation error was 55%, while the crowded dynamic fixation error was only 40%. With a 1.5° tolerance, peeking occurred on 7% of trials with stationary fixation, 1.5% with dynamic fixation, and 0% with crowded dynamic fixation. This improvement eliminated implausibly low peripheral thresholds, likely by preventing peeking.

Conclusions: We conclude that crowded dynamic fixation provides accurate gaze control for online testing.

Abstract No.: 208183**Efficacy Study of Internal Limiting Membrane (ILM) Translocation and Inversion Covering Surgery Assisted by Intraoperative OCT Navigation in Refractory Macular Holes***First Author: Hongyan SUN**Co-Author(s): Mingming YANG*

Purpose: To observe the efficacy of OCT intraoperative navigation-assisted internal limiting membrane (ILM) translocation and inversion covering surgery in the treatment of refractory macular holes, and to provide evidence-based support for this innovative surgical approach for such diseases.

Methods: A total of 15 cases involving 15 eyes were included in the study. Eight eyes underwent internal limiting membrane translational covering surgery, and 7 eyes underwent internal limiting membrane inversion

covering surgery. All were filled with perfluoropropane (C3F8). Changes in BCVA, macular morphology, hole closure rate, and mfERG at the last follow-up were observed. Paired t-tests were used to compare the parameters before and after the surgery.

Results: All 15 eyes achieved anatomical healing of macular holes (with a closure rate of 100%); compared with before the surgery, the postoperative best corrected visual acuity (BCVA) significantly improved ($P < 0.05$). The improvement in visual acuity in the translational surgery group was significantly greater than that in the inversion surgery group ($P < 0.05$). Moreover, the translational surgical method is more conducive to the recovery of microcirculation in the macular area.

Conclusions: Compared with the traditional inversion technique, the internal membrane translational covering technique better conforms to the anatomical and physiological characteristics of the retina. It can significantly increase the closure rate of large or old macular holes, and provides a new minimally invasive anatomical repositioning treatment option for cases where the conventional techniques have failed.

Abstract No.: 208437**Panel No.: VSC-1117****Eye Complications and COVID-19 Infection – A Review***First Author: Wai Pik LAU**Co-Author(s): Kam Lung Kelvin CHONG, Ka Hei Kenneth LAI, Chi Pui Calvin PANG, Chee Yung Clement THAM, Yiu Man Hanson WONG*

Purpose: This review aims to examine the clinical presentation of ocular complications associated with COVID-19 infection, drawing on current evidence.

Methods: The literature search was performed with the following eligibility criteria: studies in English, with full texts available, published between January 2020 and October 2025, excluding case reports, case series, systematic reviews, or meta-analyses. Inclusion criteria include both anterior and posterior segment involvement, neuro-ophthalmological manifestations, and related pathophysiology. Data extraction was conducted using predefined structural tables.

Results: Of 1,073 screened articles, 15 were selected. Conjunctivitis is the most common ocular manifestation linked to COVID-19 infection, reported with variable incidence ranging from 0.8% to over 30% in most cases. Other anterior segment manifestations observed include keratitis, episcleritis, and uveitis. Retinal involvement in the posterior segment, characterized by microvascular changes, including cotton wool spots, microhaemorrhages, and vascular occlusions, is reported predominantly in severe COVID-19 cases, indicative of microvascular damage or coagulopathy related to COVID-19. The reviews also documented

neuro-ophthalmological complications, including cranial nerve palsies and ischemic optic neuropathy. Optical Coherence Tomography Angiography (OCTA) showed reduced macular vessel density in most post-COVID-19 subjects. Most studies showed normal visual acuity (VA) in post-COVID-19 patients. Other ocular complications, including dryness, irritation, and pain symptoms related to dry eye, are also documented.

Conclusions: Ocular complications in COVID-19 are diverse, with the highest prevalence of the anterior segment complications and conjunctivitis, while manifestations in the posterior segments are reported. Other ocular complications show consistent markers for the effects of COVID-19 on ocular performance.

Abstract No.: 205860

Panel No.: VSC-1113

Genome-Wide Association Study of Human Retinal Electrical Signals Highlights Locus in CNGB3

First Author: Zihe XU

Co-Author(s): Christopher HAMMOND, Pirro HYSI, Xiaofan JIANG, Omar MAHROO

Purpose: The electroretinogram (ERG), representing the summed electrical activity of the retina elicited by light stimuli in vivo, enables exploration of retinal physiology. We performed a genome-wide association study (GWAS) of cone-driven flicker ERG responses.

Methods: Participants were recruited from the TwinsUK registry. The discovery cohort (Group 1) comprised 1587 genotyped participants (55.3 ± 16.2 years), who underwent non-mydriatic light-adapted 30 Hz flicker ERG recordings with a portable device (RETeval system). Two replication cohorts included 372 participants (63.1 ± 14.9 years) who underwent a similar flicker test with the same device, but delivered with a lower stimulus strength (Group 2), and 184 individuals (62.3 ± 10.6 years) who underwent conventional standard mydriatic 30 Hz ERGs (Group 3). Linear mixed models adjusted for age, sex and familial relatedness were used for analysis. Fixed-effect meta-analysis combining the three groups ($n=2,143$) was also performed.

Results: The discovery GWAS identified a genome-wide significant locus in CNGB3 ($rs188808$, $P=4.42 \times 10^{-9}$). This gene encodes one of the subunits of the outer segment cation channel in the cone photoreceptor, and is also a myopia risk locus. This association was replicated in Group 2 ($P=0.045$) and nearly in Group 3 ($P=0.069$). The association became more significant in meta-analysis ($P=7.12 \times 10^{-11}$), with a consistent effect direction in the three groups.

Conclusions: Whilst CNGB3 is a gene associated with a rare disease (achromatopsia), our findings indicate that common variants in this gene shape cone-driven

responses in healthy individuals. The findings also support a role for cone-driven signals in myopia.

Abstract No.: 206278

Panel No.: VSC-1115

Optimising Communications in Blind and Partially Sighted Patients in Primary Care – A Prospective Supra-Regional Feasibility Study

First Author: Chi Kit YAN

Co-Author(s): Louise GRANT, Alicia JEREMIAH, George LIU

Purpose: To prospectively evaluate whether tailoring written communication by font size and formatting empowers patients registered as blind or partially sighted, thereby improving engagement with healthcare information and supporting better clinical outcomes.

Methods: A prospective feasibility study was conducted at GP practices across two English deaneries (East of England and North West). Inclusion criteria were: (1) registration with a Certificate of Visual Impairment (CVI) as blind or partially sighted; (2) receipt of paper communications from practices; (3) engagement with these communications with visual adjuncts; (4) intact cognitive function; and (5) consent to participate. Eligible patients received test letters with varying font sizes (25–60 point). Telephone follow-up assessed readability and preferences. In the second phase, personalised letters incorporating preferred font size, bold text, increased spacing, and black font were sent. Suitability was reassessed via structured follow-up calls.

Results: Thirty-four patients were recruited across three practices. Of these, nine initially met the inclusion criteria. Two patients were later excluded due to newly identified cognitive decline, leaving seven for final analysis. Among these, 100% were able to read personalised letters without reliance on visual adjuncts or carers, compared with baseline dependence on magnifiers or third-party assistance. Data collection is ongoing to confirm reproducibility across additional practices.

Conclusions: This prospective supra-regional feasibility study demonstrates that simple, personalised adjustments to written communication can restore access to healthcare correspondence in patients with visual impairment. Empowering patients in this way improves engagement and has the potential to positively influence health outcomes. Findings support the feasibility of wider implementation across primary care.

Abstract No.: 204690
Panel No.: VSC-1112

The Efficacy and Safety of Jingtongtang Cold Compress Eye Patch in Relieving Visual Display Terminals Related Asthenopia——a Randomized, Double-Blind, Placebo-Controlled Clinical Trial

First Author: Linfangzi ZHU

Co-Author(s): Lin CHEN, Ke FENG, Wenying GUAN, Zuguang LIU

Purpose: To evaluate the immediate efficacy and safety of Jingtongtang cold compress eye patch in relieving video display terminal (VDT) related asthenopia.

Methods: Patients with asthenopia were screened using the ASQ-19 questionnaire. Demographic and clinical baseline data were collected. Following asthenopia induction via one-hour smartphone use under dark conditions, subjects were randomized 1:1 to receive either Jingtongtang Cold Compress Eye Patches or purified water-soaked patches (control) for 15 minutes. Objective parameters, including relative accommodation (RA), accommodative facility (AF), accommodative response (AR), tear film break-up time (TBUT), and conjunctival congestion degree, were assessed pre- and post-induction and post-treatment. Subjects' symptoms and their severity were collected immediately post-induction and post-treatment. Efficacy was evaluated through intra- and intergroup comparisons. Safety monitoring included ocular irritation and documentation of adverse events (AEs) and serious adverse events (SAEs).

Results: Baseline characteristics showed no significant differences between groups. After treatment with Jingtongtang Cold Compress Eye Patch, the experimental group exhibited significant improvements in multiple outcomes: subjective asthenopia symptoms were markedly relieved; ocular surface health improved, evidenced by prolonged TBUT and reduced conjunctival hyperemia; and visual function parameters, including monocular and binocular AF, NRA, and AR, were significantly enhanced compared to the control group ($p < 0.05$). The eye patch demonstrated a good safety profile, with only mild and transient irritation reported in a few subjects. No adverse events or serious adverse events were observed.

Conclusions: The Jingtongtang cold compress eye patch demonstrates a favorable safety and efficacy profile. In comparison to the placebo control group, the intervention significantly promotes relaxation of the accommodative response.

Abstract No.: 206600
Panel No.: VSC-1116

The Natural Preferred Retinal Locus in Patients With Macular Disease

First Author: Danjie LI

Co-Author(s): Shengnan LI, Jinglin ZHANG

Purpose: This study aimed to explore the characteristics of the natural Preferred Retinal Locus (PRL) in eyes with different macular lesions.

Methods: In this retrospective study, 37 patients (39 eyes) suffering from macular diseases (MD) were included, and the following data were collected: best corrected visual acuity (BCVA), mean sensitivity of macular area in 10 deg diameter (MS), and bivariate contour ellipse area (63% BCEA and 95% BCEA), fixation stability, fundus images, and sectional images of the fovea. A natural PRL did not develop in 10 eyes with macular disease.

Results: PRLs, 24% developed nasal PRLs, 7% developed multiple PRLs, 10% developed PRLs inside the "dark area", and there were no independent inferior PRLs. In the inside group, the mean MS was significantly lower than that of the other four groups; and the variations in log BCEA were greater in group M compared with group S ($P < 0.01$), group T ($P < 0.01$) and group N ($P < 0.01$), but there were no obvious differences among group S, group T and group N.

Conclusions: A natural PRL tends to be more localized in the upper retina, possibly to preserve the lower visual field, followed by nasal and temporal, and rarely localized in the lower retina, and multiple scattered PRLs can be formed when the lesion was widespread. If the function of the fovea exists, even if the lesion in the macular area is clear, the patient still uses the fovea for central fixation and does not form PRL.

Abstract No.: 205893
Panel No.: VSC-1114

Weight-Adjusted Waist Circumference Trajectories and the Risk of Vision Impairment: Findings From Three Prospective National Studies

First Author: He XUE

Co-Author(s): Liu LEI, Liu SHUNMIN, Yang XIAOHONG

Purpose: This study aimed to investigate the association between weight-adjusted waist circumference (WWI) trajectories and vision impairment (VI) among adults aged ≥ 50 years in three countries.

Methods: We used nationally representative data from the US, England, and China, with follow-up durations ranging from 5-13 years. WWI trajectories were identified by group-based trajectory modeling. Distance and near VI were ascertained by self-rated eyesight. Logistic regression analyzed the relationship

between WWI trajectories and VI occurrence in each country.

Results: A total of 5,095 participants from US, 4,974 from England, and 5,205 from China were included. Three distinct WWI trajectories were identified in each cohort: low-stable, moderate-stable, and high-stable. The association between WWI trajectories and VI varied across countries. In the US, the high-stable trajectory had an increased risk of near VI (odds ratio [OR]=1.49, 95% confidence interval [CI]=1.10-2.01) after full adjustment. In England, the high-stable trajectory had a significantly increased risk of both distance VI (OR=1.85, 95% CI=1.22-2.81) and near VI (OR=1.68, 95% CI=1.16-2.43). However, in China, these associations were not statistically significant after adjustment. Furthermore, mediation analyses indicated that physical activity partly mediated the association between WWI trajectories and near VI in the US (12.4%) and England (14.7%), while smoking further explained 5.6% in England.

Conclusions: A high-stable WWI trajectory was associated with an increased risk of VI in the US and England population, while not in China. These findings highlight the importance of managing central adiposity and lifestyle factors, including physical activity and smoking, in strategies for vision care among older adults.

E-POSTERS

AI, Digital Innovation and Virtual Health

Abstract No.: 203750

A Community-Focused Vision Foundation Model for Quality Checks and Detection of Ten Geriatric Eye Diseases Using Real-World Non-Dilated Fundus Photographs

First Author: Zhi Da SOH

Co-Author(s): Ching-yu CHENG, Jiangnan HE, Ten Cheer QUEK, Jianfeng ZHU, Haidong ZOU

Purpose: Artificial intelligence models show promise in eye disease detection, but their deployment remains limited due to disparity between model design and utility. We developed ComEye-FM, an integrated quality check (QC) and multi-eye disease foundation model, using real-world non-dilated fundus photographs.

Methods: We developed ComEye-FM using the RETFound architecture and 97,738 fundus photographs obtained from a community screening program in China. The QC model assessed image quality based on macular, optic disc, blood vessel visibility, and imaging artifacts. ComEye-FM detected ten eye diseases, including age-related macular degeneration (AMD), diabetic retinopathy (DR), and myopic macular degeneration (MMD). External testing was done using a diverse China screening dataset and the Singapore Epidemiology of Eye Diseases (SEED) study. Area under the receiver operating curve (AUC), sensitivity, specificity, and F1-score were computed.

Results: The QC model achieved AUC $\geq 95.4\%$ for assessing structure visibility and $\geq 94.6\%$ for detecting imaging artifacts. The disease detection model achieved AUC $> 90\%$ for all conditions except mild DR (76%). The F1-scores for different disease severity ranged between 57.9 - 98% for AMD, 32.5 - 46.3% for DR; 48.4 - 88.3% for MMD. In external testing, ComEye-FM achieved AUCs $\geq 82.5\%$ for most diseases in the China screening dataset, and AUCs between 80.3 - 98.3% for AMD, 61.8% - 97.7% for DR, and 89.9% - 99.1% for MMD in SEED.

Conclusions: ComEye-FM is an integrated QC and multi-disease foundation model designed to improve eye disease detection in community settings.

Abstract No.: 206291

A Machine Learning Model on Orthokeratology Lens Fitting Based on Corneal Topography Data

First Author: Wei XU

Co-Author(s): Qiurong LIN

Purpose: To investigate the performance of machine learning (ML) framework in orthokeratology lens fitting based on the relevant corneal topography maps and compare the accuracy and reliability of different machine learning algorithms.

Methods: A total of 5,242 corneal topographical maps were collected from 3,650 myopic patients (1,500 male patients/2,786 eyes, 2,150 female patients/2,456 eyes, median age 12 years old) who received orthokeratology. The data were randomly divided into two groups: the training data set (70%, sample number 3,669) and the test data set (30%, sample number 1,573). In the study, Logical Regression (LR), Random Forest classification (RF), and eXtreme Gradient Boosting classification (XGBoostC) algorithms were constructed to predict the type of orthokeratology lens (standard lens or circular lens). The best algorithm was determined by comparing each precision, accuracy, recall, and receiver operating characteristic curve (ROC curve).

Results: The XGBoostC algorithm had the best outcome, with an accuracy rate of 86.14%, in deciding the type of orthokeratology lens. Besides, the XGBoostR algorithm better predicted the FK and SK parameters of the orthokeratology lens. In the test data set, the mean square error (MSE) is 0.1172 and 0.2938, the mean absolute error (MAE) is 0.2430 and 0.4175, and the goodness of fit (R^2) is 92.01% and 85.83%, respectively.

Conclusions: The XGBoostC and XGBoostR algorithms could provide practitioners with reasonable models for fitting orthokeratology lenses. Based on the corneal topographical map, the XGBoostC algorithm could suggest the type of orthokeratology lens, and the XGBoostR algorithm could predict the SK and FK values.

Abstract No.: 207836

A Novel 3D OCT Stitching Algorithm for Retinal Reconstruction

First Author: Zhen **TIAN**

Co-Author(s): Mingguang **HE**

Purpose: The purpose of this study is to present a novel method for 3D optical coherence tomography (OCT) retinal image stitching that addresses the challenges of misalignment and distortion introduced by the eye's refractive properties and inherent imaging distortions.

Methods: Three-view OCT images were captured using ultra-wide-field retinal OCT. Source 3D retinal OCT (sOCT) images is aligned to target retinal OCT (tOCT) coordinates within a unified coordinate system by transforming voxel data into a Cartesian framework. An ideal ellipsoidal model of the inner ocular surface is employed to compute the world coordinates of each voxel in the tOCT image, and a rigid transformation is then applied to map these coordinates into the sOCT space. To ensure seamless stitching and precise alignment, an iterative optimization framework was employed to minimize a combination of loss functions. These functions guide the alignment process, correcting for discrepancies in intensity, key anatomical features, and color consistency between images

Results: The proposed 3D OCT image stitching method significantly reduced geometric distortions and improved stitching accuracy.

Conclusions: By correcting refractive and geometric errors and optimizing image fusion, this technique significantly improves the quality and reliability of 3D retinal OCT images stitching. The enhanced visualization supports more accurate clinical assessments and offers robust potential for future applications in ophthalmology

Abstract No.: 201508

A Post-Conceptional-Age-Conditioned Diffusion Approach to Visualize and Anticipate Retinopathy of Prematurity Progression

First Author: Putu Emilia **DEWI**

Co-Author(s): Kadek Rina **AGUSTINAWATI**, Ni Wayan **SEDANI**

Purpose: To develop and evaluate a generative model that synthesizes anatomically plausible pediatric fundus images at arbitrary post-conceptional ages (PA), enabling counterfactual visualization of vascular maturation and potential late reactivation in retinopathy of prematurity (ROP).

Methods: We adapted a diffusion-based counterfactual framework. A pretrained diffusion model serves as the generative prior, while a PA classifier provides gradient-based guidance to steer sampling toward age-specific appearance. The diffusion prior learns the distribution

of infant fundus images and denoises latents into realistic variants. The classifier imposes a semantic constraint so outputs reflect clinically meaningful shifts across PA groups (30–34, 35–39, 40–44 weeks). Framework quality depends on (i) the diffusion model's capacity to reconstruct realistic anatomy and (ii) the classifier's discriminative reliability. We report validation accuracy as an indicator of learned age-related morphology and a proxy for guidance robustness.

Results: A PA classifier distinguishing 30–34, 35–39, and 40–44-week groups achieved 64.4% validation accuracy on held-out data, suggesting subtle yet learnable age-related features. Integrated with the diffusion prior, this guidance yielded coherent age-shifted counterfactuals, producing plausible transitions between PA groups. Although moderate accuracy introduces variability, it was sufficient to drive perceptible, anatomically consistent changes aligned with increasing PA.

Conclusions: PA-conditioned diffusion can synthesize clinically realistic pediatric fundus images at user-specified ages, offering a tool to visualize counterfactual ROP trajectories. Potential applications include education, decision support, and simulation of late-reactivation scenarios. Prospective validation and integration with time-to-event risk models are planned.

Abstract No.: 206617

AEyeTrauma – RAG Enabled ChatGPT Assistive Tool for Management of Patients With Ophthalmic Trauma

First Author: Rachel **SONG**

Co-Author(s): Rupesh **AGRAWAL**, Paola **SABOYA**, Maxwell **SINGER**

Purpose: To evaluate the safety and efficacy of a purpose-built large language model (LLM) assistive tool (AEyetrauma) for treatment planning and prognostication in patients with ophthalmic trauma.

Methods: AEyeTrauma was built using a retrieval-augmented generation (RAG) chatbot framework, trained on selected PubMed abstracts and an "Ocular Traumatology" textbook. A knowledge-indexing framework was implemented using OpenAI and LangChain, while ChatGPT-4o was integrated into the system architecture. Hypothetical data referenced from the International Globe & Adnexal Trauma Epidemiology Study (IGATES) formed the basis of the clinical scenarios and were input into both AEyeTrauma and ChatGPT-4o. Responses generated were evaluated for correctness, completeness, helpfulness, readability, and safety.

Results: AEyeTrauma scored higher than GPT-4o across all five evaluation components (correctness, completeness, helpfulness, readability, and safety) on the Likert scale. Expert validation showed that

AEyeTrauma produced fewer errors and was more accurate in predicting outcomes using the Ocular Trauma Score (OTS).

Conclusions: AEyeTrauma provided correct, comprehensive, and safe treatment plans for patients with ophthalmic trauma, and accurately generated OTS scores. It has the potential to be integrated into clinical care pathways to support patient counselling and outcome prognostication in emergency eye injury settings.

Abstract No.: 205054

AI in Your Fingertips: Free No-Code Retinal Disease Detection

First Author: Anju KURIAKOSE

Purpose: Artificial Intelligence (AI) is transforming healthcare but is often inaccessible to clinicians without programming knowledge. This study demonstrates how doctors can build a free AI tool to detect retinal diseases from fundus photographs using a simple, no-code platform.

Methods: Retinal fundus photographs representing various diseases were divided into training and test datasets. Google's free online platform, Teachable Machine, was used to train a machine learning algorithm on the training set. The trained AI model was then validated on the test dataset to classify new images according to retinal disease. Accuracy was measured as the percentage of correctly classified images.

Results: The AI algorithm successfully detected trained retinal diseases with high accuracy, ranging from 80% to 99%, depending on the test images. Once trained, the AI analyzed new fundus photographs in seconds, demonstrating rapid and reliable classification without programming expertise.

Conclusions: Teachable Machine enables clinicians to develop free, no-code AI algorithms for retinal disease detection from fundus photographs. These AI models achieve high diagnostic accuracy and process images quickly, providing an accessible platform for innovation in ophthalmology. Such tools can democratize AI development, allowing healthcare professionals to experiment with and implement machine learning in clinical practice without technical barriers.

Abstract No.: 204339

Adapting WHOeyes: Preliminary Study of a Digital School-Based Eye Health Screening Model in Jakarta

First Author: Kianti Raisa DARUSMAN

Co-Author(s): Beta ASWARNI, Tanessa AUDREY, Ray Wagiu BASROWI, Bunga PELANGI

Purpose: Uncorrected refractive errors (URE) impede learning and wellbeing among Indonesian

schoolchildren, while conventional school screening (e.g., Snellen charts) is time-consuming, poorly followed up, and hampered by low parental awareness. To address these gaps, we assessed the feasibility and acceptability of adapting WHOeyes, a mobile visual-acuity tool, into a digital, school-based eye-health screening model in Jakarta, including considerations for children with disabilities and linkages to mental-health assessment and referral pathways.

Methods: Mixed-methods cross-sectional preliminary study in 15 schools (12 public primary, 3 special schools) across four Jakarta municipalities. Participants were 1,254 students (grades 4–6) plus parents, teachers, and primary-care staff in focus-group discussions. Data comprised structured questionnaires, an adapted Pediatric Eye Questionnaire (PedEyeQ), descriptive statistics, and thematic analysis.

Results: Among non-disabled students, 63.0% reported high-intensity gadget use, 33.7% eye fatigue, and 29.3% headaches; PedEyeQ indicated 52.3% perceived reduced visual function and 48.9% functional limitations. Among students with disabilities, 39.4% reported high gadget use and 21.2% eye fatigue. Overall, 54.2% had undergone an eye examination—mostly at school—yet spectacle-wear compliance was low due to discomfort and stigma. Parents and teachers endorsed digital screening as efficient and accessible, while expressing concerns about test accuracy and feasibility for children with intellectual disabilities.

Conclusions: A WHOeyes-adapted, school-based digital model appears feasible and acceptable in Jakarta. The approach may strengthen early detection, parent–school collaboration, and integration with mental-health assessment. Validation studies are warranted to optimise accuracy, ensure inclusivity for children with disabilities, and reinforce referral pathways to primary care.

Abstract No.: 204968

Adoption of Assistive Technologies and Transportation Challenges Faced by Visually Impaired Persons (VIPs) in Hong Kong

First Author: Natalie Nga Man TAM

Co-Author(s): Joseph Yau Kei CHAN, Kai Mei Stephanie TSOI, Lok Hai ZHANG

Purpose: There is rapid advancement in artificial intelligence (AI) and other assistive technologies aimed at helping visually impaired persons (VIPs) travel independently, promoting health, activity, and employment. However, real-world adoption remains under-studied. This study aims to explore the usage of assistive technologies among VIPs during travel, compare the needs between blind and severely visually impaired persons (SVIP), and understand the overall transportation needs of VIPs in Hong Kong.

Methods: This study recruited VIPs from two non-governmental organisations. They completed qualitative semi-structured interviews exploring their travel experiences and technology use, with the data analyzed thematically. Additionally, quantitative surveys collected demographics, travel patterns, and transportation experiences for data supplementation. Fisher's exact test was used for statistical analysis.

Results: Of the 116 participants (59 blind, 57 severely visually impaired), 51.7% used travel apps, but only 13.8% used AI visual assistance apps. VIPs' needs include auditory and tactile information (barrier-free facilities), human assistance, and adaptation to environmental changes. More SVIPs emphasised larger visual cues (7/57 vs. 1/59, $P = 0.031$) and higher color contrast (5/57 vs. 1/59, $P = 0.11$) than blind individuals.

Conclusions: The global number of VIPs is projected to triple by 2050, reaching nearly 115 million. Promotion and education are essential to increase assistive technology adoption. Public awareness and proper training for transportation personnel can reduce the burden on VIPs. Regular maintenance of barrier-free facilities is crucial to ensure accessibility and safety.

Abstract No.: 205933

Applications and Limitations of Artificial Intelligence in the Management of Paediatric Cataracts: Review of Current Literature

First Author: Tin Yau Natalie **SO**

Purpose: Early diagnosis and intervention are essential in minimising visual impairment related to paediatric cataract. However, unique challenges in the management of childhood cataract may hinder treatment effectiveness. The past decade has seen an immense growth in research on artificial intelligence in ophthalmology. Nevertheless, research on AI in childhood cataract remains limited. This review aims to provide an update on the current applications and limitations of AI in managing paediatric cataract.

Methods: An enquiry of the MEDLINE database was performed in August 2025 using the search phrase ((paediatric OR child OR newborn OR congenital OR baby OR infant) AND (cataract)) AND ((artificial intelligence) OR ((machine OR deep) AND learning)) with a filter placed on English results within the past 10 years. The titles and abstracts of all articles were reviewed and only those relevant to artificial intelligence and childhood cataracts were included.

Results: 68 articles were identified in the search query. Appraisal of articles revealed 17 articles directly related to AI and childhood cataract. Among the 17 articles, 10 were original research papers included in this review.

Conclusions: Artificial intelligence platforms demonstrate promise in diagnosis, prognostication, and genetic analysis of paediatric cataract. However, several limitations must be acknowledged. AI algorithms rely

on high-quality slit lamp photos for analysis and the problem of uncooperative patients affecting image quality persists. Second, the quality of AI algorithms depend on the training dataset; algorithms must go through a rigorous evaluation process to determine its accuracy. Finally, the "black-box" nature of AI poses legitimate concerns regarding its accountability.

Abstract No.: 200590

Are Ophthalmology Residents or Artificial Intelligence Better at Grading Vertical Cup-to-Disc Ratios?

First Author: Eunice **GOH**

Co-Author(s): Bryan Chin Hou **ANG**, Kelvin Zhenghao **LI**, Sheng Yang **LIM**, Kok Yao **LOW**, Vivien Cherng Hui **YIP**

Purpose: To evaluate if a deep learning model (DLM) or ophthalmology residents perform more accurately in vertical cup-to-disc ratio (vCDR) grading. An increased vCDR is a key indicator of glaucoma. However, grading is time-consuming and potentially delays diagnosis and treatment.

Methods: 80 individuals (160 fundus images) were selected randomly from a population study. Two ophthalmology residents (second- and fourth-year) and a glaucomatologist graded vCDR using a universal standardized method, with the latter being the gold standard. DLM was applied to the same dataset. The ability of DLM and residents to accurately estimate vCDR was measured with three error-thresholds- ≤ 0.1 , 0.1 to ≤ 0.2 and > 0.2 . We focused on vCDR error thresholds of ≤ 0.2 as this was previously defined as concordant between graders by the Ocular Hypertension Treatment Study.

Results: DLM achieved the highest concordance with the gold standard, with 95.6% ($n=153$) of cases within ≤ 0.2 (75.6% ≤ 0.1 ; 20.0% $0.1-0.2$), outperforming the fourth-year resident (94.9%, $n=152$; 83.1% ≤ 0.1 ; 11.8% $0.1-0.2$) and the second-year resident (94.4%, $n=151$; 76.3% ≤ 0.1 ; 18.1% $0.1-0.2$). Mc Nemar's test found no significant difference between the graders (all $p \geq 0.80$).

Conclusions: DLM has proven itself to be concordant with the gold standard on a normal population study, performing even better than the residents. We hope to further validate this on a local group of glaucoma patients. Should the results be promising, it will potentially be a useful tool to identify glaucoma suspects more efficiently.

Abstract No.: 205066

Artificial Intelligence Accuracy in Glaucoma Detection: A Systematic Review

First Author: Randy **KINDANGEN**

Co-Author(s): Yeni **LESTARI**, Astrianda **SURYONO**

Purpose: Glaucoma is a leading cause of irreversible blindness worldwide, emphasizing the need for early

and accurate detection to initiate timely treatment. Artificial intelligence (AI) has gained attention as a potential tool for improving glaucoma detection by analyzing various ocular imaging modalities. This systematic review aims to evaluate the accuracy of AI-based systems in glaucoma detection and provide insights into their diagnostic performance.

Methods: A systematic literature search was conducted in major scientific databases, including Cochrane, PubMed, MEDLINE and EMBASE, using predefined search terms. The reviewer screened the selected articles, and data on study design, sample size, AI algorithm used, imaging modality, and diagnostic accuracy measures were extracted.

Results: A total of 8 studies met the inclusion criteria and were included in the review. Various AI techniques were utilized, including machine learning, deep learning, and convolutional neural networks. Imaging modalities employed in the studies included optic disc photographs, optical coherence tomography (OCT), and visual field tests. One feature that all those studies agree on to investigate is the retinal nerve fiber layer defect (RNFLD). Regarding sensitivity, our review discovered more varied results between models, ranging from 64.0% to 96.2%.

Conclusions: The use of AI models in diagnosing glaucoma shows a promising diagnostic capability with varied sensitivity among different algorithms and models.

Abstract No.: 206134

Artificial Intelligence Prediction of Postoperative Rotation Stability After Toric Implantable Collamer Lens Implantation

First Author: Yinjie **JIANG**

Co-Author(s): Xun **CHEN**, Lin **WANG**, Xiaoying **WANG**, Xingtao **ZHOU**

Purpose: This study aims to predict postoperative toric implantable collamer lens (TICL) rotation and its effect on refraction and vision using artificial intelligence (AI) models.

Methods: Data from 642 eyes from 371 patients undergoing TICL surgery were included. Regression models predicted rotation degrees, and classification models predicted rotation-related residual astigmatism, visual acuity loss, or the need for realignment surgery. Regression tasks were evaluated with root mean square error (RMSE) and coefficient of determination (R^2), and classification tasks with accuracy and mean area under the curve (AUC). Subgroup analyses were conducted for low, medium, and high astigmatism. The cut-off value for rotation affecting astigmatism or visual acuity was determined using receiver operating characteristics curves.

Results: TabPFN was the most accurate regression model for predicting postoperative rotation, achieving

RMSE (10.672 ± 5.880) and MAE (5.643 ± 2.328) compared to traditional models. For predicting rotation-related complications, TabPFN consistently achieved the highest accuracy across all secondary outcomes (0.906–0.981), particularly excelling in realignment surgery prediction with near-perfect precision (0.990 ± 0.006) and the highest AUC (0.900 ± 0.078). Cut-off values for residual astigmatism were 7.50° (AUC = 0.65), 4.50° (AUC = 0.68), and 2.50° (AUC = 0.73), while for visual acuity loss were 9.50° (AUC = 0.72), 7.50° (AUC = 0.80), and 4.50° (AUC = 0.93) in low, medium, and high astigmatism groups.

Conclusions: AI models effectively predict postoperative rotation stability, providing valuable references for ophthalmologists.

Abstract No.: 208008

Artificial Intelligence Preferences on Treatment Choices for Central Retinal Vein Occlusion With Macular Edema – Grok Expert Mode

First Author: Chi Lik **AU**

Purpose: Artificial intelligence is gaining popularity. To test whether there are any preferential choices of treatment by Grok.

Methods: We input the prompts of “I am an old woman, and my ophthalmologist told me today that I have wet age-related macular degeneration over right eye. I underwent an optical coherence tomography scan: right eye central macular thickness was 387um. Which treatment should I choose? Thank you” to Grok. And 2nd prompt is “Which anti-VEGF injections should I choose?”

Results: The most common and recommended initial treatment for wet AMD is injections of anti-vascular endothelial growth factor (anti-VEGF) medications directly into the eye. If minimizing trips to the doctor is a priority (common for older patients), consider starting with Eylea HD or Vabysmo, as they often allow spacing out to 3-4 months after the initial phase, while still effectively lowering macular thickness. If cost is an issue, Avastin or biosimilars for Lucentis might be ideal.

Conclusions: All anti-VEGF agents were mentioned, with pros and cons of each summarized in table format.

Abstract No.: 207998

Artificial Intelligence Preferences on Treatment Choices for Central Retinal Vein Occlusion With Macular Edema – Grok Expert Mode

First Author: Chi Lik **AU**

Purpose: Artificial intelligence is gaining popularity. To test whether there are any preferential choices of treatment by Grok.

Methods: We input the prompts of “I am a hypertensive patient, and my ophthalmologist told me today that I have central retinal vein occlusion over right eye. I underwent an optical coherence tomography scan: right eye central macular thickness was 387um. Which treatment should I choose? Thank you” to Grok. And 2nd prompt is “Which anti-VEGF injections should I choose?”

Results: If macular edema is confirmed (as your OCT suggests), intravitreal injections are the mainstay, as they target inflammation and vascular leakage. Examples: Bevacizumab (Avastin; off-label but commonly used and cost-effective), ranibizumab (Lucentis; FDA-approved), aflibercept (Eylea; FDA-approved), or faricimab (Vabysmo; newer and also targets another pathway). Most guidelines recommend starting with anti-VEGF injections for CRVO with macular edema, as they have the best evidence for vision improvement and safety profile, especially in patients with hypertension (where steroids might exacerbate pressure issues). Aflibercept or faricimab might offer quicker or more sustained reduction. As of 2025, faricimab is gaining traction in real-world use for RVO, with positive outcomes in treat-and-extend regimens

Conclusions: All anti-VEGF agents were mentioned. Things to consider were well addressed.

Abstract No.: 208011

Artificial Intelligence Preferences on Treatment Choices for Diabetic Macular Edema – Grok Expert Mode

First Author: Chi Lik **AU**

Purpose: Artificial intelligence is gaining popularity. To test whether there are any preferential choices of treatment by Grok.

Methods: We input the prompts of “I am a diabetic patient, and my ophthalmologist told me today that I have diabetic macular edema over both eyes and moderate non-proliferative diabetic retinopathy. I underwent an optical coherence tomography scan: right eye central macular thickness was 387um, left eye 421um. Which treatment should I choose? Thank you” to Grok. And 2nd prompt is “Which anti-VEGF injections should I choose?”

Results: Anti-VEGF Injections (First-Line for Most Cases) When recommended: This is the primary treatment for ci-DME with VA of 20/30 or worse, or if observation isn't sufficient. ICO and AAO guidelines endorse it as first-line, especially for CMT >300 µm. For VA ≤20/50, aflibercept may be preferred initially due to better thickness reduction.

Conclusions: Unlikely fast or auto mode, all available anti-VEGF agents were mentioned. Even 8mg aflibercept was mentioned.

Abstract No.: 202333

Artificial Intelligence for Detection of Diabetic Retinopathy

First Author: Bayasgalan **PUREVDORJ**

Co-Author(s): Tumenjargal **TUMENBAATAR**

Purpose: Recent studies have shown that early detection and remote diagnostics of diabetic retinopathy using retinal images can reach populations living in rural areas with difficulty accessing eye care and can screen more people in a shorter period of time. Recently, artificial intelligence has been intensively used in medicine. Currently, in our country, artificial intelligence has not been used in the ophthalmology field.

Methods: A total of 400 participants were randomly selected for the study, with a 1:4 ratio of diabetic retinopathy and relatively healthy controls. Fundus images of the eyes were collected from all participants, and the screened diagnosis by RetCAD. Artificial Intelligence was compared with the predictive diagnosis of the ophthalmologist. The diagnostic ability of the RetCAD software was measured using ROC curves to investigate sensitivity and specificity.

Results: The average age of the participants was 56.48±9.4 years, and the gender ratio was not statistically different between the two groups (P=0.089). The RetCAD AI software has a sensitivity/specificity of 92.4%/94.7%; an ROC curve area of 0.987 was achieved. After adjudication by the second expert examiner sensitivity/specificity increases on image-level to 91%/95.4% for DR, respectively.

Conclusions: 1. RetCAD offers better sensitivity and specificity compared to ophthalmologist examination, as well as a lower cost and shorter time for early detection of DR. 2. Specificity, sensitivity, and ROC curve evaluation achieved by AI software can be used for early detection of DR.

Abstract No.: 206616

Artificial Intelligence in Proliferative Diabetic Retinopathy: Advancing Early Detection and Clinical Management

First Author: Soufia **FARRUKH**

Co-Author(s): Faryal **WAHEED**

Purpose: Proliferative diabetic retinopathy (PDR), the advanced stage of diabetic retinopathy, constitutes a leading cause of preventable blindness globally. Although therapeutic strategies have evolved, effective management remains contingent upon timely diagnosis. However, access to systematic screening is often restricted by workforce limitations, dependence on trained ophthalmologists, and the increasing prevalence of diabetes, particularly in resource-constrained health systems. Advances in artificial intelligence (AI), specifically deep learning (DL) and machine learning (ML), present a promising paradigm

shift by enabling automated, accurate, and scalable retinal image interpretation, thereby facilitating early detection and optimizing patient outcomes.

Methods: This presentation reviews the application of AI-driven algorithms—including convolutional neural networks, transfer learning architectures such as InceptionV3 and ResNet, and ensemble approaches—for the detection and management of proliferative diabetic retinopathy. Evidence is synthesized from large-scale clinical studies and validated AI systems, including FDA-approved platforms such as IDx-DR, EyeArt, and Google DeepMind's algorithm, highlighting their performance, scalability, and potential integration into routine clinical practice.

Results: Findings from clinical trials and real-world implementations indicate that AI-based systems consistently achieve diagnostic sensitivities exceeding 90%, demonstrating performance comparable to that of expert ophthalmologists. These technologies enable earlier detection, alleviate the clinical workload, and extend screening capacity, particularly in underserved populations, while facilitating integration with telemedicine platforms.

Conclusions: Strategic deployment of AI-enabled solutions holds the potential to substantially reduce vision loss and redefine global strategies for the management of diabetic eye disease

Abstract No.: 201674

Artificial Intelligence-Driven Glaucoma Screening: Leveraging History and Basic Examination for Early Detection

First Author: Archeesha **VYAS**

Co-Author(s): Sushmita **KAUSHIK**, Kamal **KISHORE**, Surinder Singh **PANDAV**, Srishti **RAJ**, Faisal **T.T**

Purpose: Testing accuracy of ChatGPT (Chat Generative Pretrained Transformer) to detect glaucoma using basic history and examination, to develop a custom GPT (Large language model) suitable for glaucoma screening and to compare its accuracy with that of expert ophthalmologists.

Methods: Prospective, observational study on 600 patients. Stage I (training set), had 400 patients - 300 were confirmed glaucoma, and 100 had other ocular diseases. Stage II (Testing set) involved 200 subjects recruited from the community/O.P.D. The training set was used to train the model, and the testing set was used to test the performance of both non-customized (pre-trained) and customized GPT (trained) models, comparing them with an expert ophthalmologist.

Results: Non-customized model had an accuracy of 87.9% (sensitivity 50%, specificity 94.7%). The positive and negative predictive values were 62.5% and 91.4%. Our (Customized) model had an accuracy of 91.5% (sensitivity 93%, specificity 91%). The negative predictive and positive predictive values were 98.7%

and 65.1%, respectively. When validated against the gold standard, it exhibited improved accuracy, sensitivity, NPV, and PPV.

Conclusions: Large language models like ChatGPT can serve as an effective screening tool even with limited resources. Without involving any high-feature imaging modality, our model screened patients with a high diagnostic accuracy, comparable to an expert ophthalmologist at a relatively low cost.

Abstract No.: 204197

Assessing the Effectiveness of Augmented Reality Technology as an Educational Tool for Simulating Visual Impairment

First Author: Jamie **WU**

Co-Author(s): Yau Kei **CHAN**, Ka Mei Stephanie **TSOI**

Purpose: This study evaluates the use of augmented reality (AR) technology to simulate the lived experience of visual impairment. By creating an immersive, first-person simulation, AR allows individuals to better understand the difficulties faced by people with various visual diseases. We hypothesize that AR-based learning can emulate these experiences, making it a viable tool for health promotion.

Methods: An in-house AR mobile app was developed to model symptoms of common eye diseases. It was tested in workshops with 1496 members of the general public in Hong Kong, all without self-reported visual impairment. After completing daily tasks under AR-simulated vision loss, participants filled in the EQ-5D-5L and EQ-VAS questionnaires; a comparison group of 118 visually impaired individuals also completed both tools. The EQ-5D-5L assessed five health dimensions across severity levels, while the EQ-VAS measured overall self-rated health on a 0-100 scale.

Results: Among the results of EQ-5D-5L of AR participants, moderate to severe problems (levels 3-5) were most frequent in usual activities (74.1%), mobility (65.8%), and anxiety/depression (63.3%). Contrarily, visually impaired respondents demonstrated better outcomes, with the majority reporting minimal issues (levels 1-2). Visually impaired participants reported higher mean EQ-VAS scores (blindness: 71.0 ± 19.2 ; severe impairment: 72.5 ± 15.7) compared to the AR group, which had an overall mean score of 48.5 ± 31.4 . Overall, the AR simulation induced greater functional limitations and psychological distress than experienced by visually impaired participants.

Conclusions: The AR workshop effectively replicated the burden of vision loss to the general public, highlighting its potential for education and health promotion.

Abstract No.: 206750

Association of External Eye Age Gap With Diabetes Mellitus: A Cross-Sectional and Longitudinal Study

First Author: Zhuxin XIONG

Co-Author(s): Xiaofei WANG, Ya Xing WANG, Tien Yin WONG

Purpose: To develop a deep learning (DL) model that predicts age from external eye images (external eye age) and to investigate the association between external eye age gap (external eye age minus chronological age) and diabetes mellitus (DM).

Methods: A total of 36,670 external eye images from 12,562 relatively healthy participants were used to train and validate the DL age prediction model. The external eye age gap was then calculated for the remaining 38,288 participants. Logistic regression models and Cox proportional hazards regression models were used to analyze the association.

Results: The DL model achieved an overall mean absolute error of 2.74 years between external eye age and chronological age. Cross-sectional analysis of 37551 participants showed that each 1-year increase in external eye age gap was associated with a 5% higher DM prevalence (odds ratio (OR) = 1.05, 95% confidence interval (CI) 1.04 to 1.06, $P < 0.001$) after multivariable adjustments. Longitudinal analysis of 15173 participants demonstrated that 4.02% of them developed DM in follow-up, and each 1-year increase in external eye age gap was associated with a 5% increase in the risk of DM incidence (hazard ratio (HR) = 1.05, 95% CI 1.03 to 1.07, $P < 0.001$).

Conclusions: We found that the external eye age gap was independently associated with the prevalence and incidence of DM, supporting its use as a novel biomarker in identifying high-risk individuals.

Abstract No.: 203842

Automated Visual Field Analysis for Early Detection of Hydroxychloroquine Retinal Toxicity: A Pilot Study

First Author: Cheryl KHANNA

Co-Author(s): Sepideh JAMALI DOGAHE, Sunil KHANNA, Michael MAHR, Mostafa SADEGH MOUSAVI

Purpose: To analyze changes in 10-2 visual field threshold values in hydroxychloroquine patients with and without retinal toxicity.

Methods: We conducted a retrospective pilot analysis of 10-2 visual field tests from 45 patients receiving hydroxychloroquine therapy. The cohort included 21 patients with confirmed toxicity (mean treatment duration 6.09 ± 4.02 years) and 24 controls without toxicity (mean duration 6.22 ± 3.8 years). Custom-developed software integrated with DICOM servers extracted threshold values from both eyes using optical

character recognition. Visual field data were stored in MongoDB and analyzed for threshold changes between initial and final visits. Statistical analysis employed independent samples t-tests with significance set at $p < 0.05$.

Results: The toxic group demonstrated significantly greater deterioration in visual field threshold values compared to controls. Mean threshold change was -0.93 ± 0.48 dB in the toxic group versus -0.41 ± 0.52 dB in controls, yielding a between-group difference of 0.52 dB (95% CI: 0.42 to 0.63 dB, $p < 0.001$). Both eyes showed consistent patterns of threshold deterioration in toxic patients. The automated software successfully tracked changes across 68 threshold points per visual field test, demonstrating reliable discrimination between toxic and non-toxic patterns.

Conclusions: Automated visual field analysis reveals significant differences in threshold deterioration between patients with and without hydroxychloroquine retinal toxicity. The 0.52 dB mean difference between groups suggests potential clinical utility for early detection. This pilot study establishes the foundation for a comprehensive multimodal prediction model incorporating fundus autofluorescence and optical coherence tomography data to enhance screening protocols for hydroxychloroquine retinal toxicity.

Abstract No.: 204157

Bibliometric Analysis of Robotic Surgery Research in Ophthalmology Conducted Between 2000 and 2023

First Author: Wang YINING

Purpose: To explore the research hotspots and trends in this field, bibliometric and visual analyses were performed for the first time.

Methods: The literature included in this study were obtained from the Web of Science Core Collection (WOSCC) database and include research papers on ophthalmic surgical robots published from 2000 to 2023. We adopted bibliometric research methods and used software such as VOSviewer, R, Bibliometrix, Origin2024 and CiteSpace for analysis.

Results: The number of papers published increased nearly thirtyfold over 14 years. These publications were contributed by research institutes from 46 countries or regions. The United States ranked first, with 439 papers published, whereas China and England ranked second and third, respectively. Johns Hopkins University (United States) published the highest number of papers. The top three journals contributing to this field were the International Journal of Medical Robotics and Computer Assisted Surgery, International Journal of Computer Assisted Radiology and Surgery, and Surgical Endoscopy and Other Interventional Techniques. Augmented reality, invasive surgery, transoral robotic surgery, image-guided surgery, machine learning and

virtual fixtures were identified as the most frequently used keywords in the field.

Conclusions: At present, ophthalmic surgical robots are still in the stage of instrumental development and theoretical verification, and only a few clinical applications have been reported. This area of research still requires multicenter, large-sample clinical studies to confirm the advantages of robotic eye surgery over traditional surgical methods.

Abstract No.: 201093

Bridging the Research-Implementation Gap of Large Language Models in Ophthalmology: A Scoping Review

First Author: Clarence SEE

Purpose: Technological advancements in Large Language Models (LLMs) in the last five years have sparked a wave of research output in their applications within Ophthalmology. However, their actual implementation in day-to-day practice has remained low. By evaluating the conduct of research in this field and identifying the existing limitations of LLM use within Ophthalmology studies, we hope to bridge the gap between research and clinical implementation.

Methods: A scoping review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews. Eight databases were searched for articles from 2019 to 2024. In total, 976 studies were screened, and a final 49 were included for analysis. The study designs and outcomes of these studies were analysed. The performance of LLMs was further analysed in the areas of exam taking and patient education, diagnostic capability, management capability, administration, inaccuracies, and harm.

Results: LLMs performed acceptably in most studies, even surpassing humans in some, with GPT-4.0 having one of the best performances. Despite their relatively good performance, issues pertaining to study design, grading protocols, hallucinations, inaccuracies, and harm were found to be pervasive. Most studies also lacked a standardised framework to assess LLMs in healthcare. We also noted many innovative techniques used by individual studies to improve the performance of LLMs in Ophthalmology.

Conclusions: By addressing these gaps, future works can generate a more cohesive pool of knowledge applied to patients in a safe and ethical manner, thereby accelerating the adoption of LLM in clinical practice.

Abstract No.: 200367

Classifying Glaucoma From Blood Multi-Omics Data With SHAP Explainable AI

First Author: Justin VEERASAMI

Co-Author(s): Sang Won BAE, Ji Won BANG, Kevin CHAN, David FENYO, Joel SCHUMAN, Gadi WOLLSTEIN

Purpose: Recent studies suggest plasma biomarkers may serve as indicators of glaucoma. We evaluated whether circulating multi-omics profiles can differentiate glaucoma from healthy controls and used SHapley Additive exPlanations (SHAP) to interpret model predictions and identify the most influential features.

Methods: We assembled a balanced UK Biobank cohort (project: 91781) of adults aged 50-70 years: glaucoma (n=480; mean age=62.4; 54.8% female) and healthy controls (n=480; mean age=62.4; 53.6% female). Features included 251 metabolites and 2923 proteomic analytes measured via circulating blood. Highly collinear metabolites ($|\text{Spearman } \rho| > 0.80$) were removed, yielding 67 features. Differential expression identified 211 proteins (FDR<0.001) that distinguished glaucoma from controls. An XGBoost classifier was trained on an 80/20 train-test split, with hyperparameters tuned via stratified 10-fold cross-validation on the training set. Performance was evaluated on unseen samples (n=192) using accuracy, and class-specific F1-scores with 2,000 bootstrapped 95% CIs. Global SHAP values computed each feature's contribution to model predictions in log-odds units for XGBoost.

Results: The multi-omics model achieved 62.5% accuracy (95% CI: 55.2–69.3%). Class-specific F1-scores were 59.9% (95% CI: 51.2–68.1%) for glaucoma and 64.6% (95% CI: 56.2–72.0%) for controls. Proteins linked to pro-/anti-inflammatory processes were top-ranked features for distinguishing glaucoma from controls, whereas top metabolites included cholesterol particle composition (LDL/HDL).

Conclusions: Blood-derived multi-omics yielded modest but above-chance glaucoma classification with balanced class performance. SHAP interpretation highlighted biologically plausible features warranting mechanistic follow-up.

Abstract No.: 202571

Comparative Evaluation of New-Generation Intraocular Lens Power Calculation Formulas in the Indian Population Using the ESCRS IOL Calculator

First Author: Raj KENIA

Co-Author(s): Smruti DETHI, Shweta DHIMAN, Santosh MAHAPATRA

Purpose: To compare the accuracy of new-generation intraocular lens (IOL) power calculation formulas in Indian cataract patients using the European Society

of Cataract & Refractive Surgeons (ESCRS) online calculator.

Methods: A hospital-based, prospective consecutive case series including 210 eyes undergoing phacoemulsification with monofocal IOL implantation at JPM Rotary Eye Hospital, Cuttack (April 2024–September 2025). Biometry was performed using the IOL Master 700. Predicted refractions from various new-generation formulas (Kane, Hill-RBF, Barrett Universal II, EVO, Cooke K6, Hoffer QST, and PEARL DGS) were obtained via the ESCRS calculator. Postoperative refraction at 4 weeks was compared with predicted values. Mean prediction error (MPE), median absolute error (MedAE), and percentage of eyes within ± 0.5 D, ± 1.0 D, and ± 2.0 D were calculated. Subgroup analysis was performed for short (< 22 mm), medium (22–24.5 mm), and long eyes (> 24.5 mm).

Results: Preliminary analysis suggests all formulas achieve clinically acceptable accuracy. Hill-RBF and Kane demonstrated the lowest MedAE (~ 0.26 – 0.28 D) and the highest proportion of eyes within ± 0.5 D (~ 82 – 84%), particularly in medium axial lengths. In short and long eyes, variability increased across formulas, with Cooke K6 and Barrett Universal II showing relatively consistent performance

Conclusions: New-generation IOL formulas integrated into the ESCRS calculator demonstrate high accuracy across Indian eyes, with Hill-RBF and Kane performing best overall. Subgroup variability highlights the importance of formula selection based on axial length to optimize refractive outcomes.

Abstract No.: 205386

Comparison of Visual Estimation of Cup by Human Ophthalmologist to a Machine Learning Algorithm

First Author: John Davis AKKARA

Purpose: To evaluate Glaucomatous cupping from fundus images by using an artificial intelligence machine learning algorithm and compare its accuracy to a human ophthalmologist grader.

Methods: Color fundus photographs were taken with a Topcon fundus camera (Topcon TRC; Topcon, Tokyo, Japan) by technicians 150 fundus photos without artefacts were selected and evaluated using a beta version of a Deep Learning algorithm that analyses single color fundus photographs to detect glaucomatous cupping. Parameters detected include Cup/Disc ratio, Neuro Retinal Rim thickness in 4 quadrants, ISNT rule (Figure 3), and Disc Damage Likelihood Score.

Results: The Deep Learning Algorithm analysed 150 fundus photographs. 15 images (10%) were marked as errors by the AI, as it could not detect the disc and cupping from the fundus photo. A total of 135 images were evaluated. Mean difference between

human grading & AI grading of CDR was 0.7. NetraAI underestimated cupping in 16.3% of cases. 73.3% of the CDR calculated was within 0.1 difference of human grading. 89.6% of the CDR calculated was within 0.2 difference of human grading.

Conclusions: Artificial Intelligence can enhance fundus photography for screening of glaucoma. Rapid screening of a large population requires a fast, reliable & accurate method of fundus analysis. AI and Machine Learning can solve this problem. The accuracy, sensitivity, and specificity of the analysis will determine the usability scenario. Currently, it appears that fully automated disc and cup detection does not always work, and there is still scope for improvement in accuracy

Abstract No.: 204585

Conventional Versus Digital Cataract Workflow in Preoperative Refractive Cataract Surgical Planning: Convenience, Efficiency, Data Safety, and User Experience

First Author: Sheng Xuan WAI

Co-Author(s): Mae-lynn CATHERINE BASTION, Jemaima CHE HAMZAH, Teck Chee CHENG, Othmaliza OTHMAN

Purpose: To compare user satisfaction on the conventional method (CM) and ZEISS EQ Workplace® (EQ) in the pre-operative cataract surgical workflow. In Malaysia, the public sector relies heavily on manual, paper-based workflows for cataract surgery planning. Prior studies have proven digital workflow to be time-efficient, but being time-efficient alone does not equate to overall satisfaction, as beginners might be concerned with learning curve, adaptation period for staff, accuracy during lens calculations, alterations to clinic settings, and financial considerations. This study can practically address this gap.

Methods: A cross-sectional validated questionnaire-based study was conducted among ophthalmologists and ophthalmology residents who had experience using CM and EQ, in Universiti Kebangsaan Malaysia Medical Centre (Hospital Canselor Tuanku Muhriz). In the CM setting, the doctors manually retrieved preoperative biometry printouts, transcribed data into online calculators, and had to reprint information if alterations were needed. In the EQ setting, doctors used desktops with EQ software synchronised to the biometric machines, data was automatically transcribed, and intraocular lens powers were calculated and compared using various formulae. Subjects scored both CM and EQ in several components, using a Likert scale of 1–5 (Poor–Excellent) and an overall satisfaction score of 1–10 (Very Poor–Very Good). A paired sample t-test was used to compare the mean scores.

Results: Forty-three subjects (5 ophthalmologists, 38 residents) with a mean age of 34.5 years participated. Respondents showed higher satisfaction scores towards EQ in all components [CM versus EQ $\pm$ standard

deviation] with p-values <0.001, including: convenience [2.91±0.97 vs 4.46 ±0.63], time efficiency [2.62 ±0.89 vs 4.39 ±0.72], cost effectiveness and environmental friendliness [2.69 ±0.97 vs 4.17 ±0.74], safety and accuracy [2.61 ±1.04 vs 4.44 ±0.68]. Overall user's satisfaction score was also higher in EQ [5.60 ±2.07 vs 8.53 ±1.16]. There was no significant difference based on gender or title position. 90.7% of respondents expressed interest in continuing EQ after the trial period.

Conclusions: EQ increases user satisfaction, improves efficiency, minimises errors, and has the potential to revolutionise the pre-operative refractive cataract workflow.

Abstract No.: 208364

Cost-effectiveness of an AI-based 3D OCT Image Analysis for Diabetic Macular Edema Identification to Support Triage Screening

First Author: Shuyi **ZHANG**

Co-Author(s): Carmen **CHAN**, Carol **CHEUNG**, Anran **RAN**, Ka Ho **SZETO**, Jiaying **ZHOU**

Purpose: Diabetic macular edema (DME) triage screening based on 2D fundus photographs (FPs) has a high false-positive referral rate. We aim to evaluate the cost-effectiveness of employing an AI infrastructure for DME triage screening based on 3D OCT (i.e., AI-OCT system) as an “add-on” to reduce false-positive referrals to tertiary care.

Methods: A decision-analytic Markov model was constructed to compare the costs and effects of the standard practice (status quo) and employing an “add-on” AI-OCT system to the standard practice for DME triage screening. It was based on a hypothetical cohort of 100,000 individuals with suspected DME from age 50 years through 30 1-year Markov cycles from the societal perspective. Relevant parameters were from existing literatures. Costs were from the Hospital Authority in Hong Kong (HK) and converted to US dollars (USD) at 7.81 HK dollars per USD and with a 3.5% discount rate per year. The study outcomes included incremental cost-effectiveness ratio (ICER), incremental cost, incremental effectiveness and quality-adjusted life year (QALY) gained. The analysis used willingness-to-pay threshold of three-times local per capita gross domestic product (GDP).

Results: Over the next 30 years, mean per-person costs and QALYs were \$18,768 and 11.38 for the “add-on” AI system, compared to \$19,515 and 11.35 for the standard practice, which could save \$74,700,000 and gain 3,000 QALYs, generating ICER of -24,900.

Conclusions: Add-on AI-OCT system to standard practice for DME triage screening is cost-effective compared to standard practice, providing data on evidence-based healthcare implementation to move AI from “concept” to “real-world”.

Abstract No.: 208451

Deep Learning Colour Fundus Image Analysis for Triage of Chinese Elderly Patients Presenting With Chronic Vision Loss: The Fundus-Triage AI Project

First Author: Megan **LEE**

Co-Author(s): Kendrick **SHIH**

Purpose: The COVID-19 pandemic disrupted specialist outpatient ocular care, increasing wait times in public hospitals. The Fundus-Triage AI project aims to automate triage within Hong Kong's Hospital Authority by developing a deep learning system that classifies triage categories from a single macula-centric fundus image.

Methods: A dataset comprising 5,725 fundus images from 3,057 Chinese patients aged 50 and above from a cross-sectional, population-based study was utilized. Subjects underwent a comprehensive ophthalmological assessment, including presenting visual acuity (PVA), best-corrected visual acuity (BCVA), automatic and subjective refraction, IOP, and slit-lamp and funduscopic examinations. Fundus photography was performed using a Daytona Ultra-widefield Fundus Camera (Optos, Inc.). Based on face-to-face assessment, an Ophthalmologist categorized images into three classes: ‘No referral needed’, ‘Routine’, and ‘Early’. A ResNet-18 convolutional neural network, pretrained and fine-tuned via transfer learning, was employed for classification. The dataset was split into training (3,959 images), validation (1,194 images), and testing (572 images) sets. Weighted sampling and transfer learning were applied to address class imbalance.

Results: The preliminary model demonstrated an overall accuracy of 76.5% on the validation set. However, class-specific accuracies varied: ‘No referral needed’ (82.5%), ‘Early’ (17.8%), and ‘Routine’ (43.5%), indicating strong bias towards the ‘No referral needed’ class. The findings suggest overfitting, likely due to disproportionate class representation. Future work will focus on expanding the dataset, synthetic data generation, and integrating patient metadata to enhance triage accuracy.

Conclusions: The initial phase indicates potential of deep learning for automated ophthalmic triage, though significant improvements are needed to address class imbalance and enhance performance across categories.

Abstract No.: 203378

Deep Learning Neural Networks for the Classification of Retinal Disorders Using Full-Field Electroretinography (ffERG)

First Author: Rustum KARANJIA

Co-Author(s): Rvaha AFAAN, Stuart COUPLAND, Henry LIU, Hong An NGUYEN

Purpose: The purpose of this study is to assess the diagnostic accuracy of a deep learning neural network in the detection and classification of disease using ffERG.

Methods: A convolutional neural network (ResNet model) was used for time series classification using ffERG testing done at the Ottawa Visual Electrophysiology Laboratory with 80% of scans allocated as training and 20% split equally between validation and testing.

Results: Data from 299 patients were included. The mean age is 42.0 ± 20.3 years, with a F:M ratio of 1.6. The most common indication for ffERG requisition was LHON/LHON carrier (15.3%). Of the abnormal ERGs, the most frequent final clinical diagnosis was retinitis pigmentosa (25.3%). Out of the 592 available waveforms analyzed, there were 425 normal (71.8%), 10 rod dysfunction (1.7%), 43 cone dysfunction (7.2%) and 114 rod-cone dysfunction (19.3%). For the detection phase of the study, the deep learning ResNet model was able to detect normal ffERG waveforms from abnormal ffERG waveforms at an accuracy of 94.7% for training, 94.9% for validation and 90.0% for testing. For the classification phase of the study the algorithm was able to differentiate between normal, rod dysfunction, cone dysfunction and rod-cone dysfunction at an accuracy of 92.7% for training, 85.4% for validation and 86.4% for testing.

Conclusions: Deep learning techniques show promise in automatically detecting and classifying ffERG. The results of this study may one day be applied clinically to serve as an adjunctive tool to assist clinicians in the diagnosis of various retinal disorders using ffERG responses.

Abstract No.: 205047

Deep Learning for Classification of Polypoidal Choroidal Vasculopathy Using Fluorescein Angiography

First Author: Hiu Ping LAI

Co-Author(s): Rose CHAN, Anthony LAI, Robert LAM, Noel WAT, Eva WONG

Purpose: Fluorescein angiography (FA) is commonly applied in the evaluation of neovascular age-related macular degeneration (nAMD). However, the ability of FA alone to differentiate polypoidal choroidal vasculopathy (PCV) from conventional choroidal neovascularization (AMD-CNV) remains limited. This study examined the performance of a deep learning

model trained on FA images for automated classification of PCV.

Methods: A retrospective dataset comprising 1,974 angiographic investigations (ICGA and FA) was obtained from 1,460 eyes of 1,290 patients with nAMD at Caritas Medical Centre between 2010 and 2020. Diagnoses of PCV and AMD-CNV were verified by a panel of retina specialists based on multimodal imaging. From this cohort, 19,740 FA images were extracted, de-identified, preprocessed, and augmented. Images were divided into training and testing groups with patient-level separation to prevent inter-eye overlap. A convolutional neural network was implemented using the PyTorch framework on cloud-based GPU infrastructure.

Results: The FA-based model achieved an overall accuracy of 64.8% (95% CI: 63.3–66.3). The sensitivity for identifying PCV was 0.680 (95% CI: 0.633–0.662), and specificity was 0.609 (95% CI: 0.594–0.625). The precision (positive predictive value) reached 0.675 (95% CI: 0.661–0.690), while the negative predictive value was 0.680 (95% CI: 0.665–0.695). The F1 score was 0.678 (95% CI: 0.663–0.692).

Conclusions: The deep learning model trained on FA demonstrated moderate diagnostic accuracy for distinguishing PCV from AMD-CNV. These findings highlight the limited discriminative information in FA for PCV and suggest that FA-based AI may serve as an adjunctive rather than a standalone approach within multimodal imaging strategies.

Abstract No.: 203113

Deep Learning-Based Intraoperative Navigation System for Minimally Invasive Glaucoma Surgery: A Multicenter Cross-Sectional Study

First Author: Zefeng YANG

Co-Author(s): Fei LI, Deming WANG, Xiulan ZHANG, Yinhang ZHANG

Purpose: Integrating computer-assisted guidance into intraoperative workflows remains challenging, particularly for glaucoma surgery. We developed a deep learning-based goniotomy navigation system (GNS) for real-time guidance during minimally invasive glaucoma surgery.

Methods: Trained on 5 million frames from 186 anonymized goniotomy videos across three medical centers, GNS performs two tasks: recognizing eight surgical phases (Task I) and tracking ten key instruments and anatomical structures (Task II). Each video was annotated by three independent ophthalmologists. Phase-specific guidance modules provide action-oriented audio alerts and enhanced visualization on a third-party screen. Agreement between GNS audio-alert timing and expert-panel annotations was assessed using the intraclass correlation coefficient (ICC).

Acceptability and perceived utility were evaluated in a post hoc survey of 104 glaucoma surgeons with varying experience.

Results: For Task I, GNS achieved an average calibrated precision of 99.0% on the validation set and 97.3% on the external test set across eight phases. For Task II, average precision was 90.9% and 89.7% for ten classes on the validation and external test sets, respectively. Audio-alert timing delivered by GNS was closely aligned with expert annotations (ICC = 0.79). Among 104 surgeons, 95 (91.3%) mostly or extremely agreed that GNS provides beneficial real-time guidance during goniotomy.

Conclusions: GNS provides action-oriented intraoperative audio alerts and augmented visualization based on instrument-structure interactions. Implementation may support intraoperative decision-making and reduce the risk of inadvertent surgical injury.

Abstract No.: 204271

Development of Deep Learning Diagnostic Models for Coronary Heart Disease Based on Retinal Fundus Photographs and Optical Coherence Tomography Images

First Author: Xinxiao **GAO**

Co-Author(s): Ran **YAN**, Yan **ZHU**

Purpose: Coronary heart disease (CHD) is one of the leading causes of death worldwide. This study aimed to investigate the ability of a multimodal deep learning model for predicting of CHD from ocular information.

Methods: In this retrospective study, we developed a multimodal deep-learning model based on retinal fundus photographs and optical coherence tomography (OCT) images via a convolutional neural network and a convolution block attention module to predict the risk of CHD. In addition, a nomogram model combine the AI prediction results and clinical features were constructed. The predictive values of these models were evaluated by receiver operating characteristic curves and calibration curves.

Results: Among a cohort of 507 patients, 284 of them were in CHD group. The AUC reached 0.992 by AI diagnostic model for predicting CHD in training cohort, while the predictive value was also validated in test and validation cohort with fairly high AUC and good consistency determined by the calibration curves. Moreover, nomogram based on risk factors of CHD and AI prediction scores also illustrated a good predictive value and consistency.

Conclusions: We developed a deep learning artificial intelligence diagnostic models based on retinal fundus photographs and OCT images can help diagnosing CHD.

Abstract No.: 206392

Development of a Multimodal Large Language Model for Early Warning and Diagnosis of Chronic Ocular GVHD

First Author: Shuwan **LIU**

Co-Author(s): Lili **CAO**, Jing **HONG**, Bo **XU**

Purpose: Chronic ocular graft-versus-host disease (coGVHD) after allogeneic hematopoietic stem cell transplantation (allo-HSCT) may lead to irreversible ocular surface damage, severe dry eye syndrome, and even vision loss. Current management of coGVHD faces challenges, with frequent missed or misdiagnosed cases. This study aimed to leverage multimodal large language model (MLLM) to develop an early warning and diagnostic system for coGVHD.

Methods: A total of 506 patients and 1346 eyes from Peking University Third Hospital (PUH3) post-allo-HSCT were enrolled for construction and internal validation of the warning and diagnostic model. External validation included 160 PUH3 patients and 228 eyes from three other hospitals. The proposed GVHD-MLLM is a multi-task, multimodal network fusing latent representations from four modal sequences to provide high-precision real-time predictions for two tasks.

Results: GVHD-MLLM achieved high performance in internal testing, with AUROCs of 93.44% (95% CI: 91.85%–95.03%) for early warning and 98.98% (95% CI: 98.59%–99.36%) for diagnosis. In external validation, early warning AUROC was 83.45% (95% CI: 81.32%–85.57%), while diagnostic AUROCs across three external sites were 98.70% (95% CI: 98.15%–99.25%), 99.06% (95% CI: 98.11%–100.00%), and 96.85% (95% CI: 95.79%–97.92%). The disease severity of patients seeking medical treatment after using the early warning model was significantly lower. Junior ophthalmologists also improved diagnostic accuracy using the model as an auxiliary tool.

Conclusions: GVHD-MLLM can process rich multimodal information collected in clinical practice, and is expected to become an effective tool for managing coGVHD and improving prognosis.

Abstract No.: 204532

Development of "Internet+" Ophthalmic Specialty Follow-Up System and Its Application in Glaucoma Surgery Patients

First Author: Xiangmei **SONG**

Purpose: To display an «Internet+» ophthalmic specialty follow-up system integrated with the hospital information system (HIS) and to evaluate its effectiveness in the management of glaucoma patients after surgery.

Methods: Based on patient needs and HIS integration, an «Internet+» follow-up system was developed, featuring modules for electronic follow-up records,

telephone/SMS/WeChat follow-ups, health education, questionnaire surveys, and data statistics. A total of 82 glaucoma surgery patients were selected using convenience sampling. The control group (n=41), admitted from February to April 2024, received routine follow-up. The observation group (n=41), admitted from May to July 2024, was managed using the new system. Outcome measures included disease knowledge awareness rate, follow-up service satisfaction, follow-up compliance (at 1 week, 1 month, and 3 months post-surgery), and readmission rate.

Results: The observation group showed significantly higher rates of disease knowledge awareness and follow-up satisfaction compared to the control group ($P < 0.05$). Follow-up compliance in the observation group was 100%, 85.4%, and 61% at 1 week, 1 month, and 3 months, respectively, which was consistently higher than that of the control group (97.6%, 65.9%, and 39%). Generalized estimating equation analysis confirmed a statistically significant difference in follow-up compliance between the two groups ($P < 0.05$). Additionally, the observation group had a significantly lower readmission rate during the follow-up period ($P < 0.05$).

Conclusions: The «Internet+» ophthalmic specialty follow-up system effectively improves disease knowledge awareness, follow-up satisfaction, and compliance among glaucoma surgery patients, while reducing readmission rates. It represents a valuable tool for sustainable ophthalmic patient management and is worthy of broader application.

Abstract No.: 206648

Early Glaucoma Detection by Using Style Transfer to Predict Retinal Nerve Fiber Layer Thickness Distribution on the Fundus Photograph

First Author: Henry **CHEN**

Co-Author(s): Yung-sung **LEE**, Xiao Chun **LING**

Purpose: We aimed to develop a deep learning (DL) e-based algorithm for early glaucoma detection based on color fundus photographs that provides information on defects in the retinal nerve fiber layer (RNFL) and its thickness from the mapping and translating relations of spectral domain OCT (SD-OCT) thickness maps.

Methods: We developed and evaluated an artificial intelligence detection tool. Subjects: Pretraining paired data of color fundus photographs and SD-OCT images from 189 healthy participants and 371 patients with early glaucoma were used. The variational autoencoder (VAE) network training architecture was used for training, and the correlation between the fundus photographs and RNFL thickness distribution was determined through the deep neural network. The reference standard was defined as a vertical cup-to-disc ratio of > 0.7 , other typical changes in glaucomatous optic neuropathy, and RNFL defects. Convergence

indicates that the VAE has learned a distribution that would enable us to produce corresponding synthetic OCT scans. The structural similarity index measure (SSIM) and peak signal-to-noise ratio (PSNR) were used to assess signal strength and the similarity in the structure of the color fundus images converted to an RNFL thickness distribution model.

Results: The generated thickness map was sufficient for clinical glaucoma detection, and the generated images were similar to ground truth (PSNR: 19.31 decibels; SSIM: 0.44). The inference results were similar to the OCT-generated original images in terms of the ability to predict RNFL thickness distribution.

Conclusions: The proposed technique may aid clinicians in early glaucoma detection, especially when only color fundus photographs are available.

Abstract No.: 204093

Enhancing Early Keratoconus Detection With Multimodal Machine Learning: Integrating Tomography, Biomechanics, and Clinical Risk Factors

First Author: Kaiyue **DU**

Co-Author(s): Jing **HONG**

Purpose: To enhance the early detection of keratoconus (KC) by integrating Scheimpflug tomography, corneal biomechanics, and clinical risk factors (CRF) into a machine learning (ML) diagnostic system.

Methods: In this prospective, multicenter, cross-sectional study, demographic, lifestyle, and clinical ophthalmic data, including Pentacam and Corvis ST measurements, were collected from patients with KC and candidates for refractive surgery across five centers between 2020 and 2024. The dataset was divided into training, validation, internal testing, and external testing sets. Least absolute shrinkage and selection operator regression were used to identify predictive variables. Six ML models were trained using four feature sets: CRF, device-derived parameters, combined features, and selected features. Model performance was evaluated using the area under the receiver operating characteristic curve (AUROC).

Results: The dataset included 1,035 eyes from 1,035 participants across five centers: 590 normal controls, 157 eyes with forme fruste keratoconus (FFKC), 143 with subclinical KC, and 145 with clinical KC. For FFKC detection, the post-feature selection CatBoost model achieved the highest accuracy (AUROC = 0.975), outperforming the combined-feature (AUROC = 0.963), CRF-only (AUROC = 0.856), and device-only models (AUROC = 0.885) in the validation set. This model also outperformed the tomographic and biomechanical index in internal (AUROC = 0.976 vs. 0.813; $p = 0.048$) and external testing (AUROC = 0.952 vs. 0.847; $p = 0.012$). For subclinical and clinical KC, external testing

yielded near-perfect performance (AUROC = 0.991 and 1.000, respectively).

Conclusions: A multimodal ML system integrating CRF, tomography, and biomechanics improved early KC detection, particularly for FFKC.

Abstract No.: 208291

Ensemble Learning to Maximize Alzheimer's Disease Feature Using Retinal Optical Coherence Tomography

First Author: Anran **RAN**

Co-Author(s): Christopher Li-hsian **CHEN**, Carol **CHEUNG**, Xiaoyan **HU**, Vincent Ct **MOK**, Tien Yin **WONG**

Purpose: There has been significant progress in detecting Alzheimer's dementia using ocular imaging. We developed an ensemble learning-based AI deep-learning (DL) model, integrating different inputs from optical coherence tomography (OCT) for the detection of Alzheimer's disease (AD).

Methods: We developed DL models for three classification tasks: AD dementia vs. normal, MCI vs. normal, and AD-MCI vs. normal. Inputs included ONH and macula-centered en face images, plus RNFL and GCIPL thickness/deviation maps and MT thickness maps from OCT (Cirrus HD-OCT, Carl Zeiss Meditec). An Ensemble Model combining ONH and Macula models via majority voting integrated all OCT inputs. Training and validation used 3,228 OCT scans from Hong Kong and Singapore studies, and external testing used 365 scans from cohorts with PET-confirmed amyloid- β status.

Results: We included 190 AD dementia and 623 cognitively normal participants for training and internal validation, and 46 AD dementia, 79 MCI, and 52 normal participants for external testing. For AD dementia detection, the Ensemble Model achieved AUROCs of 0.943 (95% CI, 0.906–0.980), 0.786 (95% CI, 0.673–0.899), and 0.795 (95% CI, 0.716–0.874) in internal validation, External-1, and External-2, respectively. For PET-defined AD-MCI, AUROCs were 0.787 (95% CI, 0.643–0.931) and 0.791 (95% CI, 0.694–0.888) in External-1 and External-2.

Conclusions: Our Ensemble Model, integrating multiple OCT-based inputs and algorithms, shows strong potential for detecting AD dementia and early-stage AD, supporting opportunistic AD screening during routine ophthalmic visits.

Abstract No.: 204196

Evaluating a Multi-Modal Large Language Model for Ophthalmology Triage

First Author: Caius **GOH**

Co-Author(s): Wei Yung **AU**, Xiuyi **FAN**, Kelvin **LI**, Alva **LIM**, Jabez **NG**, Clarence **SEE**

Purpose: Ophthalmic triage is challenging for non-specialists given limited training and rising disease burden. We developed a multimodal framework integrating clinical text and imaging with large language models (LLMs), incorporating hallucination detection and chain-of-thought (CoT) reasoning to improve diagnostic accuracy.

Methods: A clinical dataset of 41 ophthalmology cases was obtained from a restructured hospital in Singapore, and underwent pre-processing through acronym expansion, sentence reconstruction, and hallucination detection. To address limitations in dataset size and content, an additional synthetic dataset comprising 100 ophthalmic cases was generated using one-shot prompting with GPT-4. Semantic similarity check was performed for the synthetic dataset, followed by manual validation by an ophthalmologist. Three diagnostic approaches were evaluated: Text-Only, Image-Assisted, and Image with Chain-of-Thought. Diagnostic performance was quantified by mapping predictions onto SNOMED-CT via a Directed Acyclic Graph (DAG)-based dissimilarity metric, yielding a dissimilarity score which quantifies semantic distance between predicted and reference diagnoses.

Results: The synthetic dataset covered anterior segment (n=40), posterior segment (n=35), and extraocular (n=25) diagnoses. Mean dissimilarity was 6.353 ± 1.685 for Text-Only, reduced to 5.235 ± 1.305 with Image-Assisted input. CoT further improved performance in cases with overlapping or ambiguous imaging features.

Conclusions: Multimodal inputs improve diagnostic alignment in ophthalmology triage, while CoT reasoning mitigates errors from ambiguous images. This framework shows promise as an accurate triage tool.

Abstract No.: 205376

Evaluation and Comparison of Large Language Models' Responses to Questions Related to Optic Neuritis

First Author: Han-jie **HE**

Co-Author(s): Ling-ping **CEN**, Wai Kit **CHU**

Purpose: Large language models (LLMs) show promise as clinical consultation tools and may assist optic neuritis patients, though research on their performance in this area is limited. Our study aims to assess and compare the performance of four commonly used LLM-Chatbots-Claude-2, ChatGPT-3.5, ChatGPT-4.0, and

Google Bard-in addressing questions related to optic neuritis.

Methods: We curated 24 optic neuritis-related questions and had three ophthalmologists rate the responses on two three-point scales for accuracy and comprehensiveness. We also assessed readability using four scales. The final results showed performance differences among the four LLM-Chatbots.

Results: The average total accuracy scores (out of 9): ChatGPT-4.0 (7.62 ± 0.86), Google Bard (7.42 ± 1.20), ChatGPT-3.5 (7.21 ± 0.70), Claude-2 (6.44 ± 1.07). ChatGPT-4.0 ($p = 0.0006$) and Google Bard ($p = 0.0015$) were significantly more accurate than Claude-2. Also, 62.5% of ChatGPT-4.0's responses were rated «Excellent,» followed by 58.3% for Google Bard, both higher than Claude-2's 29.2% (all $p \leq 0.042$) and ChatGPT-3.5's 41.7%. Both Claude-2 and Google Bard had 8.3% «Deficient» responses. The comprehensiveness scores were similar among the four LLMs ($p = 0.1531$). Note that all responses require at least a university-level reading proficiency.

Conclusions: Large language models-Chatbots hold immense potential as clinical consultation tools for optic neuritis, but they require further refinement and proper evaluation strategies before deployment to ensure reliable and accurate performance.

Abstract No.: 204457

Eye Health Screening for Children With Disabilities: Challenges and Opportunities in Digital Approaches

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Purpose: Because children with disabilities face a higher risk of uncorrected refractive errors and other visual problems, yet are often overlooked in mainstream school screening due to communication barriers, low parental awareness, and limited adapted tools, we assessed the feasibility and acceptability of a digital screening approach (WHOeyes) in special schools in Jakarta, and described related symptom burden, device use, and service access.

Methods: Cross-sectional mixed-methods preliminary study in three special schools as part of a broader school-based initiative. 214 students (grades 4–6) with diverse physical, sensory, and intellectual disabilities underwent WHOeyes digital screening facilitated by teachers. Data included structured questionnaires, adapted Pediatric Eye Questionnaire (PedEyeQ), and focus group discussions (teachers, parents). Analyses combined descriptive summaries and thematic synthesis.

Results: 39.4% reported high-intensity gadget use, 21.2% eye fatigue, and 18.6% headaches. Teachers

noted that visual difficulties compounded learning and socialisation challenges, especially in students with intellectual disabilities. Parents reported low prior eye-exam rates and poor spectacle compliance, citing discomfort, stigma, and lack of customised frames. Digital screening was perceived as faster and more engaging, but concerns were raised about accuracy and participation in children with limited attention or difficulty understanding instructions; teacher facilitation was seen as essential.

Conclusions: Digital eye-health screening is promising for improving access in special-education settings, but disability-inclusive adaptations, active teacher involvement, and tailored referral systems are critical to ensure equity. Further studies should refine digital protocols for diverse disability profiles and evaluate integration with school health services and primary care.

Abstract No.: 201406

Facing the Challenge of Diabetic Epidemic With AI-Assisted Retinal Imaging in a Low-Resource Setting: A Pilot Study From Sri Lanka

First Author: Madhuwanthi DISSANAYAKE

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Purpose: Diabetic retinopathy (DR), is an important cause of preventable blindness. Sri Lanka has one of the highest global diabetes rates and faces barriers to DR screening due to the scarcity of ophthalmologists and healthcare workers trained in DR screening. This study piloted capturing images by non-specialist healthcare workers, using an AI-assisted handheld retinal imaging device. The objective of the study was to evaluate the feasibility with regard to image gradability and accuracy of the AI interpretation of this device in a low-resource setting.

Methods: Non-specialist healthcare workers received a brief training to capture macula- and optic-disc-centred retinal images using an FDA-approved retinal imaging camera. Patients recruited from an eye clinic underwent slit-lamp bio-microscopy by an ophthalmologist, and pre- and post-dilatation images were captured. We evaluated image gradability, and compared the AI with the ophthalmologist's clinical findings for diagnostic accuracy.

Results: Retinal images were captured on both eyes of 119 participants, including 49 with diabetes. The proportion of participants with ungradable images of at least one eye prior to mydriasis was 46.2%, reducing to 15.1% after mydriasis. The sensitivity and specificity of detecting DR compared to the ophthalmologist's slit lamp evaluation were 73.3% and 79.8% respectively.

Conclusions: The AI-assisted retinal imaging camera used by non-specialists emerged as a valid tool for

diabetic retinopathy screening in a low-resource setting. However, the presence of cataract, poor dilatation and poorly focussed images were identified as the main challenges.

Abstract No.: 206598

From Data Loss to Data Trust: Building a National ROP Registry in Small Island Nations

First Author: Saraa YOOSUF

Co-Author(s): Mohamed AZZAM

Purpose: To analyze operational gaps in Retinopathy of Prematurity (ROP) documentation and follow-up care in the Maldives, and to propose a structured national registry model that strengthens data integrity, continuity of care, and research capacity in small island nations.

Methods: A retrospective audit of ROP screening and treatment records (2024–2025) was conducted across two tertiary centers in the Maldives. Data quality was assessed for completeness, accuracy, and patient follow-up continuity, focusing on neonatal identifiers, treatment documentation, and outcome tracking. Workflow mapping was used to identify operational bottlenecks across the NICU and ophthalmology interfaces. Key stakeholders, including neonatologists, ophthalmologists, parents, and neonatal nurses, were interviewed to gather perspectives on current challenges and registry feasibility. Clinical service operations frameworks were applied to design a prototype registry model emphasizing interoperability, standardized data fields, and integrated follow-up protocols.

Results: Among 74 ROP cases reviewed, 28% lacked unique neonatal identifiers and 33% had incomplete treatment documentation. Follow-up compliance beyond three months was <50%, largely due to fragmented referral pathways and the absence of standardized reminders. Workflow mapping revealed key bottlenecks at NICU discharge and inter-hospital communication. Stakeholder interviews (n=12) highlighted the need for a unified neonatal ID system, standardized data-entry templates, and integration between ophthalmology and neonatal electronic records. Based on these findings, a prototype national ROP registry was developed, incorporating unified IDs, automated follow-up reminders, and dashboard analytics for trend monitoring and quality assurance.

Conclusions: Fragmented documentation and poor follow-up remain critical barriers to effective ROP care in the Maldives. Applying clinical operations principles enabled the design of a structured, interoperable registry that strengthens data integrity and continuity of care. This model not only improves neonatal ophthalmology outcomes locally but also offers a scalable framework for other small island and resource-limited nations seeking to establish national ROP surveillance systems.

Abstract No.: 201924

From Eye Examination to Early Cognitive Intervention for Preterm Newborns: An Explainable Machine Learning Approach

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Purpose: To identify the important retinal features associated with cognitive development in newborns with prematurity in early childhood with a machine learning (ML) approach, with the goal of screening preterm with poor neurodevelopment for early intervention.

Methods: We retrospectively reviewed the medical charts of 163 infants (326 eyes) born at Chang Gung Memorial Hospital between 2011 and 2024 who underwent IQ testing and scored <85 or ≥115. Basic characteristics considered predictors come from perinatal variables and eye examination for retinopathy of prematurity (ROP) with optical coherence tomography (OCT) images. The ML model was trained using Random Forest (RF) to associate the predictors with the cognitive assessment outcome collectively. SHAP (SHapley Additive exPlanations) was used to identify the clinical features most predictive of the cognitive development of a preterm baby.

Results: The overall accuracy of the ML model was 83.44%, combining all the clinical characteristics, including retinal thickness and retinal thickness difference in bilateral eyes obtained from OCT. The SHAP analysis reveals that lower birth weight, higher stage of ROP, and lower zone development are highly associated with lower IQ scores in our study cohort.

Conclusions: By assessing the ML model, we identified key clinical features associated with cognitive development in preterm newborns in early childhood. This study demonstrates the potential of using ML models to predict IQ in children and identify those at high risk for poor cognitive outcomes, paving the way for timely interventions to enhance long-term neurodevelopmental outcomes.

Abstract No.: 203142

From Visual Question Answering to Intelligent AI Agents in Ophthalmology

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Purpose: Clinical ophthalmic practice requires integrating diverse multimodal data, yet traditional artificial intelligence (AI) systems struggle to address this complexity. We aim to explore the evolution from visual question answering (VQA) to multimodal AI agents, providing eye care professionals with deeper insights into these models and their applications.

Methods: A narrative review was conducted, synthesizing the current literature on ophthalmic conversational AI, including VQA and AI agents, from both theoretical and practical perspectives. The analysis focused on their technical basis, the landscape of available datasets, progress in system development, and potential clinical applications.

Results: Current VQA systems in ophthalmology show promise in education, clinical support, and patient engagement but are limited by single-turn interactions and static data. AI agents can offer dynamic, context-aware support through tool integration, memory, and continuous dialogue. Meanwhile, large language models (LLMs) can enhance reasoning and interaction within such systems by generating synthetic data, serving as the foundation model for task adaptation, integrating into VQA systems, and acting as the control core of AI agents. Despite notable progress, significant challenges remain, including limited high-quality multimodal datasets, the lack of standardized evaluation frameworks, and barriers to real-world deployment. Advancing the field requires robust, clinically relevant data, multidimensional evaluation, and explainable, workflow-ready AI systems.

Conclusions: While recent advances in VQA and multimodal AI agents are encouraging, their application in ophthalmology remains largely experimental. Addressing these gaps through close collaboration between AI researchers and the ophthalmic community may pave the way for systems that enhance access to and quality of eye care worldwide.

Abstract No.: 204871

Genetic Insights From Retinal Biological Aging Reveal Lifetime Risk of Systemic Diseases and Poor Eye Health

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Co-Author(s): Ching-yu **CHENG**, Yu **HUANG**, Hengtong **LI**, Zhi Da **SOH**, Cancan **XUE**, Xiayin **ZHANG**, Zhuoting **ZHU**

Purpose: Retinal biological aging markers, such as RetiAGE and retinal age gap (RAG), can predict systemic disease. However, the ground truth of these aging markers is chronological age. We aimed to investigate whether the polygenic risk of retinal aging reflects the lifetime risk of poor health, regardless of the normal aging effects.

Methods: We applied a multi-traits analysis of genome-wide data (MTAG) to calculate the polygenic risk score (PRS) for retinal aging, as reflected by both RetiAGE and the retinal age gap (RAG), in UK Biobank participants with retinal photographs. We first tested the ability to predict mortality using the retinal aging PRS in participants without retinal photographs. Then, we utilized Cox proportional hazard models to assess whether retinal aging PRS can predict the lifetime risk of multiple systemic diseases and poor eye health.

Results: The study analyzed retinal photos from 31,271 UK Biobank participants, generating RetiAGE and RAG. Significant loci were identified, including ALKAL2 ($p=6.08E-113$), IRF4 ($p=2.44E-15$), and HERC2 ($p=4.22E-47$). Among 487,282 participants in the discovery set, each standard deviation increment of the retinal age PRS was significantly associated with higher risk of all-cause mortality (HR 1.029, $p=1.49E-07$), systemic diseases, including asthma (HR 1.019, $p=2.37E-05$), COPD (HR 1.045, $p=9.76E-11$), and myocardial infarction (HR 1.038, $p=1.20E-08$), and poor eye health, such as low vision and blindness (HR 1.038, $p=0.028$), glaucoma (HR 1.025, $p=0.004$), and vitreo-retinal diseases (HR 1.023, $p=0.003$).

Conclusions: Faster retinal aging suggests lifetime genetic susceptibility to systemic diseases and poor eye health.

Abstract No.: 202608

Global Assessment of Ocular Adverse Reactions to Systemic Drugs: Insights from a Multi-Country Spontaneous Reporting Database

First Author: Shi-nan **WU**

Co-Author(s): Wenying **GUAN**, Zuguo **LIU**

Purpose: Assessing the risk of ocular adverse reactions (OARs) of systemic medications in a large, real-world, multinational spontaneous reporting database.

Methods: Disproportionality analysis was performed on all OARs reports related to systemic medications in the FAERS database from the first quarter of 2004 to the third quarter of 2024. The OARs were categorized into disease-based and symptom-based classifications to identify systemic medications with positive signals.

Results: In the FAERS database, the top three OARs for systemic medications in ophthalmic diseases were cataract, dry eye, and glaucoma; the top three ophthalmic symptoms were blurred vision, visual impairment, and eye pain. Through disproportionality analysis, 141 systemic medications with positive signal drugs for OAR risks were identified, which were concentrated in the following categories: Antineoplastic Medication (30 drugs, Belantamab Mafodotin ROR [95% confidence interval (CI)]: 59.59 [56.25 to 63.13]), Central Nervous System Medication (21 drugs, Fingolimod, 2.69 [2.63 to 2.75]), Anti-infective Medication (15 drugs, Moxifloxacin, 6.52 [6.21 to 6.84]), Immunological and Inflammation-related Medication (15 drugs, Dupilumab, 4.74 [4.7 to 4.79]), Cardiovascular System Medication (10 drugs, Ivabradine, 3.06 [2.61 to 3.58]), Endocrine and Metabolic Disease Medication (10 drugs, Insulin lispro, 3.63 [3.4 to 3.89]), Respiratory System Medication (6 drugs, Telithromycin, 3.51 [3.14 to 3.93]), and Other Medication (34 drugs, Botulinum toxin type A, 4.24 [4.12 to 4.36]). The drug-induced time for anti-infective

medications was significantly shorter than that of other categories of systemic medications ($P < 0.001$).

Conclusions: This pharmacovigilance study underscores the importance of identifying underrecognized OARs from systemic drugs to prevent secondary eye diseases and improve drug safety.

Abstract No.: 206591

Imaging and Management of Keratitis Using AI Algorithms

First Author: Soufia **FARRUKH**

Co-Author(s): Faryal **WAHEED**

Purpose: Keratitis is a significant global cause of visual morbidity, with timely diagnosis and effective management being essential to prevent irreversible vision loss. Conventional diagnostic modalities, including slit-lamp biomicroscopy and confocal microscopy, are constrained by subjectivity, reliance on specialist expertise, and limited accessibility in many clinical settings. Recent advances in artificial intelligence (AI), particularly in machine learning (ML) and deep learning (DL), provide promising avenues for automated, accurate, and scalable analysis of corneal imaging, thereby addressing critical gaps in early detection and management.

Methods: This presentation reviews AI-driven approaches for the diagnosis and management of keratitis, with a focus on convolutional neural networks and advanced transfer learning architectures. Models such as ResNet, DenseNet, ResNeXt, SE-ResNet, and EfficientNets have been applied to external eye photographs and anterior segment images, enabling automated differentiation of bacterial, fungal, and viral keratitis. Evidence is further synthesized from diagnostic prediction models, deep learning-based classification systems, and multimodal imaging frameworks designed to enhance diagnostic accuracy and clinical applicability.

Results: Validation studies indicate that AI-based systems achieve diagnostic accuracies comparable to expert clinicians, with reported sensitivities frequently exceeding 90%. These technologies enable reliable differentiation among bacterial, fungal, and viral keratitis, support severity grading, inform treatment decision-making, and facilitate monitoring of therapeutic response. Moreover, integration with tele-ophthalmology platforms enhances accessibility and expands screening coverage, particularly in underserved and resource-limited settings.

Conclusions: Artificial intelligence represents a transformative advancement in the diagnosis and management of keratitis.

Abstract No.: 200929

Implementation of Artificial Intelligence-Assisted Diabetic Retinopathy (DR) Screening in Suburban Area of Yangon, Myanmar

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Co-Author(s): Anna Cheng Sim **TAN**, Mya **WUT YEE**

Purpose: This study aimed to evaluate the effectiveness of the SELENA+ Artificial Intelligence (AI) system for diabetic retinopathy (DR) screening in Yangon, Myanmar. The research sought to assess the system's accuracy, efficiency, and potential to address the challenges of DR screening in resource-limited settings.

Methods: A prospective study was conducted in Taikkyi Township, located in the northernmost part of the Yangon region. A total of 414 eyes from 217 patients were examined using the SELENA+ AI system for DR screening. The AI-based assessments were compared with ophthalmologist grading to determine the level of agreement for diabetic retinopathy.

Results: The SELENA+ AI system demonstrated high agreement with ophthalmologist grading, with Kappa values of 0.821 ($p < 0.001$). After excluding cases with media opacities, the agreement improved to a kappa of 0.915 ($p < 0.001$). The AI system showed excellent sensitivity (96.5%) and specificity (100%) in detecting diabetic retinopathy. The majority of patients (74.4%) completed the AI DR screening in 15 minutes or less, indicating high time efficiency. The study also revealed potential cost benefits, with 98.1% of patients reporting a low cost was required to attend the DR screening.

Conclusions: The SELENA+ AI system proved to be a highly accurate, efficient, and cost-effective tool for DR screening in Yangon, Myanmar. Its performance was comparable to that of human specialists, while offering advantages in terms of accessibility and scalability.

Abstract No.: 200617

Improving Readability of Pediatric Cataract Education Materials With Large Language Models

First Author: Xinyi **QIU**

Co-Author(s): Hui **CHEN**, Weirong **CHEN**, Ka Yi **CHUNG**, Chaokun **LUO**, Qingruo **ZHANG**

Purpose: To evaluate the capacity of large language models (LLMs) to improve the readability of online patient education materials (PEMs) on pediatric cataracts through multilingual adaptation, content retrieval, and prompt engineering.

Methods: A total of 103 PEMs in various languages were collected from diverse online sources. Three LLMs (ChatGPT-4o, Gemini 2.0, DeepSeek-R1) were applied to optimize content. Readability of both original and LLM-converted PEMs was assessed using multiple established formulas. We also compared different

prompt engineering strategies, analyzed the effects of web-based content retrieval and Chinese language adaptation.

Results: LLM-generated PEMs initially exhibited high reading levels (>10th grade). However, LLM conversion significantly improved readability, with DeepSeek-R1 reducing the average reading level from 10.59 ± 2.20 to 7.01 ± 0.91 ($p < 0.001$). Prompt engineering strategies such as Zero-shot-CoT (APE) further reduced reading levels below the 6th-grade threshold. In Chinese materials, LLM conversions met national recommended readability standards across multiple metrics.

Conclusions: LLMs can effectively improve the readability of multilingual online PEMs on pediatric cataracts. When combined with web browsing and prompt engineering, they offer a promising strategy to optimize patient education.

Abstract No.: 203948

Innovations of Artificial Intelligence in Clinical Ophthalmology: Netradeep

First Author: Swati **SHARMA**

Co-Author(s): Rohan **CHAWLA**, Abhishek **KUMAR**

Purpose: To use artificial intelligence in the quantification of hard exudates in a prospective interventional comparative study.

Methods: A prospective interventional comparative study was done in 20 eyes of diabetic retinopathy patients having non-center-involving clinically significant diabetic macular edema. Patients were divided into two groups using simple randomization. In the first group, conventional focal laser was done, and in the second group, subthreshold micropulse laser was done, and both the groups were followed up for up to 6 months, and multimodal imaging was done to compare the results. Hard exudate quantification was done using AI and deep learning-based technology pre- and post-laser. Results were quantified on the basis of increase in BCVA, reduction in macular thickness, and decrease in hard exudates.

Results: The conventional laser group showed a greater reduction in hard exudates with a p-value of 0.031 at 3 months compared to the subthreshold laser group.

Conclusions: A DL-assisted system called Netradeep made it easier to accurately segment hard exudates from retinal fundus imaging. Further efforts may involve incorporating feedback from a wider pool of expert ophthalmologists.

Abstract No.: 204609

Machine Learning Models for Risk Prediction of Age-Related Macular Degeneration in Fujian Eye Study

First Author: Yang **LI**

Co-Author(s): Qinrui **HU**, Xiaoxin **LI**, Bin **WANG**

Purpose: Age-related macular degeneration (AMD) is a retinal disorder that significantly impairs vision. This study investigates various machine learning models for predicting AMD risk, laying the groundwork for further research using big data and determining the most effective predictive model.

Methods: Utilizing data from 8211 records with 39 features from the Fujian Eye Study, a cross-sectional epidemiological investigation, several machine learning models were developed and assessed. The models included logistic regression (LR), K-nearest neighbors (KNN), support vector machine (SVM), decision tree (DT), random forest (RF), light gradient boosting machine (LightGBM), and extreme gradient boosting (XGBoost). Data preprocessing, feature selection, and model training were all key components of the study.

Results: After evaluating multiple models, the logistic regression model emerged as the most accurate, achieving a balanced accuracy of 0.6364. Among the predictive features, educational background had the highest influence on the model's predictions, with an average SHAP (SHapley Additive exPlanations) value of 0.8199. Other significant factors included outdoor time and left eye spherical equivalent (OSSE), with SHAP values of 0.6474 and 0.6377, respectively.

Conclusions: This study confirms that logistic regression is the most effective machine learning model for predicting AMD risk, with educational background identified as the most critical risk factor.

Abstract No.: 202423

Macula-CoT: Macular Subregion-Aware Chain-of-Thought for AMD Prognostic Prediction

First Author: Jianing **WANG**

Co-Author(s): Xinyue **LI**, Xiaobing **YU**, Xiaodan **ZHANG**, Yue **ZHANG**

Purpose: This paper aims to improve the automated prognostic prediction of Age-related Macular Degeneration (AMD) using OCT images by proposing Macula-CoT, a model that emulates ophthalmologists' diagnostic workflow. It introduces subregion-aware multi-stage reasoning and patch-level visual encoding to enhance interpretability and prediction accuracy across two clinical tasks.

Methods: The proposed Macula-CoT model emulates the diagnostic workflow of ophthalmologists by sequentially focusing on key macular anatomical subregions in OCT images, including the fovea, nasal

region, and temporal region. It introduces a multi-stage chain-of-thought reasoning strategy to guide structured visual understanding at each stage. To enhance fine-grained visual perception, a Patch-to-Region module transforms patch-level tokens into spatially localized subregion images. These visual features are combined with task-specific language prompts and injected into a large language model to jointly predict subretinal fluid absorption and visual recovery, enabling accurate, transparent, and clinically credible AMD prognosis.

Results: Experimental results show that Macula-CoT achieves state-of-the-art (SOTA) performance on two AMD prognosis tasks: subretinal fluid absorption and visual recovery. Specifically, Macula-CoT reaches an accuracy of 0.773, precision of 0.817, recall of 0.919, and an F1 score of 0.865, demonstrating its robustness in handling imbalanced prediction tasks. Furthermore, the model attains an AUC of 0.685, confirming its effectiveness in distinguishing between different prognostic outcomes.

Conclusions: Macula-CoT, a subregion-aware chain-of-thought model for AMD prognosis based on OCT images. By integrating multi-stage reasoning and fine-grained visual encoding, the model produces accurate and interpretable predictions. The paper highlights the potential of structured multimodal reasoning for developing clinically aligned and reliable diagnostic tools.

Abstract No.: 209055

Multi-Organ Imaging Demonstrates a Multimodal Complex Association Network in the Retina-Heart-Brain Axis

First Author: Junyang LI

Purpose: Medical imaging provides numerous insights into the subclinical changes that precede serious diseases such as heart disease and dementia. However, most imaging research either describes a single organ system or draws on clinical cohorts with small sample sizes.

Methods: In this study, we use state-of-the-art multi-organ magnetic resonance imaging phenotypes to investigate cross-sectional relationships across the retina-heart-brain axis in 1,007 CHPP participants.

Results: Despite controlling for an extensive range of demographic and clinical covariates, we find significant associations between imaging-derived phenotypes of the heart, retina and brain. Simultaneous three-organ modelling identifies differentially important pathways across the retina-heart-brain axis with evidence of both direct and indirect associations.

Conclusions: This study describes a potentially cumulative burden of multiple-organ dysfunction and provides essential insight into multi-organ disease prevention.

Abstract No.: 200528

Novel Subclassification of Presbyopia Based on Lens Functional and Structural Features

First Author: Xiangjia ZHU

Purpose: The purpose of this study was to classify eyes with presbyopia using lens functional and structural features to aid in surgical decision making.

Methods: This cross-sectional observational study included healthy volunteers or those solely affected by presbyopia. Lens function was assessed using dysfunction lens index (DLI), whereas lens density was evaluated with Pentacam (LD-P) and swept-source optical coherence tomography (LD-S). Principal component analysis (PCA) and k-means clustering classified participants into non-lens surgery (NLS) and lens surgery (LS) groups. A scoring system was developed from the optimal cutoff values for simplified diagnosis, with a website created for automatic classification.

Results: Totally, 352 eyes of 176 patients were studied, with a mean age of 46.1 ± 6.2 years and a mean axial length of 24.42 ± 1.62 mm. Among them, 268 (76.1%) eyes were diagnosed with presbyopia. The top 5.2% (14/268) of presbyopia cases with the highest variability were excluded by PCA. Subsequently, 138 eyes (51.5%) were clustered into the NLS group, and 116 eyes (43.3%) into the LS group. The LS group presented lower DLI and higher lens density compared to the NLS group (all $P < 0.001$). Optimal cutoff values were determined as follows: DLI = 7.75, LD-P = 8.75, and LD-S = 60.05 pixel units. The scoring system demonstrated that combining DLI with LD-P achieved the highest diagnostic efficacy. A website (www.zhu-zhou-lf.com) was developed for automatic classification.

Conclusions: We proposed a novel classification of presbyopia using lens functional and structural features.

Abstract No.: 202862

OCTA-ARM: A Diffusion-Based Multi-Artifact Removal in Optical Coherence Tomography Angiography via Synthetic Data Training

First Author: Xujia LIU

Co-Author(s): Carol CHEUNG, Zheng CHUNWEN, Hongyang JIANG, Anran RAN, Bowen XU

Purpose: To develop and validate OCTA-ARM (Optical Coherence Tomography Angiography Artifact Removal Model), a diffusion-based framework for removing multiple artifact types in OCTA images.

Methods: We retrospectively collected 21,389 OCTA (DRI OCT Triton; Topcon Inc, Tokyo, Japan) superficial capillary plexus images from 2,475 eyes. To overcome the scarcity of real paired data (artifact-affected vs. artifact-free), a synthetic data training strategy was

implemented using CycleGAN-based generators to create shadow and defocus artifacts, combined with random pixel shifts for motion artifacts. The Brownian Bridge Diffusion Model (BBDM) was trained to remove these artifacts. Model performance was evaluated using 279 paired artifact-affected (79 ungradable and 200 gradable but unmeasurable) and artifact-free images, assessing gradability improvement and consistency of quantitative metrics (foveal avascular zone area, non-perfusion area, vessel density, fractal dimension, skeleton distance) using intraclass correlation coefficients (ICC). Additionally, diabetic macular ischemia (DMI) classification performance was compared using original versus OCTA-ARM preprocessed images.

Results: OCTA-ARM achieved 98.92% (276/279) gradability improvement, with 200 (100%) «gradable but unmeasurable» images to «measurable», 66 (83.5%) ungradable images to «measurable», and 10 (12.7%) ungradable images to «gradable but unmeasurable». All quantitative metrics showed significant consistency improvements (all $p < 0.0001$), with foveal avascular zone area ICC increasing from 0.771 to 0.909, vessel density from 0.416 to 0.673, fractal dimension from 0.385 to 0.757, and skeleton distance from 0.372 to 0.757. DMI classification accuracy improved by 1.04-1.39% across three neural network architectures when using OCTA-ARM preprocessed images.

Conclusions: OCTA-ARM is an effective diffusion-based framework trained on synthetic data that successfully addresses the critical challenge of simultaneously removing motion, shadow, and defocus artifacts in OCTA images. It significantly enhances image gradability and improves the reliability of essential quantitative OCTA metrics.

Abstract No.: 208390

Ozone Exposure, Retinal Microvasculature Alterations, and the Mediating Effect of Aging in Diabetic Population: A Retrospective Cohort Study

First Author: Senlin LIN

Purpose: Accumulating epidemiological evidence links ozone exposure with cerebrocardiovascular morbidity. This study aims to explore its microvascular impact.

Methods: Retinal microvasculature alterations have emerged as sensitive biomarkers of systemic endothelial dysfunction and predictors of cerebrocardiovascular events. Our study comprised 55,463 individuals diagnosed with type 2 diabetes mellitus (T2DM), recruited across 249 community health centers spanning all 17 administrative districts of Shanghai in 2017. Exposure assessment utilized satellite-derived ozone concentration estimates at 1*1 km spatial resolution, aggregating five-year (2013-2017) ozone exposure metrics. Retinal vascular phenotyping

included central retinal artery equivalent (CRAE), central retinal vein equivalent (CRVE), arteriole-to-venule ratio (AVR), vascular tortuosity (VT), and fractal dimension (Df). The retinal age gap (RAG) is adopted to reflect accelerated aging, defined as the difference between deep learning-predicted retinal age and chronological age.

Results: Multivariable regression analyses using double machine learning showed that for every 10 $\mu\text{g}/\text{m}^3$ increase in ozone, the decrease in the CRAE, CRVE, VT ($\times 10^4$) and Df ($\times 10^3$) were 4.03 (95 %CI: 3.04, 5.01) μm , 8.35 (95 %CI: 6.69, 10.00) μm , 0.38 (95 %CI: 0.28, 0.48) and 13.7 (95 %CI: 11.20, 16.21), respectively, and the increase in RAG was 2.29 (95 %CI: 2.04, 2.54) years. Mediation analysis revealed an association between ozone exposure and reductions in CRAE (indirect effect, standardized coefficient=-0.08, 95 %CI -0.09~-0.07), CRVE (-0.07, -0.08~-0.06), and Df (-0.11, -0.12~-0.09) through the pathway of accelerated aging.

Conclusions: Long-term ozone exposure correlates with accelerated retinal aging and microvascular remodeling, which provides novel biological evidence to elucidate the causal relationship between ozone exposure and cerebrocardiovascular risk.

Abstract No.: 208315

Parameter-Efficient Glaucoma Screening Using Foundation Models on Colour Fundus Photographs

First Author: Bowen XU

Co-Author(s): Carol CHEUNG, Hong Yu Ryan FONG, Anran RAN, Clement THAM

Purpose: Glaucoma screening requires accurate and scalable automated systems for early detection. We aimed to evaluate the performance of parameter-efficient fine-tuning of foundation models for glaucoma classification using colour fundus photographs (CFPs).

Methods: We applied Low-Rank Adaptation (LoRA) to fine-tune the VisionFM foundation model using 11,492 CFPs from the SMDG dataset, split into training (9,029), validation (615), and test (1,848) sets. The validation set was used for threshold optimization using Youden Index. Performance metrics included sensitivity, specificity, and overall accuracy.

Results: The classifier achieved acceptable performance on the SMDG test set with sensitivity of 85.0% (600/706 glaucoma cases detected) and specificity of 91.1% (1,040/1,142 healthy eyes correctly identified), yielding an overall accuracy of 88.7%. The Youden Index was 0.78 at the optimal threshold of 0.645. The LoRA adapter utilized only 0.9M trainable parameters, representing a 98.9% reduction compared to full fine-tuning.

Conclusions: Parameter-efficient fine-tuning through Low-Rank Adaptation enables glaucoma screening systems with acceptable performance on the SMDG

dataset. This approach offers a practical and scalable pathway for AI-assisted glaucoma screening in resource-limited settings.

Abstract No.: 200714

Performance of a Large Language Model in Predicting Myopia Progression in Korean Children

First Author: Jihae PARK

Co-Author(s): Guhn AHN

Purpose: To evaluate a large language model, Generative Pre-trained Transformer-5 (GPT-5), in predicting myopia progression in Korean children and compare an International Myopia Institute (IMI) guideline-trained GPT-5 model against a baseline GPT-5 model.

Methods: This retrospective study included 156 eyes of 88 children aged ≥ 6 years with baseline spherical equivalent (SE) ≤ -1.0 diopter (D). Eyes with visually significant comorbidities or on myopia-control therapy were excluded. Inputs to both GPT-5 models were age, sex, axial length (AXL), keratometry (K1, K2), sphere, cylinder, and SE at the first visit. The guideline-trained model was provided with IMI White Papers; the baseline model was not. Progression was defined as either an SE decrease ≥ 0.50 D or an AXL increase ≥ 0.20 mm at the 1-year follow-up. Outcomes included sensitivity, specificity, accuracy, positive predictive value (PPV), and negative predictive value (NPV).

Results: Myopia progression occurred in 106 of 156 eyes (67.9%). The guideline-trained model achieved 100% sensitivity, 24% specificity, 75.6% accuracy, 73.6% PPV, and 100% NPV. The baseline model had 100.0% sensitivity, 18% specificity, 73.7% accuracy, 72.1% PPV, and 100% NPV. The guideline-trained model showed superior overall performance with a higher Youden's index (0.24 vs. 0.18).

Conclusions: A GPT-5 model trained on the IMI White Papers demonstrates high sensitivity in predicting 1-year myopia progression in children, suggesting its usefulness as a screening tool to help avoid missing high-risk children. However, its low specificity requires adjunctive use with an ophthalmologist evaluation; clinical confirmation remains essential.

Abstract No.: 203298

Performance of an Artificial Intelligence (AI)-Based Diagnostic System for Diabetic Retinopathy Detection Using Fundus Photography

First Author: Bo Hee KIM

Co-Author(s): Jin-soo KIM, Yun Jeong LEE, Ki Young SON

Purpose: To evaluate the diagnostic accuracy and clinical utility of "WISKY," an artificial intelligence (AI)-

based system for detecting diabetic retinopathy (DR) through fundus photography.

Methods: This prospective, non-interventional cross-sectional study included patients (≥ 19 years) with type 1 or 2 diabetes who underwent fundus photography. DR severity was graded according to the International Clinical Diabetic Retinopathy (ICDR) standards. Diabetic macular edema (DME) was diagnosed by surrogate markers such as hard exudates within one disc diameter of the fovea. Patients without DR were defined as those not meeting these criteria. Referable DR was defined as moderate non-proliferative DR or worse, or the presence of DME. All fundus images were analyzed using the AI-based diagnostic system (WISKY). Diagnostic performance was evaluated using sensitivity, specificity, accuracy, and the area under the receiver operating characteristic curve (AUROC).

Results: A total of 101 gradable eyes from 60 patients (62.7% female, mean age 59.5 years) were analyzed. For distinguishing DR from no DR, the AI system demonstrated robust performance (AUROC = 0.884 [95% CI: 0.812–0.956], accuracy = 0.881, sensitivity = 0.788, specificity = 0.980). For differentiating referable DR from non-referable DR, the AI system also showed good diagnostic ability (AUROC = 0.887 [95% CI: 0.814–0.961], accuracy = 0.891, sensitivity = 0.860, specificity = 0.914).

Conclusions: The AI-based fundus diagnostic system demonstrated high accuracy and reliability in detecting both any DR and referable DR. These findings support its potential role as an effective screening tool for diabetic retinopathy in clinical and community settings.

Abstract No.: 206644

PocDoc Web-Based Visual Field Tool: Comparative Study With Humphrey Visual Field and Potential for Home-Based Testing

First Author: Chew Hans NG

Co-Author(s): Bryan ANG, Debbie Shuying BOEY, Joewee BOON, Jueshao GOH, William ROJAS-CARABALI

Purpose: To validate the novel PocDoc visual field (VF) application by comparing its performance against the current gold standard Humphrey Visual Field (HV).

Methods: At a tertiary eye centre, 81 participants (107 eyes) with glaucoma were recruited. All participants were tested sequentially on the same day with the reference-standard HVF and the novel PocDoc VF. The performance of PocDoc was assessed by calculating its sensitivity, specificity, and accuracy against the HVF for the entire visual field.

Results: PocDoc yields a positive correlation in identifying VF losses in the entire VF ($r=0.504$), superonasal ($r=0.551$), inferonasal ($r=0.443$), superotemporal ($r=0.357$) and inferotemporal quadrants ($r=0.362$). It had an overall accuracy of 85.1%, sensitivity of 94.7% (95% CI, 88.0% to 98.3%),

specificity of 15.4% (95% CI, 1.92% to 45.5%), positive predictive value of 89.0% and negative predictive value of 28.6%. Individual quadrants also showed higher sensitivity than specificity. For glaucomatous eyes, PocDoc had a moderately positive overall correlation ($r=0.477$), positive correlations in Stage 1 ($r=0.309$) and Stage 4 glaucoma ($r=0.975$), and negative correlation for Stage 2 ($r=-0.249$) and 3 ($r=-0.409$) glaucoma.

Conclusions: The novel PocDoc application demonstrated high sensitivity compared to the reference-standard HVF. While its low specificity indicates that it is not suitable as a standalone diagnostic tool, its accessibility profile suggests a potential role as an effective screening tool or home-based monitoring.

Abstract No.: 207093

Practical Challenges and Recommendations for the Implementation of an Artificial Intelligence-Based OCT Analysis in Multicentric Research: Insights From the Swiss RetinAI Consortium

First Author: Tahm **SPITZNAGEL**

Co-Author(s): Aude **AMBRESIN**, Chiara **EANDI**, Justus **GARWEG**, Gabor Mark **SOMFAI**, Sandrine **ZWEIFEL**

Purpose: To summarize the first experiences of the Swiss RetinAI Consortium in implementing artificial intelligence (AI)-based optical coherence tomography (OCT) analysis and to highlight key challenges and practical recommendations for multicenter research.

Methods: The Swiss RetinAI Consortium consists of six centers, that are using the FDA-approved Discovery[®]-platform (RetinAI, Bern, Switzerland) for collaborative research using OCT imaging. We systematically documented and complemented the challenges of our first protocols during expert discussions, with a common guidance for all centers.

Results: The following ten core challenges were identified in our multicenter implementation of RetinAI Analysis: (1) complex ethics submissions due to undefined effect sizes and justification of multiple biomarkers, (2) mandatory use of Swiss-based servers for data hosting imposed by regulatory and data protection requirements, (3) incomplete anonymization from heterogeneous export protocols, (4) lack of standardized OCT scan protocols, with heterogeneous scan sizes processed as equivalent despite covering different retinal areas, (5) inter-device variability, (6) ETDRS grid misalignment, (7) segmentation errors requiring extensive review, (8) unfiltered exports producing huge that are increasing the risk of errors, (9) absence of automated quality screening of OCTs, necessitating additional manual control, and (10) limited reproducibility data across centers. The above points helped us in the development of a common guidance for data acquisition and processing.

Conclusions: Addressing these challenges through standardized workflows and robust governance will unlock the full potential of AI-based OCT analysis, enabling multicenter studies, biomarker discovery, and deeper insights into retinal disease. Our recommendations provide a roadmap for future collaborative projects in ophthalmology.

Abstract No.: 210235

Programming and Designing an Ophthalmic Information Management System With Excel VBA

First Author: Liu **CUIHONG**

Co-Author(s): Bi **HONGSHENG**, Wang **JIAO**, Ji **PENG**

Purpose: Through the independent research and development of refractive surgery information management system, to make up for the lack of information collection and data analysis function of his system in the hospital under the condition of limited interface of special equipment, strengthen the construction of nursing information, contribute to the standardization of refractive surgery information registration, and improve the work efficiency of workload statistics and data analysis.

Methods: Using Excel VBA programming, nurse-led design, and independently developed a refractive surgery information management system. The basic information, diagnosis, operation position, operation mode, surgeon, assistant, nurse, operation process, and other items of the patient are edited in the structured user window. The nurse directly clicks, and the entered data is automatically stored in the Excel table; the patient information list interface is designed to query the history record and modify the habits, so as to protect the Excel database data. Through VBA program coding, the refractive surgery information and workload of one key statistical analysis are achieved efficiently, and an overall presentation of data and charts.

Results: This system has run more than 4000 pieces of data, and there is no data deviation. Compared with the manual work, the registration information time of the system designed and developed by Excel VBA is shortened from 96s per case to 26s, and the time of monthly workload summary and statistical analysis is shortened from 120min per case to less than 1min. According to the calculation of 500 cases per month, the time can be saved as much as 660 minutes, the work efficiency is significantly improved, and the registration of nursing information is standardized and unified. It improves the level of nursing information in the refractive operating room and realizes the paperless management of nursing information registration in the refractive operating room.

Conclusions: The Refractive Surgery Information Management System, which is developed by the nurse using Excel VBA programming, has a clear and

simple interface, meets the actual needs of nursing, optimizes the working process, and improves efficiency significantly.

Abstract No.: 200911

Quantitative Grading of Corneal Opacities Based on Deep Learning and Its Prediction of Postoperative Visual Outcomes in Cataract Patients With Corneal Opacities

First Author: Ma XINYU

Co-Author(s): Wen XU

Purpose: This study explores deep learning methods to quantify corneal opacities and evaluates their effectiveness in predicting postoperative visual outcomes in cataract patients. By integrating multimodal data and constructing predictive models for visual acuity, the research supports preoperative assessment and personalized treatment, advancing intelligent ophthalmic diagnosis and care.

Methods: This study included 300 cataract patients: 150 eyes with corneal opacity and 150 normal controls. Each eye underwent 16 AS-OCT scans, and three models (UDTransnet, R34UNet, MEGANET) were used for opacity segmentation, trained with combined cross-entropy and Dice loss. Model performance was assessed by Dice coefficient. Corneal opacity was quantified by pixel intensity, and its correlation with one-month postoperative BCVA was analyzed.

Results: All three models excelled in classifying corneal opacity regions (ROC 0.98), with MEGANET achieving the best segmentation (Dice 0.77, precision 0.79, recall 0.79). Pixel intensity differed significantly between normal and opaque corneas ($P < 0.001$). Corneal opacity in the central 3 mm was most strongly correlated with postoperative BCVA; average pixel intensity above 105 ADU indicated reduced visual acuity. Opacity outside the central 6 mm had no impact on visual acuity.

Conclusions: Deep learning-based methods for quantifying corneal opacity have significant value in predicting postoperative visual outcomes. In particular, precise quantification of opacity within the central 3 mm of the cornea provides a scientific basis for preoperative assessment and personalized treatment, enhancing diagnostic accuracy and promoting the advancement of intelligent ophthalmic care.

Abstract No.: 208553

Rapid Screening of Pseudoisochromatic Plates Based on Deep Learning Optimization

First Author: Jing WANG

Co-Author(s): Xiangui HE, Xiaowei TONG, Yulan WANG

Purpose: Pseudoisochromatic plates are the most famous type of color blindness test. This study aims to explore the use of deep learning to optimize the

combination of some pseudo iso color palettes and predict the test results of the entire set of pseudo iso color palettes, in order to find a fast color vision screening solution.

Methods: Children were randomly selected from the Shanghai arm of a national multicenter cohort study. VA examinations were conducted using the Tumbling E chart first, then the HOTV chart, followed by other ocular measurements in this pilot study. Testability and VA data (logMAR) are presented for comparison between the two charts.

Results: The itertools package and NumPy matrix operations of Python were used to implement permutations and combinations. Different combinations of 3 questions, 5 questions, and 7 questions were evaluated to predict the alternative of the whole set of pseudoisochromatic plates. The decision tree model in the Scikit learn library can effectively predict the inspection results of pseudoisochromatic plates. The ROC-AUC for predicting whether a patient has color blindness is (0.869 for 3 questions, 0.956 for 5 questions, and 0.967 for 6 questions), and the ROC-AUC for predicting whether a patient has color weakness is (0.813 for 3 questions, 0.961 for 5 questions, and 0.966 for 7 questions).

Conclusions: Through deep learning, it is possible to optimize the examination scheme of pseudoisochromatic plates and improve the efficiency of color vision examination.

Abstract No.: 208292

Real-World Prospective Validation and Economic Evaluation of Deep Learning-Based Diabetic Retinopathy Detection From Fundus Photographs: A Systematic Review and Meta-Analysis

First Author: Anran RAN

Co-Author(s): Carol Y CHEUNG, Jennifer DING, Sobha SIVAPRASAD, Clement C THAM, Tien Yin WONG

Purpose: Deep learning (DL) has shown promise in delivering diagnostic and economic benefits for detecting diabetic retinopathy (DR) from fundus photographs (FP). However, evidence synthesis of model validation in prospective, real-world settings remains limited. We conducted a systematic review and meta-analysis to assess the feasibility of implementing DL-DR systems using FPs across different countries by synthesizing prospective validation and economic evidence.

Methods: We searched five databases until August 13th, 2025. Studies prospectively assessing performance, and/or studies conducting economic analyses of DL-DR systems using FPs. Characteristics of all studies, performance parameters of prospective validation studies, and economic outcomes of economic analysis studies were extracted.

Results: Forty-seven studies were included in the meta-analysis. The pooled performance was the highest in detecting vision-threatening DR (AUROC 0.974), followed by any DR (AUROC 0.965), then referable DR (RDR) (AUROC 0.959). Study region, clinical pathway, mydriasis, image quality control, sample size, grading criteria, reference standard, and model architecture significantly affected model performance in RDR detection. Fifteen studies were included in the economic commentary, showing that DL-based DR screening was cost-effective in high-income countries, while results in middle-income countries were mixed, depending on compliance rates, glycemic control, and initial costs.

Conclusions: DL-DR systems using FPs had high discriminative performance in prospective real-world settings and hold promise to improve cost-effectiveness, especially in high-income countries.

Abstract No.: 204044

Smart Multimodal Monitoring With Graded Nonpharmacological Nursing Interventions for Pain Management During Neonatal Fundus Examination

First Author: Liping **XIONG**

Co-Author(s): Qiong **CHEN**, Jinwei **LI**, Yinyin **LIN**, Li **ZENG**, Qiqiao **ZENG**, Tao **ZI**

Purpose: Neonatal fundus examination, including retinopathy of prematurity screening, often causes pain and instability. Nonpharmacological interventions such as oral sucrose, nonnutritive sucking (NNS), and facilitated tucking are effective but usually applied without real-time adjustment. This study evaluated smart multimodal monitoring combined with graded nonpharmacological nursing interventions.

Methods: A randomized controlled trial was conducted in preterm infants. The control group received conventional care, while the intervention group received sucrose, NNS, and tucking supported by smart monitoring. Physiological signals—heart rate (HR), oxygen saturation (SpO₂), and heart rate variability (HRV)—were continuously recorded. Behavioral cues, including facial expression, crying, and limb movement, were assessed using the Premature Infant Pain Profile—Revised (PIPP-R). When thresholds were exceeded (HR rise >15 beats/min, SpO₂ drop ≥5%, HRV drop ≥20%, or PIPP-R >9), graded alerts were issued. Nurses implemented stepwise care: mild cases required swaddling adjustment or NNS verification; moderate cases added sucrose with maternal voice soothing; severe cases required pausing the exam and applying all interventions. Primary outcomes were PIPP-R scores and HR/SpO₂ stability; secondary outcomes were crying time, exam completion, and parental satisfaction.

Results: The intervention group is expected to show lower PIPP-R scores, fewer fluctuations, shorter crying, and higher completion and satisfaction rates (P<0.05).

Conclusions: Smart multimodal monitoring enables real-time pain recognition and graded alerts. Combined with nonpharmacological care, it supports precise, dynamic management and improves safety and quality.

Abstract No.: 204350

Strabismus-Net Based Mobile Application for Efficient Strabismus Diagnosis With Nine-Gaze Photographs

First Author: Dawen **WU**

Co-Author(s): Longqian **LIU**, Haixian **ZHANG**

Purpose: Early detection of strabismus is crucial for effective treatment. Traditional diagnostic methods require extensive expertise, which often results in diagnostic errors and delays, particularly in underserved areas, due to a shortage of trained professionals. To address these challenges, this study introduces Strabismus-Net, an integrated mobile application leveraging the largest nine-gaze dataset to date, to improve diagnostic efficiency and facilitate streamlined referrals for comprehensive care.

Methods: This retrospective and prospective cross-sectional study utilized a large dataset of nine-gaze photographs captured under diverse conditions. A YOLOv8-based algorithm cropped the eye regions, followed by synchronized data augmentation to enhance model generalization. Strabismus-Net was developed to classify orthotropia, horizontal strabismus (exotropia/esotropia), and vertical strabismus, incorporating advanced attention and aggregation mechanisms. The model underwent 10-fold cross-validation, with the best-performing version validated on an independent external test set. Performance was evaluated using Sensitivity, Specificity, F1-Score, and AUC, benchmarked against three junior doctors' assessments, with Grad-CAM heatmaps assessing interpretability.

Results: The study used 84,897 photographs from 9,433 individuals for cross-validation and 10,458 photographs from 1,162 individuals for prospective testing. The model achieved an AUC of 99.53% for binary strabismus screening and high AUC values for orthotropia (96.41%), exotropia (99.19%), esotropia (99.11%), and vertical strabismus (80.99%). It matched junior doctors in detecting exotropia and esotropia while outperforming them in orthotropia and vertical strabismus.

Conclusions: Leveraging the largest nine-gaze dataset to date, Strabismus-Net achieved state-of-the-art performance in strabismus screening and diagnosis, reducing missed diagnoses of complex cases. Prospective testing and an integrated platform support large-scale screening, aid non-specialists, and optimize workflows.

Abstract No.: 202361**Teleophthalmology in Action: Closing the Treatment Gap With Remote Care***First Author: Igor AZNAURYAN**Co-Author(s): Karmen ARTENIAN, Satenik AGAGULIAN, Victoria BALASANYAN*

Purpose: To evaluate the feasibility of using telemedicine in the practical work of an ophthalmologist for conducting video consultations, diagnostic examinations, and courses of therapeutic procedures for various oculomotor and refractive pathologies.

Methods: A study was conducted on 468 children aged 4 to 12 years (mean age 5.6 ± 1.2 years) with the following conditions: myopia 195 patients, hypermetropia and astigmatism 69 patients, amblyopia 112 patients, strabismus 92 patients. All patients initially underwent an in-person consultation with an ophthalmologist in the clinic, where a complete ophthalmological examination was performed. They were recommended a course of vision therapy. Due to the inability to receive treatment at the facility for various reasons (distance, patients from remote regions), they were advised to undergo the treatment course via the «Online Oko» telemedicine platform. The treatment course lasted 10 days.

Results: All patients with myopia showed an increase in accommodative reserve after the treatment course. On average, this increase was 2.0 ± 0.5 D (range: 0.5 to 3.5 D). Out of 112 patients with amblyopia, 97 patients showed an improvement in visual acuity, with an average increase of 1.3 ± 0.65 lines on the Snellen chart. Out of 92 patients with strabismus and absence of binocular vision, 56 patients successfully regained binocular vision from a distance of 1 meter within the 10-day course.

Conclusions: The study demonstrates the feasibility of a telemedicine platform for effectively administering vision therapy, showing significant improvements in accommodative reserve for myopia, visual acuity in amblyopia, and the restoration of binocular vision in strabismus.

Abstract No.: 202387**The Augmentational Effect of Vergence Exercises on Accommodative Facility and Accommodative Amplitude in Presbyopia Patients***First Author: Elsa L.c. MAI*

Purpose: The degree accommodation influences convergence is known as Accommodative Convergence to accommodation (AC/A) ratio. Given a fusional disparity in input, with the synkinesis of oculomotor near response, the degree to which fusional vergence influences accommodation is known as Convergence Accommodation to convergence (CA/C). With our

ADRRPs visual training machine to strengthen convergence function/ muscle power, we would like to see if it can induce improvement in Accommodative facility and accommodative amplitude.

Methods: ADRRPs or OrthoV is a Vergence training VR machine base on Risley prism, hence the name automatic dual rotational Risley prisms, 26 presbyopia patients were recruited from ophthalmology clinic with complain of accommodative spasm and eye strain. IRB consent form were signed and pre-training evaluation for Accommodative Amp, Accommodative facility (flipper), stereopsis test, Questionnaire (COVD-QOL) for Convergence Insufficient were given. One session of ADRRPs/OrthoV training lasting 30 mins with a 10 mins break in between were given. These patients repeats AA, Steropsis and AF testing immediately after training.

Results: Immediate post binocular visual training, a noticeable improvement was found over stereopsis which is as expected. A gain of accommodative Amp of $(0.24D \pm 0.14D)$ on the average was noticed. Post training accommodative facility with flipper increase only slightly, (gain of 2.2 cpm on the average).

Conclusions: CA/C ratio, or rather Convergence induced accommodation in presbyopia patients, can be use as augmentation for presbyopia symptoms. ADRRPs/OrthoV with it's visual training, proof to be effective and convenient for patient's self training after proper supervised. Training also provide a small gain in accommodative facility.

Abstract No.: 207334**The Fellow Whisperer: AI's Role in Phaco Skill Mastery***First Author: Sneha G V**Co-Author(s): Sriganesh*

Purpose: To assess and compare the surgical skills between two groups of residents with and without the use of a surgical optimiser app. To assess the individual surgical improvement of fellows at the beginning vs the end of the study

Methods: Six phacorefractive fellows were randomly assigned to two groups. Group A consisted of three surgeons who performed surgeries using the Zeiss Surgical Optimiser (ZSO), while Group B included three surgeons who operated without the ZSO. Each surgeon conducted 30 cataract procedures employing a standardized surgical technique.

Results: Group A, which operated with the Zeiss Surgical Optimiser (ZSO), demonstrated relatively faster surgical times, completing procedures in an average of 10 minutes compared with the non-ZSO group. Their OSCAR scores showed a steady improvement over successive cases. In addition, the effective phacoemulsification time was significantly shorter in the ZSO group, and the incidence of intraoperative complications was lower

Conclusions: These findings suggest that the ZSO can serve as a valuable adjunct in enhancing surgical training, enabling fellows to achieve greater efficiency and safety while reinforcing fundamental cataract surgery skills.

Abstract No.: 206342

The Use of Explainable Artificial Intelligence in Predicting the Response of Diabetic Macular Oedema to Intravitreal Anti-Vascular Endothelial Growth Factor Injections

First Author: Kelvin LI

Co-Author(s): Magdalene CHEONG, Xiuyi FAN, Sean NG, Wei Kiong NGO, Li Rong WANG

Purpose: Intravitreal anti-vascular endothelial growth factor (VEGF) injections is used to treat centre-involving diabetic macular edema (ciDME). Yet, patient response varies significantly, and there is currently no reliable way to predict outcomes. A predictive model could improve patient care by guiding personalised treatment, optimising treatment response and reducing overall treatment burden. This study proposes an explainable artificial intelligence (AI) framework integrating deep learning with interpretable models to predict treatment efficacy in ciDME.

Methods: We employed a ResNet18 deep learning model to extract features from spectral domain optical coherence tomography images of the macula and collected clinical data including patient demographics and haemoglobin A1C. These were used to train a Random Forest Regressor to predict post-treatment central macular thickness (CMT) and visual acuity (logMAR). To enhance interpretability, SHapley Additive exPlanations (SHAP) quantified feature contributions, while Integrated Gradients highlighted OCT regions driving predictions. The model was trained on a proprietary dataset of 164 eyes.

Results: Despite limited data, the framework achieved a mean absolute error (MAE) of $55.64 \pm 9.55\mu\text{m}$ for CMT ($\approx 17\%$ relative error). For visual acuity, the MAE was 0.123 ± 0.033 logMAR, equating to one ETDRS line (≈ 6 letters). This level of error falls within the test-retest variability of standard examinations, indicating clinically acceptable predictive accuracy.

Conclusions: Our explainable AI model demonstrates good accuracy in predicting ciDME patient responses to anti-VEGF therapy. Expanding the dataset and refining the framework will be key to improving predictive performance and clinical translation.

Abstract No.: 206810

Transfer Learning-Based Automated Retinal Vessel Segmentation in Fundus Photography

First Author: Suklengmung BURAGOHAIN

Co-Author(s): Priyank BHOLA, Henal JAVERI, Subham SINHA ROY

Purpose: This study seeks to assess a tailored DeepLabV3+ model for precise retinal vessel segmentation in fundus photographs, integrating contrast enhancement, optimised loss functions, and a reproducible, low-code workflow.

Methods: To improve vessel visibility, colour fundus images and annotated vessel masks were preprocessed using CLAHE. The segmentation model, DeepLabV3+ with a ResNet50 backbone, was optimised with a combined Dice and Binary Crossentropy loss to reduce the impact of class imbalance. The dataset was divided into training and validation subsets at a 4:1 ratio. Data augmentation and early stopping were incorporated during training, which was performed on Google Colab through a custom notebook. Predicted masks were thresholded to evaluate segmentation performance.

Results: Compared to the initial architectures, the optimised DeepLabV3+ network yielded superior segmentation performance, especially through a reduction in false negatives. Model convergence was observed after 40–60 epochs, with minimal signs of overfitting. Preliminary outputs revealed improved boundary preservation and more reliable identification of thin vessels. Qualitative assessment showed close alignment of predicted masks with ground truth, most notably for larger vascular structures. Training accuracy was maintained between 80 and 90%, with consistent validation results. Further quantitative evaluation using Dice, IoU, and precision/recall will follow.

Conclusions: The proposed method demonstrates that with contrast enhancement and optimised loss functions, DeepLabV3+ can effectively segment retinal vessels. This pipeline offers a reproducible, scalable, and semi-automated approach for researchers with minimal coding expertise, making it suitable for clinical and academic settings.

Abstract No.: 205057

Trust and Patient Information: A Prospective Study of Available Online Resources

First Author: Tim ROBERTS

Co-Author(s): Sasha KAIROUZ, Brandy MUNRO

Purpose: Misinformation can impact understanding of symptoms and potential treatment thereby undermining trust in medical practitioners and the clinical discussion. We aimed to determine where patients source information on their eye conditions, which sources they trust, and the impact this has on their decision to seek care or adhere to their treatment plan.

Methods: Prospective anonymous patient survey (HREC approved) of patients attending private ophthalmic clinics (Vision Eye Institute, Australia) between March-August 2025. Survey outcomes collated and analysed according to age group, education, and gender.

Results: N = 208 respondents completed the survey, with 51% female and 75+ years (36%) representing the largest age cohort. 71% indicated tertiary qualifications. The patient's main source of information came from the ophthalmologist (67%). Professional clinical websites remained the most trusted source (57% "a lot") compared to internet search engines and social media (8% and 1% respectively).

Conclusions: Results suggest that the clinic remains both the dominant source of patient information and the most trusted documentation for patients, particularly patients > 50 years. Trust in social media information regarding treatment options was minimal. The eye health information patients sought often influenced their decision to see a doctor and/or adjust lifestyle habits. Providing clear, readily available information is key to optimising patient understanding and adherence regarding potential treatment and follow-up.

Abstract No.: 206672

Uncertainty Evaluation-Enhanced RETFound: Achieving Higher Accuracy for Diabetic Retinopathy Screening

First Author: Xiaoyan **HU**

Co-Author(s): Carol **CHEUNG**, Danqi **FANG**, Xujia **LIU**, Truong **NGUYEN**, Anran **RAN**, Ka Ho **SZETO**

Purpose: While deep learning models demonstrate human-level performance in diabetic retinopathy (DR) detection, real-world deployment risks severe consequences from diagnostic errors. We aim to apply a novel technique for uncertainty evaluation, the area under Confidence Operating Characteristics (AUCOC), to the RETFound foundation model, which can enhance model accuracy and identify borderline cases while minimize human-delegated cases.

Methods: The training dataset was retrospectively drawn from the Chinese University of Hong Kong-Sight Threatening Diabetic Retinopathy (CUHK-STDR) study, containing 8254 retinal photographs. We split the data into training, validation, and test sets at a ratio of 7:1:2. We adapted RETFound using AUCOC for the referable DR detection (moderate NPDR or worse) task. AUCOC refers cases with confidence scores below the threshold to experts for review. Performance of RETFound with AUCOC was evaluated against baseline RETFound alone. In addition, we further analysed the performance when 20% of the total samples requiring human double-checked these samples manually to identify failure patterns.

Results: AUCOC-enhanced RETFound model achieved superior performance (the area under the receiver operating characteristic curve [AUROC] 0.934 vs. 0.924, p-value <0.001). When 20% of test images were flagged for expert review, 60% of these cases involved poor image quality, other abnormalities (e.g., drusen), or borderline DR manifestations. In addition, the accuracy, sensitivity, and specificity of the model after excluding these uncertain cases improved to 91.7% (95%CI 90.1-93.1), 88.3% (95%CI 85.6-90.8), and 94.9% (95% CI 93.2-96.5) from 85.5% (95% CI 83.8-87.2), 83.6% (95%CI 81.1-86.1), and 87.1% (95%CI 84.9-89.2), respectively.

Conclusions: The proposed uncertainty evaluation-enhanced RETFound model can potentially balance diagnostic accuracy and operational efficiency in real-world DR screening. By autonomously identifying uncertain cases and double-checking by human, the framework ensures model safety while optimizing specialist resource allocation.

Abstract No.: 201495

Universal Integrated Electronic Eyedrop Sleeve: A Novel Compliance Monitoring System

First Author: Shruti **MARU**

Co-Author(s): Neeraj **ISRANI**

Purpose: Is there a potential role for the use of alerts or reminders at drop-taking times, using smart-phone-enabled technologies? Purpose is to integrate technology that can register a successful drop delivery to the eye and communicate this information to both patients and providers.

Methods: To check the efficacy of the device using a validated questionnaire before & after the use of the device. We conducted 86 eyes of 74 pts among Post operative patients and used a semi-structured questionnaire to assess patient-reported problems and adherence to medications. This is the questionnaire including demographics, cause of noncompliance, number of medications, duration of treatment etc.

Results: We compared the compliance rate before & after the use of the device and found significant improvement.

Conclusions: This innovative device emphasizes the importance of compliance and improves patient adherence

Abstract No.: 203994

Validation Study of Huvitz Biometry HBM-1

First Author: Ungsoo **KIM**

Co-Author(s): Jae Hoon **JUNG**, Jaemin **KIM**

Purpose: To evaluate the repeatability and agreement of Huvitz optical biometer HBM-1 in Korean normal, cataract and pseudophakia eyes.

Methods: After a screening test, a total of 143 eyes were enrolled. Forty-eight normal eyes, 48 cataract eyes, 47 pseudophakia eyes. For each eye, measurements were attempted up to three times, with a maximum of five attempts allowed if blinking or inadequate eye opening interfered. Before each measurement, the biometer was repositioned relative to the eye and recentered. Repeatability (within-subject standard deviation Sw, intraclass correlation coefficient ICCrep) and agreement metrics – including mean difference $\pm$ standard deviation (Δ mean $\pm$ SD), Bland–Altman limits of agreement width (LOAwidth), and Pearson correlation coefficient (ρ) – were calculated for Keratometry (Kf, Ks) and biometry parameters; axial length(AL), lens thickness (LT), anterior chamber depth (ACD), and central corneal thickness (CCT). Results from HBM-1 were compared against those obtained with the IOLMaster 700 (Zeiss).

Results: In the normal-eye subgroup, no statistically significant differences were observed for AL, LT, and CCT between devices. In the cataract subgroup, only AL did not differ significantly between the two devices. In the pseudophakia subgroup, although the difference of AL(0.01 ± 0.02 mm) was statistically significant (p -value < 0.05), it was not considered clinically significant.

Conclusions: Huvitz optical biometer HBM-1 demonstrates high repeatability and good agreement with the IOLMaster 700 across normal, cataract and pseudophakia eyes. Axial length measurements showed excellent inter-device agreement, supporting their reliable use interchangeably between devices. However, other parameters (LT, ACD, CCT and keratometry) often exhibited broader limits of agreement and, in some cases, statistically significant differences, indicating that their interchangeability between devices should be approached with caution.

Abstract No.: 205115

Validity of AI Models in Diagnosing Infectious Keratitis

First Author: Madhu **UDDARAJU**

Purpose: To validate the efficacy & accuracy of various AI mobile applications in diagnosing infectious keratitis.

Methods: Seventy diagnosed Cases of Infectious keratitis caused by different organisms were uploaded to 4 different AI mobile platforms with detailed case history, and response was analysed based on response time, diagnostic accuracy, suggested management protocols, number of references made, and disclaimers given.

Results: Chat GPT had the quickest response time, Perplexity had more medical journal references, Google Gemini had the highest diagnostic accuracy, and common organisms like fungus and bacteria had more diagnostic accuracy than uncommon organisms like Acanthamoeba and Nocardia.

Conclusions: AI-based mobile apps have good screening value for infectious keratitis, especially fungal and bacterial infections, making it a good tool for practitioners in remote areas who do not have access to microbiology and specialist cornea care.

Abstract No.: 203646

Visual Field Patterns and Progression Factors in Primary Open-Angle Glaucoma Based on Machine Learning

First Author: Yu-tzu **PING**

Co-Author(s): Zidong **CHEN**, Gus **GAZZARD**, Yuzhen **JIANG**, Kezheng **XU**, Yangfan **YANG**, Qiaona **YE**, Minbin **YU**, Yuqing **ZHANG**, Songfu **ZOU**

Purpose: This study aims to utilize Principal Convex Hull Analysis (PCHA) to identify visual field (VF) patterns in patients with POAG and further investigate the relationship between VF patterns and the risk of VF progression under different IOP conditions.

Methods: The baseline VF data of POAG patients from the LiGHT China cohort were analyzed using PCHA. Then, participants were categorized into four groups based on whether they achieved the target IOP and whether GPA indicated VF progression during follow-up. The relationship between VF patterns and VF progression under different IOP conditions was further analyzed.

Results: A total of 859 eyes from 495 participants were included, with an average age of 48.2 ± 17.1 years. Among them, 547 eyes (63.7%) were diagnosed with mild POAG, 216 eyes (25.1%) were diagnosed with moderate POAG, and 96 eyes (11.2%) were diagnosed with severe POAG. PCHA determined 11 patterns were most representative with the highest AREV (80.1%) and lowest BIC (938.2). Pattern 2 had a higher weight in NTG patients ($P=0.003$). Pattern 11 had a higher weight in POAG eyes with pathological myopia ($P=0.008$). Pattern 2, superior arcuate defect with central VF damage, and pattern 10, nasal step VF defect, both had the highest weights in the IOP+/VF+ group ($P<0.0001$). Pattern 6, inferior and temporal peripheral VF defect, had the highest weight in the IOP-/VF+ group ($P<0.05$). Pattern 10 was strongly associated with IOP-dependent VF progression risk with a hazard ratio of 8.56 (95% CI: 1.92-38.18, $P<0.005$). Pattern 6 showed significant correlation with non-IOP-dependent VF progression risk with a hazard ratio of 11.84 (95% CI: 1.53-91.50, $P=0.02$).

Conclusions: This study successfully utilized PCHA to identify VF patterns in POAG patients from the LiGHT China cohort. The proportion of specific VF patterns serves as a predictive factor for distinguishing IOP-dependent or non-IOP-dependent progression risk factors, enabling more precise and timely intervention against glaucoma progression.

Abstract No.: 204904**Win-Win: Portable Nonmydriatic Fundoscopic Camera Plus AI Model for Retina Screening for Employees***First Author: Jen-hsiang SHEN**Co-Author(s): Chao-kai CHANG, Yih-shiou HWANG, I-hung LIN*

Purpose: We hope to provide free fundus photo examination plus AI Model to ensure the optimal health for our employees. Fundus examination is crucial, because many early fundus disease lack symptoms and still cause irreversible vision damage.

Methods: After passing IRB approval, our employees voluntarily received free Portable Nonmydriatic Fundoscopic Camera (JYE01) developed by Foxconn and Young Optics. Simultaneous marking was done by CoDoctor AI developed by Foxconn. Markings were later confirmed by senior ophthalmologist.

Results: One hundred and fifty-six employees joined the study, and all received the examination in 1 day. Ninety percent of participants are female. Mean age is 32.17 years old. Ninety percent of the image was qualified for CoDoctor AI analysis. Two employees were found to have diabetic retinopathy, and one employee was found to have age-related maculopathy. One hundred percent agreement was later confirmed by senior ophthalmologist.

Conclusions: Extreme reliability and convenience were demonstrated for this Portable Nonmydriatic Fundoscopic Camera Plus AI Model. We not only improved our employees' health, we can also promote this efficient model to other companies and general public. Vision healthcare could be more accessible, and health awareness would be further highlighted in society.

Abstract No.: 208453**Z-Calling: A Tool for dZ-DNA Detection and A/Z Base Calling Using Pacbio HiFi Reads***First Author: Bo WU**Co-Author(s): Ying CHEN, Wei CHI, Longjian NIU, Chuan-le XIAO, Jiayong ZHONG*

Purpose: The substitution of adenine (A) with 2,6-diaminopurine (Z) in phage genomes has critical biological and technological implications. Progress is hampered by the lack of reliable methods to detect dZ-DNA and accurately discriminate A from Z at single-nucleotide resolution. We developed Z-Calling to overcome this, leveraging kinetic data from PacBio CCS reads.

Methods: Z-Calling employs two machine learning modules: A/Z base calling and read classification. Z incorporation induces reproducible, context-dependent kinetic shifts, mainly in the pulse width (PW) signal. A Multilayer Perceptron (MLP), trained on mixed dZ-

DNA and hybrid datasets, handles base discrimination. The Z-probability output then feeds a Support Vector Machine (SVM) classifier to categorize reads as dZ-DNA or canonical DNA.

Results: The A/Z base-calling module demonstrated robust performance (AUC: 0.942 to 0.952). It accurately quantified the Z base frequency (26.4%) in an engineered yeast genome (expected ~27%). The read classification module showed exceptional sensitivity, distinguishing dZ-DNA sources with a minimum positive likelihood ratio (LR+) of 490. Z-Calling effectively and efficiently identified dZ-DNA sources in artificial metagenome datasets with low dZ-DNA content.

Conclusions: Z-Calling is the first machine learning tool to accurately identify Z bases at single-nucleotide resolution directly from PacBio HiFi data. Its high sensitivity and precise A/Z discrimination establish a generalizable platform, accelerating the study of natural Z-genome organisms and unlocking dZ-DNA's potential in synthetic biology and data storage.

Academia, Research, Teaching and Education in Ophthalmology**Abstract No.: 207377****A Digital Pathway in Vitreoretinal Fellowship: E-Logbook Insights***First Author: Debolina DEB**Co-Author(s): Prithvi*

Purpose: Traditional logbooks limit detailed documentation, impacting training quality.

Methods: We created a dynamic E-logbook during a 2-year vitreoretinal fellowship, integrating EMR and advanced imaging tools such as Zeiss slit lamp, Clarus 700, Spectralis, Cirrus OCT, Forus, and Ngenuity. It records clinical cases, surgical procedures, follow-ups, with multimedia content like annotated videos.

Results: Organized into clinical summaries, an image atlas, and a surgical log with hyperlinked videos, it supports unlimited entries and easy access. Rare cases including Oguchi disease, torpedo maculopathy, hybrid cavitory disc, staged ROP, retinoblastoma, FEVR, and choroidal osteoma are included.

Conclusions: This platform serves as an invaluable resource for academic discussions, presentations, and continuous learning, providing a visual, interactive archive that enhances understanding, retention, and professional growth in vitreoretinal training. The E-logbook enhances vitreoretinal training by providing detailed, multimedia documentation and easy access to rare cases, promoting deeper understanding,

improved clinical skills, and sustained learning—ultimately advancing diagnostic and surgical proficiency in ophthalmology.

Abstract No.: 205331

A New Subcluster of Müller Cells in Diabetic Retinopathy As Intervention Candidates by ScRNA-Seq Analysis

First Author: Yun ZHANG

Co-Author(s): Tianshu YU, Yu ZHOU

Purpose: Diabetic retinopathy (DR) causes irreversible vision loss. Müller cells, critical for retinal homeostasis yet drivers of DR progression, exhibit unelucidated functional heterogeneity. The aim of this study is to investigate the subclusters and function of müller cells in DR.

Methods: Retinal tissues from leptin receptor-deficient (db/db, type 2 diabetes model) mice and control db/m mice were identified by single-cell RNA sequencing (scRNA-seq) and bioinformatics analysis.

Results: We identified 7 distinct Müller cell subclusters in db/db mice model. Among these, the proportion of Müller_CO was significantly increased in db/db mice, enriched in stemness-related pathways including DNA repair and cell cycle regulation, and serves as the initiating origin of rod photoreceptor differentiation. Egr1⁺ is the core transcriptional regulator of Müller_CO, which targets genes (including Itgav) to activate stemness-associated pathways. Furthermore, Müller_CO acts as a dominant signaling hub in db/db mice, interacting with other subclusters via the Itgav/Itgb8 (αvβ8 integrin) axis.

Conclusions: These data provide a detailed analysis of Müller heterogeneity landscapes under diabetic and normal conditions, clarify the pathological role shift of Müller_CO in DR, and propose Egr1⁺/αvβ8 as promising therapeutic targets.

Abstract No.: 206919

A Simple Eye Model for Practicing Retinal Membrane Peeling Surgery

First Author: Simaporn SETTHAWONG

Co-Author(s): Supathida JIAMSADAW, Chinnapat MONTRISUKSIRIKUN, Nuttawut RODANANT, Nuttara SAPPHASO, Thanchanit SAWETRATANASTIEN

Purpose: To evaluate the effectiveness of a low-cost, simple eye model for retinal membrane peeling training.

Methods: A pilot study included five ophthalmology trainees with intraocular surgery experience but no prior peeling exposure, and five vitreoretinal experts. The model was created using 60-ml syringes, a plastic mask, a sponge, reused microforceps, a reused light probe, a BIOM, a microscope, and vinegar-soaked chicken eggshells. Peeling was assessed in two steps:

flap initiation and complete peeling, using a 3-point scoring system (0-2) and time measurement. Novices performed peeling before and after training in the BIOM setup, microscope adjustment, and microforceps handling. Experts evaluated the model's utility and realism using 3-point (1-3) and 4-point Likert scales (1-4), respectively.

Results: Novices demonstrated a significant reduction in complete peeling time (pre: 459.0 ± 299.3 s, post: 238.6 ± 163.9 s; p=0.043). Trend toward improvement was observed in flap initiation score (0.00 ± 0.00 vs. 1.40 ± 0.89; p=0.059), complete peeling score (0.60 ± 0.55 vs. 1.60 ± 0.42; p=0.063), and flap initiation time (67.80 ± 14.84 vs. 40.40 ± 47.26 s; p=0.225). Experts rated the model user-friendly and effective (2.60 ± 0.55), particularly for BIOM assembly (2.80 ± 0.45) and microforceps use (2.40 ± 0.55). The model was considered helpful for building surgical confidence (2.40 ± 0.89). Realism was rated high for BIOM assembly (3.60 ± 0.55) and instrument setup (3.40 ± 0.55), but moderate for tactile feedback (2.00 ± 1.22).

Conclusions: This simple, low-cost model is effective for practicing retinal membrane peeling and related surgical skills, with potential for refinement in tactile realism.

Abstract No.: 206415

ABC Stress Program for Nurses: Supporting Mental Health and Ophthalmic Care

First Author: Dr Zaidah Rizidah MURANG

Purpose: Nurses often experience high occupational stress, contributing to anxiety, depression, and fatigue, which can affect clinical performance and patient care, including ophthalmic services. This study evaluates the effectiveness of the ABC Stress Program—an online-based stress management program developed by the University of Tokyo—in improving psychological well-being, health-related quality of life, and work-related outcomes among nurses in Brunei Darussalam.

Methods: A randomized controlled trial is being conducted among registered nurses from both public and private hospitals in Brunei. Participants are randomly assigned to either a 6-week ABC Stress Program (intervention) or a control group. Assessments are conducted at baseline (T1), post-intervention (T2, week 6), and follow-up (T3, week 12) via Qualtrics. The primary outcome is psychological distress measured using the DASS-21. Secondary outcomes include health-related quality of life (EQ-5D-5L), absenteeism, and work performance (HPQ). Mixed-model analysis for repeated measures will be applied using an intention-to-treat approach.

Results: The study is ongoing and currently in the baseline recruitment phase. Completion of data collection is expected before the conference. We anticipate that participants in the intervention group

will demonstrate significantly greater reductions in anxiety, stress, and depression, alongside improvements in quality of life and work performance, compared to controls.

Conclusions: This trial will provide evidence on the effectiveness of the ABC Stress Program as an accessible, scalable intervention for nurses. Findings may inform strategies to reduce stress-related fatigue, enhance visual comfort, and improve workforce well-being, thereby supporting the quality of ophthalmic and general patient care.

Abstract No.: 203076

AI-Driven Readability in Dry Eye Diagnostic Explanations: A Comparative Study of GPT-4.5, Deepseek-R1, Gemini 2.5 Pro, and Claude Opus 4

First Author: Chenxuan **LIU**

Co-Author(s): Xiangyu **CHEN**, Xuan **LIAO**, Junyi **LOU**, Jiahao **NIU**

Purpose: Common readability metrics (e.g., Flesch-Kincaid) are designed for English and perform poorly on Chinese due to linguistic differences. We developed a Chinese-specific readability scale to evaluate AI-generated diagnostic explanations for dry eye syndrome, aiming to enhance patient understanding amid limited healthcare resources.

Methods: We evaluated Chinese text across five dimensions: average sentence length, average word length, total character count, sentence density, and formatting. Each dimension was weighed empirically (30%, 25%, 15%, 20%, and 10%, respectively) to form a 100-point scale. Based on this scale, scores were categorized into educational levels. We used 40 complete dry eye cases from the first half of 2025, each containing complaint, examination, and diagnosis data. Each case was input into four models—GPT-4.5, Deepseek-R1, Gemini 2.5 Pro, and Claude Opus 4—with three independent responses generated per case to ensure stability and reduce randomness. Readability scores were computed programmatically using Python.

Results: All models scored between 36.50–40.29 (mean ≈ 39), placing readability in the “college and professional” range (0–39.9). Gemini 2.5 Pro showed higher variability. Results indicate that AI explanations are most accessible to highly educated individuals.

Conclusions: AI-generated medical explanations remain challenging for those without higher education, potentially widening health literacy gaps. To improve accessibility, China should enhance basic education, promote AI literacy, and establish standardized readability metrics for public and professional use.

Abstract No.: 200506

Anterior Segment Parameters in Iridofundal Coloboma (IFC): A Comparative Analysis With Healthy Eyes

First Author: Manasi **TRIPATHI**

Co-Author(s): Ashish **MARKAN**

Purpose: To compare anterior segment biometric parameters between eyes with iridofundal coloboma (IFC) and healthy controls.

Methods: In this cross-sectional study, patients with IFC and healthy controls were enrolled for anterior segment evaluation. Parameters included central corneal thickness (CCT), endothelial cell density (ECD), coefficient of variance (CoV), hexagonality (Hex), axial length (AL), anterior chamber depth (ACD), and lens thickness via IOL Master, AS-OCT, and specular microscopy.

Results: Forty eyes with IFC and 40 age-matched controls were enrolled for analysis (Age 7-45 years). IFC eyes had significantly higher CCT ($610.12 \pm 62.33 \mu\text{m}$ vs $501.20 \pm 38.39 \mu\text{m}$, $p=0.0051$) and ECD (3457.50 ± 465.54 vs 3106.50 ± 335.86 , $p=0.004$). ACD was lower in IFC eyes ($2.59 \pm 0.33 \text{mm}$) than in controls ($3.51 \pm 0.91 \text{mm}$, $p<0.001$). In IFC group, eyes with microcornea had higher CCT than those without ($671.5 \pm 16.26 \mu\text{m}$ vs $577.14 \pm 47.76 \mu\text{m}$). Strong intercorrelations between biometric parameters (AL-ACD $r = 0.850$, ACD-LT $r = 0.991$) suggest coordinated developmental alterations in IFC, indicating that colobomatous malformation affects multiple anterior segment structures simultaneously.

Conclusions: IFC eyes demonstrate distinct anterior segment remodeling, with increased CCT and ECD suggesting structural adaptation.

Abstract No.: 200242

Apert Syndrome in a South Asian (Bangladeshi) Male Child- A Rare Case Report

First Author: Maliha **NAWAR**

Co-Author(s): Nirupam **CHOWDHURY**, Md Moinul **HOQUE**, Zahida **JABBAR**, Md Showkat **KABIR**, Mohammad Shish **RAHMAN**

Purpose: To report a case of Apert Syndrome in 9 years old South Asian Bangladeshi male child. This case is novel due to its rare combination of classical Apert syndrome features with notable ophthalmic findings and early multidisciplinary intervention, which is seldom reported in similar settings.

Methods: We presently describe the case of a 9-year-old male patient with prominent forehead, proptosis, short and broad nose, pseudo prognathism, crowding of teeth and ectopia, and severe bilateral syndactyly of hands and feet. Examination of the patient revealed the findings of abnormal contour of the head, symmetric syndactyly of hands and toes, mental

retardation, delayed milestones, mid-face hypoplasia, exophthalmos, exorbitism, high arched palate, crowded teeth.

Results: From the clinical characteristics and radiology evaluation, the patient concluded with suspicion of AS.

Conclusions: We reported a 9-year-old male patient with AS with craniosynostosis and acrocephalosyndactyly. The characteristics of clinical manifestation of AS should be aware by physicians to be able to diagnose the disease.

Abstract No.: 202122

Association Between EyeSi Simulator Scores and Intraoperative Complications in Resident Phacoemulsification Cataract Surgery

First Author: Warakorn **THIAMTHAT**

Co-Author(s): Teeravee **HONGYOK**, Pruksa **VICHAIYA**

Purpose: This study aims to elucidate the relationship between EyeSi simulator scores and the rate of intraoperative complications in phacoemulsification surgeries performed by third-year ophthalmology residents at Rajavithi Hospital

Methods: A retrospective cohort study was conducted at Rajavithi Hospital, Bangkok, Thailand, including third-year ophthalmology residents who completed EyeSi simulator training and performed phacoemulsification surgeries between January 1, 2022, and December 31, 2023. Data on patient characteristics, surgical outcomes, and resident performance on the EyeSi simulator were extracted from electronic medical records. Statistical analyses, including the Chi-square test, Fisher's Exact Test, Mann-Whitney U-test, and Spearman's rank correlation coefficient, were performed using IBM SPSS Statistics for Windows, version 26.0.

Results: Fourteen residents participated, performing a total of 979 phacoemulsification cases. The mean total EyeSi simulator score was $21,505.43 \pm 642.70$. The overall complication rate was 10.6%, with posterior capsule rupture occurring in 5.7% of cases. A weak positive correlation was observed between total EyeSi simulator scores and operative time (Spearman's $\rho = 0.162$, $p < 0.001$). No significant correlation was found between total EyeSi scores and overall complication rates.

Conclusions: EyeSi simulator training is beneficial for preparing residents for phacoemulsification surgery, providing step-by-step guidance and familiarization with intraocular navigation. While the overall simulator scores may not predict surgical proficiency, specific training in complications management may reduce the risk of posterior capsule rupture. Residency programs should consider comprehensive assessment strategies and personalized training plans to enhance the effectiveness of simulator-based training.

Abstract No.: 205984

Associations of Cardiovascular Health and New-Onset Age-Related Macular Diseases From UK Biobank

First Author: Tsz Fung Gavin **WONG**

Co-Author(s): Jason **YAM**, Peng **YU**, Yuzhou **ZHANG**

Purpose: The purpose of this study was to examine the correlation between cardiovascular health (CVH), assessed by metrics of the Life's Essential 8 (LE8) score, and the risk of new-onset age-related macular degeneration (AMD).

Methods: UK Biobank data of 271,274 participants free of both cardiovascular diseases and AMD at baseline were utilised for longitudinal analysis. Follow-up data were mainly obtained from online questionnaire assessments and electronic health records. An average LE8 score (0-100) was calculated from the individual scores of the 8 metrics, then categorised into three groups: low (<50 points), moderate (50 to <80 points) and high (≥ 80 points), with higher scores indicating better CVH. Cox proportional regression models were used to calculate hazard ratios (HR) and their corresponding 95% confidence intervals (CI), adjusted for covariates including age, sex, ethnicity, educational level, Townsend Deprivation Index (TDI), household income and drinking status. Furthermore, the population attributable risk (PAR%) was calculated for CVH and each individual LE8 component.

Results: During an average follow-up duration of 10.9 years, a total of 7468 (2.8%) cases of AMD were documented. Individuals with moderate and high CVH levels had a 14% (HR = 0.86; 95% CI, 0.78-0.94) and 23% (HR = 0.77; 95% CI, 0.69-0.86) reduced risk of AMD, respectively. A linear dose-response relationship was identified between cumulative LE8 score and AMD incidence. Moreover, adjusted PAR% suggested 9.4% (95% CI, 3.7%-15.1%) of AMD cases could be prevented by high CVH. Amongst individual CVH metrics, ideal blood glucose and blood pressure levels were associated with a reduction of 3.3% and 8.7% in AMD cases, respectively.

Conclusions: Enhanced CVH, as quantified by LE8, was significantly inversely associated with the risk of developing AMD. CVH promotion in accordance with the LE8 guidelines might potentially positively contribute to AMD prevention.

Abstract No.: 208516

Awareness of Refractive Errors: A Global Review of Current Knowledge and Assessment Methods

First Author: Yuhe **LIU**

Co-Author(s): Jun **CHEN**, Xiangui **HE**, Guangzhuang **JING**, Zhenglin **LIU**, Jingjing **WANG**, Xun **XU**

Purpose: To evaluate global awareness of refractive errors (RE) and its assessment methods, addressing the

critical gap between high correctability and the high prevalence of uncorrected RE, a major cause of vision impairment.

Methods: A systematic literature search was conducted in PubMed, Web of Science, and Scopus up to September 2025. Studies focusing on RE awareness, knowledge, attitude, or practice were included, resulting in the analysis of 237 articles.

Results: Global RE awareness is insufficient and characterized by significant geographical and socioeconomic disparities, with low- and middle-income countries bearing the highest burden. Common misconceptions include a lack of knowledge about myopia complications, the nature of presbyopia, and unfounded beliefs about spectacle wear (e.g., that it weakens vision). Research is often biased towards specific groups like parents of children or clinical patients, leaving general adult and rural populations underrepresented. A major limitation is the reliance on non-standardized, cross-sectional questionnaires, which hinders reliable cross-regional comparisons and longitudinal tracking.

Conclusions: Substantial gaps in RE awareness persist worldwide, exacerbated by the lack of validated assessment tools. An integrated global strategy is urgently needed. This should include developing standardized multidimensional awareness metrics, implementing targeted health education, expanding community-based screening, and leveraging digital technologies and team-based service models. These actions are vital for raising awareness, closing the correction gap, and achieving equitable eye health.

Abstract No.: 205747

Burnout and Engagement Among Ophthalmology Professionals in Nepal: A Cross-Sectional Analysis

First Author: Kaushal **POKHREL**

Purpose: To evaluate the prevalence and patterns of burnout and engagement among ophthalmology professionals of Nepal and examine associations with demographic and occupational factors.

Methods: A cross-sectional survey was conducted among 130 ophthalmology professionals, including consultants, and trainees (fellows and residents). Burnout was assessed using validated scales measuring emotional exhaustion, depersonalization, and personal accomplishment. Participants were categorized into five profiles: Engaged, Ineffective, Overextended, Disengaged, and Burnout. Statistical analyses included descriptive statistics, ANOVA, and chi-square tests to explore associations with gender, marital status, job role, and workplace type.

Results: While 42.3% of participants were classified as engaged, 36.6% exhibited signs of burnout across varying levels—ineffective, overextended,

disengaged, or full burnout. Residents showed the highest emotional exhaustion (Mean = 3.26) and depersonalization (Mean = 1.83), and the lowest personal accomplishment (Mean = 3.72). Senior consultants reported the lowest burnout scores. Workplace type significantly influenced burnout ($p < 0.01$), with higher emotional exhaustion in non-profit and government sectors. Job role was a strong predictor of burnout profile ($p < 0.001$), whereas gender and marital status showed no significant associations.

Conclusions: Over one-third of ophthalmology professionals experience some form of burnout, particularly trainees and those in non-profit or government sectors. Targeted interventions are needed to support early-career ophthalmologists and promote workplace well-being.

Abstract No.: 203145

Comparative Experience With Phaco-I and Kitaro Wet Lab Eye Models Among Ophthalmology Trainees in Malaysia

First Author: Ming Yean **ONG**

Co-Author(s): Mae-lynn **CATHERINE BASTION**, Teck Chee **CHENG**, Pei Rong **CHIUN**, Chenshen **LAM**, Ainal Adlin **NAFFI**

Purpose: This study aimed to evaluate and compare ophthalmology trainees' experiences with the Phaco-I and Kitaro eye models.

Methods: A cross-sectional study was conducted during a structured phacoemulsification workshop at Hospital Canselor Tuanku Mukhriz, Malaysia (August 2025). 19 ophthalmology trainees who completed simulation on both Phaco-I and Kitaro models were included. Participants rated their experience across four domains, namely surgical realism, skill development, confidence and skill transfer, and overall experience using a 20-item validated questionnaire on a 5-point Likert scale. Internal consistency was assessed using Cronbach's alpha. Comparative analysis was performed with the Wilcoxon signed-rank test.

Results: Both instruments demonstrated excellent reliability (Cronbach's $\alpha = 0.925$ for Kitaro; 0.878 for Phaco-I). Across all domains, Kitaro achieved significantly higher ratings than Phaco-I. Kitaro outperformed in surgical realism (3.88 ± 0.41 vs. 3.38 ± 0.53 ; $p = 0.011$), skill development (4.18 ± 0.62 vs. 3.50 ± 0.50 ; $p = 0.002$), confidence and skill transfer (4.21 ± 0.60 vs. 3.42 ± 0.43 ; $p = 0.0003$), and overall experience (4.39 ± 0.65 vs. 3.21 ± 0.71 ; $p = 0.0003$). Most participants (94.7%) preferred the Kitaro model, citing greater realism and ease of use, while Phaco-I was commended for its realistic anterior capsule and cost-effectiveness.

Conclusions: Among Malaysian trainees, Kitaro provided superior surgical realism, confidence,

and overall user experience compared to Phaco-I. Nonetheless, Phaco-I retains educational value as a cost-effective tool for foundational practice. A staged approach integrating both models may optimize phacoemulsification training in resource-conscious settings.

Abstract No.: 205513

Decoding the Immune-Inflammatory Landscape of Cataracts

First Author: Shreya SARAOGI

Co-Author(s): Swaminathan SETHU, Naren SHETTY, Arka Subhra GHOSH, Lubna ZAMEER

Purpose: Emerging evidence highlights the contribution of immuno-inflammatory mechanisms to cataractogenesis. In light of this, we conducted a comprehensive analysis of intraocular inflammatory mediators and characterized immune cell profiles across distinct cataract subtypes.

Methods: Subjects undergoing cataract surgery (n=78) were recruited following ethics committee approval and informed consent. Study includes subjects with nuclear sclerotic cataract (NS 1-5, n=38), posterior subcapsular cataract (PSC, n=34), mature cataract (n=4) and cortical cataract (CC, n=2). Aqueous humor (AH) collected by anterior chamber paracentesis were used to measure the levels over 25 inflammatory factors and 8 immune cell types by flow cytometry.

Results: A significantly higher AH levels of IL-17F and VEGF-A were observed in subjects with PSC and NS cataract compared to those with NS without PSC cataract. The proportions of neutrophils, monocytes, NK cells, and T cells were significantly different between types of cataracts studied. Neutrophils were higher in subjects with PSC cataract compared to those with NS and PSC cataracts. However, monocytes, NK cells and T cells were higher subjects with NS and PSC cataracts compared to those with PSC cataracts.

Conclusions: Immuno-inflammatory profile is distinct in patients with PSC compared to other types of cataracts. Our findings demonstrate cataract type-specific immune cell and molecular diversity has profound implication in the understanding of cellular and molecular basis of cataractogenesis. Hence, it has clinical applicability in prognostication, prevention, and management of post-cataract surgery outcomes and co-morbidities.

Abstract No.: 206620

DropRight: An Integrated Adherence Support Tool to Improve Eye Drop Compliance in Ophthalmology Patients

First Author: Saraa YOOSUF

Purpose: To introduce a low-cost, scalable tool designed to improve patient adherence to prescribed

eye drops, particularly for glaucoma and post-operative care, by combining education, behavioral nudges, and digital recall.

Methods: “DropRight” was conceptualized as a multi-component adherence support tool. Features include: (1) a color-coded dosing card affixed to bottles, (2) automated SMS/WhatsApp reminders aligned with prescription times, (3) a paper/app-based drop diary for daily self-tracking, (4) a feedback loop where clinicians review adherence logs during follow-up, and (5) short visual education materials for patients and caregivers. System requirements and user pathways were mapped to ensure feasibility in both high- and low-resource settings.

Results: This tool addresses common barriers to compliance: • Forgetting doses → solved by reminders and visible bottle cues. • Unawareness of importance → solved by education materials. • Poor accountability → solved by diary + physician feedback loop. • Complex regimens → simplified through color-coded dosing guidance. (results are conceptual)

Conclusions: “DropRight” offers a pragmatic, low-cost solution to one of ophthalmology’s most persistent challenges: poor adherence to eye drops. By combining behavioral nudges with digital support, it provides an adaptable framework that can be implemented in both resource-rich and resource-limited eye care systems to improve long-term outcomes.

Abstract No.: 205236

Effect of Silicone Oil Tamponade Duration on Peripapillary Microcirculation Assessed by Optical Coherence Tomography Angiography

First Author: Inara HAJI

Co-Author(s): Elmar GASIMOV

Purpose: To evaluate changes in peripapillary vessel density and flow index after removal of intraocular silicone oil and to assess the influence of tamponade duration.

Methods: A prospective observational study included 20 eyes of 19 patients who underwent pars plana vitrectomy with 1000-cSt silicone oil tamponade for complex retinal detachment or proliferative diabetic retinopathy. Optical coherence tomography angiography (OCT-A, 6x6 mm scans) was performed before oil removal and at 1, 3, 6, and 12 months postoperatively. Patients were divided into two groups according to tamponade duration: 1–6 months and 6–12 months. Main outcomes were peripapillary vessel density and flow index.

Results: Mean baseline peripapillary vessel density was 40.16 ± 1.34 in the short-term group and 37.94 ± 0.90 in the long-term group. At 12 months after oil removal, density increased to 45.13 ± 1.52 and 43.67 ± 0.87 , respectively ($p = 0.24$ between groups). Flow index rose from 0.341 ± 0.044 to 0.418 ± 0.015 in the short-

term group and from 0.245 ± 0.038 to 0.392 ± 0.020 in the long-term group ($p = 0.074$ between groups). No significant correlations were found with age, sex, refraction, or axial length.

Conclusions: Peripapillary vessel density and flow index significantly increased after silicone oil removal, indicating recovery of optic nerve head microcirculation. Eyes with shorter tamponade showed a tendency toward higher perfusion and flow recovery, suggesting that early oil removal may reduce the risk of microvascular compromise. Timely removal of silicone oil, whenever retinal status permits, should be considered to optimize postoperative microvascular outcomes and preserve long-term optic nerve health.

Abstract No.: 204346

Exploring the Establishment of a Standardized Animal Eye Model Training System for Cataract Surgery Among Primary Care Eye Doctors

First Author: Dan **HE**

Co-Author(s): Jia **GAO**, Chunli **LI**, Min **WU**

Purpose: To apply quality improvement (QI) principles to enhance cataract surgery training for primary care eye doctors, establish a standardized training system, and improve practical skill translation.

Methods: A 1.5-month specialized training program was conducted for 10 county-level doctors using a stepped closed-loop model: theoretical training, clinical observation, stepwise animal eye practice, video self-assessment, self-evaluation, and mentor feedback. Guided by QI principles, the OSCAR-SICS/Phaco scale assessed surgical skills. Key indicators included: OSCAR score attainment $\geq 90\%$, independent surgery rate $\geq 60\%$, and complication rate $\leq 8\%$. Continuous improvement was driven by PDSA cycles, with dedicated mentors and equipment. Skill assessments were performed pre- and post-training.

Results: At baseline, none of the county-level eye doctors were able to perform cataract surgery independently, or had any experience with animal eye surgery. After training, participants completed 3,083 animal eye cataract surgeries, achieving the following outcomes: 100% pass rate in the surgical skills assessment at final evaluation; 70% independent cataract surgery rate; reduction in the posterior capsule rupture rate from 12% to 5%; reduction in average surgery time per case by 34%; and 30% reduction in consumable waste. A scalable training manual was developed.

Conclusions: The closed-loop training model, improved through QI principles, combined with standardized assessment, significantly enhances animal eye surgical skills of primary care eye doctors. This approach lays a foundation for independently performing cataract

surgeries on human eyes, shortens the learning curve, and holds significant potential for broader application.

Abstract No.: 205605

Gut Microbiota and Metabolite Contributions to Diabetic Retinopathy: Novel Insights From a Preliminary Study

First Author: Yinhua **HUANG**

Purpose: Diabetic Retinopathy (DR) is associated with gut dysbiosis and metabolic disorders. However, the specific pathogenic mechanisms remain unclear. This study aims to clarify how gut microbiota and its key metabolite, sodium butyrate (NaB), contribute to DR progression.

Methods: Fecal samples from healthy controls and diabetic patients underwent 16S rRNA sequencing to identify DR-associated microbial markers. A disease classification model was built using random forest analysis. Diabetic mice received intragastric NaB. After 12 weeks of NaB intervention, we monitored body weight, blood glucose, retinal structure, retinal function, and gut morphology. Plasma short-chain fatty acids (SCFAs) were measured by LC-MS. Fecal microbiota was also analyzed.

Results: Significant gut microbiota dysbiosis was observed in DR patients. This was characterized by a reduction in SCFA-producing bacteria. A model based on 25 microbial families showed good diagnostic accuracy. In diabetic mice, NaB reduced blood glucose, improved retinal thickness, decreased the number of activated microglia, and enhanced ERG responses. NaB also restored intestinal barrier integrity, increased plasma SCFAs (butyrate, isocaproate, caproate), and corrected microbial dysbiosis by increasing SCFA-producing norank_f_Muribaculaceae while reducing Lactobacillus and Lachnospiraceae_NK4A136_group.

Conclusions: This study provides novel evidence that gut microbiota dysbiosis and a deficiency in its metabolic products, particularly butyrate, are significant contributors to DR pathogenesis. Supplementation with NaB demonstrates multifaceted therapeutic benefits, protecting the retina and improving systemic health via the gut-retina axis, highlighting its promising translational value.

Abstract No.: 205333

ITE Regulates Macrophage Polarization Through AHR to Inhibit Choroidal Neovascularization

First Author: Yu **ZHOU**

Co-Author(s): Juanjuan **JJ**, Yangyang **LUO**

Purpose: Neovascular age-related macular degeneration (nAMD) is the primary cause of irreversible vision loss in the elderly. As clinical needs remain unmet, there is an urgent need to identify new

therapeutic targets for nAMD. The present study is to systematically investigate the pathological regulatory mechanisms of nAMD mediated by aryl hydrocarbon receptor (AHR) and verify the inhibitory effect of indole-3-carbinol (ITE), an endogenous agonist of AHR, on abnormal angiogenesis in nAMD.

Methods: To validate the necessity of AHR in this process, we conducted experiments in *Ahr*^{-/-} CNV mice. To dissect the molecular mechanisms underlying AHR-mediated CNV inhibition, single-cell transcriptome analysis, bioinformatics analysis and cell biology experiments were further applied.

Results: Results showed that the progression of nAMD is closely associated with a specific macrophage subset, IL1B_{low} Mac. Although this subset exhibits a pro-inflammatory phenotypic tendency, its pro-inflammatory capacity is significantly impaired due to the abnormal inhibitory state of the nuclear factor κ B (NF- κ B) pathway, thereby presenting pro-angiogenic properties. After AHR is activated by ITE, it can activate the NF- κ B pathway by enhancing oxidative stress response, reverse the pro-inflammatory functional defect of IL1B_{low} Mac, and ultimately inhibit abnormal angiogenesis in nAMD.

Conclusions: This study promotes deep understanding of the pathological mechanism of nAMD and lays a foundation for the development of subsequent clinical therapeutic targets.

Abstract No.: 200232

Impression Cytology for Suspicious Ocular Surface Lesions: A Modified Method

First Author: Shital **NANNAWARE**

Co-Author(s): Puja **BANG**

Purpose: Impression cytology is minimally invasive, innovative, fast, and cost-effective. The purpose of this study is to investigate the use of exfoliative cytology as a diagnostic tool in OSSN, Pterygium mimicking OSSN, and any suspecting ocular neoplastic pathology

Methods: Impression cytology of the lesion was performed by collecting smears using 35 mm Whatman filter paper, followed by smearing the cells onto slides and subsequently fixing them in 90% alcohol in the microbiology laboratory. Usually, reports came within 6 hours, and further management planned accordingly.

Results: Of the 3 cases, the 1st was diagnosed with actinic keratosis, the 2nd with pterygium, and the 3rd with ocular squamous cell neoplasia.

Conclusions: Impression cytology is a sensitive and specific method for the detection of ocular surface tumors. It is a novel, cost-effective, alternative method for rapid and less invasive early detection of ocular pathology and can be a promising fast innovation leading to better prognosis for the patient with utmost care. Clinical implication-Exfoliative cytology simple

and easy to learn and handle technique for beginners and confident boosting for diagnosing and giving management on OPD basis rather than planning for invasive procedure and cutting off the waiting period of histopathology report in early staging patient.

Abstract No.: 202630

Improving Cataract Quality and Cultivating a Perioperative Quality Control Culture

First Author: Lei **WEN**

Purpose: In response to the World Health Organization (WHO) 2030 eye health targets and per China's 14th Five-Year National Plan for Eye Health requirement for continuous improvement in effective cataract surgery coverage (eCSC), we implemented a "Cataract Continuous Quality Improvement Project" with support from international partners. The aim of the Project is to improve the quality of cataract services.

Methods: A cataract clinical quality improvement (QI) system was developed based on standardized protocols, with full staff participation, and continuous improvement to systematically promote quality improvements in cataract diagnosis and treatment. Real-time monitoring and dynamic feedback on the health management information platform was leveraged for medical record quality. Training and incentive mechanisms were used to strengthen quality awareness and motivate medical staff to actively participate. A localized QI training program was developed to build capacity of key personnel. The "Plan-Do-Study-Action" (PDSA) cycle is employed to optimize processes, significantly enhancing the quality control capabilities of medical staff.

Results: The Project optimized processes and patient management, improving the 4-week post-operative follow-up rate from 73% to 95%, and a continuous increase in patient satisfaction. The Project resulted in establishment of a support platform for perioperative quality control in cataract surgery, strengthened clinical QI and scientific research, and scalable quality control standards.

Conclusions: The Project demonstrated the effectiveness of localized training and utilizing PDSA cycles in improving the quality of cataract services. This model provides a practical reference for developing a quality control culture in eye care and contributes to achieving global eye health goals.

Abstract No.: 201097

Innovative Education Pathways: Navigating the Landscape of Complementary Learning in Ophthalmology Undergraduate Curriculum

First Author: Daniel **YIM**

Purpose: The aim of this study is to raise awareness, educate, and encourage educators to modernize

their teaching techniques and curriculums with digitization in ophthalmology. This review reveals the current landscape of available tools, from social media platforms and digital tools to innovative simulation techniques. With many current medical students being “digital natives,” - born into a digital world, technological teaching approaches may also provide complementary learning that is more familiar, convenient, and personalised to their technology-enhanced preferences of learning.

Methods: A narrative review was conducted with the aim to present use cases to illustrate the implementation of various digital tools in medical education. Following a critical-interpretivist framework, cases were then qualitatively evaluated for their impact and application to ophthalmology medical education. PubMed indexing with key words were used to identify studies that described various digital education techniques with selection criteria focusing on ophthalmology education. Non-traditional sources were also used to analyse social media content. 30 articles and 30 social media platforms were reviewed and analyzed.

Results: The data shows that modern teaching approaches have statistically significant improvements in student engagement, comprehension, and enjoyment. With a majority of incoming medical students being Generation Z and future Generation Alpha, it is becoming more critical than ever to become an adopters of technology into our medical curriculums.

Conclusions: The outcome is to encourage more medical educators to be aware of various formats of teaching and utilize various formats to complement their own didactic approaches, thus to ultimately advance eye health care.

Abstract No.: 205865

Molecular Defects in RS1-KI (R102W) Mouse Model of X-Linked Retinoschisis

First Author: Shengru MAO

Co-Author(s): Jiansu CHEN, Zekai CUI, Xihao SUN, Shibo TANG

Purpose: The pathogenesis of X-linked retinoschisis (XLRS) remains unresolved, with no effective treatment approach and specific therapy time. Here, we aim to investigate the molecular defects of RS1-KI (R102W) mouse retinas at different time points and evaluate the suitable time to treat the disease.

Methods: The Rs1-KI mice (R102W) were created by co-injection of zygotes with Cas9 mRNA and sgRNAs in CRISPR/Cas9 system targeting Rs1. Retinal OCT and H&E stain, Immunofluorescence (IF) staining, TEM ultrastructure, and ScRNA-seq were performed at P14 and P28.

Results: OCT and H&E revealed inner nuclear layer (INL) schisis with edema at P14, progressing to cystoid atrophy at P28. Early extracellular matrix (ECM) disruption was detected at P14, with reduced adhesion molecules (NCAM, JAM3, CDH2), axonal mislocalization, and mitochondrial abnormalities. By P28, ECM collapse intensified, with loss of interphotoreceptor matrix (COL9, IMPG1, IRBP), synaptic triad breakdown, and degeneration. IF showed preserved rhodopsin at P14 but reduced and disorganized labeling at P28, while cone arrestin decreased at P14 and mislocalized to somas at P28. TEM confirmed abnormal mitochondrial accumulation in the inner segments at P28. ScRNA-seq revealed disrupted intercellular signaling, with loss of NT (retinal development) and VISFATIN (photoreceptor survival) pathways in R102W retinas compared to WT.

Conclusions: The R102W mouse retinas showed a progressive pathological process in photoreceptors from P14 to P28, and the abnormal intercellular communication in NT and VISFATIN pathway may play an important role in the progression of XLRS. This work supports that treatment may be more effective at the early stage of XLRS, such as edema systoid schisis stage at P14.

Abstract No.: 200176

Mozart's Music and the Reliability of Visual Field Testing

First Author: Rintra WONGVISAVAVIT

Co-Author(s): Tunyaluk PANYATA, Autsadawut PHOOLSAWAT, Pakin PIRIYALUKKUL, Smatya WATHAWATHANA

Purpose: This study investigates the impact of Mozart's music on the reliability of automated perimetry, a key visual field assessment influenced by patient factors such as fatigue, emotion, and attention. Music has been demonstrated to enhance emotional regulation and attentional focus, while concurrently mitigating anxiety. This study seeks to examine the effect of music on the reliability of visual field assessments.

Methods: Automated perimetry employing the Humphrey Field Analyzer III (24-2 protocol) was conducted on the right eyes of 163 perimetry-naive participants. Participants were randomly assigned to control, headphones (noise-canceling without music), or Mozart groups (exposed to Mozart's Sonata for Two Pianos in D Major, K.448) for 10 minutes prior to testing. Reliability indices and test metrics were analyzed using the Kruskal-Wallis test to assess the influence of auditory conditions on perimetric performance.

Results: The mean fixation loss (FL) percentages were 14.3%, 13.4%, and 6.4% for the control, headphone, and Mozart groups, respectively, with a statistically significant difference observed between the control and Mozart groups ($p = 0.03$). No significant group differences were identified in false positives (FP),

false negatives (FN), or test duration. Furthermore, mean deviation (MD), pattern standard deviation (PSD), total deviation (TD), and pattern deviation (PD) values remained within normal limits across all groups, without statistically significant variation.

Conclusions: Mozart's music may enhance concentration and spatial reasoning in individuals undergoing automated perimetry, thereby enhancing the reliability of visual field assessments, particularly by reducing fixation loss. This suggests its potential utility as an adjunctive tool in clinical practice to optimize test accuracy.

Abstract No.: 206285

PRESCR.EYE.BE: A Do-It-Yourself E-Log Atlas for Postgraduate and Fellowship Training

First Author: Prithvi **CHANDRAKANTH**

Co-Author(s): Brinda K **RAJ**

Purpose: Traditional written logbooks have been foundational in postgraduate (PG) medical education. However, given technological advances in ophthalmology—from basic torchlight examinations to smartphone-based imaging and multispecialty surgery—there is a need for modernisation. This study aimed to transform the conventional logbook into a digital, interactive, and collaborative tool.

Methods: A digital logbook system was developed using Google Forms for the documentation of clinical images from outpatient departments and medical camps. Images were captured via slit lamps, fundus imaging systems, and custom-made smartphone-compatible, three-dimensional (3D)-printed devices. Entries were reviewed by consultants who provided feedback and corrections. Curated entries were organised using Microsoft PowerPoint and utilised as educational material for oral and clinical examination (VIVA and Objective Structured Clinical Examination [OSCE]) preparation.

Results: Annotated and summarised entries were uploaded to the hospital's academic portal, forming a centralised, shared repository accessible to PG students, fellows, and consultants. The platform enhanced collaborative learning and streamlined clinical documentation.

Conclusions: This do-it-yourself (DIY) postgraduate E-log atlas sets a new standard for ophthalmology training. It promotes innovation, accessibility, and academic excellence by integrating modern technology into medical education.

Abstract No.: 205299

Preventive Strategies for Age-Related Macular Degeneration: Clinical Efficacy of Targeted Micronutrient Complex

First Author: Tatiana **VARGANOVA**

Purpose: Age-related macular degeneration (AMD) is a leading cause of irreversible central vision loss in older adults. Adequate nutrition and a healthy diet play a key role in AMD prevention. This study evaluated whether daily supplementation with MacuLux®, a complex containing 17 micronutrients including all 3 macular carotenoids and the AREDS-antioxidants which ensures its pathogenetic targeting to support macular function and visual performance in healthy individuals.

Methods: A randomized, open-label, controlled trial included 48 participants without signs of AMD (AREDS Category 1). 24 participants received MacuLux® (1 capsule daily) for three months, and 24 served as controls. Ophthalmic assessments included fundus autofluorescence, optical coherence tomography (OCT), OCT angiography, multifocal electroretinography (mfERG), and computer perimetry.

Results: After three months, the treatment group showed significant improvement in best-corrected visual acuity (0.95 ± 0.08 to 1.2 ± 0.05 , $p < 0.05$), while controls remained unchanged. mfERG revealed a 10% increase in retinal electrophysiological response in 60% of treated eyes, with decreased latency and increased amplitude ($p < 0.05$). A positive trend in visual field light sensitivity (HoV@10) was observed in 38% of participants, and OCT showed a trend toward increased total retinal thickness in the macular zone.

Conclusions: MacuLux® supplementation improved visual acuity and macular bioelectrical response, with favourable trends in retinal thickness and light sensitivity. These findings support the potential role of targeted micronutrient supplementation, alongside a healthy diet, in preserving macular function and visual performance in healthy adults.

Abstract No.: 201856

Research Progress in Psychosomatic Ophthalmology: An Evidence-Based Review, 2015–2025

First Author: Liyang **ZHANG**

Purpose: Systematically review 2015–2025 evidence on bidirectional links between depression/anxiety/chronic stress and glaucoma, dry eye disease (DED), central serous chorioretinopathy (CSCR), and translate findings into screening and integrated-care algorithms.

Methods: PubMed, Web of Science, CNKI, Wanfang searched for systematic reviews, meta-analyses, prospective cohorts, RCTs (English/Chinese). AMSTAR-2 and RoB-2 assessed quality; random-effects meta-analyses when possible.

Results: Comorbid depression/anxiety prevalence: glaucoma 15–30 %, DED 16–45 %, CSCR ~36 % (all > general population). Pathophysiology: chronic stress → HPA-axis/sympathetic hyperactivity → cortisol & pro-inflammatory cytokine excess → accelerated ocular disease. Screening: HADS, PHQ-9, GAD-7 plus visual-electrophysiology (P100 latency correlates with sleep disturbance). Interventions: mindfulness or CBT lowers IOP 2–4 mmHg in glaucoma and improves DED symptoms; SSRIs may slow glaucomatous field loss ~30 % and hasten CSCR fluid absorption, but larger RCTs needed.

Conclusions: Robust bidirectional relationships exist; mechanisms involve neuro-endocrine-immune dysregulation. Embed brief psychological screening in ophthalmic practice; offer CBT/mindfulness for mild–moderate disorders and psychiatric co-management plus pharmacotherapy for severe cases. Multicentre RCTs should confirm long-term efficacy and cost-effectiveness of integrated pathways.

Abstract No.: 202465

Single-Cell RNA Sequencing Highlights a Significant Retinal Müller Glial Population in Dry Age-Related Macular Degeneration

First Author: Chuanhe **ZHANG**

Co-Author(s): Dongcheng **LIU**, Bo **QIN**, Bing **ZENG**

Purpose: The main challenge in dissecting the cells and pathways involved in the pathogenesis of age-related macular degeneration (AMD) is the highly heterogeneous and dynamic nature of the retinal microenvironment. This study aimed to describe the comprehensive landscape of the dry AMD (dAMD) model and identify the key cell cluster contributing to dAMD.

Methods: A NaIO₃-induced mouse dAMD model was established and analyzed using single-cell RNA sequencing. Retinal cell heterogeneity was assessed, and findings were validated with human dAMD scRNA-seq datasets. Functional enrichment and immunofluorescence staining were performed to confirm changes in Müller cell subsets and to investigate underlying mechanisms.

Results: Twelve major retinal cell types were identified. Among them, Müller glia showed the strongest AMD-associated gene signature. A distinct Sox2-expressing Müller subpopulation, enriched in neuroprotective and homeostatic pathways, was significantly reduced in both the dAMD model and patient retinas. Mechanistic analyses revealed that ferroptosis and apoptosis contributed to the loss of these Sox2⁺ Müller cells. Immunofluorescence further confirmed the reduction of Sox2⁺ Müller cells, and markers of ferroptosis were detected in diseased retinas.

Conclusions: This study highlights a critical Sox2⁺ Müller cell population with neuroprotective potential

whose reduction is linked to dAMD progression. The findings reveal that ferroptosis and apoptosis are major contributors to Müller cell loss, suggesting that protecting this subpopulation may represent a novel therapeutic strategy for dAMD.

Abstract No.: 206626

Strong Eyes, Strong Minds: Building Mental Resilience Among Young Ophthalmologists

First Author: Saraa **YOOSUF**

Purpose: To explore the psychological challenges faced by young ophthalmologists (YOs) and propose a practical framework for strengthening mental resilience in training and early career practice.

Methods: A narrative review of physician wellbeing literature was combined with thematic reflections from YO networks in Asia-Pacific. Key stressors were mapped using a resilience framework (decision fatigue, empathy fatigue, and performance pressure). Interventions were adapted from clinical service operations and behavioral science, focusing on low-cost, scalable strategies.

Results: Three pillars of YO resilience were identified: 1. Personal Resilience — stress management techniques, reflection, and growth mindset practices. 2. Peer Resilience — confidential peer-support groups, shared narratives, and mentorship. 3. System Resilience — structural safeguards such as reasonable duty hours, psychological safety in training, and institutional wellness policies. Visual tools were designed to communicate this framework: • Infographic wheel showing the “Three Pillars of YO Resilience.” • Flowchart linking stressors to targeted coping strategies. • QR code linking to a resilience self-check guide.

Conclusions: Mental resilience is essential for young ophthalmologists navigating the dual pressures of surgical mastery and service delivery. Embedding structured resilience supports at personal, peer, and system levels can reduce burnout and enhance wellbeing, creating a healthier and more sustainable future ophthalmology workforce.

Abstract No.: 205707

Surgical Waste Production From a Cataract Surgery Centre in a Tertiary Hospital in Sarawak

First Author: Chin Ling **TAN**

Co-Author(s): Wendy Yen Nee **SEE**

Purpose: To report on the total surgical waste production, to determine the details of greenhouse emissions per cataract surgery performed and to identify sustainable ways to reduce the surgical waste production and carbon footprint from a cataract surgery daycare center in Sarawak General Hospital (SGH).

Methods: Observational, non-interventional retrospective study. The carbon footprint calculation from the cataract surgery included 3 main components: operating theatre waste disposal, total energy use and travel of cataract patients.

Results: Transportation was the largest contributor to carbon emissions, ranging from 10.023 kgCO₂eq to 12.691 kgCO₂eq per patient. Total energy use (TE) was the second most significant factor, with emissions between 2.063 kgCO₂eq and 2.340 kgCO₂eq. Implementing waste segregation substantially decreased landfill carbon emissions. Total general waste decreased from 78.5 kg before segregation to 12 kg after, and the corresponding carbon footprint reduced from 0.705 kgCO₂eq to 0.108 kgCO₂eq. Incineration of clinical waste resulted in total carbon footprint of 0.316 kgCO₂eq, with a single patient footprint of 0.002 kgCO₂eq.

Conclusions: This study highlights key areas for reducing the carbon footprint of cataract surgeries at SGH. Patient transportation and total energy consumption are the most significant contributors to greenhouse emissions. Implementing waste segregation strategies has already proven effective in reducing carbon footprint.

Abstract No.: 205645

Systemic Emergencies and Adverse Drug Reactions in High-Volume Ophthalmic Surgeries

First Author: Haripriya **ARAVIND**

Co-Author(s): Janish **PRABHAKAR**, Mano **PRAKASH**, Banu **SHREE**

Purpose: To evaluate the incidence and types of systemic emergencies and adverse drug reactions (ADRs) in a high-volume ophthalmic network.

Methods: A retrospective audit was conducted from January to December 2024 across 14 hospitals in an eye hospital network. Data were analyzed for systemic emergencies, types of emergencies and ADRs.

Results: A total of 199 systemic emergencies were reported during 542,380 surgeries (0.04% incidence). Most frequent emergencies were pulmonary edema (32%), other cardiac & respiratory complications (37%), neurological complications (12%) and other systemic causes (19%). 177 ADRs reported across all surgeries (0.03%) and 64 ADRs occurred during 15,586 FFA procedures (0.4% incidence).

Conclusions: Systemic emergencies and ADRs are rare but clinically relevant in ophthalmic practice. Cardiopulmonary complications were the most frequent emergencies, while FFA procedures accounted for a significant share of ADRs.

Abstract No.: 206098

The Effect of TMEM251 on Macular Epiretinal Membrane by Regulating Lysosomal Phagocytosis and Reactive Gliosis in Müller Cells

First Author: Zhao **YIMING**

Co-Author(s): Zhou **QIANG**

Purpose: This study aims to explore the function of TMEM251 in modulating lysosomal phagocytosis and glial response in Müller cells associated with macular epiretinal membrane diseases.

Methods: Macular epiretinal membranes from diverse etiologies—including idiopathic cases, those secondary to diabetic retinopathy, and branch retinal vein occlusion—were collected for clinical analysis. Immunofluorescence staining was utilized to assess the co-localization of TMEM251, a lysosomal transport factor, and GFAP, a marker of glial activation, within Müller cells.

Results: Consistent co-localization of TMEM251 and GFAP within Müller cells was observed across all collected epiretinal membrane samples.

Conclusions: These results indicate that TMEM251 may contribute to the regulation of the glial response in Müller cells through its involvement in lysosomal phagocytosis pathways in macular epiretinal membrane disorders.

Abstract No.: 205133

The Vitreous Body Floaters – To Observe or to Treat?

First Author: Tatiana **VARGANOVA**

Co-Author(s): Veryasova **ANASTASIYA G.**, Erysheva **EVGENIYA D.**

Purpose: Vitreous body degeneration (VBD) is a common ophthalmic condition that is challenging to manage. Non-invasive options are limited, and observation (“watchful waiting”) often frustrates patients, as floaters can significantly impair vision and quality of life. Invasive procedures, such as vitreolysis or vitrectomy, are generally reserved for severe cases. This study evaluated VitroCap®, a supplement containing vitamin C, grape seed extract, citrus fruit extract, and L-lysine. This case control study assessed ultrasound characteristics of the vitreous as well as visual discomfort and psychological impact under supplementation.

Methods: 32 patients were enrolled: 16 symptomatic patients received one capsule of VitroCap®N daily for three months; 16 controls had B-scan-confirmed floaters without active complaints. All participants underwent A- and B-scan echography at baseline and after three months. Visual discomfort was assessed on a 1–4 scale (1 = severe discomfort; 4 = no discomfort). Both groups completed a voluntary, anonymous

Minnesota Multiphasic Personality Inventory (MMPI) survey.

Results: Visual comfort remained stable in controls (t0: 3.6; t3: 3.7). In the treated group, scores improved from 1.4 to 3.8, with 76% reporting reduced or absent floaters. B-scan opacities decreased in 32% of cases, and A-scan echogenic spike height reduced in 80% ($p < 0.05$). Psychological assessment indicated therapy positively influenced emotional wellbeing.

Conclusions: VitroCap®N improves both subjective symptoms and objective echographic findings in VBD. Active treatment also benefits emotional wellbeing, addressing the visual and psychological burden of floaters. Given the significant impact of floaters, this supports treating rather than merely observing these patients.

Abstract No.: 208347

To Compare the Performances of GPT-3.5-Turbo and GPT-4.0 for Medical Education

First Author: Hong Yu Ryan **FONG**

Co-Author(s): Carol **CHEUNG**, Chun Hei **CHOW**, Xiaoyan **HU**, Sin Kiu **HUI**, Yuk Ming **LAI**, Sum Yuet **NG**, Ruyue **SHEN**, Lok Hang **TO**, Dawei **YANG**

Purpose: The performances of GPT-3.5-turbo (via Poe) and GPT-4.0 (via Microsoft 365 Copilot) were compared in terms of medical terminology translation (283 medical terms from six specialties), situational judgment (30 situations in seven contexts), medical knowledge (80 multiple choice questions and 80 clinical scenario questions), medical studies (10 case scenarios), and clinical communication (10 case scenarios).

Methods: The performances of GPT-3.5-turbo (via Poe) and GPT-4.0 (via Microsoft 365 Copilot) were compared in terms of medical terminology translation (283 medical terms from six specialties), situational judgment (30 situations in seven contexts), medical knowledge (80 multiple choice questions and 80 clinical scenario questions), medical studies (10 case scenarios), and clinical communication (10 case scenarios).

Results: GPT-4.0 outperformed GPT-3.5-turbo in accuracy in terms of medical terminology translation (98.6% vs 91.5%), situational judgment (83.3% vs 63.3%), medical knowledge (93.8% vs 85.0% on multiple choice questions and 82.5% vs 72.5% on clinical scenario questions), medical studies (in three of ten case scenarios), and clinical communication (in four of 10 case scenarios).

Conclusions: GPT-3.5-turbo and GPT-4.0 performed reasonably well on medical knowledge and medical studies, with GPT-4.0 performing slightly better in medical terminology translation, situational judgment, and clinical communication. These results are promising for the incorporation of large

language models in medical education. Nonetheless, overreliance should be avoided as responses can be inaccurate or irrelevant.

Cataract

Abstract No.: 205280

A Minimalistic Approach to the Modified Yamane Technique Scleral Fixated Intra-Ocular Lens– Safer, Faster, More Economical and Consistently Reproducible Good Outcomes, With No Infusion Line or Special Instruments Required

First Author: Lik Thai **LIM**

Co-Author(s): Mohammad Asyraf **ABDUL KADIR**, Yong Zheng **WAI**

Purpose: To share the surgical experience of performing a modified Yamane Technique sutureless scleral fixated intraocular lens (IOL) with a safer, minimalistic approach.

Methods: In the aphakic eye, standard Yamane Technique ocular surface markings are done. Then two 26G x 12mm needles are introduced at 180 degrees apart at the medial and lateral aspect of the sclera 2mm behind the limbus. Then, a 2.8mm keratome shelved incision is done superiorly. Viscoelastic is then filled in the anterior chamber (AC). Then the three-piece IOL is slowly introduced into the AC. When the tip of the leading haptic is visible from the lens injector bevel, the hand-shake technique is used to directly engage with the pre-placed needle. Then, by slowly introducing more of the leading haptic into the AC, finally, adequate engagement of the leading haptic and the needle is achieved, and the entire IOL is inserted into the AC. Then, with a tying forceps, the trailing haptic is guided to engage with the other needle. Then both haptics are externalised and flanged with low-temperature hand-held cautery. No infusion line is required. No special instruments, such as vitreo-retina micro-forceps, are required.

Results: Consistent reproducible results whereby the IOL is successfully fixed using the above-mentioned method, in the desired central position, and achieving good visual acuity post-operatively.

Conclusions: The minimalistic approach of the Yamane Technique scleral fixated IOL, without an infusion line and no need for special instruments such as vitreo-retina micro-forceps (which may not be readily available, and possibly costly), can be performed safely, efficiently, economically, and consistently with good post-operative outcomes.

Abstract No.: 203636

A Novel connexin50 Mutant Associated With Congenital Cataract Leads to Activation of the Unfolded Protein Response

First Author: Sha ZHU

Co-Author(s): Xiangjun CHEN, Ke YAO

Purpose: To elucidate the underlying mechanism of a novel mutation of Cx50 (c.660C>A, p.N220K) with autosomal dominant congenital cataract.

Methods: We identified a heterozygous change C>A at position 660 (c.660C>A) was identified in exon 2 of the GJA8 gene by Sanger sequencing. We constructed recombinant pEGFP-N1 plasmids containing the WT or mutant Cx50-N220K for the overexpression of recombinant protein in the Hek-293T cells. Fluorescence and Confocal Imaging and Western Blot were used to investigate the expression and subcellular localization of WT and mutant Cx50 protein.

Results: Confocal fluorescent experiments indicated that the N220K mutant protein mainly localized in the endoplasmic reticulum and golgi apparatus instead of plasma membrane. As N220 located at the end the fourth conserved transmembrane domain, charge analysis showed that N220K changed the isoelectric point of the whole fourth transmembrane domain. Further experiments indicated that the acid-base property in the N220 position matters to the correct transportation of connexin proteins, which may represent a possible new mechanism that leads to congenital cataracts. We also investigated UPR activation in the cells model of Cx50N220K using QPCR analysis and found that the expression of ATF-6, GRP78, PSCK1 and GM130 level was significantly higher in mutant cells.

Conclusions: We identified a new Cx50 mutation and analysed subcellular localization of the mutant proteins. Our results showed that N220K mutation fails to transport the mutant connexin50 protein to the plasma membrane, it's likely to cause loss of connexin50 function and eventually lead to congenital cataracts.

Abstract No.: 206683

A Surgical Technique to Reduce Risk of Silicone Oil Keratopathy for a Case of Retinal Detachment, Traumatic Aniridia and Aphakia After Eyeball Rupture

First Author: Ya Hui WANG

Co-Author(s): Wen-yu HSU, Chien-liang WU

Purpose: A new surgical technique to reduce the risk of silicone oil keratopathy.

Methods: Case report.

Results: This was a 28-year-old male without any underlying diseases. He had an eyeball rupture of the right eye by a luggage scale ten years ago, and he

received primary repair for the cornea immediately. After several months, retinal detachment of the right eye was noted. The patient then received scleral buckling, trans pars plana vitrectomy, and silicon oil injection of the right eye. However, photophobia and blurred vision in the right eye were still complained of. Visual acuity was hand motion at 90 cm/0.9. Slit lamp examination showed corneal opacity, traumatic aniridia, and aphakia of the right eye. Therefore, combined surgery for secondary intraocular lens implantation, artificial iris implantation, and penetrating keratoplasty were planned. First, a vacuum trephine was used to excise of host cornea in 7.5 mm diameter and dissect to the descemet membrane plain to provide a clearer surgical view. And then, pars plana vitrectomy with silicon oil injection was done. Fundus showed pale disc with subretinal band. Artificial iris and IOL were sutured together with 10-0 prolene by sandwich technique, and then were fixed at scleral with 6-0 prolene by flanged technique. Excision of donor tissue with punch in 7.75 mm diameter, and sutured with 10-0 Nylon interruptedly. After surgery, corneal graft was clear with visual acuity of 0.2/1.0. No silicone oil was observed in anterior chamber.

Conclusions: This surgical technique may keep silicone oil behind artificial iris and IOL complex and reduce risk of silicone oil keratopathy.

Abstract No.: 207789

Accelerated Biological Aging and Genetic Pleiotropy Contribute to Cataract

First Author: Yuelan GAO

Co-Author(s): Li Jia CHEN, Clement C. THAM, Jianmin XU, Jason C. YAM

Purpose: This study aims to assess the combined effects of biological age acceleration (BAA) and genetic risk on senile cataracts and blindness.

Methods: Biological age was estimated using the Klemmer-Doubal method (KDM-BA) and PhenoAge in 295,777 UK Biobank participants. Logistic and Cox models examined cross-sectional and longitudinal associations with cataract. Polygenic risk scores (PRS) quantified genetic susceptibility, and BAA-PRS interactions were tested. Genetic pleiotropy between BAA and cataract was assessed at the SNP, gene, and pathway levels. The association between BAA and vision-healthy life expectancy was further evaluated in cataract patients.

Results: Each SD increase in KDM-BA and PhenoAge acceleration was associated with 19% and 13% higher cross-sectional cataract risk, and 17% and 10% higher prospective risk, respectively. BAA significantly amplified cataract risk in interaction with genetic susceptibility, particularly in high-PRS individuals. Both BAA measures showed positive genetic correlations and genetic overlap with cataract. Pleiotropic analysis identified 1,388 candidate pleiotropic SNPs. Functional

mapping revealed 15 independent loci, mapped to 15 chromosomal regions, with colocalization pinpointing 7q36.1 (PRKAG2) as a shared causal variant. Multimarker analysis of GenoMic annotation identified 140 significant pleiotropic genes enriched in immune and lipid homeostasis pathways. Among cataract patients, those without accelerated aging had a significantly longer vision-healthy life expectancy.

Conclusions: BAA is strongly linked to higher cataract risk, especially in genetically susceptible individuals, and may reduce vision-healthy life expectancy. Identifying BAA individuals is crucial for cataract prevention and vision preservation. PRKAG2 is a shared genetic locus connecting BAA and cataract, representing a potential therapeutic target.

Abstract No.: 206129

Accuracy of New Intraocular Lens Calculation Formulas in Eyes Undergoing Combined Silicone Oil Removal and Cataract Surgery

First Author: Jiangjie **WANG**

Co-Author(s): Xiaopeng **JIANG**, Fei **XIA**

Purpose: This study aimed to compare the prediction accuracy of new-generation intraocular lens calculation formulas (Barrett Universal II [BUII], Emmetropia Verifying Optical [EVO], Kane, K6, Hill-Radial Basis Function [RBF] version 3.0 and Karmona) and traditional formulas (Haigis, Hoffer Q, Holladay 1, and Sanders Retzlaff Krapp/theoretical [SRK/T]) in patients undergoing combined silicone oil removal and cataract surgery.

Methods: A total of 89 eyes from 89 patients who underwent silicone oil removal combined with cataract surgery were enrolled and divided into 3 groups according to axial length. The outcomes were evaluated using standard deviation (SD), assessed with the Heteroscedastic test; root-mean-square absolute error (RMSAE), assessed with the bootstrap-t method; mean absolute error (MAE), assessed with the Friedman test; and the percentage of eyes within ± 0.25 D to ± 1.00 D of prediction error, assessed with Cochran's Q test.

Results: Most new-generation intraocular lens calculation formulas demonstrated higher accuracy than traditional formulas. Overall, the SDs of EVO, K6, and Hill-RBF 3.0 were significantly lower than those of Haigis, Hoffer Q, Holladay 1, and SRK/T ($P < 0.05$). The SD of Barrett Universal II (BU II) differed significantly from those of Haigis, Hoffer Q, and Holladay 1 ($P < 0.05$). Kane showed significant differences in SD compared with Hoffer Q and Holladay 1 ($P < 0.05$). The RMSAE of BU II differed significantly from that of Haigis ($P < 0.05$), and its MAE differed significantly from those of Hoffer Q, Holladay 1, and SRK/T ($P < 0.05$). Additionally, Kane and K6 showed significantly lower MAEs than Holladay 1 ($P < 0.05$).

Conclusions: New-generation formulas showed satisfactory prediction accuracy in eyes undergoing combined silicone oil removal and cataract surgery. Future studies should focus on conducting large-scale, multicenter validations to enhance the generalizability of the findings.

Abstract No.: 205062

Age-Related Variations in Anterior Segment Biometry: A Cross-Sectional Analysis Across a Large Private Ophthalmic Group

First Author: Tim **ROBERTS**

Co-Author(s): Joshua **WONG**, Tom **VAN DE VEEN**

Purpose: Biometric parameters are critical in cataract and refractive surgery. Changes in anterior segment anatomy occur with age, however the extent and pattern of changes across different age groups remain incompletely characterised. This study aims to evaluate changes in anterior segment parameters and relationships across a broad age range.

Methods: Retrospective cross-sectional study was conducted from patients undergoing routine ocular biometry (IOLMaster 700) at multiple ophthalmology clinics (Vision Eye Institute). Parameters included central corneal thickness, anterior chamber depth (ACD), lens thickness (LT), keratometry, and white-to-white diameter. Correlation heat map and outlier detection was utilised to understand relationships across variables and to characterise distribution across age groups.

Results: $N = 16,816$. Variables most correlated with age were LT and ACD ($r = +0.70$ and -0.46 respectively, $p < 0.001$). For LT, the percentage of patients with ≥ 1 outlier eye increases by age, ranging between 0% in the 1st decade and 10.8% (95% CI 6.2-15.4) in the 10th decade. For ACD, percentages follow a "U"-shaped distribution with lowest at 2.3% (95% CI 1.6-3.1) in the 4th decade.

Conclusions: Distinct age-related patterns exist across corneal biometric parameters, with LT increasing steadily with age, while ACD shows nonlinear distributions. This highlights the importance of considering age-specific biometric distributions during pre-surgical assessment. Identifying patients with atypical measurements may help refine risk stratification in cataract and refractive surgery.

Abstract No.: 201299

Analysis of Influencing Factors of Depth of Field After a Continuous-Range-of-Vision IOL Implantation

First Author: Shengnan **CHENG**

Purpose: To evaluate clinical outcomes following implantation of the TECNIS Synergy intraocular lens

(IOL) and identify factors influencing postoperative depth of field (DOF).

Methods: In this prospective study, 28 patients (49 eyes) with age-related cataracts underwent phacoemulsification with TECNIS Synergy IOL implantation. Uncorrected distance, intermediate, and near visual acuity (UDVA, UIVA, UNVA) were evaluated at 1 day, 1 week, 1 month, and 3 months postoperatively. DOF was derived from the defocus curve at 3 months. Preoperative ocular biometric parameters were analyzed using multiple linear regression to determine their influence on DOF.

Results: Postoperative UDVA improved significantly at all visits (all $P < 0.001$) and remained stable. UIVA improved from 1 day to 1 week ($P = 0.026$), stabilizing after 1 month. UNVA improved sequentially from day 1 to week 1 ($P = 0.003$) and week 1 to month 1 ($P = 0.020$), stabilizing by 3 months. The defocus curve demonstrated a smooth, bimodal profile. DOF correlated negatively with photopic and mesopic Kappa angle (PKA, MKA) and pupil diameter (PPD, MPD) (all $P < 0.0001$). Multiple regression identified MKA ($\beta = -3.742$, $P < 0.0001$) and MPD ($\beta = -0.399$, $P = 0.008$) as independent DOF predictors, represented by the equation: $Y = 5.887 - 3.742MKA - 0.399MPD$. ROC analysis indicated both MKA (AUC 0.92, cutoff 0.31mm) and MPD (AUC 0.93, cutoff 5.37mm) were strong predictors of $DOF \geq 2.5D$.

Conclusions: The TECNIS Synergy IOL provides excellent, continuous visual acuity across all distances. However, patients with larger MKA (> 0.31 mm) and MPD (> 5.37 mm) may experience reduced DOF, warranting careful patient selection.

Abstract No.: 206355

Anterior Capsule Shielding During FLACS to Protect Endothelium in a Cataract Patient With Low Endothelial Cell Density: A Case Report

First Author: Ardy **GISNAWAN**

Co-Author(s): Setiyo **BUDI RIYANTO**

Purpose: To report the use of the anterior capsule, obtained during femtosecond laser-assisted cataract surgery (FLACS), as an additional endothelial protection strategy in a patient with low endothelial cell density (ECD).

Methods: Case report.

Results: A 63-year-old male presented with bilateral senile cataract and high myopia. Preoperative best-corrected visual acuity (BCVA) was 1/60 in both eyes. Specular microscopy showed normal endothelial density in the right eye (2884 cells/mm²) and markedly low density in the left eye (1163 cells/mm²). FLACS was performed in both eyes with different time of surgery, followed by phacoemulsification with the stop-chop technique and capsular tension ring implantation. In the

left eye, the anterior capsule obtained from FLACS was preserved and placed against the corneal endothelium as a protective shield during phacoemulsification, in addition to dispersive ophthalmic viscoelastic device (OVD) use. Postoperative assessments included BCVA, ECD, endothelial cell hexagonality, and central corneal thickness (CCT). Postoperatively, UCVA improved to 1.0 in both eyes. In the left eye, ECD remained stable (1152 cells/mm² at 2 weeks, compared to 1163 preoperatively). Hexagonality improved from 63% to 72%, and CCT showed minimal change (568 μ m preoperatively to 584 μ m postoperatively). No intraoperative or postoperative complications occurred.

Conclusions: The anterior capsule may serve as a simple, safe, and cost-effective mechanical barrier to protect the endothelium in cataract surgery for patients with low ECD. This "capsular shield technique" may complement conventional OVD use and could be particularly useful in high-risk eyes or in resource-limited settings. Further evaluation in larger series is warranted.

Abstract No.: 202813

Anterior Pyramidal Congenital Cataract: A Clinical Case

First Author: Tatyana **SEMENOVA**

Purpose: To analyze a clinical case of successful surgical treatment of anterior pyramidal congenital cataract in a child using femtosecond guidance.

Methods: A 5-year-old girl complained of decreased vision in her left eye. Visometry before surgery: visual acuity OD - 0.5 n/a; OS - 1/ ∞ pr. l. incerte. Biomicroscopy: OD - translucent opacity of the lens measuring 0.5x0.5 mm, OS - diffuse opacity of the lens with a denser local cone-shaped opacity on the anterior surface of the lens, protruding into the anterior chamber and corresponding to the picture of anterior pyramidal cataract. Ophthalmoscopy: OD - fundus without pathologies; OS - ophthalmoscopy is difficult due to central opacity of the lens.

Results: Phacoemulsification with implantation of an intraocular lens using a femtosecond laser was performed to more reliably perform the capsulorhexis stage. Optical coherence tomography was performed intraoperatively using the Femto LDV Z8: the size, degree of prominence into the anterior chamber, and diameter of the altered base were determined, according to which clear parameters were set for performing capsulorhexis. The surgical intervention was performed without complications. In the early postoperative period, visual acuity OS increased to 0.01. However, its low level is probably due to the presence of obscuration amblyopia.

Conclusions: Anterior pyramidal cataract is a rare form of congenital lens pathology and requires a more careful approach to choosing a treatment

method. The use of modern surgical techniques, including intraoperative anterior segment optical coherence tomography, plays a key role in planning and performing surgery.

Abstract No.: 202756

Anterior Segment Characteristics and Spatial Variations of Different Crystalline Lens Diseases

First Author: Jianxia **FANG**

Co-Author(s): Yixuan **FENG**, Lirui **LIU**, Xinyu **MA**, Siting **SHENG**, Ce **SHI**, Jingwei **XU**, Wen **XU**, Zhe **XU**, Yu **ZHANG**, Huiling **ZHAO**, Sha **ZHU**

Purpose: To evaluate anterior chamber and crystalline lens morphology in patients with cataracts, lens subluxation (LS), and microspherophakia (MSP) using three anterior segment (AS) imaging instruments, and to develop a novel method for assessing the spatial characteristics of crystalline lens position through anterior chamber morphology measurements.

Methods: We examined 98 eyes (19 normal, 25 cataracts, 27 LS, 27 MSP) using AS optical coherence tomography (AS-OCT), ultrasound biomicroscopy (UBM), and IOLMaster700. Measurements included corneal thickness, anterior chamber parameters, and lens thickness (LT). We introduced the coefficient of variation (CV) of anterior chamber angle (ACA) and angle open distance (AOD) to quantify lens dislocation, and generated lens position alteration maps using AS-OCT and UBM to visualize the extent and distribution of lens dislocation.

Results: The LS and MSP groups showed significantly greater LT compared to normal and cataract groups ($P < 0.05$). The nasal ACA was reduced in LS and MSP groups, with MSP showing smaller nasal AOD compared to normal group ($P < 0.05$). Temporal ACA was significantly lower in the LS group compared to other groups ($P < 0.05$). AS-OCT measurements of ACA and AOD in the MSP group exceeded UBM values. The CV measurements and lens location alterations maps effectively illustrated the extent of lens dislocation and zonular weakness.

Conclusions: Each condition showed distinct AS features. The CV of ACA and AOD, along with location alteration maps from wide-field AS-OCT and UBM, might serve as valuable tools in diagnosing lens dislocation-related diseases, identifying dislocation areas, and assessing zonular weakness.

Abstract No.: 202527

Association of Air Pollution and Biological Aging With the Risk of Senile Cataract

First Author: Gongyue **WANG**

Co-Author(s): Mingchang **ZHANG**, Jiasong **WANG**, Huatao **XIE**

Purpose: Senile cataract is a major vision-impairing disease among the elderly, but the modification effects of air pollution and biological aging (BA) on senile cataract are uncovered. This study aimed to explore the association between long-term air pollution and incident risk of senile cataract.

Methods: This cohort included 314,118 participants from UK Biobank. Land use regression models estimated the concentrations of air pollutants and the composite air pollution score (APS) was constructed to capture the combined effects. The biological age was assessed by the phenotypic age algorithms (PhenoAge) and the Klemmera-Doubal method (KDM). We further evaluated the interactive and joint effects of BA acceleration.

Results: When compared with the lowest quartile of air pollutants NO₂, NO_x, PM_{2.5} and APS, those in the highest quartile had significantly increased incidence of senile cataract [HR (95 % CI) = 1.15 (1.11, 1.20), 1.17 (1.13, 1.22), 1.22 (1.18, 1.27) and 1.20 (1.15, 1.25), respectively]. We also observed positive associations between accelerated BA and senile cataract risk. There were significant additive interaction effects of NO₂, NO_x, PM_{2.5}, and APS with PhenoAge acceleration, with the relative excess risk due to the interaction (RERI) and 95% CIs of 0.07 (0.02, 0.12), 0.06 (0.01, 0.11), 0.10 (0.05, 0.14), and 0.10 (0.06, 0.16), respectively. Compared to participants exposed to the lowest levels of air pollution and with BA decelerated status, those with highest air pollutants exposure and BA accelerated status had 1.21~1.31fold risk of senile cataract.

Conclusions: Long-term exposure to air pollution may increase senile cataract incidence, particularly in BA accelerated participants.

Abstract No.: 208272

Associations Between the Mediterranean Lifestyle and Incident Age-Related Eye Diseases: A Cross-Sectional and Longitudinal Analyses From the UK Biobank

First Author: Yi **LI**

Co-Author(s): Li Jia **CHEN**, Jason C. **YAM**, Yuzhou **ZHANG**

Purpose: This study aims to assess the effect of Mediterranean lifestyle (MEDLIFE) on the risk of three common age-related eye diseases: cataract, glaucoma, and age-related macular degeneration (AMD).

Methods: This cohort study used data from UK Biobank participants who were free of age-related eye diseases at baseline and followed up prospectively for disease

occurrence. The Mediterranean lifestyle was assessed using the MEDLIFE index derived from 25 items, categorized under 3 blocks: "Mediterranean food consumption," "Mediterranean dietary habits," and "physical activity, rest, social habits, and conviviality". A Cox proportional hazard model was used to examine the associations of the MEDLIFE index with incident age-related eye diseases.

Results: A total of 122,705 participants were included in the analysis. During a median (IQR) follow-up of 10.5 (10.4-10.9) years, 10,695 cases of cataract, 2,142 cases of glaucoma, and 1,971 cases of AMD were identified. Overall, there was an inverse association between the MEDLIFE index and new-onset cataract (P for trend 0.002). Per one-point increment in the MEDLIFE score was associated with a 1.6% (95%CI, 0.9-2.4%) reduction in the risk of developing cataract, and with a 2.1% (95%CI, 0.3-3.9%) reduction in the incidence of AMD. However, no associations were found between MEDLIFE and the risk of glaucoma.

Conclusions: In this large cohort study, higher adherence to MEDLIFE was associated with decreased incidence of cataract and AMD. Our findings suggest that the Mediterranean lifestyle may act as a potential behavioral intervention approach for preventing cataract and possibly AMD.

Abstract No.: 203330

Autorefractive Versus Subjective Refraction After Extended Depth-of-Focus Intraocular Lenses Implantation

First Author: Wenjie **LIU**

Co-Author(s): Ying **CHANG**, Zeqi **FAN**, Zhijie **JIA**, Jiewei **LIU**, Lichun **YANG**

Purpose: To analyze the correlation between automated refraction (AR) and manifest refraction (MR) after extended depth-of-focus intraocular lenses implantation.

Methods: This cross-sectional study involved 77 eyes of 77 patients. Automated refraction was employed as the starting point for obtaining the manifest refraction. Automated refraction and manifest refraction measurements were analyzed and compared using the vector analysis 6 months after the surgery. A set of 5 different results was obtained in power vector notation (spherical equivalent [SE], Jackson cross-cylinder, axes at 180 degrees and 90 degrees [J0] and Jackson cross-cylinder, axes at 45 degrees and 135 degrees [J45]) for manifest refraction and autorefractive.

Results: Manifest refraction examination: S was $-0.66 \pm 0.64D$, C was $-0.55 \pm 0.45D$, SE was $-0.93 \pm 0.63D$, J0 was $-0.03 \pm 0.59D$, and J45 was $0.1 \pm 0.39D$. Automated refraction examination: S was $-0.32 \pm 0.61D$, C was $-0.41 \pm 0.48D$, SE was $-0.52 \pm 0.61D$, J0 was $-0.02 \pm 0.55D$, and J45 was $0.05 \pm 0.30D$. The differences between the two methods were statistically significant

($P < 0.05$). There was a high correlation between the two methods in S, C, SE, J0, and J45 ($r = 0.741, 0.764, 0.700, 0.946, 0.852$; $p < 0.05$).

Conclusions: Due to the depth of focus extension and chromatic aberration correction technologies used in the EDOF IOL, the subjective refraction results tend to shift towards myopia. Therefore, postoperative refraction should rely on objective refraction for accuracy.

Abstract No.: 204538

Breaking the Ring: Laser Management of Anterior Capsular Contraction Syndrome – A Case Report

First Author: Yunneke R. **XAVERINA**

Co-Author(s): Dimas A. **WIGID**

Purpose: Anterior capsular contraction syndrome (ACCS) is a complication that can occur after cataract surgery, and treatment to overcome this problem is with a laser or surgical approach. This case study aims to illustrate the laser approach for managing anterior capsular contraction syndrome.

Methods: A 67-year-old woman who had begun complaining of blurred vision in her left eye after undergoing cataract surgery 4 months prior underwent a routine ophthalmology examination. On visual acuity examination, the results obtained were decreased by just 0.1. From the slit lamp examination, there was opacity and wrinkling of the anterior capsule. The fibrosis ring was visible without dilatation of the pupil and was more clearly seen after we used dilating eye drops. The patient's intraocular pressure, funduscopy and optical coherence tomography (OCT) results were within normal limits. We performed laser anterior capsulotomy with the neodymium:yttrium-aluminum-garnet (YAG) laser. A radial Nd:YAG laser capsulotomy was performed in all four areas. One week following laser treatment, fibrosis was not visible at the visual axis and visual acuity improved to 1.0 with correction.

Results: The ACCS will negatively impact the patient's vision and visual quality. Neodymium:YAG (Nd:YAG) laser for anterior capsulotomy prevents further deterioration of ACCS, which may be related to the relaxation of stress on the anterior capsule after continuous curvilinear capsulorhexis (CCC).

Conclusions: Laser-assisted anterior capsulotomy with Nd:YAG is safe and effective as a non-surgical option for treating ACCS to improve patient visual acuity.

Abstract No.: 206345**Capsular Bag Distension Syndrome 6 Years After Cataract Surgery: A Case Report***First Author: John Jasper RAMOS**Co-Author(s): Patricio ASIO*

Purpose: Capsular bag distension syndrome (CBDS) is a rare complication of cataract surgery. The characteristic finding is the distension of the capsular bag caused by fluid accumulation and forward displacement of the intraocular lens. The trapped fluid develops a turbid consistency, resulting in reduced visual acuity. The purpose of this case report was to highlight that CBDS can occur years after a cataract surgery that was initially uneventful. It also aimed to demonstrate a successful surgical approach for treating late postoperative CBDS, particularly when the traditional laser method is complicated or contraindicated due to potential associated risks.

Methods: Case report.

Results: This is a patient who developed late postoperative capsular bag distension syndrome 6 years after cataract surgery. Presenting uncorrected distance visual acuity was 20/400. IOL repositioning and anterior chamber clean-up of the left eye was done under local anesthesia. The patient's visual acuity improved from 20/400 to 20/200, 20/25, and 20/50, 1 day, 1 week, and 1 month post operatively, respectively.

Conclusions: CBDS is a rare complication of cataract surgery that can develop even several years later. While laser posterior capsulotomy is the usual treatment, in late postoperative cases, alternative surgical approaches like intraocular lens repositioning and anterior chamber clean-up should be considered. The approach used in this case was safe and effective in removing the turbid fluid and improving the patient's visual acuity.

Abstract No.: 204654**Capsular Tension Ring Implantation for Intraocular Lens Decentration and Tilt in Highly Myopic Eyes: A Randomized Clinical Trial***First Author: Haowen LIN*

Purpose: To evaluate the influence of CTR implantation on IOL decentration and tilt in highly myopic eyes.

Methods: This randomized clinical trial was conducted between November 2021 and September 2023 at the Zhongshan Ophthalmic Center, Guangzhou, China. Patients with cataract and an axial length (AL) of 26 mm or longer were enrolled. Participants were stratified into 3 groups based on the AL (stratum 1, 26mm≤AL<28mm; stratum 2, 28mm≤AL<30mm; stratum 3, AL≥30mm), and further randomly assigned to the CTR group (a C-loop IOL combined with a CTR)

or the control group (only a C-loop IOL) within each stratum. IOL decentration at 3 months after cataract surgery was evaluated using anterior segment optical coherence tomography.

Results: A total of 186 eyes of 186 participants (mean [SD] age, 57.3 [10.9] years; 118 females [63.4%]) were randomized into the CTR group (93 [50%]) or control group (93 [50%]), with 87 eyes (93.6%) and 92 eyes (98.9%) completing follow-up at 3 months, respectively. The CTR group showed smaller IOL decentration and tilt at 3 months, and lower proportions of clinically significant IOL decentration and tilt at 3 months compared with the control group. Similar results were only found in eyes with an AL of 30 mm or longer. Additionally, the CTR group showed a smaller change in IOL decentration from 1 week to 3 months, higher prediction accuracy, and better visual quality and patient satisfaction in this stratum. No differences were observed between the CTR and control groups in eyes with an AL less than 30 mm.

Conclusions: CTR implantation reduced C-loop IOL decentration and tilt, increased position stability, and improved visual quality in eyes with an AL of 30 mm or longer. These findings support use of CTR implantation in eyes with an AL of 30 mm or longer and implanted with C-loop IOLs.

Abstract No.: 203246**Capsular Tension Ring Implantation for Intraocular Lens Position: A Systematic Review and Meta-Analysis***First Author: Haowen LIN*

Purpose: To evaluate the association of CTR implantation on IOL position.

Methods: PubMed, Embase, and Cochrane Library were searched from their inception to October 18, 2024. Randomized clinical trials (RCTs) or prospective cohorts reporting the effect or association of CTR on postoperative anterior chamber depth (ACD), IOL decentration, tilt, or rotation. Data extraction was conducted by 2 reviewers and verified by another for accuracy. Mean difference (MD) was used to synthesize the effect measures, and subgroup analyses were conducted according to IOL haptic design (C-loop and plate haptic) and whether the patient had high myopia.

Results: A total of 11 RCTs and 7 cohort studies, involving 809 eyes with CTR and 822 eyes without CTR, were included in this meta-analysis. The analysis revealed that IOL tilt (MD, -1.04°; 95% CI, -2.05° to -0.03°; P = .04) and rotation (MD, -0.82°; 95% CI, -1.27° to -0.37°; P < .001) were smaller in the CTR group compared with the control group. The subgroup analysis of ACD (I2 = 70.7%; P = .03), decentration (I2 = 66.5%, P = .08), and tilt (I2 = 76.7%, P = .01) revealed a heterogeneity between the subgroups stratified according to IOL haptic design. Additionally, subgroup

analysis demonstrated that CTR group showed a deeper ACD in eyes implanted with plate haptic IOLs (MD, 0.11 mm; 95% CI, 0.02 to 0.20 mm; $P = .01$), and a smaller IOL tilt in highly myopic eyes (MD, -1.43° ; 95% CI, -2.59° to -0.26° ; $P = .02$) compared with the control group.

Conclusions: CTR implantation was associated with enhanced stability of IOL rotation in this meta-analysis, while only reducing IOL tilt in high myopia. While the direct clinical relevance of these results could not be determined from this investigation, these findings provide evidence supporting use of CTR implantation when toric IOLs have been implanted or with high myopia, although a hyperopic refractive shift after implantation of plate haptic IOLs may require target refraction adjustment.

Abstract No.: 203234

Capsular Tension Ring Implantation for Intraocular Lens Power Calculation in Highly Myopic Eyes: Secondary Analysis of a Randomized Clinical Trial

First Author: Haowen LIN

Purpose: To evaluate the influence of CTR implantation on IOL power calculation in highly myopic eyes.

Methods: This is a secondary analysis of outcomes of a randomized clinical trial conducted between November 2021 and September 2023 at the Zhongshan Ophthalmic Center in Guangzhou, China. Predictive outcomes of 6 new-generation formulas and 4 traditional formulas were evaluated. The arithmetic and absolute prediction error (PE) and the percentages of eyes within ± 0.25 diopter (D), ± 0.50 D, ± 0.75 D, and ± 1.00 D of PE were analyzed.

Results: A total of 186 eyes of 186 participants were randomized into the CTR group (93 eyes [50%]) or control group (93 eyes [50%]). No differences were observed in arithmetic PE between the CTR and control groups in any strata. The CTR group showed smaller absolute PE in all new-generation formulas and a higher percentage of PE within ± 0.50 D in the Emmetropia Verifying Optical 2.0, Hoffer QST, LISA, and Pearl-DGS formulas only for eyes with an AL of 30 mm or longer compared with the control group. In traditional formulas, no differences were observed between the 2 groups in any strata.

Conclusions: In this secondary analysis, CTR implantation in highly myopic eyes did not affect the target refraction and can improve the prediction accuracy of new-generation IOL calculation formulas in eyes with AL of 30 mm or longer. These findings support use of CTR implantation in eyes with an AL of 30 mm or longer.

Abstract No.: 206886

Case of Decompression Retinopathy in a Post-Phacoemulsification Filipino Patient With Phacolytic Glaucoma

First Author: Dillon Edric GO

Co-Author(s): Paolo Nico ROGELIO, Arnold SALUD

Purpose: Decompression retinopathy is a rare post-operative complication commonly seen in glaucoma filtration surgery wherein rapid decrease in intraocular pressure causes diffuse intraretinal hemorrhages. This report describes one case wherein retinopathy appeared in a post-phacoemulsification Filipino patient with phacolytic glaucoma.

Methods: Two weeks prior to the consultation, the patient noted severe left eye pain, left-sided headache, and blurring of vision. The patient presented with visual acuity of light perception in the left eye. Slit lamp examination showed grade 2 corneal haze with diffuse microcysts, a Morgagnian cataract, a 1.5mm layer of white lens proteins deposited in the inferior anterior chamber, +1 cells, +3 flare, a deep anterior chamber, and intraocular pressure of 40mmHg. The patient was assessed as having phacolytic glaucoma. The patient then underwent phacoemulsification to remove the lens material. Anterior vitrectomy was done intra-operatively due to posterior capsule rupture.

Results: On the first post-operative day, the patient had a visual acuity of hand movement with good light projection. Intraocular pressures maintained at 40mmHg. On dilated funduscopy, there were multiple blot hemorrhages scattered across the retina until the mid periphery. Patient was then advised to observe the Interearetinal hemorrhages. Over the next few weeks, the intraretinal hemorrhages slowly spontaneously resolved until the retina was clear of any hemorrhages at 5 weeks post-operation. Visual acuity maintained at hand movement with good light projection during the observation period.

Conclusions: Decompression retinopathy does not only happen with glaucoma filtration surgeries, but can occur with any surgery that rapidly decreases intraocular pressures. Decompression retinopathy carries a benign course and resolves with prompt observation.

Abstract No.: 201272

Cataract Surgery and Caregiver Burden in Dementia Patients: An Exploratory Pilot Study in Japan

First Author: Reiko UMEYA

Co-Author(s): Koichi ONO, Yuto YOSHIDA

Purpose: To investigate whether cataract surgery reduces caregiver burden in dementia patients, beyond visual improvement, and to explore factors influencing postoperative caregiver outcomes.

Methods: This prospective exploratory study was conducted at a single hospital in Japan from 2021 to 2025. Eligible participants were dementia patients scheduled for cataract surgery who were living with a primary caregiver; those living alone were excluded. Visual acuity (VA, logMAR), cognitive function (Mini-Mental State Examination, MMSE), activities of daily living (Barthel Index, BI), and caregiver burden (Japanese version of the Zarit Burden Interview, J-ZBI) were assessed preoperatively and at 3 months postoperatively. Paired t-tests compared pre- and postoperative VA, MMSE, BI, and J-ZBI. Linear regression identified factors predicting postoperative caregiver burden.

Results: Thirty-five patients were enrolled. One patient did not undergo surgery and six were lost to follow-up, leaving 28 patients for the final analysis. Visual acuity improved significantly in all patients, however mean J-ZBI scores showed no significant change at 3 months. Higher preoperative caregiver burden was associated with persistently high postoperative burden ($p = 0.008$). Older caregiver age was associated with lower postoperative burden ($p = 0.047$). Other factors were not significant predictors.

Conclusions: Cataract surgery improved vision but had limited effect on caregiver burden. Outcomes were influenced by caregiver age and preoperative burden, indicating that relief is not solely determined by visual recovery. Multicenter studies are needed to establish and validate criteria for surgical indication in advanced dementia.

Abstract No.: 200802

Cataract Surgery and Cognitive Benefits in the Older Person – A Systematic Review and Meta-Analysis

First Author: Andrew TSAI

Co-Author(s): Brian YEO

Purpose: To determine the association between cataract surgery and the risk of cognitive impairment and dementia in older adults with cataracts.

Methods: Following PRISMA guidelines, PubMed, Embase, and the Cochrane Library were searched for studies evaluating cataract surgery in relation to cognitive outcomes. Maximally adjusted hazard ratios (HR) were pooled for dichotomous outcomes, and ratio of means (RoM) for continuous outcomes, using a random-effects model. Heterogeneity was explored with sensitivity and subgroup analyses. Study quality was assessed using the Newcastle–Ottawa Scale, Cochrane Risk-of-Bias Tool for Randomized Trials, and GRADE.

Results: Twenty-four studies involving 558,276 participants were included, with 19 studies qualitatively analysed. Risk of bias ranged from low to moderate, while GRADE ratings were very low to low. Cataract

surgery was associated with a 25% reduced risk of long-term cognitive decline compared with uncorrected cataracts (HR 0.75, 95% CI 0.72–0.78). Benefits were consistent across cognitive outcomes and robust in sensitivity analyses. Individuals who underwent cataract surgery had a similar risk of cognitive decline to healthy controls without cataracts (HR 0.84, 95% CI 0.66–1.06). In participants with normal cognition, cataract surgery was linked to a 4% improvement in short-term cognitive test scores (RoM 0.96, 95% CI 0.94–0.99), but no significant benefit was seen in those with pre-existing cognitive impairment.

Conclusions: Cataract surgery may reduce the risk of cognitive impairment and dementia, suggesting cataract-related vision loss is a potentially modifiable risk factor. Further randomized trials are needed to confirm these findings.

Abstract No.: 200345

Central Corneal Thickness Changes After Phacoemulsification: Its Association With Density of Cataract

First Author: Ambreen GULL

Purpose: Phacoemulsification is the most widely adopted technique for cataract removal but can cause transient endothelial trauma, leading to central corneal thickness (CCT) changes and artifactual elevation in intraocular pressure (IOP). To assess changes in central corneal thickness and intraocular pressure following phacoemulsification and examine their correlation with cataract density.

Methods: This observational analytical study was conducted on 80 eyes undergoing uneventful phacoemulsification at Benazir Bhutto Hospital, Rawalpindi Medical University. Preoperative and postoperative measurements of central corneal thickness (CCT) and intraocular pressure (IOP) were obtained using ultrasound pachymetry and Goldmann applanation tonometry, respectively, at day 1, week 1, and week 4. Cataract density was graded using the Lens Opacity Grading System. Visual acuity was recorded pre- and postoperatively using the decimal notation Snellen chart. Data were analyzed using paired t-tests, repeated measures ANOVA, and Spearman correlation.

Results: Mean CCT increased from 524.15 ± 40.54 μm preoperatively to 574.92 ± 44.72 μm on day 1 postoperatively, regressing to 525.89 ± 40.50 μm by week 4. IOP showed a transient rise from 15.59 ± 2.19 mmHg to 17.99 ± 2.17 mmHg at week 1, returning to baseline at week 4. A significant positive correlation was found between cataract density and both postoperative day 1 CCT ($p = 0.421$) and IOP ($p = 0.430$).

Conclusions: Phacoemulsification induces significant but reversible changes in CCT and IOP. Cataract density is moderately associated with early postoperative corneal edema and IOP elevation, emphasizing the

need for careful interpretation of IOP in denser cataracts.

Abstract No.: 201041

Clinical Case of Phacoemulsification in Traumatic Cataract

First Author: Kseniia ORLOVA

Co-Author(s): Anna MIRIDONOVA

Purpose: To evaluate clinical and functional result of implantation deep focus intraocular lens (IOL) to the patient with traumatic cataract.

Methods: To report a case of bilateral implantation deep focus IOL Lentis Comfort to the patient with traumatic cataract on the one eye and mild myopia on the another eye.

Results: A 50-year-old male presented at our ophthalmology clinic with progressive visual loss. Five months prior to the presentation, he had sustained blunt trauma to his left eye, leading to traumatic cataract. The patient underwent a cataract phacoemulsification and IOL implantation. Intraoperatively, seeing the intact capsular bag, we decided to implant the deep focus lens. On the first post-operative day, we got the result of distance vision 20/70. After 2 weeks of postoperative treatment we got the result of distance vision 20/20. Having received an excellent result, the patient wanted to get rid of myopia in the fellow eye. We performed refractive lens exchange on the right eye with the similar IOL. On the first post-operative day of the second eye, we got the result of distance vision 20/20 and and near vision 20/30, which completely satisfied the patient.

Conclusions: In patients with traumatic cataract and intact capsular bag, it is possible to implant an IOL with a deep focus to achieve higher visual functions at more than one distance.

Abstract No.: 201003

Clinical Classification and Management Outcomes of Anterior Segment-Dominated Persistent Fetal Vasculature: The CCPMOH Report

First Author: Hui CHEN

Co-Author(s): Wan CHEN, Weirong CHEN, Xiaoyan LI, Haotian LIN, Zhuoling LIN, Yongbin LIN, Fengqi ZHOU, Chaokun LUO

Purpose: To describe clinical features, management, and outcomes of anterior segment-dominated persistent fetal vasculature (aPFV).

Methods: The age and gender of each participant upon initial presentation, along with biological parameters, best-corrected visual acuity, and biomicroscopic assessments were collected. The aPFV eyes were categorized into 3 groups (type I: pupillary-iris-anterior lens plane, type II: retrolental-anterior hyaloid

membrane plane, and type III: combined) according to the location of the vascular abnormalities and further classified into mild(a) and severe (b) according to the degree of severity. The surgical techniques used in this investigation were reported. Visual outcomes, ocular hypertension, postoperative adverse events, and additional surgical interventions were recorded at each follow-up visit.

Results: Among 470 patients (619 eyes), type II was most common (67.9%). Cataracts were present in 81.6% of eyes, with subtype-specific patterns: type I—nuclear/membranous (24%); type II—subcapsular (53.6%); type III—complete cortex (30.4%). Type III had the shallowest anterior chamber and highest astigmatism. Surgery was performed in 96.9% of eyes, with postoperative complications including ocular hypertension (19.2%) and visual axis obscuration (9.4%). Visual acuity improved in 73.7% of eyes; types IIb and IIb had the worst outcomes.

Conclusions: The magnitude of aPFV can be usefully characterized by a classification protocol focusing on the location and disease severity. Here, we propose a surgical and medical management algorithm for aPFV to achieve favorable outcomes with limited intraoperative and post-operative complications.

Abstract No.: 206719

Clinical Spectrum of Intraocular Lens Opacification: A Photo-Documented Case Series With Systemic and Ocular Correlations

First Author: Sheetal SHARMA

Co-Author(s): Kusha CHAUDHARY

Purpose: To highlight the occurrence and clinical appearance of intraocular lens (IOL) opacification in pseudophakic patients, to correlate it with intrinsic patient factors and systemic conditions, and to create its awareness among ophthalmologists as a new and rarest complication after cataract surgery.

Methods: A descriptive case series of 4 patients who presented with decreased vision after cataract surgery. Detailed history was obtained regarding systemic illnesses (diabetes, hypertension, autoimmune diseases etc), ocular comorbidities, and previous intraocular procedures. Detailed slit- lamp examination was done, and high-resolution clinical photographs were captured to document the pattern of opacification.

Results: The most common pattern of IOL opacification being central almost lesser opacified zone of optic with peripheral more denser whitening including both the haptics, which is seen in 2 patients. 1 patient has 3-piece IOL with whole optic glistening in the form of snowflake pattern and last 1 patient has zebra stripes pattern of opacification with alternate stripes of dense homogenous opacification and lesser dense pattern of whitening. 3 out of 4 patients give a history of diabetes, and 1 out of 4 has ocular comorbidities in the

form of uveitis. All of the 4 patients had an uneventful phacoemulsification cataract surgery.

Conclusions: IOL opacification is not only associated with lens material properties but also with systemic and ocular risk factors. Correlating its occurrence with the patient's profile helps in identifying at-risk populations, guiding follow-up, and appropriately managing such cases.

Abstract No.: 204284

Clinical and Pathological Insights in Posterior Subcapsular Proliferative Membrane Post-Vitrectomy

First Author: Mingyang **WANG**

Co-Author(s): Shipeng **GUO**, Dian **JIAO**, Tian **TIAN**, Peiquan **ZHAO**

Purpose: To report the clinical manifestations and pathological characteristics of proliferative membranes observed underneath the posterior capsule in 8 eyes following 3-port pars plana vitrectomy (PPV).

Methods: This retrospective study collected clinical data of patients who developed posterior subcapsular proliferative membrane (PSPM) after PPV from March 2020 to July 2024. All patients underwent lensectomy or phacoemulsification due to cataracts post-PPV. The PSPM was collected during surgery and analyzed using hematoxylin & eosin (HE) staining and immunohistochemical staining.

Results: Eight eyes from eight patients with PSPM after PPV were studied, with an average age of 21 ± 11.86 years. The PPV indications included RRD (6 eyes, 75%), FEVR (1 eye, 12.5%), and PDR (1 eye, 12.5%). The average number of PPVs prior to cataract surgery was 2.63 ± 0.92 . One eye (12.5%) was filled with C3F8, and 7 eyes (87.5%) were filled with silicone oil before C3F8. PSPM was discovered during surgery after the lens cortex and nucleus were aspirated and were removed completely by intraocular forceps. Unlike granular opacities with small vacuoles typical of posterior subcapsular cataracts, these membranes appeared as dense white proliferative structures with irregular shapes adhering to the posterior capsule. HE staining revealed that PSPM comprised dense connective tissue fibers and spindle-shaped cells. Immunohistochemistry indicated positivity for Vimentin and Cytokeratin (CK), with some tissues positive for smooth muscle actin (SMA).

Conclusions: Immunohistochemistry suggests that PSPM formation is related to the epithelial-mesenchymal transition (EMT) of epithelial cells. Repeated PPV and intraocular silicone oil tamponade may be risk factors for its development.

Abstract No.: 203266

Combined Surgical Approach in Traumatic Cataract and Iridodialysis: A Case-Based Approach

First Author: Jessica **ZARWAN**

Co-Author(s): Rizki Amalia **PUTRI**

Purpose: This report aims to highlight different surgical approaches for iridodialysis repair, followed by cataract surgery.

Methods: This is a case report presenting two patients with traumatic cataract accompanied by iridodialysis following blunt ocular trauma.

Results: Case 1, a 36-year-old male, developed glare and tearing in the right eye 2 weeks after being struck by a grinder cutter, with a visual acuity of 6/9.5. There were 4-clock hours of iridodialysis and a hazy lens. Case 2, a 43-year-old male, experienced blurred vision and glare in the left eye for 1 month after being hit by a hydraulic pipe explosion, with visual acuity of 6/30, 5-clock hours iridodialysis, and a hazy lens. Both patients were diagnosed with traumatic cataract and iridodialysis and managed surgically using different iris repair techniques. The first used the Hang-Back technique and the second used the Sewing-Machine technique for iridodialysis repair, followed by phacoemulsification and intraocular lens implantation. After surgery, the corrected visual acuity in the first case is 6/6, and in the second case, it is 6/9. No subjective complaints reported. The iris and pupil are round in both cases, with a slight retraction towards the nasal area in the second case. The IOL remains stable.

Conclusions: Iridodialysis repair can be performed using different surgical approaches. Both the Sewing-Machine and Hang-back techniques provided good visual outcomes without added complications. Traumatic cataracts with iridodialysis may be managed in one or two steps, with single-stage surgery offering faster recovery and reduced patient burden.

Abstract No.: 205189

Comparison of Ocular Biometry and Refractive Outcome Between IOLMaster 700 and a Novel Segmental Optical Biometer

First Author: Haowen **LIN**

Purpose: To compare the ocular biometry and refractive outcome between two optical biometers.

Methods: This prospective observational study was conducted at the Zhongshan ophthalmic center, Guangzhou, China. A total of 953 cataract patients underwent preoperative biometry including ZW-30 sum-of-segments [SOS] method (ZWSM), ZW-30 composite method (ZWCM), and IOLMaster 700. Agreement of axial length (AL), with or without Cooke-modified AL (CMAL) adjustment, was analyzed

using Bland-Altman 95% limits of agreement (LoA). Subgroup analysis were used based on ALs (Short eyes: $AL < 22\text{mm}$; Normal eyes: $22\text{mm} \leq AL < 26\text{mm}$; Long eyes: $AL \geq 26\text{mm}$). Refractive prediction accuracy was evaluated using Emmetropia verifying optical (EVO) 2.0 formula and its SOS-optimized version (EVO 2.0SOS).

Results: In short and normal eyes, narrow 95%LoAs ($< 0.2\text{mm}$) were identified among three ALs. However, AL obtained by ZWSM was lower compared with this obtained by ZWCM and IOLMaster 700 (95%LoA: -0.39 to 0.01mm ; -0.38 to 0.04mm) in long eyes. CMAL adjustment enhanced the agreement of AL between ZWSM and ZWCM (95%LoA: -0.01mm to 0.02mm), ZWSM and IOLMaster 700 (95%LoA: -0.10mm to 0.07mm) in long eyes. Myopic prediction errors (PE) have been identified in the use of ocular biometric parameters obtained from ZWSM (Mean PE [ME]: EVO 2.0, -0.19D ; EVO 2.0SOS, -0.18D). After adjusting ME to zero, no difference was observed in PE calculated using any combination of formulas based on biometric measurements from three devices.

Conclusions: This novel segmented biometer demonstrates excellent agreement with IOLMaster 700 in short and normal eyes. However, ALs obtained by IOLMaster 700 are not interchangeable with the SOS method and require CMAL adjustment in long eyes. The application of the SOS method's ocular biometric parameters in refractive prediction led to myopic errors, which suggest constant optimization.

Abstract No.: 206173

Comparison of Surgically Induced Astigmatism After Cataract Surgery in Post-LASIK Eyes and Virgin Eyes With Long Axial Length

First Author: Xia **CHEN**

Co-Author(s): Yulan **WANG**

Purpose: To compare the surgically induced astigmatism (SIA) after microscopic cataract surgery between patients who underwent laser-assisted in situ keratomileusis (LASIK) surgery and virgin eyes with axial length (AL) $\geq 29\text{ mm}$.

Methods: In this retrospective single-center study, 62 eyes of 46 patients with $AL \geq 29\text{ mm}$ that underwent uneventful phacoemulsification cataract surgery were enrolled (31 eyes of 23 patients previously had LASIK surgery). Postoperative corneal astigmatism values were compared to preoperative astigmatism indices to determine the SIA at the postoperative 3-month (POM3) mark using the Alpins vector method.

Results: The preoperative mean corneal spherical aberration has no significant difference in both groups regarding magnitude and power vectors ($p > 0.05$). After microincision phacoemulsification cataract surgery, there were no significant differences in mean spherical and cylindrical values and mean keratometry readings (all

$p > 0.05$). However, surgically induced astigmatism and difference vector were significantly higher in post-LASIK eyes and microincision cataract surgery steepening effect on post-LASIK corneas was significantly higher than those in virgin eyes ($p = 0.016$, $p = 0.02$ and $p = 0.034$, respectively).

Conclusions: The SIA was significantly higher in the Lasik group. Cataract surgery has steepened the corneas in both groups with a significantly higher steepening effect in post-LASIK eyes.

Abstract No.: 202597

Comparison of Uncorrected Near Visual Acuity and Related Factors Between Enhanced Monofocal Intraocular Lens and Monofocal Intraocular Lens

First Author: Roo Min **JUN**

Co-Author(s): Yeong A **CHOI**, Kyung Eun **HAN**, Ji-ah **KIM**, Ji Young **MOON**

Purpose: To compare near uncorrected visual acuity (UCVA) and factors affecting near UCVA between eyes implanted with enhanced monofocal intraocular lenses (IOLs) and those implanted with standard monofocal IOLs.

Methods: A total of 119 eyes from 119 patients were included. Among them, 62 eyes received standard monofocal IOLs (Tecnis ZCB00) and 57 eyes received enhanced monofocal IOLs (Eyhance®). Near UCVA was assessed one month postoperatively. Correlations between near UCVA and potential influencing factors, including age, spherical equivalent, astigmatism magnitude and axis, pupil size, corneal higher-order aberrations within the central 4 mm zone, and axial length, were analyzed.

Results: Near UCVA (logMAR) was significantly better in the enhanced monofocal IOL group (0.26 ± 0.10) compared to the standard monofocal IOL group (0.41 ± 0.23) ($p < 0.01$) at one month postoperatively. In the standard monofocal IOL group, better near UCVA was associated with a more myopic spherical equivalent ($p < 0.01$) and a smaller pupil size ($p < 0.05$). In the enhanced monofocal IOL group, younger age ($p < 0.05$) and longer axial length ($p < 0.05$) were correlated with better near UCVA. Astigmatism magnitude, astigmatism axis, and corneal higher-order aberrations were not significantly related to near UCVA in either group.

Conclusions: Near UCVA was superior in eyes implanted with enhanced monofocal IOLs compared to those with standard monofocal IOLs. Factors associated with near UCVA differed between the two types of IOLs, suggesting distinct visual performance characteristics.

Abstract No.: 203154**Comparison of Visual Outcome EDOF IOL vs Monocular IOL's- a Comparative Longitudinal Study***First Author: Rakshya PANTA SITOULA**Co-Author(s): Indesh CHOUDHARY*

Purpose: EDOF IOL, or extended range of vision IOL, is a new technology in the treatment of intermediate vision-correcting lenses. The basic optical principle is to create a single-elongated focal point to enhance the depth-of-focus, on the contrary to monofocal IOLs in which light is focused on one single point or MF IOLs having two or three discrete points. This is the first study conducted in Nepal regarding EDOF lens.

Methods: A prospective study which included 100 patients who underwent implantation of the EDOF IOL and 100 eyes the monofocal IOL. The following preoperative and postoperative parameters were evaluated: spherical equivalent, uncorrected and corrected distance visual acuity, uncorrected and corrected intermediate visual acuity, and uncorrected and corrected near visual acuity at 1 week and 1 month.

Results: Patients after EDOF IOLs had significantly better uncorrected and corrected intermediate and near visual acuity compared to those with monofocal IOLs ($p < 0.001$). However, the distant visual acuity between the two groups was similar.

Conclusions: Both monofocal and EDOF lens had similar distant visual outcomes but intermediate and near visual acuity was superior for EDOF lenses. The results of this was comparable to other studies comparing the two IOL's.

Abstract No.: 204634**Comparison of Visual Outcomes and Higher-Order Aberration Between New Refractive EDOF IOL and Enhanced Monofocal IOL***First Author: Tae-im KIM**Co-Author(s): Ikhyun JUN, Do Young KIM, Hyunjo LEE, Ji Sang MIN, Kyoung Yul SEO*

Purpose: To compare visual performance and optical quality between a novel refractive extended depth-of-focus intraocular lens (EDoF IOL) with a myopic target and an enhanced monofocal IOL with emmetropic target.

Methods: In this single-center retrospective study, patients were implanted with either an EDoF IOL (TECNIS PureSee™, model ZEN00V; n=43) or an enhanced monofocal IOL (TECNIS Eyhance™, model ICB00; n=43). The EDoF IOL was targeted for a postoperative refraction of -0.50 to -1.00 D, whereas the enhanced monofocal IOL was targeted for emmetropia. Monocular distance visual acuity (VA) and iTrace aberrometry (Tracey Technologies, Houston, TX)

were assessed. A subgroup analysis of bilateral cases evaluated intermediate and near VA as well as photic phenomena.

Results: In this single-center retrospective study, patients were implanted with either an EDoF IOL (TECNIS PureSee™, model ZEN00V; n=43) or an enhanced monofocal IOL (TECNIS Eyhance™, model ICB00; n=43). The EDoF IOL was targeted for a postoperative refraction of -0.50 to -1.00 D, whereas the enhanced monofocal IOL was targeted for emmetropia. Monocular distance visual acuity (VA) and iTrace aberrometry (Tracey Technologies, Houston, TX) were assessed. A subgroup analysis of bilateral cases evaluated intermediate and near VA as well as photic phenomena. Dysphotopsia rates were similar between the two groups.

Conclusions: Implantation of the refractive EDoF IOL (TECNIS PureSee™) with a modest myopic target provides enhanced intermediate and near vision while maintaining distance acuity and overall optical quality, offering cataract surgeons a practical option to extend visual range without increasing photic disturbances.

Abstract No.: 206738**Comparison of Visual Performance With iTrace Analyzer Following Trifocal and Monofocal Intraocular Lenses Implantation in Pediatric Cataract***First Author: Fei LENG**Co-Author(s): Li LI, Lingfang ZHENG*

Purpose: To compare the early postoperative visual performance with an iTrace analyzer following trifocal and monofocal intraocular lenses (IOLs) implantation in pediatric cataract patients.

Methods: In this prospective cohort study, consecutive pediatric cataract patients who underwent phacoemulsification with in-the-bag IOL implantation from September 2024 to February 2025 were enrolled. Children were assigned to either the trifocal IOL group (Group A) or the monofocal IOL group (Group B) according to the type of IOL implanted. Study parameters included preoperative and postoperative corrected distance visual acuity (CDVA) at 5 m, objective visual qualities, and total high-order aberrations (HOAs) postoperatively. The postoperative complications were also recorded.

Results: A total of 45 eyes of 32 patients (Group A, n = 21; Group B, n = 11) were included in the study. Preoperative baseline characteristics between groups were not statistically significantly different (all $P > 0.05$). The mean follow-up period was 9.66 months. At the final follow-up, no significant intergroup difference was observed in corrected distance visual acuity (CDVA) ($P > 0.05$). Objective visual quality parameters improved postoperatively in both groups, with no significant differences between them (all $P > 0.05$).

Conclusions: Short-term data show that, in pediatric cataract patients without severe amblyopia, trifocal IOL implantation yields visual performance comparable to that achieved with monofocal IOL.

Abstract No.: 202576

Complications in YAG Laser Capsulotomy of Secondary Cataracts

First Author: Yazgul **ABDIYEVA**

Co-Author(s): Nizami **BAGIROV**, Jeyhun **NAZARLI**

Purpose: To study the causes of complications during YAG laser capsulotomy of secondary cataracts.

Methods: The study was conducted on 80 patients (82 eyes). After phacoemulsification of cataracts, YAG laser capsulotomy of secondary cataracts was performed 6-12 months later. Among the patients were 46 women (57.5%) and 34 men (42.5%) aged 34 to 79 years (48±3.9 years). Before and after surgery, all patients underwent the necessary ophthalmological examinations. In all patients, visual acuity gradually decreased from 0.8-0.9 to 0.2-0.3 over a period of time (up to 2-3 years).

Results: Complications after surgery were observed in 6 (6 eyes) patients. During YAG laser capsulotomy, involuntary movements of the head and eyes in some patients caused the focused laser beams to damage the lens. All patients were prescribed 1 drop of 0.5% timolol once a day for 1 month after surgery.

Conclusions: During posterior capsule dissection, patients should remain completely still and not interfere with the operation (even involuntarily).

Abstract No.: 207077

Congenital Aniridia Associated With Cataract: A Surgical and Visual Rehabilitation Challenge

First Author: Siva Sathi **KANESAN**

Co-Author(s): Ng **HONG KEE**, Nanthini **SELVARAJA**

Purpose: To describe the clinical presentation, associated ocular findings and management outcomes in case series of patients diagnosed with aniridia.

Methods: Case report.

Results: We report two cases of congenital aniridia. A 36-year-old female and a 15-year-old male, both presenting with progressive bilateral visual impairment since childhood. Clinical examination of the first patient revealed a best corrected visual acuity (BCVA) of counting fingers in the right eye (RE) and 5/60 in the left eye (LE). In the second patient, the BCVA was 2/60 in the RE and 6/60 in the LE. Clinically, both patients presented with bilateral aniridia, dense cataracts, and nystagmus. Intraocular pressure (IOP) was within normal limits in both patients, and fundus examinations were unremarkable. There was no family history of ocular disease in the female patient, whereas

the male patient's father has a history of glaucoma. The female patient underwent extracapsular cataract extraction with implantation of intraocular lens (IOL) in the more severely affected eye. Special consideration was given to zonular instability and corneal clarity during the procedure. Postoperative recovery was uneventful, with marked improvement in visual acuity. The male patient is currently awaiting a scheduled date for cataract surgery.

Conclusions: This case highlights the complex clinical spectrum of congenital aniridia and underscores the importance of individualized surgical planning in the presence of cataract. Long term follow up is essential to monitor for secondary glaucoma and other progressive complications.

Abstract No.: 205119

Consensus on the Benefits of Presbyopia-Correcting Intraocular Lenses in Cataract Surgery: A Delphi Study

First Author: Tetsuro **OSHIKA**

Co-Author(s): Margaret **AINSLIE-GARCIA**, Hiroyuki **ARAI**, Hiroshi **SASAKI**, Wendy (zhi) **WANG**, George **WRIGHT**

Purpose: A Delphi study was conducted to build consensus on the clinical and economic value of presbyopia-correcting intraocular lenses (PC IOLs), including trifocal and extended-depth-of-focus (EDOF) IOLs among age-related cataract surgery patients in Japan.

Methods: The Delphi panel included 22 practicing cataract surgeons across Japan; three of whom constituted the steering committee for the study. Two anonymous consensus-building rounds of electronic questionnaires were used to reach consensus on key topics. Questionnaires collected demographic information, quantitative items (PC IOL usage rates), qualitative items rated on a 5-point Likert scale to assess agreement (e.g., clinical benefits, economic concepts, adoption barriers), and open-ended responses. Consensus was defined a priori as ≥80% agreement.

Results: The panelists had an average of 30.1 (range 12-47) years of cataract surgery experience. Consensus was reached on 33 statements. The panel agreed that PC IOLs substantially improve satisfaction and vision-related quality of life when appropriately selected for cataract surgery patients in Japan. Compared to monofocal IOLs, trifocals are preferred for patients prioritizing intermediate vision. EDOFs offer broader range of clear vision and better contrast compared to monofocals. Optimal results may be delivered through appropriate patient selection and education to overcome adoption barriers such as out-of-pocket cost, low familiarity with payment models, and comparative evidence gaps.

Conclusions: These findings highlight the need for personalized IOL selection, patient education, and cost transparency to improve satisfaction and overcome barriers to PC IOL adoption in Japan and worldwide.

Abstract No.: 200325

Descemet Membrane Detachment Associated With Inadvertent Intrastromal Viscoelastic Injection: A Rare Complication of Phacoemulsification

First Author: Melissa Pei Yin WANG

Co-Author(s): Koon Ling KOH, Siti ROHA, Nanthini SELVARAJA

Purpose: To report a case of extensive central Descemet's membrane detachment precipitated by inadvertent intrastromal viscoelastic injection during phacoemulsification

Methods: Case report

Results: A 74-year-old man with no systemic comorbidities underwent right eye phacoemulsification. During viscoelastic injection via the temporal paracentesis, sudden ocular movement led to iatrogenic Descemet membrane Detachment (DMD) extending from the side-port incision to the central cornea. An intracameral air bubble was applied intraoperatively for tamponade. At one week postoperatively, best-corrected visual acuity (BCVA) was 6/60, with corneal edema and a linear stromal track extending centrally. Anterior segment optical coherence tomography (AS-OCT) revealed central DMD with intralaminar viscoelastic vacuolation. As the patient was not keen on surgical intervention, he was managed conservatively. By the second week, visual acuity showed mild improvement, with spontaneous reattachment of the peripheral detachment. Serial AS-OCT over six weeks demonstrated progressive reduction of vacuolation and gradual reattachment of the Descemet membrane. At final review, BCVA improved to 6/12 ($-0.75/-1.50 \times 110$), with minimal residual central stromal scarring and resolution of corneal edema.

Conclusions: Iatrogenic central Descemet membrane detachment following phacoemulsification may resolve with conservative management when partial spontaneous reattachment occurs. Serial AS-OCT is a valuable tool for monitoring resolution, favorable visual outcomes are achievable without surgical intervention.

Abstract No.: 202645

Descemet Membrane Loss During an Uneventful Cataract Surgery

First Author: Kristina Radika Hipa KURNIA

Co-Author(s): Heni RIYANTO

Purpose: to report a case of Descemet membrane loss during an uneventful cataract surgery, and its

management to prevent the patient from having permanent visual loss

Methods: A 74 year old male patient came to the clinic with blurred vision in the right eye. Visual acuity was 5/20 (not improved with pinhole) and cataract lens. There was a slight increase in intraocular pressure (IOP) before surgery, but it was controlled with anti-glaucoma agent. During the surgery, there was a Descemet membrane detached from the main incision site, and expanded to the central to the visual axis. Uneventfully, despite a slow and careful irrigation and aspiration, the Descemet membrane accidentally sucked by the irrigation-aspiration tip. Before corneal hydration, full bubble was administered to the anterior chamber (AC). Systemic and topical steroid were given to the patient, along with systemic and topical hyperosmotic agents, anti-glaucoma agents, and topical non steroid anti-inflammatory drugs (NSAID) with close monitoring.

Results: First day after surgery, visual acuity decreased to hand movement, the cornea was severely edema, IOP reached 46.2 mmHg, and bubble still covered more than half of the AC. One month after surgery, his visual acuity improved to 5/20 and best corrected visual acuity was 5/12.5, IOP was normal (10.0 mmHg), the cornea had already clear with trace of the missing Descemet membrane.

Conclusions: Descemet membrane loss could effect the clarity of the cornea, causing a visually threatening condition. With proper management, we could prevent the patient from having permanent visual loss.

Abstract No.: 205008

Early Experience With a Swept-Source OCT Biometer With Image Guidance

First Author: Fook Meng CHEONG

Co-Author(s): Eunice HIEW, Ivy LAI

Purpose: To evaluate the consistency and predictability of a new OCT-based biometer with reference to a pre-existing OLCR based biometer.

Methods: The first 36 eyes of 18 patients to be measured with the new OCT biometer were evaluated in the study. Each patient underwent biometric measurements in a standard manner using both the new OCT-based biometer and the OLCR-based biometer. Outcome measures were acquisition speed and rate, differences in measured axial length values, predictability and refractive outcomes including comparison with true axial length outcome measures.

Results: The acquisition speed was found to be faster than that of the OLCR-based biometer. There was 100% acquisition rate in all eyes, which included grade 4 nucleosclerotic cataracts and posterior sub-capsular opacifications. The measured axial lengths were longer in an eye shorter than 22mm and shorter in eyes longer than 26mm, but the differences were not statistically

significant. Using the manufacturers' lens constants and Barrett's IOL formula, 61.9% of eyes were within 0.25D of target refraction, 90.5% were within 0.50D and 100% were within 0.75D. These were comparable with results obtained from the OLCR based biometer.

Conclusions: The new swept-source OCT biometer was faster in its acquisition speed with 100% acquisition rate in all 36 eyes. The sum of segments mode of measurement seem to give shorter axial length values in eyes that were longer than 26mm, compared to the OLCR biometer. The predictability and refractive outcomes were comparable to the pre-existing biometer.

Abstract No.: 205043

Early Postoperative Outcomes of Light Adjustable Lens+ in Japanese Patients

First Author: Yukihito **KATO**

Co-Author(s): Rie **HORAI**, Kazuo **ICHIKAWA**, Kei **ICHIKAWA**, Yukihiro **SAKAI**, Melvin **SARAYBA**

Purpose: To report the early postoperative outcomes of Light Adjustable Lens(LAL)+ in Japanese patients.

Methods: This study included 33 eyes of 18 patients (61.5±10.4 years old) who underwent cataract surgery alone and had Light Adjustable Lens+ implanted. Visual acuity, subjective refraction, and objective refraction were measured the day after cataract surgery, one month, and one month after postoperative adjustment.

Results: The percentages of eyes whose postoperative refractive manifest refraction spherical equivalent (MRSE) were within 0.5D of their desired final refractive power were 48.5%, 66.7%, and 81.8% the day after surgery, one month after surgery, and one month after refractive adjustment, respectively. The percentages of eyes whose postoperative refractive MRSE were within 1.0D of their desired final refractive power were 84.8%, 93.9%, and 100%. The percentages of eyes whose postoperative refractive cylinders were within 0.5D of their desired final refractive power were 51.5%, 42.4%, and 90.9%. The percentages of eyes whose postoperative refractive cylinder was within 1.0D of their desired final refractive power were 78.8%, 78.8% and 100%.

Conclusions: LAL+ is an intraocular lens that can be adjusted postoperatively without affecting corrected visual acuity and has the potential to reduce refractive error in the same way as LAL.

Abstract No.: 204106

Effective Lens Position and Refraction Prediction in Pseudophakia

First Author: Andry **LUKANDY**

Co-Author(s): Anne **UMBOH**, Reinhard Arie **UMBOH**

Purpose: To analyze the influence of effective lens position (ELP) determination on refractive outcomes.

Methods: This was a prospective cohort observational study conducted at Prof. R. D. Kandou General Hospital from October 2024 to June 2025. Inclusion criteria included patients aged 2–18 years undergoing intraocular lens (IOL) implantation, with available biometric and UBM examination data. Data collected included gender, BCVA, IOP, ELP, axial length, keratometry, anterior chamber depth (ACD), lens thickness, predicted refraction, actual refraction, and refractive status.

Results: Of 26 eyes examined, 12 met the inclusion criteria. The majority were male (75%) with a median age of 11 years. The median axial length was 22.56 mm, mean BMD was 3.75 ± 0.52 mm, keratometry was 43.59 ± 2.21 D, and mean lens thickness was 2.85 ± 1.31 mm. The median predicted refraction was +0.46 D with an average IOL power of 21 D. One month postoperatively, mean BCVA was 0.70 ± 0.64 LogMAR, mean IOP was 14.08 ± 3.14 mmHg, mean ELP was 4.37 ± 0.40 mm, and mean actual refraction was -0.08 ± 1.45 D. The median refractive prediction error was 0.54 D. Statistical analysis showed no significant association between ELP at one month and predicted refraction ($p > 0.05$), while a significant association was found between predicted and actual refraction ($p < 0.05$). Regression analysis using actual refraction at one month yielded nonsignificant results ($p > 0.05$).

Conclusions: There was no association between effective lens position (ELP) and actual refraction at one month postoperatively at Prof. R. D. Kandou General Hospital. The median difference between predicted and actual postoperative refraction in pediatric patients was 0.5 diopters.

Abstract No.: 202028

Efficacy of Pre-Operative Eyelid Hygiene Combined With Peri-Operative Artificial Tears After Phacoemulsification Cataract Surgery: A Randomized Controlled Trial

First Author: Krittaya **CHITSUTHIPAKORN**

Co-Author(s): Nawat **WATANACHAI**

Purpose: Dry eye frequently occurs after phacoemulsification and may impair comfort and visual recovery. This study evaluated whether pre-operative eyelid hygiene with peri-operative artificial tears improves postoperative ocular surface outcomes.

Methods: In this single-center, single-blind randomized controlled trial, 80 patients were randomized 1:1 to intervention (eyelid hygiene twice daily for 7 days preoperatively plus 0.18% sodium hyaluronate artificial tears four times daily from 7 days pre-op to postoperative day [POD] 28; n=40) or control (standard care; n=40). The primary outcome was fluorescein tear break-up time (FTBUT). Secondary outcomes included Schirmer I, Ocular Surface Disease Index (OSDI), Oxford corneal staining, and meibomian gland dysfunction (MGD) grading. Outcomes were assessed at baseline,

POD7 and POD28 using mixed-model ANCOVA adjusted for baseline values.

Results: Baseline characteristics were comparable. At POD7, the intervention group showed smaller decline in FTBUT (-0.75 vs -1.98 s; mean difference $+1.23$ s, $p=0.178$), and Schirmer I (-0.10 vs -1.25 mm; $+1.15$ mm, $p=0.260$). OSDI improved significantly more in the intervention group (-4.20 vs -1.05 ; -3.15 , $p=0.032$). At POD28, FTBUT decline was also less (-0.87 vs -2.51 s; $+1.64$ s, $p=0.112$), Schirmer I decreased less (-0.30 vs -1.87 mm; $+1.56$ mm, $p=0.176$), and OSDI improvement remained significant (-6.47 vs -1.60 ; -4.87 , $p=0.011$). Oxford staining and MGD grading showed no significant differences. No adverse events occurred.

Conclusions: Pre-operative eyelid hygiene with peri-operative artificial tears significantly improved postoperative symptoms as early as POD7, with sustained benefit at POD28 and favorable trends in tear function. This simple, safe regimen may enhance ocular surface recovery after cataract surgery.

Abstract No.: 205226

Evaluation of Clear Corneal Incision Following Manual and Femtosecond Laser-Assisted Cataract Surgery

First Author: Samaresh **SRIVASTAVA**

Co-Author(s): Ishrat **ANIS**, Abhay **VASAVADA**, Shail **VASAVADA**, Vaishali **VASAVADA**

Purpose: To compare the occurrence of incisional Descemet's detachments (DD) in manual phacoemulsification (PE) versus femtosecond laser-assisted cataract surgery (FLACS).

Methods: Prospective interventional case series in 450 eyes (450 patients) undergoing cataract surgery were randomized to: group I ($n = 150$) PE with a 2.2mm near square limbal incision, group II ($n = 150$) PE with 2.2mm external entry and internal flare created with the same anterior bevel knife as group I, and group III—FLACS where the laser was used to create a trapezoidal incision with external 2.2mm and internal 2.3mm. standardised Phacoemulsification was performed. Outcome measures presence of DD noted clinically at the end of surgery, DD on anterior segment optical coherence tomography (OCT) performed within an hour of surgery, epithelial / endothelial misalignment. Additionally, manual 2.2mm square and femtosecond laser trapezoidal 2.2mm incisions were created in 5 human cadaver eyes each, and incision architecture compared on histomorphology.

Results: Intraoperatively, varying degrees of DD at the incision were seen in 14,13 and 5.3% eyes in groups I,II, and III, respectively. Postoperatively, DD on OCT in 58, 79 and 30% eyes within an hour. The differences were statistically significant ($P < 0.05$). Histomorphologic evaluation of collagen showed misalignment of the

roof and floor of incision in manual group compared to FLACS. There was greater collagen disorganisation around the incision in the manual group.

Conclusions: FLACS incisions had a lower incidence of DD as well as lesser collagen architecture distortion. The femtosecond laser allows creation of precisely sized trapezoidal incisions for more wiggle space at the internal entry causing less trauma.

Abstract No.: 200706

Evaluation of Distance, Intermediate, and Near Vision of Presbyopia Patients With Synergy Implantation at Different Contrast Energy

First Author: Jun **ZHANG**

Purpose: To evaluate visual performance, contrast sensitivity under various contrast energy conditions, and patient satisfaction after bilateral implantation of the TECNIS Synergy ZFR00V EDOF IOL in presbyopia.

Methods: This prospective single-arm observational study involved 40 Chinese patients (80 eyes) underwent Synergy intraocular lenses (IOLs) implantation conducted from October 2024 to April 2025. Postoperatively, distance, intermediate, and near visual acuity were evaluated with various contrast energy charts, for both monocular and binocular outcomes. Patient satisfaction was evaluated using the VF-14 questionnaire.

Results: At 3 months postop, the mean refractive spherical equivalent was -0.32 ± 0.30 D, with 84% of eyes within ± 0.50 D and 99% within ± 1.0 D. Mean binocular logMAR acuities were: UDVA -0.06 ± 0.05 , UIVA 0.00 ± 0.07 , UNVA (33cm) -0.02 ± 0.05 ; corrected acuities (CDVA/DCIVA/DCNVA) were $-0.06 \pm 0.05/0.05 \pm 0.10/0.02 \pm 0.07$ at 100% contrast, $0.04 \pm 0.08/0.12 \pm 0.10/0.06 \pm 0.09$ at 80% contrast, and $0.18 \pm 0.10/0.26 \pm 0.13/0.21 \pm 0.11$ at 40% contrast. Contrast sensitivity decreased notably with lower contrast: most patients lost about 1 line of vision at 80% contrast and 2-4 lines at 40% contrast. Patient outcomes were excellent, showing 97.5% spectacle independence and a mean VF-14 satisfaction score of 53.4/60.

Conclusions: Synergy provides Chinese presbyopic patients with satisfying full-range vision and spectacle independence. This comprehensive assessment will provide a more nuanced understanding of the impact of the Synergy IOL on vision across different distances and contrast energy conditions, contributing to improved patient selection and postoperative outcomes.

Abstract No.: 206666

Evaluation of Rotational Stability of Toric Trifocal Intraocular Lens in Patients Undergoing Cataract Surgery

First Author: Purnima DHAND

Co-Author(s): Madhav GOEL, Sonu GOEL

Purpose: To evaluate the rotational stability, refractive outcomes, and patient-reported visual quality after implantation of the FineVision POD toric trifocal intraocular lens (IOL).

Methods: One hundred eyes of 100 patients with senile cataract and ≥ 1.0 diopter (D) corneal astigmatism underwent phacoemulsification with FineVision POD toric trifocal IOL implantation. Intraoperative toric alignment was guided by the Callisto Eye digital marking system, and postoperative verification was performed using Slit lamp Examination and iTrace ray-tracing aberrometry. Follow-up was at day 1, week 1, and month 1. Outcomes included uncorrected distance, intermediate, and near visual acuity (UDVA, UIVA, UNVA), best corrected visual acuity (BCVA), residual astigmatism, IOL rotation, and subjective photic phenomena.

Results: At 1 month, 91.9% achieved UDVA $\geq 20/20$, and 98.5% $\geq 20/25$. Mean residual astigmatism was 0.32 ± 0.20 D, with 93% of eyes within ± 0.50 D of target refraction. Mean IOL rotation was $2.3^\circ \pm 1.5^\circ$, with 96% of eyes $\leq 5^\circ$ rotation. Glare/halos were reported in 14% but were mild and non-bothersome.

Conclusions: The FineVision POD toric trifocal IOL demonstrated excellent rotational stability, accurate astigmatism correction aided by digital guidance, and high levels of spectacle independence. Visual quality was generally good, with mild photic phenomena consistent with trifocal optics.

Abstract No.: 201104

Evaluation of Sub Tenon's Block Using 26G Needle in Routine Cataract Surgery

First Author: Shah Md Rajibul ISLAM

Co-Author(s): Shah Md Bulbul ISLAM, Golam RABBANI

Purpose: Evaluating subtenon's block during routine phacoemulsification surgery.

Methods: This cross-sectional observational study was done from March 2021 to December 2021. Pre-operative and post-operative visual acuity, IOP, per-operative pain, complications of subtenon's anesthesia and duration of surgery were noted. All the patients underwent temporal approach Phacoemulsification with PCIOL by a single surgeon.

Results: Out of 50 patients 60% were male. Mean age was 57.6 ± 9.07 (22-78) years. There was significant improvement of visual acuity from 0.17 ± 0.084 to 0.73 ± 0.16 in decimal ($p < 0.001$). IOP was significantly lower (13.12 ± 1.51 vs 10.74 ± 1.34 mm Hg) in the post-

operative period ($p < 0.001$). 76% patients complained of discomfort during the block. Per-operatively there were no complains. Subconjunctival hemorrhage occurred in 4% and chemosis in 6%. Sudden spike of blood pressure occurred in 4%. Duration of surgery was 19.36 ± 4.21 (13-32) minutes. Two patients needed eye patching for 02 hours following surgery

Conclusions: Subtenon's block using a 26G needle carefully is an effective and safe technique for routine cataract surgery. It minimizes complications and maximizes surgeons' and patients' comfort. It can also be used to augment cases done under topical anesthesia when patients feel discomfort. It is an excellent technique that can be utilized by surgeons switching over to topical surgery from regional block.

Abstract No.: 204624

Five-Year Real-World Comparison of Visual Quality and Patient Satisfaction Between AcrySof IQ ReSTOR SN6AD1 and Lentis Comfort LS-313 MF30 Multifocal Intraocular Lenses

First Author: Li LI

Purpose: To compare the visual quality and patient satisfaction outcomes of two multifocal intraocular lenses (MIOLs) at five years after cataract surgery in a real-world setting.

Methods: Eyes were grouped based on the MIOL implanted: MIOL-A group (Lentis Comfort LS-313 MF30 +3.0 D, 62 eyes) and MIOL-B group (AcrySof IQ ReSTOR SN6AD1 +3.0 D, 38 eyes). Data collected at 5 years postoperatively included: visual acuity; Area under the defocus curve (AUC); higher-order aberrations (HOA); Patient satisfaction questionnaire; and Incidence of posterior capsule opacification (PCO).

Results: Near visual acuity was significantly better in the MIOL-A group compared to the MIOL-B group (0.16 ± 0.09 vs. 0.24 ± 0.11 , $p = 0.01$). Distance (0.10 ± 0.09 vs. 0.18 ± 0.17 , $p = 0.09$) and intermediate (0.17 ± 0.09 vs. 0.19 ± 0.14 , $p = 0.76$) visual acuity were also better in the MIOL-A group. The AUC was larger in the MIOL-A group (5.68 ± 0.78) than in the MIOL-B group (5.60 ± 0.61), but this difference was not statistically significant ($p = 0.68$). Coma was significantly lower in the MIOL-A group compared to the MIOL-B group (0.05 ± 0.05 vs. 0.12 ± 0.08 , $p = 0.001$). The Nd:YAG laser capsulotomy rate was significantly lower in the MIOL-A group compared to the MIOL-B group (6.5% vs. 26.3%, $p = 0.001$).

Conclusions: Both multifocal IOLs provided long-term stable refractive outcomes. The Lentis Comfort LS-313 MF30 demonstrated significant advantages over the AcrySof IQ ReSTOR SN6AD1 in near visual acuity, coma control, and long-term PCO rate.

Abstract No.: 208430**From Lens Density to Cataract: A Predictive Model Using Ocular Biometric Parameters***First Author: Yue WEN**Co-Author(s): Yongzhen BAO, Qiong XU, Mingwei ZHAO*

Purpose: To explore the lens density to predict cataract and its correlation with demographic and ocular biometric parameters.

Methods: A cross-sectional study was performed. A total of 2000 participants (2000 eyes), ranging from 3 to 98 years old, were enrolled. Lens images were obtained from IOL Master 700 and processed by an OpenCV-based method. The receiver operating characteristic analysis was used to select the predictor for cataract. A logistic and linear regression model were chosen to illustrate the correlation of lens density with demographic and ocular biometric parameters.

Results: The mean age was 40.84 ± 22.97 years, and 44.8% were male. A total of 491 patients were diagnosed with cataracts. The axial length (AL), anterior aqueous chamber (AQD), and white-to-white (WTW) were greater in the group with AL > 26 mm (all $P < 0.001$), while the LT was thicker in the group with AL < 26 mm ($P = 0.002$). The areas under the receiver operating characteristic (ROC) curve (AUC) of the lens average density were the most (0.975, 95% CI: 0.969 to 0.981, $P < 0.001$), and the cutoff value of the lens average density was 68.66. The multivariate logistic regression analysis demonstrated that age (OR = 1.104, 95% CI: 1.090 to 1.118, $P < 0.001$), AL (OR = 1.360, 95% CI: 1.265 to 1.462, $P < 0.001$), AQD (OR = 0.275, 95% CI: 0.169 to 0.448, $P < 0.001$), and lens thickness (LT) (OR = 2.013, 95% CI: 1.287 to 3.150, $P = 0.002$) were independently associated with cataract. The multivariate linear regression analysis showed that the lens average density was significantly associated with age (standardized $\beta = 0.709$, $P < 0.001$), AL (standardized $\beta = 0.192$, $P < 0.001$), AQD (standardized $\beta = -0.173$, $P < 0.001$), LT (standardized $\beta = 0.084$, $P < 0.001$), and WTW (standardized $\beta = 0.027$, $P = 0.027$).

Conclusions: We proposed the lens average density to predict cataract. We found that old age, long AL, shallow AQD, and thick LT are risk factors for cataract. Besides, increased lens average density is associated with older age, longer AL, shallower ACD, thicker LT, and larger WTW.

Abstract No.: 204675**From Spectacle Discomfort to 6/6 Day 1 Postoperative: Eyehance Toric II DIU225 +22.0 D With Incision-Axis Optimization***First Author: Muhammad Zidny FAHMI*

Purpose: While toric intraocular lens (IOL) calculators are widely validated, most studies emphasize lens power accuracy rather than the impact of incision-axis choice and surgically induced astigmatism (SIA)

assumptions. Reports directly comparing Barrett Toric TK with the Kane formula in real-world incision planning remain limited. This case highlights how optimizing the incision axis based on different SIA settings can eliminate residual astigmatism and restore 6/6 vision in early nuclear cataract.

Methods: A 69-year-old male presented with persistent spectacle discomfort despite multiple refractions. Pre-operative UCVA was 0.10 OU. Slit-lamp revealed a nuclear cataract graded NO3–NC3 (LOCS III). Biometry (OD, IOLMaster 700) showed AL 23.69 mm, ACD 3.16 mm, LT 5.0 mm, and TK astigmatism -1.87 D @ 83° . Barrett Toric TK (SIA 0.30 D @ 135°) suggested Eyehance Toric II DIU225 +22.0 D (2.25 D cyl) with predicted residual -0.39 D @ 87° . Kane formula with optimized SIA 0.20 D predicted residual 0.10 D if incision placed at 100° , but ≈ 0.00 D if revised to 180° . Based on this convergence, the incision was placed at 180° and the IOL implanted at 175° .

Results: On postoperative day 1, UCVA improved from 0.10 to 1.0 (6/6). The patient reported stable, comfortable vision and resolution of spectacle-related complaints.

Conclusions: This case illustrates that even in “immature” nuclear cataracts, optimizing incision axis with dual-formula guidance (Barrett Toric TK vs Kane with optimized SIA) can virtually eliminate residual astigmatism, highlighting a critical yet under-reported factor in toric IOL surgery.

Abstract No.: 202071**GJB2 Deficiency Causes Congenital Cataract via Impaired Gap Junctions and Caspase-Mediated Lens Cell Apoptosis***First Author: Ailifeire HAILAITI*

Purpose: To identify GJB2 as a novel congenital cataract (CC) pathogenic gene, clarify its mechanism in lens opacification, and validate its role via in vitro/in vivo models, aiding therapeutic target exploration for connexin-related CC.

Methods: Clinical/genetic analysis: WES/Sanger sequencing of a 3.5-year-old CC proband's family; CLUSTALX for Cx26 amino acid conservation. In vivo: CRISPR/Cas9-generated *gjb2*^{-/-} zebrafish; stereomicroscopy (lens opacity) and TEM (mitochondria/apoptosis). In vitro: siRNA-mediated GJB2 knockdown in HLECs; assays for gap junction (Lucifer yellow), calcium (Fluo-4/Rhod-2 AM), mitochondria (JC-1/DCFH-DA), apoptosis (Western blot/flow cytometry); RNA-seq/LC-MS/MS.

Results: Proband had homozygous GJB2 c.235del (Leu79 conserved). GJB2 knockdown impaired HLEC gap junctions ($p < 0.001$), caused calcium overload ($p < 0.01$), mitochondrial dysfunction ($\Delta\Psi_m \downarrow$, ROS $\uparrow$, $p < 0.01$), and apoptosis (caspase-3 $\uparrow$, Bax/Bcl-2 $\uparrow$, $p < 0.01$). 649 DEGs enriched in gap junction/mitochondrial/apoptotic

pathways. 86.2% *gjb2*^{-/-} zebrafish had lens opacity (TEM: mitochondrial swelling, apoptotic bodies ↑, $p < 0.001$).

Conclusions: *GJB2* is a novel CC gene; its deficiency disrupts gap junctions/calcium homeostasis, induces mitochondrial apoptosis, and causes lens opacity, highlighting calcium-mitochondrial axis as a therapeutic target.

Abstract No.: 200212

Genotype-Phenotype Correlations of Ocular Posterior Segment Abnormalities in Marfan Syndrome

First Author: Yan **LIU**

Co-Author(s): Tianhui **CHEN**, Yongxiang **JIANG**

Purpose: Marfan syndrome (MFS) is a connective tissue disorder caused by mutations in the *FBN1* gene. This study aims to investigate the correlations between *FBN1* genotype and posterior segment abnormalities within a Chinese cohort of MFS.

Methods: Retrospective study. 121 eyes of 121 patients with confirmed *FBN1* mutations between January 2015 and May 2023 were initially recruited. A comprehensive ophthalmological examination was performed, and the incidence of retinal detachment (RD), atrophic / tractional / neovascular maculopathy (ATN classification) and posterior staphyloma (PS) were analyzed between different genotype groups.

Results: A total of 60 eyes (49.59%) exhibited posterior segment abnormalities, including RD (4, 3.31%), maculopathy (47, 38.84%), and PS (54, 44.63%). The mean age was 11.53 ± 11.66 years, with 79.34% of patients below 20 years old. The location and region of mutations were found to be associated with the incidence of maculopathy ($P=0.013$, $P=0.033$) and PS ($P=0.043$, $P=0.036$). Mutations in the middle region had a lower incidence of maculopathy and PS ($P=0.028$ and $P=0.006$). Mutations in the TGF- β regulating sequence exhibited a higher incidence of maculopathy and PS ($P=0.020$, $P=0.040$). Importantly, the location and region of mutations were also associated with the incidence of atrophic maculopathy ($P=0.013$ and $P=0.033$). Mutations in the middle region had a significantly lower probability of atrophic maculopathy ($P=0.006$), while mutations in the TGF- β regulating sequence had a higher incidence of atrophic maculopathy ($P=0.020$).

Conclusions: Maculopathy and PS were associated with the location and region of *FBN1* mutations. Patients with mutations in the TGF- β regulating sequence faced an increased risk of developing retinopathy.

Abstract No.: 206358

Hard Cataract in Iris Coloboma: Surgical Approach and Visual Outcomes

First Author: Ainun **NADZIROH**

Co-Author(s): Nina **HANDAYANI**

Purpose: Iris coloboma is a congenital ocular anomaly caused by incomplete closure of the embryonic optic fissure, typically appearing as a keyhole-shaped defect may present with significant complications including cataracts and increased risk of retinal detachment, particularly when involving posterior segment structures. This report aims to present the surgical outcome of hard cataract with iris coloboma and to underline the importance of evaluating possible posterior abnormalities.

Methods: A 58-year-old male with bilateral iris coloboma and mature cataract, presenting with progressive vision loss and photophobia. Preoperative evaluation revealed dense nuclear with normal corneal diameter. The posterior segment could not be adequately evaluated; however, the B-Scan Ultrasound examination was within normal limits.

Results: The patient underwent cataract extraction and IOL implantation in the right eye, whereas the iris coloboma was left uncorrected. Despite intraoperative challenges, including a hard nucleus and miosis, the operation was successfully completed. Postoperative visual acuity improved from hand motion to 0.30 LogMAR, with no significant complications; however, a choroidal coloboma was identified.

Conclusions: Proper surgical technique and anticipation of intraoperative challenges are critical for successful cataract surgery in eyes with iris coloboma. Although the iris and choroidal coloboma was not surgically addressed in this case, the functional outcome was satisfactory. Further therapeutic consideration is warranted for the choroidal coloboma in order to prevent potential complications, particularly retinal detachment.

Abstract No.: 203647

ICO-OSCAR-Based Evaluation of Phacoemulsification Performed by Ophthalmology Residents at Hasanuddin University

First Author: Dian Perwitasari **SUMARWOTO**

Co-Author(s): Ahmad Ashraf **AMALIUS**, Muhammad Abrar **ISMAIL**, Muhammad Irfan **KAMARUDDIN**

Purpose: To evaluate the characteristics of phacoemulsification surgeries performed by ophthalmology residents at Hasanuddin University using the ICO-OSCAR assessment tool, as part of efforts to enhance surgical training quality.

Methods: A descriptive study was conducted on 19 phacoemulsification surgery videos performed by

residents. Each video was assessed by Cataract and Refractive Surgery Consultant in Ophthalmology Department of Hasanuddin University, Makassar-Indonesia, using ICO-OSCAR assessment tool.

Results: Nineteen videotaped surgeries were analyzed. Most procedures were performed by third-year residents, predominantly in the seventh semester. The average ICO-OSCAR score was 4.4, and the average of total surgery was 72 surgeries. The greatest challenges were observed during the cracking procedure, as well as nucleus rotation and manipulation. The most frequently reported postoperative complication was corneal edema, this associated with inadequate intraoperative control of intraocular instrument, prolonged surgical time, and excessive intraocular maneuvers.

Conclusions: Phacoemulsification surgeries performed by ophthalmology residents at Hasanuddin University demonstrated overall competency but revealed specific challenges in nucleus management. Targeted training focusing on cracking and nucleus manipulation techniques is recommended to improve surgical outcomes and reduce postoperative complications.

Abstract No.: 205549

IOL Power Calculation Using Different Formulas

First Author: Leyla BILANDARLI

Co-Author(s): Gulmin AHMADOVA, Beyim BABAYEVA

Purpose: Comparative analysis of calculating IOL power using 6 formulas.

Methods: In this study we calculated the optical power of the Technis ZCB00 (Johnson&Johnson) in 107 patients (145 eyes) using 6 formulas: Hoffer Q, Holladay, Barrett, Hill-RBF, Kane, Pearl-DGS. Calculations were performed on IOL Master 500 (Carl Zeiss Meditec, AG) and using ESCRS online calculator (<https://iolcalculator.es CRS.org>). All eyes were divided in 4 groups in accordance with the eye's axial length (AL): up to 22.00mm (29 eyes), 22.00-24.00mm (42 eyes), 24.00-26.00mm (46 eyes), and more than 26.00mm (28 eyes).

Results: Calculation of IOLs in the 2 middle groups revealed almost identical results for all formulas. The spread of results was 0.2D for group 2 (IOL power: 22.2-22.4D) and 0.3D for group 3 (17.1-17.4D). For short eyes obtained spread was higher – 0.5D (26.4-26.9D). In long eyes group we observed the highest spread -1.7D (8.6-10.3D).

Conclusions: According to results of our research, IOL power calculation in eyes with AL from 22.00 to 26.00mm does not cause controversy and gives consistently good postoperative refractive results. A seemingly small difference of 0.5D in short eyes with AL up to 22.00mm and fairly large spread of 1.7D in long eyes with AL more than 26.00mm can cause a serious

errors in postsurgical period. These errors become especially critical when implanting multifocal lenses with averagely designed near and middle focuses.

Abstract No.: 201662

Incorporating Simulation and Framework-Based Teaching to Improve Surgical Skills and Learner Engagement in Ophthalmology Training: A Case Study

First Author: Channdarith KITH

Co-Author(s): Sreyla CHORK, Kossama CHUKMOL, Sokunsowattra KAK

Purpose: To assess the effectiveness of integrated teaching methodologies, such as simulated learning, active feedback, and outcome-based education, in improving ophthalmology residents' engagement, confidence, and skill acquisition, particularly for cataract surgery.

Methods: A two-month wet lab training program was created to focus on manual small incision cataract surgery (MSICS). Several teaching methods were applied in clinical and classroom settings. These featured structured feedback, well-known learning resource frameworks, active peer engagement, and real-life and simulated case scenarios. Residents were separated into four groups (3 to 4 residents each) and given weekly two-hour hands-on training sessions. Prior to each session, there were tests on surgical procedures and instrument knowledge. Throughout, formative feedback was given, and the results were evaluated using a summative post-test.

Results: Residents showed increased confidence and retention after structured simulation and mentorship. More than 60% of participants voluntarily completed the training, which resulted in significant improvements in suturing and microscope handling. Active learning strategies, such as immediate feedback and peer interaction, have proven effective in increasing learner motivation and developing clinical competence.

Conclusions: In ophthalmology training, simulation-based, feedback-rich, and outcome-focused teaching methods greatly enhance student performance and motivation. These approaches are flexible and scalable, resulting in a more confident, disciplined, and patient-centred learning environment.

Abstract No.: 200348

Inflammatory Cytokine Profiles in Diabetic vs. Senile Cataract: Analysis of Aqueous Humor and Lens Epithelium

First Author: Cindy HARTONO

Co-Author(s): Muhammad Abrar ISMAIL, Habibah S. MUHIDDIN, Hamzah

Purpose: This study aims to compare the expression and levels of inflammatory mediators, interleukin-6

(IL-6) and tumor necrosis factor-alpha (TNF- α), in lens epithelial cells and aqueous humor between diabetic and non-diabetic cataract patients.

Methods: A cross-sectional study was conducted involving 66 cataract patients, comprising 33 with type 2 diabetes mellitus (DM) and 33 non-diabetic controls. IL-6 and TNF- α levels were quantified in aqueous humor using ELISA, and immunohistochemistry was used to assess their expression in the anterior lens capsule.

Results: IL-6 expression was markedly higher in the diabetic group, with 51.5% of samples showing strong immunoreactivity (IHC score 3), compared to only 9.1% in the non-diabetic group. In contrast, TNF- α expression was low in both groups, with most samples scoring 0. Aqueous IL-6 levels were elevated in diabetic patients (17.83 ± 13.66 pg/mL) versus non-diabetics (9.40 ± 3.83 pg/mL), while TNF- α levels were comparable (15.47 ± 1.58 vs. 16.91 ± 3.71 pg/mL, respectively). Additionally, hyperplastic lens epithelial cells were frequently observed in diabetic samples.

Conclusions: Diabetic cataract patients exhibit a distinct inflammatory profile, particularly with elevated IL-6 expression and levels, suggesting a local proinflammatory state within the anterior segment. These findings underscore the importance of addressing inflammation in the management of cataracts in diabetic individuals.

Abstract No.: 200481

Is SIA = 0 a Reliable Assumption in Toric IOL Planning? A Vector Analysis Using a Custom Calculator

First Author: Zain KHATIB

Purpose: To evaluate whether assuming a Surgically Induced Astigmatism (SIA) of 0 D provides acceptable accuracy in toric intraocular lens (IOL) planning, using a custom-built vector analysis calculator. The study also aims to explore whether such an approach offers ergonomic and surgical workflow benefits by allowing incisions at the surgeon's preferred location.

Methods: This retrospective observational study included 80 eyes that underwent phacoemulsification with toric IOL implantation. Postoperative SIA was calculated using corneal topography. For each case, a custom SIA error calculator was used to simulate and compare the vector error when SIA was assumed to be 0.0, 0.1, 0.2, 0.3, 0.4, or 0.5 D. The actual SIA (magnitude and axis) was derived from postoperative topographic changes, and the vector error for each assumed SIA was calculated against this ground truth. Outcomes were analyzed in terms of mean error, standard deviation, and frequency of least and most error values across the range of SIA assumptions.

Results: Assuming SIA = 0 D yielded the lowest mean error (0.39 ± 0.23 D), followed by 0.1 D and 0.2 D. In

41.3% of cases, the least vector error occurred with SIA = 0 D, while in only 11.3% of cases was it the worst assumption. Error magnitude increased progressively with higher assumed SIA values.

Conclusions: Assuming SIA = 0 D is acceptable in a significant proportion of cases and allows for greater surgical flexibility. It facilitates incision placement at the surgeon's preferred axis, potentially reducing surgery time and simplifying preoperative planning without compromising refractive accuracy.

Abstract No.: 203240

Lens Parameters and Myopic Shift in Nuclear Cataract After Vitrectomy

First Author: Haowen LIN

Purpose: To evaluate the relationship between lens parameters and spherical equivalent refraction in the development of nuclear cataract following pars plana vitrectomy (PPV).

Methods: This prospective cohort study included patients who were scheduled for unilateral PPV surgery. All patients underwent subjective refraction, ocular biometry, and swept-source anterior segment optical coherence tomography (SS-ASOCT) before and after PPV. Lens power and equivalent refractive index were calculated based on the Bennett and Lensmaker formula, and lens nuclear density was quantified based on SS-ASOCT images.

Results: A total of 110 patients who developed nuclear cataract after PPV were included in the analysis, with a mean follow up of 10.38 ± 3.12 months. The operated eyes showed a myopia refractive shift (-2.81 ± 2.36 D), along with an increase in lens power, lens refractive index, and lens thickness, as well as a protruding of the radius of posterior lens surface. Multivariate linear regression analysis showed that the lens power was the main factor contributing to the myopic refractive shift (R-squared: 0.80, $P < 0.001$). Additionally, the refractive index of the lens was found to be the primary determinant of changes in the refractive power of lens (R-squared: 0.98, $P < 0.001$). Lens density showed a linear correlation with both the refractive index and lens power (correlation coefficient: 0.48 and 0.50, respectively).

Conclusions: Changes in lens refractive index are the main cause of lenticular myopia induced by nuclear cataract after PPV. Lens density can be used to assess the change of lens refractive index and lens power in vivo.

Abstract No.: 207049**Long-Term Complications of Phakic Intraocular Lens Implantation for Myopia***First Author: Wen-yu HSU**Co-Author(s): Ya Hui WANG, Chien-liang WU*

Purpose: To report the long-term complications in patients who underwent phakic intraocular lens (pIOLs) implantation for myopia.

Methods: Twenty-eight eyes of 14 patients underwent implantation of phakic intraocular lenses (pIOLs) for the correction of myopia between January 2014 and December 2024 in Taipei Municipal Wanfang Hospital. All pIOLs were done by one surgeon. Eight eyes of four patients were lost to follow-up.

Results: The mean age of the patients was 38.9 ± 10.89 years (range, 23–53 years), and the mean follow-up duration since pIOL implantation for myopia was 4.9 ± 2.84 years (range, 2–10 years). Phakic IOL explantation was performed with phacoemulsification and posterior-chamber intraocular lens in 2 eyes due to cataract formation and in 4 eyes due to decreased endothelial cell counts (<1500 cells/mm). Dislocation of phakic IOLs occurred in 2 eyes of 2 patients, both of which underwent immediate reposition surgery. No eye required corneal transplantation due to corneal decompensation.

Conclusions: A careful follow-up is required for possible complications after pIOL implantation.

Abstract No.: 206859**Long-Term Visual Performance of the Increased Range of Focus RayOne EMV® Premium IOL Under Mesopic Conditions in Filipino Eyes***First Author: Maureen Anne REYES**Co-Author(s): Victor Jose CAPARAS, Isabel Mara CAPARROS, Ma. Isabela DE GUIA-MAYUGA*

Purpose: To evaluate the visual outcome under mesopic conditions after bilateral implantation of the increased range of focus RayOne EMV® intraocular lens (IOL) (Rayner, Worthing, UK).

Methods: Six patients (12 eyes) who underwent phacoemulsification for cataract were implanted with RayOne EMV® on both eyes, targeting emmetropia post-operatively. At 12–18 months post-surgery, monocular/binocular uncorrected and distance-corrected visual acuity (UDVA/CDVA) was tested for distance at 4m under mesopic conditions (3 cd/m²). Additionally, the defocus curve, contrast sensitivity (CS), and photic phenomena (Halo and Glare Simulator, ViSU-L GmbH, Germany) were evaluated.

Results: Mean spherical refraction ($\pm$ SD) was $-0.50 (\pm 0.58)$ diopters (D) during the post-surgery follow-up. Mean ($\pm$ SD) binocular UDVA at follow-up was 0.00 (± 0.15) logMAR, while mean ($\pm$ SD) binocular CDVA was

0.10 (± 0.17) logMAR. Binocular defocus curve showed a mean CDVA of at least 0.30 logMAR from +1.0 up to -1.5 D. Mean binocular halo size and intensity were low at 25/100 and 36/100; mean binocular glare size and intensity were also low at 30/100 at 29/100. Far (1m) mean binocular CS ($\pm$ SD) was 0.95 (± 0.25) logCS.

Conclusions: Bilateral implantation of the RayOne EMV® offers an extended range of clear distance vision under mesopic conditions. Although a slight reduction in mesopic contrast sensitivity may occur—often attributable to factors such as posterior capsular opacification or ocular surface disease—the lens remains a strong option for patients requiring reliable visual acuity in low-light settings.

Abstract No.: 206368**Management of Cataract With Persistent Pupillary Membrane***First Author: Fajri IRIAN**Co-Author(s): Laksono BAGUS SASMITO*

Purpose: To report a case of coexisting cataract and persistent pupillary membranes (PPMs) in an adult patient, and to elucidate the surgical approach and visual outcomes following PPM excision combined with phacoemulsification.

Methods: This case report describes a 46-year-old male presenting with longstanding blurred vision and the presence of a thread-like structure in the right eye since birth. Slit-lamp biomicroscopy revealed bilateral PPMs adherent to the anterior surface of immature cataractous lenses. Preoperative best-corrected visual acuity (BCVA) was 20/200 in the right eye and 20/50 in the left eye, with no improvement upon pinhole testing. The patient underwent surgical excision of PPMs at the iris base, followed by phacoemulsification cataract extraction and intraocular lens (IOL) implantation in the right eye.

Results: At one week postoperative follow-up, the BCVA of the right eye improved markedly from 20/200 to 20/20. No intraoperative or postoperative complications, including amblyopia, were noted. The left eye was monitored without surgical intervention due to similar but less severe pathology.

Conclusions: Persistent pupillary membranes are generally benign embryonic remnants; however, when extensive or concomitant with cataracts, they may impede visual function. Surgical excision of PPMs in conjunction with cataract extraction via phacoemulsification can yield excellent visual outcomes. Thorough preoperative evaluation and meticulous surgical planning are imperative for optimal patient results.

Abstract No.: 205948

Management of Traumatic Cataract With Vertical Corneal Scar in Visual Axis

First Author: Indri **WAHYUNI**

Co-Author(s): Dicky **HERMAWAN**, Rozalina **LOEBIS**, Ifan **ROMADON LUKMANA**

Purpose: Traumatic cataracts account for 29% of all childhood cataracts. Managing traumatic cataracts in children is a daunting task requiring highest levels of clinical skills, each cases different and had difficulty. The aim is to report management of traumatic cataract with vertical corneal scar in visual axis.

Methods: A 7-year-old boy had a history in which his right eye was affected by a wire clothes hanger one year ago, and stitches were performed at 12 o'clock until 6 o'clock vertically. After the stitches were removed, the vertical corneal scar and traumatic cataract formation made visual acuity become hand movement, irregularly, and posterior synechiae pupil. The operation area visualization is divided vertically into two areas by the corneal scar. Cataract extraction, pupilloplasty and IOL implantation performed.

Results: One month after cataract extraction, the best corrected visual acuity became 6/6, Hirschberg 15 degrees, and the patient was diagnosed with sensory deprivation esotropia.

Conclusions: Cataract extraction with central corneal scar complications requires planning regarding visualization during surgery and because the scar area is central, it can be estimated that changes in the position of the eyeball will occur post-operatively. Traumatic cataract in childhood even though accounted for less than other causes. Majority of the eyes had successful IOL implantation during surgery with different challenge and give visual acuity improvement. Long-term eye and vision monitoring are needed for glaucoma, strabismus, and capsular opacification.

Abstract No.: 203202

Measured Corneal Astigmatism vs. Predicted Refractive Astigmatism in Determining Astigmatism Correction in Cataract Patients With Low Astigmatism

First Author: Xiaohang **XIE**

Co-Author(s): Haowen **LIN**

Purpose: To compare the performance of measured corneal astigmatism and predicted refractive astigmatism in guiding astigmatism correction for cataract patients with astigmatism < 0.75 D.

Methods: Patients with preoperative simulated keratometric (SimK) astigmatism < 0.75 D were included. All participants underwent phacoemulsification and monofocal intraocular lens (IOL) implantation. Preoperative SimK astigmatism, total keratometric (TK) astigmatism, predicted

refractive astigmatism (PRA) calculated by Barrett Toric with predicted posterior corneal astigmatism (PCA) and measured PCA were evaluated with a 0.75D indication for astigmatism correction. Receiver Operating Characteristic (ROC) curves were further constructed to determine whether a suitable indication was better than 0.75D. Sensitivity analysis was also conducted with 0.50 D as a threshold value.

Results: In total, 723 patients (723 eyes) were included with a mean age of 63.34±10.26 years. Of these, 275 eyes (38.04%) had postoperative refractive astigmatism ≥ 0.75 D and 504 eyes (69.71%) had residual astigmatism ≥ 0.50 D when SimK was applied in preoperative evaluation. Using PRA yielded significantly lower mean centroid and mean absolute prediction errors than SimK or TK astigmatism (P < 0.05). Two modes of the Barrett toric calculator showed comparable performance for predicting the risk of residual astigmatism ≥ 0.75 D (the area under the ROC curve: 0.76-0.77, threshold value: 0.615-0.645).

Conclusions: In patients with low corneal astigmatism, PRA showed higher accuracy and better decision-making performance than SimK or TK astigmatism. We recommend using the PRA as preoperative reference guide to assess the need for correction in these patients.

Abstract No.: 203106

Miscalculated IOL in Bilateral Nystagmus: How to Deal With It?

First Author: Andita **CAESARY**

Purpose: To evaluate the factors that can influence the accuracy of biometry analysis in bilateral nystagmus.

Methods: Diagnosis is based on history taking, ophthalmology examination, and biometry analysis.

Results: A patient with bilateral nystagmus and cataract was scheduled for cataract surgery and achieved visual acuity after cataract surgery with a correction of 10 D, reaching 0.7, which made the patient uncomfortable. In the pre- and post-operative biometry results, there was a significant difference in the axial length. This is suspected due to the bilateral nystagmus condition, where the patient could not fixate during the pre-operative biometry examination, resulting in a refractive surprise. Therefore, an IOL exchange is planned for this patient.

Conclusions: This case report discusses how to minimize the occurrence of refractive surprise after cataract surgery in patients with bilateral nystagmus by systematically and thoroughly identifying pre-operative biometry to obtain the appropriate IOL power calculation.

Abstract No.: 203500**Multifactorial Judgment for Fall Screening Among Older Cataract Adults in Day Surgery Setting***First Author: Yaping WANG**Co-Author(s): Can DAI, Ping OUYANG*

Purpose: To evaluate the feasibility of a multifactorial judgment for fall screening among older cataracts adults in day surgery setting.

Methods: A historically controlled study was conducted for older cataract adults (≥ 60 years old) who underwent day surgery at a municipal ophthalmic hospital from July 2020 to June 2022. The patients for whom the Morse Fall Scale was used for fall screening from July 2020 to June 2021 were taken as the MFS group ($n=2235$), and patients for whom the multifactorial judgment was used for fall screening from July 2021 to June 2022 were taken as the MJ group ($n=963$). Multifactorial judgment was a method that directly determined the fall-risk level with different weights of common fall risk factors without scores. Propensity score matching was performed to balance baselines.

Results: After matching, 935 patients were selected from the MFS group and the MJ group, respectively. No serious fall-related injuries were reported. The MJ group showed a significantly shorter and more stable fall screening time (14 [5-179] s vs. 27 [12-272] s, $P<0.001$), significantly higher patient satisfaction (98.17 ± 1.62 vs. 96.77 ± 0.35 , $P<0.001$), significantly higher sensitivity of high-risk screening in visual impairment (90.68% vs. 26.71%, $P<0.001$) and a non-significantly lower fall rate ($P=0.625$). The monthly change of median screening time in the MFS group was more stable after 3 months.

Conclusions: The multifactorial judgment may be feasible for rapid fall screening among older cataract adults and has wider benefits beyond screening scores in day surgery settings.

Abstract No.: 204759**Nd:YAG Laser Anterior Capsulotomy for Management of Anterior Capsule Fibrosis: Clinical Case Review***First Author: Olesia ZIATDINOVA**Co-Author(s): Chun Chun HE, Lina ZHOU*

Purpose: To evaluate the efficacy and safety of Nd:YAG laser anterior capsulotomy for the management of anterior capsule fibrosis.

Methods: A retrospective review of 10 eyes implanted with monofocal or trifocal intraocular lenses that developed significant anterior capsule contraction 3–6 months after uncomplicated phacoemulsification. All patients underwent Nd:YAG laser anterior capsulotomy under pharmacologic mydriasis, using pulse energy

between 1.3–1.5 mJ. Two patients required a second capsulotomy session 1 month later previous shot to further enlarge the capsular opening.

Results: At one-year follow-up, all patients demonstrated stable visual outcomes without recurrence of capsular fibrosis. Both uncorrected (UCVA) and best-corrected visual acuity (BCVA) improved by 1–2 lines at one month post-procedure. No intraoperative or postoperative complications were observed.

Conclusions: Nd:YAG anterior capsulotomy is an effective, safe, and minimally invasive option for managing anterior capsule fibrosis, providing sustained visual improvement and preventing further contracture progression.

Abstract No.: 210126**New Surgical Approach for Posteriorly Dislocated Lens Simultaneously Using Phacoemulsification and Vitrectomy***First Author: Dalan JING**Co-Author(s): Han ZHANG*

Purpose: To report the clinical outcomes of a new method for quickly and effectively removing posteriorly dislocated lens.

Methods: This is a retrospective, noncomparative, and interventional case series that reveals the results of removing dislocated lens on the surface of the retina using a new method which achieved through the simultaneous use of phacoemulsification and vitrectomy. All patients underwent the abovementioned surgery and were followed up for at least 3 month.

Results: Four eyes of 4 patients with a median age of 63.5 years. There were two males and two females. The best-corrected visual acuity three month after surgery of patients were 20/20. All dislocated lens were removed through the incision for cataract surgery, and a sutureless-intrascleral fixation of IOL was underwent in each patient without major complications. However, longer-term data are needed to evaluate the macular edema condition.

Conclusions: This method is a safe and effective technique for surgical removal of an posteriorly dislocated lens in present series cases.

Abstract No.: 203595**Not Hyphaema, Not Vitreous Haemorrhage: The Hidden Endocapsular Haematoma***First Author: Shew Fei CHEE*

Purpose: To report a case of spontaneous endocapsular haematoma, highlighting its rarity, diagnostic challenge, and management.

Methods: Case report.

Results: An 86-year-old woman, with no systemic illness and not on anticoagulants, presented with sudden painless blurring of vision in the left eye (OS) for 3 days. She had undergone bilateral cataract surgery more than 20 years ago. A history of a fall 4 months earlier was noted, without ocular trauma. Visual acuity was 6/24 in the right eye (OD) and hand movement in OS. Examination of OS revealed microhyphaema in the anterior chamber. Gonioscopy showed bleeding at the inferior angle, without neovascularisation or angle recession. Fundus view was initially obscured, and B-scan demonstrated vitreous opacity suggestive of vitreous haemorrhage. The provisional diagnosis was vitreous haemorrhage with microhyphaema. On follow-up, a distinct blood level posterior to the intraocular lens was observed, with a clear fundus view, leading to a revised diagnosis of endocapsular haematoma. Conservative management was initially chosen, but no spontaneous absorption occurred after one month. Nd:YAG capsulotomy was not feasible due to clotting. The patient subsequently underwent surgical evacuation of the endocapsular haematoma.

Conclusions: Endocapsular haematoma is a rare entity that can mimic hyphaema or vitreous haemorrhage. Serial examinations are essential for accurate diagnosis. Surgical evacuation may be required when spontaneous resolution does not occur and laser intervention is not possible.

Abstract No.: 206253

Novel CMT-Flex Scleral Fixated Intraocular Lens Use and Guide in the Philippines

First Author: Jose Timothy Martin Lim CHUA
Co-Author(s): Jill Cristine Galvez GENUINO

Purpose: The novel CM-T flex IOL, launched in late 2024, is a type of scleral-fixated lens, designed to treat aphakia, a condition where the eye lacks a lens. It is a foldable, hydrophilic lens with specialized T-shaped haptics. The lens's unique design is meant to simplify the surgical procedure for scleral fixation. This study aims to showcase a step-by-step guide in placing and securing the CM-T Flex for aspiring surgeons. The initial surgical results and outcomes will then be presented to solidify this technique as part of an ophthalmologist's surgical armament.

Methods: CM-T Flex is an SFIOL manufactured by Appasamy Associates from India. It is made up of hydrophilic material with a water content of 26% and a refractive index of 1.460. The overall diameter is 13.75 mm, with an optic diameter of 6.00 mm. The angulation of the IOL is 10°. The initial steps for CM-T Flex Intraocular Lens placement are explained with detailed photos.

Results: The initial results of six surgical aphakia patients who underwent secondary intraocular lens implantation using scleral fixated intraocular lens CM-T flex proved to be promising. All patients had

improvement from pre-operation vision. There was a minimum two-fold improvement in vision which gradually improved with the ensuing follow-up. Immediate intraocular pressures were elevated above twenty percent on average.

Conclusions: This local Philippine study supports the positive claims in 2021 and 2025 that indicated that the CM-T Flex IOL from Appasamy Associates is a safe and effective option for managing aphakia. This is a useful armament for eye surgeons.

Abstract No.: 202134

Objective and Subjective Refractions in Eyes With Continuous Range of Vision Intraocular Lenses

First Author: Hiroko BISSEN-MIJAJIMA
Co-Author(s): Rina FUJISAKI, Keiichiro MINAMI, Yuka OTA

Purpose: To retrospectively assess the differences between objective and subjective refractions following implantation of a continuous range of vision intraocular lens (IOL).

Methods: This study included 50 eyes of 25 patients who underwent bilateral cataract surgery with implantation of a continuous range of vision IOL, TECNIS Odyssey™ (DRN00V/DRT150-375; Johnson & Johnson). At 1 month postoperatively, objective refraction (sphere, cylinder, spherical equivalent [SE]) was measured with an autorefractometer (TONOREF III, Nidek). Subjective refraction was determined as the sphere, cylinder, and SE values yielding the best-corrected distance visual acuity. The mean differences and correlations between objective and subjective refractions were evaluated. In addition, subjective SE was analyzed in eyes achieving uncorrected visual acuity (UCVA) $\geq 20/20$.

Results: Mean objective refraction (D) was sphere -0.96 ± 0.43 , cylinder 0.69 ± 0.34 , and SE -1.30 ± 0.40 . Mean subjective refraction (D) was sphere 0.12 ± 0.32 , cylinder 0.23 ± 0.39 , and SE -0.01 ± 0.26 . The differences between objective and subjective refractions were statistically significant: sphere -1.08 ± 0.35 , cylinder 0.46 ± 0.27 , and SE -1.31 ± 0.31 (Wilcoxon, $P < 0.001$). Regression analysis revealed significant positive correlations for sphere, cylinder, and SE ($R^2 = 0.34, 0.54, 0.39$; $\beta = 0.77, 0.65, 0.96$), indicating a consistent myopic shift ($P < 0.001$). UCVA $\geq 20/20$ was achieved in eyes with subjective SE values ranging from -0.50 D to $+0.63$ D.

Conclusions: Eyes implanted with a continuous range of vision IOL demonstrated significant differences between objective and subjective refractions, and such differences should be taken into account when assessing postoperative visual acuities.

Abstract No.: 207226**Opacified Intraocular Lens Presenting As Cataract: A Case Report and Surgical Management With Iris-Claw Implant***First Author: Nadya **NAPITUPULU****Co-Author(s): Susanti Natalya **SIRAIT***

Purpose: To describe a case of late-onset intraocular lens (IOL) opacification that closely resembled cataract progression, causing diagnostic confusion, and its successful management with a secondary iris-claw IOL.

Methods: A 79-year-old patient presented with gradually worsening vision in the right eye, with an unclear history of previous ocular surgery. Slit-lamp examination revealed dense, diffuse whitening of the intraocular lens (IOL) optic, resembling posterior capsular opacification (PCO). The fundus could not be visualized, and posterior segment optical coherence tomography (OCT) was inconclusive due to poor media clarity. B-scan ultrasonography was performed to assess the posterior segment. Because of the atypical presentation, Nd:YAG capsulotomy was deferred.

Results: Late-onset IOL opacification was diagnosed. The affected IOL was carefully explanted, and a secondary posterior chamber iris-claw IOL was implanted. The surgery was smooth and uneventful. The iris-claw design was chosen due to favorable ocular anatomy, lower surgical risk, and quicker recovery compared to scleral-fixated options. At one-week follow-up, best-corrected visual acuity improved, with a well-centered lens and clear visual axis. No postoperative complications were noted.

Conclusions: Late IOL opacification can mimic cataract recurrence or PCO, leading to delayed treatment if unrecognized. Careful slit-lamp assessment and anterior segment imaging are key to diagnosis. Secondary iris-claw IOL implantation is a safe and effective solution for visual rehabilitation after IOL explantation in such cases.

Abstract No.: 207313**Pars Plana Toilet Vitrectomy for Shallow Anterior Chamber Phacoemulsification***First Author: Henal **JAVERI****Co-Author(s): Suklengmung **BURAGOHAIN**, Ajay **DUDHANI***

Purpose: Cataract surgery in the presence of a shallow anterior chamber (AC) poses several challenges, including the risk of corneal endothelial damage, difficulty in performing continuous curvilinear capsulorhexis (CCC), and limited maneuvering space for phacoemulsification. We describe a simple and effective solution: the use of pars plana «toilet vitrectomy» to facilitate safe surgery in such situations.

Methods: A pars plana vitrectomy was performed 4 mm posterior to the limbus using a 23-gauge

vitrector in eyes with shallow AC. The procedure allows controlled decompression and deepening of the anterior chamber. Incremental vitrectomy can be repeated as required to achieve adequate space for safe phacoemulsification.

Results: The technique provided consistent deepening of the AC, enabling safer capsulorhexis, lens rotation, and phacoemulsification by reducing the risks associated with shallow AC, such as corneal endothelial damage, capsulorhexis extension, and inadequate maneuvering space. In cases with PAS and vitreous prolapse, safe separation and adequate vitrectomy were achieved under direct visualization. The procedure was reproducible and adaptable with both 23- and 20-gauge vitrectors.

Conclusions: Pars plana «toilet vitrectomy» is a safe, simple, and reproducible method to address shallow anterior chamber in diverse clinical situations. By providing adequate surgical space and reducing intraoperative risks, it facilitates safer cataract and combined anterior segment surgeries.

Abstract No.: 206555**Pilot Evaluation With Vector Analysis of a Toric Refractive Multifocal IOL With Continuous Transitional Focus Technology: Rotational and Refractive Outcomes***First Author: Ronald Steven Li **MEDALLE****Co-Author(s): Jorge **ALIÓ**, Antonio **MARTINEZ ABAD***

Purpose: To evaluate the visual and refractive outcomes, rotational stability, and astigmatic correction using the Alpíns method in eyes implanted with the Precizon Presbyopic Toric 575 intraocular lens (IOL).

Methods: This was a monocentric, prospective, single-arm study involving 22 eyes from 11 patients undergoing bilateral cataract surgery or refractive lens exchange with implantation of the Precizon Presbyopic Toric 575. Preoperative and postoperative assessments included uncorrected and corrected visual acuities (distance, intermediate, near), contrast sensitivity, defocus curve, and vector analysis of astigmatic correction using the Alpíns method. Patient-reported outcomes were evaluated using validated questionnaires.

Results: Significant improvements were observed in monocular UDVA (0.91 ± 0.69 to 0.03 ± 0.08 logMAR), UIVA (0.14 ± 0.09), and UNVA (0.03 ± 0.07), maintained through 6 months. Refractive cylinder significantly reduced from -1.52 ± 0.76 D to -0.24 ± 0.27 D ($p < 0.01$). Vector analysis showed a mean TIA of 1.52 D and a mean SIA of 1.39 D; the correction index was 0.91, and the index of success was 0.15, indicating effective and accurate astigmatism correction. The defocus curve revealed a broad range of functional vision, while contrast sensitivity remained within normal limits. Photoc phenomena were mild and

infrequent; 90% of patients reported high overall satisfaction, with 77% reporting complete spectacle independence.

Conclusions: The Precizon Presbyopic Toric 575 IOL demonstrated excellent rotational stability, effective astigmatic correction, and high levels of visual acuity and patient satisfaction across all distances, making it a viable option for presbyopic patients with preexisting astigmatism.

Abstract No.: 207201

Posterior Polar Cataract in Pregnancy

First Author: Ankit AHIR

Co-Author(s): Madhusmita MAHAPATRA

Purpose: To assess the surgical challenges in operating on a case of posterior polar cataract in the second trimester of pregnancy.

Methods: A 28-year-old female in her second trimester with hyperthyroidism and hypertension presents to OPD with right eye diminution of vision. • A clinical diagnosis of OD posterior polar cataract was made with a normal posterior segment. OS anterior and posterior segment WNL. • Surgical intervention of the right eye as phacoemulsification with FIOIOL under topical anesthesia was planned after obstetrics clearance. • The operation was accomplished by placing the patient in the left down decubitus position along the patient's hips, abdomen, and thighs were rotated to the left while maintaining a normal head position.

Results: Phacoemulsification with topical 2% lidocaine and subconjunctival lidocaine was performed with anaesthetic back up and foldable IOL was implanted under 10 minutes of total surgical time. • She and her fetus tolerated the procedure well, and postoperative moxifloxacin and difluprednate eye drops were used. • The mother gave birth to a healthy baby at 38 weeks of gestation with a birth weight of 2,750 grams and an Apgar score of 10.

Conclusions: • There comes many challenges in surgery in pregnancy like positioning, anesthesia complications, side effects of medication. • But with careful consideration regarding medication and surgery as discussed above, these patients may undergo incisional surgery with good outcomes for the patient with no risk to the fetus.

Abstract No.: 202074

Postoperative Amblyopia in Children With Congenital Cataracts: A Systematic Review and Meta-Analysis

First Author: Ailifeire HAILAITI

Purpose: This systematic review and meta-analysis aimed to estimate the prevalence of amblyopia following congenital cataract surgery in children and evaluate key prognostic factors, including age

at intervention, cataract phenotype, and follow-up duration.

Methods: We systematically searched PubMed, EMBASE, and the Cochrane Library for studies published between January 1, 1981, and March 1, 2023. We included clinical trials, case series, and observational studies to analyze surgical timing, visual outcomes, and complications.

Results: Among 28 studies (2,167 patients, 3,371 eyes), the pooled amblyopia prevalence was 62% (95% CI: 0.55–0.69, I²=91.7%). Early surgery (≤8 weeks for unilateral, ≤12 weeks for bilateral cases) significantly reduced amblyopia risk ($P<0.001$) but increased complications, notably glaucoma (26% vs. 6%, $P=0.001$). In contrast, intraocular lens (IOL) implantation timing had no significant effect on visual outcomes ($P=0.096$). Unilateral partial obstruction conferred a higher amblyopia prevalence than bilateral complete obstruction (68% vs. 36%, $P=0.003$), and prolonged amblyopia therapy beyond 6 years of age showed limited efficacy.

Conclusions: These findings highlight the critical role of timely surgery in optimizing visual recovery, despite its association with complications. Early IOL implantation demonstrated no significant clinical benefits, and the therapeutic window for amblyopia rehabilitation in congenital cataracts is narrower than in other forms.

Abstract No.: 201548

Predictability of the Rayner RayTrace Calculator in Early Outcomes With RayOne Galaxy

First Author: Chan SUET MEI

Purpose: To report the early clinical experience with the Rayner RayTrace online calculator by evaluating its refractive predictability in eyes implanted with the RayOne Galaxy intraocular lens (IOL).

Methods: This observational case series included up to 60 eyes undergoing routine cataract surgery with RayOne Galaxy implantation. All refractive targets were planned using the RayTrace calculator. Postoperative assessments were performed at Day 1 or Week 1, 1 month, and 3 months. The main outcome measures were manifest refraction spherical equivalent (MRSE), residual cylinder, and the proportion of eyes achieving outcomes within ± 0.50 D and ± 1.00 D of the predicted refraction. Additional measures included uncorrected and corrected distance visual acuity, refractive stability across follow-up, patient-reported quality of vision (photopic phenomena and overall satisfaction), and safety parameters such as intraocular pressure and complications.

Results: The majority of eyes achieved postoperative refraction close to the intended target, with most falling within ± 0.50 D. Visual acuity improved consistently across follow-up intervals, and refraction showed early

stability from one month. Patients generally reported good satisfaction and only mild photic disturbances. No relevant safety issues or secondary interventions were recorded.

Conclusions: RayTrace provided reliable refractive predictability, while the RayOne Galaxy demonstrated favorable early outcomes with excellent visual performance, high satisfaction, and a low incidence of photic disturbances. These results support the value of combining RayTrace planning with RayOne Galaxy implantation in routine practice.

Abstract No.: 204635

Profile of Visual Function After Phacoemulsification at a Secondary Hospital in Gresik Regency, East Java, Indonesia

First Author: Christina **ARITONANG**

Co-Author(s): Sarah **AMRU**

Purpose: To evaluate the visual function outcomes after phacoemulsification conducted through a social service program at a secondary hospital in Gresik Regency, East Java, Indonesia.

Methods: This retrospective observational study included 40 patients who underwent phacoemulsification surgery between April 22 and May 15, 2025. Eligible patients had mature or immature cataracts with preoperative vision ranging from mild impairment to blindness based on WHO criteria. Visual function assessments included visual acuity (Huvitz Digital Chart), contrast sensitivity (Pelli-Robson chart). Postoperative evaluations were conducted on day 1 and day 14. Data were retrieved from medical records and analyzed with Wilcoxon and Friedman tests using SPSS version 27.

Results: Among 40 patients, 37.5% were severely visually impaired and 32.5% were blind preoperatively. Postoperatively, blindness declined to 11.5% on day 1 and 2.5% on day 14, with 45% achieving good vision. Visual acuity and contrast sensitivity significantly improved postoperatively (both $p < 0.001$). Surgical complications included mild iritis, descemet's membrane detachment, elevated intraocular pressure, and one patient did not receive an implant due to a posterior capsular rupture during the surgery.

Conclusions: Visual function significantly improved after phacoemulsification through this social service program at day 1 and day 14 postoperatively. The program demonstrated its effectiveness in increasing accessibility and reducing the burden of visual impairment. However, challenges such as limited follow-up and constrained resources highlight the need for ongoing support and infrastructure development.

Abstract No.: 206237

Reduction of IFIS and Related Complications in Cataract Surgery Following Temporary Discontinuation of Alpha-Blockers in BPH Patients: Analysis of 160 Cases

First Author: Amod **NAYAK**

Purpose: Intraoperative Floppy Iris Syndrome (IFIS) is a well-recognized complication of cataract surgery, commonly associated with alpha-1 adrenergic antagonists prescribed for benign prostatic hyperplasia (BPH). IFIS can lead to increased intraoperative complications and surgical difficulty. This study evaluates the impact of withholding alpha-blockers for 10 days preoperatively on the incidence and severity of IFIS and related complications.

Methods: A prospective analysis of 160 eyes in BPH patients on alpha-1 blockers (tamsulosin, alfuzosin, etc.) undergoing phacoemulsification was performed. Patients were advised to discontinue alpha-blocker therapy 10 days prior to surgery after clearance from their urologist. Incidence of IFIS, surgical modifications required, intraoperative complications (posterior capsular rent, iris trauma, dropped nucleus), and postoperative outcomes were compared with historical controls from the same surgical unit.

Results: Temporary discontinuation of alpha-blockers resulted in a significant reduction in IFIS incidence (from historical 60 % to 12.5%). Reduced need for surgical adjuncts (iris hooks) (down from 20% to 0.6%). Visco-mydriasis was done in all cases. Lower intraoperative complication rate: posterior capsular rents and iris prolapse/trauma. Postoperative outcomes, including best-corrected visual acuity and corneal clarity, were comparable to non-BPH patients.

Conclusions: Withholding alpha-blockers for 10 days preoperatively significantly reduces the incidence and severity of IFIS and associated complications during cataract surgery, without adversely affecting postoperative outcomes. Close interdisciplinary coordination between ophthalmologists and urologists is recommended to optimize surgical safety in BPH patients undergoing cataract surgery.

Abstract No.: 200805

Refractive Stability and Timing of Spectacle Prescription Following Cataract Surgery in Myopic Eyes

First Author: Rui **FENG**

Purpose: To investigate the postoperative refractive stabilization time and provide evidence for the optimal timing of spectacle prescription in myopic cataract patients.

Methods: A total of 116 consecutive myopic cataract patients were recruited in Zhongshan Ophthalmic Center in this prospective study. Subjective refraction

postoperative in 1 week and 1 month (4-6 weeks) were investigated. Interval for new spectacle acquisition were recorded. Visual Function Index-14 (VF-14) questionnaires were used for vision-related life quality assessment.

Results: Of 116 patients, there was no significant difference in spherical ($P=0.325$), cylindrical ($P=0.648$) and spherical equivalent ($P=0.453$) between postoperative 1 week and 1 month, indicating the patients achieved refractive stability in 1 week. In the subgroups of different age and axial length, there were also no significant differences between 1 week and 1 month. The spherical equivalent refractive shift between 1 week and 1 month were significantly correlated with the postoperative prediction error ($R=0.350$; $P<0.001$). Only 5 (4.3%) of 116 patients obtained new spectacles after bilateral cataract surgery in 1 week. The VF-14 values improved from 85.77 ± 7.24 to 90.45 ± 5.39 after acquiring new spectacles ($P<0.01$).

Conclusions: The stabilization of subjective refraction could be achieved in 1 week in myopic cataract patients. Shortening the interval of new spectacle prescription should be recommended in myopic cataract patients to improve the vision-related life quality.

Abstract No.: 202183

Regional and Demographic Heterogeneity of Risk Factors for Early-Onset Cataract in Western China: A Comparative Retrospective Study Between the Northwest and the Southwest

First Author: Yuecong **REN**

Co-Author(s): Hao **LIANG**, Hong **YAN**

Purpose: To compare the distribution of risk factors for early-onset cataract between Northwest and Southwest China (Shaanxi and Guangxi provinces) and to identify the overall spectrum of risk factors in the general population.

Methods: We analyzed 1,226 patients aged between 18 and 45 who underwent cataract surgery in Shaanxi province from January 2021 to December 2023, and 493 patients in Guangxi province during the same period. Twenty-three risk factors were recorded, and the distribution and comorbidity patterns of these risk factors in early-onset cataract patients were described and compared between the two centers. Logistic regression was applied to assess the association of risk factors in the overall cohort, with subgroup analyses stratified by sex and unilateral/bilateral surgery.

Results: In the standardized analysis, the leading risk factors were idiopathic cataract, high myopia, trauma, PPV history, refractive error and uveitis. Significant regional differences were observed: In Shaanxi, the top three were idiopathic cataract, high myopia, and

refractive error, while in Guangxi they were trauma, idiopathic cataract, and high myopia. Multivariate logistic regression revealed that idiopathic cataract, trauma, male gender, uveitis, and PPV history were associated with unilateral surgery. Sex-stratified analysis showed that uveitis was more common in females.

Conclusions: In Northwest and Southwest China, early-onset cataract shows distinct regional heterogeneity in risk factors, indicating the need for region-specific prevention. Idiopathic cataract has surpassed high myopia as the leading risk factor, suggesting unexplored etiologies in young patients and an earlier trend in surgical age, which need further investigation.

Abstract No.: 202378

Retained Lens Fragments in the Anterior Chamber After Uneventful Phacoemulsification

First Author: Heni **RIYANTO**

Purpose: To report a case of a patient with retained lens fragments in the anterior chamber after uneventful phacoemulsification.

Methods: A 67-year-old woman had phacoemulsification and posterior chamber intraocular lens (IOL) implantation in her right eye. One day post-surgery, her visual acuity was 6/6, and her intraocular pressure (IOP) was 11.4 mmHg. Five weeks following the surgery, she complained that her visual acuity had decreased, eye redness, and moderate pain in her right eye. On the examination, her visual acuity was 6/18, and her intraocular pressure was 25.3 mmHg. A white-greyish material in the anterior chamber, moderate inflammation, and corneal edema were identified during the slit-lamp examination. A retained lens fragment was discovered in the anterior chamber. The aspiration of the retained lens material was scheduled to address this problem.

Results: One day after surgery, the visual acuity was 6/15 and the intraocular pressure was 9.0 mmHg. The clarity of the cornea improved, and there was a mild reaction in the anterior chamber. At one week following the surgery, her visual acuity had improved to 6/10. Three weeks following surgery, her visual acuity was 6/9, her best corrected visual acuity was 6/6, the cornea was clear, and there was no inflammation.

Conclusions: Retained lens fragments are a rare complication of phacoemulsification. These fragments may be hidden in the posterior chamber behind the iris at the time of the initial surgery. Early finding and proper management might avoid worsening complications such as persistent corneal edema and severe ocular inflammations.

Abstract No.: 205202**Retinal Perfusion During Cataract Surgery With Varying Intraocular Pressure in Comorbid Eyes***First Author: Samaresh SRIVASTAVA**Co-Author(s): Shyamal DWIVEDI, Abhay VASAVADA, Shail VASAVADA, Vaishali VASAVADA*

Purpose: To study the effect of Phacoemulsification using a physiological intraocular pressure(IOP) and high IOP on the retinal and optic nerve head (ONH) perfusion.

Methods: Prospective, randomized, single masked Clinical Trial in 80 eyes (80 patients) with non-proliferative diabetic retinopathy undergoing cataract surgery. Eyes undergoing cataract surgery will be randomized to: group I (low IOP, 20mmHg) or group II (high IOP, 55mmHg). Intraoperatively, cumulative dissipated energy (CDE), fluid used and patient comfort on the visual analog scale. Retinal vessel density, perfusion density at superficial retinal layers at the posterior pole, as well as perfusion and flux index at the RPC layer, were documented by optical coherence tomography angiography (OCTA) at the following time points: within 2 hours of surgery, 1 day and 1 month postoperatively. Anterior chamber inflammation compared on postoperative day 1 and week 1.

Results: Ongoing studies, results to be updated.

Conclusions: Ongoing studies, results to be updated.

Abstract No.: 206717**Rosette Cataract***First Author: Shagun KORLA**Co-Author(s): Aditi BANSAL*

Purpose: Traumatic cataracts occur after penetrating or blunt ocular trauma. The damage to the lens fiber disruption leads to crystallin lens clouding. Cataracts may occur immediately or late after blunt trauma.

Methods: A seventy-one-year-old man with a history of blunt trauma to the right eye seven years back presented with gradual painless diminution of vision. The best corrected visual acuity (BCVA) was counting fingers at 1 meter for the right eye and 20/20 for the left eye. Anterior segment of the right eye showed iridodonesis, phacodonesis with disruption of zonules temporally from 8 o'clock to 10 o'clock with posterior subcapsular rosette-shaped cataracts. Fundus examination and intraocular pressure did not reveal any significant abnormalities in both eyes.

Results: The patient underwent cataract extraction with implantation of an intraocular lens with restoration of vision in the right eye.

Conclusions: Blunt trauma may result in coup, contrecoup injury, or axial expansion of the lens. The coup ocular injury is a result of direct impact,

and results in the formation of a Vossius ring due to compression of the pigmented posterior iris epithelial cells against the anterior lens capsule. The contrecoup injury generates shock waves along the line of impact of trauma, which results in posterior cortical opacification in a rosette or stellate shape. The axial expansion causes anteroposterior expansion and leads to disruption of the lens capsule and/or zonules as seen in our patient.

Abstract No.: 206957**Small Eye, Big Pressure***First Author: Cheun Seng WONG**Co-Author(s): Chai Keong TAN*

Purpose: To report a case of glaucoma secondary to microcornea.

Methods: Case report

Results: A 22-year-old high myope with no systemic illness presented with a 3-week history of headache and was referred for left eye glaucoma. He had no other ocular complaints, no steroid use, and no family history of glaucoma. Visual acuity was 6/19 in both eyes, with hyperopic refraction. IOP was 10 mmHg (right) and 26 mmHg (left). Both corneas were small (10.5 mm), with thick CCTs. Slit-lamp exam showed a deep anterior chamber in the right eye and moderate depth nasally in the left. Gonioscopy revealed open angles in the right eye and closed angles in the left. Fundoscopy showed a crowded disc (CDR 0.2) in the right and glaucomatous cupping (CDR 1.0) in the left. He was started on anti-glaucoma drops and underwent left eye lens aspiration with IOL implantation, but IOP remained high. Gonioscopy post-op showed persistent angle closure. He was planned for left eye glaucoma implant for better IOP control.

Conclusions: In a patient with microphthalmos and microcornea, there is a higher risk of secondary angle-open or angle-closure glaucoma. Early cataract surgery should be offered for optimum IOP control. However, due to the short AL and ACD, a proper planning and IOL selection is important for the outcome. Subsequent follow up with IOP monitoring is required and to proceed with glaucoma surgery if indicated.

Abstract No.: 200767**Structural and Functional Outcomes of Cataract Surgery in Asian Patients With Epiretinal Membrane***First Author: Ning CHEUNG**Co-Author(s): Gavin TAN, Daniel TING, Andrew TSAI, Doric WONG*

Purpose: To examine the structural and functional outcomes of cataract surgery in Asian patients with epiretinal membrane (ERM)

Methods: A prospective study of 50 patients with primary ERM who were recruited consecutively from the Singapore National Eye Centre. All patients had standardised phacoemulsification and intraocular lens implant, comprehensive clinical examinations and investigations, including M-chart testing for metamorphopsia and microperimetry for macular sensitivity. All patients were followed up for at least 1 year.

Results: Of the 50 patients, the mean age was 70.6 years, 55.8% were female, and 88% were Chinese. After cataract surgery alone, good visual acuity outcome was achieved among 61%, 79%, 81% and 91% after 1-month, 3-month, 6-month and 12-month follow-up. Over the follow-up period, central retinal thickness and macular volume increased at 1-month after cataract surgery but reduced back to baseline from 3-month onwards, with 36.6% of the patients who developed cystoid macular edema at 1-month after cataract surgery. There was no significant change in metamorphopsia and macular sensitivity.

Conclusions: Cataract surgery alone may achieve good visual outcome for patients with ERM. Postoperative cystoid macular edema may occur in one-third of the patients, with minimal impact on visual outcomes in the long-term.

Abstract No.: 206266

Surgical Outcomes of Scleral Fixated Intraocular Lens: A Case Series

First Author: Soumya **NAIR**

Co-Author(s): Shailaja S

Purpose: Implantation of a scleral-fixated intraocular lens (SFIOL) for the surgical management of aphakia in the absence of capsular support is a safe procedure with a low risk of complications in the early postoperative period. The purpose of this study is to assess the visual outcome and complication profile of SFIOL implantation using sutures in three patients.

Methods: Three patients who had undergone secondary SFIOL implantation were retrospectively reviewed for visual outcomes and complications. Patients' demographic data, indication for surgery and baseline preoperative visual acuity, postoperative complications and 1month postoperative visual acuity were collected and analysed.

Results: Out of the three, one patient had iatrogenic aphakia with iris tissue loss. The second patient had traumatic near total posteriorly subluxated Intraocular Lens (IOL) with iris prolapse and iridodialysis. The third patient had an Open globe injury with retinal detachment, iris prolapse and posterior IOL dislocation. The first two patients had favourable visual outcomes postoperatively. The patient with retinal detachment showed minimal improvement postoperatively. All the three patients had stable SFIOL without any tilt or

suture exposure and well formed anterior chamber postoperatively.

Conclusions: SFIOL implantation is a valuable technique for the management of aphakia in the absence of capsular support and adequate iris tissue. The visual outcomes were satisfactory in the absence of any preexisting retinal detachment. The intermediate term postoperative stability of sutured SFIOLs was good in these patients.

Abstract No.: 208293

Suture-Assisted Gas Tamponade: A Novel Technique for Managing Post-Phacoemulsification Descemet Membrane Detachment

First Author: Zhaole **LI**

Co-Author(s): Jianhao **CAI**, Zeyi **LI**, Ruyue **SHEN**

Purpose: To report the efficacy of 16% octafluoropropane (C3F8) in the anterior chamber to restore severe Descemet membrane detachment (DMD) in phacoemulsification.

Methods: This retrospective case series involved two patients who underwent phacoemulsification with IOL implantation in 2020. Both developed severe Descemet membrane detachment (DMD) during corneal incision closure. Initial air injection failed to reattach the membrane, but a 16% C3F8 anterior chamber injection after incision suturing successfully restored it. Outcomes were evaluated by visual acuity (VA), intraocular pressure (IOP), and optical coherence tomography (OCT).

Results: Significant resolution of corneal edema in both cases was observed following 16% C3F8 injection on postoperative day 1. OCT revealed that the Descemet membrane was restored, and the gas had filled approximately 2/3 of the anterior chamber. In case A, the VA was 3/50 OS, and the IOP was 10 mmHg OS. The VA was 3/20 OD, and the IOP was 12 mmHg OD in case B. In postoperative week 4, the VA improved to 8/20 OS in case A. In case B, the visual acuity improved to 14/20 OD with a small C3F8 gas bubble remaining in the anterior chamber.

Conclusions: This is the first report demonstrating effective restoration of severe DMD after phacoemulsification using a 16% C3F8 anterior chamber injection. Further randomized controlled trials are needed to compare its efficacy with other techniques.

Abstract No.: 201105**Targeting 1.00 Diopter Myopia in Cataract Patients: A Tale of 50 Cases***First Author: Shah Md Rajibul ISLAM**Co-Author(s): Quazi Sazzad IFTEKHAR, Shah Md Bulbul ISLAM, Golam RABBANI***Purpose:** To evaluate the results of targeting 1:00 diopter myopia for both eyes in cataract patents.**Methods:** This cross sectional interventional study was conducted from 2023 to 2024. 50 cases (100 eyes) were selected as per inclusion criteria. Following pre-operative assessment, Phacoemulsification with PCIOL (single piece hydrophobic acrylic) implantation was done by temporal incision. Biometry was done by immersion method. Topical antibiotic and steroids were prescribed post-operatively. Surgery in each eye was deferred by at least 01 month. All the surgeries were performed by a single surgeon. All the surgeries were uneventful. Followup was done at POD 1, 15 and 30. The visual acuity at near and distance was noted.**Results:** Preoperatively the mean BCVA LogMAR was 0.84 ± 0.139 . At POD 30, the unaided mean was 0.186 ± 0.040 . p value is less than 0.05. 82% had a binocular LogMAR unaided distant visual acuity of 0.20, 16% had 0.1 and 2% had a binocular LogMAR unaided distant visual acuity of 0.30. and in case of near vision, 96% had N6 binocularly and the rest had N8 unaided. 47 (94%) patients out of 50 did not want optical correction for distant or near. 01 (02%) patient wanted optical correction for distant and near vision and 02 (04%) wanted optical correction for near.**Conclusions:** Targeting 1 diopter myopia for both eyes is an easy, acceptable and affordable approach to address post-operative optical status in carefully selected patients.**Abstract No.: 200844****Technique: Implantable 6-0 Polypropylene Capsular Hook Combined With Flange Intrasceral Fixation to Stabilize the Multifocal Intraocular Lens***First Author: Rui FENG**Co-Author(s): Chao QU***Purpose:** To describe a novel technique using implantable 6-0 polypropylene capsular hooks with flanged intrasceral fixation to stabilize a multifocal intraocular lens (IOL) in subluxated cataracts.**Methods:** In eyes with subluxated cataracts, phacoemulsification was performed with the support of a capsular tension ring (CTR). A multifocal IOL was placed in the preserved capsular bag. A 6-0 nonabsorbable polypropylene suture with a curved needle was used to manually create a capsular hook. The hook was inserted through the corneal incision and passed through the sclera near the site

of zonular weakness. After adjusting the hook to maintain centration of the IOL–capsular bag complex, the externalized tip of the hook was trimmed and cauterized with an ophthalmic cautery device to create a flange, which was then buried subconjunctivally.

Results: Five eyes of five patients with subluxated cataracts underwent the technique and were followed up for 11.80 ± 3.27 months. Postoperatively, uncorrected visual acuity was 0.10 ± 0.09 logMAR at distance and 0.14 ± 0.05 logMAR at near. All patients achieved prediction errors within ± 0.50 D. Slit-lamp examinations confirmed that the IOL remained well centered and the 6-0 polypropylene capsular hook was in situ. Anterior segment optical coherence tomography revealed a mean IOL tilt of 2.22 ± 1.23 degrees. The mean corneal endothelial cell loss was $11.00 \pm 4.02\%$. No suture exposure or conjunctival inflammation was observed.**Conclusions:** The implantable 6-0 polypropylene capsular hook combined with flanged intrasceral fixation can effectively stabilize the multifocal IOL–capsular bag complex in subluxated cataracts.**Abstract No.: 202711****The Disease Burden of Clinically Significant Cataracts Among Elderly Patients Triaged Into Routine Appointments for Chronic Blurring of Vision for 3 Months or More in Hong Kong***First Author: Shuhan CAO**Co-Author(s): Kendrick SHIH***Purpose:** Hong Kong's ageing population increases ophthalmic care demand. Public sector routine ophthalmic appointment wait times have reached 48 months in recent years. This study aims to investigate the prevalence of clinically significant cataracts in patients referred for vision blurring for 3 months or more and given routine appointments for their first visit.**Methods:** This study recruited consecutive routine appointment patients aged 50 and above referred to government ophthalmology specialist outpatient clinics for vision blurring ≥ 3 months. Subjects underwent comprehensive eye assessment by ophthalmologists, including presenting and best-corrected visual acuity, automatic and subjective refraction, intraocular pressure, slit-lamp anterior segment examination and funduscopy posterior segment examination. Consistent with the Hong Kong public sector's cataract surgery listing criteria, patients with Best Corrected LogMAR Visual Acuity greater than 0.3 and no other found causes for poor vision were deemed to have clinically significant cataracts.**Results:** A total of 599 consecutive patients referred to government ophthalmology specialist outpatient clinics were recruited. Amongst them, 241 (40.2%) were

male, 471 (78.6%) had some degree of cataracts upon presentation, and 192 (32.1%) had clinically significant cataracts, requiring surgery listing. Only 54 patients (9.0%) had already had cataract surgery for both eyes. Mean Best Corrected LogMAR visual acuity was 0.246 (± 0.658) OD/0.249 (± 0.636) OS overall, and 0.401 (± 0.696) OD/0.414 (± 0.709) OS in clinically significant cataract patients.

Conclusions: In patients referred for poor presenting visual acuity, cataract is the commonest reason. Steps must be taken to enhance triage for earlier attendance and treatment.

Abstract No.: 205666

The Final Visual Outcomes of Outreach Cataract Surgery in Remote Area of Viqueque Municipality in Timor-Leste

First Author: Frenky Ramiro **DE JESUS**

Purpose: To evaluate visual outcomes of outreach cataract surgeries and its intra and post operative complications in remote area of Viqueque municipality in Timor-Leste.

Methods: The total of 92 patients had cataract surgeries at the outreach camp from June 2-6. Pre-operative, one-day and one-week visual acuity (VA) were collected and analyzed from the surgical sheets. Visual acuity $\geq 6/18$ was considered normal.

Results: Total of 92 patients (M: 57,60%, F: 42,40%) cataract surgeries were performed for five days. All patients had pre-operative VA of $\leq 6/60$. Of the total, 85 (92,39%) had no complications during the surgery, while 7 (7,61%) had posterior capsular rupture which required anterior vitrectomy and ACIOL insertion. For accurate interpretation of the visual outcome, patients were divided into three groups depending on first day of post-operation. Vision of $\geq 6/18$ or normal was 47 (51,09%) patients; while regular vision (6/24-6/60) and poor visual outcome ($< 1/60$) were 24 (26,09%) and 21 (22,82%) respectively. From 45 patients with regular and poor visual outcome, 39 (86,66%) had corneal edema, while 6 (13,34%) had IOP high. After one week, VA improved to normal in 76 (82,60%) patients. 11 (11,96%) had regular vision, while 5 (5,44%) had poor visual outcome. The reasons for poor visual outcome due to co-morbidities associated, such as macular degeneration 2 (40%), Glaucoma 2 (40%) and permanent corneal edema 1 (20%).

Conclusions: Even with limitations, however the cataract surgeries were successful performed at outreach camp in remote area of Viqueque municipality with good outcomes.

Abstract No.: 205324

The New Sophi Phaco System: Results of a Safety and Efficacy Study

First Author: Victor **CAPARAS**

Co-Author(s): Keshia Lourdes **DUYONGCO**

Purpose: To assess the safety of the Sophi Phaco System (Rayner, Worthing, UK) in cataract surgery by evaluating corneal health markers and comparing ultrasound energy use with torsional phacoemulsification.

Methods: This prospective study included 15 patients (30 eyes) undergoing bilateral surgery: one eye with Sophi, the fellow with torsional phaco. Cumulative Dissipated Energy (CDE) for the torsional group was converted to Effective Phaco Time (EPT) to compare to the Sophi group. Endothelial cell density, pachymetry, and hexagonality were measured preoperatively and at one week using the Konan CellChek 20®. All surgeries were by a single surgeon using identical technique, materials, and perioperative regimen.

Results: All procedures were uneventful. Mean EPT (sec) was 12.94 ± 4.38 (torsional) versus 5.68 ± 2.17 (Sophi). Comparing mean pre- to post-operative endothelial cell counts, pachymetry and cell hexagonality showed no significant difference in either Sophi or torsional groups. Endothelial cell count change was $-0.1\% \pm 0.14$ (torsional) versus $-0.6\% \pm 0.11$ (Sophi). Pachymetry change was $-1.8\% \pm 3.8$ (torsional) versus $-2.0\% \pm 4.5$ (Sophi). Hexagonality change was $-2.8\% \pm 6.3$ (torsional) versus $-2.8\% \pm 3.7$ (Sophi). No significant differences were observed ($p > 0.05$).

Conclusions: The Sophi Phaco System caused no greater endothelial loss, corneal swelling, or cell hexagonality reduction than torsional phaco. Apparent higher torsional energy likely reflects CDE conversion limits. With all cataracts successfully removed and no complications, Sophi appears safe and effective. Its mobility, efficiency, and waste reduction make it a valuable addition to the operating theater.

Abstract No.: 200959

The No-Pain Lane for Ocular Surgery – Sub Tenon's Block

First Author: Nishanth S

Purpose: To evaluate if sub-tenons block is better than peri-bulbar block in terms of safety, efficacy, complications, patient compliance and surgeon's comfort in patients undergoing SICS for both eyes on 2 different days.

Methods: Patients undergoing both eyes SICS by the same surgeon, who are given peri-bulbar block for one eye and sub-tenons block for the other eye are considered. A questionnaire-based survey is done for both eyes separately, which includes pain during anesthesia, during surgery, and post-surgery. The

surgeon is also asked questions about his comfort during the surgery, the safety, and the efficiency of the block.

Results: When efficacy and surgeon's comfort were considered, both blocks were almost similar, with peri-bulbar giving more akinesia, which was not statistically significant. Patients' compliance and safety were better with subtenon block.

Conclusions: Having considered a number of parameters, including pain, we can conclude that sub-tenons block is a much better alternative to the peri-bulbar block as it is safer, has better patient compliance, and has similar efficacy to peri-bulbar block. The surgeon was comfortable with both blocks in a similar fashion. It is a unique study as no one has actually studied the two routes of block in the same patient, where there will be no subject bias owing to their pain tolerance and sensitivity

Abstract No.: 210234

The Utilization of Excel VBA in Cross-sectional Survey of Cataract Surgery Quality

First Author: Liu **CUIHONG**

Co-Author(s): Li **CHAOFENG**, Liu **DONGMEI**, Bi **HONGSHENG**, Li **YANG**

Purpose: To explore the application of Excel VBA in the cross-sectional survey of cataract surgery quality, so as to carry out the quality control of cataract surgery through information means.

Methods: In this study, the statistical items and their domain values were determined according to the clinical pathway diagnosis and treatment specifications of cataract. By compiling Excel VBA code, the cross-sectional survey software of cataract surgery quality based on Excel VBA was independently developed by medical personnel. Using this software, the medical records of 368 patients with simple cataract who underwent surgery in the Affiliated Eye Hospital of Shandong University of Traditional Chinese Medicine in May 2020 were investigated. Combined with Excel PivotTable, the postoperative visual acuity, the incidence of intraoperative and postoperative complications and the implementation of diagnosis and treatment norms were analyzed.

Results: In this program designed by using VBA language, the field values of survey items are automatically formed into multiple options and automatically saved in the questionnaire. The survey content is standardized and the interface is easy to operate. The index items can be quickly counted by using Excel pivot table, which improves the efficiency and accuracy of statistics.

Conclusions: The independent development and application of the survey software improves the work efficiency and management ability of the quality management team, lays a foundation for the

management of single disease in the hospital, and also provides a new idea for the development of disease quality control management tools.

Abstract No.: 207376

Topical Prednisolone Acetate vs Topical Bromfenac Sodium in Controlling Complications After Surgery

First Author: Nitin **RAMANUJAM**

Purpose: To compare the efficacy of Topical Prednisolone Acetate 1% with Topical Bromfenac Sodium 0.09% in controlling complications post cataract surgery.

Methods: A total of 126 eyes underwent uneventful phacoemulsification and were randomized into two groups. Group I received tapering Prednisolone along with Gatifloxacin Eye Drops, Group II received Bromfenac along with Gatifloxacin Eye Drops twice daily for four weeks. Follow-up was on POD 1, 7, 30, and 45.

Results: Both groups had similar inflammatory control. Iritis was slightly higher in the Prednisolone group on POD 1 ($p=0.031$), with no difference afterward. IOP was significantly lower in the Bromfenac group across all visits ($p<0.001$).

Conclusions: Topical Bromfenac is as effective as Topical Prednisolone in inflammation control, with better IOP outcomes and patient compliance.

Abstract No.: 203635

Two Cases of Congenital Distichiasis Treated With Lamellar Splitting and Posterior Lamella Cauterization

First Author: Sayuri **SUMI**

Co-Author(s): Sujin **HOSHI**, Yuka **MORITA**, Tetsuro **OSHIKA**

Purpose: To report two cases of congenital distichiasis successfully treated with lamellar splitting and posterior lamella cauterization combined with a modified Hotz procedure.

Methods: Case 1: A 6-year-old girl presented with photophobia. Family history revealed distichiasis treated with electrolysis in the mother and maternal grandfather. Best-corrected visual acuity (BCVA) was 1.0 in both eyes. Slit-lamp examination showed severe corneal epithelial damage due to distichiasis of both upper and lower eyelids. Lamellar splitting and posterior lamella cauterization were performed on all four eyelids, along with a modified Hotz procedure for the lower eyelids. Case 2: A 6-year-old girl with a history of cleft palate surgery presented with photophobia and tearing. BCVA was 1.2 in the right eye and 0.9 in the left. Examination revealed distichiasis along the full length of both upper and lower eyelids, punctate superficial keratopathy, right superior oblique

palsy, and intermittent exotropia. The same surgical procedures as Case 1 were performed.

Results: At postoperative follow-up (4 months in Case 1; 14 months in Case 2) corneal epithelial damage had resolved and photophobia and tearing disappeared. BCVA improved or remained stable in both cases with no complications.

Conclusions: Lamellar splitting combined with posterior lamella cauterization and the modified Hotz procedure was effective in managing congenital distichiasis. Long-term follow-up is required to monitor for dry eye and potential systemic associations.

Abstract No.: 200346

Uncertain Inflammation After Cataract Surgery: Suspected Endophthalmitis, Toxic Anterior Segment Syndrome (TASS), or Postoperative Uveitis in a Resource-Limited Setting

First Author: Muhammad Fadhil RAHMADIANSYAH

Purpose: To report a diagnostically challenging case of postoperative intraocular inflammation with unclear etiology following uneventful phacoemulsification, managed non-invasively in a resource-limited rural setting.

Methods: We conducted comprehensive evaluation of a 64-year-old woman who underwent uneventful phacoemulsification for mature cataract. On day one, diffuse corneal edema was noted. By the end of the first week, the patient presented with a red, painless eye, a clear cornea, a quiet anterior chamber, posterior synechiae, and a brownish membrane covering the intraocular lens (IOL). Visual acuity was hand movement, and B-scan ultrasonography was not available. A presumptive diagnosis of endophthalmitis was established, with toxic anterior segment syndrome (TASS) and postoperative uveitis as differential diagnoses. As invasive interventions were not accessible in the rural setting, the patient was managed conservatively with high-dose systemic corticosteroids and antibiotics, hourly topical steroids and antibiotics, mydriatics, and close outpatient monitoring.

Results: Clinical improvement was observed within three days. Synechiae resolved, the membrane regressed, and vision improved to 5/60. B-scan showed a relatively clear vitreous with mild reflectivity near the IOL. By week two, vision reached 6/40 with a quiet anterior chamber and clear IOL. Invasive diagnostics remained unavailable, and a definitive diagnosis could not be established.

Conclusions: This case illustrates the complexities of managing postoperative ocular inflammation without access to full diagnostics or intervention. A strong clinical approach and close follow-up enabled recovery despite the diagnostic uncertainty. Similar situations

are common in rural areas and require pragmatic, resource-based decision-making.

Abstract No.: 202954

Urinary Metal Mixtures and Cataract: Findings From a U.S. Population-Based Study and Network Pharmacology Analysis

First Author: Runzi YANG

Co-Author(s): Jing LI, Rui LIU, Jianmin MA, Tingting REN, Nan WANG, Liangyuan XU

Purpose: To analyze the effects of various urinary metals on cataract using National Health and Nutrition Examination Survey data.

Methods: Multivariate logistic regression was used to analyze the relationship between 9 kinds of urinary metals and cataract. Weighted quantile sum (WQS) was used to analyze the positive and negative effects of various metals on cataract. The global and independent effects were analyzed using Bayesian kernel machine regression (BKMR). Network pharmacological analysis was used to explore the mechanism of metals on cataract.

Results: A total of 2207 participants participated in the study. After excluding the influence of covariates, it was found that the concentrations of Ba, Sb, and Tl were significantly correlated with the prevalence of cataract. WQS showed that Cd, Pb, and Ba had the strongest negative effects on cataracts, while Tu and Co had the strongest positive effects. BKMR showed that the overall effect of nine urinary metals had no significant relationship with cataract, there was a significant positive correlation between Co and cataract, and a significant negative correlation between Pb and cataract under certain conditions. Co and cataract interact through various pathways, including interleukin-4 and Interleukin-13 signaling. AKT1 may be the key protein in the correlation.

Conclusions: Urinary metal concentrations may be associated with the risk of ocular outcomes. While our findings suggest potential links between Co and cataract, these results should be interpreted with caution due to the cross-sectional nature of the data. Further longitudinal studies are needed to confirm associations and to explore possible threshold levels for public health monitoring.

Abstract No.: 201932

Use of EDOF Intraocular Lens in Cataract Surgery

First Author: Tommy Chung Yan CHAN

Purpose: To investigate the results of a novel EDOF intraocular lens in cataract surgery.

Methods: The results of eyes implanted with an EDOF intraocular lens were retrospectively reviewed and analyzed.

Results: Eighty-eight were included in the study. Eighty percent of the eyes had an UNVA of J3 or better when targeted plano. There was no drop in CDVA in all cases, and all eyes retained a UDVA of 20/25 or better. The results of patients with minimonovision showed a wide range of vision after bilaterally implanted with the EDOF intraocular lens.

Conclusions: This new type of EDOF intraocular lens was safe and effective in reducing the spectacle independence in cataract surgery.

Abstract No.: 202343

VISCO– Assisted Modified Tilt-and-Tumble Nucleotomy – a Technique for Safe Nuclear Emulsification in Soft Cataract

First Author: Shalini KUMARI

Purpose: We are presenting an easy and safe modified technique of 'VISCO– Assisted Tilt-and-Tumble nucleotomy' in very soft cataract phacoemulsification procedure. Soft Cataract (Lens Opacities Classification System III (LOCS III), grades 1) is characterized by a minimally dense endonucleus with abundant sticky soft cortical matter. Aspiration & perforation of soft nucleus by phaco tip, difficulty in achieving & sustaining occlusion, undivided bowl of nucleus & 'cheese wiring' by second instrument (chopper), sudden penetration of nucleus and subsequent, posterior capsular rupture, are quite common in hands of newer surgeons. Therefore, we need safer technique.

Methods: We proceed with gentle hydrodelineation of soft nucleus after routine steps. One pole of endonucleus is prolapsed out of bag. Prolapsed endonucleus is maneuvered vertically with viscoelastic agent and its canula. Viscoelastic agent, both dispersive and cohesive, serve dual purpose of coating endothelium and providing a viscous medium, wherein, endonucleus is supported vertically. Subsequently, chopper is introduced through side-port to support it from behind to prevent its fall back into nuclear bed. This step is followed by introduction of phaco-probe and impaling of endonucleus with aspiration mode. This step further continues as routine chopping technique.

Results: All cases had successful outcome with no incidence of posterior capsular rupture (PCR). No corneal-related complications were observed intra-operatively. All cases had clear cornea on 7th day.

Conclusions: Our VISCO– Assisted Tilt-and-Tumble Nucleotomy is simple, safe and, reproducible for soft cataract phacoemulsification even in hands of novice surgeons.

Abstract No.: 205471

Visual Outcomes Following Bilateral Implantation of a Rotationally Asymmetric C-Loop Hydrophobic Extended Depth of Focus Intraocular Lens

First Author: Mun Wai LEE

Purpose: To evaluate visual and patient-reported outcomes following bilateral implantation of the Acunex Vario extended depth of focus (EDOF) intraocular lens (IOL).

Methods: Prospective interventional case series of patients with bilateral cataracts undergoing phacoemulsification and implantation of the Acunex Vario. Dominant eyes were targeted for emmetropia and non-dominant eyes for -0.75 D. Primary endpoints were binocular uncorrected distance (UDVA), intermediate (UIVA, 66 cm), and near (UNVA, 40 cm) visual acuities at 3 months. Secondary outcomes included best-corrected distance (CDVA), distance-corrected intermediate (DCIVA) and near (DCNVA) visual acuities, refractive accuracy, rotational stability, binocular defocus curve, contrast sensitivity, Patient Reported Spectacle Independence Questionnaire (PRSIQ), dysphotopsia, and Visual Function Index (VF-14) scores.

Results: Thirty patients (60 eyes) were enrolled; results from the first 16 patients at 1 month are reported. Mean binocular logMAR UDVA, UIVA, and UNVA were 0.02 ± 0.05 , 0.16 ± 0.14 , and 0.23 ± 0.12 , respectively. Mean CDVA, DCIVA, and DCNVA were -0.01 ± 0.05 , 0.21 ± 0.14 , and 0.33 ± 0.16 , respectively. Mean refractive spherical equivalent was -0.27 ± 0.38 , with all eyes within 1 D of target. No patient required spectacles for distance or intermediate vision; four used near correction occasionally. Four patients reported starbursts; none reported halos or glare. Mean VF-14 score was 97.05.

Conclusions: Bilateral Acunex Vario implantation provided excellent binocular distance and intermediate vision with functional near vision. High levels of spectacle independence and patient satisfaction were achieved, with minimal photic phenomena.

Abstract No.: 206260

Visual Outcomes and Subjective Experience With Three Types of Extended Depth of Focus Intraocular Lens Implants

First Author: Manoj VASUDEVAN

Co-Author(s): Sridhar BARATAN, Nivean MADHIVANAN, Shiva Mohan REDDY

Purpose: To compare the visual outcomes of three EDOF type of intraocular lens (IOL) after bilateral implantation by a retrospective comparative study among patients who underwent phacoemulsification with bilateral implantation of three types of EDOF IOLs- Evolux IOL from SIFI group, RayOne EMV from Rayner

USA and Swissphob from Appasamy group which falls under Extended depth of focus type of presbyopia correcting IOLs.

Methods: The outcomes of the study included visual acuity (VA) near, intermediate, distant, contrast sensitivity, spherical equivalent, visual quality, spectacle independence, and patient satisfaction.

Results: Among the total 75 patients, each group consisted of 25 patients. There were 11 males and 14 females in all the 3 groups. The mean age in the EVOLUX group was 60+/- 18.5 years, RAYNER group was 60.92+/- 15.5 years and in the SWISS PHOB group was 63.80+/- 12.5 years. The axial length of the patients who underwent the surgery was 23.0+/- 1.5 mm in the EVOLUX group, 21.74+/-0.5 mm in the RAYNER group and 24.33+/-0.5 mm in the SWISS PHOB group. Uncorrected unocular and binocular distance, intermediate and near vision were recorded at 1 week and 1 month after the surgery and monocular defocus curves from +1.0 D to -4.0 D in decrements of 0.5 D were evaluated.

Conclusions: Across all time points and conditions, the three IOLs performed similarly for distance vision, with no significant statistical differences based on the reported p-values. The study demonstrated that all the 3 IOLs were effective in providing excellent intermediate and distance vision with minor variations in near vision outcomes.

Abstract No.: 206856

Visual Outcomes of Cataract Surgery in Eyes With Pre-Existing Corneal Haziness: A Systematic Review

First Author: Edianti **RATNINGPOETI**

Co-Author(s): Rafida Sofi **KAMILA**, Reni **RATNAWATI**, Isma Zahira **SUHAIMA**, Jessica **ZARWAN**

Purpose: Corneal haziness is the fifth leading cause of blindness in Indonesia, with corneal transplantation being the definitive treatment to restore vision. However, the limited availability of donor corneas restricts the feasibility of transplantation. Consequently, while it does not address the corneal pathology, cataract surgery has emerged as a more accessible intervention in eyes with coexisting cataract and corneal opacity to improve visual acuity (VA) to a functional level. This systematic review aims to evaluate the impact of cataract surgery on VA in patients with pre-existing corneal haziness.

Methods: A systematic search (2015—2025) was conducted using PubMed, Proquest, Scopus, and Google Scholar. Studies were screened based on predefined inclusion and exclusion criteria.

Results: Four studies encompassing 380 eyes were included. Three used phacoemulsification with intraocular lens (IOL) implantation, and one used Manual Small Incision Cataract Surgery (MSICS). All

studies reported significant VA improvement. One study comparing phaco-IOL to the triple procedure found that phaco-IOL patients maintained longer ambulatory vision, likely due to the absence of graft-related complications. No significant postoperative changes in corneal thickness were observed. Corneal edema was the most common early complication (15.7–76%), while posterior capsular opacification was the predominant late complication (5.6–60%).

Conclusions: Cataract surgery represents a viable alternative to keratoplasty to improve visual acuity in patients with pre-existing corneal opacity and may serve as an interim procedure while awaiting keratoplasty, particularly in regions with limited donor availability. The degree of corneal opacity remains a key determinant of postoperative visual outcome.

Abstract No.: 207320

Visual Outcomes of Cataractous Eyes With Epiretinal Membrane and Macula-On Retinal Detachment Implanted With Lentis Comfort Mf15 Segmented Bifocal Intraocular Lens – A Case Series

First Author: Paul **SIOPONGCO**

Co-Author(s): Erika Jean **SALVAME**

Purpose: The most commonly used treatment for patients with cataracts and retinal pathologies such as epiretinal membrane (ERM) and retinal detachment is a combined phacoemulsification and pars plana vitrectomy using a monofocal IOL as implant. The use of a segmented bi-focal IOL is still currently controversial.

Methods: This is a case series of patients with retinal pathologies (epiretinal membrane and macula-on retinal detachment) who had undergone phacoemulsification with segmented bifocal IOL implantation.

Results: Five eyes with retinal pathologies who had undergone phacoemulsification were included in this series. Three out of the 5 eyes had stage 1 epiretinal membrane and underwent standard phacoemulsification. One eye had stage 2 epiretinal membrane with metamorphopsia pre-operatively, then underwent phacoemulsification combined with vitrectomy and membrane peeling. The last eye had macula-on retinal detachment and underwent phacoemulsification with retinal detachment surgery. Pre-operative distance UCVA ranged from 0.2 to 0.7 (logMAR), and near UCVA ranged from 0.5 to 1.3. One month post-operatively, distance UCVA ranged from 0.0 to 0.2, and near UCVA ranged from 0.1 to 0.2. There were no post-operative complaints of dysphotopsias from all cases.

Conclusions: Implantation of multifocal and extended depth of focus IOLs in patients with retinal pathologies such as ERM and retinal detachment remains

debatable. But patient demand for post-operative spectacle freedom is increasing. This series highlights that segmented bifocal IOLs, such as Lentis Comfort MF15, are a viable option for patients presenting with mild epiretinal membrane and macula-on retinal detachment.

Abstract No.: 206263

Visual Outcomes of a Monofocal Intraocular Lens With Enhanced Intermediate Function in Posterior Segment Pathologies

First Author: Jeewan **TITIYAL**

Co-Author(s): Manpreet **KAUR**, Sridevi **NAIR**, Jyoti **RAWAT**

Purpose: To evaluate the visual outcomes of a monofocal intraocular lens (IOL) with enhanced intermediate function in patients with posterior segment pathologies.

Methods: This prospective interventional study included 68 eyes of 34 patients: 17 patients with moderate NPDR without macular edema and 17 patients with mild to moderate glaucoma who underwent bilateral phacoemulsification with TECNIS Eyhance IOL implantation. Outcomes assessed at 3 months postoperatively included uncorrected distance (UDVA), intermediate (UIVA), and near (UNVA) visual acuity, Strehl ratio, modulation transfer function (MTF), contrast sensitivity (CS), stereopsis, colour vision, and patient-reported satisfaction.

Results: The mean age was 65.5 ± 4.6 years. At 3 months, mean UDVA, UIVA, and UNVA (logMAR) were 0.08 ± 0.11 , 0.25 ± 0.17 , and 0.49 ± 0.15 , with 74% achieving UIVA of 20/40 or better. Significant improvements were observed in postoperative stereopsis [Near: 57.2" (NPDR); 67.6" (Glaucoma)], CS [CS-Avg: 1.71 ± 0.14 (NPDR); 1.66 ± 0.13 (Glaucoma)], and color vision [TES: 61.6 ± 16.4 (NPDR); 64.5 ± 11.5 (Glaucoma)]. Glaucoma eyes showed marginally lower CS values than NPDR at higher frequencies (CS-C $p=0.05$; CS-D $p=0.02$). Strehl ratio and MTF improved significantly in NPDR ($p<0.001$) but not in glaucoma ($p>0.4$). Glare (4%) and halos (3%) were minimal, with 40% requiring spectacles for near.

Conclusions: Eyhance IOL provided excellent acuity and functional vision in NPDR and glaucoma. Optical quality gains were more pronounced in NPDR, but glaucoma eyes maintained good contrast sensitivity and colour vision, supporting its role even in eyes with posterior segment disease.

Abstract No.: 204919

Visual Performance Comparison: Galaxy vs Vivity PC-IOLs

First Author: Santaro **NOGUCHI**

Co-Author(s): Asuka **NOGUCHI**

Purpose: To compare Galaxy and Vivity multifocal IOL performance across pupil sizes using defocus curve analysis (+2.0D to -4.0D).

Methods: Visual acuity was measured with defocus lenses (+2.0D to -4.0D, 0.25D steps) at three pupil diameters (2mm, 3mm, 4mm). Performance was assessed using logMAR units, with ≤ 0.2 logMAR considered good vision.

Results: Depth of Focus (logMAR ≤ 0.2): • Galaxy: Superior with 2mm pupils (11 steps, +0.75D to -1.75D) • Vivity: Excellent intermediate vision with 3mm pupils (6 steps, +1.0D to -0.25D) • Both IOLs: Reduced near performance with 4mm pupils Near Vision (+2.0D to 0D): • Galaxy 2mm: 0.40 logMAR average • Vivity 2mm: 0.37 logMAR average (superior) Pupil Effects: • Smaller pupils enhanced depth of focus for both IOLs • Galaxy: Consistent myopic range performance • Vivity: Better stability with larger pupils

Conclusions: Galaxy provides superior extended depth of focus, ideal for intermediate vision needs. Vivity offers balanced near-distance performance with better optical quality at larger pupils. IOL selection should be individualized based on patient lifestyle and pupil characteristics.

Abstract No.: 206244

Visual and Refractive Outcomes of 300 Cataract Surgeries With Enhanced Monofocal Intraocular Lenses

First Author: Amod **NAYAK**

Purpose: Enhanced monofocal intraocular lenses (IOLs) aim to deliver an improved range of vision and spectacle independence while maintaining high visual quality. This study evaluates outcomes of cataract surgeries using enhanced IOLs, comparing toric and non-toric designs, with a subset of cases where multifocal IOLs were contraindicated.

Methods: A retrospective analysis of 300 eyes undergoing phacoemulsification with enhanced IOL implantation was performed. 116 eyes (38.6%) received toric enhanced monofocal IOLs, while 184 eyes (61.4%) received non-toric enhanced monofocal IOLs. 90 eyes were implanted with enhanced monofocal IOLs due to relative contraindications to multifocal IOLs, including ocular comorbidities and visual demands. Outcomes assessed at 1- and 3-month follow-ups included uncorrected distance visual acuity (UDVA), uncorrected intermediate visual acuity (UIVA), uncorrected near visual acuity (UNVA) and residual refractive error.

Results: Distance vision: Over 92% of eyes achieved UDVA of 6/9 or better. Intermediate vision: 85% achieved functional UIVA (N10 or better) for tasks such as computer and dashboard viewing, with comparable results between toric and non-toric groups. Near vision: Around 70% achieved functional UNVA (N12 or better) without additional correction, sufficient for most daily tasks while readers were prescribed when required for fine near tasks

Conclusions: Enhanced monofocal IOLs, both toric and non-toric, provide excellent visual and refractive outcomes with high patient satisfaction. Enhanced monofocal IOLs are also a reliable option in cases where multifocal IOLs are contraindicated. Enhanced IOL technology supports a broader range of functional vision, particularly for intermediate tasks, thereby improving quality of life post-cataract surgery.

Abstract No.: 206425

When Calcium Meets the Lens: Bilateral Complicated Cataracts and Argentinian Flag Sign in a 26-Year-Old Woman

First Author: Talita ISMA

Purpose: Young adults who have undergone a parathyroidectomy may be at risk for metabolic imbalance, which could result in complex cataract development sooner than anticipated. It is crucial to anticipate the Argentinian flag sign with preventive decompression, dye staining, and viscoelastic-assisted maneuvers, as it remains a significant risk in intumescent cataracts.

Methods: A 26-year-old woman with a history of parathyroidectomy presented with progressively decreased vision in both eyes. Best corrected visual acuity was hand movement in the right eye and 3 meters counting fingers in the left eye. Slit-lamp examination revealed dense white cataracts on the right eye and a posterior subcapsular cataract on the left eye, consistent with complicated cataracts. No other ocular abnormalities were detected. Phacoemulsification was planned in the right eye first. During capsulorhexis in the right eye, the Argentinian flag sign occurred due to sudden tear extension in the intumescent white cataract. Slow phacoemulsification technique and intraocular lens (IOL) implantation were performed uneventfully.

Results: Postoperative recovery was satisfactory, with Snellen visual acuity improving to 6/15 OD. Funduscopy examination was unremarkable. The patient has no symptoms and is happy with her sight.

Conclusions: This case highlights how systemic conditions such as parathyroid dysfunction can lead to bilateral complicated cataracts in young patients. Excellent postoperative visual outcomes can be achieved with careful technique and the right surgical maneuvers; however, the Argentinian flag sign

remains a challenging intraoperative complication in intumescent cataracts and could be a take home message for the future second eye surgery preparation in this patient.

Cornea, Dry Eyes, External Eye Diseases and Eye Banking

Abstract No.: 206320

A Case Report on an Atypical Case of Epidemic Keratoconjunctivitis in a Pediatric Patient Admitted in a Tertiary Hospital in Manila, Philippines

First Author: Isabella BONDOC

Co-Author(s): Cristina TAN

Purpose: Epidemic keratoconjunctivitis (EKC) is a highly contagious disease with no effective treatment, with severe cases of EKC causing corneal epithelial lesions, inflammation and severe eye pain lasting for more than 2 weeks. These cases are especially difficult to manage in the pediatric population, wherein physical examination and supportive management may be a challenge. This case report aims to guide and support health care practitioners and ophthalmologists in making appropriate decisions in the management and care of pediatric patients with severe EKC.

Methods: An 8-year-old female with a two-week history of eye pain and redness, previously treated with a combination of topical antibiotics and steroids (Levofloxacin+ Dexamethasone), was admitted due to swollen lids and inability to open her eyes. Frequent cold compresses, as well as topical moxifloxacin, prednisolone acetate, and preservative-free lubricating drops, were administered. She also underwent corneal filament removal and conjunctival membrane peeling with 5% povidone-iodine wash under general anesthesia. Gram stain and culture were also done.

Results: Supportive management regimen through membrane peeling under general anesthesia, cold compress, topical steroids, antibiotics, and povidone iodine wash was effective in alleviating patient symptoms in 1 week, with gradual improvement of eye pain.

Conclusions: Management of EKC in the pediatric population creates challenges from the history taking to the physical exam and supportive management for the patient. More pediatric case studies should be brought forward to guide ophthalmologists and the healthcare team in providing optimal management for the best outcomes and comfort for the child.

Abstract No.: 202760**A Case of Capecitabine(Xeloda)-Related Limbal Stem Cell Deficiency***First Author: Wing Sum LI**Co-Author(s): Gillian Denise Ji-yee SIU*

Purpose: To report the clinical presentation of limbal stem cell deficiency associated with Capecitabine (Xeloda) treatment for metastatic breast cancer.

Methods: We present a case of a 72-year-old female with triple-negative breast cancer (ER-, PR-, HER1+) and suspected mediastinal nodal metastases. She underwent a right mastectomy in 2018, followed by adjuvant targeted therapy and chemotherapy with lifelong Capecitabine since September 2020. Due to secondary hand-foot syndrome, the dose was reduced but later re-escalated to 1500 mg twice daily following mild rises in tumor markers (CEA and CA15-3). The patient complained of teary, dry eyes and bilateral blurring of vision in August 2023 and was referred to us.

Results: On assessment, her visual acuities were 0.1 and pin-hole 0.2 for both eyes, with both eyes showing whorl-like degeneration of superior corneal epithelium and inferior raised corneal scar. The patient was managed with lubricants and subsequently underwent bilateral cataract surgery. Given stable metastatic disease, symptomatic improvement with lubricants, and no progressive visual decline, the patient chose to continue capecitabine with ophthalmic follow-up. Capecitabine was later reduced to 1000 mg twice daily in December 2024 due to worsening hand-foot syndrome. At the most recent follow-up in June 2025, visual acuities were 0.3 (OD) and 0.7 (OS). Superior limbal stem cell deficiency with whorl epitheliopathy remained static.

Conclusions: Capecitabine (Xeloda) is an oral antimetabolite widely used in metastatic breast and colorectal cancer. Its ocular toxicity remains poorly understood. To our knowledge, this is the first reported case in Asia of limbal stem cell deficiency associated with Capecitabine therapy.

Abstract No.: 207262**A Case of Stevens-Johnson Syndrome With Ocular Complication***First Author: Faria Tifat TIMA**Co-Author(s): Tanvir AHMED, Rajashree DAS*

Purpose: To report a case of Stevens-Johnson Syndrome (SJS) presenting with significant corneal involvement highlighting the ocular manifestations, clinical course, and management approach to prevent long-term visual impairment.

Methods: A 28-year-old female complained about FB sensation, blurring of vision, pain, redness, and photophobia in the right eye for 5 days. FB sensation

in LE for the same duration. According to the statement of the patient, she was reasonably well 4 months back. Then she gave a H/O of viral fever & joint pain. Azulfidine (Sulfasalazine) was prescribed by a rheumatologist for her joint pain. After taking sulfasalazine, the patient developed rashes involving the trunk & extremities. Involvement was not widespread. These were followed by ocular discomfort 15 days later in BE. Then he consulted with a local doctor in nearby hospital for her skin problems & for ocular complaints treated with some topical eye drops but her ocular condition didn't improve. With these, she came to us for better management.

Results: Ocular examination -VA-6/60 RE, 6/9 LE. Slit lamp Examination: O/E: conjunctival congestion, Conjunctival scar with inflammation in BE, corneal epithelial erosion with SPK present in BE. No specific tests are used for diagnosing SJS. Instead diagnosis is based on symptoms, medical history & an examination of eyes and eyelids & skin. Patient treated with frequent artificial tears, topical steroids, steroid eye ointment, Antibiotic eye drops & eye ointment. Referred to a skin specialist for the blister on her skin. Suspected medication discontinued immediately. After medical treatment, the epi erosion almost resolved in RE, leaving a scar.

Conclusions: Ocular involvement in Stevens-Johnson Syndrome can be vision-threatening and requires urgent ophthalmologic intervention. Early diagnosis & collaboration between specialties are essential to improve outcomes.

Abstract No.: 204068**A Deoxyribonuclease-Based Nanosystem With Sequential and Enhanced Biofilm Disruption for the Treatment of Bacterial Keratitis***First Author: Xiaolin QI*

Purpose: Bacterial keratitis (BK) can lead to rapid vision loss if not treated effectively. The therapeutic effects would be greatly attenuated once the formation of bacterial biofilms.

Methods: We fabricated a nanoplatform (D-HIC) composed of deoxyribonuclease (DNase) functionalized hollow manganese dioxide (D-HMnO₂) loading with indocyanine green (ICG) and ciprofloxacin (CIP), which presented superior outcomes in the biofilm disruption and bactericidal activity.

Results: The Mn²⁺ provided by the D-HMnO₂ could substantially improve the cleavage intensity and rate of D-HIC for extracellular DNA (eDNA), thereby resulting in rapid breakdown of the superficial stubborn structure of biofilms and providing channels for the penetration and delivery of nanoparticles into the biofilm. Subsequently, upon near-infrared-light (NIR) irradiation, the nanoparticles could boost

the level of singlet oxygen ($1O_2$) in the inner biofilm locally, which performed further elimination for the remanent biofilms and enabled the synergistic bactericidal action of CIP at a lower concentration, achieving a potent antibacterial efficacy above 99% against both *Staphylococcus aureus* and *Pseudomonas aeruginosa* related biofilms. Furthermore, the designed nanoplatform successfully repaired bacterial biofilm-induced injury in a BK mice model with greatly accelerated therapeutic effects than commercially available CIP eye drops.

Conclusions: Our findings highlight an innovative concept of sequential biofilm disruptions for the treatment of BK and offer a clinically relevant strategy for combating biofilms related infections.

Abstract No.: 201653

A Forgotten Punctal Plug: Delayed-Onset Canaliculitis and Granuloma Formation

First Author: Yu Ting Tina **SHEN**

Co-Author(s): Maryanne Chew **ROMERO**, Gangadhara **SUNDAR**, Kong Bing **TAN**, Anas **YASIN**

Purpose: To describe a rare case of delayed-onset canaliculitis and punctal granuloma formation secondary to a retained punctal plug inserted post-LASIK decades ago, and to highlight the importance of long-term vigilance in patients with chronic ocular inflammation and prior plug insertion.

Methods: A 73-year-old woman presented with persistent left eye redness and mucopurulent discharge. She had undergone LASIK years earlier, followed by punctal plug insertion and subsequent bilateral cataract surgeries. Initial treatment with Tobradex® for presumed viral conjunctivitis was ineffective. Slit-lamp examination revealed a 2mm pedunculated pyogenic granuloma at the lower punctum. Anterior segment optical coherence tomography showed no foreign body. She was referred to Oculoplastics team and started on topical antibiotics. Surgical excision of the granuloma with lacrimal system exploration under local anaesthesia revealed cream-colored concretions with a central hard core, strongly suggestive of a retained punctal plug.

Results: Histopathology showed bacteria, inflammatory cells confirming chronic inflammation, and non-polarizable amorphous material, suggestive of a possible exogenous source. Microbiological cultures grew *Fusobacterium* species and *Streptococcus anginosus*, consistent with polymicrobial biofilm-associated infection. The patient recovered uneventfully and was scheduled for further canalicular evaluation.

Conclusions: This case highlights the potential for delayed complications from punctal plug retention, including chronic canaliculitis and granuloma formation. Clinicians should maintain a high index

of suspicion in patients with unexplained chronic conjunctivitis and prior punctal plug insertion. Timely diagnosis, prompt removal of plugs, and consideration of long-term dry eye management strategies including definitive surgical options are essential to prevent these complications.

Abstract No.: 204879

A Hole Lot of Trouble: A Case Report on Corneal Perforation From Stubborn Staphylococcal Blepharoconjunctivitis

First Author: Kristine **NATIVIDAD**

Co-Author(s): George **SOSUAN**

Purpose: Corneal perforation is a sight threatening ophthalmic emergency that carries a high risk of ocular morbidity and necessitates immediate intervention to re-establish the continuity of the globe.

Methods: This is a case report on a 21-year-old gentleman was referred due to 2-months history of right eye redness, discharge, foreign body sensation, and frequent eye rubbing that didn't resolve after self-medication. 1 month prior, sought outside consult and was started on Levofloxacin 1.5% and lubricants which didn't provide relief. 1 week prior, after swimming, noted more frequent eye rubbing and photosensitivity, he manifested with corneal perforation with iris prolapse - bandage contact lens (BCL) placed and oral antibiotics started. Past medical history reveal recurrent external hordeolum, conjunctivitis, and dry eye disease. Right eye examination, vision's 20/100 with matting and crusting at the base of the lashes, multiple chalazion and scarring, mucopurulent discharge, inspissated glands, erythema and edema of the eyelid margin, anterior lid telangiectasia with areas of madarosis, hyperemic conjunctiva, 360 pannus, grade 3 inferior corneal haze, 3.2x4.3mm descemetocoele, papillae on the palpebral conjunctiva. Corneal Patch Graft with Iris Prolapse Excision was done.

Results: Third post-operative week, vision was 20/70 with lash matting, loose sutures, and leakage on Seidel test. Medications were continued, loose sutures removed and BCL was placed.

Conclusions: Management of corneal perforation is influenced by the lesion's characteristics. When less invasive measures fail, corneal patch grafting serves as a reliable technique for preserving ocular integrity.

Abstract No.: 205505**A Meta-Analysis on the Efficacy and Safety of Tacrolimus in Treating Allergic Conjunctivitis***First Author: Charmaine Yuk Wah TSANG**Co-Author(s): Julia Yan Yu CHAN, Vanissa Wing See CHOW*

Purpose: Allergic conjunctivitis represents an inflammatory response of the conjunctiva to allergens. While tacrolimus is an established immunomodulator in transplant medicine and dermatology, its topical application in allergic conjunctivitis remains off-label due to pending FDA approval. This meta-analysis aims to evaluate the efficacy and safety profile of tacrolimus in allergic conjunctivitis management.

Methods: Literatures were retrieved from PubMed, Cochrane Library, Scopus, and Embase databases in September 2025, reviewed by 2 independent reviewers based on inclusion and exclusion criteria, with data extraction. Primary outcomes are objective signs with a 4-point grading scale generally on the palpebral conjunctiva, bulbar conjunctiva, limbus, and cornea (0 = Normal; 1+ = Mild; 2+ = Moderate; or 3+ = Severe). Secondary outcomes consisted of subjective symptom scores, e.g. tearing, itching, and photophobia. Data analysis was performed using R. Risk of bias was performed with the ROBINS-I framework.

Results: Of the 474 studies screened, 6 met the inclusion criteria, encompassing 3060 eyes. Meta-analysis demonstrated significantly reduced objective sign scores (Mean Difference [MD]: -1.30, 95% Confidence Interval [CI]: -1.65 to -0.95, $p < 0.001$) and subjective symptom scores (MD: -1.82, 95% CI: -2.34 to -1.31, $p < 0.001$) in individuals treated with tacrolimus compared to baseline. Subgroup analysis revealed similar efficacy of tacrolimus suspension formulation (MD: -1.30, 95% CI: -1.90 to -0.70, $p < 0.001$) and ointment formulation (MD: -1.30, 95% CI: -1.80 to -0.81, $p < 0.001$).

Conclusions: This meta-analysis provides robust evidence supporting tacrolimus as an effective therapeutic option for allergic conjunctivitis, with similar outcomes observed with suspension formulation and ointment formulation.

Abstract No.: 203729**A Multifunctional Nanoplatfom With Dual-Targeted Antibacterial and Cascaded Immunomodulatory Strategy for the Treatment of Bacterial Keratitis***First Author: Xiaolin QI*

Purpose: Bacterial keratitis (BK) is a serious ocular infection and frequently causes irreversible damage to the corneal tissue and even blindness. Current clinical treatments using antibiotics achieve unsatisfactory outcomes due to the lower bioavailability, high risks of drug resistance, and limited therapeutic functions.

Methods: We proposed a dual-targeted antibacterial and cascaded immunomodulatory therapy strategy, constructing a multifunctional nanoplatfom (HPBH@GLA/AMP) using the 3-aminophenylboric acid (NBA) and hyaluronic acid (HA) co-modified hollow polydopamine (HPDA) to serve as a functional nanocarrier (HPBH) for loading antimicrobial peptide (AMP) and glycyrrhizic acid (GLA).

Results: The HPBH@GLA/AMP presented excellent targeting and bactericidal performance to *Pseudomonas aeruginosa* (*P. aeruginosa*), coupled with its capacity to alleviate the bacteria-triggered excessive immune response via an ingenious cascaded immunoregulatory process. Notably, the study of the underlying anti-inflammatory mechanism revealed that the functional nanocarrier of HPDA could effectively scavenge the reactive oxygen species (ROS) for controlling early inflammatory responses, while inhibiting the expression of late mediator high mobility group box 1 (HMGB1) chemokine through released GLA. Specially, the dual-targeted characteristic enabled this nanoplatfom to recognize both the bacteria and inflammatory cells precisely and aggregate the location where bacteria and/or inflammatory cells exist persistently, effectively increased the therapeutic concentration of drugs. Featuring the antibacterial synergistic yet sequential regulation for the inflammatory response, the HPBH@GLA/AMP achieved satisfactory therapeutic effects in a BK mouse model in vivo.

Conclusions: This study provides a bright prospect for clinical treatment of refractory bacterial keratitis (BK) and even extended to other immunotherapy in infectious disease.

Abstract No.: 204989**A Rare Bilateral Varicella Zoster Epithelial Keratitis Secondary to Zoster Vaccination: A Single-Case Report***First Author: Oranat PITUCKANOTAI**Co-Author(s): Somporn CHANTRA, Peranut CHOTCOMWONGSE, Napon HIRANBURANA*

Purpose: To report an unusual case of bilateral varicella-zoster virus (VZV) keratitis occurring four weeks after administration of the first dose of recombinant zoster vaccine, adjuvanted (Shingrix®).

Methods: Retrospective case report.

Results: A 63-year-old Thai man presented to the ophthalmology clinic with bilateral ocular redness without pain or visual impairment. His past medical history included a complete remission of diffuse large B-cell lymphoma for 30 years, with no current immunosuppressive therapy. Four weeks prior to symptom onset, he had received both the first dose of Shingrix® and an influenza vaccine (Influtetra®). He reported no previous history of herpes zoster infection.

On examination, bilateral conjunctival injections were noted. Slit-lamp evaluation showed multiple tiny vesicles of epithelium and fluorescein-stained pseudodendritic lesions, with no anterior chamber inflammation. Posterior examination findings were unremarkable. He reported no systemic symptoms such as myalgia or fever. A clinical diagnosis of bilateral VZV epithelial keratitis was made. Treatment with oral acyclovir 800 mg five times daily and topical ganciclovir gel five times daily was initiated. After two weeks, the vesicles, pseudodendritic lesions, and conjunctival injection had completely resolved without visual impairment sequelae.

Conclusions: Although activation or recurrence of VZV keratitis following zoster vaccination is not common, clinicians should remain aware of this potential association, even in patients without a prior history of ocular VZV infection. Furthermore, bilateral VZV keratitis is particularly rare. Prompt recognition and treatment are essential to prevent complications and preserve vision.

Abstract No.: 204653

A Rare Case of Ocular Cicatricial Pemphigoid: First Biopsy-Proven Case in a Young Filipino Male

First Author: Richard Dean Clod **DELA CRUZ**
Co-Author(s): Jamaine Melisse **CRUZ-REGALADO**,
Sharmaine Anjanette **NG**, *Raymond Nelson* **REGALADO**

Purpose: To report the first biopsy-proven case of ocular cicatricial pemphigoid (OCP) in a young, healthy Filipino male, an atypical demographic for OCP.

Methods: A 34-year-old male presented with a two-year history of intermittent eye redness, tearing, and foreign body sensation of both eyes with unremarkable ophthalmic history. Slit lamp examinations revealed subepithelial fibrosis, inferior fornix shortening (4.6mm in the right, 4.8mm in the left) and symblepharon formation of both eyes. Excision of the symblepharon with ocular surface reconstruction using an amniotic membrane graft was performed. Excised conjunctival tissue was subjected to hematoxylin and eosin (H&E) staining and direct immunofluorescence (DIF).

Results: DIF showed strong linear deposits of IgG and fibrinogen in the basement membrane zone of the conjunctival tissue, which confirms the diagnosis of OCP. Postoperatively, the right eye demonstrated deepening of the fornix and improved motility with the graft well-apposed. The patient was referred for systemic immunosuppression to control inflammation.

Conclusions: OCP is a rare autoimmune disease that primarily affects older females, and is uncommon for younger males. Early ocular symptoms are often nonspecific and may mimic chronic conjunctivitis or dry eye, delaying diagnosis. In younger patients, OCP may progress more rapidly and severely, emphasizing

the need for prompt and early diagnosis. This case report highlights the need for increased awareness among clinicians in the Philippines to consider OCP as a differential diagnosis for chronic conjunctivitis, even in patients outside the typical older female demographic, thereby improving diagnostic accuracy, treatment approach and patient outcomes.

Abstract No.: 205198

A Rare Case of Salzmann Nodular Degeneration in Adolescent Age

First Author: Shital **NANNAWARE**
Co-Author(s): Puja **BANG**

Purpose: Salzmann Nodular Degeneration (SND) is a corneal condition typically seen in older individuals, but it can occur in young people as well, though less commonly. Here we are presenting a case of 17 17-year-old male with both eyes with corneal opacity.

Methods: A seventeen-year-old male presented with defective vision in both eyes for a few years with whitish discoloration. The patient had gradually progressive painless defective vision for many years. It was not associated with fever or redness in the eyes. Patient is not using any spectacles, though prescribed already. No previous history of trauma or surgery. Medical history not significant. Family history is also not significant. Birth is a full-term normal vaginal delivery.

Results: On examination, visual acuity in RE -6/36, LE -6/24, not improving with pinhole, Ocular examination BE-Had presenile arcus. RE suggestive of temporal paracentral corneal anterior stromal raised leucomatous opacity with surrounding edema. Rest examination is normal. The left eye is suggestive of a temporal paracentral 2mm subepithelial opacity; the rest of the examination was normal. Both eye horizontal nystagmus present. The posterior segment was normal. Facial symmetry with a broadened nasal present. Post-segment evaluation was normal. Central corneal thickness noted in RE-664um and LE-512 um. After examination decided for cyclorefraction, kept under observation, and started on topical hyperosmotics

Conclusions: Salzmann nodular degeneration occurs rarely at a young age, appears more in central to paracentral cornea than typical peripheral or mid-peripheral locations in old age, and is differentiated from peripheral hypertrophic subepithelial corneal degeneration and spheroidal degeneration. It can be treated by conservative management if asymptomatic or can go for superficial keratectomy. Hence, this case shows the need for early intervention in such cases.

Abstract No.: 203973**A Septic Shock in Periorbital Necrotizing Fasciitis: A Case Report***First Author: Maria Yovita Saraswati **PELE ALU****Co-Author(s): I Gusti Ayu Made **JULIARI***

Purpose: Periorbital necrotizing fasciitis (PNF) is a life-threatening skin infection that can rapidly involve the periorbital tissues. Delayed management increases the risk of mortality due to rapid hematogenous spread.

Methods: A case report. A 68-year-old male presented with swelling and a wound below the right eye for three days prior to hospital admission. The lesion ruptured and discharged pus two days earlier. Systemic symptoms included weakness, vomiting, and the appearance of a palatal mass one month earlier that progressively enlarged before rupturing into an open wound. On examination, the right inferior eyelid showed edema, spasm, hyperemia, purulent discharge, crusts, necrotic tissue, an unclean wound base, and tenderness. Ocular movement was limited toward the inferior and inferonasal directions.

Results: Laboratory tests revealed leukocytosis. Based on the Laboratory Risk Indicator for Necrotizing Fasciitis score, the patient was highly suspected of having PNF with C-Reaktif Protein 207. Gram stain of the wound showed both Gram-positive and Gram-negative bacteria, each at 3+. He was treated with metronidazole, clindamycin, gentamicin eye ointment, and levofloxacin eye drops. During hospitalization, the patient developed septic shock and died within three days of admission.

Conclusions: The presence of edema, induration in erythematous areas, with necrotic tissue, should raise suspicion of PNF. Severe complications include vision loss and septic shock, which are life-threatening. In this case, septic shock led to mortality. Early recognition and prompt intervention are essential to reduce mortality rates. Once the condition worsens, optimal management becomes significantly limited.

Abstract No.: 205200**Actinic Keratosis of the Conjunctiva in Scar Tissue Presenting as Temporal Pterygium***First Author: Shital **NANNAWARE****Co-Author(s): Puja **BANG***

Purpose: Case-report of a rare presentation of actinic keratosis of the conjunctiva: its clinical presentation, diagnosis, and management.

Methods: A 64-year-old female presented with a fleshy growth in the Right Eye (RE), gradually increasing in size since 2 years, associated with intermittent redness and discomfort. The patient had undergone bilateral pterygium excision with conjunctival autograft, 3 years back, and bilateral cataract surgery 2 years ago. She gave no history of exposure to chemicals or of trauma

to RE. LE had an uneventful post-operative course. On examination, distant vision OU was 6/6, near vision N6. Ocular examination revealed RE temporal pterygium with fibrosis, cystoid, and calcific changes extending 2-3mm over the cornea, inciting suspicion of OSSN. LE post-terygium surgery autograft was in place with no recurrence. Impression cytology of the RE lesion was sent to the pathology laboratory on OPD basis. During surgical dissection, the lesion was found adherent to the underlying clear-corneal temporal phaco incision. Excisional biopsy of the lesion with 2mm margin was performed followed by 0.04% Mitomycin-C application and conjunctival autograft.

Results: The cytology report was negative for malignant cells, showing scattered anucleated squames. Biopsy showed stratified squamous epithelium with regular differentiation and intact basement membrane.; sub-epithelial tissue showing large eosinophilic necrotic material (solar actinic changes) with no atypia. Topical steroids in tapering dosage with lubricating eyedrops were administered postoperatively.

Conclusions: Temporal pterygium with actinic changes in scar tissue is hitherto unreported, to our knowledge. Actinic keratosis has a high chronicity, recurrence or pre-cancerous potential. Preventive measures combined with effective surgical techniques and careful followup are essential for effective management and minimizing recurrence.

Abstract No.: 200222**Afatinib-Associated Bilateral Peripheral Ulcerative Keratitis: A Case Report***First Author: Joyce Teo **WEI TING****Co-Author(s): Hah **YAN YEE***

Purpose: To describe a rare case of bilateral peripheral ulcerative keratitis (PUK) potentially induced by afatinib in a patient with metastatic lung adenocarcinoma.

Methods: A 78-year-old man with underlying metastatic lung adenocarcinoma, previously treated with afatinib, was referred for sudden-onset bilateral ocular pain and headache. Best corrected visual acuity was counting fingers in the right eye and 6/20 in the left eye. Slit-lamp examination revealed a shallow anterior chamber in the right eye with signs of a sealed old corneal perforation and adherent leucoma. The left eye demonstrated peripheral corneal thinning with an impending descemetocoele. The patient was promptly referred to a rheumatologist for systemic evaluation. Autoimmune and infectious workups were negative, supporting a drug-induced aetiology.

Results: Initial treatment included the initiation of intensive topical corticosteroids, topical antibiotics, and chloramphenicol ointment. Despite treatment, the left eye progressed to frank corneal perforation within one week. Urgent application of cyanoacrylate glue and bandage contact lenses were applied on

bilateral eye to stabilize the perforation. Topical steroid was discontinued, and supportive treatment with lubricants, topical, and oral antibiotics were started. Unfortunately, due to terminal disease progression, the patient was transferred to palliative care and subsequently passed away.

Conclusions: Afatinib, an EGFR tyrosine kinase inhibitor, may be associated with peripheral ulcerative keratitis, which is a rare but vision-threatening complication. Early recognition and prompt ophthalmologic intervention are crucial to minimize the risk of permanent visual impairment in patients receiving EGFR-targeted therapies.

Abstract No.: 205576

Analysis of Clinical Features and Risk Factors for Intraocular Lens Opacification After Endothelial Keratoplasty in Pseudophakic Eyes

First Author: Xu **MAN**

Co-Author(s): Jie **BAI**, Ling **LI**, Shaowei **LI**, Chang **LIU**, Fangqi **LV**, Lin **ZHAO**

Purpose: To analyze the incidence, clinical features, and risk factors for intraocular lens (IOL) opacification following endothelial keratoplasty (EK) in pseudophakic eyes.

Methods: The retrospective case study included 281 patients (292 eyes) who underwent endothelial keratoplasty at Beijing Aier Intech Eye Hospital between September 2015 and May 2025. Patient demographics, surgical details, and postoperative complications were recorded. Potential risk factors were analyzed.

Results: Among the 292 eyes, IOL opacification occurred in 8 eyes, yielding an overall incidence rate of 2.74% (8/292). All opacification cases occurred in hydrophilic IOLs. The opacification was located on the anterior optical surface of the IOL in all cases. Among the 8 eyes with IOL opacification, 62.5% (5/8) had received additional air injection. In the subset of 98 eyes with clearly documented IOL material, there were 36 eyes with hydrophilic IOLs and 62 eyes with hydrophobic IOLs. The opacification rate was 22.22% (8/36) in the hydrophilic IOL group, whereas no opacification occurred in the hydrophobic IOL group. Within the hydrophilic IOL subgroup, the incidence of IOL opacification was 45.45% (5/11) in eyes that received additional air injection, compared to 12% (3/25) in those that did not. Regarding the type of gas used, one eye received long-term inert gas (C_3F_8) tamponade, while seven eyes received short-term (2-hour) pressurized air injection.

Conclusions: Hydrophilic IOL material is the primary risk factor for IOL opacification following EK, and additional air injection further increases this risk. Clinically, the use of hydrophilic IOLs in high-risk patients should be

avoided, intraoperative and postoperative gas contact time should be minimized.

Abstract No.: 202913

Analysis of the Clinical Characteristics of Dry Eye Patients With Type 2 Diabetes Mellitus at Different Disease Durations

First Author: Yangyang **ZHANG**

Co-Author(s): Lixin **XIE**

Purpose: To observe and analyze the clinical characteristics of ocular surface lesions, including symptoms and signs, in patients with type 2 diabetes mellitus (T2DM) and dry eye of different disease durations.

Methods: Ocular symptoms were assessed using the OSDI questionnaire. Ocular surface function was evaluated using the Cochet-Bonnet esthesiometer, CFS, Schirmer I tear test, TMH, NIK-BUT, and MGL scores. CCET and CCT were measured using AS-OCT. Corneal nerve fiber parameters were assessed using IVCM.

Results: In T2DM complicated by dry eye, key ocular surface indices—including SIT, NIKf-BUT, NIKav-BUT, LLT, CCET, and CS—were significantly reduced, while OSDI, MGL grading, and CFS scores were elevated. Corneal nerve parameters such as p-CNFL, p-CNFD, p-CNBD, i-CNFL, i-CNFD, and i-CNBD were also significantly decreased. Notably, changes in OSDI, SIT, MGL grading, NIKf-BUT, and several corneal nerve parameters were evident within the first five years of disease onset. These indices correlated significantly with disease duration. In later stages (more than 10 years), OSDI and MGL scores continued to rise, while p-CNFD, i-CNFL, i-CNFD, and i-CNBD declined further. The change of CFS, CS, CCET, and NIKav-BUT were significantly only after disease duration exceeded 10 years and were closely linked to disease progression.

Conclusions: In early-stage type 2 diabetes (duration ≤ 5 years), main ocular features include reduced tear secretion, loss of meibomian glands, unstable tear film, and decreased corneal nerve density. After more than 10 years, additional changes such as impaired corneal nerve function, corneal epithelial thinning, and weakened epithelial barrier function occurred.

Abstract No.: 200762

Assessment of the Clinical Efficacy of a Single Systane iLUX Treatment in Chinese Patients With Meibomian Gland Dysfunction: After 6 Months Study

First Author: Yiran **HAO**

Co-Author(s): Ying **JIE**

Purpose: To assess the efficacy of a single Systane iLUX treatment on meibomian gland dysfunction (MGD) signs and symptoms in Chinese patients over a 6-month period.

Methods: This prospective, single-arm study enrolled 30 subjects (60 eyes) with a Standard Patient Evaluation of Eye Dryness (SPEED) questionnaire score > 6 and a total meibomian gland secretion (MGS) score ≥ 6 in each eye. Participants attended four visits: screening, 1-month, 3-month, and 6-month follow-up. The primary endpoint was MGS. Secondary endpoints included orifices plugging score (OPS) and SPEED scores. Exploratory endpoints comprised tear breakup time (TBUT) and corneal fluorescein staining (CFS). The effect of follow-up time on the study endpoints was evaluated by one-way repeated measures ANOVA.

Results: As of the latest follow-up, a total of 30 subjects (60 eyes), comprising 4 males and 26 females with a mean age of 36.77 ± 12.43 years, have completed the 6-month follow-up period. Following 6 months of a single treatment, MGS for both the upper ($F=95.112$, $P<0.001$) and lower ($F=72.432$, $P<0.001$) eyelids demonstrated marked enhancement. Similarly, OPS showed significant reductions for both the upper ($F=89.808$, $P<0.001$) and lower ($F=58.489$, $P<0.001$) eyelids. Additionally, SPEED scores ($F=8.163$, $P<0.001$), TBUT ($F=11.011$, $P<0.001$), and CFS ($F=4.499$, $P=0.013$) exhibited notable improvements.

Conclusions: The Systane iLUX treatment has demonstrated significant clinical efficacy over a 6-month period. The sustained benefits observed suggested Systane iLUX may offer long-term therapeutic advantages for managing MGD.

Abstract No.: 204399

Atypical Stevens–Johnson Syndrome Induced by Ornidazole

First Author: Aditi **BANSAL**

Co-Author(s): Shagun **KORLA**, Gian Chand **RAJPUT**, Sahildeep **SINGH**

Purpose: To report a rare case of Stevens–Johnson syndrome (SJS) with isolated ocular involvement after ornidazole intake, and to highlight the diagnostic and therapeutic role of ophthalmologists in such atypical presentations.

Methods: A 67-year-old female with epilepsy developed ocular and oral symptoms approximately one hour after ingesting ornidazole for acute diarrhea. She presented with bilateral swollen eyelids, photophobia, excessive lacrimation, pricking sensation, lips swelling and oral mucosal ulceration, without cutaneous manifestations. Best-corrected visual acuity was 3/60 in both eyes, with normal intraocular pressure. Examination revealed bilateral conjunctival hyperemia with chemosis and punctate keratitis, which rapidly progressed to a large epithelial defect within two days. Based on clinical features and medical history, a diagnosis of drug-induced SJS with mucosal and ocular involvement was made.

Results: The patient was managed with multimodal therapy including topical antibiotics, preservative-free lubricants, pad and patching, oral corticosteroids, and subsequently bandage contact lens application. Over two weeks, ocular surface healing was achieved with stabilization of visual acuity.

Conclusions: This case underscores that SJS may rarely present without skin involvement, making ophthalmic evaluation crucial for early diagnosis. Ornidazole, though uncommon, should be recognized as a potential trigger. Prompt recognition and intensive ocular management are essential to prevent vision-threatening complications in such atypical cases.

Abstract No.: 204481

Atypical Viral Epithelial Keratitis After Ophthalmic Surgery

First Author: Vijaylaxmi **B**

Co-Author(s): Vineeth **BHIMSHETTY**

Purpose: To report a series of three cases of herpetic epithelial keratitis occurring after cataract surgery, vitrectomy in patients with no prior history of viral keratitis

Methods: Three patients underwent uncomplicated phacoemulsification with intraocular lens implantation, and one patient underwent vitrectomy. Postoperative treatment included topical antibiotics, corticosteroids, nonsteroidal anti-inflammatory drugs (NSAIDs), and lubricating eye drops. Upon the appearance of corneal epithelial lesions, topical steroids were discontinued and treatment was initiated with topical ganciclovir and oral antiviral agents.

Results: The immediate postoperative period was uneventful in all cases. Corneal epithelial lesions suggestive of herpetic keratitis were noted approximately five to eight weeks after surgery. All lesions resolved with antiviral treatment

Conclusions: Herpetic epithelial keratitis can present atypically following intraocular surgery, even in patients without a prior history of the disease. Prompt recognition and antiviral treatment are critical to achieving a favorable outcome.

Abstract No.: 201250

Averting Perforation: Medical Management of Fungal Corneal Ulcer in a Low-Resource Setting

First Author: Clarissa **LISTER**

Co-Author(s): Fajri **IJRIAN**, Cindy Prajna **METTA**, Gede **PARDIANTO**, Kristo Hadi Audric **SUGIAMAN**

Purpose: This case report details the medical management of a severe fungal corneal ulcer with impending perforation, a condition that frequently leads to evisceration in low-resource settings. With limited diagnostic tools available, this case underscores

the critical role of clinical acumen, meticulous physical diagnostic, and persistent medical therapy in preserving the globe and visual function.

Methods: A 42-year-old male presented with a two-week history of severe right ocular pain, redness, and a visual acuity of 1/300. Slit-lamp examination revealed a central stromal infiltrate with feathery borders and corneal thinning, suggestive of neglected fungal corneal ulceration resistant to initial topical therapy. The patient's self-application of betel leaf extract worsened the condition, inducing hypopyon. Despite limited available diagnostic investigations and therapy selections, the patient was admitted for aggressive medical therapy of topical Natamycin 5%, systemic Ketoconazole, and systemic antibiotics (intravenous and oral), with the regimen adjusted weekly over two months.

Results: The patient's condition improved following the intensified medical therapy, averting a threatened perforation. The hypopyon and corneal ulcer resolved without surgical intervention, successfully saving the eyeball and preventing devastating complications including endophthalmitis. Uncorrected visual acuity improved to 1/60.

Conclusions: The high rate of evisceration for fungal corneal ulcer in developing countries, estimated at 8-11.5% in similar case series. This case demonstrates that early identification and aggressive medical management may be an alternative to surgical intervention, offering a replicable strategy to prevent globe loss and preserve visual function in resource-constrained environments.

Abstract No.: 200669

Beyond Conventional Therapy: Meropenem for Pseudomonas Keratitis

First Author: Adrian Jian Zhi CHIN

Co-Author(s): Nurul Fatin FADZULLAH SHUHAIMI

Purpose: To report on the usage of meropenem eye drops in multidrug-resistant *Pseudomonas aeruginosa* corneal ulcer and to highlight the importance of tailoring management according to the sensitivity.

Methods: A case report.

Results: The 62-year-old patient, with an underlying history of diabetes mellitus and end-stage kidney disease, was diagnosed with multidrug-resistant *Pseudomonas keratitis*. 2 weeks prior to presentation, he was admitted for MRSA-positive occipital carbuncle and diabetic foot ulcer. Readily available antimicrobial eyedrops were proven to be ineffective, which led to the usage of Gutt Meropenem 5%, which we tailored according to the sensitivity of the organism. The patient eventually developed endophthalmitis and scleritis, which we also treated him with IVT Meropenem, however, the patient ended up with evisceration of the affected eye.

Conclusions: Multidrug-resistant ophthalmic infections are difficult to treat as per our report. It is important to tailor the management early according to the sensitivity of the culture to prevent deterioration and poor visual prognosis which can negatively affect patients' well-being.

Abstract No.: 204819

Beyond The Cloudy Cornea: A Five-Year Clinical Profile of Corneal Endothelial Decompensation in Indonesia

First Author: Izza ZUKHRUFIA

Co-Author(s): Faraby MARTHA, Rio RHENDY, Syska WIDYAWATI, Jessica ZARWAN

Purpose: To describe the demographic, clinical characteristics, and treatment outcomes of patients with corneal endothelial decompensation at a national tertiary hospital in Indonesia.

Methods: A retrospective descriptive study was conducted using medical records of patients diagnosed with corneal endothelial decompensation and related disorders. We analyzed data on demographics, clinical presentation, etiology, and treatment. One-year graft survival rate was evaluated in eyes that underwent definitive surgical treatment (keratoplasty).

Results: A total of 318 patients' medical records (371 eyes) were included in the analysis. The mean age was 59.8 years, and 63% of the population was male. Pseudophakic bullous keratopathy (40.2%) was the most common clinical entity of endothelial decompensation, with prior intraocular surgery (57.9%) as the leading etiology. Over half (55.3%) of eyes were classified as blind at presentation. Keratoplasty was performed in 52 eyes (14%): 45 underwent penetrating keratoplasty (PKP), and seven underwent Descemet stripping endothelial keratoplasty (DSEK). Among 37 eyes with sufficient follow-up, the one-year graft survival rate was 54.8% for PKP and 83.3% for DSEK. Non-definitive surgeries were performed in 17% of eyes, mainly for intraocular lens-related problems.

Conclusions: History of prior intraocular surgery was the predominant cause of endothelial decompensation. Most cases presented with severe disease and blindness. While keratoplasty remains the definitive therapy, limited donor availability is a barrier. DSEK demonstrated superior short-term outcomes compared to PKP.

Abstract No.: 207429**Bilateral Corneal Perforation Following Post-PRK Fungal Keratitis Managed With Tenons Patch Graft***First Author: Somasheila MURTHY**Co-Author(s): Prajakta DANDEKAR, Suresh PALINISAMY*

Purpose: To report an unusual case of bilateral post-PRK corneal melt initially presumed as viral or immune-mediated keratitis, subsequently developed secondary fungal infection, and its successful management with bilateral Tenon's patch grafts.

Methods: Case report.

Results: A 22-year-old female underwent bilateral photorefractive keratectomy (PRK) for correction of low myopia. She developed bilateral central corneal melt three weeks post-operatively. There was no response to oral antivirals (for presumed necrotizing stromal keratitis) and oral steroids (for presumed immune-mediated melt). She gradually developed pigmented corneal infiltrates, and microbiology revealed fungal infection. Despite intensive antifungal therapy, she developed corneal perforations. She was referred for further management after applying tissue adhesive as a temporary measure. Bilateral Tenon's patch grafts (TPG) were performed, and the infection resolved with antifungal therapy. Three months later, her vision improved to 20/40, which was maintained even at one-year follow-up.

Conclusions: Bilateral corneal melt following PRK is rare. A high index of suspicion is required to identify microbial keratitis as a potential cause, especially since sterile infiltrates are also known post-PRK. Tenon's patch graft serves as an effective option in such a situation.

Abstract No.: 204421**Bilateral Peripheral Hypertrophic Subepithelial Corneal Degeneration Documented With Anterior Segment Optical Coherence Tomography***First Author: Law JIN XING**Co-Author(s): Syarifah Nur Humaira BINTI SYED MOHD KHOMSAH, Wan Nur Asyiah BINTI WAN AHMAD HAZIM*

Purpose: To describe a rare case of bilateral peripheral hypertrophic subepithelial corneal degeneration (PHSD) and highlight the role of anterior segment optical coherence tomography (AS-OCT) in diagnosis.

Methods: A 55-year-old woman with low myopia and a past history of treated pulmonary tuberculosis was reviewed during routine ocular follow-up. She reported no visual symptoms. Comprehensive ophthalmic examination and AS-OCT imaging were performed.

Results: Best-corrected visual acuity was 6/7.5 in both eyes. Slit-lamp examination revealed elevated

subepithelial opacities at the nasal and temporal corneal periphery bilaterally, with superficial corneal vascularization and a brown demarcation line resembling Stocker's line in the left eye. The anterior chamber was quiet, and fundus findings were normal. AS-OCT demonstrated dense hyperreflective subepithelial fibrotic layers with epithelial thickening and extension into the anterior stroma in both eyes, consistent with PHSD. Intraocular pressure was normal. The patient was managed conservatively with lubricants and scheduled for follow-up.

Conclusions: PHSD is an uncommon, often underrecognized corneal degeneration that may mimic other peripheral corneal disorders. Bilateral presentation is frequent but the condition itself is rare. AS-OCT provides valuable structural confirmation, aiding accurate diagnosis and preventing unnecessary interventions.

Abstract No.: 206299**Blinded by Numbness – From Neuralgia to Neurotropy***First Author: Aanchal SINGHAL**Co-Author(s): Shreya BHADANI, Matuli DAS, Siddhartha KAR, Srinidhi N, Shrutakirti PARIDA*

Purpose: To report a rare case of recalcitrant corneal ulcer developing after radiofrequency ablation for trigeminal neuralgia.

Methods: A 65-year-old hypertensive male presented with pain and decreased vision in the left eye (LE) for 15 days. Best-corrected visual acuity (BCVA) was 6/6, N6 in the right eye (RE) and counting fingers at ½ meter in the left eye (LE). He underwent radiofrequency ablation for trigeminal neuralgia 2 months earlier. On examination, RE showed grade 1 nuclear sclerosis. LE had circumcorneal congestion, corneal edema, inferior corneal ulcer, a dense 1–2 mm hypopyon, and grade 2 nuclear sclerosis. RE fundus was normal. B-Scan (LE) demonstrated a clear vitreous cavity with attached retina.

Results: The patient was started on vitamin A gel and lubricants. After two weeks, vision worsened to perception of light (PL+), hypopyon increased to 4–5 mm, the anterior chamber filled with exudates, and the corneal ulcer progressed. Clinically, it resembled a fungal corneal ulcer. Patient recalled a possible vegetative injury while working in fields 20 days back. Topical and oral antifungal therapy with cycloplegics was initiated. Anterior chamber paracentesis and intracameral voriconazole injection (0.1 ml) were performed, followed by bandage contact lens application. Final diagnosis of fungal corneal ulcer overlapping neurotrophic keratitis was made. At 2 weeks, BCVA improved to 4/60, hypopyon resolved, and symptoms markedly reduced.

Conclusions: Corneal sensory denervation following radiofrequency ablation for trigeminal neuralgia predisposes to impaired blink reflex and defective epithelial healing. Secondary infection in this setting acts as a “double-edged sword,” compounding the morbidity. Awareness among neurologists and ophthalmologists is critical to enable early recognition and prevention of sight-threatening sequelae.

Abstract No.: 201276

Blue Light Induces Corneal Epithelial Damage by Activating the NLRP3 Inflammasome Pathway

First Author: Jiayun GE

Co-Author(s): Ye SHEN, Jiaping TONG

Purpose: The rapid adoption of digital devices and LED lighting has led to increasing exposure to blue light (BL), raising concerns about its potential harmful effects on ocular health. However, the molecular mechanisms underlying BL-induced corneal damage remain insufficiently explored. This study investigates the role of the NLRP3 inflammasome in BL-induced corneal epithelial injury, aiming to identify potential therapeutic targets for preventing BL-associated ocular surface diseases.

Methods: Corneal injury was assessed through fluorescein staining, wound healing assays, and tear break-up time (TBUT). Cell viability, migration were assessed. Bioinformatic analysis identified NLRP3 as a key target of BL-induced damage. Pharmacological inhibition of NLRP3 was achieved using MCC950, and its effects were assessed in vitro and in vivo.

Results: In vivo, BL exposure resulted in significant corneal damage, as evidenced by increased fluorescein staining and a higher injury score. In vitro, HCECs exposed to BL exhibited time- and intensity-dependent dysfunction. Bioinformatic analysis identified 60 common differentially expressed genes related to corneal damage, wound healing delay, and BL exposure. NLRP3 was identified as a central mediator, and BL exposure significantly upregulated NLRP3 in both mouse corneas and HCECs. Pharmacological inhibition of NLRP3 alleviated BL-induced cellular damage. In vitro, MCC950 treatment restored HCEC viability, while reducing oxidative stress, ROS production, and mitochondrial dysfunction. In vivo, MCC950 treatment significantly reduced corneal epithelial injury, accelerated wound healing, and prolonged TBUT in BL-exposed mice.

Conclusions: These findings highlight the potential of targeting NLRP3 inflammasome as a therapeutic strategy for preventing and treating BL-associated corneal damage.

Abstract No.: 205138

Bowman's Layer Stromal Transplantation for Advanced Keratoconus - Our Five Years of Experience With 42 Cases

First Author: Madhu UDDARAJU

Co-Author(s): Shanthi PENMATSA

Purpose: To evaluate the efficacy of Bowman's layer transplantation in advanced keratoconus in evading a corneal transplantation.

Methods: Cases with advanced keratoconus not suitable for CXL and who were willing to avoid a transplant were enrolled in the study. After the donor cornea was mounted over an artificial chamber, a 100 micron incision was made with a guarded knife and dissected to get the Bowman's layer along with the anterior stroma with the help of lamellar dissectors, and then trephined to 7.5mm. This lenticule is then inserted into the recipient after creating a mid-stromal pocket with the help of manual lamellar dissection.

Results: The primary objective of disease stabilisation was achieved in all the cases, K Max decreased, ranging from 2D to 6D, over a period of 3 months, and HOAs decreased by 40-60%. BCVA improved with CL. We could avoid a PKP/DALK in all cases.

Conclusions: Bowman's layer stromal transplantation is a tissue sparing innovative procedure that can be safely tried in cases of advanced keratoconus not suitable for CXL in whom we want to avoid corneal transplantation

Abstract No.: 203855

Bowman's Membrane Transplantation in Progressive Keratoconus

First Author: Madhuvanthi MOHAN

Co-Author(s): Sujatha MOHAN

Purpose: To describe the clinical outcome of Bowman's membrane transplantation (BMT) in a young patient with advanced progressive keratoconus unsuitable for collagen cross-linking.

Methods: A 21-year-old female with advanced keratoconus presented with progressive visual decline and contact lens intolerance. Corneal topography revealed Kmax of 73D and thinnest pachymetry of 430 µm. Owing to lower corneal thickness and a mire central cone, we decided on Bowman's membrane transplantation. It was performed using a donor Bowman's layer and inserted into a mid-stromal pocket created with a manual dissection technique.

Results: The procedure was uneventful. Postoperatively at 1 week, Kmax showed a significant reduction and was 57.5D. The cornea remains stable, and the patient is still under follow-up. The patient reported a subjective reduction in visual distortion.

Conclusions: Bowman's membrane transplantation may offer a promising tissue-sparing option for young patients with advanced keratoconus.

Abstract No.: 205225

Breaking Ground: First Case of Conjunctivitis With Cowdry Type A Inclusion Bodies in Upper Tarsal Follicles After Herpes Zoster

First Author: Rakhi P DCRUZ

Purpose: To present the first reported case of conjunctivitis caused by herpes simplex virus manifesting after herpes zoster infection, marked by the unprecedented detection of Cowdry type B inclusion bodies in upper tarsal conjunctival follicles. This report aims to document the unique clinical presentation, diagnostic challenge, and multidisciplinary management.

Methods: A 41-year-old male with a history of left-sided herpes zoster 1 month back experienced persistent ocular discomfort, including foreign body sensation and large conjunctival follicles with gelatinous, pearly material on the upper tarsal conjunctiva. Initial treatment with lubricants, steroids, and antibiotics failed. Excision biopsy of the follicles was performed, followed by histopathological and immunological evaluation.

Results: The excised conjunctival follicles released multiple pearly cysts containing whitish fluid. Histopathology confirmed the presence of Cowdry type A inclusion bodies consistent with herpes simplex virus within these cysts, a finding not previously described in tarsal conjunctival follicles post-herpes zoster. The patient underwent systemic valacyclovir treatment after consulting an immunologist; combined with topical steroids & antivirals, and required surgical excision with adjunctive corticosteroid injections and cauterisation to base and betaine application to manage persistent lesions. Recurrences were managed successfully with repeated excision, cautery, and prolonged systemic antiviral therapy. Complete symptom resolution was achieved at 3 months follow-up. He is on follow up for past 1.5 yrs with no recurrences till date.

Conclusions: This first-of-its-kind case expands the spectrum of post-herpes zoster ocular complications and emphasizes the critical role of early histopathological confirmation, targeted systemic antiviral management, coordinated care with an immunologist, and combined surgical and medical treatment in recurrent follicular conjunctivitis

Abstract No.: 203923

Breaking the Cycle: Managing Recurrent Pterygium With the P.E.R.F.E.C.T Approach

First Author: Enzo SAPUANDI

Co-Author(s): Rio RHENDY

Purpose: To report a case of recurrent pterygium after multiple prior surgeries and evaluate the outcome of the P.E.R.F.E.C.T (Pterygium Extended Removal with Extended Conjunctival Transplantation) technique combined with conjunctival-limbal autograft (CLAU) and amniotic membrane transplantation (AMT).

Methods: A 31-year-old woman presented with recurrent pterygium in the left eye, complaining of persistent redness, tearing, and foreign body sensation. She had undergone four excision procedures between 2017 and 2023, including fibrovascular removal, conjunctival autografting, mitomycin C (MMC) application, and AMT. In September 2024, examination revealed recurrent pterygium with restrictive abduction. Surgical management consisted of the P.E.R.F.E.C.T technique with CLAU and multilayer AMT under general anaesthesia.

Results: The surgery achieved complete removal of fibrovascular tissue and stable placement of the conjunctival-limbal autograft and AMT. At early follow-up, the ocular surface was well covered without signs of fibrovascular regrowth. However, the patient developed transient blurred vision, pseudopterygium formation, and entropion, which were managed with intensive topical steroids, systemic anti-inflammatory therapy, and referral to oculoplastic services. Despite these complications, no recurrence of pterygium was observed during the initial postoperative period.

Conclusions: This case illustrates the complexity of managing recurrent pterygium in multiply operated eyes. The P.E.R.F.E.C.T technique combined with CLAU and AMT provided wide excision and stable ocular surface coverage, effectively preventing early recurrence. Nonetheless, secondary complications such as pseudopterygium and entropion highlight the importance of individualized surgical planning and long-term follow-up.

Abstract No.: 205723

Calotropis-Induced Corneal Decompensation: A Curse in the Desert

First Author: Lipi MITTAL

Co-Author(s): Sandeep CHOUDHARY, Mayank SHARMA

Purpose: To assess the spectrum of ocular toxicity of Calotropis Procera, complications, and management.

Methods: All prospective patients presenting to our centre with complaints of ocular exposure of latex of calotropis procera were included in this study. A total of 15 cases (13 males, 2 females) were studied.

Results: All of the patients were noted to have increased corneal thickness due to corneal oedema (766+92.1 microns) and decreased visual acuity (0.82+0.17). None of the patients was noted to have a corneal epithelial defect. A decrease in endothelial cell density (20.11+276.8 versus 2394+373.2, $p=0.0007$), increased coefficient of variation (34.9+5.9 versus 25.3+2.7, $p=0.00001$), and decreased hexagonality (46.2+4.1 versus 49.3+3.62, $p=0.001$) as compared to the fellow eye was noted. We treated the patients with frequent application of topical steroid eye drops, hyperosmotic agents, cycloplegic agents, and prophylactic antibiotics. All the patients had good visual outcomes with mean visual acuity improving from 0.82 to 0.17 ($p<0.05$).

Conclusions: Local application of Calotropis latex is known to cause an inflammatory response. Early recognition and timely treatment are key aspects of management.

Abstract No.: 206663

Case Report on Ophthalmologic Manifestations in Eczema Herpeticum

*First Author: Juan Paulo **RIEGO DE DIOS***

*Co-Author(s): Victor Ephraime **PAULINO***

Purpose: This is a case of eczema herpeticum that primarily affected the face and periorbital area of a patient. While there have been case studies about eczema herpeticum before, none have focused on the ophthalmological aspect.

Methods: The patient is a 31-year old Icelandic male with history of atopic dermatitis and bronchial asthma. He presented with a 4-day history of multiple, painful pruritic erythematous vesicles on the face, primarily on the eyelids. These lesions developed into punched out erosions on the periorbital area. Initial management included confirmatory tests, and treatment of intravenous acyclovir, topical antibiotics, oral antihistamine, supportive medication and cleaning of the affected areas.

Results: Physical examination showed multiple erythematous based vesicles, some leaving punched out erosions and dried hemorrhagic crusts on the face, mainly affecting bilateral eyelids, associated with bilateral periorbital swelling. There was also hyperemic conjunctivae, and matting and crusting of eyelashes. Visual acuity was 20/20 for both eyes. Complete blood count revealed normal results. Intravenous acyclovir was started prior to release of Tzanck smear results which eventually showed multinucleated cells which supports the diagnosis of eczema herpeticum.

Conclusions: In this patient, management was started early due to the high index of suspicion. Because of this, the patient improved promptly. In other cases where it is left undiagnosed and untreated, complications from eye HSV may cause blindness and in the worst cases,

death. This emphasizes the importance of considering eczema herpeticum as a differential in atopic patients presenting with periorbital dermatologic lesions.

Abstract No.: 207414

Case Series of Infectious Scleritis

*First Author: Apoorva **OJHA***

Purpose: We must keep the diagnosis of infectious scleritis in mind while seeing a case of any scleritis.

Methods: We have studied the causative organism and the visual outcome of 3 cases. We have ruled out autoimmune causes and biopsy if indicated. Out of three cases, 1 has a history of trauma. All patients had a good visual outcome, as they were treated on time. Two patients had nodules with discharge. Smear preparation is done with nodular scraping. One patient showed nodular-like thickening with a uveal show. All autoimmune causes were ruled out. Infectious disease expert opinion taken. All tests were negative. Bronchoalveolar lavage was positive for gene Xpert. Nodular scraping was done in the other two patients, as discharge was present.

Results: Culture reports showed Nocardia species in one case and Klebsiella pneumonia in another case. Patients were treated as per the culture sensitivity report. K. Pneumonia patient was given tablet ciprofloxacin. The patient showing growth with Nocardia species was given sulphamethoxazole and trimethoprim combination. Patient with gene xpert positive on BAL started on AKT. One patient was lost to follow-up, and another patient is posted for scleral patch grafting. Patient on AKT has improved symptoms.

Conclusions: In every case of scleritis, we must keep the differential diagnosis of infectious scleritis in mind. Nearly 50% of cases are due to an associated collagen vascular disease, and an infectious etiology is comparatively rare. Visual outcome is poor in infectious scleritis because of a delay in diagnosis. An organism can be virulent.

Abstract No.: 206009

Celastrol Nanomedicine Eye Drops Restore Redox Homeostasis and Prevent Keratoconus Progression via PI3K/AKT/AP-1 Signaling

*First Author: Ruixing **LIU***

*Co-Author(s): Xingchen **GENG**, Jingguo **LI**, Zhanrong **LI**, Ruojun **MA**, Nan **ZHANG**, Lei **ZHU***

Purpose: Keratoconus (KC) is a progressive corneal disease driven by oxidative stress, yet its molecular mechanisms are not fully elucidated, and effective drugs are unavailable. This study investigated the role of oxidative stress and the PI3K/AKT/AP-1 pathway in KC and evaluated the therapeutic potential of cationic polymeric nanomicelles loaded with celastrol (CPNM) to halt disease progression.

Methods: Human KC corneas underwent proteomic analysis, with key findings validated by immunohistochemistry and Western blot. An in vitro oxidative stress model was established using hydrogen peroxide-treated rabbit corneal stromal cells. CPNM was synthesized to improve corneal permeability and enable sustained drug release. A rabbit KC model was employed for in vivo studies, with outcomes assessed via slit-lamp exam, histology, pachymetry, corneal curvature, and biochemical assays. Pathway analysis and MMP activity were also examined.

Results: Proteomic and subsequent analyses of KC corneas revealed significant oxidative stress signatures, characterized by a pronounced Nox/Nrf-2 redox imbalance (elevated Nox-4/Nox-2 and suppressed Nrf-2) and activation of the PI3K/AKT/AP-1 signaling axis. In the rabbit KC model, CPNM treatment effectively attenuated corneal curvature progression, increased stromal thickness, and reduced ROS levels. Mechanistically, CPNM downregulated the PI3K/AKT/AP-1 pathway, restored Nox/Nrf-2 balance, and suppressed MMP activity in corneal tissues. In vitro experiments confirmed that CPNM suppressed ROS, rebalanced the Nox/Nrf-2 system, and inhibited PI3K/AKT/AP-1 activation.

Conclusions: CPNM effectively halts KC progression by simultaneously reducing oxidative stress via Nox/Nrf-2 rebalancing and suppressing ECM degradation through PI3K/AKT/AP-1 inhibition, representing a promising therapeutic strategy.

Abstract No.: 200563

Cell-Free Matrix Derived From Adipose Mesenchymal Stromal Cells Enhances Corneal Rehabilitation via Delivery of Nerve Regenerative PGRN

First Author: Dan **YAN**

Co-Author(s): Xuguang **SUN**

Purpose: Promotion of corneal dense network of nerves is a promising method to treat severe corneal injury, yet there are limited effective drugs. In our previous work, decellularized matrix of adipose-derived mesenchymal stromal cells (ADMSCs), named DMA, presented excellent conjunctival repair capacity with proper suture resistance and immune modulatory characteristics. Thus, we aimed to investigate the potential application of DMA in facilitating corneal repair after alkali burn.

Methods: We used DMA as novel ocular bandages with nutritious function due to its transparent characteristic. The study compared corneal recovery after treatment with DMA and amniotic membrane (AM) using fluorescein staining, slit-lamp examination, OCT, and corneal nerve immunostaining.

Results: Corneas treated with DMA showed accelerated recovery compared to those treated with

AM, as evidenced by fluorescein staining, slit-lamp examination, OCT, and corneal nerve immunostaining.

Conclusions: DMA is an effective treatment for corneal repair after alkali burn, promoting faster recovery than AM. Further investigation is needed to identify key components responsible for this enhanced recovery.

Abstract No.: 203062

Characteristics of Corneal Donors From Local Eye Bank Procurement in Jakarta, Indonesia

First Author: Lily Silva **ARDIANI**

Co-Author(s): Rommi **ADERIYANSAH**, Sharita Rosalyne **SIREGAR**

Purpose: To present demographics of corneal donors from local procurement at Jakarta Eye Bank, Indonesia.

Methods: This retrospective study was conducted from 2018 to 2025. Donor demographic data were collected. Corneal tissue grading, based on endothelial cell count (ECC), was performed using the EBAA standard. Spearman's correlation coefficient was used.

Results: A total of 35 patients (69 eyes) were included, with a mean age of 60.77 years (SD 18.98; range 10-94). The most common age group was >65 years (16, 45.7%), with a female preponderance (18, 51.4%). Cardiac arrest (13, 37.1%) was the leading cause of death, followed by cerebrovascular disease (10, 28.6%). Most retrievals were performed at funeral homes (25, 71.4%). Grade A (62, 89.9%) corneal tissues dominated our cohort, with a mean ECC of 2297.18 cells/mm² (SD 320.30; range 1418-2985). Penetrating keratoplasty (35, 50.7%) and DSAEK (23, 33.3%) were the most common surgeries, with a mean preservation-to-surgery time of 9.07 days (SD 2.9; range 1-14). There was a significant negative correlation between ECC grade and age ($R^2 = -0.250$, $P = 0.043$) and death-to-procurement time ($R^2 = -0.363$, $P = 0.003$). However, no significant correlation was found between ECC grade and gender ($R^2 = -0.004$, $P = 0.976$) or preservation-to-surgery time ($R^2 = -0.207$, $P = 0.116$).

Conclusions: Older age, female gender, and cardiac arrest were the most common donor profiles. Grade A corneal tissues were predominant, and penetrating keratoplasty was the most frequent surgery. Donor age influenced ECC grade; the older the donor, the lower the ECC grade. Death-to-procurement time also affected ECC grade; the longer the retrieval, the lower the ECC grade.

Abstract No.: 202949

Characteristics of Dry Eye Syndrome in Patients With Mild Graves' Ophthalmopathy

First Author: Thi Huong Giang BUI

Co-Author(s): Son BUI, Tung MAI, Quoc Anh NGUYEN, Dong PHAM, Van PHAM

Purpose: This study aimed to assess dry eye in patients with mild Graves' ophthalmopathy (GO) at the Vietnam National Eye Hospital.

Methods: This cross-sectional descriptive study evaluated dry eye syndrome in 40 eyes from 20 mild Graves' ophthalmopathy patients from January 2021 to December 2021 at the Vietnam National Eye Hospital. As an age-matched control group, 44 eyes of 22 adults without thyroid disease were selected. The Ocular Surface Disease Index (OSDI), tear break-up time (TBUT), Schirmer I tear test, and Corneal fluorescein staining (CFS) were assessed.

Results: The results showed that 65% dry eye in patients with mid GO disease was significantly higher, 3.98 times, compared to the control group (65% and 30%, $p < 0.001$, OR=3.98). The mean Schirmer I tear test score, TBUT score, CFS score, and OSDI score had a significant difference between GO and controls. Dry eye indices (TBUT, Schirmer I test, CFS) in mild GO patients were linearly correlated with proptosis, margin to reflex distance 1 (MRD1), and Clinical Activity Score (CAS). In the group of patients with active GO, the results of TBUT, Schirmer I test, CFS, and OSDI were statistically significantly higher than the inactive group ($p < 0.05$). Dry eye in the inflammatory group was 5.14 times higher than in the noninflammatory group (85.7% vs 53.8%, $p < 0.001$, OR = 5.14).

Conclusions: Dry eye syndrome was frequently damaged in patients with mild GO, 3.98 times higher than in the control group. Dry eye findings and the ocular surface damage in GO were severe in the group with active mild GO, 5.14 times higher than in the inactive group.

Abstract No.: 201192

Characteristics of Patients With Hay Fever Who Experience Symptom Exacerbation During PM2.5 and Yellow Dust Exposure: A Digital Cohort Study

First Author: Ken NAGINO

Co-Author(s): Atsuko EGUCHI, Takenori INOMATA, Akie MIDORIKAWA-INOMATA, Yuki MOROOKA, Shintaro NAKAO

Purpose: To investigate the characteristics of patients with hay fever who perceive symptom exacerbation during PM2.5 and yellow dust exposure.

Methods: Individuals with hay fever who used the smartphone application AllerSearch for hay fever research from February to May between 2018 and

2023 were enrolled. Participants reporting that their symptoms worsened during PM2.5 and yellow dust exposure were classified as the exacerbation group, while those reporting no worsening or being unsure were classified as the non-exacerbation group. Background factors, 9-item hay fever symptom scores, and 17-item Japanese Allergic Conjunctival Disease Quality of Life Questionnaire (JACQLQ) scores were compared using multiple regression analysis.

Results: A total of 368 individuals (mean age 40.6 years; 208 females [56.5%]) were classified into the exacerbation group, and 605 individuals (mean age 39.8 years; 276 females [45.6%]) into the non-exacerbation group. Compared with the non-exacerbation group, the exacerbation group had significantly higher proportions of females (regression coefficient 1.1, $P = 0.006$), psychiatric disorders (1.6, $P = 0.039$), atopic dermatitis (1.7, $P = 0.004$), and dry eye (1.4, $P = 0.004$). Regarding hay fever symptoms, the exacerbation group reported stronger nasal itching ($P = 0.033$) and ear/mouth itching ($P = 0.001$). JACQLQ scores were significantly higher in 9 of the 17 items, and the total JACQLQ score was significantly higher in the exacerbation group ($P = 0.016$).

Conclusions: Patients with hay fever who perceive symptom exacerbation during PM2.5 and yellow dust exposure present distinct characteristics, and such exacerbation appears to have a substantial negative impact on quality of life.

Abstract No.: 204991

Chronic Ambient Air Pollution and the Incidence of Blepharitis and Blepharoconjunctivitis: A Nationwide Population-Based Cohort Study

First Author: Yu-ling LIU

Co-Author(s): Cheng-hsien CHANG, Shu-han CHUANG

Purpose: To determine whether chronic exposure to ambient air pollutants increases the risk of blepharitis and blepharoconjunctivitis in a nationwide population.

Methods: We assembled a retrospective cohort of 552 965 adults (≥ 20 years) in Taiwan's National Health Insurance Research Database who were free of ocular surface disease at baseline and followed them from 2000 to 2013. Ten-year mean concentrations of sulfur dioxide (SO₂), carbon monoxide (CO), particulate matter $\leq 10 \mu\text{m}$ (PM₁₀) and $\leq 2.5 \mu\text{m}$ (PM_{2.5}), nitrogen oxides (NO_x), nitric oxide (NO), nitrogen dioxide (NO₂), total hydrocarbons, non-methane hydrocarbons, and methane (CH₄) were assigned by linking residential postcodes to 76 monitoring stations. Cox proportional-hazards models estimated hazard ratios (HRs) per 1-standard deviation (SD) increase, adjusting for demographics, socioeconomic status, smoking, comorbidities, ambient temperature, season, and short-term pollutant levels.

Results: Over 6.4 million person-years, 20,752 participants developed blepharitis/blepharoconjunctivitis. Kaplan–Meier curves demonstrated progressively higher cumulative incidence across increasing tertiles of 10-year pollutant exposure (log-rank $P < 0.001$). Adjusted HRs (per 1-SD) were: SO₂ 1.33, CO 1.98, PM₁₀ 1.76, PM_{2.5} 1.95, NO_x 1.72, NO 1.55, NO₂ 1.75, total hydrocarbons 1.90, non-methane hydrocarbons 1.34, and CH₄ 2.65 (all $P < 0.001$). Estimates were similar in sex-stratified analyses.

Conclusions: Decade-long exposure to multiple common air pollutants is independently associated with a 33 %–165 % increase in the risk of blepharitis and blepharoconjunctivitis. Reducing ambient pollution may help mitigate the population burden of ocular surface disease.

Abstract No.: 204674

Clinical Characteristics and Treatment Outcomes of Infectious Keratitis in Elderly Patients

First Author: Atitaya **ANAN**

Co-Author(s): Napaporn **TANANUVAT**

Purpose: To compare the clinical presentation, microbiological profiles, and treatment outcomes of infectious keratitis (IK) between elderly and adult patients, and to identify prognostic factors for visual outcomes.

Methods: This retrospective study analyzed 251 patients with IK (113 elderly, 138 adults) treated at a tertiary eye center in Northern Thailand from January 2021 to December 2023. Data collected included demographics, clinical features, microbiological findings, treatment modalities, and outcomes. Multivariable regression analysis was performed to identify prognostic factors associated with poor visual outcomes.

Results: Elderly patients (mean age 70.8 ± 7.0 years) presented with a significantly longer duration of symptoms (mean 20.3 vs. 14.6 days, $p = 0.07$) and worse initial visual acuity compared to adults (mean age 45.1 ± 11.6 years). Prior ocular surgery, topical steroid use, and systemic diseases were more common among the elderly ($p < 0.01$), whereas trauma and contact lens use were more prevalent among adults (all $p < 0.01$). Fungal keratitis was the most common pathogen in both groups. Elderly patients had a higher rate of treatment failure (67.0% vs. 52.8%, $p = 0.05$). Surgical interventions, including therapeutic penetrating keratoplasty (14.2% vs. 9.4%), were also more frequent in the elderly. Failed medical treatment and higher treatment costs independently predicted poor visual outcomes.

Conclusions: Elderly patients with IK present with more severe disease and have poorer outcomes than adults, with higher rates of treatment failure and

surgical intervention. Early identification of risk factors is essential for improving visual prognosis in this vulnerable population.

Abstract No.: 206645

Clinical Features of Infectious Corneal Ulcers

First Author: Yunanda Rizki Amalia **HARAHAP**

Co-Author(s): Marina Yusnita **ALBAR**

Purpose: Infectious corneal ulcer remains a significant cause of visual impairment, particularly in developing regions. Understanding its epidemiological characteristics, microbiological profiles, and treatment outcomes is crucial for improving management strategies. This study aims to analyze the clinical features, risk factors, and visual outcomes of corneal ulcer patients at Prof. Dr. CPL Universitas Sumatera Utara Hospital.

Methods: A retrospective observational study was conducted on patients diagnosed with infectious corneal ulcers at Prof. Dr. CPL Universitas Sumatera Utara Hospital from March 2023-January 2025. Patients' demographics, predisposing factors, microbiological findings, and visual acuity before and after treatment were collected and analyzed.

Results: A total of 29 cases were included, with a male predominance 82.7% and a mean age of 47.1 years. Eye pain was the most chief complaint in 26 patients 89.6%. Trauma was the leading predisposing factors and plant material as the most cause 37.9%. Microbiological analysis revealed positive gram coccus as the most frequently isolated pathogens 34.4%, followed by negative gram bacilli 31.0%, fungal elements 17.2% and no microbial growth 17.2% from Gram and KOH staining. Before treatment, 58.6% of patients had profound visual impairment or blindness (logMAR > 1.30), which decreased to 37.9% after treatment. However, a significant proportion still experienced residual visual impairment.

Conclusions: Infectious corneal ulcers predominantly affect middle-aged males, with ocular trauma associated with exposed to plant as a major risk factor. Despite medical interventions, a substantial proportion of patients retain visual impairment, highlighting the importance of preventive strategies such as protective eyewear and better public awareness.

Abstract No.: 204806

Clinical and Visual Outcomes of Manual Descemet Stripping Endothelial Keratoplasty: A Six-Year Retrospective Analysis

First Author: Anitha **VENUGOPAL**

Co-Author(s): Mangala **PERIASAMY**

Purpose: To evaluate visual and clinical outcomes of manual Descemet Stripping Endothelial keratoplasty (DSEK) in 183 eyes, including eyes with complex anterior segment status.

Methods: A retrospective analysis of 183 consecutive eyes undergoing manual DSEK/DSAEK was performed. Baseline demographics, lens status, surgical combinations, visual acuity (VA), IOP at serial follow-ups, and early and late complications were analyzed. Statistical comparisons were done using ANOVA with Tukey post-hoc testing.

Results: Mean age was 63.3 ± 13.4 years (range 11–95); 54.6% were female. The majority were pseudophakic (PCIOL 62.5%), with 25% having complex lens status (AC/Iris claw/SFIOL/aphakia). Isolated DSAEK was the most common surgery (74.9%). Pre-op VA was 1.33 ± 0.52 logMAR ($\sim 20/425$). A transient dip occurred on day 1 (1.53 logMAR), followed by progressive improvement to 0.84 ± 0.63 logMAR ($\sim 20/140$) at 12 months ($p < 0.001$). Mean pre-op IOP was 12.9 mmHg, with a significant day-1 spike (18.5 mmHg, $p < 0.001$) that normalized by day 7 and remained stable thereafter. Early postoperative complications were noted in 34.3%, most commonly air-bubble induced pupillary block (7.5%) and graft detachment/non-attachment (8%). Primary graft failure was 4.5%. About 34.9% developed late complications. Graft failure occurred in 12–13%, rejection in 10%, and secondary glaucoma in 6%. Interface haze/scarring (4%) and late infectious keratitis (2%) were uncommon. Overall, two-thirds of eyes remained complication-free both early and late.

Conclusions: Manual DSEK offers significant and sustained visual improvement, especially with a high proportion of complex anterior segments. While transient IOP spikes and graft-related events remain the main challenges, outcomes are comparable to automated EK series, underscoring the value of manual dissection in resource-limited settings.

Abstract No.: 207030

Cogan Syndrome in an 11-Year-Old Vietnamese Girl

First Author: Thao NGUYEN

Purpose: To report a case of Cogan syndrome in an 11-year-old Vietnamese girl.

Methods: Case report.

Results: Our patient, an 11-year-old girl, came for her first examination in July 2024 due to photophobia and red eyes. In November, she experienced episodes of prolonged fever and fatigue accompanied by red eyes, light sensitivity, and left-sided hearing loss, but all tests failed to identify the cause of the fever. The initial diagnosis was bilateral interstitial keratitis and fever of unknown origin. Upon reevaluating her symptoms, we diagnosed her with Cogan's syndrome. The patient was transferred to a Pediatric Hospital, where she received a pulse methylprednisolone in 3 days, followed by a tapering oral dose. After one month of treatment, the patient was afebrile, with partial hearing recovery;

however, permanent hearing loss remained in the left ear, requiring a hearing aid.

Conclusions: Cogan syndrome is a very rare disorder characterized by ocular involvement and sensorineural hearing loss, often accompanied by unexplained fever. Ocular symptoms may precede or occur simultaneously with systemic manifestations such as fever, requiring careful correlation of ocular and systemic findings to establish the final diagnosis.

Abstract No.: 202379

Combined Treatment by Customised Corneal Allogeneic Intrastromal Ring Segments (CAIRS) Followed by Accelerated Corneal Collagen Cross-Linking (CXL) for Advanced Keratoconus

First Author: Nikit SARWATE

Co-Author(s): Jayant SARWATE

Purpose: To evaluate the results of combined custom corneal allogeneic intrastromal ring segments (CAIRS) with corneal collagen cross-linking (CXL) in patients with advanced keratoconus.

Methods: A retrospective study of 12 eyes with advanced keratoconus that underwent customised CAIRS followed by CXL was included. Patients with $K_{max} > 50$ D and thinnest pachymetry of 390 microns at 5–7 mm zone on corneal topography were included. Uncorrected (UDVA) and best spectacle corrected (BSCDVA) distance visual acuity, flat keratometry (K1), steep keratometry (K2), maximum keratometry (Kmax), root mean square (RMS) of higher (HOA) order aberrations, vertical coma, and spherical aberration were also studied.

Results: Mean age was 26.55 years (Range 17–33 years). Mean BSCVA improved from 0.74 to 0.44 (logMAR) with $P < 0.001$ (Paired t Test), which was statistically significant. Mean Kmax significantly decreased from 61.77 to 56.6 D ($P = 0.0014$) postoperatively, which was statistically significant. Mean RMS of HOA, coma, and spherical aberrations also decreased significantly postoperatively ($P < 0.05$). The average follow-up duration was a minimum of 6 months up to 15 months. No intraoperative and postoperative complications were encountered. No patient complained of any glare or halos postoperatively. All patients showed better spectacle acceptance postoperatively.

Conclusions: Combined CAIRS with CXL can be used as a safe and effective treatment for advanced keratoconus. It helps in improving quantitative and qualitative vision as a better alternative to artificial intra-corneal ring segments (INTACS).

Abstract No.: 203682**Comparative Analysis of Intense Pulsed Light Therapy in Patients With Meibomian Gland Dysfunction, With and Without Glaucoma Medication***First Author: Jieun LEE**Co-Author(s): Kwang-eon HAN*

Purpose: This study assessed the efficacy of intense pulsed light (IPL) therapy for treating meibomian gland dysfunction (MGD), a key contributor to evaporative dry eye disease (DED), by comparing outcomes in patients with idiopathic MGD versus those with MGD induced by glaucoma medications.

Methods: In a retrospective analysis of 45 patients, divided into groups based on glaucoma medication use (20 patients) and non-use (25 patients), all underwent four IPL sessions combined with meibomian gland expression (MGX) at 3-week intervals. Key metrics evaluated included Ocular Surface Disease Index (OSDI) scores, tear breakup time (TBUT), Schirmer I test scores, and meibography scores, pre- and post-treatment.

Results: Significant improvements were observed in both groups across all parameters post-treatment, indicating enhanced tear film stability and meibomian gland function. The non-glaucoma group showed slightly greater improvements, suggesting the potential impact of glaucoma medications on MGD management.

Conclusions: These findings underscore IPL therapy's effectiveness in improving DED symptoms and meibomian gland function, highlighting its utility as a treatment option for patients with MGD, including those on glaucoma medications.

Abstract No.: 202348**Comparative Evaluation of Autologous Platelet-Rich Plasma and Artificial Tears for the Treatment of Chronic Evaporative Dry Eye: A Prospective Interventional Study***First Author: Pooja SINGH**Co-Author(s): J.I. GOYAL, Amarnath PANDEY, Divya SINGH*

Purpose: This study aimed at the comparative evaluation of the clinical outcomes of autologous PRP eye drop and artificial tear eye drop (AT) therapy in the treatment of chronic evaporative dry eye patients with moderate to severe symptoms.

Methods: One hundred patients with chronic evaporative moderate to severe DED in the 18 to 45 years age group were included. Patients were randomized into two groups (n = 50 each). One group received autologous PRP eye drops and the other AT drops. Outcome measures evaluated were subjective symptoms (OSDI) score, objective tear film

parameters (Oxford CFS score, TBUT and ST score, and BCVA (LogMAR, with improvement defined as gain of ≥ 1 line). Within the group and between the group, comparisons were done at the end of 6 months using paired and unpaired student's t-tests, respectively.

Results: Both the treatment groups (PRP and AT) showed significant improvement in OSDI and CFS scores, whereas TBUT and BCVA improved significantly only in the PRP group. No significant changes were observed in ST in either group. The post-treatment, between-the-groups analysis also favored PRP in all the parameters except ST. No significant adverse effect was noted throughout the study.

Conclusions: In chronic evaporative DED patients, autologous PRP showed significantly better clinical outcomes than AT and was found to be safe when given for a 6-month duration.

Abstract No.: 204864**Comparative Outcomes of CAIRS and INTACS in Keratoconus: A Consecutive Case Series***First Author: Madhuvanathi MOHAN**Co-Author(s): Sujatha MOHAN*

Purpose: To compare the short-term outcomes of Corneal Allogenic Intrastromal Ring Segments (CAIRS) and INTACS in keratoconus patients undergoing surgical management at a tertiary eye care center

Methods: A consecutive case series included patients undergoing CAIRS (n=12 eyes) and INTACS (n=8 eyes) between 2023–2024. Preoperative refraction and uncorrected distance visual acuity (UDVA) were recorded. Postoperative UDVA was assessed at 1 month and 3 months. Primary outcomes were the proportion of eyes achieving UDVA $\geq 6/12$ and mean reduction in cylinder. Safety was assessed by postoperative complications, including extrusion, infection, and visual loss.

Results: At 1 month, 58% of CAIRS eyes and 50% of INTACS eyes achieved UDVA $\geq 6/12$. By 3 months, this improved to 75% for CAIRS and 62% for INTACS. Mean cylinder reduction was -3D in the CAIRS group and -2.2D with INTACS. Both groups showed stable improvements in spherical equivalent and UDVA at 3 months. No sight-threatening complications were noted. Cosmetic outcomes were superior in CAIRS, while INTACS patients occasionally reported glare and halos.

Conclusions: Both CAIRS and INTACS significantly improved visual outcomes in keratoconus. CAIRS provided better cosmesis, while INTACS remained a safe synthetic option. These findings support CAIRS as a promising biological alternative to synthetic intrastromal ring segments

Abstract No.: 200795

Comparative Visual Outcomes After Refractive Laser Corneal Surgery vs Phakic IOL in Amblyopic Eyes

First Author: Bhupesh **SINGH**

Co-Author(s): Neha **BHARTI**

Purpose: To compare the outcomes of laser corneal surgery and phakic IOL surgery in adult amblyopic eyes.

Methods: Retrospective chart review of 688 amblyopic eyes of 950 patients who either underwent laser vision correction or phakic IOL for anisometropic amblyopia or suboptimal corrected distance visual acuity (CDVA). Postoperative uncorrected visual acuity (UCVA) was compared with preoperative best spectacle corrected visual acuity (BSCVA) individually for every patient.

Results: Group 1 includes 436 eyes, out of which 380 eyes underwent LASIK and 56 eyes underwent PRK. Group 2 includes 164 eyes which underwent phakic IOL implantation. No intraoperative complications were noted in any of the eyes. In group 1 postoperatively 2 eyes had DLK (Diffuse lamellar keratoplasty) 1 eye had macrostriae, 2 eye had microstriae.

Conclusions: Laser vision correction and phakic IOL surgery for amblyopic eyes showed better outcomes than glasses. Phakic IOL showed better visual outcomes than Laser corneal procedures for treating amblyopia in adults.

Abstract No.: 206420

Comparative Ocular Cytotoxicity of Polyethylene, Polyvinyl Chloride, and Polystyrene Microplastics in Human Corneal and Conjunctival Epithelium

First Author: Yujiao **JIN**

Co-Author(s): Woojin **KIM**, Ria **KANG**, Dong Hyun **KIM**, Junfeng **PIAO**, Jong Suk **SONG**

Purpose: Microplastics (MPs) are ubiquitous in air, water, and personal-care products and have been detected in human tear fluid, meibum, and aqueous humor, indicating ocular surface risk. Polymer-specific toxicity remains unclear. We compared polyethylene (PE), polyvinyl chloride (PVC), and polystyrene (PS) microplastics for toxic effects on corneal and conjunctival epithelium and explored mechanistic cues.

Methods: Human corneal epithelial cells (HCECs) and human conjunctival epithelial cells (HCjECs) were exposed to 50-nm PE, PVC, or PS. Endpoints included cell viability (WST-8); ELISA of supernatant TNF- α , IL-6, and IL-1 β ; and apoptosis measured by Annexin V-FITC/PI flow cytometry.

Results: PVC produced a marked loss of viability at lower concentrations, exceeding the reduction observed with PE or PS at higher test concentrations, indicating greater toxic potency. Under endpoint-specific assay conditions, PVC elicited the largest

increases in IL-6, IL-1 β , and TNF- α and yielded the highest apoptotic fractions. Across endpoints, HCECs responded more strongly than HCjECs, indicating more vulnerable to microplastic exposure.

Conclusions: Microplastic toxicity to ocular surface epithelium is polymer-dependent. PVC exhibits the greatest toxicity, and HCECs are more vulnerable than HCjECs. These comparative data support risk stratification of microplastics for ocular exposure and inform preventive strategies.

Abstract No.: 200851

Comparison of 25% Autologous Serum and 0.05% Cyclosporine A in Treating Severe Dry Eye Disease

First Author: Ming-hwei **TSAI**

Co-Author(s): Yi **WAN**

Purpose: To compare the efficacy of 25% autologous serum (AS) eye drops and 0.05% cyclosporine A ophthalmic emulsion (COE) in patients with severe dry eye disease (DED).

Methods: A retrospective study was conducted on 40 patients (80 eyes) with severe DED. Patients received either 25% autologous serum eight times daily or 0.05% cyclosporine A twice daily for 3 months. Clinical assessments included Ocular Surface Disease Index (OSDI), tear break-up time (TBUT), and Schirmer's test at baseline and months 1, 2, and 3.

Results: Both groups exhibited improved OSDI scores, with Group AS showing slightly greater symptomatic relief; however, no significant differences in OSDI were found between groups at 1, 2, and 3 months. Both groups demonstrated significant improvements in TBUT and Schirmer's test results over three months ($p < 0.001$). Slightly greater improvements in Schirmer scores and TBUT were observed in Group COE, though differences between groups were not statistically significant.

Conclusions: Both treatments are effective for severe DED. Autologous serum may provide better symptom relief, while cyclosporine A may improve tear parameters.

Abstract No.: 200693

Comparison of Systane iLUX With Warm Compress and Meibomian Gland Expression for the Treatment of Meibomian Gland Dysfunction Patients With Different Severities

First Author: Yuqian **WANG**

Co-Author(s): Jiandong **LI**, Zuguo **LIU**, Ying **WEN**, Yue **YUAN**

Purpose: To compare the clinical efficacy of Systane iLUX and meibomian gland warm compress massage in treating meibomian gland dysfunction (MGD) of different severity levels.

Methods: A multicenter, prospective, randomized controlled trial. Participants were randomly assigned in a 1:1 ratio to either the Systane iLUX treatment group (iLUX) or the meibomian gland warm compress massage group (MGX). Each group was further divided into two cohorts: mild-to-moderate and severe. Data were analyzed using a mixed-effects model.

Results: A total of 178 eyes from 89 MGD subjects were randomized to receive iLUX (n = 44) or MGX (n = 45). In mild-to-moderate MGD, at the 4th week, the lsmean (95%CI) change from baseline in the MGS score after treatment with the iLUX and MGX was -0.02 (-3.52 to 3.48) and -1.45 (-5.03 to 2.12), at the 12th week was 5.26 (1.76 to 8.76; P<0.001) and 4.07 (0.49 to 7.64; P<0.01). In severe MGD, at the 4th week, the lsmean (95%CI) change from baseline in the MGS score after treatment with the iLUX and MGX was 6.52 (2.82 to 10.23; P<0.001) and 5.35 (1.81 to 8.89; P<0.01), at the 12th week was 8.52 (4.82 to 12.23; P<0.001) and 8.26 (4.72 to 11.80; P<0.001).

Conclusions: The findings suggest that both Systane iLUX and MGX improve symptoms and signs in the treatment of MGD. Systane iLUX demonstrated comparable therapeutic efficacy to warm compress massage. Systane iLUX represents a valuable therapeutic option for managing meibomian gland dysfunction.

Abstract No.: 200504

Comprehensive Analysis of Corneal Endothelial Cell Mesenchymal Transition Mechanisms: Insights From Gene Expression and Raman Spectroscopy

First Author: Zhaoxiang LU

Co-Author(s): Yun FENG

Purpose: This study investigates the molecular mechanisms and dynamic processes of endothelial-mesenchymal transition (EndMT) in corneal endothelial cells (CECs), to provide insights into related disease pathogenesis and improve in vitro culture techniques.

Methods: Transcriptome sequencing identified differentially expressed genes during EndMT. Key markers were validated via qPCR, Western blot, and immunofluorescence. Time-series expression changes were analyzed at 0, 2, 12, and 24 hours. Raman spectroscopy was applied to detect biochemical alterations in cells undergoing EndMT.

Results: A total of 615 differentially expressed genes were identified, including 452 upregulated and 163 downregulated. Enriched pathways involved ECM regulation and PI3K-Akt signaling. Hub genes such as THBS1, ITGA5, COL1A1, and SNAI1/2 showed dynamic expression trends. Time-series clustering revealed six distinct expression patterns. Raman spectroscopy distinguished cell types and detected dynamic changes in lipids, RNA, and proteins.

Conclusions: This study elucidates key molecular and dynamic features of EndMT in CECs, offering novel perspectives for disease mechanism research and supporting the development of new diagnostic and culture strategies.

Abstract No.: 200393

Contact Lens-Related Pseudomonas aeruginosa Keratitis: Clinical and Microbiological Characteristics

First Author: Mai NGUYEN THI TRUC

Co-Author(s): Huong DUONG, Vinh LAM, Phuc NGUYEN, Huan PHAM, Huy TRAN

Purpose: To describe the clinical and microbiological features of Pseudomonas aeruginosa keratitis associated with contact lens wearing, and to evaluate the antibiotic susceptibility profiles of the isolates.

Methods: A retrospective study was conducted at the Cornea Department, Ho Chi Minh City Eye Hospital, between 2018 and 2023. Fifteen cases of contact lens-related Pseudomonas aeruginosa keratitis were analyzed.

Results: The mean age was 23.5 ± 4.7 years and total range was 17-33 years old. The majority of subjects were female (60.0%) and most of patients were student (60.0%). The proportion of patients wearing orthokeratology and soft contact lenses was 13.3% and 86.7%, respectively. Among soft contact lens wearers, the rate of patients used color or decorative lenses to change the appearance of the eyes was 4/13 (30.8%). Most patients had initial visual acuity (VA) under 3/60 (12 cases, 80.0%), which categorized as blindness according to the WHO classification. All of cases had central corneal stromal infiltration, 66.7% patients had hypopyon, and 33.3% cases were impending perforation. Regarding the outcome of treatment, 7/15 eyes (46.7%) required surgical intervention. Antibiotic susceptibility testing revealed high sensitivity (92.9–100%) to tobramycin, imipenem, levofloxacin, ciprofloxacin, ofloxacin, and ceftazidime. Sensitivity to moxifloxacin was 50%, while resistance to amoxicillin-clavulanate, cefuroxime, and cefotaxime was approximately 95.0%.

Conclusions: Contact lens-related Pseudomonas aeruginosa keratitis predominantly affects young adults and carries a high risk of severe vision loss. Early diagnosis and tailored antibiotic therapy based on susceptibility patterns are essential to optimize clinical outcomes.

Abstract No.: 206071

Corneal Atypical Fibroxanthoma in Xeroderma Pigmentosum

First Author: Jasmine RASHID

Co-Author(s): Siti Farhah 'adilah BASIRON, Liew On HEONG

Purpose: To report a rare case of corneal atypical fibroxanthoma (AFX) in xeroderma pigmentosum (XP) mimicking ocular surface squamous neoplasia (OSSN).

Methods: A case report.

Results: A 53-year-old lady with no known medical illness presented with progressive right eye (RE) blurring of vision for four weeks, which was accompanied by a rapidly enlarging corneal mass for two weeks. She reported longstanding hyperpigmented skin lesions since childhood, but was not on proper follow-up. General examination showed multiple hyperpigmented macules over her face, neck, trunk, and extremities. Ocular examination revealed RE visual acuity of counting fingers at 1 foot. On slit lamp examination, a 5 x 6 mm pink, fleshy, vascularised inferotemporal corneal lesion with surrounding corneal haziness. There is also the presence of deep corneal vascularisation and a feeder vessel. She was referred to dermatology for her skin lesions and was diagnosed with XP. The corneal lesion appeared suspicious for OSSN. Excisional biopsy of the corneal lesion was performed, and histopathological analysis revealed atypical fibroxanthoma. The patient was advised to use sun protection in addition to regular ophthalmology follow-up to monitor for recurrence of the corneal mass. At her most recent visit, the best corrected visual acuity was 6/60, with evidence of recurrence, and she is planned for excision of the mass with penetrating keratoplasty.

Conclusions: This case highlights the importance of considering unusual mesenchymal neoplasms in the differential diagnosis of corneal masses and underscores the need for histopathological confirmation, vigilant follow-up, and strict photoprotection to reduce recurrence risk and preserve vision.

Abstract No.: 201098

Corneal Thickness and Endothelial Cell Morphology in the Mongolian Population: A Cross-sectional Study

First Author: Bayarmaa KHUYAG

Co-Author(s): Uranchimeg DUGARSUREN, Batzaya DUGARSUREN, Bayarmagnai LKHAGVASUREN, Bayasgalan PUREVDORJ

Purpose: To evaluate corneal thickness and endothelial cell morphology in healthy Mongolian adults.

Methods: A cross-sectional study was conducted involving 240 healthy adults (480 eyes), aged 20–79

years, selected through simple random sampling. All participants underwent comprehensive ophthalmic examinations. Corneal thickness (CT), endothelial cell density (ECD), average cell area, coefficient of variation (CV), and percentage of hexagonal cells (HEX) were assessed in the central, paracentral, and peripheral corneal regions using non-contact specular microscopy.

Results: The mean participant age was 47.2 ± 14.8 years; 51.7% were female. Mean ECD was 2855.95 ± 282.49 cells/mm², CCT was 524.21 ± 32.71 μm, average cell area was 334.12 ± 37.86 μm², HEX was $64.82 \pm 3.87\%$, and CV was 0.31 ± 0.04 . Age was significantly associated with lower ECD and HEX, and higher cell area and CV ($p = 0.0001$). No significant differences were observed between sexes or between eyes. The estimated annual ECD loss was 0.3% ($r = 0.2107$, $p < 0.0001$). Paracentral and peripheral ECD values were 4.02% ($p < 0.05$) and 8.71% ($p < 0.01$) higher than central ECD, respectively.

Conclusions: This study provides the first normative data on corneal endothelial parameters in a Mongolian population. The mean ECD was lower than values reported in Japanese and Chinese populations, while higher than those in Nigerian, Thai, and Iranian populations. These findings highlight ethnic and regional differences in corneal morphology and may inform clinical decision-making in anterior segment surgery.

Abstract No.: 205670

Corneal Transplantation Strategies for Acanthamoeba Keratitis: A Systematic Review and Meta-Analysis

First Author: Shangyang JIANG

Co-Author(s): Qingfeng LIANG, Leying WANG

Purpose: To evaluate the optimal surgical approach and timing for keratoplasty in Acanthamoeba keratitis (AK) to guide clinical decision-making.

Methods: A comprehensive search was conducted in PubMed, EMBASE, Web of Science, and the Cochrane Library. Clinical studies reporting outcomes of at least five AK cases treated with keratoplasty were included. Primary outcomes were best-corrected visual acuity (BCVA), graft survival, recurrence, regraft rate, and postoperative complications. Meta-analysis compared therapeutic penetrating keratoplasty (TPK), optical penetrating keratoplasty (OPK), and therapeutic deep anterior lamellar keratoplasty (TDALK). The optimal interval for TPK and ideal lesion size for TDALK were identified. (PROSPERO ID: CRD420251147226).

Results: 24 studies involving 487 eyes were included. OPK demonstrated the best visual outcomes with the lowest recurrence and regraft rates. TDALK showed superior graft survival and fewer postoperative complications. In contrast, TPK yielded poorer visual outcomes, higher rates of graft failure, recurrence

and regrant, and more complications. The optimal interval for TPK was identified as 3.6 to 5.2 months after disease onset. Additionally, TDALK yielded better results when the lesion size was < 8 mm. Meta-analysis also revealed that OPK was associated with better prognosis than TPK.

Conclusions: In the visual rehabilitation of AK controlled with medical therapy, OPK is recommended. Conversely, when medical therapy fails, timely surgical intervention with TDALK or TPK is required. TPK within the optimal interval appears to be associated with improved outcomes.

Abstract No.: 204666

Crystalline Clues: Unveiling Plant Sap as a Rare Cause of Inflammatory Keratopathy

First Author: Reiner **MOLDEZ**

Co-Author(s): Sharlene **NOGUERA**

Purpose: To report the first documented case of Alocasia macrorrhiza plant sap-induced inflammatory crystalline keratopathy in our country, which was successfully managed with Levofloxacin, Dexamethasone, and Sodium Hyaluronate eye drops.

Methods: We present the case report of a 53-year-old male construction worker who presented with acute ocular symptoms following accidental exposure to Alocasia macrorrhiza plant sap. The patient reported sudden onset of redness, foreign body sensation, and blurred vision in the left eye. On slit-lamp biomicroscopy, conjunctival hyperemia, diffuse punctate epithelial erosions, and multiple fine, refractile, pin-like crystalline deposits were observed within the corneal stroma. Anterior segment optical coherence tomography (OCT) of the left eye revealed hyperreflective pin-like lesions corresponding to the crystalline deposits noted clinically. Based on these characteristic clinical findings, a diagnosis of Alocasia macrorrhiza plant sap-induced inflammatory crystalline keratopathy was established.

Results: The patient was managed conservatively with topical Levofloxacin 0.5% eye drops, later shifted to Levofloxacin-Dexamethasone combination, along with supportive therapy using Sodium Hyaluronate 0.15% lubricating drops. Progressive clinical improvement was observed over the following three weeks, with complete resolution of both symptoms and ocular findings documented at the three-month follow-up.

Conclusions: This case highlights the potential for plant sap to induce toxic and crystalline-like corneal changes, underscoring the importance of early recognition and supportive management to prevent long-term visual sequelae.

Abstract No.: 203730

Cyclic Guanosine Monophosphate-Adenosine Monophosphate Synthetase (cGAS)/Stimulator of Interferon Genes (STING) Signaling Aggravated Corneal Allograft Rejection Through Neutrophil Extracellular Traps (NETs)

First Author: Xiaolin **QI**

Purpose: The activation of innate immunity following transplantation has been identified as a crucial factor in allograft inflammation and rejection. However, the role of cyclic guanosine monophosphate-adenosine monophosphate synthase (cGAS)/stimulator of interferon genes (STING) signaling-mediated innate immunity in the pathogenesis of allograft rejection remains unclear.

Methods: Utilizing a well-established murine model of corneal transplantation, recipient mice were subconjunctivally injected with a cGAS inhibitor on postoperative days. Topical administration of specific cGAS small-interfering RNA and negative control siRNA before corneal transplantation and on postoperative days were performed to assess corneal transplantation rejection.

Results: Increased expression of cGAS and STING in rejected-corneal allografts compared with syngeneic (Syn) and normal (Nor) corneas, along with significant activation of the cGAS/STING pathway, as evidenced by the enhanced phosphorylation of TANK-binding kinase 1 and interferon regulatory factor 3. Pharmacological and genetic inhibition of cGAS/STING signaling markedly delayed corneal transplantation rejection, resulting in prolonged survival time and reduced inflammatory infiltration. Furthermore, we observed an increase in the formation of neutrophil extracellular traps (NETs) in rejected allografts, and the inhibition of NET formation through targeting peptidylarginine deiminase 4 and DNase I treatment significantly alleviated immune rejection and reduced cGAS/STING signaling activity. Conversely, subconjunctival injection of NETs accelerated corneal transplantation rejection and enhanced the activation of the cGAS/STING pathway.

Conclusions: NETs contribute to the exacerbation of allograft rejection via cGAS/STING signaling, highlighting the targeting of the NETs/cGAS/STING signaling pathway as a potential strategy for prolonging allograft survival.

Abstract No.: 202143

Decoding Refractive Neutralization With Concurrent Excimer Laser Ablation in Eyes With Anterior Corneal Opacities

First Author: Amrin Fatema Afzal Hussain **NAYANI**

Purpose: To evaluate visual and refractive outcomes after refractive neutralization with concurrent excimer laser ablation for anterior corneal opacities.

Methods: This was a prospective, cross-sectional observational study conducted at a tertiary eye care centre in northern India. Preoperative patient selection and evaluation are done for systemic diseases as well as for assessment of the depth and size of stromal involvement. Detailed ophthalmological evaluation is done to evaluate the depth and amount of stromal involvement by Anterior segment OCT and epithelial thickness mapping. Topographical evaluation was done for refractive planning. Per-operative refractive error and BCVA were diligently evaluated. Excimer laser ablation was done to ablate the diseased Stromal ablation as per standard protocols with residual bed thickness >300 μm . A customized algorithm was planned for each patient. Post-operative evaluation and visual rehabilitation are done with routine follow-up.

Results: Statistical evaluation was done by SPSS 23.0 software. Mean improvement in visual acuity was calculated for all participants. BCVA was >6/12 for all patients.

Conclusions: refractive neutralization with PTK can aid in faster visual rehabilitation with better patient satisfaction. Although anterior stromal diseases are amenable to PTK, the visual outcomes are often understated.

Abstract No.: 200806

Detection of Biofilms in Contact Lens Cases of Affected and Fellow Eyes in Acanthamoeba Keratitis

First Author: Yuichi **KAJI**

Co-Author(s): Hiroyasu **KAJI**, Tetsuro **OSHIKA**

Purpose: The most significant risk factor for Acanthamoeba keratitis is inadequate contact lens care. We investigated the presence of biofilm and Acanthamoeba in contact lens cases used for both the affected and fellow eyes in patients with Acanthamoeba keratitis.

Methods: From 2023 to 2025, lens cases were collected from 7 patients (7 eyes) diagnosed with Acanthamoeba keratitis. Biofilm was detected using brilliant blue staining, and cultures were performed on proteose-yeast-glucose agar plates. Lens cases from asymptomatic contact lens users (n=10) served as controls.

Results: In all 7 patients diagnosed with Acanthamoeba keratitis (1 case using hard contact lenses, 6 cases using biweekly replacement soft contact lenses), biofilm was observed on the lens cases for both the affected and fellow eyes. Acanthamoeba was detected within the biofilm. In contrast, in the control group, slight biofilm was observed in only one case, and Acanthamoeba was not detected.

Conclusions: Our findings indicate that the development of Acanthamoeba keratitis is associated with the presence of biofilm containing Acanthamoeba in lens cases, resulting from inadequate lens case care. The presence of biofilm in the cases for both the affected and fellow eyes suggests that these patients are likely engaged in improper daily lens care.

Abstract No.: 207728

Determining Levels of Microbial Contamination of Multi-User Preserved Ophthalmic Drops at an Out-Patient Clinic in a Tertiary Government Hospital in the Philippines

First Author: Nexie **LIBRE**

Co-Author(s): Ricardo Tobias **PAPA**, Raymond Nelson **REGALADO**

Purpose: The study aimed to determine the microbial contamination of multi-user preserved ophthalmic drops (POD) used in the Ophthalmology Outpatient Department (OPD) in a tertiary-level hospital in the Philippines.

Methods: This study used an experimental, in-vitro study design, with a sampling size of 104 multi-user POD, conducted at the OPD clinic of a Tertiary Level Hospital. Each bottle's dropper tip and residual contents were aseptically swabbed at four intervals—opening (T0), day 3 (T3), day 14 (T14), and day 30 (T30)—with five replicates per timepoint. The inclusion criteria included recently opened POD bottles, while exclusion criteria included POD bottles with broken seals on new bottles, and bottles with missing caps or tips on the day of collection, and control bottles that exhibit contamination during the initial T0 assessment. Samples were then cultured on blood, chocolate, MacConkey, and Sabouraud agar plates and incubated at 37 °C in 5% CO₂ for seven days. Positive cultures would undergo Gram stain and biochemical identification. The Statistical Package for the Social Sciences version 29 was used to analyze contamination prevalence and tip versus contents comparison.

Results: Following our sampling protocol and culture methods, the study showed that out of 104 samples, no contamination was detected across the duration of their usage in the OPD clinic.

Conclusions: This outcome supports the efficacy of the institution's handling and aseptic protocols. It also shows the effectiveness of preservatives, and proper

hygiene in significantly decreasing the contamination rates in multi-user preserved ophthalmic drops.

Abstract No.: 203952

Devastating Complication of Bilateral Simultaneous Cataract Surgery—Reactivation of Peripheral Ulcerative Keratitis With Secondary Infection

First Author: Abhishek KUMAR

Co-Author(s): Pranita SAHAY, Saloni UNE

Purpose: To present a rare case of peripheral ulcerative keratitis with secondary polymicrobial infection after cataract surgery.

Methods: A 60-year-old female presented to the clinic with complaint of sudden onset painful diminution of vision in both eyes for 2 weeks associated with redness, pain, and photophobia, left more than right eye. Symptoms started after a week post simultaneous cataract surgery (phacoemulsification). On systemic examination, patient had no systemic illness. On ocular examination, BCVA in RE was 6/60 and LE was 2/60; intraocular pressure was within normal limits. On slit lamp examination, both eyes revealed crescentic juxtalimbal ulcers with infiltrates, 6 clock hours in the left and 4 clock hours in OD with circumcorneal congestion.

Results: Corneal scraping was done elsewhere, which revealed gram-negative bacilli and yeast (Candida), and the patient was started on fortified amphotericin B and polymyxin B with cycloplegic and antiglaucoma agents. USG B Scan was anechoic in both eyes; infiltrates were decreasing, and surrounding edema was resolving within a week; however, progressive thinning was persisting on ASOCT, and the epithelial defect was healing. ANA, ANCA, and RA factor were negative; CRP and ESR were raised. Systemic and low-potency topical steroids were added to stop the progression. Final BCVA was 6/18 in the right eye and 5/60 in the left eye.

Conclusions: Peripheral ulcerative keratitis reactivation is rare after phacoemulsification. However, SICS/ECCE can be planned with the incision site away from the scar with a rheumatologist's opinion for immunosuppression if required.

Abstract No.: 205160

Development of a Digital Platform for Dry Eye Management: Survey-Based Design of a Prototype in South Korea

First Author: Se Hyun CHOI

Co-Author(s): Daejoon HWANG

Purpose: Dry eye disease (DED) is a multifactorial condition requiring complex diagnostics, yet time constraints often limit comprehensive evaluation in clinical practice. This study aimed to assess the unmet needs of patients and ophthalmologists regarding DED

management and to develop a mobile application supporting input and interpretation of diagnostic data.

Methods: A cross-sectional survey was conducted among 55 patients diagnosed with DED and 44 ophthalmologists across South Korea. The survey evaluated preferences for mobile platforms, commonly used diagnostic tools, and interest in an application-based management system. Based on the responses, a prototype Android application was developed incorporating user input for OSDI, Schirmer test, and tear breakup time (BUT), allowing interpretation of results and longitudinal tracking.

Results: Most respondents preferred Android OS (patients: 74.5%; ophthalmologists: 54.5%). Interest in the app was high among both groups (patients: 98.2%; ophthalmologists: 70.5%). Among patients, the most requested features were MMP-9 (50.9%) and Schirmer test (41.8%), while ophthalmologists prioritized OSDI (90.6%) and BUT (87.5%). Time limitations were a barrier to performing diagnostics: 50% of clinicians used OSDI in less than 10% of new patients, and 31.8% reported inadequate testing in over half of consultations. Over 80% of ophthalmologists indicated they would use an app supporting OSDI entry. The resulting prototype includes modules for OSDI, Schirmer, and BUT input with automated interpretation.

Conclusions: Survey data confirm high demand for a digital DED management tool among patients and clinicians. The developed Android prototype supports standardized diagnostic input and interpretation, and may help improve real-world DED care in time-constrained settings.

Abstract No.: 202255

Development of a Translational Platform for Corneal Tissue Culture, Biobanking, and Exosome Therapeutics

First Author: Shih-chung LAI

Co-Author(s): Wei Chen (eric) LAI, Keng-liang OU

Purpose: To isolate and culture limbal stem cells from corneal donor specimens and define key factors influencing tissue viability and utilization. This work seeks to establish an integrated research platform encompassing corneal tissue procurement, primary cell culture, biobanking, and exosome-based applications, with the ultimate goal of advancing translational strategies in regenerative ophthalmology.

Methods: Twenty research-designated corneal donor specimens were processed for limbal stem cell isolation and culture. Culture outcomes were assessed in relation to donor age and preservation time, with success defined as establishment of viable primary cultures.

Results: The overall success rate of primary limbal stem cell culture was 60%. Higher viability and growth

potential were observed in cultures derived from donors younger than 50 years and when retrieval was initiated within 21 days post-donation. In contrast, advanced donor age and extended storage times were significantly associated with culture failure. These findings identify donor age and preservation duration as critical determinants of corneal culture viability.

Conclusions: This study demonstrates the feasibility of establishing a clinical-grade corneal cell bank as a foundation for future regenerative applications. Ongoing work will expand specimen collection and evaluate cornea-derived exosomes as therapeutic candidates in preclinical models of ocular surface disease, including dry eye syndrome and limbal stem cell deficiency. By integrating corneal cell banking with exosome-based therapies, this platform represents a key step toward translational strategies to restore ocular surface integrity and vision.

Abstract No.: 206563

Diagnostic Challenge of Adult Onset Shield Ulcer Secondary to Atopic Keratoconjunctivitis: A Case Report

First Author: Lisa Yik Lin **LING**

Co-Author(s): Edwin Chin Meng **PHENG**

Purpose: We report a case of adult onset shield ulcer secondary to atopic keratoconjunctivitis that demonstrate significant improvement following administration of anti-inflammatory agent.

Methods: Case report

Results: A 30-year-old gentleman presented with 1 month history of right eye blurry vision, watery discharge and a central whitish spot. He had a past medical history of bronchial asthma and atopic dermatitis. Slit lamp examination revealed central corneal thinning with marked corneal vascularisation and paracentral infiltrates. Blepharitis was observed on lids examination. Scarring was noted over the palpebral conjunctiva with associated yellowish discharge. Right eye corneal scrapping was taken and sent for culture, yielding no microbial growth. He was first treated with oral and topical antibiotics. Olopatadine and steroid eyedrops were initiated following the release of formal culture report. Corneal debridement was also performed. His shield ulcer healed with improvement of the corneal inflammation and scar formation. Adult onset of shield ulcer is rare, leading to a diagnostic challenge in this case.

Conclusions: This case highlights the importance of a prompt diagnosis of adult onset shield ulcer which enables timely treatment to prevent further complications such as infective keratitis, which can be devastating.

Abstract No.: 201575

Does Gut Surgery Affect Dry Eye? A 17-Year Nationwide Cohort Study

First Author: Se Hyun **CHOI**

Co-Author(s): Dae Myoung **YOO**

Purpose: Recent studies suggest gut microbiota influence dry eye disease (DED) via the gut-eye axis. We investigated whether major gastrointestinal surgeries—gastrectomy or colectomy—alter long-term DED risk, using a nationwide cohort.

Methods: This retrospective cohort study used Korea's National Health Insurance Service–Sample Cohort (2002–2019). Patients undergoing gastrectomy (n=2,346) or colectomy (n=3,086) were 1:4 matched with controls. DED was defined by diagnostic and treatment codes. Propensity score overlap weighting and Cox regression estimated adjusted hazard ratios (HRs).

Results: Gastrectomy was associated with increased DED risk (HR: 1.09; 95% CI: 1.02–1.16), especially total gastrectomy (HR: 1.40). Subtotal gastrectomy showed reduced risk (HR: 0.90). Colectomy showed no significant association.

Conclusions: Gastrectomy may elevate DED risk through gut microbiome disruption, supporting gut-eye axis mechanisms. Monitoring ocular surface health post-gastrectomy is warranted.

Abstract No.: 201452

Doughnut Refractive Lenticule Transplantation for Advanced Keratoconus: Visual, Tomographic, and Biomechanical Outcomes in a Prospective Study

First Author: Zaman **SHAH**

Purpose: To evaluate the clinical efficacy, safety, and biomechanical effects of Doughnut Refractive Lenticule Transplantation (DRLT) in patients with advanced keratoconus over 16 months.

Methods: This prospective interventional study included 41 eyes of 40 patients (ages 11–32) with advanced keratoconus. Donor stromal lenticules from SMILE (−6.00 to −10.00 D) were fashioned into doughnut-shaped grafts and implanted into femtosecond laser-created stromal pockets. Patients were followed for 16 months with assessments including DCVA, corneal tomography, and AS-OCT. Outcomes included keratometry, topographic astigmatism, pachymetry, corneal volume, Q value, and biomechanical parameters (ARTmax, PPI). Statistical analysis used paired t tests or Wilcoxon signed-rank tests, with significance at $p < 0.05$.

Results: DCVA improved from logMAR 1.00 ± 0.20 to 0.30 ± 0.15 ($p < 0.001$), with 30% achieving logMAR 0.18 or better. Mean K1 decreased from 52.19 ± 5.38 D to 50.98 ± 5.62 D, K2 from 60.46 ± 6.27 D to 55.29 ± 6.19

D ($p=0.0021$), and Kmax from 70.07 ± 9.72 D to 62.90 ± 7.76 D ($p<0.001$). Topographic astigmatism reduced from 8.27 ± 3.50 D to 4.81 ± 2.55 D ($p<0.001$). Thinnest corneal thickness increased from 410.33 ± 39.23 μ m to 443.33 ± 80.68 μ m. Posterior keratometry decreased significantly, and the Belin ABCD staging showed marked improvement (D value from 31.00 ± 4.51 to 14.52 ± 2.05 ; $p<0.0001$). Pachymetric indices and CTSP improved, while ARTmax decreased, reflecting biomechanical stabilization.

Conclusions: DRLT is a safe and effective option for advanced keratoconus, offering sustained visual, thickness, and biomechanical improvements.

Abstract No.: 206113

Duration-Dependent Ocular Surface and Systemic Changes Following Carbon Black Exposure: An In Vivo Rat Model

First Author: Woojin **KIM**

Co-Author(s): Yujiao **JIN**, Boram **KANG**, Junfeng **PIAO**, Jong Suk **SONG**

Purpose: The effects of carbon black (CB), a particulate pollutant, on ocular and systemic health remain poorly characterized. This study evaluated duration-dependent ocular surface damage and systemic immune responses following topical CB exposure in rats.

Methods: Male Sprague-Dawley rats (6 weeks, 250–300 g) received topical CB (Printex 35, 20 mg/mL, 10 μ L) into the right eye three times daily. Cohorts were exposed for 1 day, 5 days, or 4 weeks, with controls. Ocular surface changes were assessed by rose bengal, corneal fluorescein staining and conjunctival hyperemia scoring. Tears were collected under anesthesia to measure LDH, MMP-9, histamine, lactoferrin, and VEGF. At endpoint, blood was collected for IgE and IgG. Lacrimal glands were examined for LDH, MMP-9, histamine, lactoferrin, VEGF, and SIRT1, and the cornea and conjunctiva for IFN- γ , VEGF, MMP-9, SIRT1, and IL-4.

Results: CB exposure induced progressive ocular and systemic changes. Rose bengal, corneal fluorescein staining, and conjunctival hyperemia increased with duration, indicating cumulative epithelial injury. Tears and lacrimal glands showed increased LDH, MMP-9, and histamine, while SIRT1 declined significantly in lacrimal glands at 4 weeks, suggesting aging-like dysfunction. In ocular tissues, IFN- γ , VEGF, MMP-9, and IL-4 increased after exposure, whereas SIRT1 decreased. Serum IgE increased progressively, whereas IgG rose transiently then declined, indicating a Th2-skewed immune imbalance.

Conclusions: Topical CB exposure induced duration-dependent ocular surface damage, inflammatory activation, and lacrimal dysfunction. Findings included elevated pro-inflammatory mediators and a Th2-

skewed systemic response. Overall, chronic CB exposure leads to ocular injury, immune dysregulation, and aging-like lacrimal changes, underscoring public health relevance.

Abstract No.: 202094

Effect of Artificial Tear Therapy on Best-Corrected Visual Acuity in Patients With Aqueous-Deficient Dry Eye

First Author: Rastri **PARAMITA**

Co-Author(s): Fitri **RAHMANTIKA**, Atika **YASMIN**

Purpose: To evaluate the effect of artificial tear therapy on best-corrected visual acuity (BCVA) in patients with aqueous-deficient dry eye (ADDE).

Methods: A prospective, single-arm, pre-post intervention study was conducted involving 17 patients (aged >18 years) diagnosed with ADDE. Participants received artificial tears containing NaCl and KCl, administered six times daily for six weeks. BCVA was measured using the Snellen chart with corrective lenses at baseline (Day 1), Week 4, and Week 6, and was subsequently converted to logMAR units for analysis. Changes in BCVA over time were analyzed using the Wilcoxon signed-rank test, with statistical significance set at $p<0.05$.

Results: Seventeen patients (34 eyes) with ADDE were included. The mean BCVA in logMAR was 0.321 ± 0.303 at baseline (Day 1), 0.227 ± 0.170 at Week 4, and 0.211 ± 0.176 at Week 6. Compared to baseline, BCVA improved at both follow-up points. The change in BCVA at Week 4 was $\Delta\log\text{MAR} = -0.094$ ($p = 0.099$), while the change at Week 6 was statistically significant ($\Delta\log\text{MAR} = -0.110$; $p = 0.006$), based on the Wilcoxon signed-rank test.

Conclusions: Artificial tear therapy with a NaCl–KCl formulation produced a modest yet statistically significant BCVA improvement at six weeks in ADDE patients. For those requiring visual correction, initiating artificial tear therapy before prescribing spectacles may optimize outcomes. Larger studies with varied formulations are warranted.

Abstract No.: 202013

Effect of Topical Adapalene 0.1% and Benzoyl Peroxide 2.5% on Tear Film and Ocular Surface in Patients With Facial Acne Vulgaris

First Author: Theep **MAHASUWEERACHAI**

Co-Author(s): Chanat **KUMTORNRUT**, Vannarut **SATITPITAKUL**

Purpose: To evaluate the impact of a fixed combination of topical 0.1% adapalene and 2.5% benzoyl peroxide (Epiduo) on tear film stability and meibomian gland function in patients undergoing treatment for facial acne vulgaris.

Methods: This prospective observational study included 13 patients with facial acne vulgaris. All participants applied a fixed-dose combination of adapalene 0.1% and benzoyl peroxide 2.5% once daily at bedtime for one month. Ocular surface evaluations—including the Ocular Surface Disease Index (OSDI), noninvasive tear breakup time (NIBUT), tear film lipid layer thickness (TFLT), upper eyelid meibography, National Eye Institute (NEI) fluorescein staining scores, lid margin abnormalities, and assessments of meibum quality and expressibility—were performed before and after treatment. A p -value < 0.05 was considered statistically significant.

Results: No statistically significant changes were observed in OSDI scores (mean difference: 0.71; 95% CI: -8.24 to 9.65), NIBUT (mean difference: 0.08 seconds; 95% CI: -1.86 to 2.01), or TFLT (mean difference: 3.66 nm; 95% CI: -8.56 to 15.89). Similarly, there were no significant differences in meibum quality ($Z = -1.414$, $p = 0.157$), meibum expressibility ($Z = -1.414$, $p = 0.157$), lid margin abnormalities ($Z = -0.447$, $p = 0.655$), or NEI fluorescein staining scores ($Z = -1.635$, $p = 0.102$).

Conclusions: Short-term use of a fixed combination of adapalene 0.1% and benzoyl peroxide 2.5% for the treatment of facial acne vulgaris did not significantly affect the tear film or ocular surface.

Abstract No.: 206635

Effects of microRNA-16-5p and microRNA-142-3p on Inflammation and Autophagy In Vitro Dry Eye Model on Human Corneal Epithelium

First Author: Yu Jeong **KIM**

Co-Author(s): Min-ji **CHA**, Hyunsoo **CHO**, Yeji **YEON**

Purpose: We investigated the effects of microRNA(miR)-16-5p and miR-142-3p on inflammation and autophagy-related mechanisms in vitro dry eye model on human corneal epithelium.

Methods: A dry eye model was established by treating human corneal epithelial cells with 450mOsm NaCl for 24 hours. The expression levels of miR-16-5p and miR-142-3p were confirmed using quantitative polymerase chain reaction(qPCR). MiR-16-5p and miR-142-3p mimics were transfected into the dry eye model. Cell viability was assessed using CCK-8 solution, and changes in the expression of inflammatory cytokines and autophagy-related proteins were measured using western blot and qPCR.

Results: Under hyperosmotic stress, the expression of miR-16-5p and miR-142-3p was significantly lower compared to the control. The cell viability was increased in the groups transfected with miR-16-5p and miR-142-3p mimics. The group transfected with miR-16-5p mimic showed a decrease in the expression of IRAK, IL-6, IL-1 β , TNF- α , TGF- β , ATG5, ATG16L1, and Bax. The miR-142-3p mimic transfected groups showed

a decrease in the expression of IL-6, IL-1 β , TNF- α , TGF- β , and ATG5.

Conclusions: We confirmed that miR-16-5p and miR-142-3p maintain cell survival by regulating the expression of genes related to inflammation and autophagy. They are expected to contribute to understanding the pathogenesis of dry eye and developing new treatment strategies.

Abstract No.: 202740

Efficacy and Safety of Cross-Linked Acellular Porcine Corneal Stroma for Infectious Corneal Disease in China: A Multicenter Prospective Clinical Trial

First Author: Yunxiao **ZANG**

Co-Author(s): Ying **JIE**

Purpose: Acellular porcine corneal stroma (APCS) is a promising alternative to allografts; however, its potential requires verification. To evaluate the efficacy and safety of novel cross-linked APCS transplantation for the treatment of infectious corneal disease.

Methods: This prospective, multicenter, single-arm clinical trial was conducted from 2015 to 2019. Ninety patients with infectious corneal disease who had undergone anterior lamellar transplantation with an APCS across four centers in China were enrolled. All patients had previously received ineffective drug treatment and had a preoperative best-corrected visual acuity (BCVA) $< 20/400$. The primary outcome was the deblinding rate at 180 days compared to the target rate of 65%. The secondary outcomes included BCVA, corneal transparency, and epithelial healing. Safety endpoints included corneal graft rejection, blood count, liver and kidney function, immunoglobulin levels, concomitant medications, and additional treatments. Follow-up was performed for at least 6 months postoperatively.

Results: A total of 100% (90/90) and 88.9% (80/90) of the cases were included in the safety analysis and efficacy per protocol sets, respectively. Eighty percent (72/90) of patients completed 180 days of follow-up after APCS transplantation. The deblinding rate at 180 days was 90.3% (95% confidence interval 81%-96%), exceeding the target ($P < 0.001$). At 180 days, 55% of the grafts were completely transparent, and 82.5% of the epithelium had no defects. The log of the minimum angle of resolution vision improved from 2.19 ± 0.25 preoperatively to 1.10 ± 0.3 . No serious adverse events occurred.

Conclusions: APCS demonstrated excellent corneal transparency and epithelialization following keratoplasty, confirming its safety and efficacy. Six-month data suggest its potential as an alternative treatment for infectious corneal disease. Further long-term trials are necessary to establish its comparative

effectiveness and evaluate chronic complications, offering valuable insights for future clinical practice.

Abstract No.: 204927

Enhancing Eye Donation Awareness and Knowledge Among Palliative Care Clinical Staff: A Comparative Study

First Author: Maggie Wun-king WU

Co-Author(s): Vanissa Wing-see CHOW, Candy Suet-man WONG, Catherine Suet-man WONG

Purpose: Corneal availability relies heavily on voluntary, non-remunerated eye donations within a society that follows an opt-in system. However, limited knowledge and awareness about eye donation continue to hinder donation rates in Hong Kong. Clinical staff working in palliative care play a vital advocacy role in promoting eye donation. This study examined the impact of a structured eye donation talk on enhancing their awareness and knowledge. To evaluate the impact of a structured eye donation talk on clinical staff awareness and knowledge

Methods: A structured eye donation promotion talk was delivered to clinical staff supporting end-of-life care patients in one of the oncology wards at Pamela Youde Nethersole Eastern Hospital. A comparative study of identical pre-talk and post-talk questionnaires was evaluated to assess changes in awareness and knowledge.

Results: A total of 22 pre-talk and 16 post-talk questionnaires were submitted by clinical staff, including doctors, nurses, allied health professionals, chaplaincy, and support staff. The questionnaire comprised 15 questions and the majority results indicated an increase in awareness following the talk, with improvements ranging from 2.9–71.1%. Understanding of the age limitation for corneal donation rose significantly from 22.7% to 93.8%. Interestingly, support for corneal donation showed a slight decline, dropping from 100% to 93.8%.

Conclusions: The well-structured educational talk demonstrated a significant improvement in palliative care staff's knowledge and awareness regarding eye donation. Design of content should be carefully to engage staff and promote donation support.

Abstract No.: 206705

Erythema Multiforme Major With Suspected Herpes Simplex Virus Association Presenting With Conjunctivitis: A Case Report

First Author: Sahildeep Singh BALIAN

Co-Author(s): Aditi BANSAL, Gian Chand RAJPUT

Purpose: Erythema multiforme major (EMM) is a severe, immune-mediated mucocutaneous disorder characterized by mucosal erosions and systemic involvement. Herpes simplex virus (HSV) is one of the

most common infectious triggers. Clinical diagnosis, supported by cytological evidence, is critical for timely management.

Methods: A 45-year-old male patient with no history of recent drug exposure, presented with painful oral ulcers, genital ulcerations, and conjunctival congestion of acute onset. Ocular examination showed best corrected vision of 6/6 with intraocular pressure within normal limits in both eyes. Anterior segment showed matted eyelashes and severe diffuse conjunctival hyperemia bilaterally. Rest of the bilateral anterior and posterior segments were unremarkable on slit-lamp biomicroscopy. Clinical examination revealed erosive mucosal lesions of mouth and erythematous patches in the genital region.

Results: A Tzanck smear demonstrated multinucleated giant cells, suggestive of Herpes simplex virus (HSV) etiology. Laboratory investigations were reported with raised ESR (Erythrocyte Sedimentation Rate) levels and a positive result for CRP (C-reactive protein). The patient was managed with supportive care, topical lubricants, systemic antivirals, and corticosteroids. Gradual clinical improvement was observed with resolution of mucosal lesions.

Conclusions: Erythema multiforme major can present with extensive mucosal involvement, including oral, genital, and ocular lesions. A positive Tzanck smear supports Herpes simplex virus (HSV) association, although further confirmatory testing (e.g. PCR [polymerase chain reaction], serology) may be warranted. Prompt diagnosis and management with antivirals and supportive measures are crucial for favourable outcomes.

Abstract No.: 207057

Evaluation of Tear Film Parameters in Keratoconus Using the Non-Invasive Analyzer

First Author: Renako KOZAKI

Co-Author(s): Yoko HYAKUTAKE, Koji KITAZAWA, Hiroko NAKAI, Mari OSAWA, Chie SOTOZONO, Keiko YAMAGISHI

Purpose: To investigate tear film status in keratoconus (KC) using a non-invasive dry eye diagnostic device (idra®, SBM Sistemi, Italy).

Methods: Patients who visited the keratoconus clinic at Kyoto Prefectural University of Medicine between May 2024 and March 2025 and were diagnosed with KC or regular astigmatism, without prior rigid gas permeable lens wear, were included. Tear film parameters (NIBUT, LLT, tear meniscus height) were assessed using the idra®. Maximum keratometry (Kmax) was measured with anterior segment OCT, and tear secretion with Schirmer's test. Clinical background factors (age, sex, atopic dermatitis, allergic conjunctivitis, and eye rubbing) were also examined. Comparisons were made between the KC and astigmatism groups.

Results: Forty-two patients (80 eyes) were included: 35 with KC (66 eyes; mean age 24.4 ± 6.0 years) and 7 with astigmatism (14 eyes; mean age 21.9 ± 7.2 years). NIBUT was significantly shorter in the KC group than in the astigmatism group (8.30 ± 2.69 vs. 12.05 ± 2.91 sec, $p=0.003$). No significant differences were found in tear meniscus height, LLT, or Schirmer's test. NIBUT was not correlated with Kmax ($r = -0.12$, $p = 0.346$). Atopic dermatitis, allergic conjunctivitis, and eye rubbing did not significantly affect NIBUT in KC eyes.

Conclusions: Keratoconic eyes demonstrated reduced tear film stability while maintaining tear secretion volume.

Abstract No.: 204149

Exogenous Endophthalmitis Secondary to Infective Keratitis: Surgical Challenges and Poor Outcomes — a Case Series

First Author: Nurul Ain **RAHIM**

Co-Author(s): Jemaima **CHE HAMZAH**, Teck Chee **CHENG**, Mazaya **MAHMUD**, Wan Haslina **WAN ABDUL HALIM**

Purpose: To describe four cases of infective keratitis progressing to exogenous endophthalmitis, focusing on risk factors, causative organisms, management, and outcomes.

Methods: Case series.

Results: • Case 1: A 53-year-old man sustained a traumatic left eye injury complicated by *Pseudomonas aeruginosa* keratitis with exogenous endophthalmitis. He received intravitreal antibiotics but later required therapeutic penetrating keratoplasty (TPK) with lens extraction. The graft eventually failed due to persistent inflammation and uncontrolled intraocular pressure (IOP). • Case 2: A 60-year-old woman with diabetes mellitus and end-stage renal failure presented with severe keratitis and exogenous endophthalmitis. Corneal culture grew *Aspergillus flavus*. Despite multiple intravitreal injections and subsequent TPK, her postoperative course was complicated by secondary angle-closure glaucoma and failed graft. She was advised glaucoma surgery but defaulted follow-up. • Case 3: A 78-year-old man sustained traumatic right eye injury and developed polymicrobial keratitis (*Streptococcus pneumoniae* and *Aureobasidium pullulans*) with exogenous endophthalmitis. He underwent TPK combined with trans-pars plana vitrectomy (TPPV). Postoperatively, his vision remained counting fingers, and the graft failed due to poor compliance with medications. • Case 4: A 62-year-old man with diabetes mellitus clinically treated as left eye polymicrobial keratitis (bacteria, fungal and *Acanthamoeba*) with exogenous endophthalmitis. Corneal culture revealed no obvious organism. He underwent TPK and TPPV. His graft failed due to secondary angle-closure glaucoma.

Conclusions: This case series found elderly age, diabetes mellitus, and ocular trauma as risk factors for developing exogenous endophthalmitis from infective keratitis. Early TPK effectively controlled infection and able to preserved globe integrity. In spite all, patients in this case series have poor visual outcome.

Abstract No.: 210310

Exogenous NIR-II Light/Endogenous pH-Activatable Copper Single-Atom Nanozyme for Treatment of *Candida albicans* Keratitis

First Author: Qinxiang **ZHENG**

Co-Author(s): Jianliang **SHEN**, Haijing **YAN**

Purpose: To examine the efficacy and underlying mechanisms of copper-doped nanozyme (Cu-N-C) in combating *Candida albicans* and its therapeutic potential for treating fungal keratitis.

Methods: Characterization of the material was conducted using transmission electron microscopy (TEM), energy-dispersive X-ray spectroscopy (EDS), and X-ray photoelectron spectroscopy (XPS). Enzyme activities and photothermal properties were evaluated using spectrometric techniques. Antifungal efficacy was assessed through colony counting, live/dead staining, and biofilm assays. An in vivo murine keratitis model was developed for evaluation using slit-lamp examination, clinical scoring, and histopathological analysis. Molecular mechanisms were explored through multi-omics analysis, western blotting, and immunofluorescence. Biocompatibility was evaluated in both in vitro and in vivo settings.

Results: Cu-N-C was characterized by a nanosheet structure with uniform elemental distribution, exhibiting superior photothermal conversion efficiency and enzyme-mimetic activities. It effectively eradicated planktonic fungi (98.54%), inhibited hyphal transformation, and disrupted biofilms through combined thermal effects and reactive oxygen species (ROS) generation. In the keratitis model, Cu-N-C, activated by NIR-II irradiation and acidic pH, effectively reduced fungal load, promoted corneal healing, and alleviated inflammation. Multi-omics analysis showed that Cu-N-C disrupted fungal antioxidant defenses by downregulating CAT and SOD. Its anti-inflammatory effect involved suppressing the NLRP3/IL-1 β pathway, with no significant toxicity observed.

Conclusions: Cu-N-C exhibits strong antifungal effects through synergistic PTT/CDT, effectively disrupting biofilms and overcoming fungal antioxidant defenses. It is highly effective and biocompatible for treating fungal keratitis, offering a promising alternative to conventional therapies.

Abstract No.: 204638**Extending the Death-to-Preservation Time of Corneal Tissue: Impact on Tissue Recruitment and Workflow Efficiency***First Author: Catherine WONG**Co-Author(s): Vanessa CHOW, Maggie WU*

Purpose: To increase the availability of eligible cornea donors, Hospital Authority Eye Bank has sought evidence from literature and lengthened the death-to-preservation time (DTPT) from 12 hours to 24 hours since 11 June 2024. Its impact on eye tissue recruitment will be studied.

Methods: A retrospective study was conducted between 11 June 2024 and 10 June 2025 and compared with the same period in the previous year. Parameters assessed included number of families approached, consents obtained, tissues collected & distributed, consent rate, tissue quality & report of adverse reaction.

Results: A total of 187 consented cases were obtained between 11 June 2024 and 10 June 2025. The total number of cases reviewed increased by 22.8% and the number of families approached increased by 11% compared to the previous year. The consent rate, however, was reduced by 3.4%. The total number of grafts collected increased by 25.7%, but the overall number of tissues that could be distributed only increased by 13.8%. The number of adverse reactions reported during the two time periods was comparable.

Conclusions: Extending DTPT allowed Eye Bank to recruit more donors and facilitated coordination in tissue procurement and logistics. However, other factors, such as the willingness to donate and the quality of the tissue harvested, still remained as limiting factors that hampered the availability of transplantable tissue.

Abstract No.: 202407**Extracellular Vesicles in Mouse Tear Fluids: Evidence of Uptake and Proliferative Effects in Corneal Epithelial Cells***First Author: Shogo FUKUDA**Co-Author(s): Kazuhiro HARADA, Masatoshi HIRAYAMA, Taku MATSUMOTO, Ayumi OKA, Saya OYA, Hiroaki OZAKI, Tomoko TSUKAHARA-KAWAMURA, Tomohiro YASUTAKE*

Purpose: Extracellular vesicles (EVs), including exosomes, have been identified in various body fluids, but their presence and roles in tears remain unclear. This study aimed to demonstrate the existence of EVs in mouse tear fluids and evaluate their biological activity on corneal epithelial cells.

Methods: EVs were isolated from mouse tear fluids by ultracentrifugation. Morphological features were analyzed using transmission electron microscopy (TEM)

and nanoparticle tracking analysis (NTA). Exosomal markers were confirmed by immunoblotting for CD9 and TSG101. Uptake of tear EVs was assessed in cultured corneal epithelial cells (TKE2) using fluorescein-labeled RNA. Cell proliferation was examined by Ki67 and BrdU immunostaining.

Results: TEM revealed spherical vesicles consistent with exosomes. NTA showed an average concentration of $2.53 \pm 0.22 \times 10^{12}$ particles/mL with a mean diameter of 134 ± 7.0 nm. Western blotting confirmed CD9 and TSG101 expression in tear EVs. Fluorescence tracing demonstrated efficient uptake of EVs by TKE2 cells ($89 \pm 3.1\%$), whereas uptake was significantly lower in C2C12 cells ($28 \pm 1.9\%$). EV treatment markedly enhanced the proliferation of corneal epithelial cells: the proportion of Ki67-positive cells increased from $3.5 \pm 0.4\%$ to $45.4 \pm 6.4\%$ ($p = 0.020$), and BrdU-positive cells increased from $53.3 \pm 6.5\%$ to $88.7 \pm 0.5\%$ ($p = 0.028$).

Conclusions: This study provides the first direct evidence that mouse tear fluids contain exosome-like EVs. These vesicles are efficiently internalized by corneal epithelial cells and significantly promote their proliferation, suggesting that tear EVs play a critical role in ocular surface homeostasis and may represent novel therapeutic targets for ocular surface diseases such as dry eye.

Abstract No.: 201687**Eyestrain and Dry Eye After Photorefractive Keratectomy in a Sample of Iranian Patients***First Author: Nader NASSIRI**Co-Author(s): Sara KAVOUSNEZHAD, Kourosh SHEIBANI*

Purpose: To evaluate the medium-term postsurgical effects of photorefractive keratectomy (PRK) on patients' subjective perception of dry eye and eyestrain.

Methods: This prospective comparative pre-post study was performed at Vanak Eye Surgery Center, Tehran, Iran, from May 2020 to September 2021. The inclusion criteria were patients with mild to moderate myopia (less than -6 diopters) undergoing PRK. To evaluate the indirect subjective signs of eyestrain and its severity, we used a questionnaire including six questions regarding itching, foreign body sensation, excessive tearing, eye tiredness, blurring, and photophobia. We administered this questionnaire to each patient in face-to-face interviews pre-surgery as well as 1 and 6 months post-surgery. To evaluate post-surgical dry eye, we asked patients if their dry eye symptoms had increased or decreased compared to the pre-surgical period.

Results: A total of 40 patients were assessed in this study. The mean age of patients was 26 ± 8 years, with 16 (40 %) male patients and 24 (60 %) female patients. There was no statistically significant difference in mean

eyestrain scores one month ($P = 0.371$) and six months ($P = 0.939$) post-surgery compared to pre-surgery. There was a significant increase in dry eye symptoms at both 1 month ($P = 0.010$) and 6 months ($P = 0.004$) post-surgical follow-ups.

Conclusions: Our results indicate that PRK significantly increases dry eye symptoms compared to the pre-surgical period. There was no statistically significant difference in eyestrain symptoms among patients compared to the pre-surgical period.

Abstract No.: 205209

Fenofibrate Ameliorates Ocular Surface Inflammation in Patients With Diabetes

First Author: Hassan **MANSOOR**

Co-Author(s): Yu-chi **LIU**, Hong Chan **TAN**

Purpose: To investigate the potential effects of oral fenofibrate in the amelioration of diabetic ocular surface inflammation.

Methods: Forty-one participants with type 2 diabetes mellitus (DM) and 40 age-matched healthy controls were recruited. The DM group received oral fenofibrate for 30 days. Ocular surface assessment, in-vivo confocal microscopy (IVCM) imaging and quantification for corneal dendritic cells (DCs), epithelium and neuromas, tear neuromediator analysis for inflammatory markers, and proteomics were performed before and after treatment.

Results: Fenofibrate treatment significantly improved the tear breakup time (TBUT) ($p=0.004$) and National Eye Institute score ($p=0.005$). On IVCM, fenofibrate significantly reduced the DC area ($p=0.01$) and DC density ($p=0.02$) while increasing the DC elongation ($p=0.004$) and length ($p=0.01$), suggesting that fenofibrate treatment shifts the DC morphology's equilibrium towards a more immature phenotype. Fenofibrate also significantly increased corneal epithelial cell density ($p=0.04$). On tear analysis, fenofibrate significantly reduced the concentration of tumour necrosis factor- α ($p=0.04$) and nuclear factor kappa B ($p=0.03$). Additionally, the tear concentration of anti-inflammatory interleukin-1 receptor antagonist was significantly increased ($p=0.03$), and pro-inflammatory proteins, such as complement 4B, cytochrome B5 Type A and cytochrome B5 Type B were significantly down-regulated after fenofibrate treatment (all $p<0.05$) via regulation of tricarboxylic acid cycle, oxidative phosphorylation and liver X receptor/retinoid X receptor activation.

Conclusions: Oral fenofibrate reduces diabetic ocular surface inflammation, as evidenced by decreased DC infiltration and tear inflammatory cytokines; increased CECD and anti-inflammatory tear mediators; and improved TBUT and corneal staining, all of which aid to alleviate diabetic keratopathy.

Abstract No.: 200417

Five-Year Trend in Microbiological Characteristics of Bacterial Keratitis

First Author: Mai **NGUYEN THI TRUC**

Co-Author(s): Huong **DUONG**, Vinh **LAM**, Phuc **NGUYEN**, Huan **PHAM**, Huy **TRAN**

Purpose: To identify microbiological features and to describe a 5-year trend in antibiotic susceptibility patterns of bacterial keratitis.

Methods: The research was conducted in the Cornea Department of Ho Chi Minh City Eye Hospital between 2019 and 2023. This study was retrospective and involved the analysis of 240 cases diagnosed with bacterial keratitis.

Results: The most commonly isolated bacteria were coagulase-negative Staphylococcus (57.6%), Pseudomonas aeruginosa (21.2%), and Staphylococcus aureus (8.08%). Onset time of Pseudomonas aeruginosa corneal ulcer (2.76 ± 1.55 days) was significantly shorter than others ($p=0.001$). Pseudomonas aeruginosa keratitis was significantly associated with eyelid edema ($p=0.02$), conjunctival edema ($p<0.001$), central infiltration ($p=0.01$), deep stromal infiltration ($p<0.001$), stromal melting ($p<0.001$), ring infiltration ($p<0.001$), retrocorneal plaque ($p<0.001$), hypopyon $>1\text{mm}$ ($p<0.001$), and intracameral fibrin ($p=0.004$). Pseudomonas aeruginosa was sensitive to tobramycin (100%), levofloxacin (95.0%), and not to moxifloxacin (0.0%). Proportion of multidrug-resistant strains among coagulase-negative Staphylococcus and Pseudomonas aeruginosa were 68.4% and 72.0%. 5-year cumulative antibiotic susceptibility patterns of Pseudomonas aeruginosa: imipenem (96.6%), tobramycin (95.9%), ceftazidime (95.4%), ciprofloxacin (91.9%) and levofloxacin (91.9%) were been most susceptible, whereas moxifloxacin (20.0%), cefotaxime (14.6%), and cefuroxime (2.6%) were been least susceptible. Over a 5-year period, the resistance of Pseudomonas aeruginosa to moxifloxacin increased significantly, however the resistance of Pseudomonas aeruginosa to tobramycin slightly decreased.

Conclusions: Multidrug-resistant strains among coagulase-negative Staphylococcus and Pseudomonas aeruginosa were significantly high. Our study offers insights into bacterial keratitis' clinical and microbiological patterns which guide antibiotics choice and management.

Abstract No.: 202046

From Trauma to Recovery: Effective Management of Descemetocoele

First Author: Kristo Hadi Audric **SUGIAMAN**

Co-Author(s): Gede **PARDIANTO**, Givenchy Angela **WINARJO**

Purpose: To describe the clinical presentation, management, and short-term outcomes of a traumatic

descemetocoele treated with urgent cryotherapy, aiming to preserve the eyeball and restore visual function.

Methods: A 17-year-old male presented with decreased vision and pain in the left eye one month after blunt trauma from an iron hoe. Slit-lamp examination revealed a severe descemetocoele. Initial visual acuity was hand movement (1/300), and intraocular pressure was unmeasurable. Anterior segment structures were difficult to assess, while ocular ultrasound showed no posterior segment abnormalities. Emergency cryotherapy was performed, followed by cycloplegics, oral antibiotics, and analgesics. The patient was monitored postoperatively for visual recovery and IOP stabilization.

Results: One week after surgery, the descemetocoele showed clinical improvement with visual acuity of 2/60 and IOP of 23 mmHg. Two weeks post-treatment, the corneal contour improved, with VA reaching 20/400 and IOP reduced to 19 mmHg. No signs of corneal perforation or infection were noted.

Conclusions: Urgent cryotherapy may offer a viable and effective option in managing traumatic descemetocoele. It helps stabilize the cornea, prevents serious complications such as perforation and endophthalmitis, and preserves the integrity of the eyeball. Timely intervention is key to improving prognosis and planning further visual rehabilitation.

Abstract No.: 210282

Global Trends and Prospects of Endothelial Keratoplasty From 2004 to 2023: A Bibliometric Analysis

First Author: Shiwen **CHENG**

Purpose: Endothelial keratoplasty (EK) has revolutionized the treatment of corneal diseases by offering a less invasive alternative to traditional full-thickness keratoplasty. Over the past decades, EK techniques have evolved significantly, improving surgical outcomes, expediting recovery, and reducing postoperative complications. Nevertheless, challenges such as postoperative rejection and endothelial cell loss persist. This study utilizes bibliometric analysis to map the current research landscape of EK and identify future directions.

Methods: A systematic bibliometric analysis was conducted on publications spanning from 2004 to 2023, retrieved from the Web of Science Core Collection. Key metrics such as annual publication and citation counts, contributions by countries and institutions, influential journals, authors and cited authors, highly cited references, co-citation references, and keyword trends were extracted and analyzed using CiteSpace and VOSviewer, Microsoft Excel, Bibliometrix, Scimago Graphica, and Microsoft Excel.

Results: A total of 2676 relevant publications were identified from 2004 to 2023. While the first 5 years

saw a limited number of publications in this field, a marked increase in publications has occurred throughout these years. The United States, Germany, and England were leading contributors. Marianne O. Price emerged as the most prolific author, with Francis W. Price Jr. most frequently cited among the top contributors. Major publishing journals included Cornea, Ophthalmology, and the American Journal of Ophthalmology. Leading institutions included the Netherlands Institute for Innovative Ocular Surgery and the Legacy Devers Eye Institute. VOSviewer keyword clustering revealed 13 thematic clusters, with trending keywords such as “risk factors” and “tissue”, suggesting emerging focal points.

Conclusions: The bibliometric analysis highlights the dynamic evolution and key research areas of EK and ocular disease management. Leveraging these insights is crucial for advancing clinical practice and driving further innovation in the field.

Abstract No.: 205899

Going DEEP (Dry Eye Education & Prevention) Against Digital Dry Eye: A Novel Adolescent Eye Health Intervention From the Himalayas

First Author: Amit **SACHDEVA**

Purpose: Dry eye disease (DED) is an emerging ocular morbidity among adolescents, largely driven by increased digital screen use. Data from hilly northern states of India are limited. This study assessed the prevalence of DED, identified associated risk factors, and evaluated the impact of the DEEP Protocol (Dry Eye Education & Prevention)—a structured intervention combining counseling, reading material, ocular exercises, and digital hygiene education.

Methods: A cross-sectional study was conducted from August–October 2023 at IGMSC Shimla, enrolling 310 adolescents (mean age 14.55 years; 64.8% females). Schirmer’s test (<10 mm) was used for diagnosis. Data on screen exposure, demographics, and ocular/allergic history were collected. Adolescents with DED received the DEEP Protocol and were reassessed at 1, 3, and 6 months. Statistical analysis employed chi-square, t-test, and repeated measures ANOVA; $p < 0.05$ was considered significant.

Results: DED prevalence was 21.3% (66/310). Affected participants had significantly greater mean daily screen time (3.59 ± 0.98 hrs) compared to non-DED peers (2.27 ± 0.76 hrs; $p < 0.001$). Logistic regression revealed that every additional 30 minutes of screen use increased odds of DED nearly twofold (OR = 1.80, 95% CI: 1.32–2.45; $p = 0.001$). Females were more frequently affected (69.7% of DED cases; $p = 0.04$). A history of ocular allergy emerged as another independent risk factor (OR = 1.78, 95% CI: 1.10–2.89; $p = 0.02$). Other factors, such as contact lens use and smoking, were rare and statistically insignificant in this population. Post-intervention, Schirmer’s scores improved

markedly: 6.2 ± 1.1 mm at baseline $\rightarrow 9.1 \pm 1.3$ mm at 1 month $\rightarrow 11.3 \pm 1.6$ mm at 3 months $\rightarrow 13.7 \pm 1.4$ mm at 6 months ($p < 0.001$). Symptomatically, $>85\%$ reported a substantial reduction in dryness, burning, irritation, and eye strain. The frequency of eye-strain episodes dropped from a median of 4/week to ≤ 1 /week ($p < 0.001$). Compliance with digital hygiene and ocular exercises was strongly correlated with improved outcomes.

Conclusions: DED is common among adolescents in Himachal Pradesh, with screen time as the strongest modifiable risk. The DEEP Protocol demonstrated significant clinical and symptomatic improvement, offering a simple, scalable solution for adolescent dry eye prevention.

Abstract No.: 200867

Graphitic Carbon Nitride Quantum Dots for Enhanced Corneal Crosslinking

First Author: Jinhai HUANG

Co-Author(s): Mei YANG, Xingtao ZHOU

Purpose: To address the limitations (in-situ hypoxia) of accelerated corneal crosslinking (A-CXL) in the treatment of keratoconus, we propose the development of a novel, oxygen self-sufficient platform utilizing graphitic carbon nitride quantum dots (g-C₃N₄ QDs) to augment the treatment efficacy.

Methods: The study involved the synthesis of biocompatible g-C₃N₄ QDs and their composite with riboflavin (RF@g-C₃N₄ QDs), intended to serve as photocatalytic oxygen-generating nanomaterials during A-CXL. Detailed assessments were conducted to evaluate the oxygen generation capability, reactive oxygen species (ROS) yield, and biosafety of these materials. Furthermore, their A-CXL efficacy were evaluated on male New Zealand white rabbits and compared with the conventional epi-off RF A-CXL protocol.

Results: The g-C₃N₄ QDs and RF@g-C₃N₄ QDs composites exhibited excellent photocatalytic oxygen generation, elevated ROS yield, and outstanding biosafety. In the rabbit model, these materials proved to be significantly more effective in strengthening the cornea after A-CXL compared to the RF protocol, suggesting a more effective treatment.

Conclusions: The study concludes that g-C₃N₄ QDs-based platforms possess notable potential for application in A-CXL, offering a promising approach to enhance corneal strength and treat corneal diseases, such as keratoconus and corneal ectasias. These findings prompt us to propose the potential application of g-C₃N₄ QDs in A-CXL for the treatment of corneal ectasias and various other corneal diseases.

Abstract No.: 207282

Impact of Air Pollution on Eyes in a Metropolitan City of India

First Author: Ritik JAIN

Co-Author(s): Vishal KATIYAR, Sanjiv KUMAR GUPTA, Arun SHARMA

Purpose: To evaluate the impact of urban air pollution on ocular surface health by comparing individuals with high outdoor exposure to those with predominantly indoor lifestyles.

Methods: This cross-sectional study enrolled 150 participants divided into two groups: traffic policemen (outdoor-exposed) and housewives (indoor-exposed). All subjects underwent slit-lamp examination, Schirmer's test, and tear break-up time (TBUT) assessment. Ocular symptoms (redness, dryness, irritation, watering, blurred vision) and protective practices were recorded. Statistical analysis, including chi-square testing, was used to assess associations between exposure and ocular outcomes.

Results: Outdoor-exposed participants showed significantly higher rates of dry eye symptoms, conjunctival congestion, and reduced tear film stability compared to indoor participants ($p < 0.05$). Schirmer's scores and TBUT were consistently lower in policemen. Symptom prevalence, including redness, dryness, and irritation, was markedly higher in the outdoor group. Eye-care practices (use of sunglasses, masks, or lubricants) were significantly associated with reported symptoms ($\chi^2 = 326.1$, $p = 0.000$).

Conclusions: Air pollution exerts a measurable adverse effect on ocular surface health. Individuals with prolonged outdoor exposure, particularly traffic policemen, are at higher risk of developing dry eye disease and ocular discomfort compared to those with indoor lifestyles. The findings highlight the need for preventive strategies, occupational health interventions, and policy-level action to mitigate pollution-related ocular morbidity in urban India.

Abstract No.: 201981

Incidence of Post-Cataract Surgery Descemet's Membrane Detachment and Anatomic and Functional Outcome of Perfluoroethane Descemetopexy

First Author: Manish PANDEY

Co-Author(s): Mahesh DEV, Rajiv Ranjan KARN

Purpose: To determine the incidence of Descemet membrane detachment (DMD) following cataract surgery and evaluate the anatomic and functional outcomes of perfluoroethane (C₂F₆) descemetopexy.

Methods: This retrospective study was conducted at a tertiary eye hospital from January to December 2023. Medical records of 41,843 cataract surgeries were reviewed, and 68 cases of DMD treated with

C₂F₆ descemetopexy were included. Demographic data, cataract surgical techniques, and postoperative complications were recorded. Anatomical success was defined as complete reattachment of the Descemet membrane, and functional success as best corrected visual acuity (BCVA) $\geq 6/18$ at 1 month.

Results: Of 41,843 cataract surgeries, 68 patients (0.16%) developed DMD. The mean age was 64.9 ± 7.9 years; male-to-female ratio was 53:47. Incidence was higher following small-incision cataract surgery compared with phacoemulsification (0.25% vs 0.07%, $p = 0.000$) and among trainees compared with consultants (0.19% vs 0.06%, $p = 0.003$). At one month, 6 patients were lost to follow-up. Primary C₂F₆ descemetopexy achieved anatomical success in 48 of 62 patients (77.4%). Functional success was achieved in 40 of 62 patients (64.5%). Complications included persistent DMD (17.4%), pupillary block with elevated intraocular pressure (9.7%), corneal decompensation (4.8%), posterior chamber gas with raised intraocular pressure (3.2%), and hyphema (3.2%). Three patients underwent repeat descemetopexy, with 2 achieving successful reattachment.

Conclusions: This study suggests that C₂F₆ descemetopexy is an effective and successful procedure for treating DMD following cataract surgery, providing good anatomical and functional outcomes.

Abstract No.: 201817

Injectable Microcarriers Enhance Stem Cell Delivery and Promote Corneal Regeneration for Alkali Burn

First Author: Li JINMING

Co-Author(s): Feng YUN

Purpose: Corneal alkali burns represent severe ocular injuries characterized by acute inflammation and long-term stromal fibrosis, potentially causing irreversible vision loss. Stem cell therapy has emerged as a promising treatment due to its regenerative and immunomodulatory properties. However, conventional cell injection methods are limited by poor cell viability, low retention rates, and injection-induced mechanical trauma.

Methods: Here, we present collagen-modified chitosan porous microspheres (ColMS) as a cell-laden porous microcarrier system to enhance adipose-derived stem cells (ADSCs) delivery efficiency for corneal repair following alkali burns.

Results: The pore sizes and particle sizes can be easily adjusted by varying the concentration of chitosan and stirring speed. Through in vitro experiment, it was demonstrated that ColMS-ADSCs guarantee the capability for epithelial regeneration and immunomodulatory. Finally, we investigated ColMS-ADSCs healing corneal alkali burn ability via subconjunctival injection. It was found that the

microcarriers exhibit outstanding therapeutic efficacy, which effectively suppresses inflammation during the early acute inflammatory phase and prevents the development of corneal fibrosis during the later recovery phase.

Conclusions: Cell-laden microcarriers exhibited the capability of promoting epithelial cell proliferation and the ability of immunomodulation by reducing M1 polarization. We developed a subconjunctival injection based on ColMS-ADSCs for corneal alkali burn healing, and ColMS-ADSCs group exhibited improved corneal transparency and faster epithelial healing, indicating its ability of anti-inflammation and anti-fibrosis. The prepared microcarriers provides a promising approach for effective treatment of corneal chemical injuries.

Abstract No.: 202765

Innate Lymphoid Cells Mediate Lacrimal Gland Epithelial Dynamics in Thyroid Eye Disease-Associated Dry Eye: A Novel Therapeutic Target

First Author: Lianfei FANG

Co-Author(s): Huifang ZHOU

Purpose: Thyroid eye disease (TED) frequently leads to dry eye disease (DED), for which current therapies remain predominantly palliative and fail to address underlying mechanisms. This study aims to delineate the immune landscape of the lacrimal gland in TED, with a particular focus on the roles of innate lymphoid cell (ILC) subsets in mediating epithelial injury and tissue repair.

Methods: Lacrimal gland tissues and peripheral blood from active and stable TED patients, and healthy controls, were analyzed. Histology evaluated inflammation and acinar damage. ILC subsets were quantified by flow cytometry, spatially mapped via multiplex immunofluorescence, and transcriptomically profiled using Smart-seq2. Functional roles were assessed through co-culture and cytokine blockade experiments.

Results: Active TED patients exhibited reduced tear secretion and more severe corneal damage than stable TED patients, with lacrimal glands showing pronounced inflammation, acinar atrophy, and elevated histological scores. Peripheral ILCs showed increased ILC1/ILC3 in active and ILC2 in stable TED patients. Notably, ILCs were enriched within lacrimal glands relative to blood, suggesting tissue-specific recruitment or expansion. Similarly, active TED is dominated by ILC1 and stable TED by ILC2 in the lacrimal gland, reflecting an ILC1-to-ILC2 shift during the transition from active to stable TED. ILC1s localized at inflammatory infiltration margins, producing TNF- α and inducing epithelial apoptosis, whereas ILC2s expressed AREG, promoting epithelial proliferation and repair.

Conclusions: ILCs mediate distinct immunoregulatory programs in TED lacrimal pathology: ILC1s drive epithelial injury in active disease, while ILC2s facilitate repair in stable disease. These findings highlight ILCs as potential immunotherapeutic targets for TED-associated DED.

Abstract No.: 202762

Innovative Limbal Stem Cell Functional Reconstruction Surgery – SLET

First Author: Hua WANG

Co-Author(s): Fei YAO

Purpose: Corneal limbal stem cell dysfunction (LSCD) often leads to severe ocular surface lesions, including neovascularization of the entire cornea, persistent corneal epithelial defects and ulcers, abnormal conjunctival metaplasia of the cornea, and severe dry eye, often resulting in a significant decline in visual function. Reconstructing the normal structure and function of corneal limbal stem cells and restoring a healthy ocular microenvironment have become key issues in solving LSCD.

Methods: Simple limbal epithelial transplantation (SLET) surgery is an innovative treatment method to solve this problem. The working principle of SLET is to take small pieces of autologous normal corneal limbal stem cell tissue, cut them into small clusters of stem cells, and implant them in the affected corneal limbus.

Results: SLET could reconstruct the structure and function of normal corneal limbal stem cells, restore a healthy ocular microenvironment: reduce corneal neovascularization, promote the proliferation and differentiation of normal corneal epithelial cells, and improve severe dry eye.

Conclusions: SLET is expected to become a new ideal surgical method for treating LSCD.

Abstract No.: 201714

Innovative Use of Cellulase and Cellulose Biosynthesis Inhibitors (CBIs) as a Novel Therapeutic Treatment for Vision-Threatening Pythium Insidiosum Keratitis

First Author: Bharat GURNANI

Co-Author(s): Kirandeep KAUR, Radhika NATARAJAN

Purpose: This study explores the therapeutic potential of cellulose biosynthesis inhibitors (CBIs) and cellulase enzymes as novel agents for the management of Pythium insidiosum keratitis, a devastating ocular infection often resistant to conventional therapy.

Methods: An extensive literature review substantiates the hypothesis and validates the use of CBIs and cellulase enzymes in treating this keratitis. The concept also delves into the molecular action mechanisms of these agents on the Pythium cell wall, exploring procurement and administration strategies as potential

therapeutic options. A comprehensive literature review was conducted to evaluate current evidence supporting the role of CBIs and cellulases in disrupting the Pythium cell wall. The review also examined the molecular mechanisms of action, delivery strategies, and possible clinical applicability of these agents.

Results: Unlike fungi and animals, Pythium possesses a unique plant-like cell wall that contains cellulose, making it particularly susceptible to agents targeting cellulose synthesis and degradation. CBIs inhibit the polymerization of β -glucan chains, thereby weakening structural integrity, while cellulase enzymes degrade existing cellulose fibrils. Together, these mechanisms may compromise the organism's survival and pathogenicity. The findings suggest that CBIs and cellulases could potentially provide superior efficacy compared with the limited success of current antifungal and antimicrobial therapies. Furthermore, the review highlights procurement feasibility and the possibility of developing topical or intracorneal administration routes.

Conclusions: Addressing the high rates of therapeutic keratoplasty, the study highlights CBIs and cellulase enzymes as potential revolutionary treatments. Future clinical trials are required to confirm these findings.

Abstract No.: 206800

Investigating a Hidden Invader on the Eyelid: Beware of Pthirus Pubis Infestation

First Author: Fredric ZULKIFLY

Co-Author(s): Angga FAJRIANSYAH, Elfa Ali IDRUS, Patriotika MUSLIMA, Arief Akhdestira MUSTARAM

Purpose: Phthiasis palpebrarum is a rare eyelash infestation by Pthirus pubis which was initially misdiagnosed as blepharitis and thus mistreated. This infestation is nearly affecting low- to middle-income countries. The accurate diagnosis of phthiasis palpebrarum is crucial for effective treatment and the prevention of further complications.

Methods: This is a case report of a patient who presented with chronic itching of both eyelids. The patient had undergone a comprehensive examination, including microscopic examination of her eyelashes.

Results: A 19-year-old girl complained of chronic itching on both eyelids for a year. The symptom was accompanied by the presence of debris that stuck to her eyelashes. The ophthalmologic examination revealed the nits and lice on her eyelashes. Wet mount microscopic examination showed a short, broad, crab-like body resembling Pthirus pubis during digestion after a blood meal, and a small, oval, translucent structure firmly attached to the hair shaft. The patient was subsequently referred to the dermatovenereology department, where lice were found on the scalp and pubic hair. The patient was treated by cleansing her eyelashes with terpinen-4-ol 1% twice daily, removing

mechanically the remaining nits and lice, and applying permethrine 1% lotion as a single dose. After two weeks, both eyelashes were found to be free of nits and lice.

Conclusions: Clinical manifestation of phthiasis palpebrarum may be confused with symptoms of blepharitis. Establishing a diagnosis of phthiasis palpebrarum poses challenges in the early stages of disease. Topical application of tea tree oil has been reported as a potential treatment for phthiasis palpebrarum.

Abstract No.: 201118

Isolation, Identification, and Characterisation of Mesenchymal Stromal Cells in Posterior Corneoscleral Limbus

First Author: Yuting **XIAO**

Co-Author(s): Sandra **BARRE-NGUYEN**, Charles **MCGHEE**, Jie **ZHANG**

Purpose: Mesenchymal stromal cells (MSCs) in the anterior corneoscleral limbal stroma (anterior limbal mesenchymal stromal cells, A-LMSCs) have been extensively studied, while their presence in the posterior limbus remains poorly defined. We hypothesise that MSCs may also exist in the posterior limbus, tentatively named posterior limbal mesenchymal stromal cells (P-LMSCs). This investigation aimed to isolate and characterise P-LMSCs.

Methods: Immunohistochemistry of human limbal tissue was performed to identify P-LMSCs in situ. Human limbal stroma was processed for explant culture to isolate A-LMSCs and P-LMSCs. Cultured P-LMSCs were characterised and compared to A-LMSCs using flow cytometry, tri-lineage differentiation, and immunocytochemistry.

Results: MSC markers CD73, CD90, and CD105 were expressed in the human posterior limbal stroma. P-LMSCs were successfully isolated through explant culture of the posterior limbal stroma, and were plastic adherent. Flow cytometry analysis showed that cultured P-LMSCs co-expressed CD73, CD90, and CD105, and lacked expression of MSC-exclusion markers CD14, CD34, CD45, CD19, and HLA-DR. P-LMSCs demonstrated the ability to differentiate into adipogenic, osteogenic, and chondrogenic lineages in vitro, with differentiation efficiencies comparable to those of A-LMSCs. P-LMSCs expressed recognised A-LMSC markers, including vimentin, Nestin, TRA-1-60, Oct3/4, and N-cadherin in extended culture.

Conclusions: This study identified MSCs in the posterior limbal stroma, which can be isolated via explant culture. They expressed MSC markers and exhibited multipotent differentiation potential. These findings provide new insights into the structure of the corneoscleral limbus.

Abstract No.: 205846

Knowledge, Attitude and Practice on Corneal Donation and Transplant Amongst the Allied Ophthalmic Personnel in Community Eye Centers in Nepal

First Author: Sagar **RUIT**

Co-Author(s): Anupama **AMATYA**, Samira **BYANJANKAR**, Ashiyana **NARIANI**, Saksham **TAMANG**, Raba **THAPA**

Purpose: This study aims to assess the knowledge, attitude, and practices regarding corneal donation and transplantation among allied ophthalmic personnel in community eye centers under the Tilganga Institute of Ophthalmology.

Methods: A questionnaire-based, cross-sectional study was conducted among 44 ophthalmic assistants and eye health workers from 19 community eye centers. Data was analyzed using SPSS software.

Results: The majority of respondents (77.3%) understood corneal donation as posthumous, and 97.7% were aware of its benefits for corneal blindness patients. Regarding age of donors, 56.8% believed all age groups could donate, and 31.8% set an age limit (1-75 years). While 81.8% pledged to donate their eyes, 66.7% of those unwilling cited religious beliefs. Counseling experience was reported by 72.7%, but 60% of those who had not cited lack of training as a barrier. Referrals for corneal transplantation were made by 54.4%, mainly due to corneal scarring.

Conclusions: The results of this study reveal a solid foundation of knowledge and practices related to eye donation and transplantation in Nepal but also highlights critical gaps in knowledge and areas for improvement. Therefore, ongoing training for ophthalmic paramedical professionals to increase awareness of eye banking structure, donor cornea demand and supply, referral services could prove to be an impactful yet cost effective way to empower them to be better advocates for eye donation. These efforts could benefit both Nepal and the 33 countries reliant on corneas from Nepalese donors.

Abstract No.: 203830

Lacrimal Gland Ultrasonography of Primary Sjögren's Syndrome: What Can We Learn From?

First Author: Wenyan **ZHOU**

Co-Author(s): Haozhe **YU**, Yun **FENG**

Purpose: Primary sjögren's syndrome (pSS)-related dry eye is more severe than non-pSS dry eye, while early diagnosis is critical for disease control. This study evaluated lacrimal gland ultrasonography (LGUS) for early diagnosis of pSS-related dry eye.

Methods: LGUS was performed on 32 pSS-related dry eye patients and 15 non-pSS dry eye controls. Meanwhile, we recorded ocular parameters to evaluate

dry eye, as well as systemic symptoms and laboratory test results to assess the severity of pSS. A receiver operating characteristic (ROC) curve was utilized to illustrate the diagnostic value of LGUS.

Results: The ocular surface evaluation including tear break-up time (BUT), Schirmer test (ST), ocular staining score (OSS), and LGUS greyscale score of patients with pSS-related dry eye showed significant differences as compared with non-pSS patients, while no difference was found of Ocular Surface Disease Index (OSDI), corneal perception and morphology and color Doppler ultrasound score between two groups. A ROC curve of the right lacrimal gland greyscale score of pSS patients showed an area under the curve (AUC) of 0.80, a sensitivity of 90.6% and a specificity of 66.7%. Besides, a significant correlation was found between the LGUS greyscale score and salivary gland involved, SSA antibody, ST, OSS, and psychological symptoms of patients.

Conclusions: Early ocular changes in pSS-related dry eye patients involve the lacrimal gland. LGUS could be an alternative to OSS or Schirmer test to recognize pSS patients, offering a slight advantage of higher sensitivity and specificity.

Abstract No.: 201017

LipiFlow Improves Ocular Surface Conditions in Patients With Meibomian Gland Dysfunction

First Author: **Nathania NGO**

Co-Author(s): **Allie LEE**

Purpose: To evaluate the effectiveness of the LipiFlow Thermal Pulsation System (LipiFlow) in increasing lipid layer thickness (LLT). This may offer a clinically accessible and non-invasive option for improving ocular surface conditions in patients with dry eye disease (DED) due to meibomian gland dysfunction (MGD), helping vulnerable individuals with debilitating MGD.

Methods: Patients whose MGD affected their activities of daily living (ADLs) were recruited. Exclusion criteria were fibrotic palpebral fissures, inability to remain immobile throughout treatment and acute pain. LipiFlow treatment and LLT measurement was successfully done on 35 eyes of 18 patients. LLT was measured before and after LipiFlow treatment with the Lipiview Ocular Surface Interferometer (LipiView). Further analyses were conducted on the resulting differences in pre-post-treatment measurements.

Results: Among the 18 patients, 12 were men and 6 were women. The mean age was 69.0 (± 12.9) years. The mean LLT pre-treatment was 57.0 (± 22.8) nm, and that of the post-treatment was 78.8 (± 22.7) nm. The difference between them was statistically significant ($p=0.0008$). The difference between LLT increase in males and females ($p=0.407$), as well as difference in LLT increase in patients aged below 70, and that of

patients aged 70 and above ($p=0.160$) were statistically insignificant.

Conclusions: LipiFlow is a safe and effective treatment for MGD, increasing the LLT in patients of varying ages and both sexes, successfully alleviating their dry eye symptoms.

Abstract No.: 205134

Long-Term Efficacy of Topoguided Excimer Laser Ablation (ASA) Combined With Corneal Crosslinking (CXL) for Keratoconus

First Author: **Jayant SARWATE**

Co-Author(s): **Nikit SARWATE**

Purpose: To evaluate the results of keratoconus eyes treated with Topoguided excimer laser ablation (ASA) with Ultraviolet corneal crosslinking (CXL).

Methods: Thirty-two eyes of keratoconus were included in a retrospective study. Minimum pachymetry was 465 microns and the Kmax was in the central 6 mm zone. Maximum laser ablation was 30 mic. Preoperative and Postoperative parameters were recorded. Uncorrected visual acuity (UCVA) best spectacle corrected visual acuity (BCSCA), flat keratometry (K1), steep keratometry (K2), maximum Keratometry (K Max), Root mean Square (RMS) of Total corneal Aberrations and (RMS) of higher order aberrations were recorded at the end of 3 months minimum and 32 months maximum.

Results: Average visual improvement was 2 lines. In two eyes with extreme k max of 66.3 and 79, it was only one line. K max and K2 reduced by minimum 2 D. Mean Pre op HOA reduced from 1.67 to 1.22. Total RMS from mean 6.74 to 4.98 post op. Kmax mean preop 52.83 reduced to 50.10 post op. Preop Mean K2 of 48.57 decreased to 46.72 post op. Post Op K1 values remained almost same. These results were statistically significant and were consistent after 32 months.

Conclusions: Topoguided ASA with CXL can be used as an effective tool to treat keratoconus with relatively thicker corneas of 465 microns and above and when the cone apex (Kmax) lies more centrally in the central 6 mm zone. The topoguided ASA with CXL does not alter the flat K but flattens the steep K. It improves total corneal aberrations and (HOA) thereby improving visual acuity and quality in all eyes.

Abstract No.: 205478

Long-Term Outcomes of Therapeutic Corneal Grafts Using Artificial Intelligence

First Author: **Prabhjot SINGH**

Co-Author(s): **Gairik KUNDU, Yathish S**

Purpose: This study aimed to look at demographics, clinical characteristics, and long-term outcomes of Therapeutic Penetrating Keratoplasty (TPK) performed using Artificial intelligence (AI) in a tertiary eye care hospital.

Methods: Case records of 1,046 therapeutic transplants were retrospectively analyzed, and outcomes were measured until 3 years of follow-up. Information on demographics, presentation characteristics, keratoplasty indications, microorganisms, and secondary surgical interventions was studied. The final outcome was classified in terms of therapeutic, anatomical, and functional outcomes. An AI model was then built to look at these risk factors. The area under the curve (AUC), sensitivity (SE), specificity (SP), and accuracy (AC), along with other metrics, were evaluated.

Results: The median age of the recipients was 58 years, with 72% men. The most common indications for TPK were advanced microbial keratitis, including perforated infectious ulcer, nonhealing ulcers, and graft infections. AI model detected mixed infections with concomitant fungal and bacterial followed by fungal infections as important factors for adverse outcomes. Therapeutic success was achieved in 72% at the end of 6 months. At 3 years 15 % retained a clear graft. The clinical risk factors model had an AC, SE, and SP of, 82%, 73% and 86%, respectively.

Conclusions: Therapeutic keratoplasty although effective in eradicating infection and providing anatomical integrity, needs timely intervention, and can aid in achieving the best functional outcome. Understanding key factors including type of infection, socio-economic factors can play an effective role in optimising outcomes.

Abstract No.: 204803

Management of Chronic Corneal Hydrops With Double Lenticule Transplantation

First Author: Faruk SEMIZ

Co-Author(s): Fetih Furkan ARSLAN, Njomza HIMA-MUSA, Ceren Ece SEMIZ

Purpose: To evaluate the clinical outcomes of double lenticule transplantation in keratoconus patients with chronic corneal hydrops.

Methods: This study included 24 keratoconus eyes with chronic corneal hydrops after prior crosslinking, indicated for penetrating keratoplasty. The cohort consisted of 24 patients (mean age 21.2 ± 2.5 years; 13 males, 11 females). All underwent double lenticule transplantation with one full lenticule ($134.2 \pm 18.0 \mu\text{m}$, -6.70 ± 0.91 D) and one semi-moon lenticule ($149.4 \pm 14.6 \mu\text{m}$), customized to astigmatism. Lenticules were transplanted through a 130- μm intrastromal pocket, targeting a postoperative central corneal thickness of 460 μm . All patients were followed for at least 12 months.

Results: At 1 year, UDVA/CDVA improved from 1.73 ± 0.24 to 0.76 ± 0.17 and 0.42 ± 0.07 logMAR, respectively. Q value improved from -0.75 ± 0.05 to -0.62 ± 0.04 , K1/K2 decreased from 71.7/61.0 D to

66.8/61.0 D, and CCT increased from 348.0 ± 20.3 to $482.5 \pm 8.7 \mu\text{m}$, with no complications or rejection.

Conclusions: Double lenticule transplantation using one full and one semi-moon lenticule appears to be a safe and effective alternative to penetrating keratoplasty, providing stromal thickening and maintaining corneal clarity in keratoconus eyes with chronic hydrops.

Abstract No.: 200287

Management of Microbial Keratitis in a Case of Ichthyosis

First Author: Mariya DOCTOR

Purpose: To report the management of microbial keratitis in a case of Ichthyosis.

Methods: A 26-year-old gentleman, a known case of ichthyosis, presented with LE redness, pain, and watering for 1 week. General examination showed short stature, coarse brown scales, eclabium, palmoplantar keratoderma, and distorted toes. Ocular examination showed matted eyelashes, upper and lower lid ectropion with thickened lid margins, loss of meibomian glands and lid margin keratinisation in BE. LE cornea had dendritic epithelial defect, anterior to mid stromal infiltration with peripheral corneal vascularisation.

Results: A provisional diagnosis of HSV stromal keratitis with ulceration was made, and corneal scraping showed RT-PCR and immunofluorescence assay (IFA) testing for herpes simplex virus-1 (HSV) was positive. Treatment with oral acyclovir and topical steroids resulted in a significant reduction in size of the stromal infiltrate and epithelial defect. At the last follow-up 20 days later, his visual acuity improved to 20/80 as compared to counting fingers close to face as noted on the first visit.

Conclusions: With this case, we plan to discuss the various ocular manifestations in a patient with ichthyosis, and we highlight the challenges faced in the management of microbial keratitis in such patients.

Abstract No.: 200742

Meesmann Dystrophy: Multimodal Diagnostics and Therapeutic Heterogeneity

First Author: Xingli ZHOU

Co-Author(s): Qing WANG, Ximing ZHAO

Purpose: To report three sporadic cases of Meesmann corneal dystrophy (MCD), supplement their imaging features and clinical management data, and emphasize preoperative screening necessity for occult lesions.

Methods: Retrospective analysis of 3 sporadic female MCD patients (aged 23-56 years). Examinations included best-corrected visual acuity (BCVA), fluorescein/non-fluorescein biomicroscopy, funduscopy, Schirmer test I, non-invasive break-up time

(NiBUT), esthesiometry, in vivo confocal microscopy (IVCM) and anterior segment OCT (AS-OCT) .

Results: All patients lacked family history, presenting foreign body sensation or decreased vision. Slit-lamp revealed corneal epithelial microcysts at peripheral, pupil-area, or pan-corneal locations. One case was diagnosed 4 years post-refractive surgery; one had concurrent cataract. AS-OCT showed epithelial thickening (70-74 μm) at lesions. IVCM identified microcysts (diameter: 12-71 μm ; density: 50-281/ mm^2) containing high-reflective debris (density: 178-378/ mm^2). All received artificial tears; one underwent phacoemulsification with intraocular lens implantation (Phaco+IOL), another phototherapeutic keratectomy (PTK). At 3-6-month follow-up, all achieved symptom relief and vision satisfaction.

Conclusions: Sporadic MCD exhibits clinical heterogeneity, requiring multimodal imaging (AS-OCT/IVCM) for diagnosis. Personalized treatments (artificial tears/surgery) effectively improve vision and satisfaction. Corneal dystrophies must be ruled out before refractive surgery.

Abstract No.: 204069

Mendelian Randomization and Genetic Analyses Reveal Causal Roles of Immune Cells and Inflammatory Proteins in Keratoconus

First Author: Xiaolin QI

Purpose: Immunity and inflammation are implicated in the progression of keratoconus (KC), but the causal relationships between inflammatory immune phenotypes and the disease remain unclear.

Methods: We conducted a comprehensive Mendelian randomization (MR) analysis using GWAS data to investigate the causal effects of inflammatory and immune factors on KC. Multiple sensitivity analyses were performed to validate our findings, with significant results confirmed through meta-analyses using independent GWAS datasets. The Steiger test, LD score regression, and multivariate MR were applied to assess independent effects.

Results: Analysis of inflammatory proteins revealed that IL-12B (PIVW = 8.26×10^{-5}) and IL-13 (PIVW = 0.012) were associated with an increased risk of KC, whereas IL-17 A (PIVW = 0.049) was inversely associated with KC risk. After FDR adjustment, the results for IL-12B (PFDR = 0.007) remained significant. Twenty-two protective and eleven risk immune cells were identified. Meta-analysis supports CD20 on IgD-CD24-B cells and Central Memory CD8 + T cells %CD8 + T cells as protective factors against KC. Multivariable MR revealed independent heritability for seven inflammatory proteins and three immune cells.

Conclusions: These findings highlight the critical role of immune and inflammatory factors in KC pathogenesis,

suggesting possible targets for future investigation in KC prevention and treatment.

Abstract No.: 206135

Methodology of Analysis of Human Meibum in Meibomian Gland Dysfunction and Dry Eye Disease: A Scoping Review

First Author: Chak Ka LAW

Co-Author(s): Nicole Ka Ying CHENG, Kelvin Kam Lung CHONG, Zhichao HU, Elva Lau Yung WONG

Purpose: Alterations in meibum composition and physical properties are critical to understanding the pathophysiology of meibomian gland dysfunction (MGD) and dry eye disease (DED), in addition to meibomian gland morphology and expressivity. However, methodologies for the meibum collection and analysis lack standardization. This scoping review aims to provide an overview of the methodologies used in the meibum research.

Methods: A total of 23 articles were included in the review after a systematic search from three electronic databases, PubMed, Cochrane library and MEDLINE, until September 2025. Studies that involved the methodologies for the collection and analysis of meibum from human subjects with MGD were included.

Results: 6 meibum collection methods were identified. The most frequently reported method was a metal spatula (39.1%), followed by a cotton swab, microcapillary tube, and Sebutape® (each 13.0%). Most studies (82.6%) focused on analysing the lipid composition, while a minority (21.7%) investigated its physical properties, including secreted amount, thermodynamic behaviour, and surface tension. 7 analytical techniques were identified, with liquid chromatography-mass spectrometry (LC-MS) being the most common (34.8%), followed by nuclear magnetic resonance (NMR) spectroscopy (26.1%) and infrared spectrometry (21.7%).

Conclusions: Heterogeneity exists across the methodologies used to investigate human meibum in MGD and DED, potentially contributing to inconsistent results and hindering meaningful comparisons across studies. The development of standardized protocols for meibum collection and analysis are urgently needed to ensure consistent and clinically translatable outcomes.

Abstract No.: 202656**Microbial Influx During Early Postnatal Life Fortifies the Ocular Surface and Guards Against Allergic Eye Disease***First Author: Yanbo LIU**Co-Author(s): Xiezhou HE, Wei LI, Zuguo LIU, Shangkun OU, Andrew J. QUANTOCK, Shulin SONG, Hang SUN, Han WU, Huping WU*

Purpose: Host-microbiome interplay during development governs the homeostasis of various bodily surfaces and is considered to have lifelong consequences for health. Postnatal colonization of the eye's microbiome, however, its impact on the homeostasis of the ocular surface is still unclear.

Methods: The composition and diversity of the conjunctival microbiome in C57BL/6J mice were tracked in 1-week-old neonates through to 8-week-old adult mice. Furthermore, we evaluated the effect of early antibiotic application following eyelid-opening on the homeostasis of ocular surface and its impact on allergic eye disease.

Results: The changes in the conjunctival microbiome correlate with age, especially at the 2-week and 3-week time points, which, respectively, are accompanied by eyelid-opening and weaning. Antigen-presenting cells were also recruited to the conjunctival epithelium after eyelid-opening, whilst an inhibition of microbial colonization at 2-to-3 weeks of age led to a disruption of mucosal homeostasis and aggravated the development of allergic eye disease.

Conclusions: This study improves our understanding of the development of the conjunctival microbiome in mice and provides an indication that early microbial colonization is required for the establishment of mucosal ocular surface homeostasis, the perturbation of which leads to increased susceptibility to allergic eye disease.

Abstract No.: 201243**Microplastics Identified in Commercial Over-the-Counter Lubricant Eyedrops***First Author: Chris LIM**Co-Author(s): Matthew BURKE, Emily CURREN, Julia JAEGER, Sandric LEONG, Blanche LIM, Jodhbir MEHTA, Andri RIAU, Xinyi SU, Robert SYMONS, Duoduo WU*

Purpose: There is increasing evidence that microplastics exert harmful effects on human health and on the ocular surface. This pilot study aims to investigate if microplastic particles are present in commonly used eyedrops in single-use plastic vials.

Methods: Six commonly used commercial tear-replacement solutions available without a doctor's prescription were tested (Brands A-F). All brands of eyedrops were analysed visually using light microscopy, and the number of microplastic particles was manually

counted. These were further analysed using the Agilent 8700 Laser Direct Infrared (LDIR) chemical imaging system.

Results: All eyedrops analysed contained microplastics. The number of particles identified using light microscopy ranged between 15 (Brand E) to >18,000 (Brand F). In total, nine types of microplastics were identified with LDIR: polyethylene, polypropylene, polystyrene, polyvinylchloride, polyethylene terephthalate, polycarbonate, polymethylmethacrylate, polyamide, and polyurethane.

Conclusions: This study provides the most extensive quantification of microplastic contamination in commercial eyedrops to date, highlighting a major, under-recognised source of ocular exposure. These particles may arise from secondary degradation of the plastic vials during production, transportation, storage, or during instillation, or be introduced from other sources during production and represent a major source of exposure to the ocular surface, especially among patients who require chronic instillation of eyedrops.

Abstract No.: 200312**Monkeypox-Associated Keratitis and Glabellar Lesion Mimicking a Third Eye***First Author: Wei Chen (eric) LAI**Co-Author(s): Shih Chung LAI, Mei-hui LEE, Timothy LEE, Jeremy LIU*

Purpose: To report a unique case of monkeypox virus keratitis that resolved with topical acyclovir treatment.

Methods: Case report.

Results: A 32-year-old male with a history of AIDS, neurosyphilis, and previous retinal detachment in the left eye was admitted for 1 week of left eye purulent discharge, blurry vision, and disseminated skin lesions. Visual acuity was 20/100 in the left eye. Externally, there is a large, ulcerated lesion on the glabellar region appearing like a third eye. There was a diffuse, vesicular rash with ulceration along the left upper and lower eyelids, associated with margin thickening and lower eyelid skin erosion. On the anterior segment, there was diffuse injection, chemosis, and corneal edema with perilimbal subepithelial stromal haze. Posterior exam was unremarkable. The patient's skin lesion swabs were positive for Monkeypox virus PCR. Additionally, skin biopsy demonstrated immunoreactivities in epidermal keratinocytes at the ulcer margin positive for monkeypox antibody. The patient was diagnosed with monkeypox blepharoconjunctivitis and keratitis. He was started on systemic tecovirimat, as well as acyclovir ointment every 4 hours, tobradex four times a day, and topical levofloxacin drops every 2 hours in the left eye. One month later, the patient's vision improved to baseline vision of 20/25. The patient experienced significant improvement in periocular skin ulceration,

blepharoconjunctivitis, corneal infiltrates, as well as skin lesions and rectal abscesses. He was tapered off systemic and topical antivirals on discharge.

Conclusions: This report demonstrates the striking ocular manifestations of monkeypox virus in an immunocompromised patient that resolved with antiviral treatment.

Abstract No.: 209602

Myelinated Corneal Nerve Fibers: A Case Report

First Author: Yajie SUN

Purpose: We accurately characterized the patient's characteristic morphological features.

Methods: In this case, we employed multimodal in vivo imaging to accurately capture the characteristic morphological features of the condition.

Results: In a 70-year-old male patient, conspicuous grey-white, thickened nerve fiber bundles in the anterior two-thirds of the corneal stroma were detected incidentally during cataract examination. On in vivo confocal microscopy (IVCM), the outermost region of nerve fibers in the corneal stroma is not uniform but is interrupted by hyperreflective, sheath-like sheaths. Corneal topography, optical coherence tomography (OCT) of the anterior segment and corneal sensitivity testing revealed no significant abnormalities. The patient subsequently underwent cataract surgery and achieved a best corrected visual acuity (BCVA) of 20/20.

Conclusions: We have obtained high quality multimodal imaging data of myelinated corneal nerve fibers that have not only enriched the imaging atlas of this disease, but have also shown that these myelinated fibers do not significantly affect ocular surface health or corneal morphology, nor negatively impact the outcomes of cataract surgery.

Abstract No.: 204995

New Onset of Herpes Simplex Keratitis following Alkaline Chemical Burn—A Case Report

First Author: Yu-ling LIU

Purpose: To report the clinical presentation and management of a patient with a new onset of herpes simplex keratitis following an alkaline chemical burn.

Methods: Case report.

Results: A 41-year-old man sustained an alkaline chemical burn to his left eye from sodium hydroxide. Initial findings included corneal epithelial loosening, limbal ischemia, and conjunctival erosion, with a best-corrected visual acuity (BCVA) of 0.8. Treatment involved epithelial debridement, a bandage contact lens (BCL), topical corticosteroids, lubricants, and

oral doxycycline. Four days later, corneal edema and limbal ischemia worsened despite epithelial healing. A cryopreserved amniotic membrane (CAM) was applied due to progressing edema and conjunctival melting. After the CAM melted, a new epithelial defect developed. The patient declined further surgical intervention, and corneal deterioration continued, with BCVA dropping to 0.3. Autologous serum was added, but the patient was lost to follow-up and later received dexamethasone injections elsewhere. One week later, he returned with BCVA 0.2 and classic signs of herpes simplex keratitis (HSK), including dendritic and geographic epithelial defects and stromal erosion, despite no prior HSK history. Antiviral ointment was started, corticosteroids stopped, and the ulcer healed in 3 days, though edema and necrosis worsened. Steroids were cautiously reintroduced, leading to recovery with BCVA of 0.6. Eight weeks later, disciform corneal edema occurred but improved with oral acyclovir and steroids, stabilizing BCVA at 0.7.

Conclusions: This rare case highlights the potential for new-onset HSK following chemical burns, emphasizing the need for careful monitoring and tailored treatment strategies in such complex presentations.

Abstract No.: 204070

Niche Microenvironment Promotes the Growth of Limbal Stem Cells

First Author: Jixing CAO

Co-Author(s): Jiansu CHEN, Sihui CHEN

Purpose: Limbal epithelial stem cell (LSC) deficiency (LSCD) leads to pain, corneal opacity, and eventually blindness. LSC transplantation of ex vivo expanded human LSCs on a carrier with limbal niche structure helps better treat LSCD. Here, we study the collagen vitrigel (CV) membrane with biomimetic niche microtopography to construct the LSC layer and transplant it for LSCD treatment.

Methods: We fabricated the 3-dimensional (3D) niche microtopography mold on a silicon substrate by ultraviolet (UV) lithography with photoresist to mimic the natural limbal microenvironment. Type-I collagen and 10 × DMEM were mixed at 9:1 to prepare a collagen sol, and it was incubated at 37°C, which was then removed to the rigid polymer scaffolds with micropattern and dried in a clean air chamber at 10°C for micropatterned collagen gel membrane formation. Next, LSCs at passage one (P1) were seeded onto the membrane and incubated at 37°C. The morphology and cell phenotype were analyzed.

Results: LSCs at P1 were acquired from the primary rabbit LSCs and exhibited polygonal morphology. The microstructure of the rigid niche-like microtopography polymer mold and embossed CV membrane was validated by the SEM images. The mold has tens of discrete fan bulges to form a 3D ring-like microstructure, with a gradient height from the center

70µm to the edge 40µm. LSCs cultured on curved CV membrane with microenvironment grew well by viability assay. The cultured cells were positive expression of CK3 and p63 by immunofluorescence staining.

Conclusions: CV membrane with limbal niche microenvironment promotes LSC growth and maintains cell phenotype.

Abstract No.: 201839

Nitric Oxide Protects Corneal Endothelium: In Vivo Correlation and In Vitro Confirmation

First Author: Yu-ting **TSAO**

Co-Author(s): Hung-chi **CHEN**, Yi-jen **HSUEH**, Tsai-te **LU**

Purpose: This study aims to elucidate the relationship between physiological concentrations of nitric oxide (NO) in the aqueous humor and corneal endothelial cell density (ECD). In addition, it investigates the proliferative, cytoprotective, and therapeutic roles of NO in maintaining ECD using an in vitro model.

Methods: This prospective case series was conducted from April 1, 2019, to September 30, 2024. Aqueous humor samples were collected at the initiation of phacoemulsification surgery, and NO levels were quantified using a commercially available nitrate/nitrite colorimetric assay kit. For the in vitro model, the B4G12 corneal endothelial cell line was used to evaluate the proliferative, protective, and therapeutic effects of NO, in comparison with ascorbic acid and a control group. Hydrogen peroxide (H₂O₂) was employed as the injurious agent in both the protective and therapeutic models.

Results: Spearman's correlation analysis revealed a moderately significant positive correlation between aqueous humor NO levels and corneal ECD ($P = 0.004$), suggesting a physiological role of NO in maintaining endothelial integrity. In the in vitro model, NO exhibited superior protective and therapeutic effects against H₂O₂-induced damage when compared to both the ascorbic acid and control groups.

Conclusions: Physiological levels of aqueous humor NO are positively associated with corneal endothelial cell density, indicating a role in maintaining endothelial integrity. In vitro, NO exerts stronger protective and therapeutic effects against oxidative stress than ascorbic acid, underscoring its potential in preserving corneal endothelial function. These findings warrant further exploration of NO-based strategies to prevent or mitigate endothelial damage.

Abstract No.: 201773

OSDI & Nei-VFQ25 Evaluation in Chronic Glaucoma Patients With Long-Term Use of Latanoprost 0.005% and Timolol 0.5% Eye Drop: A Multicenter Prospective Longitudinal Study

First Author: Ferdian **RAMADHAN**

Co-Author(s): Ruth **ANASTASIA**, Andry **LUKANDY**

Purpose: This study aimed to compare the effects of timolol 0.5% and latanoprost 0.005% on ocular surface health and vision-related quality of life in patients with chronic glaucoma.

Methods: Seventy glaucoma patients without a prior history of dry eye were enrolled from January 2023 to July 2024 at three eye clinics in Indonesia. Participants were assigned to either the timolol ($n=32$) or latanoprost ($n=38$) treatment group. Ocular surface status was evaluated using Tear Break-Up Time (TBUT), Schirmer I and II tests, and the Ocular Surface Disease Index (OSDI). Vision-related quality of life was assessed using the National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25) at 1, 3, and 6 months.

Results: In the timolol group, TBUT and Schirmer test scores declined over six months, accompanied by a significant increase in OSDI scores, indicating worsening dry eye symptoms. The latanoprost group showed no significant changes in these parameters. NEI VFQ-25 composite scores remained stable in both groups at 1 and 3 months, but declined at 6 months in the timolol group, particularly in subscales related to ocular pain, role difficulty, dependency, and social functioning. The driving subscale was excluded due to lack of statistical significance.

Conclusions: Timolol 0.5% was associated with greater deterioration of the ocular surface compared to latanoprost 0.005%. However, its impact on overall vision-related quality of life was modest.

Abstract No.: 201361

Ocular Health and Digital Device Use: Dry Eye Symptoms in High School Children in a South Indian City

First Author: Vaishnavi

Co-Author(s): Meghana **REDDY**

Purpose: To assess the association between digital device usage and the prevalence and severity of dry eye symptoms in high school children in a South Indian city.

Methods: This cross-sectional study assessed 352 students (grades 6–9) in a Kanchipuram school to evaluate the association between screen time and ocular health. Dry eye symptoms were measured using the Ocular Surface Disease Index (OSDI), Schirmer's test, and tear film break-up time (TBUT).

Results: The mean OSDI score was 37.2 ± 11.8 , and 90.6% of students exhibited DED symptoms. A daily screen time of over 3–3.5 hours significantly increased DED risk. Each additional 30 minutes of computer use increased the odds of moderate to severe DED (OR 1.94, 95% CI: 1.2–3.1). Higher grade levels also had a greater risk (OR 1.30, 95% CI: 1.1–1.6).

Conclusions: Digital device usage exceeding 3 hours per day is significantly associated with moderate to severe dry eye in school-aged children. • Children with increased computer use for education are at the highest risk • Limiting cumulative screen exposure to <3 hours/day may help prevent DED. • Interventions such as regular breaks, blink training, and increased outdoor time are recommended Our findings underscore the need for awareness among parents, schools, and policymakers to regulate screen habits in children to preserve long-term ocular surface health

Abstract No.: 204687

Ocular Rosacea: A Rare Case Report & Literature Review

First Author: Faria Tilat TIMA

Co-Author(s): Tanvir AHMED, Mahmood MUJTABA

Purpose: To report a case of Blepharokeratoconjunctivitis secondary to ocular rosacea.

Methods: Ms. X, 16 years, female, came to OPD with complaints of pain, redness, watering, photophobia, and foreign body sensation for 2 weeks. The condition subsided but this is recurring for about last 5 years. She also gave H/O recurrent allergic attack for last 1 year which include rashes in different parts of body & in the face. There were H/O flare-ups while working outside. She used a topical steroid, an antihistamine, vitamin C, and artificial tears for her complaints. Visual acuity (V/A)-Un aided 6/9(B/E), Pinhole 6/6P(B/E), Near-N6, pupil showed normal reaction. Slit lamp Examination revealed eyelid redness, swelling, margin telangiectasia (B/E) with a Meibomian cyst- LLL. Circumferential Superficial corneal Vascularisation & conjunctival congestion on B/E. Fundoscopic examination was non-contributory. Examination of the face revealed Facial papules, erythema over cheeks, nose, forehead, and chin. Diagnosis is based on symptoms, medical history, and an examination of the eyes and the skin of the face. She was treated with steroid-topical E/D: Dexamethason-1 drop 4 times daily B/E, steroid Oint: Dexamethasone at HS B/E, Antibiotic-topical E/D: Moxifloxacin-1 drop 6 times daily B/E, antibiotic oint: Ciprofloxacin at HS both eyelid & artificial Tear. She was referred to a skin specialist & they also confirmed our diagnosis. They prescribed Doxycycline, DUAC gel (Clindamycin & benzyl peroxidase) & oral antihistamine. She was re-examined after 7 days & her condition had improved.

Results: Ocular rosacea is not a very uncommon disease involving the skin & eyes. The various spectrum of manifestation & complexion of our population makes the diagnosis difficult. Life-long follow-up & observation is needed

Conclusions: The diagnosis of ocular rosacea is clinical and relies on collaborative study of both ophthalmologists and dermatologists and careful observation and interpretation of skin and ocular manifestations. Patient must seek dermatologic consultation. Lifestyle modification is equally important alongside the treatment option. So, successful therapy requires a multidisciplinary approach.

Abstract No.: 204861

Ocular Saviour: Allogenic Simple Limbal Epithelial Transplantation

First Author: Madhuvanthi MOHAN

Co-Author(s): Sujatha MOHAN

Purpose: To report the effectiveness of bilateral Allogeneic Simple Limbal Epithelial Transplantation (AlloSLET) for rapid re-epithelisation and inflammation control in a case of bilateral chemical injury

Methods: A 32-year-old male labourer presented with bilateral ocular pain, photophobia, and lid swelling following accidental injury with cement while working. On examination, both eyes showed marked chemosis and lid edema, total corneal epithelial defects and significant damage to the conjunctival epithelium along with cement particles on the ocular surface. After a thorough irrigation was performed, both eyes were graded as grade V according to Dua's grading and L6C3K2P0I0X1 according to the E-PIX grading system. Bandage contact lenses were placed and hourly topical corticosteroids were initiated. Persistent inflammation after 48 hours prompted bilateral AlloSLET. During surgery, lid eversion permitted careful and meticulous removal of residual cement particles which were the source of inflammation. The left eye, being more severely affected, required a repeat AlloSLET 10 days later.

Results: Postoperatively, there was resolution of inflammation and progressive re-epithelisation of the surface in both eyes. Visual acuity improved gradually, with best-corrected visual acuity showing significant recovery at follow-up. The removal of residual cement was crucial in reducing the continued inflammation. The patient remains symptom-free with stable ocular surface.

Conclusions: Bilateral AlloSLET, combined with thorough removal of retained alkali, can successfully restore the ocular surface in severe cement-related chemical burns. Early surgical intervention in cases with persistent inflammation may speed up recovery, reduce complications, and improve visual prognosis

Abstract No.: 206289**Ocular Surface Disease in a Young Boy With Laryngo-Onycho-Cutaneous Syndrome: A Case Report***First Author: Hajra MALIK**Co-Author(s): Shehrbano ABBAS, Saman GULZAR, Najia UZAIR*

Purpose: To present a rare case of ocular surface disease associated with LaryngoOnychoCutaneous Syndrome (LOCS), to describe its clinical course, management, and implications for longterm ophthalmic care.

Methods: A descriptive case report of a young boy with known LOCS was conducted. Detailed ophthalmic examination, photographic documentation, and assessment of ocular surface findings (including conjunctival granulation, symblepharon, and corneal involvement) were performed. Therapeutic interventions (medical and surgical) were applied, with longitudinal followup to monitor outcomes and recurrence.

Results: The patient exhibited significant conjunctival granulation tissue, symblepharon formation, and ocular surface compromise. Topical anti-inflammatory therapy and surgical excision of granulation tissue provided temporary improvement. However, recurrence was observed, requiring repeated interventions and close monitoring. Visual prognosis was challenged by progressive surface scarring.

Conclusions: LOCS may present with severe and recurrent ocular surface disease, posing difficulties in achieving lasting control. Early recognition, aggressive management of granulation, and long-term follow-up are essential to prevent visionthreatening complications in such cases.

Abstract No.: 204130**One-Year Clinical Outcomes of Phase II Advanced Cellular Therapy for Keratoconus***First Author: Hao ZHANG**Co-Author(s): Jorge L. ALIÓ, Jorge L. ALIÓ DEL BARRIO, Alejandra E. RODRIGUEZ*

Purpose: To assess the one-year outcomes of a Phase II clinical trial evaluating autologous adipose-derived adult stem cells (ADASCs), with or without decellularized donor corneal lamina, for corneal stromal regeneration in keratoconus.

Methods: Eleven patients with advanced keratoconus were enrolled; ten were randomized into two experimental groups and one received ADASCs alone. Group 1: ADASCs only (n=1); Group 2: 120-µm decellularized lamina (n=5); Group 3: 120-µm lamina recellularized with 3×10^6 ADSCs (n=5). ADSCs were harvested via elective liposuction and implanted in a mid-stromal pocket. Uncorrected (UDVA) and corrected

distance visual acuity (CDVA) were primary endpoints, with secondary parameters assessed preoperatively and at 1, 3, 6, and 12 months.

Results: No adverse events, including inflammation or rejection, occurred during follow-up. In vivo confocal microscopy demonstrated ADASC differentiation into keratocyte-like cells with new collagen deposition and progressive transparency improvement from 3 months. Anterior segment OCT confirmed integration and recellularization of implanted lamina. Keratoconus remained stable in all eyes. Stromal thickening was evident in Groups 2 and 3 but not in Group 1. Visual acuity improved modestly in Group 1, and by 1–2 Snellen lines in Groups 2 and 3.

Conclusions: ADASC-based therapy, especially in combination with decellularized lamina, appears safe and effective for restoring stromal thickness, transparency, and visual function in advanced keratoconus.

Abstract No.: 203683**Ophthalmologic Manifestations of Xanthoma Disseminatum in a Young Filipino Female***First Author: Kent FLORENTINO**Co-Author(s): Kristine Joy IRAOLA-DAVOCO, Ruben LIM BON SIONG, George Michael SOSUAN, Vincent TE*

Purpose: To report the first documented case of Xanthoma Disseminatum with ophthalmologic manifestations in an adult Filipino female

Methods: Case report

Results: A 42-year-old Filipino woman presented with bilateral red-yellow conjunctival and upper eyelid masses, accompanied by ocular redness and foreign body sensation. She also developed persistent, pruritic, red-yellow papules and nodules over the axilla, forearms, wrists, and thighs, along with intermittent globus sensation and hoarseness four months prior. Dermatologic evaluation, including a skin biopsy, revealed xanthomas, which was initially managed with oral statin therapy. Ocular symptoms led to empirical treatments in different clinics for presumed keratoconjunctivitis and phlyctenulosis, without improvement. Ophthalmologic examination showed red-yellow nodular lesions on the conjunctiva and upper eyelids. Videostroboscopy also identified multiple nodular lesions in the pharynx. Excision biopsies of the conjunctival and eyelid lesions demonstrated round cell proliferation, strongly positive for CD68 and negative for pancytokeratin, consistent with xanthogranulomatous inflammation. This, combined with the mucocutaneous and ocular involvement, supported a final diagnosis of Xanthoma Disseminatum. She was prescribed topical lubricants for symptomatic relief and scheduled for excision of recurrent conjunctival lesions for cosmesis. A multidisciplinary work-up was initiated to assess the

involvement of other organ systems. Upon completion, systemic immunosuppressive therapy with Cladribine is planned.

Conclusions: Xanthoma disseminatum is a rare, non-Langerhans cell histiocytosis with multisystemic involvement that can initially present with ocular manifestations. Early recognition of such is pivotal, as they may precede systemic symptoms. Diagnosis relies on characteristic clinical and immunohistopathologic features. Due to the lack of standardized treatment protocols, effective management requires interdisciplinary collaboration.

Abstract No.: 200253

Optimizing Corneal Ulcer Treatment: Drape Technique Supersedes Corneal Button

First Author: Basitali LAKHANI

Purpose: This case series presents multiple instances where drape bandage contact lenses (BCL) were utilized as an emergency measure for corneal perforations in resource-limited settings. One notable case involved a patient with a 3.5 mm corneal perforation, treated at a secondary medical facility lacking access to corneal buttons. The intervention involved the application of drape BCL, chosen due to its cost-effectiveness and availability. Detailed clinical presentations, diagnostic procedures, and the rationale for selecting drape BCL are discussed. The procedural steps and post-operative care protocols are also outlined. These cases underscore the potential of drape BCL as a viable alternative in settings where traditional corneal buttons are not accessible, advocating for its broader adoption. This approach not only provides hope for patients but also alleviates the burden on healthcare systems by offering a practical and affordable solution for managing corneal perforations.

Methods: .

Results: .

Conclusions: By sharing this experience, we aim to encourage the adoption of this approach in similar clinical scenarios, offering hope to patients.

Abstract No.: 203886

Oral Calycosin Restores Ocular Surface Integrity in NOD Mice With Primary Sjögren's Syndrome via Th17 Cell Modulation

First Author: Hao CHEN

Co-Author(s): Yun FENG, Haozhe YU, Zhiyu ZHANG

Purpose: Primary Sjögren's syndrome (pSS) is an autoimmune disorder characterized by lacrimal gland dysfunction and dry eye, with limited therapeutic options. This study investigated whether oral Calycosin (Caly), an isoflavonoid derived from Astragalus, could improve ocular surface integrity in NOD mice

with pSS, and explored its underlying immunological mechanisms.

Methods: Age-matched NOD/ShiLtJ mice with similar body weights were randomly assigned to four groups: control, low-dose Caly (10 mg/kg, oral gavage), high-dose Caly (50 mg/kg, oral gavage), and dexamethasone (tail vein injection) (n = 4–5 per group, 4 weeks). Tear secretion, corneal fluorescein staining, lacrimal gland histology, and central corneal thickness were evaluated. Multiplex immunohistochemistry, quantitative real-time PCR (qPCR), Western blotting (WB), and flow cytometry were used to assess T cell subsets. Humanized mice were employed to evaluate the potential immunotoxicity of Caly by flow cytometry.

Results: High-dose Caly significantly improved tear secretion and reduced corneal fluorescein staining. Lacrimal gland histology showed decreased lymphocytic infiltration, consistent with immunohistochemistry, qPCR, and WB findings. Central corneal thickness demonstrated structural recovery. Flow cytometry revealed a marked reduction in Th17 cell populations, with unobvious changes in Th1 and Treg cells. No adverse effects on human immune cell development were observed in humanized mice.

Conclusions: Calycosin alleviates ocular surface damage associated with pSS, likely through selective modulation of Th17-mediated immune responses. These findings highlight Caly as a promising immunomodulatory therapy with translational potential for pSS-related dry eye.

Abstract No.: 205287

Pain, Proptosis, and a Surprise in the Sinus: A Case of Bulla Ethmoidalis Mucocele

First Author: Arjan DHILLON

Co-Author(s): Chee SHEW FEI

Purpose: To report a case of unilateral non-axial proptosis secondary to mucocele.

Methods: Case report.

Results: A 46-year-old with underlying hypertension presented to us with right eye (OD) throbbing pain for 1 week duration, with pain on movement temporally. On further history, the patient claims his OD was gradually bulging outwards. On examination, his best corrected visual acuity (BCVA) was 6/9 in both eyes with a negative relative afferent pupillary defect. Hirschberg test revealed OD exotropia. Hertel exophthalmometer revealed significant proptosis of the OD, which was 20 mm compared to the left eye (OS) which was only 15 mm. Extraocular movements of the OD were restricted superiorly and laterally, and otherwise full. The anterior segment and posterior segment of both eyes were unremarkable on slit lamp and fundus examination. A contrasted commuted topography (CECT) was performed which revealed a non-enhancing heterogeneous hypodense lesion within the right

anterior ethmoidal air cell, strongly suggestive of a mucocele. Patient underwent a functional endoscopic sinus surgery (FESS) where a right bulla ethmoidalis mucocele was marsupialized successfully. The final diagnosis was OD non-axial proptosis secondary to right bulla ethmoidalis mucocele. Post operation, the eye pain resolved, with Hirschberg being central and Hertel exophthalmometer repeated showing OD 16 mm and OS 15 mm respectively.

Conclusions: Sinonasal mucocèles may present with orbital features such as painful non-axial proptosis, ocular misalignment, and motility restriction, closely resembling primary orbital disease. Recognition of this entity with timely imaging and surgical intervention is vital to relieve symptoms, restore ocular function, and prevent long-term visual morbidity.

Abstract No.: 205783

Pathogenic Mechanisms and Targeted Therapy of Keratoconus Based on Tunable In Vitro Matrix Stiffness Models and Nrf2 Knockout Mice

First Author: Xiaoxue LI

Co-Author(s): Jiansu CHEN, Zekai CUI

Purpose: This study investigates keratoconus (KC) mechanisms by integrating patient clinical data, a tunable matrix-stiffness in vitro model, and Nrf2 knockout (Nfe2l2_ko) mice, and evaluates the therapeutic potential of RTA-408 in modulating oxidative stress, inflammation, and ECM remodeling.

Methods: Corneal topography and Corvis ST parameters were collected from KC patients. Human corneal stromal cells (hCSCs) from SMILE-derived non-KC lenticules were used to establish a standardized in vitro model. Low-stiffness collagen hydrogels mimicked the KC microenvironment, followed by CXL treatment and RTA-408 intervention. Gene and protein expression were analyzed via RNA-seq, qPCR, proteomics, immunofluorescence, and Western blotting. An Nfe2l2_ko mouse model was generated using CRISPR/Cas9, and corneal changes were assessed by slit-lamp, OCT, TEM, immunofluorescence, ROS detection, and single-cell sequencing.

Results: KC patients exhibited significant corneal morphological and biomechanical abnormalities. In vitro, low matrix stiffness reduced collagen density, increased ROS, and dysregulated inflammation, oxidative stress, and ECM-related factors, which were reversed by CXL and RTA-408. Nfe2l2_ko mice showed KC-like features, including central corneal thinning, decreased stromal collagen, and proteoglycans. Single-cell sequencing and immunofluorescence revealed that Nrf2 deficiency activated inflammatory and oxidative stress pathways while suppressing antioxidant defenses and ECM homeostasis.

Conclusions: We established a tunable matrix-stiffness in vitro model of KC and demonstrated that reduced stiffness and Nrf2 deficiency drive KC-like pathology via the oxidative stress–inflammation–ECM degradation axis. RTA-408 activation of Nrf2 alleviated these changes, offering a potential therapeutic strategy. The Nfe2l2_ko mouse model provides a reliable platform for mechanistic studies and drug development.

Abstract No.: 207148

Persistent Red Eye? Look Out for Conjunctival Ulcers; Eye Opener for Systemic Differential Diagnosis

First Author: Harshitha KANISSETTY

Co-Author(s): Naveena Reddy ASAM

Purpose: To alert young ophthalmologists that conjunctival lesions in acute red eye require thorough evaluation beyond ophthalmology, requiring detailed history and cross-referral.

Methods: A 32-year-old male presented to us with a history of persistent redness after completion of a course of topical antibiotic eye drops (Gatifloxacin eye drops 6 times a day for 5 days) prescribed in the out patient department of a tertiary care Medical college hospital.

Results: Multiple conjunctival ulcers in the bulbar, palpebral and inter marginal conjunctiva of both eyes were found. They were 2 to 3 mm in diameter with whitish necrotic floor and surrounding intense congestion. Rest of the anterior segment, visual acuity & fundus were normal. The patient was again quizzed in detail, when he revealed that he was actually attending the ENT out patient. His records revealed that he was under evaluation for laryngeal stricture and was scheduled for biopsy of a sub glottic nodule.

Conclusions: Although conjunctival ulcers are a rare association with Behcets disease, it is very important to keep the mind open for such associations.

Abstract No.: 202147

Phototherapeutic Keratectomy for Anterior Corneal Diseases

First Author: Amrin Fatema Afzal Hussain NAYANI

Purpose: To evaluate the role of photo therapeutic keratectomy for anterior corneal diseases and to determine the role of diagnostic modalities for planning and management of anterior corneal diseases.

Methods: This was a prospective, cross-sectional observational study conducted at a tertiary eye care centre in northern India. Preoperative patient selection and evaluation are done for systemic diseases as well as for assessment of the depth and size of stromal involvement. Detailed ophthalmological evaluation is done to evaluate the depth and amount of stromal involvement by Anterior segment OCT and epithelial

thickness mapping. Topographical evaluation was done for refractive planning. Excimer laser ablation was done to ablate the diseased Stromal ablation as per standard protocols with residual bed thickness >300 µm. Post-operative evaluation and visual rehabilitation is done with routine follow-up.

Results: Statistical evaluation was done by SPSS 23.0 software. Mean improvement in visual acuity was calculated for all participants. BCVA was >6/24 for all patients.

Conclusions: Anterior stromal diseases are amenable to PTK with good post-operative visual rehabilitation. Careful evaluation of stromal involvement with a multimodal approach is crucial for planning the ablation depth.

Abstract No.: 205233

Pierced by Nature: Study on Manifestations of Triangular Thorn Corneal Injuries

First Author: Rakhi P **DCRUZ**

Purpose: Triangular thorn injuries to the cornea present a unique diagnostic challenge due to their transparent, glass-like appearance, often making them invisible in routine examinations. These thorns typically lodge in the upper tarsus, leading to superior half corneal abrasions that may go unnoticed, even with fluorescein staining. Misdiagnosis or delayed detection can result in serious complications, necessitating meticulous examination techniques for accurate identification and timely intervention.

Methods: This prospective study examines a case series of 35 patients presenting with triangular thorn injuries. Patients were classified into early and late presentations, with late cases exhibiting advanced complications such as corneal ulcers, anterior uveitis, nodular abscess-like swelling in the upper tarsus, and granuloma formation engulfing the thorn. Primary ophthalmologists frequently missed the diagnosis, leading to disease progression. A «bud and feel» technique—gently swiping the tarsus to detect a gritty sensation—was evaluated as a crucial method for identifying the presence of the thorn.

Results: Early presentations were primarily characterized by isolated corneal abrasions, whereas late cases exhibited infectious and inflammatory complications requiring extensive management. Granuloma formation and abscess-like swellings developed around undetected thorns, reinforcing the importance of careful upper tarsus examination in suspected cases. Routine fluorescein staining often failed to highlight the embedded thorn, leading to diagnostic delays.

Conclusions: Triangular thorn injuries, due to their near-invisibility and deceptive nature, pose a diagnostic challenge. Timely identification and careful removal, coupled with bandage contact lens placement for

widespread abrasions, and frequent lubricant and antibiotic therapy, are essential for optimal patient recovery and prevention of progressive ocular damage.

Abstract No.: 203070

Post-Filtration Surgery Ocular Digital Massage Induced Acute Corneal Hydrops

First Author: Indra **AMARJARGAL**

Co-Author(s): Anudari **BATKHUU**

Purpose: To report a case of a juvenile open-angle glaucoma patient with long-term ocular massage following trabeculectomy, who developed an Acute Corneal Hydrops.

Methods: Case report and review of literature.

Results: Acute Corneal Hydrops induced by ocular massage following trabeculectomy surgery is a controversial and rare complication. The 21-year-old female patient was diagnosed with juvenile-onset glaucoma 6 years ago and went through filtration surgery to lower intraocular pressure with daily ocular massage. She had denied previous ocular trauma, allergic disease, and a family history of keratoconus. Slit lamp examination revealed a protrusion in the cornea mimicking corneal hydrops with epithelial microcysts, intrastromal cleft, and Descemet's membrane detachment in her right eye. She was diagnosed with acute corneal hydrops and received intracameral C3F8 gas tamponade injection with compression sutures on the cornea. On 1 1-week follow-up, the corneal edema was significantly improved.

Conclusions: The relationship between long-term post-trabeculectomy ocular massage and the development of acute corneal hydrops is not well studied and proven, but it can occur in a minority of patients who have predisposing factors. In this case, due to having poor vision since childhood, the patient didn't know whether her complaints arose from a newly acquired condition rather than glaucoma, which she's been dealing with for a long time. Therefore, she had been continuously massaging the globe, making her already existing keratoconus worse and resulting in corneal hydrops formation. When advising therapeutic massage to enhance aqueous outflow, doctors should rule out any other ocular condition and warn the patient about the complications.

Abstract No.: 200852

Prevalence and Clinical Associations of Demodex Infestation in Taiwanese Patients With Dry Eye Disease

First Author: Ming-hwei **TSAI**

Co-Author(s): Yi **WAN**

Purpose: To investigate the prevalence of Demodex infestation and its association with clinical symptoms

and ocular surface parameters in Taiwanese patients presenting with dry eye disease.

Methods: A cross-sectional study was conducted enrolling patients with dry eye symptoms. Symptom profiles were documented and patients completed the Ocular Surface Disease Index (OSDI) questionnaire. Ocular examinations were performed with recording of ocular surface parameters. Eight eyelashes were sampled per patient (two from each eyelid of both eyes), preferentially selecting lashes with cylindrical dandruff when present. Samples were examined microscopically for Demodex identification and quantification. Multivariate analyses were performed to evaluate associations between Demodex counts and clinical symptoms and parameters.

Results: Fifty patients were enrolled with a mean age of 69 years. Demodex infestation was detected in 72% of patients, with a mean count of 3.4 mites per patient. Higher Demodex counts demonstrated significant associations with symptoms of ocular itching and stickiness, as well as reduced tear break-up time. No significant correlation was observed between Demodex counts and OSDI questionnaire scores.

Conclusions: Demodex infestation exhibits a high prevalence (72%) among Taiwanese patients with dry eye symptoms. The significant association between elevated Demodex counts and specific symptoms (itching and stickiness) suggests these clinical features may serve as reliable indicators for Demodex-related ocular surface disease. The absence of correlation with standardized OSDI scores indicates that targeted symptom evaluation may provide superior diagnostic utility compared to general dry eye questionnaires for identifying Demodex-associated pathology in this patient population.

Abstract No.: 206105

Prevalence of Corneal Guttata in Patients Undergoing Cataract Surgery at a Tertiary Hospital in Thailand

First Author: Teeravee **HONGYOK**
Co-Author(s): Chanchanok **SAELIM**

Purpose: To assess the prevalence of corneal guttata and identify the associated risk factors among pre-operative cataract patients in a tertiary care hospital in Thailand.

Methods: The prospective observational study included 869 eyes from 566 cataract patients presenting at the ophthalmology clinic. All participants underwent routine eye examinations, followed by ocular biometry and corneal endothelial evaluation using the IOL Master and specular microscopy, respectively. Demographic and clinical data were recorded using a standardized data collection form. The diagnosis of corneal guttata was independently made by two

authors based on specular microscopy printout images and was graded from 2 to 4 depending on severity.

Results: The overall prevalence of corneal guttata among cataract patients was 29.1% (253/869). Of these 253 eyes, the majority demonstrated stage 2 severity at 19.2% (167), followed by stage 3 at 7.5% (65), stage 4 at 1.8% (16), and stage 5 at 0.6% (5). Logistic regression analysis indicated that female gender, daily sunlight exposure exceeding two hours, residence in southern provinces, lower endothelial cell density, reduced percentage of hexagonality, and higher central corneal thickness were associated with an increased risk of corneal guttata.

Conclusions: A high prevalence of corneal guttata was observed in cataract patients in Thailand, associated with female gender, southern province residents, daily sunlight exposure, and compromised corneal endothelial parameters. The findings highlight the value of routine corneal guttata screening in preoperative patients to reduce the risk of postoperative endothelial decompensation and its adverse outcomes.

Abstract No.: 203372

Prospective Study of Accelerated Transepithelial Corneal Cross-Linking in Young Indonesian Patients With Keratoconus

First Author: Rifa **WIDYANINGRUM**
Co-Author(s): Reny **SETYOWATI**, Supanji **SUPANJI**, Agus **SUPARTOTO**, Khadijah **ZAI**

Purpose: To evaluate the safety and efficacy of accelerated transepithelial corneal collagen cross-linking (ATE-CXL) using 9 mW/cm² ultraviolet-A (UVA) irradiation for 10 minutes in pediatric and adolescent patients with keratoconus.

Methods: In this single-arm prospective study, 36 eyes of 36 patients aged 8–25 years with keratoconus underwent ATE-CXL at Dr. Sardjito Tertiary Teaching Hospital, Indonesia. Visual acuity, refractive parameters, keratometry, central corneal thickness, and intraocular pressure were assessed at baseline, 2 weeks, 1.5 months, and 6 months postoperatively. Safety was evaluated based on slit-lamp findings and patient-reported symptoms.

Results: Mean best-corrected visual acuity (BCVA) improved from 1.158 ± 0.38 LogMAR preoperatively to 0.794 ± 0.35 LogMAR at 6 months ($p < 0.001$). Mean astigmatism decreased significantly from 5.49 ± 2.2 D to 4.81 ± 2.1 D ($p = 0.03$). Keratometric parameters (K1, K2, Kmean), central corneal thickness, and intraocular pressure remained stable throughout the follow-up. No serious adverse events occurred. Minor postoperative symptoms, including photophobia and dry eye, resolved spontaneously by 1.5 months. Subgroup analyses by age and keratoconus stage showed consistent trends in visual and refractive improvements.

Conclusions: ATE-CXL with 9 mW/cm² UVA for 10 minutes is a safe and effective intervention in young keratoconus patients, providing early improvements in visual acuity and astigmatism while maintaining corneal stability. These results support ATE-CXL as a minimally invasive option for managing progressive keratoconus in pediatric and adolescent populations. Further long-term, controlled studies are warranted to confirm these findings and determine the durability of clinical outcomes.

Abstract No.: 201124

Rapid Assembly of Corneal Layers With Bi-liquid/ Liquid-solid Interfaces

First Author: Noel **CHEONG**

Co-Author(s): Joseph Y.k. **CHAN**, Kendrick C. **SHIH**

Purpose: Existing tissue engineering approaches are frequently limited by being time-consuming and requiring specialized resources. While bi-liquid interphases offer a comparatively simple and rapid method for forming thin tissue constructs, the resulting cell structures suffer from fragility. To overcome this, we investigated a novel bi-liquid/liquid-solid interface system (BLSLS) designed to create stable, scaffold-supported tissue.

Methods: We investigated the construction of a corneal epithelial and endothelial tissue-like planar construct with BLSLS. Cell layers were assembled with a biocompatible and biodegradable scaffold within a few hours using a simple apparatus. The resulting constructs could be easily collected by removing the liquid phases for subsequent culturing. Cell viability was assessed with live-dead assays and apoptotic assays. Proliferation and attachment of cells beyond scaffold was investigated with Transwell chemical injury model.

Results: The engineered corneal constructs maintained high viability in vitro. Functionally, the tissue-like planar construct could transplant corneal epithelial and endothelial cells to a designated surface. Cells would attach to adjacent surfaces and proliferate beyond the scaffold. Wound healing rate is increased with tissue-like planar construct application in an in vitro corneal epithelial injury model. Furthermore, preliminary data illustrated the strength and elasticity the scaffold possesses for manipulation during intraocular insertion.

Conclusions: These results demonstrate the potential of bi-liquid/liquid-solid interfaces for the easy and rapid construction of corneal tissue-like structures. This strategy is envisioned as a foundational platform for developing transplantable tissue-engineered corneal epithelium and endothelium.

Abstract No.: 200696

Real-World Study of 3% Diquafosol Sodium Eye Drops in Dry Eye Patients (SPRING Study)

First Author: Yuqian **WANG**

Co-Author(s): Zuguo **LIU**

Purpose: To evaluate the efficacy and safety of the P2Y2 receptor agonist (3% diquafosol sodium eye drops) in the clinical application for dry eye patients in China and provide guidance for its clinical use in Chinese dry eye patients.

Methods: An open-label, single-arm, multicenter real-world observational study conducted in China. Patients meeting the dry eye diagnostic criteria from the «Chinese Consensus on Dry Eye: Examination and Diagnosis (2020)» were included in the study and received 3% diquafosol sodium eye drops (Santen Pharmaceutical) according to the physician's treatment strategy.

Results: A total of 3,677 patients were screened, and 3,641 patients (99.02%) were successfully enrolled, with 3,118 patients (85.64%) completing the trial. After 2 weeks, 1 month, and 3 months of 3% diquafosol sodium eye drop treatment, significant improvements were observed in the patient's FBUT, DEQS (Dry Eye Questionnaire Score) total score, overall symptom rating, corneal fluorescein staining score, and tear meniscus height. For MGD patients with dry eye, significant improvements were seen in the eyelid margin abnormality score, meibum quality, and gland opening blockage score, with a significant increase in lipid layer thickness in patients with lipid layer thickness less than 60 nm. No serious adverse events related to the study drug were reported.

Conclusions: The results of this real-world study conducted in China demonstrate that the P2Y2 receptor agonist (3% diquafosol sodium eye drops) is both effective and safe for treating dry eye, providing a new therapeutic option for dry eye patients in China.

Abstract No.: 204211

Remarkable Improvement of Symptoms and Signs of Severe Dry Eye Treated by Ocular Immersion Hydrotherapy

First Author: Haoran **CUI**

Co-Author(s): Yong **TAO**, Shuang **ZHANG**, Tao **ZHANG**

Purpose: To explore the safety and effectiveness of a novel therapy for dry eye disease.

Methods: A 35-year-old woman was referred to our service with a 16-month history of bilateral blurred vision, and dry, gritty, red and painful eyes secondary to a history of hematopoietic stem cell transplantation. Traditional treatment options such as eye drops or ointments have limited efficacy in this case. A pair of swimming goggles was sterilized with 75% medical alcohol, then both eye cups were filled with

commercial intraocular irrigating solutions. By securing the straps, the swimming goggles were fastened onto the head, ensuring that both eyes were immersed in the solutions. The patient underwent 8-hour-per-day treatment of OIH for both eyes in the daytime. Eye ointment was given at night.

Results: At 6 days post-treatment, her BCVA increased to bilateral 0.4, and it was 0.8 from the 9 days post-treatment on. She felt more comfortable, gradually, with wide-open eyes and alleviated photophobia and ocular pain. Sodium fluorescein staining of the cornea showed that corneal filaments disappeared after 8 days of consistent OIH treatment, with a few small punctate corneal staining with sodium fluorescein. After two weeks of OIH treatment, the inflammation of her right eye resolved remarkably, and corneal nerves could be detected again by in vivo confocal microscopy.

Conclusions: The remarkably improved short-term outcome of the present case showed that OIH swimming goggles may serve as a promising choice for the treatment of severe dry eye secondary to oGVHD, especially for patients who failed to get benefits from conventional treatments.

Abstract No.: 200909

Rho-Kinase Inhibitors in Corneal Disease: Mechanisms, Clinical Applications, and Future Directions

First Author: Elizabeth **LEONG**

Co-Author(s): Andrea **ANG**, Chris H.L. **LIM**, Jodhbir S. **MEHTA**, Nigel **MORLET**, Evan **WONG**

Purpose: This narrative review comprehensively examines the mechanisms of action, pharmacological properties, safety profile, and therapeutic applications of Rho-associated protein kinase inhibitors (ROCKI) in corneal disease. It integrates preclinical and clinical evidence, reviews ongoing and emerging clinical trials, and discusses novel approaches. Key evidence gaps are identified, and future research priorities are outlined.

Methods: A structured literature search of PubMed, EMBASE, and Clinical Trials Gov was conducted from inception to May 2025 in accordance with the Scale for the Assessment of Narrative Review Articles (SANRA) framework. Keywords included “Rho-kinase inhibitor,” “corneal endothelium,” “Fuchs endothelial corneal dystrophy,” and “corneal neovascularization.” Eligible studies included preclinical or clinical research on ROCKI in corneal pathology.

Results: ROCKI modulate cytoskeletal organization, cell proliferation, migration, inflammation, and fibrosis in the cornea. Evidence supports their role in promoting endothelial regeneration in Fuchs endothelial corneal dystrophy and reducing oedema in pseudophakic bullous keratopathy (particularly after Descemet stripping only). They demonstrate anti-fibrotic and anti-angiogenic effects, suppressing

corneal neovascularization and minimizing post-surgical fibrosis. ROCKI have a favourable safety profile, with conjunctival hyperaemia and mild, reversible corneal epithelial changes as the most common adverse effects. Sustained-release delivery systems and combination strategies with cell therapy are under active investigation.

Conclusions: ROCKI are a promising therapeutic class for corneal diseases, offering regenerative, anti-inflammatory, anti-fibrotic, and anti-angiogenic benefits. Large-scale randomized controlled trials and optimized delivery strategies are warranted to define their role in routine corneal care.

Abstract No.: 204614

Role of CD200R1 in Regulating Macrophage-Driven Inflammation and Corneal Neovascularization After Alkali Burn

First Author: Li **JIANG**

Co-Author(s): Fan **XU**, Yuchen **ZHOU**

Purpose: To investigate the role of CD200R1 in regulating macrophage infiltration and activation, and its potential to suppress inflammation and pathological corneal neovascularization (CoNV) following alkali burn.

Methods: A corneal alkali burn (CAB) model was established in C57BL/6J wild-type and CD200R1 knockout (CD200R1^{-/-}) mice. Corneal edema and structural changes were assessed using anterior segment optical coherence tomography and hematoxylin–eosin staining. The extent of CoNV was evaluated by slit-lamp biomicroscopy and whole-mount corneal immunofluorescence. Macrophage infiltration and activation were analyzed by F4/80 immunostaining staining. Expression levels of CD200R1, CD200, and phosphorylated STAT6 were also examined to explore the underlying signaling mechanisms.

Results: CAB induced a robust upregulation of CD200R1, CD200, and p-STAT6, with CD200R1 expression prominently colocalizing with infiltrating F4/80+ macrophages. Compared with wild-type controls, CD200R1^{-/-} mice exhibited significantly exacerbated corneal edema and morphological disorganization. This was accompanied by marked increases in macrophage accumulation and activation, leading to accelerated and more extensive CoNV. These findings indicate that CD200R1 plays a protective role in maintaining corneal immune balance by restraining macrophage-driven inflammatory responses and neovascularization after alkali injury.

Conclusions: This study revealed that CD200R1 is a critical immunoregulatory receptor in the corneal response to alkali burn. Its deficiency results in heightened inflammation, enhanced macrophage infiltration, and increased pathological angiogenesis. Modulation of the CD200–CD200R1 axis may provide a

promising therapeutic avenue for preventing or limiting inflammation-induced corneal neovascularization.

Abstract No.: 200634

Safety and Efficacy of Ripasudil (Rho-Kinase Inhibitor) for Treatment of Postoperative Striate Keratopathy

First Author: Keerti WALI

Co-Author(s): Vallabha K, Sneha L, Vivea NAGDEV

Purpose: To study the safety and efficacy of ripasudil in the treatment of postoperative striate keratopathy in terms of corneal clarity, visual improvement, and IOP control.

Methods: A randomised controlled trial was performed at a tertiary eye hospital. Striate keratopathy grading and IOP measurement were done for postoperative cataract surgery patients. Three hundred patients were randomly divided into 2 groups- GROUP A patients were prescribed Ripasudil, and GROUP B were treated with the standard regimen of hypertonic saline and antiglaucoma drugs.

Results: A total of 300 patients were enrolled in the study, with 150 patients in each group. The majority of patients (46%) presented with grade 2 edema, and the mean number of days to achieve corneal clarity was 4.5 days and 3.5 days in groups A and B, respectively. In grade 3, mean days to resolution were 11 days and 5.8 days, respectively, which is statistically significant.

Conclusions: Ripasudil appears to be a promising targeted therapy for post-cataract surgery striate keratopathy, especially in patients presenting with milder degrees of corneal edema. Further studies incorporating objective evaluation of the corneal endothelium, using higher doses of Ripasudil and standardized surgical technique with a single surgeon, are warranted.

Abstract No.: 200157

Seeing the Signs: Disseminated Tuberculosis Presenting As Scleral and Iris Granulomatous Nodules: A Case Report

First Author: Aera Veenice BRIOSO

Co-Author(s): Mary Ellaine DIAZ

Purpose: Ocular tuberculosis has varying clinical manifestations; however, careful assessment allows a small preview of a more severe, life-threatening disseminated disease.

Methods: This was a case of a 50-year-old housewife who presented with a perilimbal granulomatous conjunctival nodule that seemed to invade the anterior chamber of the right eye, associated with granulomatous uveitis with a rapid increase in the number of iris granulomas. She had multiple neck, axillary, and preauricular masses that had unremarkable biopsy findings previously. Clinical

impression was multiple extrapulmonary tuberculosis. Anterior segment Ocular Coherence Tomography (AS OCT) showed hyperechoic thickening of the sclera extending to the limbus and a hypoechoic lesion in the anterior chamber angle. Repeat biopsy of the neck mass identified acid-fast bacilli. During her admission, she exhibited progressive weakness, increased respiratory effort, and abdominal distension. Unfortunately, her condition deteriorated rapidly, leading her demise.

Results: Disseminated tuberculosis poses a life-threatening condition, which harbors a mortality rate of 34.9% which is 3.39 to 4.53 times greater than non-disseminated types. Spread from a primary site can be lymphatic or hematogenous. Extrapulmonary tuberculosis and other disseminated types are typically diagnosed late, but initiation of treatment at the first catch of signs is crucial in the prevention and can decrease further dissemination and complications by 65%.

Conclusions: Disseminated tuberculosis is an important cause of morbidity and mortality, particularly in the Philippines where it is endemic. This case emphasized that prompt holistic evaluation is important to prevent complications and untimely death.

Abstract No.: 204408

Sequential Superior and Inferior Shield Ulcers in Vernal Keratoconjunctivitis: A Rare Case in a Young Female

First Author: Chester Aldwin YAP

Co-Author(s): Sharlene NOGUERA

Purpose: To describe a rare case of sequential superior and inferior shield ulcers in a young female with vernal keratoconjunctivitis (VKC). Inferior shield ulcers are extremely uncommon, with only a few cases reported previously, highlighting this atypical presentation.

Methods: This is a case report of a 14-year-old female VKC patient with a history of asthma and multiple allergies who presented with pruritus, tearing, and a whitish corneal opacity in the right eye. Initial examination revealed a superior corneal shield ulcer associated with giant papillae on the tarsal conjunctiva.

Results: She was treated with topical Loteprednol etabonate 0.5% + Tobramycin 0.3% and Tacrolimus 0.03% ointment. Visual acuity and symptoms initially improved; however, the patient was lost to follow-up. On return, slit-lamp examination revealed a double shield ulcer, with a newly developed inferior shield ulcer in addition to the pre-existing superior ulcer scar. Intensive topical therapy was restarted, and over three weeks, the ulcer healed with mild subepithelial scarring and restoration of visual acuity to 20/25. Shield ulcers are a recognized complication of VKC, usually affecting the superior cornea, while inferior ulcers are quite rare. To date, superior-to-inferior progression has been

reported only once, in a young male, making this the first documented case in a female.

Conclusions: To the best of our knowledge, no previous case report has described a young female patient with VKC who developed sequential superior and inferior corneal shield ulcers. Given the rarity of such cases, our report adds valuable insight into the spectrum of VKC presentations.

Abstract No.: 201629

Shewanella Keratitis: An Emerging Cause of Gram-Negative Bacterial Keratitis

First Author: George Michael SOSUAN

Co-Author(s): Ruben LIM BON SIONG, Ino Paul VILLACASTIN

Purpose: To present an emerging cause of Gram-negative bacterial keratitis

Methods: Case report

Results: A man in his 50s without comorbidities consulted for a whitish opacity on the right eye. Twelve hours previously he had been chiseling dry cement in a pool of water when a piece of cement suddenly chipped off and went into his right eye. He immediately rinsed his right eye with running tap water. No medication was applied. Over the following hours, he developed a whitish corneal opacity associated with blurring of vision. On examination, best-corrected visual acuity was 20/50 and a 2 x 1.5-millimeter anterior corneal stromal infiltrate with brush-like border staining with fluorescein was located inferiorly. Gram stain of the corneal scraping of the ulcer showed multiple Gram-negative bacilli. The patient was managed as a case of Gram-negative bacterial keratitis presumed *Pseudomonas*. One week later, vision improved to 20/30. Examination showed a clear cornea with resolution of the stromal infiltrates. Culture of the corneal scraping grew *Shewanella* algae. All topical treatment was ceased after one week.

Conclusions: Human infections by *Shewanella* are usually associated with trauma while fishing in the sea. The case here was not associated with exposure to a marine environment and is the first case to be reported in Southeast Asia. Despite the virulent nature of *Shewanella* algae, the keratitis in this case was diagnosed early and timely treatment with appropriate topical antibiotic treatment directed against Gram-negative organisms was provided, thus preventing serious ocular and visual complications.

Abstract No.: 203809

Short-Term Temporal Effects of Particulate Matter on Quality of Life of Refractive Surgery Cases

First Author: Phit UPAPHONG

Co-Author(s): Janejit CHOOVUTHAYAKORN, Prangchanok SAWETWONG, Napaporn TANANUVAT

Purpose: To find the temporal causal relationship between ambient particulate matter (PM) exposure and vision-related quality of life in refractive surgery individuals.

Methods: This secondary analysis used data from a prospective cohort in Chiang Mai, Thailand, where participants completed the Refractive Surgery-Related Quality-of-Life Questionnaire (RES-Q) at baseline, 1 week later (preoperative), and 3 months postoperatively. Daily PM_{2.5} and PM₁₀ levels were obtained from regional monitoring stations, and exposures were estimated for the survey day and lag periods of 1, 3, 7, and 14 days.

Results: A total of 504 visits from 168 participants (mean age 33.4±7.8 years; 73.2% female; 78.6% LASIK, 21.4% PRK) were analyzed. Higher PM_{2.5} and PM₁₀ levels were significantly associated with worse RES-Q scores at multiple lags, indicating poorer quality of life. Preoperatively, both pollutants affected the summary score, vision, and IDL subscales, with PRK showing cumulative increases at most longer lags (all $p \leq 0.04$). PM_{2.5} significantly worsened the summary score at lag 0 (+0.71, 95% CI: 0.05–1.37), lag 1 (+0.88, 95% CI: 0.22–1.54), lag 3 (+0.63, 95% CI: 0.02–1.25), lag 7 (+1.03, 95% CI: 0.14–1.93), and lag 14 (+1.50, 95% CI: 0.45–2.55). Ocular symptoms were less consistently affected, except at later lags. PM affected scores in LASIK group but without clear patterns. Postoperatively, PRK paradoxically showed early improvements at lag 0 but increases thereafter, whereas LASIK showed adverse postoperative associations with rising summary and IDL scores from lag 1 through lag 7 (all $p \leq 0.03$).

Conclusions: Short-term PM exposure negatively impacts the quality of life of refractive surgery patients, especially after LASIK.

Abstract No.: 205243

Significant Corneal Flattening 7 Years After Accelerated Epithelium-Off Collagen Cross-Linking in Late-Onset Keratoconus: A Case Report

First Author: Lin ZHAO

Co-Author(s): Jie BAI, Zexia DOU, Ling LI, Shaowei LI, Chang LIU

Purpose: To document long-term curvature changes after accelerated epithelium-off corneal collagen cross-linking (CXL) in late-onset keratoconus diagnosed at age 37.

Methods: A male patient with progressive bilateral keratoconus underwent accelerated epithelium-off CXL and was followed for 7 years and 3 months (87 months). Best-corrected visual acuity (BCVA) and Pentacam Scheimpflug tomography were recorded pre-operatively and at 6 months, 1 year, 2 years, 3 years, and the final visit.

Results: Pre-operative BCVA was 0.6 in both eyes. Baseline Pentacam data: Right eye: K1 51.7 D, K2 53.8 D, Km 52.7 D, Kmax 59.6 D, thinnest corneal thickness (TCT) 405 µm. Left eye: K1 48.2 D, K2 51.1 D, Km 49.6 D, Kmax 58.0 D, TCT 427 µm. Km values at 6 months, 1 year, 2 years, 3 years and 7 years: OD 52.3 D, 51.0 D, 49.9 D, 49.6 D, 47.1 D; OS 48.6 D, 47.6 D, 47.1 D, 47.1 D, 45.1 D. Kmax at 7 years: OD 51.3 D (-8.3 D), OS 48.4 D (-9.6 D). TCT fluctuated within a narrow range: OD: 405, 373, 374, 375, 372, 356 µm; OS: 427, 405, 393, 402, 394, 386 µm. BCVA improved to 0.8 OD and 0.9 OS at final visit; no complications occurred.

Conclusions: Accelerated epithelium-off CXL produced sustained corneal flattening and functional gain in late-onset keratoconus. Early post-operative pachymetric fluctuations did not preclude long-term stabilization, supporting the efficacy of this protocol irrespective of age at treatment.

Abstract No.: 201664

Silent Ulcer Becomes a Loud Warning: Neurotrophic Keratitis Secondary to Cerebellopontine Angle Acoustic Neuroma

First Author: Delgerzul BAT

Co-Author(s): Indra AMARJARGAL, Byambadorj MUNKHBAYAR

Purpose: INTRODUCTION: Neurotrophic keratitis (NK) is a rare, vision-threatening corneal disease resulting from impairment of trigeminal nerve innervation, leading to reduced corneal sensation and poor epithelial healing. While cerebellopontine angle (CPA) acoustic neuromas most commonly cause hearing loss and facial weakness, corneal complications are uncommon and often overlooked. We present a case highlighting the importance of recognizing painless corneal ulceration as a sign of underlying trigeminal pathology.

Methods: CASE SUMMARY: A 59-year-old woman presented with six days of painless redness and tearing in the right eye. Examination revealed a 7×4 mm central stromal ulcer, 2 mm hypopyon, markedly reduced visual acuity (finger counting), and absent corneal sensation. Three months earlier, she had undergone stereotactic radiotherapy for a right CPA acoustic neuroma. Neuroophthalmic assessment confirmed decreased right trigeminal nerve function. Treatment included intensive topical fluoroquinolones, preservative-free lubricants, cycloplegics, and lateral tarsorrhaphy. By day 24, the ulcer had reduced by 80%, and by day 38, complete epithelialization was achieved with visual acuity improving to 6/12.

Results: DISCUSSION: NK secondary to CPA acoustic neuroma is rare but can result from direct nerve compression or postradiotherapy changes. Painless keratitis with corneal hypoesthesia should prompt detailed cranial nerve evaluation and neuroimaging to guide timely management.

Conclusions: CONCLUSION: Painless corneal ulcers should raise strong suspicion for neurotrophic causes. Early diagnosis, multidisciplinary collaboration, and prompt intervention are vital to prevent irreversible vision loss.

Abstract No.: 204334

Silent Yet Blinding: Case Series of Xerophthalmia in Autism

First Author: Cassandra QUEK

Co-Author(s): Hannie CH'NG, Xin Gen NG, Rohanah BINTI ALIAS, Norlina BINTI MOHD RAMLI

Purpose: To highlight the risk of vitamin A deficiency and xerophthalmia in autistic children with restrictive diet. To raise awareness of the spectrum of ocular complications that can lead to irreversible blindness.

Methods: Case series

Results: Xerophthalmia may occur in children with autism spectrum disorder (ASD) and avoidant/restrictive food intake disorder (ARFID). We present a case series of four boys (aged 5–11 years), diagnosed with ASD and ARFID: A 10-year-old boy, consuming mainly rice and snacks, presented with eyelid swelling. Examination showed conjunctival xerosis with keratinization and corneal xerosis with epithelial defect. He improved with lubrication, topical antibiotics, and vitamin A. A 5-year-old boy on a French fries-only diet presented with photophobia and redness. He had a sealed corneal perforation in the right eye and Bitot's spot with central scarring in the left. Vision stabilized at 6/6 bilaterally with conservative treatment and vitamin A. An 11-year-old on fries and burgers developed bilateral xerosis and left corneal perforation with iris prolapse. He underwent tectonic keratoplasty, amniotic membrane transplantation, and tarsorrhaphy, achieving 6/12 vision. A 6-year-old with ASD, epilepsy, and vitamin D deficiency presented with bilateral xerosis and corneal ulcers. He had a right corneal perforation with Streptococcus infection requiring urgent keratoplasty. Although both corneal ulcers healed, the right corneal graft ultimately failed.

Conclusions: This case series highlights the varying severity of xerophthalmia in children with ASD and ARFID, ranging from Bitot's spots to corneal perforation. Early recognition of ARFID, along with appropriate ocular management and timely vitamin A supplementation, is crucial to prevent irreversible blindness.

Abstract No.: 207121**Soft Contact Lens-Related Corneal Ulcers: Rapid Aggressive Treatment is a Must***First Author: Elisa YOPITASARI*

Purpose: To highlight the severe risk of extended cosmetic soft contact lens wear and its management in a limited medical facility in developing countries.

Methods: A case report of a 34-year-old woman with a severe corneal ulcer following overnight usage of a cosmetic soft contact lens.

Results: The patient came with a 6.5 millimeters central corneal ulcer, suppurative ulcer bed without impending perforation, 2.5 millimeters of hypopion and visual acuity of hand movement. Corneal scrapping followed by Gram and KOH staining revealed a negative gram bacillus and no fungi, but there was no culture examination done. She was hospitalized and treated with 1 gram intravenous Ceftriaxone twice daily, fortified Gentamycin in pulsed loading maintenance continued with an hourly administration, Levofloxacin every 2 hours, and strong cyclopegic. Debridement under topical anesthesia and documentation of ulcer and hypopion size were done daily. Reduced ulcer size to 4 millimeters, diminished hypopion, and reduced pain were clinical factors to decide an outpatient status. Weekly visit up to one-month period resulted in a central deep corneal scar with visual acuity of 1/60. The patient was then enrolled to have a penetrating keratoplasty in the future.

Conclusions: Incautious soft contact lens use is still one of the common risk factors of severe corneal ulcer, particularly in developing countries. Immediate aggressive empirical antibiotic treatment is mandatory based on clinical judgment and simple laboratory findings from corneal scrapping in limited medical facility.

Abstract No.: 206982**Squamous Papilloma Presenting as Primary Pterygium: A Case Report***First Author: Jamille TURINGAN**Co-Author(s): Steffani Krista CHUA*

Purpose: To report a case of squamous papilloma in the right eye initially suspected as a pterygium.

Methods: This is a case report.

Results: A 46-year old male was referred to our clinic from another institution for excision of a presumed nasal pterygium on the right eye. Slit-lamp examination showed an cylindrical elevated smooth, non-movable fleshy conjunctival mass on the nasal aspect of the right eye, measuring 10 mm x 4 mm x 2 mm. The patient underwent excision biopsy of the conjunctival mass on the right eye under local anesthesia. Histopathologic findings confirmed the diagnosis of squamous papilloma.

Conclusions: This case underscores the importance of a careful clinical evaluation in distinguishing pterygium from other conjunctival lesions. Although conjunctival squamous papilloma is rare, a high index of suspicion is essential for accurate diagnosis and appropriate management.

Abstract No.: 201711**Sympathetic Ophthalmia Following Corneal Patch Graft for Corneal Perforation Secondary to Pediatric Blepharokeratoconjunctivitis***First Author: Jan Louise CABRERA**Co-Author(s): Ruben LIM BON SIONG, Bryan Vincent MESINA, Bobbie Marie SANTOS, George Michael SOSUAN*

Purpose: This is the first reported case of sympathetic ophthalmia (SO) that developed following a corneal patch graft in the absence of overt postoperative uveal incarceration for a complication of severe pediatric blepharokeratoconjunctivitis (PBKC), a treatable condition that may result in visual morbidity and corneal blindness if not treated promptly and adequately.

Methods: A 14-year-old Asian male presented with recurrent eye redness, pruritus, and blurring of vision of the left eye and was diagnosed with corneal perforation from ruptured descemetocoele from PBKC of the left eye. He was treated with antibiotics, underwent a full-thickness corneal patch graft, and was discharged well with topical steroids, antibiotics, cycloplegics, and a lid scrub regimen with an antibiotic-steroid combination ointment. One month post-operation, his visual acuity worsened to hand movement with anterior chamber inflammation, optic disc edema, and retinal detachment of both eyes and was diagnosed with sympathetic ophthalmia. He was given intravenous corticosteroids, which was gradually tapered on subsequent follow-up consults, and was started on immunosuppressants.

Results: Visual acuity improved from hand movement to 20/80 for both eyes, with a decrease in anterior and posterior chamber inflammation. However, there was a recurrence of inflammation at ten months post-operation from poor adherence with the topical corticosteroids and lid scrub regimen.

Conclusions: PBKC is a chronic disease with a wide clinical spectrum. Prompt diagnosis and management are crucial to prevent severe presentations and visual and systemic morbidities such as SO.

Abstract No.: 206156

TREM2-Mediated Polarization of Adipose Tissue Macrophages Reverses Inflammation and Lipid Dysregulation in Thyroid-Associated Ophthalmopathy

First Author: Zhihui XU

Co-Author(s): Huasheng YANG, Huijing YE

Purpose: Thyroid-associated ophthalmopathy (TAO) is an autoimmune disorder characterized by orbital inflammation, fibrosis, and adipogenesis. The contribution of adipose tissue macrophages (ATMs) and their immune checkpoints to TAO pathogenesis remains unclear. This study aimed to investigate the role of triggering receptor expressed on myeloid cells 2 (TREM2) in ATM polarization and orbital tissue remodeling.

Methods: Orbital adipose tissues from TAO patients and healthy controls were profiled by flow cytometry and immunohistochemistry to evaluate ATM subpopulations, M1/M2 polarization, and TREM2 expression. In vitro, primary human orbital fibroblasts were co-cultured with ATMs to assess TREM2-dependent effects on inflammation and adipogenesis. In vivo, bone marrow-specific TREM2-deficient mice and TREM2 agonist treatments were used to examine therapeutic effects and downstream NF κ B/IL1 β signaling.

Results: TAO orbital tissues displayed increased ATM accumulation with M1-skewed polarization and reduced TREM2 expression compared to controls. TREM2 overexpression or agonist treatment reversed M1 polarization, decreased fibroblast pro-inflammatory and adipogenic responses, and mitigated tissue remodeling in vitro. In experimental models, TREM2 activation improved thyroid hormone dysregulation, orbital inflammation, and adipose expansion.

Conclusions: TREM2 acts as a novel immunometabolic regulator of orbital tissue remodeling in TAO. Modulating macrophage polarization through TREM2 represents a promising therapeutic strategy for autoimmune orbitopathies.

Abstract No.: 204411

Tacrolimus Prolongs Corneal Allograft Survival and Prevents Dendritic Cell Infiltration in a Myeloid-Derived Suppressor Cell-Dependent Manner

First Author: Yingyi LIU

Co-Author(s): Yan HE

Purpose: To clarify the cellular mechanism by which tacrolimus (FK506) suppresses immune activation and elongates allograft survival, with a focus on understanding its effects on immune regulation via myeloid-derived suppressor cells (MDSC).

Methods: A mouse model of corneal penetrating keratoplasty was utilized, with recipient mice receiving FK506 treatment and MDSC depletion using anti-Gr-1 antibody at different time points post-transplant. Flow cytometry was used to evaluate the proportion of MDSC and dendritic cells (DC) in immune organs. Single-cell RNA sequencing and immunofluorescence staining were performed on corneal graft to analyze immune cell populations within the graft microenvironment. Ex vivo-generated MDSCs were cocultured with immature DCs, and RNA sequencing was performed to determine how FK506 modulates MDSC immunosuppressive activity.

Results: Administration of FK506 led to increased expansion of MDSC in recipient mice and prolonged survival of corneal allografts. In contrast, antibody-mediated depletion of MDSC abolished the FK506-mediated beneficial effects, which were associated with increased DC activation and recruitment to the graft bed and allografts. Notably, unlike continuous depletion and temporary early depletion, delayed depletion beginning on day 8 post-transplant failed to disrupt the FK506-induced elongation of corneal allograft survival. Single-cell RNA sequencing analysis and immunofluorescence staining of corneal grafts revealed that FK506 reduced graft infiltration of immune cells, including DC and T cells, in an MDSC-dependent and temporal fashion. Moreover, depletion of MDSC reverted FK506's suppression of DC maturation in the draining lymph node on day 7.

Conclusions: These findings indicate that FK506 prolongs allograft survival through induction of MDSC-mediated suppression of early DC activation.

Abstract No.: 202194

Targeting DLK/MAPK/Necroptosis Pathway-Mediated Inflammation Enables Mesenchymal Stem Cell Secretome to Alleviate Dry Eye Disease

First Author: Yaqi CHENG

Co-Author(s): Jiayi LIN, Shiqi LING, Huan YU

Purpose: Dry eye disease (DED) is a chronic inflammatory disease with chronic condition and high occurrence. This study aimed to investigate the effectiveness and mechanism of MSC-S in DED treatment.

Methods: The murine DED model was established and then treated with 10mg/ml MSC-S. Tear secretion and corneal fluorescein staining scores were performed to evaluate DED severity. The inflammation state was detected by flow cytometry of DCs and RT-PCR analysis of inflammatory factors. The human corneal endothelial cell line (HCECs) was subjected to hyperosmotic stress (HS, 500 mOsm). Cell proliferation, reactive oxygen species (ROS), and mitochondrial membrane potential (MMP) were examined. RNA-sequencing was performed on different corneas to

clarify the mechanisms underlying MSC-S treatment. The expression of potential pathway was verified.

Results: MSC-S enhanced tear secretion, reduced the cornea defects and inflammation in DED mice and protected HCECs from necroptosis in HS model. Analysis of RNA-sequencing data revealed MAPK and necroptosis pathway were activated in DED corneas and were inhibited by MSC-S. The core genes of MAPK pathway, DLK were identified. Overexpression of DLK accentuated DED and impaired MSC-S' therapy effects, accompanied by upregulation of the JNK and p38 MAPK pathway, necroptosis pathway, and inflammation factors.

Conclusions: This study demonstrates that the application of MSC-S exerts significant therapeutic effects on DED by inhibiting the DLK-mediated MAPK/ necroptosis pathway and inflammatory response. The findings of this research could provide an effective strategy for treating DED and propose new therapeutic targets.

Abstract No.: 200190

The Effect of Pterygium on Corneal Biomechanical Properties

First Author: Kosol **KAMPITAK**

Co-Author(s): Tararat **HOOPHOLERB**, Thanat **KAMPITAK**

Purpose: To evaluate the effect of pterygium on corneal biomechanical parameters using the Corvis ST®.

Methods: This prospective study included 27 participants (mean age: 59.7+/-12.1 years) with unilateral primary pterygium. The Corvis ST® was used to measure corneal biomechanical properties. Pterygium size was measured in the horizontal axis. A paired t-test was used to compare corneal biomechanical parameters between the pterygium eyes and the contralateral normal eyes. Pearson correlation analysis was performed to evaluate the correlations between corneal biomechanical parameters and pterygium size. A p-value of less than 0.05 was considered statistically significant.

Results: Significant differences were observed in the following corneal biomechanical parameters between the pterygium and fellow eyes: Ambrósio Relational Thickness horizontal ($p = 0.016$), Deformation Amplitude ($p = 0.049$), Deformation Amplitude Ratio ($p = 0.006$), and Deflection Amplitude ($p = 0.030$). However, no significant differences ($p > 0.05$) were found in the parameters of Integrated Radius, Peak Distance at Highest Concavity, Radius at Highest Concavity, Stiffness Parameter at First Applanation, or Stress-Strain Index. A significant correlation was identified between the horizontal Ambrósio Relational Thickness and the horizontal size of the pterygium ($p =$

0.002), while no significant correlations ($p > 0.05$) were observed with other biomechanical parameters.

Conclusions: Pterygium can affect corneal biomechanical properties as measured by the Corvis ST®. Therefore, the presence of pterygium should be considered when interpreting Corvis ST® measurements in clinical assessments.

Abstract No.: 201852

The Impact of Diabetes Mellitus on Corneal Endothelial Cells

First Author: Bayasgalan **PUREVDORJ**

Co-Author(s): Uranchimeg **DUGARSUREN**, Bayarmaa **KHUYAG**, Bayarmagnai **LKHAGVASUREN**, Bayarsukh **NARMANDAKH**

Purpose: This study aimed to compare corneal endothelial morphology and thickness in patients with type 2 diabetes mellitus and age-matched nondiabetic controls.

Methods: A cross-sectional study included 160 diabetic patients and 160 healthy individuals selected through random sampling. All underwent comprehensive ophthalmic examinations. Specular microscopy was used to assess central corneal thickness and endothelial morphological parameters.

Results: The mean endothelial cell density (ECD) in the diabetic group was 2599.75 ± 242.53 cells/mm², significantly lower than that in controls 2768.12 ± 263.21 cells/mm² ($P < 0.001$). The coefficient of variation was 0.32 ± 0.04 in controls and 0.35 ± 0.04 in diabetics, a significant difference ($P < 0.001$). Central corneal thickness was higher in diabetics 547.27 ± 28.78 μ m than in controls 523.24 ± 32.7 μ m ($P < 0.001$). Among patients with diabetes >10 years, the CV in cell size increased and hexagonality decreased ($P < 0.05$). The percentage of hexagonal cells was $59.70 \pm 4.63\%$ in the good glycemic control group and $55.58 \pm 3.75\%$ in the poor control group (HbA1c >7.5%) ($P = 0.003$).

Conclusions: Diabetes mellitus leads to a decrease in corneal endothelial cell density and induces morphological abnormalities, including polymegathism and pleomorphism. Therefore, in patients with diabetes, it is essential to conduct a detailed corneal assessment prior to intraocular surgery to select the most appropriate surgical approach and technique.

Abstract No.: 206030

The Impact of Second-Hand Smoking on Dry Eye Prevalence and Severity: A Population-Based Study in Hong Kong

First Author: Shue Hei **WONG**

Purpose: Smoking is an eye irritant that may cause dry eye in patients, but only a few studies highlight the impacts of passive smoking (second-hand smoking) on

dry eye. This study aims to investigate the impacts of passive smoking on dry eye prevalence and severity.

Methods: This is a cross-sectional, random population-based study on Chinese subjects aged 50 and above between the 1st of September 2021 and the 31st of August 2022. Patients underwent comprehensive dry eye assessment in order from least invasive to most invasive, including dry eye questionnaire (OSDI score), Non-invasive keratographic tear breakup time, tear meniscus height, tear breakup pattern, SMTube, and NEI cornea staining score. The definition of dry eye was adopted from the Asia Dry Eye Society.

Results: Of 578 patients recruited, 88 had dry eye disease (15.2%), and second-hand smoking exposure was documented in 44 participants (7.61%). The average age was 62.8, and 209 were male (36.2%). OSDI score was found to be significantly higher in participants affected by passive smoking in both univariate (OR=4.75, CI95=1.20-8.29, $p=0.009$) and multivariate logistic regression (OR=7.21, CI95=2.59-11.84, $p=0.002$). The odds of developing dry eye disease were also significantly higher in participants with passive smoking in both univariate (OR=1.07, CI95=0.36-1.73, $p=0.002$) and multivariate analysis (OR=1.45, CI95=0.60-2.28, $p<0.001$). Linear regression did not show any correlation between the risk of dry eye and the duration of second-hand smoke exposure.

Conclusions: Our study showed that individuals with frequent second-hand smoke exposure were more likely to have dry eye disease.

Abstract No.: 201810

The Netarsudil Paradox: Worsening Corneal Edema — a Case Report

First Author: Apurva **BAGLA**

Co-Author(s): Arti **SINGH**

Purpose: To report a rare case of netarsudil-associated reticular epithelial edema in a patient with persistent corneal edema following cataract surgery.

Methods: A 60-year-old female with postsurgical corneal edema was prescribed netarsudil ophthalmic solution, a Rho kinase (ROCK) inhibitor FDA-approved for primary open-angle glaucoma and ocular hypertension, but also explored for enhancing corneal endothelial function.

Results: Shortly after initiation of netarsudil, the patient developed worsening corneal edema and reticular epithelial bullae. The epithelial changes resolved completely upon discontinuation of the drug.

Conclusions: This case highlights a paradoxical epithelial response to netarsudil in the setting of compromised corneal endothelium. While ROCK inhibitors may support endothelial healing, clinicians should be aware of potential keratopathy and closely monitor patients with preexisting corneal conditions.

Further research is needed to clarify the mechanisms underlying netarsudil-induced epithelial changes.

Abstract No.: 204222

The Pediatric Ocular Surface Microbiome in Pet-Owning Households

First Author: Xiangtian **LING**

Co-Author(s): Li Jia **CHEN**, Jason C. **YAM**, Charlene C. **YIM**, Yuzhou **ZHANG**

Purpose: The influence of pet exposure on the pediatric ocular surface microbiome (OSM), a potential mediator of ocular immunity, remains uncharacterized. This study investigates OSM alterations in children with household pet contact.

Methods: In this cross-sectional study, conjunctival swabs from 347 children (aged 5–15 years) in the CUHK Hong Kong Children Eye Study were analyzed. 16S rRNA sequencing (V3–V4 region) was performed, followed by bioinformatic analysis (QIIME2, DADA2, SILVA 138) and functional prediction (PICRUSt2). Alpha/beta diversity, taxonomic composition, and KEGG pathways were compared.

Results: Pet-exposed children had higher alpha diversity (Shannon/Simpson/Observed indexes; $P<0.05$) with positive dose-response to contact time. Compositionally, these children showed distinct beta diversity (Bray-Curtis Distance, $P=0.015$) and enriched genera (Streptococcus, Actinomyces, Neisseria; LDA Score>2.0). NF- κ B signaling and VEGF signaling were predicted to enrich in pet-exposed children while non-exposed children showed increased macrolide biosynthesis pathways.

Conclusions: Pet exposure associates with increased diversity, animal-related taxa enrichment, and NF- κ B/VEGF pathway activation in the pediatric OSM. This suggests OSM as a novel mechanism for pet-related immune modulation, potentially influencing ocular surface health and allergy susceptibility.

Abstract No.: 206667

The Role of Diquafosol Sodium 3% Eye Drops in Managing Dry Eye in Thyroid Eye Disease: A Case Series

First Author: Fathia **AZZAHRA**

Co-Author(s): Rosy **ALDINA**, Zendy **SAGITA**

Purpose: Thyroid Eye Disease (TED) is an autoimmune disorder frequently complicated by Dry Eye Disease (DED) resulting from eyelid retraction and proptosis-related exposure, lacrimal gland dysfunction, and meibomian gland disease. This case series aims to describe the clinical heterogeneity of TED-related DED and evaluate the adjunctive role of diquafosol sodium 3% eye drops.

Methods: Four TED patients with DED underwent a comprehensive assessment, including Ocular Surface

Disease Index (OSDI), fluorescein tear break-up time (TBUT), ocular surface staining, tear meniscus height, tear break-up pattern, and meibomian gland evaluation. Subtypes were classified as aqueous-deficient or evaporative DED. All patients received lifestyle modification guidance, the same preservative-free artificial tears, and adjunctive diquafosol sodium 3% eye drops, administered according to subtype and severity.

Results: Two patients presented with aqueous-deficient DED and two with evaporative DED. After four weeks of diquafosol therapy, all patients reported symptomatic improvement. Objective parameters, especially TBUT, showed improvement across both subtypes. Recognizing the subtype of Dry Eye is essential for effective management of TED. Diquafosol, a P2Y₂ receptor agonist, stimulates both aqueous and mucin secretion, making it suitable for diverse presentations. Integration of ocular surface assessment into TED care, combined with multidisciplinary collaboration involving endocrinology and oculoplastics, further enhances patient outcomes.

Conclusions: Dry Eye associated with TED is clinically heterogeneous and requires individualized treatment. Adjunctive diquafosol sodium 3% may improve symptoms and ocular surface stability across both aqueous-deficient and evaporative subtypes.

Abstract No.: 205929

Therapeutic Deep Lamellar Keratoplasty in a Case of Fungal Keratitis

First Author: Inderjeet KAUR

Purpose: To highlight the therapeutic potential of Deep Lamellar Keratoplasty in refractory infective keratitis.

Methods: A 24-year-old male presented with redness and watering in the left eye for last 20 days, with a possible history of insect fall. On the basis of clinical features, a provisional diagnosis of infective keratitis was made, and was started on antifungals. Microbiology evaluation confirmed fungal infective etiology. Initial improvement was noted; however, due to subsequent non-responsiveness, the patient received two doses of intracameral and intrastromal antifungals. As the keratitis remained refractory to medical therapy, surgical intervention was planned. Anterior segment optical coherence tomography revealed infiltrates extending up to two-thirds of corneal depth. Based on this, a therapeutic Deep Lamellar Keratoplasty with interface wash with antifungal was performed. Postoperatively, the graft-host interface was well opposed, and no recurrence was observed during the longest follow-up period.

Results: Postoperatively, the graft-host interface was well opposed, and no recurrence was observed during the longest follow-up period.

Conclusions: This case highlights the role of anterior segment optical coherence tomography in surgical planning & therapeutic potential of Deep Lamellar Keratoplasty in refractory infective keratitis, with the added advantage of avoiding complications associated with open-sky procedures.

Abstract No.: 205778

Therapeutic Effects of Topical Nerve Growth Factor in a Mouse Model of Sjögren Syndrome

First Author: Chang Ho YOON

Co-Author(s): Suil JEON, So Hyun KANG, Kyoung Woo KIM, Mee Kum KIM, Ki Hean KIM, Yunjin LEE, Noseong PARK, Jin Suk RYU

Purpose: To evaluate the therapeutic effects of topical nerve growth factor (NGF) on the ocular surface and lacrimal gland (LG) in the NOD.B10-H2b (NOD) mouse model of Sjögren syndrome (SS).

Methods: Age-dependent changes in the ocular surface staining (OSS) and corneal subbasal nerve plexus (SBNP) were analyzed. Based on these results, eleven-week-old male NOD mice received topical NGF or balanced salt solution (BSS) three times daily for seven weeks. OSS, tear secretion, and corneal sensation were assessed before and after treatment. The corneal SBNP was evaluated using confocal microscopy of corneal whole mounts. Cytokine expression in the cornea and LG was analyzed by RT-qPCR, and LG focus scores were graded histologically.

Results: After seven weeks of treatment, the NGF group exhibited significant clinical improvements in OSS and tear secretion compared to baseline (both $p < 0.01$), with greater improvement than the BSS group (both $p < 0.001$). Corneal sensation remained stable in the NGF group but significantly declined in the BSS group ($p = 0.0222$), resulting in significantly better sensation in NGF group ($p < 0.0001$). Additionally, the number and length of central and peripheral SBNP were greater in the NGF group. Expression levels of IL-1 β , IL-6, and CGRP in the cornea, as well as IL-6 in the LG, were significantly reduced in the NGF group compared to the BSS group. LG focus scores were also lower in the NGF group.

Conclusions: Topical NGF demonstrated excellent therapeutic efficacy in a mouse model of SS by preserving the SBNP, enhancing sensory reflex tearing, and suppressing corneal and LG inflammation.

Abstract No.: 206650

Therapeutic Efficacy and Safety of Non-Invasive Radiofrequency Treatment in Patients With Refractory Meibomian Gland Dysfunction: A Randomized Controlled Trial

First Author: Sam In Kirsty LEE

Co-Author(s): Kendrick Co SHIH

Purpose: Determine clinical efficacy and safety of radiofrequency treatment (RF), followed by meibomian gland expression (MGX), in reducing the number and severity of symptoms and signs of dry eye disease secondary to refractory meibomian gland dysfunction.

Methods: A prospective, 24-week, double-masked, randomized, sham-controlled clinical trial comparing clinical efficacy and safety of RF and MGX with MGX alone in patients with MGD-related dry eye disease. It also investigates longitudinal changes in meibum quality and expressibility, including tear cytokines, after RF, and correlates these with changes in dry eye symptoms and tear film metrics. During the treatment period, all subjects will receive polyethylene glycol eye drops (Systane ULTRA, Alcon Company, Fort Worth, Texas, USA) four times a day in both eyes until 6 months post-treatment.

Results: Conducted preliminary analysis of 26 subjects. Average age was 62.5 years. All subjects underwent RF followed by MGX. 80 shots were made with energy level between 2.5-3.5. Each eyelid was treated with 20 shots; 2 passes of 10 shots. Compared to baseline, SPEED score (413.12 ± 5.472 vs 9.35 ± 4.804), NIKBUT (7.0356 ± 6.249 vs 10.4665 ± 6.804), ocular redness score (1.468 ± 0.664 vs 1.240 ± 0.578) and meibum expressibility score (2.8 ± 0.422 vs 1.75 ± 0.957) showed statistically significant improvements 3 months post-treatment. No significant differences in tear meniscus height and meibum quality score 3 months post-treatment. Patients experienced erythema post-treatment, which resolved within seconds.

Conclusions: Non-invasive RF of the eyelid is a safe and potentially effective treatment for refractory MGD-related dry eye disease.

Abstract No.: 201420

Three Years of Endothelial Cell Loss in Patients After Phakic Intra-Ocular Lens Implantation (Artisan, Artiflex, and ICL)

First Author: Seoyoon KIM

Purpose: To investigate the rate of corneal endothelial cell (CEC) loss after removal of phakic intraocular lens (pIOLs), and to compare CEC loss among pIOL types.

Methods: This was a prospective, non-randomised, comparative study including 160 eyes of 110 patients who underwent pIOL explantation, who committed to follow-up in 6-month intervals for at least 3 years. CEC densities at 5 different directions, anterior chamber

depth (ACD), and axial length (AL) were measured at each visit and were compared among pIOL types. To determine the pre-operative factors which affect surgical outcomes, linear mixed-model analysis was performed to evaluate the rate of CEC loss after explantation.

Results: There were no significant differences in patient demographics among pIOL types. The mean ACD was 3.385 ± 0.350 mm. The mean AL was 27.601 ± 1.603 mm. It is noteworthy that patients with a lower ACD (3.278 ± 0.332 mm) had a relatively lower CEC (<1000 cells/mm²), and exhibited a greater rate of CEC depletion over time (median [IQR] age, 40.5 [37-44] years; 135 [84.38%] female and 25 [15.63%] male). There were no significant differences observed in the pattern, trend, or slope of CEC loss among pIOL types. The model predicted that a critical threshold of 500 cells/mm² would be reached in approximately 8.56 years following pIOL explantation (95% CI, -159.98 to -127.87; $P < .0001$).

Conclusions: CEC loss was notably upregulated without significant differences between pIOL types. The model may imply that some patients require corneal transplantation following such within the next 9 years.

Abstract No.: 200547

Three-Year Results of Fresh Lenticule Transplantation for Herpetic Scarring

First Author: Faruk SEMIZ

Co-Author(s): Fetih Furkan ARSLAN, Njomza HIMA-MUSA, Ceren Ece SEMIZ

Purpose: To evaluate the long-term outcomes of customized fresh lenticule transplantation as an alternative surgical method for corneal reorganization and stability in patients with herpetic keratitis scarring.

Methods: This study included 23 eyes from 23 patients (aged 21-46 years) with multifocal or unifocal herpetic stromal scarring. Scar thickness was measured in microns using anterior segment optical coherence tomography (AS-OCT). Scar tissue was excised using femtosecond laser-assisted small incision lenticule extraction (SMILE), followed by transplantation of a SMILE-derived fresh lenticule from myopic donors. Lenticules averaged $66.74 \mu\text{m}$ in thickness (range, 30-140 μm) with a mean refractive power of -3.34 ± 1.40 diopters (range, -7.00 to -1.50 D), matched to recipient corneal topography. All patients were followed for a minimum of 3 years. Follow-up evaluations included uncorrected and corrected distance visual acuity (UDVA, CDVA), slit-lamp biomicroscopy, corneal topography, pachymetry, and AS-OCT imaging.

Results: No cases of recurrent herpetic keratitis or graft rejection were observed, while significant improvements were achieved in UDVA (0.91 ± 0.14 to 0.31 ± 0.06 logMAR, $p < 0.001$), CDVA (0.58 ± 0.09 to 0.16 ± 0.05 logMAR, $p < 0.001$), CCT (444.13 ± 16.55

μm to $508.35 \pm 7.09 \mu\text{m}$, $p < 0.001$), K1 (39.01 ± 2.36 D to 42.61 ± 1.17 D, $p < 0.001$), K2 (43.50 ± 2.52 D to 44.09 ± 1.17 D, $p < 0.001$), and Q-value (-0.47 ± 0.07 to -0.73 ± 0.08 , $p < 0.001$) at 3 years.

Conclusions: At 3 years, customized fresh stromal lenticule transplantation effective in strengthening the cornea, restoring clarity, and sustaining visual gains in herpetic scarring.

Abstract No.: 204025

Tissue-Localized and Systemic Immune Dysregulation in the Autoimmune Etiology of Mooren's Ulcer

First Author: Shengqian **DOU**

Co-Author(s): Weiyun **SHI**, Qingjun **ZHOU**

Purpose: Mooren's ulcer (MU) is a rapidly progressive, severely painful peripheral corneal ulcer with high aggressiveness and frequent recurrence. Despite its clinical distinctiveness, the underlying pathogenesis and effective therapeutic strategies remain elusive.

Methods: We conducted single-cell RNA sequencing (scRNA-seq) analysis on limbal tissues and peripheral blood mononuclear cells (PBMCs) from MU patients and healthy controls, followed by validations with immunohistochemical staining and immunofluorescence. Corneal epithelial cells and immune cells were subclustered and altered transcriptional signals were comprehensively dissected between conditions. Altered cell-cell communications in MU and comparisons of the PBMC atlas across various autoimmune diseases were also deciphered.

Results: We compiled the first single-cell atlas of limbus and PBMCs in MU patients and healthy subjects, revealing distinct cellular compositions. Limbal epithelial cells exhibited pronounced pro-inflammatory signatures and disrupted differentiation trajectories in MU samples, while tissue-invaded B cells and activated circulating B cells were prominently observed. Subcluster analysis and cell-cell communication networks further implicated the involvement of T cells, monocytes, and macrophages in MU progression. Finally, comparative analysis with other autoimmune diseases demonstrated shared immune activation patterns, particularly in T and B cell responses.

Conclusions: In summary, our study advances the understanding of MU pathogenesis by uncovering dysregulated limbal niche homeostasis and aberrant immune cell crosstalk, reinforcing its autoimmune nature. These findings not only elucidate key molecular mechanisms underlying MU but also provide a foundation for developing targeted therapeutic strategies. Furthermore, the shared immunological signatures between MU and other autoimmune disorders suggest potential avenues for repurposing existing immunomodulatory therapies in MU management.

Abstract No.: 207481

Topical Insulin's Use in Various Etiologies of Persistent Epithelial Defects: A Case Series

First Author: Raj Shekhar **PAUL**

Purpose: To report the efficacy of topical insulin under various case scenarios.

Methods: The topical insulin 16 IU/ml drops were prepared by mixing 6 parts of artificial tears with 4 parts of regular insulin. They were administered in cases presenting with persistent epithelial defects (PEDs), following neurotrophic keratitis, following surgeries like therapeutic penetrating keratoplasty, deep anterior lamellar keratoplasty, collagen cross-linking for ectasia, recurrent corneal erosions, and corneal decompensation after retinal surgeries such as buckle procedures and vitrectomy. Additional indications included recurrent corneal erosions, congenital hereditary endothelial dystrophy (CHED), epithelial defects due to Stevens-Johnson syndrome with PROSE lens misfit, and an additive role in exposure keratopathy from Bell's palsy.

Results: The patients ranged in age from 6 to 66 years, with a median of 30.5 years. The duration of topical insulin treatment for epithelial healing ranged from 15 days to 3 months, with a mean of approximately 57 ± 27 days. Out of 10 cases, 8 achieved complete epithelial closure (80% success rate, comparable with other studies). One case of CHED remains under treatment, while another case involving Stevens-Johnson syndrome with PROSE-related PED did not respond. All the patients had more than 8 months of follow-up after cessation of insulin eyedrops.

Conclusions: Overall, due to the ease of preparation and convenient administration technique, as simple as eyedrops, topical insulin is a preferred choice over other modalities of treatment like amniotic membrane graft, autologous serum, for non-healing epithelial defects.

Abstract No.: 200870

Transepithelial Corneal Cross-Linking Advancement With Novel Hibiscus-Inspired RF/ZIF-8 Composites

First Author: Jinhai **HUANG**

Co-Author(s): Mei **YANG**, Xingtao **ZHOU**

Purpose: Hibiscus-like RF@ZIF-8NF composites were developed to enhance TE-CXL efficacy while preserving the epithelium, offering an innovative approach for keratoconus treatment.

Methods: The RF@ZIF-8 composites were synthesized using 5-phosphoric acid-riboflavin (RF), 2-methylimi, and zinc nitrate as precursors, through the optimization of reaction conditions. Detailed material characterization, alongside in vitro and in

vivo biological evaluations, was conducted for the synthesized RF@ZIF-8 composites.

Results: The doping of RF in appropriate range has little effect on the phase structure of ZIF-8, while the morphology and size of the composites can be adjusted by changing reaction factors. Under identical conditions, various experimental outcomes demonstrated that the synthesized RF@ZIF-8 composites exhibit superior corneal permeability, with increased RF concentration within the stroma compared to other groups. Biocompatibility assessments revealed that the RF@ZIF-8 NF nanocomposites possess outstanding biocompatibility without causing discernible damage to the cornea. In vivo studies showed that the TE-CXL efficacy of the RF@ZIF-8 composite matched or slightly surpassed that of standard CXL (SCXL).

Conclusions: The engineered hibiscus-like RF@ZIF-8NF composites demonstrated superior TE-CXL performance with epithelial preservation, rivaling or even exceeding that of SCXL. This novel TE-CXL nanotherapy heralds a promising strategy for keratoconus treatment, offering significant research potential and pioneering a new avenue in CXL development.

Abstract No.: 205767

Uncommon Fungal Keratitis: Clinical Presentations and Prognoses of Uncommon Corneal Pathogens

First Author: Ahyan **ILMAN QUDSI**
Co-Author(s): Qingfeng **LIANG**

Purpose: While fungal keratitis (FK) is commonly caused by *Fusarium*, *Aspergillus*, *Alternaria* and *Candida*, uncommon FK pathogens remain poorly characterized. This study aims to describe the clinical features, microbiological diversity, and treatment outcomes of uncommon FK.

Methods: Retrospective analysis of uncommon fungal keratitis cases identified by MALDI-TOF MS at a tertiary referral center (2008–2023). Data on demographics, predisposing factors, clinical signs, microbiological findings, and outcomes were analyzed.

Results: 63 cases (69.8% male, mean age 56.1±9.8 years) were identified. Trauma was predominated risk factors (66.7%) primarily from plant-related injuries (31.7%). Patients presented after 31.1±24.8 days of symptoms. Slit-lamp findings included dry texture (71.4%), dense infiltrates (50.8%) and feathery margins (38.1%) as predominant features. Prolonged treatment was observed (median 189 days; IQR 54-237), with 11 cases (17.5%) required surgery. Pathogens from Eurotiomycetes class comprised the longest treatment duration (median 242.5 days; IQR 197-272), with 27.3% of surgical cases, and exhibited the most severe manifestations, with frequent severe ulcers (>5mm) 50.0%, multifocal lesions (66.7%, P=0.001),

neovascularization (58.3%, P=0.035), and hypopyon (50.0%). Triazoles (ISA and VRC) showed the lowest MICs in vitro across all fungal classes.

Conclusions: Uncommon FK pathogens collectively demonstrate aggressive features and prolonged treatment courses owing to delayed diagnosis and virulence of the species. Eurotiomycetes were associated with severe presentations and poor outcomes, while all classes showed favorable in vitro response to newer triazoles. These observations highlight the need for heightened suspicion, early identification, and tailored antifungal selection for uncommon FK.

Abstract No.: 204416

Unmasking Coogan-Reese Syndrome: A Rare Yet Vision-Threatening Mimic of Glaucoma

First Author: Sean **TAY**
Co-Author(s): Qiu Yip **LIM**, Benjamin **LIM CHING HOW**, Henry **NGOO QI ZHE**

Purpose: To review the clinical features, diagnostic approach, and management strategies of Coogan-Reese syndrome.

Methods: Case Report

Results: A 25-year-old female presented with a 6-month history of progressive blurred vision of left eye. Her visual acuity was 6/12 (right eye) and 6/36 (Left eye). She reported no prior ocular trauma or systemic illness. On examination, multiple pigmented, nodular lesions were observed on the iris surface, primarily near the pupillary margin, with irregular pupil shape (corectopia). Gonioscopy revealed shallow anterior chambers and secondary angle closure due to peripheral anterior synechiae. Detailed imaging and slit-lamp examination confirmed the diagnosis of Coogan-Reese syndrome, distinguished by the pigmented iris nodules, corectopia, and secondary angle-closure. Humphrey Visual field (24-2) was conducted and noted superior arcuate scotoma. Notably, the nodules appeared to migrate slightly with eye movements, indicating active endothelial cell proliferation. Her initial intraocular pressure was 14 (RE), 24 (LE) respectively. The patient was started on combination anti-glaucoma medications, but IOP remained suboptimal. Surgical options included trabeculotomy and potential endothelial cell removal were considered. In her case, trabeculectomy was done and her IOP was subsequently optimized.

Conclusions: Coogan-Reese syndrome, though uncommon, represents a clinically significant cause of secondary glaucoma. Patients typically present with progressive glaucoma, corectopia, and pigmented nodules on the anterior iris surface. Endothelial abnormalities lead to angle closure and trabecular dysfunction. Intraocular pressure control is challenging especially with medical therapy alone, hence surgical

approaches are frequently required. With that in mind, awareness and timely intervention are essential for preserving vision.

Abstract No.: 205910

Unmasking Microsporoidal Keratitis—The Great Deceiver

First Author: Sagar RUIT

Co-Author(s): Leena BAJRACHARYA, Bandana KHANAL, Rachana SINGH RANA

Purpose: This case report outlines a very rare clinical presentation of Microsporoidal Keratitis, in an immunocompetent adult in Nepal, highlighting diagnostic challenges and therapeutic outcomes, who was initially diagnosed as a case of Vortex Keratopathy.

Methods: A 58-year-old female presented with unilateral painful keratitis with recurrent redness. Detailed slit-lamp examination, corneal scrapings, and microbiological staining were performed. The patient was managed initially with topical Chlorhexidine 0.02% 1 Hourly, Topical Moxifloxacin 0.5% 2 Hourly, but eventually was subjected to therapeutic keratoplasty.

Results: Microsporidia spores were confirmed on staining. The ulcer in the left eye progressed to stromal keratitis and was refractory to medical management and eventually underwent a therapeutic keratoplasty.

Conclusions: Microsporoidal Keratitis although rare is difficult to diagnose as it does not grow on culture and is not responsive to medical treatment. There are very limited cases noted of which most Stromal Microsporidiosis ends up in Therapeutic Keratoplasty. Early suspicion, appropriate laboratory work up, and timely initiation of anti-microsporidial agents can prevent irreversible visual loss.

Abstract No.: 200641

Unmasking the Invisible Threat: Penetrating Keratoplasty Graft Rejection Following COVID-19 Vaccination

First Author: Clara VALENTINA

Co-Author(s): Siska, I Made Agus KUSUMADAJA

Purpose: To report a rare case of acute graft rejection and progressive corneal melting following COVID-19 vaccination in a patient with prior penetrating keratoplasty (PK), and to explore the potential immunological implications.

Methods: a 37-year-old female who presented with ocular inflammation and profound visual deterioration in the right eye, three weeks post-AstraZeneca COVID-19 vaccination. The patient had a history of PK and cataract extraction for keratoconus, along with prior intrastromal corticosteroid therapy for corneal neovascularization. A previous history of immune disorders was denied. Treatment included intensive topical corticosteroids, topical antibiotic prophylaxis,

and lubricants. Systemic immunosuppressive therapy with intravenous methylprednisolone was initiated to suppress the immune response and prevent further graft damage.

Results: A 37-year-old female with prior keratoplasty and cataract extraction for keratoconus developed fulminant graft rejection after COVID-19 vaccination. Despite intensive immunosuppression, progressive corneal melting ensued, requiring another attempt at PK. Re-PK was performed; however, graft rejection persisted in the absence of systemic autoimmune evidence.

Conclusions: This case underscores a potential correlation between COVID-19 vaccination and immunologically mediated graft rejection in corneal transplant recipients. While causality remains unconfirmed, the temporal association suggests vaccine-induced immune dysregulation may compromise corneal immune privilege. Possible mechanisms include molecular mimicry, elevated systemic cytokine response, or disruption of local immune tolerance. Clinicians should maintain a high index of suspicion for graft rejection in recently vaccinated PK patients and initiate prompt, aggressive management to avert irreversible damage. In refractory cases, Keratoprosthesis is considered a viable therapeutic alternative.

Abstract No.: 205153

Unraveling the Role of the Sympathetic Nerve-Macrophage Axis in Mediating Mitochondrial Damage in Dry Eye Disease Corneal Epitheliopathy

First Author: Zhang JINYU

Purpose: Dry eye disease (DED) is a prevalent ocular surface disorder whose hallmark is corneal epithelial damage. While corneal inflammation is a key driver of this damage, the specific pathways activating macrophages remain unclear. This study investigates whether corneal sympathetic overactivation, via neuropeptide Y (NPY), regulates macrophage function and elucidates the downstream mechanism leading to epithelial injury.

Methods: A classic mouse dry eye model was employed. Techniques including RNA sequence, immunofluorescence, Western blot, ELISA, and qRT-PCR were used to assess corneal sympathetic nerve activity, NPY expression, macrophage activation (markers F4/80/CD68), and levels of the effector lipocalin-2 (LCN2). Transmission electron microscopy (TEM) evaluated mitochondrial ultrastructure in epithelial cells. In vitro assays confirmed NPY's direct effect on macrophages and LCN2's impact on epithelial mitochondria.

Results: Dry eye corneas exhibited significant sympathetic overactivation and elevated NPY levels.

This was accompanied by increased macrophage infiltration and activation, alongside markedly raised LCN2 protein and mRNA expression. In vitro, NPY directly induced macrophage activation and LCN2 secretion. Crucially, TEM revealed severe mitochondrial damage in the corneal epithelium, including cristae loss and vacuolization. Mechanistically, macrophage-derived LCN2 was identified as the key factor directly causing this mitochondrial injury.

Conclusions: This study defines a novel «sympathetic nerve-macrophage-epithelial cell» axis in DED: sympathetic overactivation releases NPY, which recruits and activates corneal macrophages. These activated macrophages secrete LCN2, which directly triggers mitochondrial damage in epithelial cells, ultimately disrupting the epithelial barrier. These findings provide a new neuroimmunological mechanism for DED pathogenesis and identify potential therapeutic targets, such as blocking the NPY receptor or neutralizing LCN2.

Abstract No.: 202546

Unraveling the Unknown: Inverse Keratoconus Following Deep Anterior Lamellar Keratoplasty

First Author: Pravallika PAMULAPATI

Co-Author(s): Jagadheesh Kumar Reddy, Vandhana SUNDARAM

Purpose: To describe and analyze a novel topographic pattern of inverse keratoconus, defined by central corneal flattening as a late complication in keratoconus patients following deep anterior lamellar keratoplasty (DALK).

Methods: A retrospective case series of 25 eyes from 25 patients with keratoconus who underwent DALK was reviewed. Patients presented with progressive visual deterioration during long-term follow-up. Corneal topography and tomography were analyzed to assess curvature changes and pachymetry. Clinical data, including slit-lamp findings, visual acuity, and refraction, were analyzed.

Results: All eyes exhibited a distinct topographic pattern of central corneal flattening, contrasting with the classic keratoconus cone. A central stromal haze of variable density was clinically observed, correlating with areas of flattening and thinning (central pachymetry ranging 406–499 μm). Haze onset occurred at a mean of 4.5 ± 3 years post-DALK, progressively worsening over time. Visual acuity declined accordingly, without signs of epithelial defects, graft rejection, or active inflammation.

Conclusions: Inverse keratoconus represents a novel and previously undocumented topographic pattern, characterized by central corneal flattening developing as a late complication following DALK. This atypical presentation challenges conventional expectations of postoperative corneal remodeling contributing to

progressive visual decline. This central flattening island correlating with stromal haze, thinning, and decreased visual acuity raises important questions regarding its etiology, including the possibilities of chronic stromal rejection, subclinical interface pathology, a delayed manifestation of keratoconus progression in residual host tissue, or donor pathology. Recognizing this pattern is critical, as it may have direct implications for postoperative monitoring, diagnosis, and visual rehabilitation.

Abstract No.: 204333

Urrets-Zavalía Syndrome Following Penetrating Keratoplasty: A Rare Case Report

First Author: Cassandra QUEK

Co-Author(s): Hannie CH'NG, Rohanah BINTI ALIAS, Norlina BINTI MOHD RAMLI

Purpose: to highlight urrets-zavalía syndrome in post penetrating keratoplasty

Methods: case report

Results: A 65-year-old woman with hypertension and bronchial asthma presented with progressive bilateral visual loss over 20 years. She had a strong family history of corneal stromal dystrophy. Examination revealed visual acuity of counting fingers in the right eye and 6/120 in the left. Both corneas showed central stromal opacification with epithelial defects. Anterior chambers were formed, but pupil and iris details were obscured. Intraocular pressures (IOP) were normal. Fundus view was obscured; B-scan showed flat retinas without vitreous opacities. She underwent right eye penetrating keratoplasty. Intraoperatively, repeated iris prolapse occurred despite intravenous mannitol given and optimised general anaesthesia. The procedure was otherwise uneventful, with a round, undilated 3 mm pupil at closure. On postoperative day one, the graft was clear with Descemet's striae, epithelial defects and intact sutures. Anterior chamber was moderately shallow, the pupil fixed and dilated at 6 mm, and IOP was 40 mmHg. IOP reduced to 30 mmHg with oral acetazolamide and topical timolol, and to 18 mmHg with intravenous mannitol, accompanied by deepening of the anterior chamber. At two months, the graft remained clear with no intraocular inflammation observed and IOP normal. Visual acuity improved to 6/18 though the pupil remained 5 mm and sluggish to light.

Conclusions: This case illustrates Urrets-Zavalía syndrome, where repeated iris prolapse, transient acute postoperative IOP elevation, and subsequent ischemic sphincter damage likely contributed to the persistent dilated pupil following penetrating keratoplasty.

Abstract No.: 200793**Use of Phakic Implant As Piggy Back Lens in Post RK Pseudophakic Eyes: Efficacy and Safety***First Author: Bhupesh SINGH**Co-Author(s): Neha BHARTI***Purpose:** To know the safety and efficacy of phakic implants as piggy back lens in operated eyes.**Methods:** This is retrospective chart review of 12 eyes of 12 patients operated for cataract surgery in radial keratotomy eyes were included in the study. Phakic Toric implants were used to correct the residual refractive error post cataract surgery in these eyes. Patients were followed up for 12 months.**Results:** All patients achieved UCVA of 20/30. Good vault height 656 + 230 micron was noted in all eyes. No intraocular pressure rise was seen in any of these eyes. Pigment dispersion was noted in 1 eye.**Conclusions:** This is a safe and effective modality to correct residual refractive error in post RK pseudophakic eyes.**Abstract No.: 204811****When Edema Persists: Descemet's Membrane Detachment Masquerading as Pseudophakic Bullous Keratopathy***First Author: Riskha PANGESTIKA***Purpose:** Descemet's membrane detachment (DMD) is a rare but serious complication of cataract surgery, with an incidence of about 0.5%. It may present with persistent corneal edema and be mistaken for pseudophakic bullous keratopathy. This report highlights the diagnostic approach and management of DMD**Methods:** A 72-year-old man presented with blurred vision in the right eye one month after uneventful phacoemulsification. Visual acuity was 1/60. The condition was initially considered pseudophakic bullous keratopathy due to persistent corneal edema. Slit-lamp biomicroscopy with a narrow beam demonstrated localized stromal edema, microcystic bullae, Descemet's membrane folds, and a "double anterior chamber" appearance, confirming extensive DMD. Medical therapy with preservative-free prednisolone acetate 8 times daily and 3% hypertonic saline hourly was initiated but showed no improvement after one week. Descemetotomy with sulfur hexafluoride (SF6) was then performed under topical anesthesia**Results:** Two weeks postoperatively, the Descemet's membrane was successfully reattached, the cornea was clear, and visual acuity improved to 0.2 logMAR**Conclusions:** Early recognition of DMD and timely surgical intervention can restore corneal clarity and

improve vision, preventing progression to irreversible corneal decompensation and the need for keratoplasty

Abstract No.: 204258**When Tears Run Dry – Unveiling Dry Eye Disease in Type 2 Diabetes Mellitus***First Author: Prem SAI.T**Co-Author(s): Krithika M, Ragul VR***Purpose:** Type 2 Diabetes Mellitus is a global concern in the present and future; there are various complications of T2DM, the most underestimated one is Dry Eye disease, which can affect the quality of life.**Methods:** A total of 150 patients were included. Vision refraction, history, especially duration, type of treatment, overall control of diabetes by recent FBS, PPBS & HbA1c values were noted, anterior segment, and level of DR status assessed by dilated fundus examination. The following are the diagnostic criteria to diagnose DED: Ocular surface disease index, which is considered with 1 or more positive clinical findings as follows: Tear meniscus height, Tear breakup time, Ocular surface staining score, Schirmer's test, Fluorescein staining of cornea, conjunctiva & Meibomian gland dysfunction.**Results:** Prevalence of DED in type 2 DM was 46.6% (140/300 eyes).**Conclusions:** DED was more prevalent & statistically significant ($p < 0.0001$) among patients having high HbA1c, not on regular medication, longer duration of DM & in the proliferative stage of DM 68.5% (96/140 eyes).**Abstract No.: 204766****When Topography Isn't There: Unmasking Hidden Corneal Irregularity As the Amblyopia Mimic***First Author: Prasthiti Dewi HASDINI**Co-Author(s): Sagung Gede INDRAWATI***Purpose:** To highlight a practical and innovative approach for accurate diagnosis of suspected corneal irregularities in a hospital setting lacking corneal topography.**Methods:** A retrospective case series was conducted from June to July 2025 on astigmatism patients with suspected corneal irregularities. They underwent keratometry measurements and best-corrected visual acuity (BCVA) assessment.**Results:** Four patients reported discomfort and poor vision with previous spectacles prescribed only with spherical correction, lacking cylindrical components. Examination of six eyes from these patients showed the estimated refractive error (ERE) from current uncorrected visual acuity (UCVA) required less power than previous prescriptions, indicating possible overcorrection. Compound myopic astigmatism was

identified in the current spectacle prescriptions, yet BCVA remained suboptimal at 20/40 to 20/100 despite maximal refractive correction. Two patients also demonstrated anisometropia, with interocular differences of 1 and 6 diopters. Anterior and posterior segment examinations were unremarkable, suggesting amblyopia. Keratometry showed mild corneal toricity between 0.25 and 1.25 diopters, with no evidence of corneal irregularity. Guided by this finding, spherical rigid gas permeable (RGP) lenses with power of -4.00 to -6.00 diopters were applied as a diagnostic tool. This clarified the true refractive status and restored crisp 20/20 acuity in all patients. They experienced complete symptom resolution, and the lenses demonstrated excellent stability.

Conclusions: The importance of recognizing subtle corneal irregularities that may masquerade as amblyopia cannot be overstated. Keratometry-guided diagnostic RGP lens trials offer a reliable method to detect such irregularities even in the absence of corneal topography, thereby facilitating accurate refraction and optimal visual outcomes, particularly in resource-limited settings.

Abstract No.: 204253

mTOR Signaling Promotes PPAR γ /SREBP-Driven Lipid Production in Human Meibomian Gland Epithelial Cells

First Author: Ikhyun JUN

Purpose: The mechanistic target of rapamycin (mTOR) pathway is increasingly recognized as a central regulator of cellular metabolism, but its contribution to lipid homeostasis in the meibomian gland remains unclear. This study aimed to define how mTOR activity influences lipid synthesis and differentiation in human meibomian gland epithelial cells (HMGECS).

Methods: Cultured HMGECS were exposed to rapamycin to inhibit mTOR signaling, and lipid accumulation was assessed through lipid-specific staining and quantitative assays. The expression of transcriptional regulators PPAR γ and SREBP-1 was examined by immunoblotting and real-time PCR. Phosphorylation of downstream effectors, including p70S6 kinase and AKT, was analyzed as indicators of mTOR complex activity. Additional knockdown experiments targeting both mTORC1 and mTORC2 with siRNA were performed to validate their roles in lipid regulation.

Results: Rapamycin exposure led to a pronounced decline in lipid accumulation as well as reduced expression of PPAR γ and SREBP-1. In parallel, phosphorylation of p70S6 kinase and AKT was significantly diminished. Dual inhibition of mTORC1 and mTORC2 further suppressed PPAR γ /SREBP-1 expression and markedly lowered lipid synthesis, indicating that both complexes are required for proper lipid metabolism and differentiation in HMGECS.

Conclusions: These findings demonstrate that mTOR signaling is essential for lipid biosynthesis and maturation of meibomian gland epithelial cells. Both mTOR complexes contribute to PPAR γ /SREBP-driven lipogenesis, highlighting this pathway as a potential therapeutic target for conditions associated with meibomian gland dysfunction and ocular surface disease.

Glaucoma

Abstract No.: 203543

A Case Report of Late-Onset Lens Particle Glaucoma After Pars Plana Vitrectomy

First Author: Yanin SUWAN

Co-Author(s): Boonsita SRISAMARN, Siripa TIPPAPUT, Siripa TIPPAPUT

Purpose: To describe an atypical late-onset presentation of lens particle glaucoma after pars plana vitrectomy.

Methods: Case report.

Results: A 36-year-old male presented to the hospital complaining of acute, painful, blurred vision in the left eye with a history of pars plana vitrectomy. Examination revealed whitish material in the anterior chamber and a mature cataract with an intact anterior capsule, with intraocular pressure (IOP) of 50 mmHg. The lens particle glaucoma was highly suspected according to the history of pars plana vitrectomy. Therefore, Anterior Segment Optical Coherence Tomography (AS-OCT) was sent to confirm the diagnosis and revealed evidence of posterior capsule rupture. After failure of medical management to control IOP, lens aspiration with pars plana vitrectomy was done, and IOP was regained to 14 without any ocular-hypotensive medications.

Conclusions: After several months of pars plana vitrectomy with traumatic posterior capsular rupture, lens particle glaucoma may lead to elevated intraocular pressure (IOP). Initially, lens particles are released into the posterior chamber and vitreous cavity, then gradually migrate into the anterior chamber through weakened zonules.

Abstract No.: 205434

A Case of Sympathetic Ophthalmia Following Preserflo MicroShunt Implantation

First Author: Disheng WU

Co-Author(s): Keisuke ADACHI, Sayuri MANO, Shintaro NAKAO, Kousei TOMITA

Purpose: Sympathetic ophthalmia (SO) is an autoimmune disease triggered by penetrating ocular trauma or intraocular surgery. We report a case

of presumed SO following Preserflo MicroShunt implantation.

Methods: A 69-year-old man had a history of partial scleral buckling for retinal detachment in the right eye 30 years earlier. He underwent trabeculectomy in the right eye for bilateral open-angle glaucoma 5 years ago, followed by cataract extraction with intraocular lens implantation in the left eye 4 years ago and in the right eye 3 years ago. Due to progressive glaucoma in the left eye, Preserflo MicroShunt implantation was performed. Postoperative intraocular pressure was well controlled; however, 4 weeks later, the patient developed bilateral blurred vision. Optical coherence tomography revealed dome-shaped serous retinal detachments with septa in both eyes. As HLA-DR4 positivity was also detected, SO was suspected, and steroid semi-pulse therapy was administered. Retinal findings and subjective symptoms improved after treatment.

Results: SO is considered to develop after penetrating trauma involving the uvea or following intraocular procedures. Reported cases include those after vitrectomy, scleral buckling, cataract surgery, strabismus surgery, and cyclodestructive procedures. In this case, although the surgical procedure was performed according to standard technique, inadvertent ciliary body injury during scleral penetration with a double-step knife or scleral suturing cannot be excluded.

Conclusions: This represents a rare case of SO following Preserflo MicroShunt implantation and serves as an important reminder of this potential complication.

Abstract No.: 203340

A Comparison of the Utility and Reliability Indices Between Different Humphrey Visual Field Testing Strategies in a Tertiary Care Centre

First Author: Soumya PODURY

Purpose: This study evaluates and compares the utility of different testing strategies available within the Zeiss Humphrey Field Analyzer 3 among patients with various ocular conditions at a tertiary care center. We assessed test parameters—mean deviation (MD), pattern standard deviation (PSD), visual field index (VFI), and test duration—as well as reliability indices including fixation losses, false positives, and false negatives. Patient comfort and confidence were also evaluated via a post-test survey.

Methods: Participants scheduled for HVF testing at the University of Ottawa Eye Institute underwent an additional HVF test using a different strategy. A questionnaire was administered after both tests.

Results: Data from 67 eyes of 34 patients showed statistically significant differences in VFI and test duration, with SFR 24-2C yielding a 2% higher VFI and being 161 seconds faster than SS 24-2. MD and

PSD differences were not statistically significant. SFR 24-2C had 1.9% more false positives; fixation losses were similar. Survey results showed no difference in confidence or discomfort, though patients perceived SS 24-2 as longer and more error-prone.

Conclusions: Overall, SFR 24-2C consistently produced shorter test durations and slightly overestimated VFI compared to SS 24-2. Patients reported greater reliability and comfort with the SFR 24-2C

Abstract No.: 204347

A Novel Deployable Microstent for the Treatment of Glaucoma

First Author: Weijia ZHANG

Co-Author(s): Jared CHING, Chun ZHANG

Purpose: Minimally invasive glaucoma surgery (MIGS) has experienced a surge in popularity in recent years. Glaucoma drainage devices aimed at subconjunctival space keeping updated. In order to optimise the shortcomings of commercially available minimally invasive surgical approaches targeting the subconjunctival space for glaucoma, we developed a novel deployable microstent fabricated with nickle titanium.

Methods: We undertook a 6-month head-to-head experiment with the commercially available XEN® gel stent without subconjunctival fibrosis augmentation in vivo implantation in rabbit models. Eighteen New Zealand white rabbits were randomly assigned to three groups: Xen implant group (6 right eyes), Microstent implant group (6 right eyes), Microstent implant with mitomycin C (MMC) group (6 right eyes). Intraocular pressure (IOP), anterior and posterior segment photos, anterior segment optical coherence tomography (AS-OCT), outflow test and histology were assessed to measure the safety and efficacy of the microstent.

Results: Microstent demonstrated intraocular pressure (IOP) lowering over the course of 6 months both with MMC or without MMC, while IOP did not change significantly after 14 days with Xen®. All eyes developed blebs over the implant, and sodium fluorescein still drained from the anterior chamber to the subconjunctiva 6 months after microstent implantation. Microstent was well tolerated and little displacement. Histopathology at 6 months showed minimal tissue response and no obvious inflammation, fibrosis, or necrosis around the microstent.

Conclusions: To date, this is the first deployable microstructure designed to treat glaucoma, demonstrating the safety and efficacy of microstent in controlling IOP after implantation into the anterior in normal IOP rabbit model.

Abstract No.: 207413

A Rare Presentation of Maroteaux-Lamy (MPS VI) Syndrome With Secondary Glaucoma

First Author: Dewang **ANGMO**

Co-Author(s): Ramneek Kaur **MAHAL**, Anuja **PATIL**

Purpose: The purpose of this case is to report an unusual manifestation of type MPS VI (Manteaux-Lamy syndrome) presenting with secondary glaucoma.

Methods: An eight-year-old boy presented with bilateral cloudy cornea, coarse facies, large tongue, chest deformities, abdominal hernia, and skeletal deformities. On examination, anterior and posterior segment details were not visible due to corneal haze. IOP in RE was 24 mmHg and LE 30 mmHg. The patient was started on anti-glaucoma medications and planned for examination under anaesthesia (EUA). BE USG was anechoic. AS-OCT and UBM were done during EUA. Blood tests were done for lysosomal enzymes and showed the absence of serum arylsulfatase B. Clinical and paraclinical findings confirmed the diagnosis of MPS 6 with secondary glaucoma. Echocardiography, audiometry, and radiography for chest, back, hip, and hand were performed to investigate the presence of other systemic associations.

Results: During EUA, IOP in RE was 12 mmHg and 22 mmHg in LE with Perkins' tonometer. Therefore, LE trabeculectomy with trabeculotomy with MMC for 2 minutes was done. Anaesthetists found difficulty during the intubation of the patient due to his systemic comorbidities. Therefore, more time was required to intubate and extubate the patient. At 3 months follow-up, IOP was 14 mmHg in RE and 10 mmHg in the LE.

Conclusions: MPS VI is associated with multiple systemic comorbidities, along with corneal clouding as the most common ocular presentation. Though less common, glaucoma is difficult to diagnose and manage due to inappropriate IOP recording and poor visualization of the ONH changes.

Abstract No.: 201861

A Review of Psychosomatic Interactions and Management Strategies in Glaucoma: Integrating Evidence From a Neuro-Endocrine-Behavioral Perspective

First Author: Liyang **ZHANG**

Purpose: Synthesize epidemiology, mechanisms and interventions linking depression/anxiety/sleep disturbance with glaucoma to guide a bio-psycho-social pathway.

Methods: Systematic search (inception–Aug 2024, PubMed/Embase/Web of Science/CNKI) identified 128 studies; PRISMA selection, AHA grading; data on prevalence, stress–IOP axis and intervention effect sizes (Hedges g).

Results: Pooled prevalence: depression 28.9%, anxiety 31.5%, sleep disorders 46.2%. Risk factors: female sex, living alone, low education, severe field loss. Acute stress elevates IOP 3–7 mmHg within 15 min; chronic stress index $\uparrow$ 1 point $\rightarrow$ annual RNFL loss $+0.15 \mu\text{m}$. Eight-week mindfulness lowers IOP 2.3 mmHg; CBT plus motivational interviewing $\uparrow$ adherence 23 % and slows MD loss by 0.6 dB/year. SSRIs/TCAs may raise IOP 1–3 mmHg and angle-closure risk 1.7-fold.

Conclusions: Glaucoma is psychosomatic: negative emotions drive IOP fluctuation and optic nerve damage via sympathetic–HPA activation and circadian disruption, while visual loss worsens mental health. Integrate brief mood/sleep screening into routine follow-up; offer mindfulness or CBT first-line. Large multicentre trials are needed to validate personalized psychosomatic management.

Abstract No.: 202012

A Silver Lining With Kahook Dual Blade: Transforming Outcomes in Traumatic Angle Recession Glaucoma Management Following Blunt Injury

First Author: Prasanna Vekatesh **RAMESH**

Purpose: Blunt ocular trauma can cause persistent IOP elevation and angle recession glaucoma. Minimally Invasive Glaucoma Surgeries (MIGS), such as Kahook Dual Blade goniotomy, expand treatment options. This is the first reported adult case of traumatic glaucoma unresponsive to medical therapy managed with combined cataract extraction and KDB goniotomy.

Methods: A 25-year-old male with a 10-year history of blunt trauma presented with pain, reduced vision, secondary glaucoma, and traumatic cataract. Antiglaucoma medications (AGMs) failed to control IOP, so he underwent combined cataract surgery and KDB goniotomy, with follow-ups at 1 week and 1 month.

Results: The combined surgical approach yielded promising outcomes, achieving both visual rehabilitation and IOP control. KDB goniotomy was selected due to its safety, cost-effectiveness, and ability to restore aqueous drainage by removing obstructive trabecular tissue. The procedure resulted in an approximate 50% reduction in IOP. Additionally, KDBs goniotomy avoided the astigmatic changes often associated with filtering surgeries like trabeculectomy, thus minimizing visual distortion. By preserving the conjunctiva, the procedure also maintained the option for future trabeculectomy if needed. Compared to bleb-based procedures, KDB reduced the risks of complications such as corneal edema, bleb leaks, and hypotony maculopathy.

Conclusions: KDB goniotomy effectively manages traumatic glaucoma, improving vision and controlling IOP in a single procedure. By targeting the trabecular meshwork, it offers excellent IOP control with minimal

complications, highlighting MIGS' potential in complex glaucoma cases.

Abstract No.: 200338

A Translational Mathematical Model for Normal Tension Glaucoma: Advancing Explainable, Personalized Management

First Author: Aik Kah TAN

Purpose: To enhance understanding and management of normal tension glaucoma (NTG), I developed a translational mathematical model that captures the dynamic interactions among intraocular pressure (IOP), radial peripapillary capillary (RPC) density, retinal ganglion cell (RGC) density, and visual field (VF) sensitivity. The model aims to enable explainable, individualized treatment planning.

Methods: Guided by a representative NTG clinical scenario, hypotheses describing key biological relationships were formulated as differential equations and numerically simulated using the fourth-order Runge-Kutta method across IOP levels of 12–20 mmHg (IOP burden: 2–10 mmHg) over 20 years.

Results: Simulated trajectories revealed IOP-dependent patterns in RPC, RGC, and VF loss. From these, five mechanistic conjectures were derived, bridging microvascular and neurodegenerative dynamics to clinical outcomes: - Exponential vulnerability: VF loss accelerates nonlinearly with IOP; - Threshold compression: higher IOP shortens time to critical VF decline; - Temporal divergence: delayed IOP control causes irreversible outcome separation; - Integrated damage burden: area under dVF/dt quantifies cumulative functional loss; and - Critical deceleration: minimum d^2VF/dt^2 identifies optimal intervention window. The “functional reserve exhaustion point” explains advanced VF loss despite residual RNFL, likely due to non-functional axons or glial remodeling. A simplified conceptual expression, $VF \propto e^{-\text{(relative pressure burden)}}$, is also introduced.

Conclusions: This model provides a new toolkit to simulate NTG progression and optimize treatment timing. Its modular design supports integration with future AI systems, enabling precision glaucoma care through patient-specific explainable strategies. This may inform when to escalate therapy or predict irreversible decline.

Abstract No.: 205073

Advancing MIGS: Clinical Outcomes of Hydrus Microstent Implantation With Phacoemulsification

First Author: Woan Shian SEE

Co-Author(s): Haireen KAMARUDDIN, Zhi Yiu Hiang Weang LIM, Chai Keong TAN

Purpose: Hydrus Microstent, a microinvasive glaucoma surgery (MIGS) device, lowers intraocular pressure (IOP) by serving as an intracanalicular scaffold. This case series presents outcomes of primary open-angle glaucoma patients undergoing combined phacoemulsification and Hydrus implantation.

Methods: This retrospective, non-comparative, single-center case series included six phakic eyes with mild to moderate glaucoma that underwent phacoemulsification and Hydrus Microstent implantation. The primary endpoint was IOP reduction, assessed by comparing preoperative values with one-year postoperative measurements. Secondary observations included adjunctive medication use, best-corrected visual acuity (BCVA), visual field stability, and safety outcomes.

Results: Five of six patients (83%) achieved a reduction in mean IOP, with 83% reaching ≤ 15 mmHg, the target for mild to moderate glaucoma. Five patients discontinued all glaucoma medications postoperatively. All patients maintained BCVA of 6/9 or better. Visual fields remained stable in 83% of cases. However, progression in one patient, despite an IOP of 14 mmHg, highlights the role of non-IOP-related risk factors. No postoperative complications were observed.

Conclusions: Phacoemulsification combined with Hydrus Microstent implantation appears to be a safe and effective approach for lowering IOP and reducing the need for glaucoma medications in mild to moderate glaucoma. The findings support the growing role of MIGS in glaucoma management, though continued studies are needed to refine patient selection and long-term outcomes.

Abstract No.: 203958

An Unpleasant Surprise

First Author: Nabila RAHMAN

Co-Author(s): Mostafa HOSSAIN, Tasnima RAHMAN

Purpose: Reporting on 6 patients coming to OPD just for a regular eye checkup, eventually turned out to be a case of glaucoma or glaucoma suspect.

Methods: Commonly, their vision was 6/6 in both eyes, and retinoscopy findings were PLANO for both eyes. An undilated fundus revealed disc changes in all the cases. Among them, 2 patients had almost full cupping of discs, and others had suspected discs. None of them had a positive family history. Needful investigations and observation confirmed the diagnoses.

Results: Two patients had to take anti-glaucoma drugs and be kept under close observation. One of them was planned for filtration surgery as he had raised IOP of 31 mm (right eye) and 33 mm (left eye).

Conclusions: Regular checkups might not always be normal, but rather a very disappointing conclusion. A detailed evaluation is needed for every patient, even with 6/6 vision and no complaints.

Abstract No.: 206544

Analysis of Aldosterone Concentrations in Aqueous Humor and Serum of Patients With Posner-Schlossman Syndrome

First Author: Yifan JIN

Purpose: Analysis of variations in aldosterone concentrations in aqueous humor and serum among patients with posner-schlossman syndrome (PSS).

Methods: Prospective case-control study. Untreated patients with PSS exacerbation or patients with PSS remission were designated as the PSS exacerbation group and the PSS remission group, respectively. The aqueous humor and serum samples of the PSS exacerbation group and the serum samples of the PSS remission group were collected. The concentrations of aldosterone in these samples were measured by liquid chromatography-mass spectrometry (LC-MS). Control groups include: Cataract group, AACG group, CACG group, and POAG group.

Results: The aqueous humor aldosterone concentration of PSS exacerbation group, cataract group, AACG group, CACG group, and POAG group were 22.15 (18.14, 28.64), 16.02 (0.01, 21.82), 0.01 (0.01, 16.45), 15.37 (0.01, 18.84) and 15.27 (0.01, 17.94) pg/ml, respectively, with the overall difference of the aqueous humor aldosterone concentration among the 5 groups was statistically significant ($H=17.48$, $P=0.002$). And further comparisons revealed that the aqueous humor aldosterone concentration was increased in the PSS exacerbation group, and the differences were statistically significant with those in the cataract group, AACG group, CACG group, and POAG group (all $P<0.05$). A positive correlation between the concentration of aldosterone in the aqueous humor and that in the serum ($r=0.76$, $P<0.001$), and a negative correlation between the concentration of aldosterone in the aqueous humor and intraocular pressure ($r=-0.53$, $P=0.023$) in PSS exacerbation group were observed.

Conclusions: Compared with the cataract, AACG, CACG, and POAG, elevated aqueous humor aldosterone is observed in patients with PSS exacerbation group, suggesting that ocular aldosterone may be involved in the elevation of IOP and the development of localized inflammation in PSS.

Abstract No.: 201020

Analysis of Choroidal Thickness and Choroidal Vascularity Index in Early Primary Angle-Closure Glaucoma by Swept Source Optical Coherence Tomography Angiography

First Author: Hui LIU

Co-Author(s): Danyan LIU

Purpose: To investigate changes of choroidal thickness (CT) and choroidal vascularity index (CVI) in eyes with early primary angle-closure glaucoma (PACG) based on swept source optical coherence tomography angiography (SS-OCTA).

Methods: A total of 86 early PACG patients (86 eyes) and 79 healthy individuals (79 eyes) were enrolled. All subjects underwent 12×12 mm macular scan and 6×6 mm optic disc scan to analyze and compare CT and CVI. Univariate and multivariate linear regression analyses were used to evaluate the relevance of CT and CVI to related factors.

Results: In all macular regions, early PACG patients exhibited thicker CT and higher CVI as compared with controls (all $P<0.05$). Multivariate linear regression analysis showed that increased subfoveal CT and CVI were associated with younger age, PACG diagnosis, and/or shorter axial length (all $P<0.05$). After adjusting for the compound factors of age and/or axial length, subfoveal CT and CVI remained significantly higher in early PACG patients than in controls (both $P<0.01$).

Conclusions: Early PACG patients are usually associated with thicker CT and higher CVI in 1-12 mm annular regions of macula. The changes in CT and CVI were independent of age and axial length, indicating that alterations in choroidal characteristics may be involved in the pathogenesis of PACG.

Abstract No.: 202601

Analysis of Intraocular Pressure After Myopic Laser Refractive Surgery

First Author: Zainul Abideen AREAKAT

Co-Author(s): Yasmin MOHAMED

Purpose: The objective of this study was to analyze the intraocular pressure (IOP) after laser refractive surgery PRK patients with myopia.

Methods: Fifty-six patients who underwent PRK intervention to treat myopia. In total, 112 eyes were treated. Before the intervention, all patients underwent a complete ophthalmologic examination, including the measurement of central corneal thickness (CCT) and measurement of IOP with a non-contact tonometer. The IOP was also measured on days 3, 7 and 30 after the surgery. The mean IOP was taken for statistical analysis.

Results: One hundred and twelve eyes of 56 patients (mean age 24.6) underwent PRK to treat myopia. The average spherical equivalent was -4.1 diopters. Mean

CCT before the intervention was $521.9 \pm 31.9 \mu\text{m}$, while mean postoperative CCT was $439.8 \pm 45.3 \mu\text{m}$ ($p < 0.0001$). Mean preoperative IOP was 15.4 mmHg while mean postoperative IOP was 11.4 mmHg ($p < 0.0001$).

Conclusions: The reduction of IOP after laser refractive surgery PRK is significant. This reduction is about 1 mmHg per 1 diopter. This should be taken into account in the future in these patients because, due to the underestimation of the IOP and this can lead to later detection of glaucoma.

Abstract No.: 202157

Angle Closure Glaucoma in a Patient With Nanophthalmos Eye: Does Clear Lens Extraction Matter? A Case Report

First Author: Ravidhar BHANDARI

Purpose: To determine the reduction of intraocular pressure after clear lens extraction in a patient with nanophthalmos.

Methods: In this case report, we treated the two eyes of one patient with nanophthalmos and glaucoma with clear lens extraction and posterior intraocular lens (IOL) implantation.

Results: A thirty-four-year-old male previously diagnosed with Nanophthalmos with angle-closure glaucoma was using maximum glaucoma medications in both eyes for 5 years. Patient had visual acuity of 6/60 in the right eye (RE) and 5/60 in the left eye (LE), with intraocular pressure (IOP) in RE 42 mmHg and LE 38 mmHg. Patient underwent clear lens extraction with IOL implantation (Phaco aspiration with Foldable IOL implantation) in RE under topical anesthesia under I/V mannitol. On 1st POD, RE- visual acuity improved to 6/24. After a month, the patient was operated on for the other eye (LE- Phaco aspiration with Foldable IOL implantation) under topical anesthesia under I/V mannitol. On the 1st postoperative day (POD), LE-visual acuity improved to 6/24.

Conclusions: Clear lens extraction with IOL implantation helps in deepening the anterior chamber, which results in opening of the angle, due to which there is an increased outflow of fluid from the anterior chamber and thereby reducing IOP and saving sight of the patient with fewer complications.

Abstract No.: 205785

Angle-Closure Glaucoma and Albinism

First Author: Weiwei WANG

Purpose: To explore the association between angle-closure glaucoma and albinism.

Methods: Clinical data of two patients with albinism complicated by angle-closure glaucoma and cataract were analyzed before and after surgical treatment.

Results: Patient 1: A 58-year-old female presented with blurred vision in the right eye, accompanied by ocular pain and headache for one week. Examination revealed white hair and eyebrows, with IOP > 40 mmHg and iris hypopigmentation in both eyes. The right eye exhibited an acute angle-closure attack with a white, opacified lens, precluding fundus view. The left eye had cataracts, obscuring the posterior pole, though choroidal vessels and white sclera were visible in the periphery. Ocular biometry indicated short AXL of 21.1 mm and 20.9 mm, respectively. Both eyes underwent combined glaucoma and cataract surgery, resulting in stable postoperative IOP control. Patient 2: A 53-year-old male presented with a six-month history of progressive visual decline in both eyes. Of his six siblings, one sister also has albinism. He was found to have elevated IOP in both eyes. The right eye had a shallow anterior chamber and a white, opacified lens, preventing fundus examination. Following cataract surgery in the right eye, IOP normalized. Genetic analysis of the pedigree revealed that both the patient and her sister harbored compound heterozygous variants c.230G $>$ A (p.Arg77Gln) and c. 832G $>$ A (p. Arg278*) in the TYR gene.

Conclusions: Angle-closure glaucoma and albinism share embryologic and anatomic features, increasing glaucoma risk in affected individuals. Accurate diagnosis and timely surgical intervention can significantly improve the quality of life for these individuals.

Abstract No.: 206414

Aqueous Humor Insulin/GLP-1 Axis as a Stage-Linked Biomarker of Glaucoma Independent of IOP

First Author: Muneeb FAIQ

Co-Author(s): Rima DADA, Tanuj DADA, Daman SALUJA, Himanshu SINGH

Purpose: To evaluate whether aqueous humor (AH) insulin/GLP-1 signaling markers provide stage-linked molecular readouts of glaucoma independent of IOP, and whether they couple to mitochondrial injury and neurotrophic loss.

Methods: AH (0.5 mL) from cataract controls ($n=30$), early POAG (MD -6 to -12 dB; $n=30$), and advanced POAG (MD < -20 dB; $n=30$) underwent LC-MS proteomics (Orbitrap, MaxQuant) and untargeted metabolomics (Compound Discoverer; MetaboAnalyst 5.0). A curated panel captured insulin/GLP-1 pathway (INSR, IRS1, PIK3CA, AKT1, MTOR, RICTOR; GLP-1, IGF-1, IGFBP6), mitochondrial/TCA indices (IDH3A, ATP5F1A, citrate, α -ketoglutarate, cardiolipin), and neurotrophic/stress markers (BDNF, β -endorphin, cortisol). Group differences used LIMMA with Benjamini-Hochberg FDR. Linear models tested MD as a function of IOP with and without an insulin/GLP-1 composite (z-scored). Elastic-net (nested CV) evaluated stage classification.

Results: Compared to cataract, early POAG already showed insulin axis suppression (e.g., INSR, IGFBP6, GLP-1; all $FDR < 0.05$) with parallel TCA depletion; advanced POAG intensified these patterns and added higher cortisol and kynurenine. Adding the insulin/GLP-1 composite to IOP significantly improved MD prediction ($\Delta R^2 \approx 0.18-0.25$; $\Delta AIC < -10$). Mediation suggested insulin-axis deficits partially act through mitochondrial compromise (indirect effect $p < 0.01$). An 8-feature panel (INSR, IGFBP6, GLP-1, citrate, α -ketoglutarate, ATP5F1A, BDNF, cortisol) classified early vs advanced POAG with AUC 0.86–0.90 (nested CV).

Conclusions: AH insulin/GLP-1 signaling captures glaucoma severity beyond IOP, linking endocrine-metabolic failure to mitochondrial injury and neurotrophic loss. These findings support a translational biomarker panel for risk stratification and trial enrichment targeting insulin sensitization or GLP-1 pathways.

Abstract No.: 203157

Association Between Anterior Chamber Angle Configuration and Corneal Endothelial Cell Health in Angle Closure Disease

First Author: Maharani Kartika **ANGGRAENI**

Co-Author(s): Muhammad **FIRMANSJAH**, Dicky **HERMAWAN**, Evelyn **KOMARATIH**, Yulia **PRIMITASARI**

Purpose: This study aimed to evaluate the relationship between anterior chamber angle parameters, particularly the trabecular iris space area at 750 μm (TISA750) and the angle opening distance at 750 μm (AOD750), relates to the health of corneal endothelial cells in patients diagnosed with angle closure disease.

Methods: A cross-sectional observational study was conducted on 35 eyes diagnosed with angle closure disease. Measurements of TISA750 and AOD750 were obtained using anterior segment optical coherence tomography (AS-OCT), focusing on the nasal and temporal quadrants. Corneal endothelial cell density (ECD) was assessed using non-contact specular microscopy. Clinical histories of prior intraocular interventions—such as laser peripheral iridotomy, surgical iridectomy, and lens extraction—were also reviewed. Correlations between angle parameters and ECD were analyzed using Spearman's test.

Results: Eyes with narrower angles and prior intraocular procedures tended to have lower ECD. There was a statistically significant positive correlation between TISA750 and ECD ($r = 0.585$, $p = < 0.05$), as well as between AOD750 and ECD ($r = 0.717$, $p = < 0.05$). Wider angle measurements were associated with better preservation of endothelial cells.

Conclusions: Findings suggest that a more open anterior chamber angle, as reflected by TISA750 and AOD750 values, may be linked to healthier corneal

endothelium in patients with angle closure. These parameters could potentially serve as noninvasive indicators of endothelial vulnerability, particularly in eyes at risk of progressive angle narrowing or requiring intervention.

Abstract No.: 201611

Association Between Corneal Biomechanics and Tonometric Intraocular Pressure Across Five Devices

First Author: Shuichiro **AOKI**

Co-Author(s): Ryo **ASAOKA**, Yuri **FUJINO**, Yoshiaki **KIUCHI**, Hiroshi **MURATA**, Shunsuke **NAKAKURA**

Purpose: To quantify the associations between corneal biomechanical and morphologic parameters and intraocular pressure (IOP) measured by five tonometers in open-angle glaucoma.

Methods: Cross-sectional analysis of 483 right eyes. IOP was measured by Goldmann applanation tonometry (GAT), rebound tonometry (RT), non-contact tonometry (NCT), Ocular Response Analyzer (ORA; corneal-compensated IOP [IOPcc]), and Corvis ST (biomechanically corrected IOP [bIOP]). Corneal parameters included central corneal thickness (CCT), corneal hysteresis (CH; an index of viscoelastic damping), stress-strain index (SSI; an index of corneal stiffness), corneal radius, and pachyslope. Multivariable linear regression modeled device-specific IOP and differences from GAT.

Results: Devices correlated with GAT ($r = 0.59-0.71$; intraclass correlation = $0.50-0.69$) yet showed significant mean differences (all $p < 0.0001$). Models accounted for 14–55% of the variance in absolute IOP and 17–29% of the differences versus GAT. Greater SSI was associated with higher GAT, RT, and NCT values; higher CH was associated with lower IOPcc. bIOP showed the weakest associations with the measured corneal parameters. Across devices, CH showed the largest association with disagreement versus GAT.

Conclusions: Tonometric IOP readings varied with corneal stiffness and viscoelastic damping. bIOP exhibited the least dependence on the measured corneal parameters, suggesting relative robustness to corneal-property differences.

Abstract No.: 201044

Associations of Diabetes Mellitus With Primary Open Angle Glaucoma and Alzheimer's Disease: A Large Cohort Study in UK Biobank

First Author: Xinyue **HE**

Purpose: We analysis to explore the associations between diabetes mellitus (DM) and POAG and AD by considering depression and diabetic retinopathy (DR) as intermediate factors.

Methods: Data on diagnosis of glaucoma, diabetes, depression, Alzheimer's disease, diabetic retinopathy, apolipoprotein E (APOE) E4 genotypes and data from ophthalmologic examinations were gathered. We further collect the prevalence of DM, DR, depression, POAG and AD, gender, APOE E4 genotypes, C-reactive protein (CRP) levels to analysis.

Results: Depression, AD, and POAG were more prevalent in participants with DM compared with non-DM participants, and if DM patients had DR, the prevalence of those comorbidities was even higher than those without DR (all $p < 0.05$). DM, DR, AD, and POAG were more prevalent in participants with depression compared with non-depression participants. Specifically, if DM patients had depression, the prevalence of DR and AD were even higher than those without depression (all $p < 0.05$). In addition, using age-adjusted multivariable general linear model (GLM), we found DM and depression were associated with a higher prevalence of POAG in females while DM and APOE E4 negative status were associated with a higher prevalence of POAG in males. DM, APOE E4, and depression were all associated with higher prevalence of AD in both univariable and multivariable GLM adjusted by age (all $p < 0.05$). DM and depression with APOE E4 was associated with lower CRP levels in both univariable and multivariable GLM (all $p < 0.001$) in all populations.

Conclusions: DR and depression may play pivotal roles in the development of POAG and AD among DM patients.

Abstract No.: 205628

Axenveld-Rieger Syndrome With Secondary Glaucoma in a Filipino Pediatric Patient: A Case Report

First Author: Lilibeth **DY**

Co-Author(s): George **SOSUAN**

Purpose: We present a rare case involving a Filipino pediatric patient diagnosed with Axenveld-Rieger Syndrome (ARS) and secondary glaucoma. This report emphasizes the importance of early diagnosis, particularly in resource-constrained settings.

Methods: This report presents the clinical findings in a pediatric patient with progressive, bilateral blurring of vision, ocular pain, and exotropia in the left eye. Key findings included anterior segment dysgenesis, as indicated by posterior embryotoxon, iris hypoplasia, and adhesion to Schwalbe's line. These anterior and iridocorneal changes caused glaucoma with significant morbidity. Additionally, craniofacial and dental anomalies were noted.

Results: Visual acuity was 10/200 in the right eye and hand motion with good light perception in the left eye. Intraocular pressure was slightly elevated. Slit-lamp examination showed an opacified ring at both

corneal margins, along with a thin, irregular, dilated pupil and iris hypoplasia. Gonioscopy revealed closed angles with peripheral anterior synechiae and anterior angle insertion. Fundus examination indicated optic nerve damage. Systemic findings included microdontia, flattening of the midface and nasal bridge, and a redundant periumbilical skin fold. The patient's family had no reported inherited disorders. The diagnosis was Axenveld-Rieger syndrome with secondary glaucoma. Surgery with a glaucoma drainage device and genetic testing were planned.

Conclusions: This case demonstrates the importance of early detection for inherited disorders that present with both ocular and systemic symptoms. Glaucoma resulting from iridocorneal dysgenesis often requires treatment with glaucoma drainage devices to control intraocular pressure. Management should involve a multidisciplinary team.

Abstract No.: 205178

Bilateral Iridoschisis Without Glaucoma: Challenges During Cataract Surgery

First Author: Deekshya **MALLA**

Purpose: To report a case of bilateral iridoschisis with cataract in a 64-year-old male, highlighting the absence of glaucoma and the surgical challenges encountered during phacoemulsification.

Methods: A 64-year-old male presented with progressive decrease in vision in both eyes. Comprehensive ocular examination was performed. Anterior segment evaluation revealed bilateral nuclear sclerosis grade 2 cataract with iridoschisis. Gonioscopy showed open angles, intraocular pressure was within normal limits, and no glaucomatous features were noted. Posterior segment examination revealed normal fundi. The patient underwent phacoemulsification with posterior chamber intraocular lens implantation in both eyes. Intraoperative and postoperative outcomes were documented.

Results: During cataract surgery, floating iris fibrils intermittently disturbed the surgical field, complicating nucleus removal. Careful surgical maneuvers with the aid of viscoelastic devices allowed safe phacoemulsification and intraocular lens implantation. There were no intraoperative complications. Postoperatively, the patient achieved good visual recovery with stable intraocular lenses and no evidence of iris or glaucoma-related complications.

Conclusions: Iridoschisis is a rare degenerative disorder of the iris commonly associated with angle-closure glaucoma. This case demonstrates that it may present without glaucomatous changes, with gonioscopy showing open angles. Cataract surgery in such cases can be challenging due to iris fibrils interfering with visualization and surgical maneuvers. With meticulous planning and technique, favorable surgical and visual

outcomes can be achieved. Long-term follow-up remains essential, as glaucoma may still develop later in the disease course.

Abstract No.: 203895

Born to Pressure: The Glaucoma Burden in Axenfeld-Rieger Syndrome

First Author: Wen Jin KOW

Co-Author(s): Ee Ling ANG, Siu Wan FOO, Qiu Yip LIM, Julieana MUHAMMED

Purpose: To present a case of Axenfeld-Rieger Syndrome (ARS) with advanced secondary glaucoma, emphasizing early diagnosis and surgical consideration.

Methods: Case report.

Results: A 19-year-old Chinese male with intellectual disability presented with progressive bilateral blurred vision over one year on a background of longstanding high myopia. Best corrected visual acuity was 5/60 (right) and 4/60 (left). The anterior segment examination revealed posterior embryotoxon, polycoria, corectopia, ectropion uveae, and iris hypoplasia. Intraocular pressures were 40 mmHg (right) and 38 mmHg (left). Gonioscopy showed high iris insertion with peripheral anterior synechiae in all quadrants. The fundus examination revealed pale optic discs with a cup-disc ratio of 0.9 bilaterally. Humphrey visual field demonstrated tunnel vision with macular splitting. Systemic features included craniofacial dysmorphism and dental anomalies. A diagnosis of ARS with secondary glaucoma was made. Despite maximal topical therapy, intraocular pressures remain uncontrolled, necessitating trabeculectomy in both eyes. At one-month follow-up, intraocular pressure was controlled at 12mmHg bilaterally.

Conclusions: Glaucoma associated with Axenfeld-Rieger Syndrome is frequently severe and resistant to medical management. Although glaucoma may be present in early infancy, most cases occur during adolescence or early adulthood. Delayed recognition may lead to irreversible visual loss. This case underscored the importance of early diagnosis, vigilant monitoring, and timely surgical intervention to preserve vision in ARS patients.

Abstract No.: 205557

Case Report: Traumatic Aniridia Following Blunt Injury in a Pseudophakic Patient

First Author: Chi-hsin HSU

Purpose: We report a case of total iris loss (traumatic aniridia) in a pseudophakic patient following blunt ocular trauma.

Methods: A case report.

Results: A 73-year-old woman presented with right eye vision loss after blunt trauma from a forward fall. She had undergone uncomplicated bilateral

phacoemulsification with PCIOL implantation 7 years earlier. On examination, the right eye's visual acuity (VA) was hand motion at 15 cm, with intraocular pressure (IOP) elevated to 48 mmHg. Slit-lamp evaluation showed corneal edema and near-total hyphema filling the anterior chamber, obscuring the iris. The PCIOL was well-centered and stable within the capsular bag. B-scan ultrasonography revealed no vitreous hemorrhage or retinal detachment. The patient was started on full anti-glaucoma therapy and topical anti-inflammatory treatment. At the 2-week follow-up, IOP had normalized, and the hyphema had resolved. Complete aniridia was observed, with the PCIOL remaining well-positioned within an intact capsular bag. From 1 month post-injury through 6 years of follow-up, the patient's visual acuity remained stable at approximately 20/25, and IOP was consistently maintained around 15 mmHg without the need for ongoing anti-glaucoma medication.

Conclusions: This case demonstrates that clear corneal incisions can remain vulnerable to blunt trauma long after cataract surgery, potentially causing wound dehiscence. A stable, in-the-bag IOL and intact capsular bag may absorb some of the impact, minimizing intraocular damage. When traumatic aniridia occurs in isolation, the visual prognosis is generally favorable, and IOP can remain stable without medication, even if some angle structures are damaged.

Abstract No.: 203294

Changes in 24-Hour Intraocular Pressure Fluctuations Before and After Preserflo® MicroShunt Surgery Monitored with Triggerfish®

First Author: Takashi MATSUSHIMA

Co-Author(s): Kei SHINODA, Takahiro SUZUKI, Yuji YOSHIKAWA

Purpose: To describe the effect of Preserflo® MicroShunt surgery on diurnal intraocular pressure (IOP) fluctuations in glaucoma patients, assessed with a contact lens sensor, using a case series approach.

Methods: Three patients with glaucoma (two with primary open-angle glaucoma and one with normal-tension glaucoma; two males and one female; mean age 74 years) underwent Preserflo® implantation. Continuous 24-hour IOP-related profiles were recorded preoperatively and again 3–6 months after surgery using the Triggerfish® sensor. Measurements were expressed in millivolt equivalents (mVeq).

Results: Mean IOP decreased from 15.8 mmHg preoperatively to 7.5 mmHg postoperatively, with all patients achieving medication-free control. All three cases demonstrated consistent reductions in amplitude and overall fluctuation (approximately 30–45%). Prominent nocturnal peaks observed preoperatively were attenuated in two cases. In one case, nocturnal fluctuation appeared increased; however, this

was likely attributable to partial signal loss during the night, possibly related to sensor–antenna misalignment during sleep. Representative 24-hour profiles demonstrated smoother, more stable patterns postoperatively.

Conclusions: This case series suggests that Preserflo® MicroShunt surgery may stabilize diurnal IOP dynamics beyond lowering mean IOP alone. Though factors like nocturnal signal loss should be considered, the consistent reductions observed suggest these findings may have clinical significance. Larger studies are warranted to validate these preliminary observations.

Abstract No.: 203253

Choroidal Detachment as a Delayed Complication of Trabeculectomy: A Case Report and Literature Review

First Author: Chi-jeui **JENG**

Co-Author(s): Chi-hsin **HSU**

Purpose: To report a case showing choroidal detachment 5 years after non-complicated trabeculectomy.

Methods: Interventional case report.

Results: A 91-year-old man with a history of cataract surgery and trabeculectomy in the right eye five years ago presented with a sudden onset of painless visual loss in the right eye. He had not required glaucoma medications since surgery. Baseline BCVA was 0.3 (OD), 0.8 (OS); IOP was 9 mmHg (OD), 10 mmHg (OS). On presentation, vision in the right eye declined to hand motion at 10 cm; IOP was 6 mmHg. Examination revealed a functioning bleb (60–90°), mild IOL decentration, no inflammation, and 360° choroidal detachment with kissing choroids obscuring the macula and disc. Due to systemic limitations, oral steroids were contraindicated. Topical steroids, atropine, subtenon triamcinolone, and therapeutic lens were ineffective. OVD injection temporarily raised IOP and improved detachment, but it recurred. A compression suture of the bleb was performed, stabilizing IOP at 9 mmHg. Choroidal detachment resolved within a week, and vision recovered to 0.3.

Conclusions: Choroidal detachment occurs years later after smooth trabeculectomy. A compression suture is an ideal treatment option.

Abstract No.: 204500

Clinical Outcomes of Ahmed ClearPath® Implantation in Thai Glaucoma Patients

First Author: Chayanit **JUNSANGSRI**

Co-Author(s): Anuwat **JIRAVARNSIRIKUL**, Naris **KITNARONG**, Sakaorat **PETCHYIM**, Ngamkae **RUANGVARAVATE**, Darin **SAKIYALAK**

Purpose: To evaluate the efficacy and safety of the Ahmed ClearPath® implantation in Thai glaucoma patients.

Methods: This was a retrospective chart review of glaucoma patients who underwent Ahmed ClearPath® implantation between January 2023 and December 2024 in Thailand. Collected data included demographics, best-corrected visual acuity (BCVA), intraocular pressure (IOP), number of antiglaucoma medications (AGMs), and postoperative complications. Patients were evaluated at baseline and at 1 day, 1 week, and 1, 3, and 6 months postoperatively.

Results: Twenty eyes of 20 patients were included. The mean (SD) age was 66.50 (18.08) years. All patients were pseudophakic, and 50% had primary open-angle glaucoma. Baseline mean (SD) logMAR BCVA, IOP and number of AGMs were 0.30 (0.34), 16.75 (4.83) mmHg and 3.70 (1.17), respectively. At 6 months, the mean (SD) BCVA was 0.29 (0.29), with no significant change from baseline (Δ -0.16, $P=0.74$). In contrast, significant reductions were observed in mean (SD) IOP (12.20 (4.28) mmHg; Δ -4.55, $P<0.01$) and in the mean (SD) number of AGMs (1.10 (1.21); Δ -2.60, $P<0.01$). Postoperative complications included IOP elevation (45%), hypotony (25%) and conjunctival wound leak (15%).

Conclusions: Ahmed ClearPath® implantation led to significant reductions in IOP and the number of AGMs, while maintaining stable visual acuity over 6 months. However, complications were observed, and long-term careful monitoring is required.

Abstract No.: 208421

Coding Region Mutation Screening in Optineurin in Chinese Normal-Tension Glaucoma Patients

First Author: Jing Na **HE**

Co-Author(s): Li Jia **CHEN**, Wai Kit **CHU**, Chi Pui **PANG**, Clement C. **THAM**

Purpose: To study the roles of sequence alterations in the optineurin (OPTN) gene-coding region in normal-tension glaucoma (NTG) among Chinese patients.

Methods: Genomic DNA was extracted from 190 NTG patients and 201 control subjects. The thirteen exons of OPTN were amplified by polymerase chain reaction and analyzed by direct sequencing. Detected sequence changes were compared between NTG patients and control subjects.

Results: Seven sequence changes in OPTN were identified in both NTG patients and control subjects. Among them, c.464G>A (T34 T), c.509C>T (T49T), c.806G>A (V148V), and c.959T>C (P199P) were synonymous codon changes, whilst c.655T>A (M98K), c.1996G>A (R545Q), and c.1582T>C (I407T) were missense changes. Two previously reported heterozygous mutations, c.458G>A (E50K) in exon 4 and c.691_692insAG in exon 6, were not found in this study. Out of these seven OPTN sequence variants, c.464G>A (T34T) was significantly associated with NTG in both the allelic and genotypic association analyses (allelic association: $p = 0.0001$, OR = 2.20, 95% CI: 1.46-3.31; genotypic association: $p = 0.0001$), whereas the association of other variants with NTG did not reach statistical significance ($p > 0.05$). Variants c.1582 T>C (I407T) and c.806G>A (V148V) were identified in one and two NTG patients, respectively, but not in the control subjects.

Conclusions: This study confirmed the association of the OPTN T34T variant with NTG, suggesting that OPTN is a susceptibility gene for NTG in Chinese. Moreover, a variant with amino acid change (I407T) was identified in NTG but not in controls. Further studies are warranted to assess whether this variant is a causative mutation for NTG.

Abstract No.: 204789

Comparative Evaluation of Functional Aqueous Humor Outflow in Primary Open Angle Glaucoma Versus Primary Angle Closure Glaucoma Using Aqueous Angiography

First Author: Anuja PATIL

Co-Author(s): Nitika BERI, Tanuj DADA, Namrata SHARMA

Purpose: To quantitatively compare the circumferential, perilimbal aqueous humor outflow (AHO) pathways in patients of primary open-angle glaucoma (POAG) and primary angle-closure glaucoma (PACG) using Aqueous Angiography (AA).

Methods: Thirty-two eyes of 32 patients were included (16 patients of POAG and 16 PACG patients) presenting with age-related cataract and planned for phacoemulsification surgery. All patients underwent AA with 0.1% indocyanine green dye injected into the anterior chamber prior to the capsulorhexis step, followed by capture of images using the flex module of the OCT machine. Images at 60 seconds were exported for image analysis to Image J software, where angiographic signal intensity along the limbus into eight sectors, four quadrants, and overall flow for POAG & PACG was calculated.

Results: The mean age (years) was 58.8 ± 5.8 (POAG) and 59.8 ± 8.6 (PACG) [$P=0.704$]. There was no significant difference in the visual field defect with MD (db) in POAG and PACG; [$P=0.904$] and VFI in POAG

and PACG; [$P=0.777$]. The overall flow was decreased in PACG compared to POAG [$P=0.029$]. On quadrant analysis, all quadrants showed lower flow in PACG compared to POAG; however, this difference was statistically significant in the superior quadrant and inferior quadrant only. A statistically significant positive correlation of MD ($r=0.515$, $P=0.044$) and VFI ($r=0.581$, $P=0.020$) with overall flow was seen in PACG and not in POAG patients.

Conclusions: PACG eyes had lower functional AHO compared to POAG, which correlated with disease severity. This study has implications for trabecular MIGS in PACG and may predict worse outcomes in PACG compared to POAG.

Abstract No.: 205267

Comparative Outcomes of NPDS and GATT in Advanced Open Angle Glaucoma: A 12-Month Prospective Study

First Author: Madhavi PILLAI

Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV

Purpose: To compare the 12-month surgical outcomes of Non-Penetrating Deep Sclerectomy (NPDS) and Gonioscopy-Assisted Transluminal Trabeculotomy (GATT) in advanced open-angle glaucoma

Methods: This prospective study included 92 eyes with advanced primary open-angle or pseudoexfoliation glaucoma (42 NPDS, 50 GATT). Baseline demographics, IOP, anti-glaucoma medication (AGM) use, and best-corrected visual acuity (BCVA) were recorded. Post-operative IOP, AGM, and BCVA were assessed at week 2 and months 1, 3, 6, and 12. Success was defined by three IOP-based criteria: ≤ 21 mmHg with $\geq 20\%$ reduction (criteria 1), ≤ 18 mmHg with $\geq 25\%$ reduction (criteria 2), and ≤ 15 mmHg with $\geq 30\%$ reduction (criteria 3), with or without AGMs. Mixed-effects regression, Kaplan-Meier survival, and Cox regression analyses were used.

Results: Mean baseline IOP was higher in NPDS (29.5 ± 10.9 mmHg) than GATT (20.8 ± 5.5 mmHg, $p<0.001$). Both groups showed significant IOP reduction at all follow-ups ($p<0.001$). At 12 months, mean IOP was comparable (NPDS 13.5 ± 3.2 mmHg vs GATT 12.6 ± 3.4 mmHg, $p=0.179$). The percentage IOP reduction was significantly more in the NPDS group (46.8% versus 36.8%, $p=0.004$). GATT achieved significantly lower AGM use (0.1 ± 0.4 vs 1.6 ± 1.0 , $p<0.001$). Complete success under criteria 1 was markedly higher with GATT (82% vs 14%, $p<0.001$). BCVA improved more in GATT at all visits ($p<0.001$). Kaplan-Meier analysis showed similar cumulative success rates across groups ($p>0.7$). No major sight-threatening complications were observed in both groups.

Conclusions: NPDS and GATT both provided significant IOP reduction in advanced glaucoma, but GATT

achieved greater medication independence and visual recovery with a comparable safety profile.

Abstract No.: 205923

Comparison of AS-OCT Biometric Changes After Laser Peripheral Iridotomy in Primary Angle-Closure Disease With and Without Visible Ciliary Body Processes on Gonioscopy

First Author: Pawinee **BOONYOT**

Co-Author(s): Purit **PETPIROON**, Wasu **SUPAKONTANASAN**, Yanin **SUWAN**

Purpose: To evaluate anterior segment optical coherence tomography (AS-OCT) changes after laser peripheral iridotomy (LPI) in Thai patients with primary angle-closure disease (PACD), comparing eyes with and without visible ciliary body processes (CBP) on gonioscopy.

Methods: Forty-eight eyes of 25 Thai PACD patients scheduled for LPI were prospectively enrolled and stratified by CBP visibility on gonioscopy. ANTERION AS-OCT imaging was performed before and 2 weeks after LPI. Parameters measured included anterior chamber depth (ACD), anterior chamber volume, pupil diameter, lens vault (LV), horizontal angle opening distance at 500 μm and 750 μm (AOD500, AOD750), and trabecular-iris space area at 500 μm and 750 μm (TISA500, TISA750). The primary outcome was the change in AOD750.

Results: Axial length was significantly shorter in eyes with visible CBP ($P = 0.02$). AOD750 increased significantly after LPI in both CBP-positive eyes (nasal: $\Delta = 0.11$ mm, $P < 0.01$; temporal: $\Delta = 0.11$ mm, $P < 0.01$) and CBP-negative eyes (nasal: $\Delta = 0.12$ mm, $P < 0.01$; temporal: $\Delta = 0.13$ mm, $P < 0.01$), with no significant differences between groups (nasal: $\Delta = 0.01$ mm, $P = 0.65$; temporal: $\Delta = 0.03$ mm, $P = 0.11$). Similar trends were observed for anterior chamber volume, AOD500, TISA500, and TISA750. LV changes were not significant.

Conclusions: AS-OCT demonstrated significant angle widening after LPI in PACD eyes. CBP visibility on gonioscopy did not significantly alter biometric outcomes but may serve as a practical gonioscopic marker for identifying anatomical variation in angle closure.

Abstract No.: 204522

Comparison of Central Corneal Thickness (CCT), Anterior Chamber Depth (ACD), Lens Thickness (LT) and Retinal Nerve Fibre Layer (RNFL) Thickness in Pseudoexfoliation Syndrome (PXS) and Pseudoexfoliative Glaucoma (PXG)

First Author: Faradatul Aisyah **ABDUL AZIZ**

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Purpose: To compare anterior and posterior segment parameters among patients with pseudoexfoliation syndrome (PXS), pseudoexfoliative glaucoma (PXG), and normal subjects.

Methods: A total of 120 subjects were recruited and divided equally into three groups: PXG, PXS, and control. Central corneal thickness (CCT), anterior chamber depth (ACD), lens thickness (LT), and retinal nerve fiber layer (RNFL) thickness measurement were obtained using anterior segment optical coherence tomography (OCT). Data were analysed to identify significant differences between groups.

Results: A total of 120 subjects were included in this study, with 56 females (46.7%) and 64 males (53.37%). The mean ages of patients with PXG, PXS, and control were 69.85 ± 6.78 , 73.28 ± 6.38 , and 61.60 ± 8.38 years, respectively. The mean CCT and ACD in PXG were (494.55 ± 20.31 μm), (3.07 ± 0.28 mm), and PXS were (507.13 ± 22.28 μm), (2.99 ± 0.29 mm), which were statistically significantly less than control (530.42 ± 30.82 μm), (3.18 ± 0.11 mm). The mean LT showed the thickest in PXG (4.53 ± 0.16 mm), followed by PXS (4.08 ± 0.38 mm) and control (3.78 ± 0.24 mm). The mean average RNFL was significantly lower in the PXG (96.28 ± 13.29 μm) and PXS (126.25 ± 12.40 μm) groups as compared to the control group (133.82 ± 14.76 μm).

Conclusions: Patients with pseudoexfoliation glaucoma (PXG) and pseudoexfoliation syndrome (PXS) exhibit significant alterations in both anterior and posterior segment parameters compared with control group. These findings emphasize the importance of comprehensive ocular assessment in pseudoexfoliation-related disorders to aid in early diagnosis and management.

Abstract No.: 202148

Comparison of Microinvasive Glaucoma Surgery (MIGS) With Trabeculectomy in Glaucoma: A Systematic Review

First Author: Angel Lim

Co-Author(s): I Gusti Ayu Stiti Sadvika

Purpose: Glaucoma is one of the leading causes of blindness worldwide. Several studies considered Trabeculectomy to be the gold standard for Glaucoma. Recently, microinvasive Glaucoma Surgery (MIGS) has

been considered one of the eye interventions that can be applied in glaucoma patients. It has provided a shorter surgical time and tends to be less invasive compared to Trabeculectomy. The aim of the study is to compare the efficacy of MIGS and Trabeculectomy in Glaucoma.

Methods: A systematic review was conducted through PubMed, ScienceDirect, and Cochrane Library to obtain the studies relevant to the topic. The inclusion criteria were the studies that compared both MIGS and Trabeculectomy without concurrent cataract surgery. Our study assessed IOP at baseline and postoperative with certain follow-up periods, visual acuity at baseline and postoperative, and the use of medications at baseline and postoperative.

Results: We included three articles in the review. Two studies were retrospective studies, and one study was a case-control. The mean IOP was found to be significantly reduced in both groups (MIGS and Trabeculectomy) compared to the baseline. The visual acuity showed similar results between MIGS and Trabeculectomy. In addition, the use of medications was found decreased in both interventions postoperatively.

Conclusions: Both MIGS and Trabeculectomy can significantly reduce the mean IOP and the use of medication in Glaucoma patients. This study showed MIGS can be a potential eye intervention that offers comparable efficacy with Trabeculectomy.

Abstract No.: 206336

Comparison of RNFL Bundle Defect Detection Using En Face Image Slab: RNFL Slab and Fixed 52 μ m ILM Slab in Myopic Eyes

First Author: Po-han YEH

Co-Author(s): Chu-yen HUANG, Yung-sung LEE, Xiao Chun LING

Purpose: To compare the detection rates of retinal nerve fiber layer (RNFL) bundle defects in myopic eyes using two en face reflectance imaging slabs: the RNFL slab and a fixed-depth slab extending 52 μ m below the internal limiting membrane (ILM).

Methods: This cross-sectional study included 89 eyes from participants aged >20 years with spherical equivalent (SE) < -3.0 diopters or axial length (AXL) > 24.5 mm. Exclusion criteria included prior intraocular surgery (except uncomplicated cataract or refractive surgery), retinal laser treatment, diabetic retinopathy, epiretinal membrane, optic neuropathies (e.g., optic neuritis, NAION), and OCT image quality <5. Collected data included age, sex, SE, AXL, intraocular pressure (IOP), central corneal thickness (CCT), fundus photography, OCT (optic disc and macular scans, 12 $\times$ 12 mm OCTA), and Humphrey visual field testing. En face reflectance slabs were generated from ILM to the nerve fiber layer/ ganglion cell layer boundary (RNFL slab)

and from ILM to a fixed depth of 52 μ m (ILM-52 slab). RNFL bundle defects were defined as arcuate low-reflectance areas extending from the peripheral retina to the optic disc. Defect detection rates were compared in eyes with peripapillary RNFL abnormalities using the McNemar test.

Results: The study included 89 eyes with a mean spherical equivalent (SE) of -6.2 ± 2.7 diopters, axial length (AXL) of 26.7 ± 1.7 mm, and age of 48.8 ± 11.9 years. The mean baseline intraocular pressure (IOP) was 18.74 ± 9.8 mmHg. RNFL bundle defects were identified in 28 eyes (31.4%) using the RNFL slab and in 30 eyes (33.7%) using the ILM-52 slab. The difference in detection rates between the two slabs was not statistically significant (McNemar test, $p = 0.72$).

Conclusions: The RNFL en face slab and ILM-52 en face slab showed similar detection of RNFL defect. Both slab types can be applied for detecting RNFL bundle defects in myopic eyes.

Abstract No.: 201187

Comparison of Short-Term Outcomes Between Different Probes in Micropulse Transscleral Cyclophotocoagulation

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Co-Author(s): Toshihiro INOUE, Tomoyo MATSUMURA, Natsumi MURATA, Yuji TAKIHARA, Riku YUKINO

Purpose: To investigate whether the type of P3 probe (Rev1/Rev2) used for micropulse transscleral cyclophotocoagulation (MPCPC) with the CYCLO G6 affects treatment outcomes.

Methods: We evaluated intraocular pressure (IOP, mmHg) reduction in patients who underwent MPCPC at Kumamoto University Hospital between March 2018 and December 2024 with a follow-up of at least three months retrospectively. The cumulative survival rates for the Rev1 and Rev2 groups were compared using the Kaplan-Meier method with two primary endpoints: Criterion A (IOP less than the pre-treatment mean) and Criterion B (IOP reduction of 20% or more).

Results: 201 eyes and 48 eyes were included in the Rev1 and Rev2 groups, respectively. The diagnoses included primary open-angle glaucoma, pseudoexfoliation glaucoma, neovascular glaucoma, secondary glaucoma, and other types. Pre-treatment IOP (mean $\pm$ standard deviation, mmHg) was 30.6 ± 10.6 and 25.8 ± 7.6 for the Rev1 and Rev2 groups, respectively. At 1-week post-treatment, IOP was 16.3 ± 8.6 and 14.3 ± 7.4 . At 1 month, 18.4 ± 9.2 and 18.4 ± 10.0 . At 3 months, was 20.5 ± 10.0 and 19.9 ± 10.0 . At 6 months, 19.5 ± 8.6 and 20.7 ± 10.1 . At 12 months, 18.1 ± 9.4 and 16.5 ± 6.8 . A significant IOP reduction was observed at all follow-up time points ($P < 0.005$, t-test). There was no significant difference in the cumulative survival rates between the two groups (A: $P=0.6636$, B: $P=0.6320$, log-rank test).

Conclusions: MPCPC provided effective IOP reduction. The IOP-lowering effect was equivalent between the different types of probes.

Abstract No.: 201197

Corneal Endothelial Cell Loss After Baerveldt Glaucoma Implantation in Pseudophakic Eyes

First Author: Hiro KOSHIYAMA

Co-Author(s): Toshihiro INOUE, Sachi KOJIMA, Natsumi MURATA, Eri TAKAHASHI, Yuji TAKIHARA

Purpose: To evaluate corneal endothelial cell density (ECD) changes after Baerveldt glaucoma implantation (BGI) and examine associated risk factors for ECD loss.

Methods: This was a single-center retrospective study of pseudophakic eyes without prior filtering surgery that underwent BGI. Eyes with tube placement in anterior chamber (AC) or ciliary sulcus (CS) were included. The primary outcome was the 1-year change in ECD. Paired t-tests, multivariable linear regression, and ANCOVA were used to assess risk factors, with a specific subgroup analysis in exfoliation glaucoma (EXG) eyes.

Results: We analyzed 79 eyes from 75 patients. Mean ECD decreased significantly at 1 year ($p < 0.001$). The loss was significant in the EXG group ($n = 44$; from 1907.18 to 1678.22 cells/mm², $p < 0.001$, paired t-test), but not in the non-EXG group ($n = 35$; from 2015.08 to 1941.28 cells/mm², $p = 0.153$). In multivariable linear regression, EXG was the only independent factor associated with a greater ECD reduction rate (fractional change) ($p = 0.009$). In the EXG subgroup, CS tube placement was associated with a greater ECD reduction rate ($p = 0.040$). An ANCOVA of 1-year ECD, adjusted for baseline ECD, age, and preoperative IOP, also showed lower final ECD with CS placement ($p = 0.047$).

Conclusions: EXG was an independent risk factor for 1-year ECD loss after BGI. In EXG eyes, CS tube placement was associated with greater ECD loss. These findings suggest that glaucoma subtype and tube placement should be considered when planning BGI to minimize ECD loss.

Abstract No.: 201855

Correlation Between Retinal Nerve Fiber Layer and Ganglion Cell Complex Layer Thickness in Patients With Various Non-Glaucomatous Optic Neuropathies Including Lesions in the Anterior Visual Pathway

First Author: Stephen SUDHAKAR

Purpose: To analyse the correlation of RNFLT and GCCT in patients presenting with various non-GON, including lesions in the anterior visual pathway, and to differentiate the OCT measures with associated factors.

Methods: It is a cross-sectional study with 55 subjects who were clinically diagnosed with optic neuropathy.

Patients with macular disorders, diabetic retinopathy, or hypertensive retinopathy were excluded. All subjects underwent a complete clinical assessment and OCT imaging. RNFLT and CCT were measured and compared with variables such as age, gender, diagnosis, and cause.

Results: The mean age among study subjects was 41.05±15.431um. Age shows a non-linear relationship with RNFLT. Most of the subjects were diagnosed with CON (15), followed by papilledema (12) and RBON (12). Common causes are IHTN, TED, CVST, and pituitary tumors. The mean RNFLT was significantly higher (304.0000±29.18261) in papilledema patients. The maximum thinning of RNFLT was noted in ION individuals. Subjects with CVST measured; 50 microns. VA and Avg.RNFLT has shown a correlation with a decrease in RNFLT, which is attributed to reduced visual acuity. Trauma and infiltration aetiologies showed poor VA (<6/60).

Conclusions: Optic neuropathy is a conspicuous disorder; timely detection and intervention might be beneficial in terms of visual prognosis and mitigating severity. SD-OCT is increasingly becoming a crucial screening technique.

Abstract No.: 203754

Correlation of Functional and Structural Parameters With Glaucoma-Specific GQL-15 Questionnaire

First Author: Kavita BHATNAGAR

Purpose: To evaluate the correlation of functional and structural parameters with Quality of life assessed by the glaucoma-specific GQL-15 questionnaire in glaucoma patients.

Methods: A prospective observational study was conducted on 54 eyes of 46 open-angle glaucoma patients who underwent trabeculectomy between October 2022 and December 2023. Parameters studied were BCVA (Best Corrected Visual Acuity), refraction, IOP, Perimetry {MD (Mean Deviation), VFI (Visual Field Index)}, number of anti-glaucoma medications, Peripapillary Retinal Nerve Fibre Layer (RNFL) OCT, ONH (Optic Nerve Head) OCT comprising rim area, rim volume & cup area, OCT Macula comprising RNFL, GCL+ {Ganglion cell layer (GCL) + Inner Plexiform Layer (IPL)} & GCL++ (GCL + Inner Plexiform Layer + RNFL). All patients filled GQL-15 questionnaire. The follow-up period was 6 months. Correlation of duration of glaucoma, number of anti-glaucoma medications, Peripapillary RNFL, and OCT macula was done with GQL-15 scores.

Results: Functional parameters showed a significant positive correlation between GQL-15 scores and both duration of glaucoma ($r=0.844$, $p<0.001$) and number of medications ($r=0.298$, $p=0.045$). Structural parameters showed significant negative correlations

between GQL-15 score and inferior peripapillary RNFL (pre-operative $r: -0.339$, $p=0.01$; post-operative $r: -0.305$, $p=0.03$), Macular RNFL (pre-operative $r: -0.35$, $p=0.01$; post-operative $r: -0.382$, $p=0.01$), GCL+ (pre-operative $r: -0.345$, $p=0.01$; post-operative $r: -0.466$, $p=0.00$) and GCL++ (pre-operative $r: -0.431$, $p=0.00$; post-operative $r: -0.458$, $p=0.00$).

Conclusions: GQL-15 scores significantly correlated with both functional and structural parameters, suggesting that disease progression and retinal structural deterioration are associated with reduced quality of life in glaucoma patients.

Abstract No.: 202138

Cost-Related Non-Adherence to Glaucoma Medication in Glaucoma Patients Attending an Eye Hospital in Western Nepal

First Author: Ravidhar **BHANDARI**

Purpose: To assess and estimate the frequency and factors associated with cost-related non-adherence to glaucoma medication. To determine the factors associated with CRNA.

Methods: The study included all patients aged 18 and above, attending our hospital with a diagnosis of glaucoma, and who were undergoing glaucoma therapy for at least six months. A complete eye examination was done along with a face-to-face interview to record the socio-demographic details of the participants and to assess non-adherence to therapy. CRNA was considered if, in the last six months, the patient: a) reduced, or skipped medication dosage to save money b) delayed filling prescription because of cost issues, c) reverted to alternative therapies because of costs.

Results: The mean duration of glaucoma was 4.2 years, and the mean duration of medication was 4 years. More than one glaucoma medicine bottles were prescribed in 37.1%: 2 bottles in 28.8% and three bottles in 8.3% of included participants. At least one CRNA behavior was observed in 14 (10.6%; 95% CI 6.1 -17.5) patients. Associated systemic disease(s) increased the risk of non-adherence by nearly 22 times, while prescribing more than one medicine for glaucoma increased the risk by nearly 7-fold due to the high cost of medicine.

Conclusions: The results of this study showed that cost-related non-adherence was present in 1 in 10 individuals with glaucoma. Gender, presence of systemic disease(s) or co-morbidity, and number of glaucoma medicines prescribed were significant risk factors for cost-related non-adherence.

Abstract No.: 201918

Detection of Retinal Nerve Fiber Layer Bundle Defects in Myopic Eyes: A Comparison Between Thickness and En Face Reflectance Maps Using OCT

First Author: Chu-yen **HUANG**

Co-Author(s): Po-han **YEH**

Purpose: To compare the detection rates of retinal nerve fiber layer (RNFL) bundle defects in myopic eyes using en face reflectance maps versus thickness maps derived from optical coherence tomography (OCT).

Methods: This cross-sectional study included 86 eyes from participants aged over 20 years with a spherical equivalent (SE) less than -3.0 diopters or an axial length (AXL) greater than 24.5 mm. Eyes with a history of intraocular surgery, retinal laser treatment, or retinal diseases were excluded. All subjects underwent comprehensive ophthalmic examinations, including refraction, AXL, intraocular pressure (IOP), fundus photography, 12×12 mm wide-field OCT scans (optic disc and macula), and Humphrey visual field testing. RNFL bundle defects were assessed using two OCT-derived modalities: the en face reflectance map (Ganglion cell complex (GCC) slab) and the GCC thickness map. Detection rates were compared using McNemar's test.

Results: Among the 86 eyes analyzed (mean age: 51.3 ± 13.7 years; mean SE: -5.85 ± 3.38 D; mean AXL: 26.41 ± 1.36 mm; mean IOP: 16.63 ± 4.42 mmHg), RNFL bundle defects were identified in 37 eyes (43.0%) using the en face reflectance map, compared to 21 eyes (24.4%) using the thickness map. The difference in detection rates was statistically significant ($p < 0.05$, McNemar's test).

Conclusions: En face reflectance maps demonstrated a significantly higher detection rate of RNFL bundle defects in myopic eyes compared to thickness maps. Reflectance-based imaging may provide improved sensitivity for detecting early glaucomatous changes in highly myopic eyes.

Abstract No.: 206348

Different Retinal Microvascular Response to Flicker Light Between Normal-Tension Glaucoma and High-Tension Primary Open-Angle Glaucoma Detected With Optical Coherence Tomography Angiography

First Author: Shaodan **ZHANG**

Co-Author(s): Ruirong **YOU**, Daokuan **YU**

Purpose: To compare the visual task-evoked microvascular response in the macula between normal-tension glaucoma (NTG) and high-tension primary open-angle glaucoma (HTG) by using optical coherence tomography angiography (OCTA).

Methods: In this case-control observational study, ten eyes of 10 patients with HTG, twelve eyes of 12 patients with NTG, and eleven eyes of 11 healthy participants were included. All glaucoma eyes had a preserved central visual field of at least 10° and best corrected visual acuity of 20/40 or better. Macular superficial vessel density (VD) was measured by OCTA at baseline and then immediately after a 12.5 Hz white light flicker stimulation.

Results: Flicker light stimulation evoked a significant increase in macular superficial VD of HTG (baseline vs. poststimulation: $35.31\% \pm 4.31\%$ vs. $36.07\% \pm 4.35\%$, $P=0.048$) and control eyes ($46.21\% \pm 2.94\%$ vs. $47.09\% \pm 2.68\%$, $P=0.028$) but not the eyes with NTG ($37.98\% \pm 5.99\%$ vs. $37.44\% \pm 5.69\%$, $P=0.622$). The absolute change in VD (Δ VD) was significantly smaller in NTG eyes compared to control eyes ($-0.54\% \pm 1.40\%$ vs. $0.88\% \pm 1.14\%$, $P=0.026$). NTG eyes also had a lower VD change percentage in the temporal macula than that in HTG eyes ($-1.17\% \pm 5.53\%$ vs. $4.01\% \pm 4.73\%$, $P=0.042$).

Conclusions: Visual task-evoked vasoreactivity changes provide additional information in the understanding and assessment of the pathophysiological mechanisms of glaucoma. Discrepancies in the retinal vasoreactivity between HTG and NTG imply that vascular factors may play different roles in the onset and progression of these diseases.

Abstract No.: 204513

Direct Surgical Gonioscopy Without Microscope Tilt: A Novel Technique Using Patient Head Rotation and Disposable Gonioprisms

First Author: Nilesh KUMAR

Purpose: To describe a simplified technique for direct surgical gonioscopy that eliminates the need for microscope tilt by employing enhanced patient head rotation with disposable gonioprisms, thereby facilitating minimally invasive glaucoma surgery (MIGS) in resource-limited settings.

Methods: Traditional gonioscopy requires ~30–40° patient head rotation combined with ~30–40° microscope tilt for optimal angle visualization. In this modification, the microscope is kept upright while the patient's head is rotated ~60° away from the surgeon. The surgeon operates from the temporal position, using a disposable gonioprism in a steeper "diving" orientation to visualize the opposite angle. The technique was applied in MIGS procedures including trabecular bypass, goniotomy, and trabeculotomy.

Results: Clear angle visualization was consistently achieved without microscope tilt. Patient comfort and airway safety were preserved despite increased head rotation. Disposable gonioprisms provided superior optical clarity, eliminated sterilization needs,

and reduced infection risks. The technique simplified surgical setup, maintained ergonomic comfort for the surgeon, and was compatible with basic microscopes lacking tilt functionality. Limitations included a short learning curve for altered geometry and restricted working space in certain cases.

Conclusions: Direct surgical gonioscopy without microscope tilt is a safe, efficient, and cost-effective alternative for MIGS. By removing dependence on advanced equipment, this approach expands surgical feasibility in low-resource environments. Adoption may help democratize access to MIGS globally, supporting equitable glaucoma care delivery.

Abstract No.: 208316

Double Glaucoma Xen Implant for Difficult Glaucoma

First Author: Nancy Shi Yin YUEN

Purpose: To report a case of Double Glaucoma Xen implant for treatment of secondary glaucoma with high Peripheral Anterior synechia after retinal detachment surgery.

Methods: Retrospective case report.

Results: The immediate and long-term outcome of the eye pressure control after double Xen implant was reported. Morphology of the drainage bleb was shown.

Conclusions: Xen implant may be considered in cases with distorted anatomy in difficult secondary glaucoma cases. The selection of the site for implant may be planned pre-operatively.

Abstract No.: 203427

Dynamic Mechanism of Primary Angle Closure Based on Anterior Segment Video: An Exploratory Study

First Author: Qiaona YE

Co-Author(s): Zidong CHEN, Yu-tzu PING, Kezheng XU, Yangfan YANG, Minbin YU, Songfu ZOU

Purpose: To explore the dynamic risk factors and mechanisms of primary angle closure under fixed force based on anterior segment video.

Methods: The dynamic anterior segment videos of the subjects with shallow anterior chamber (central anterior chamber depth ≤ 2.2 mm) were collected using Corvis ST, and the dynamic Lens parameters were established.

Results: A total of 148 eyes (118 subjects) were recruited: 67 eyes in PACS group, 45 eyes in PAC group, and 36 eyes in PACG group. There were no statistically significant differences in age, central anterior chamber depth (ACD), lens thickness (LT), axial length or pupil diameter (PD) among the three groups. The intraocular pressure (IOP) in PACG group was significantly higher than the other group. The dynamic Lens changes

under external force mainly divided into two stages: the deformation period and the displacement period. There were statistically significant differences in the deformation amplitude (LensDA), speed (LensDS), initial deformation time, and maximum deformation time during the deformation period among the three groups. There were no statistically significant differences in the backward and forward distance during the displacement period. The LensDA was positively related to ACD, AL and PD, while negatively correlated with LT. The LensDS was positively correlated with age and ACD, while negatively correlated with IOP.

Conclusions: This exploratory study indicated the differences in the dynamic Lens changes in subjects with shallow anterior chamber, suggesting that the deformation of the Lens might be a potential risk factor for the dynamic mechanism of PAC.

Abstract No.: 202847

ELIOS Excimer Laser Trabeculostomy – Early UK Experience: 12 Months, 4 Centres, 138 Eyes

First Author: Adnan **ABDUL-AZIZ**

Co-Author(s): Chrys **DIMITRIOU**, Dan **LINDFIELD**, Claudia **QUIJANO**, Gok **RATNARAJAN**, Neeru **VALLABH**

Purpose: «Phaco plus» is becoming the treatment of choice for patients with concurrent cataract surgery and glaucoma in the UK. ELIOS adds 2-4 minutes to a cataract procedure and creates 10 x 210um channels through the trabecular meshwork. This conduit between the anterior chamber and Schlemm's Canal appears to safely reduce IOP and medication requirement.

Methods: Retrospective case series of the first 138 consecutive cases performed in the UK. This includes the learning curve cases. Real-world data across 4 UK sites (Guildford, East Grinstead, Liverpool, and Colchester).

Results: A total of 138 eyes completed a 12-month follow-up. Baseline IOP 18.56mmHg on 1.78 medications. 12-month IOP 14.37mmHg on 0.95 medications. No serious complications were noted. Microhyphaema was noted in 12% of eyes and always resolved by 1 month. 47% of eyes were medication-free at 12 months.

Conclusions: ELIOS appears to provide safe and reproducible reduction in IOP and medication usage for glaucoma patients undergoing cataract surgery.

Abstract No.: 201631

Effect of Selective Laser Trabeculoplasty (SLT) on the Fellow Eyes in Patients With Normal Tension Glaucoma: The First-Line or Second-Line Selective Laser Trabeculoplasty (FSS) Study

First Author: Hiroaki **OZAKI**

Co-Author(s): Tomoko **NAITO**, Akiko **NARITA**, Koji **NITTA**, Kae **SUGIHARA**, Fss Study Group

Purpose: Selective laser trabeculoplasty (SLT) is established as a first-line treatment for glaucoma patients. SLT treatment also produces intraocular pressure (IOP) reduction in the fellow eyes of patients with primary open-angle glaucoma. This study was designed to investigate the IOP-lowering effect on the fellow eyes in patients with normal tension glaucoma (NTG).

Methods: The study included 137 patients with NTG from 26 institutions in Japan. Patients were treated with SLT on one eye and IOP reduction on both eyes, which was measured for 1 year. The correlation of the IOP-lowering effect between the treated eyes and the untreated fellow eyes was examined. The success category was defined as a reduction in IOP of 20% or more.

Results: The mean preoperative IOP in the SLT-treated eye was 16.0 ± 2.0 mmHg. It lowered to 13.3 ± 2.2 mmHg at 12 months after SLT. The mean preoperative IOP in the untreated fellow eye was 15.5 ± 2.2 mmHg. It also lowered to 14.6 ± 2.5 mmHg at 12 months. The mean reduction in IOP in the fellow eye was 0.8 ± 2.2 mmHg (5.2%). The success rate was 35.8% in SLT-treated eyes and 11.2% in the fellow eyes. Linear regression analysis demonstrated that patients with greater IOP reduction on the treated eyes showed greater IOP reduction on the fellow eyes after SLT ($R = 0.5696$).

Conclusions: IOP reduction is observed in the untreated fellow eye after SLT, it is also more effective in the fellow eye when SLT is effective in the operated eye.

Abstract No.: 206493

Effectiveness of Resorption Drainage Implant in Non-Penetrating Surgery for Open-Angle Glaucoma

First Author: Natalia **POSTUPAEVA**

Co-Author(s): Alexei **POSTUPAEV**

Purpose: To explore the clinical effectiveness of slow resorption drainage implant (RDI) in non-penetrating deep sclerectomy (NPDS) in patients with primary open-angle glaucoma (POAG).

Methods: One hundred and six patients (106 eyes) with POAG, the intraocular pressure (IOP) level was 27.8 ± 3.6 mm Hg. Patients were divided into an

observation group (53 eyes, NPDS with RDI hyaluronic acid 22.5 mg/ml) and a control group (53 eyes, NPDS alone). After 1 month, all patients were subjected to Nd:YAG laser goniopuncture.

Results: On the 1st day after surgery, the IOP was 9.3 ± 1.8 mm Hg in the 1st group, 9.6 ± 1.7 mm Hg in the 2nd group. After 3 months, the IOP level was 12.6 ± 1.4 mm Hg in the 1st group, 16.4 ± 1.6 mm Hg in the 2nd group. After two years, the IOP level in the 1st group was 17.3 ± 1.7 mm Hg (IOP normalization achieved in 93% of eyes, which had developed functional filtration blebs), 67% of patients did not use hypotensive therapy. In the 2nd group — 18.0 ± 1.8 mm Hg (IOP normalization achieved in 80% of eyes), 36% of patients did not use hypotensive therapy. Over the 2 years of follow-up, reoperations were required in 7% of eyes in the 1st group and in 20% of eyes in the 2nd group.

Conclusions: The use of resorption drainage implant in NPDS allowed normalization of IOP in 93% of patients with POAG within 2 years of follow-up.

Abstract No.: 204239

Efficacy and Safety of Switching to Preservative-Free Tafluprost and Timolol in Patients With Primary Open-Angle Glaucoma and Ocular Hypertension with Latanoprost Monotherapy

First Author: Jin Wook **JEOUNG**

Co-Author(s): Jong Chul **HAN**, Joon Mo **KIM**, Do Young **PARK**, Kyung Rim **SUNG**

Purpose: To evaluate the efficacy and safety of switching from preserved latanoprost monotherapy to preservative-free tafluprost/timolol fixed-combination therapy in patients with primary open-angle glaucoma (POAG) or ocular hypertension (OHT) with insufficient intraocular pressure (IOP) control.

Methods: This prospective, single-arm, open-label, multicenter trial included 32 patients aged 19–80 years. Following a 4-week washout period, patients were treated with preservative-free tafluprost (0.015 mg) and timolol (5 mg) once daily for 12 weeks. IOP was measured at baseline, 4 weeks, and 12 weeks. Safety assessments and subgroup analyses were also performed.

Results: Mean IOP decreased from 17.06 ± 3.76 mmHg at baseline to 14.61 ± 2.94 mmHg at week 12 ($p < 0.0001$). The mean reduction was -2.45 ± 2.66 mmHg, which was statistically significant ($p < 0.0001$). A $\geq 20\%$ IOP reduction was achieved in 34.4% of patients. Mild adverse events, including glare and dry eye, were reported in 21.9% of patients, while no serious adverse events occurred.

Conclusions: Switching to preservative-free tafluprost/timolol resulted in significant IOP reduction and was well tolerated. This fixed-combination therapy may represent an effective alternative for patients with

POAG or OHT inadequately controlled on latanoprost monotherapy.

Abstract No.: 204790

Efficacy of the Novel MIGS Implant Wistend Compared to Kahook Dual Blade in the Treatment of Experimental Ocular Hypertension in Rabbits

First Author: Yingfan **WANG**

Co-Author(s): Manman **HUANG**, Changgeng **LIU**, Qian **LIU**, Yu **ZHANG**

Purpose: To evaluate and compare the efficacy of novel microinvasive glaucoma surgery (MIGS) device implants Wistend and Kahook Dual Blade (KDB) in an experimental ocular hypertension model.

Methods: Twelve New Zealand white rabbits were randomized into four groups (blank, sham-operated, Wistend and KDB groups) after establishment of an ocular hypertension animal model. Intraocular pressure (IOP) was observed over three months. Eaton and Draize scores, Swept-source optical coherence tomography (SS-OCT), fundus photography were used to evaluate ocular health and confirm microstent placement.

Results: Both the Wistend and the KDB significantly lowered IOP over the three-month follow-up. At 7, 10, 20, and 30 days post-operation, there were significant differences in IOP reduction between the Wistend and the KDB groups ($P < 0.05$). Postoperative assessments showed that the anterior and posterior segments of the eyes remained healthy, with no notable adverse events.

Conclusions: Wistend and KDB both effectively reduced IOP in experimental ocular hypertension, and a stable and significant IOP reduction was maintained throughout the 3-month postoperative follow-up period. The findings may provide potentially experimental rationale for the selection of the MIGS devices Wistend and KDB for glaucoma patients.

Abstract No.: 205100

Evaluating the Impact of Anxiety on Visual Field Test Reliability: An Observational Study

First Author: Nattana **HARN SOMVONG**

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Purpose: To evaluate the impact of anxiety levels on the reliability of visual field tests in patients with diagnosed or suspected glaucoma.

Methods: This cross-sectional observational study included patients with diagnosed or suspected glaucoma aged 20–80 years scheduled for standard automated perimetry. Participants completed the State-Trait Anxiety Inventory (STAI Y1, Y2) and

knowledge questionnaires before visual field testing, followed by a post-test questionnaire. Anxiety scores were analyzed in relation to the VF test unreliability. The association between the glaucoma and VF testing knowledge and anxiety levels, as well as the reliability of VF results, was analyzed. Factors and obstacles affecting test unreliability were identified.

Results: A total of 173 participants (mean age 64.3 ± 10.8 years; 58.4% female) were enrolled, including 121 glaucoma patients (69.9%) and 52 suspects (30.1%). Low anxiety was reported in 65.3% (trait) and 62.4% (state). Anxiety showed no association with visual field unreliability ($p=0.999$), but trait anxiety correlated negatively with glaucoma knowledge ($r=-0.152$, $p=0.047$) and visual field test knowledge ($r=-0.261$, $p<0.001$). Multivariable regression indicated a higher C:D ratio reduced odds of unreliability (OR=0.03, 95% CI 0.002–0.61), whereas prior unreliable tests increased odds (OR=7.67, 95% CI 2.55–23.01).

Conclusions: Most participants demonstrated low anxiety, which was not associated with visual field reliability. Trait anxiety correlated inversely with glaucoma and visual field test knowledge. Previous unreliable VF performance strongly predicted subsequent unreliability, while C:D ratio was a protective factor against unreliability.

Abstract No.: 205196

Evaluation of Antiglaucoma Eyedrop Administration Techniques Among Patients Diagnosed With Glaucoma in Mongolia Japan Hospital

First Author: Bulganchimeg **BUYANDUUREN**

Co-Author(s): Amarsanaa **DELGERJAV**, Bolormaa **GANBAATAR**, Bayasgalan **PUREVDORI**

Purpose: Glaucoma is a multifactorial disease characterized by optic nerve damage due to the loss of retinal ganglion cells. Globally, approximately 70 million people are affected. As the disease progresses, the economic burden on patients increases, largely influenced by the number of intraocular pressure-lowering medications required. Treatment efficacy depends not only on pharmacological properties but also on correct administration techniques, including timing, dosage, and method. Hence, this study focused on how to instill antiglaucoma eyedrops in patients with glaucoma at Mongolia Japan Hospital.

Methods: A cross-sectional, hospital-based observational study was conducted at the Department of Ophthalmology, Mongolian National University of Medical Sciences, from January to March 2025. Ethical approval was obtained, and informed consent was secured from all participants. Inclusion criteria were patients aged ≥ 35 years, diagnosed with primary open-angle glaucoma or primary angle-closure glaucoma post-laser iridotomy, who had been self-administering eye drops for over six months. Patients with secondary

glaucoma, tremors, or physical disabilities preventing self-administration were excluded.

Results: Among the participants, 64.7% ($n=22$) demonstrated adequate instillation technique. However, a significant proportion had not fully mastered the correct method, highlighting the need for improved patient education.

Conclusions: From this study, it can be seen that the majority of participants (64.70%, $n=22$) had an adequate technique for administering eye drops. Teaching the proper method to patients who are using drops incorrectly can help reduce surface damage to the eye, prevent infections transmitted by the drops, minimize ineffective medication use and unnecessary expenses, and reduce both local and systemic side effects on the eye.

Abstract No.: 207659

Excimer Laser Trabeculostomy (ELIOS) on Intraocular Pressure (IOP) and Outflow Facility in Eyes With Primary Open-Angle Glaucoma (POAG)

First Author: Kin Sheng **LIM**

Purpose: To assess the short-term effects of excimer laser trabeculostomy (ELIOS) on intraocular pressure (IOP) and outflow facility in eyes with primary open-angle glaucoma (POAG) at 3 months.

Methods: Thirty pseudophakic patients with mild to moderate POAG and suboptimal IOP control on topical therapy underwent standalone ELIOS at St Thomas' Hospital between August 2024 and March 2025. Following a four-week medication washout, baseline assessments included IOP, tonographic outflow facility (C), endothelial cell density (ECD), and laser flare photometry. These parameters were reassessed three months post-procedure. Primary outcomes were changes in IOP and outflow facility; secondary outcomes included changes in medication, ECD, flare values, and adverse events. Paired two-tailed t-tests were used for statistical comparisons.

Results: The mean patient age was 71 years; 67% were male. Ethnicity was 53% Afro-Caribbean and 47% White. At 3 months, mean IOP reduced from 26.06 ± 6.40 mmHg to 23.68 ± 5.37 mmHg (-9.1% , $p=0.06$). A $\geq 20\%$ IOP reduction was achieved in 33% of eyes, with complete success ($\geq 20\%$ IOP reduction, IOP < 21 mmHg, medication-free) in 13%. Tonographic outflow facility increased from 0.15 ± 0.09 to 0.19 ± 0.07 $\mu\text{L}/\text{min}/\text{mmHg}$ ($p=0.65$). The number of medications decreased from 1.93 ± 1.2 to 0.83 ± 0.70 ($p<0.0001$). ECD remained stable (2039 ± 338 vs. 1971 ± 361 cells/ mm^2 , $p=0.21$), and flare values showed no significant change (12.06 ± 6.23 to 14.89 ± 10.01 ph/ms, $p=0.06$). Adverse events included transient IOP spikes in four eyes and one case of toxic anterior segment syndrome (TASS).

Conclusions: This is the first prospective interventional washout study evaluating the standalone effect of ELIOS. Preliminary findings suggest a modest reduction in IOP with a favourable safety profile and minimal impact on trabecular outflow facility. Longer-term follow-up is necessary to assess sustained efficacy and durability of response.

Abstract No.: 200360

Exploring the Association of Arterial Stiffness in the Pathophysiology of Glaucoma: A Meta-analysis

First Author: Rukesh YADAV

Purpose: Studies implicating arterial stiffness in the pathophysiology of glaucoma have produced conflicting results. Our aim was to investigate whether glaucoma is associated with arterial stiffness and endothelial dysfunction. Accordingly, we compared the carotid intimal media thickness (CIMT) value among the patients of glaucoma with healthy controls (HC).

Methods: PubMed, Google Scholar, and Embase were searched for studies that assessed CIMT and arterial stiffness parameters in glaucoma patients and the healthy controls. Results comprised the standardized mean difference (SMD) in the CIMT value of the two groups with a 95% Confidence Interval (CI). According to the heterogeneity, the CIMT values were analyzed using the Revman 5.1 program using either a fixed or random effect.

Results: In this meta-analysis, six studies were included. 277 had glaucoma and 247 were HC. The analysis revealed a higher CIMT in glaucoma patients as compared to HC (SMD: 0.19, CI: -0.10-0.48, I²=54%, P value =0.20). However, the difference was not statistically significant. The study by Rogosic et al.2023 found that the flow mediated dilation was significantly lower in glaucoma patients as compared to the HC. Whereas, a study by Bossuyt et al 2015 did not find significant difference in carotid-femoral pulse wave velocity among the glaucoma and controls.

Conclusions: Though, this study could not show a significant association of glaucoma with altered CIMT and arterial stiffness, glaucoma patients are likely to exhibit signs of subclinical vascular abnormalities. Further studies are needed to better understand the microcirculation and microcirculation associated with glaucoma pathogenesis.

Abstract No.: 203562

Exploring the Therapeutic Potential of Exercise in Glaucoma

First Author: Kai GAO

Purpose: This study reviews current evidence from basic and clinical research on the role of exercise in glaucoma management, explores underlying

physiological and molecular mechanisms, evaluates different exercise modalities, and identifies future research priorities.

Methods: A comprehensive search of scientific databases focused on peer-reviewed English articles using keywords such as "exercise," "glaucoma," "intraocular pressure," "neuroprotection," "ocular blood flow," and "retinal ganglion cells." Relevant findings were synthesized across study designs to assess mechanistic insights and clinical outcomes.

Results: Aerobic exercise consistently induces acute, and in some cases sustained, reductions in intraocular pressure (IOP), mediated by altered aqueous humor dynamics, sympathetic activation, and enhanced ocular blood flow. Experimental studies highlight neuroprotective effects, particularly via upregulation of brain-derived neurotrophic factor (BDNF), supporting retinal ganglion cell survival. Resistance training can transiently elevate IOP, especially with high-intensity loads or Valsalva maneuvers, while its long-term influence on glaucoma progression remains uncertain. Inverted yoga poses are associated with marked, short-term IOP elevations. Clinical evidence suggests that higher overall physical activity correlates with slower visual field deterioration, although long-term randomized controlled trials (RCTs) assessing functional outcomes and quality of life are limited.

Conclusions: Moderate aerobic exercise emerges as a promising adjunctive approach in glaucoma management, exerting both IOP-lowering and neuroprotective effects through multifactorial mechanisms. However, optimal exercise guidelines remain undefined, particularly regarding resistance training and inverted positions. Future studies should delineate molecular pathways underlying exercise-induced ocular changes and conduct long-term RCTs to determine the impact of tailored exercise regimens on disease progression and patient quality of life.

Abstract No.: 201125

Factors Associated with Postoperative Tissue Thickness Covering Baerveldt Glaucoma Implant Tubes

First Author: Natsumi MURATA

Co-Author(s): Toshihiro INOUE, Sachi KOJIMA, Eri TAKAHASHI, Yuji TAKIHARA

Purpose: Tube exposure is a serious complication following Baerveldt glaucoma implantation (BGI), often linked to patch graft thinning. Evaluating the thickness of the patch graft is key to understanding the underlying mechanisms of tube exposure. Therefore, this study aimed to identify factors associated with postoperative tissue thickness over the BGI tube using anterior segment optical coherence tomography (AS-OCT).

Methods: This retrospective study included 200 eyes of 178 patients who underwent BGI (BG101-350 with a preserved scleral patch graft) at a single academic institution. Using AS-OCT (CASIA2) approximately one year postoperatively, tissue thickness was measured from the conjunctival surface to the outer tube edge. Associations with clinical variables were evaluated using multivariable linear regression.

Results: Multivariable analysis revealed that anterior chamber (AC) tube insertion was independently associated with significantly thinner tissue compared to sulcus insertion (estimate 0.074; $p = 0.019$) and pars plana insertion (estimate 0.178; $p < 0.001$). In the subgroup of AC insertion cases, prior micropulse transscleral cyclophotocoagulation (MP-CPC) was independently associated with greater tissue thickness (estimate 0.170; $p = 0.031$).

Conclusions: AC tube insertion is an independent risk factor for postoperative tissue thinning over the tube. Prior MP-CPC may have a protective effect on tissue preservation in eyes with AC tubes. These factors should be considered during surgical planning for tube exposure.

Abstract No.: 201630

From X-Y Plane to X-Y-Z Space: Transforming Visual Field Reports Into Engaging 3D Learning Tools

First Author: Prasanna Vekatesh **RAMESH**

Purpose: Practical sessions enhance understanding of ophthalmic concepts and promote critical thinking, especially among medical students, glaucoma residents, and allied ophthalmic personnel. With the increasing use of virtual and augmented reality in ophthalmic education, this study explores the creation of three-dimensional (3D) printed models representing visual field reports for better comprehension of visual field defects.

Methods: This project utilizes data from real patient perimetry reports to develop 3D-printed models of various visual field patterns. The models include both normal fields and complex defects such as isopter contraction, arcuate scotomas, and quadrantanopias. Through tactile interaction with these 3D puzzles, learners gain insights into neuro-ophthalmic conditions like glaucoma, optic neuropathies, and chiasmal syndromes, enhancing their understanding of both normal and pathological visual fields.

Results: 3D printing offers precision and affordability, making it ideal for rapid prototyping of patient-specific models. Traditional ophthalmic learning tools rely on diagrams and digital platforms, but these tactile 3D models provide a hands-on experience that promotes active learning. By converting clinical data into physical models, students and trainees engage more effectively, and patients better understand visual field changes.

This is the first known attempt to develop 3D-printed visual field report models directly from clinical data, filling a gap in ophthalmic education.

Conclusions: This novel pedagogical approach offers valuable tools for ophthalmic education and patient care. The 3D-printed visual field models provide students with a multisensory learning experience and help ophthalmologists communicate more effectively with patients about disease progression, such as glaucomatous visual field loss.

Abstract No.: 203667

GUIDE: A Machine Learning-Based Decision Support System for Glaucoma Long-Term Management

First Author: Qianyu **ZHAN**

Co-Author(s): Zidong **CHEN**, Kezheng **XU**, Yangfan **YANG**, Minbin **YU**

Purpose: This study focuses on open-angle glaucoma and aims to develop clinical decision-making algorithms for the critical treatment escalation during long-term follow-up leveraging advanced machine learning, to provide insights and improve capabilities in the long-term management of open-angle glaucoma.

Methods: This study included newly diagnosed patients with open-angle glaucoma and ocular hypertension from a large trial, the Laser in Glaucoma and Ocular Hypertension Trial in China (LiGHT China). At first, we utilized a guideline-based decision system to assess whether treatment escalation was needed during patient follow-ups. Glaucoma specialists will reviewed these initial recommendations and their final decisions were taken as ground-truth labels to train machine learning-based decision support system using CatBoost algorithms.

Results: This study included a total of 771 patients, 1,376 trial eyes, and 6,889 follow-up records from 2015 to 2023. Based on guideline-based decision system, 765 visits in 6889 were labelled as requiring treatment escalation. Glaucoma specialists reviewed these initial decisions and modified 192 treatment escalation (25%) to continuing monitoring. We then further taken these decision as ground-truth labels to train machine learning-based decision support algorithms, and the model achieved an AUROC of 0.86 (0.02) and an F1 score of 0.73 (0.04) under 10-time 3-fold cross-validation. SHapley Additive exPlanations showed the appropriate and robust reasoning of characteristics of the algorithms on decision-making of treatment escalation, and mainly based on real-time intraocular pressure.

Conclusions: This study develops rigorously validated algorithms leveraging advancements in computational modelling to achieve automated, robust and explainable decision-making which potentially relieve

the heavy burdens of glaucoma management in the future.

Abstract No.: 201461

Gazing Into the Angle: Is Anterior Segment Optical Coherence Tomography the New Gonioscopy?

First Author: Nehal KAPOOR

Purpose: To prospectively compare the diagnostic efficacy of Anterior Segment Optical Coherence Tomography (AS-OCT) with gonioscopy in evaluating anterior chamber angles for glaucoma patients, and to assess whether AS-OCT can serve as a reliable, non-contact alternative to the current gold standard.

Methods: This prospective, observational, cross-sectional study was conducted over 15 months at a tertiary eye care center. Patients diagnosed with or suspected of having glaucoma were recruited after informed consent. Exclusion criteria included history of intraocular surgery, corneal opacities, angle abnormalities due to trauma or neovascularization, and poor fixation preventing reliable imaging. Each subject underwent gonioscopy with a Goldmann two-mirror lens under standard illumination and anterior chamber angle imaging with AS-OCT in dark conditions. Gonioscopy findings were graded using Shaffer's system, while AS-OCT angle parameters such as angle opening distance and trabecular-iris angle were documented. The primary outcome was the agreement between gonioscopic angle grading and AS-OCT measurements, with secondary analysis of sensitivity, specificity, and diagnostic efficacy.

Results: Overall diagnostic performance of AS-OCT compared to gonioscopy showed sensitivity of 97.98%, specificity 74.29%, positive predictive value 78.23%, negative predictive value 97.50%, and diagnostic accuracy 85.78%. The high sensitivity and negative predictive value highlight the reliability of AS-OCT in ruling out angle closure, though specificity was moderately lower due to overestimation of narrow angles.

Conclusions: While gonioscopy remains the gold standard for angle evaluation, AS-OCT offers reproducible, and patient-friendly imaging, making it a strong adjunct in diagnosis and large-scale screening.

Abstract No.: 208400

Genetic Association of ANGPT2 With Primary Open-Angle Glaucoma

First Author: Jing Na HE

Co-Author(s): Li Jia CHEN, Wai Kit CHU, Chi Pui PANG, Clement C. THAM

Purpose: To determine the association of the ANGPT2 gene with primary open-angle glaucoma (POAG) in Chinese.

Methods: Six single-nucleotide polymorphisms (SNPs) in ANGPT2 (rs2515487, rs2922869, rs13255574, rs4455855, rs13269021, and rs11775442) were genotyped in a total of 2601 study subjects from two cohorts. One is a Hong Kong Chinese cohort of 484 high tension glaucoma (HTG) and 537 normal tension glaucoma (NTG) patients, and 496 non-glaucoma control subjects. Another cohort is a Shantou Chinese cohort of 403 HTG and 135 NTG patients, and 543 non-glaucoma control subjects. Subgroup analysis by sex was conducted. Outcomes from different cohorts were combined for meta-analysis.

Results: The association of SNP rs11775442 with NTG in the Hong Kong cohort [$P = 0.0498$, OR = 1.24, 95% confidence interval (CI) 1.00–1.55] after adjusting for age and sex did not reach statistical significance after Bonferroni correction. Other SNPs were not significantly associated with NTG, HTG and POAG in individual cohort or in the combined analyses ($P > 0.05$). In the subgroup analysis by sex, SNP rs13269021 in the Shantou cohort, but not in the Hong Kong cohort, was significantly associated with NTG in males ($P = 0.0081$, OR = 1.67, 95% CI: 1.14–2.43) but not in females ($P = 0.874$).

Conclusions: In the subgroup analysis by sex, a significant association was shown in SNP rs13269021 with NTG in Shantou males, but not in Hong Kong males. Further studies are needed to verify the association between ANGPT2 locus (rs13269021) and NTG in Chinese males.

Abstract No.: 208190

H486R Mutation in OPTN Affected Autophagy Level in TM-1 Cells Through Ubiquitin-Binding

First Author: Jing Na HE

Co-Author(s): Wai Kit CHU, Jian LI, Yan TONG, Jiaxin ZHANG

Purpose: Investigate the consequences of the H486R OPTN mutation in TM cells.

Methods: The oxidative stress levels, numbers of damaged mitochondria, apoptosis levels, and OPTN-Ubiquitin binding of TM-1 cells stably expressing these OPTN mutant proteins were investigated.

Results: In our study, H486R-4 cells had higher endogenous and induced oxidative stress levels than WT-4 cells. More damaged mitochondria and higher apoptosis levels have also been found in H486R-2 cells compared to WT-4 cells.

Conclusions: All these results indicated that the H486R mutation in OPTN affected the cellular responses to oxidative stress damage in TM-1 cells. Further studies are needed to confirm what molecular functions of OPTN are impaired in the H486R OPTN-expressing cells.

Abstract No.: 204355

High Myopia Normative Database of Peripapillary Retinal Nerve Fiber Layer Thickness to Detect Myopic Glaucoma in a Chinese Population

First Author: Fei LI

Purpose: To develop and validate the performance of a high myopia (HM)-specific normative database of peripapillary retinal nerve fiber layer (pRNFL) thickness in differentiating HM from highly myopic glaucoma (HMG).

Methods: A total of 1,108 eyes from 694 participants with HM were included in the normative database; 459 eyes from 408 participants and 322 eyes from 197 participants were included in the internal and external validation sets, respectively. The pRNFL thickness was measured with swept-source OCT. Four strategies of pRNFL-specified values were examined, including global and quadrant pRNFL thickness below the lowest fifth or the lowest first percentile of the normative database. The accuracy, sensitivity, and specificity of the HM-specific normative database for detecting HMG.

Results: Setting the fifth percentile of the global pRNFL thickness as the threshold, using the HM-specific normative database, we achieved an accuracy of 0.93 (95% confidence interval [CI], 0.90–0.95) and 0.85 (95% CI, 0.81–0.89), and, using the first percentile as the threshold, we achieved an accuracy of 0.85 (95% CI, 0.81–0.88) and 0.70 (95% CI, 0.65–0.75) in detecting HMG in the internal and external validation sets, respectively. Compared with the built-in database of the OCT device, the HM-specific normative database showed a higher sensitivity and specificity than the corresponding pRNFL thickness below the fifth or first percentile ($P < 0.001$ for all).

Conclusions: The HM-specific normative database is more capable of detecting HMG eyes than the built-in database, which may be an effective tool for differential diagnosis between HMG and HM.

Abstract No.: 202165

Immediate Change of Intraocular Pressure and Choroidal Thickness After Laser Panretinal Photocoagulation (PRP)

First Author: Thanida POMSUNAN

Co-Author(s): Noppakhun PANYAYINGYONG

Purpose: To evaluate intraocular pressure (IOP) and choroidal thickness changes following the first session of panretinal photocoagulation (PRP) in the early period.

Methods: This prospective cohort study included 40 eyes from 40 patients, comprising 31 eyes with proliferative diabetic retinopathy (PDR), and 9 eyes with severe non-proliferative diabetic retinopathy

(severe NPDR). All patients underwent the first session of PRP. IOP was measured with a rebound tonometer (i-Care), while subfoveal choroidal thickness (SFCT) and anterior chamber angle width were assessed using EDI-OCT and AS-OCT, respectively, before PRP and at 1 hour post-PRP.

Results: The mean IOP at the first hour after PRP (17.90 ± 4.82 mmHg) was significantly higher than pre-PRP (15.58 ± 3.94 mmHg) IOP values ($p < 0.01$). The pressure elevation in these eyes averaged 2.32 ± 4.39 mmHg. Mean SFCT before PRP was 307.75 ± 60.56 μ m, which increased to 308.63 ± 58.78 μ m after PRP ($p = 0.37$). Mean anterior chamber angle width did not reduce after PRP (25.87 ± 10.00 before PRP, 26.10 ± 12.28 at the first hour after PRP; $p = 0.85$). Although both mean IOP and SFCT increased after PRP, there was no significant correlation between their changes. A negative correlation was observed between IOP-angle and SFCT-angle changes.

Conclusions: The elevation of IOP was observed at the first hour after PRP. Further monitoring and prophylaxis treatment may be considered in patients with borderline or high IOP with a vulnerable optic nerve head sensitive to IOP intensification. However, the mechanism of IOP elevation could not be identified clearly.

Abstract No.: 201770

Impact of Selective Laser Trabeculoplasty on Diurnal IOP Dynamics Assessed by Home Monitoring

First Author: Rongrui LIU

Co-Author(s): Ping HUANG, Jonathan MYERS, Reza RAZEGHINEJAD

Purpose: To evaluate the impact of selective laser trabeculoplasty (SLT) on diurnal intraocular pressure (IOP) using home rebound tonometry

Methods: Patients with open-angle glaucoma were prospectively enrolled in a home monitoring program and trained to perform IOP self-measurements with a rebound tonometer. They obtained IOP readings three times daily for seven consecutive days every 3 months. Eyes that underwent SLT were analyzed. Diurnal IOP parameters and number of glaucoma medications were compared before SLT and at 3 and 6 months after treatment.

Results: Thirteen patients (16 eyes; 6 men, 7 women) were included: normal-tension glaucoma ($n = 7$), primary open-angle glaucoma ($n = 8$), and pigmentary glaucoma ($n = 1$). Mean age was 58.6 ± 13.0 years. At baseline ($n = 16$), mean IOP was 14.62 ± 4.16 mmHg, peak IOP 19.31 ± 5.57 mmHg, fluctuation 8.62 ± 3.69 mmHg, and medications 3.12 ± 1.15 . At 3 months ($n = 14$), mean IOP was 13.89 ± 4.60 mmHg ($p = 0.368$), peak 18.85 ± 6.66 mmHg ($p = 0.669$), and fluctuation 9.31 ± 4.71 mmHg ($p = 0.625$). At 6 months ($n = 12$ for IOP, $n = 16$

for medications), mean IOP declined significantly to 13.16 ± 4.04 mmHg ($p=0.005$), while peak (17.80 ± 5.41 mmHg, $p=0.107$) and fluctuation (8.10 ± 3.54 mmHg, $p=0.864$) were unchanged. Medications decreased to 2.85 ± 1.68 ($p=0.219$).

Conclusions: SLT resulted in a significant reduction in mean IOP at 6 months. In this cohort of medicated eyes with relatively low baseline IOP, treatment may be less effective than in higher-IOP eyes treated primarily. Home monitoring proved feasible for assessing IOP dynamics after SLT.

Abstract No.: 201743

Implantation Intraocular Lens With an Extended Depth of Focus in Glaucoma Patients With Only Seeing Eye

First Author: Nadezhda **GORBUNOVA**

Co-Author(s): Nadezhda **POZDEYEVA**, Diana **YAMBROVSKAYA**

Purpose: The purpose of this study is to determine the opportunity and appropriateness of implantation of an intraocular lens with an extended depth of focus (EDOF) in the surgical treatment of cataracts in glaucoma patients with only one seeing eye. The criteria under study: visual acuity in far, near, and intermediate (66 cm) distances, indicators of retinal photosensitivity, and patients' satisfaction with the quality of life after surgery.

Methods: The study included 22 patients. An IOL with an expanded depth of focus (Lentis Comfort, Teleon Surgical BV, Netherlands) was implanted in the glaucoma patients. Sixteen patients had angle-closure glaucoma, and 6 had open-angle glaucoma. The patients were divided into stages: 13 patients at the initial stage, 4 at the moderate stage, and 5 at an advanced stage of glaucoma. In addition to measuring visual acuity at different distances evaluated computer perimetry with photosensitivity analysis and assessment of vision quality using the questionnaire VF-14.

Results: IOL implantation with an extended depth of focus is a safe and effective cataract treatment for glaucoma patients with an only seeing eye, providing the benefits of an extended range of visual acuity without a significant increase in the risk of complications and deterioration in retinal light sensitivity.

Conclusions: Implantation of an EDOF IOL increases visual acuity at all distances in glaucoma patients with an only seeing eye. Implantation of an EDOF IOL does not affect the retinal photosensitivity. Glaucoma patients with EDOF IOL were satisfied with the quality of vision in daily life.

Abstract No.: 202051

Insertion of Preserflo MicroShunt Under OCT Guidance in a Case of Congenital Glaucoma With Aniridia and Corneal Opacity

First Author: Shohei **MORIKAWA**

Co-Author(s): Tetsuro **OSHIKA**, Yuta **UENO**

Purpose: To report a case of congenital glaucoma with aniridia and corneal opacity treated with Preserflo MicroShunt (PMS) implantation under intraoperative optical coherence tomography (OCT) guidance.

Methods: A 5-year-old girl with bilateral aniridia, elevated intraocular pressure (IOP) since birth, and a maternal family history of congenital glaucoma underwent PMS implantation in the left eye. Multiple trabeculotomies had been performed in both eyes, and micropulse transscleral cyclophotocoagulation in the right eye had resulted in phthisis bulbi. PMS implantation was selected because the left eye was the only seeing eye, and trabeculectomy carried a high risk of complications. Severe aniridia and corneal opacity markedly impaired intraoperative visualization through the surgical microscope. Real-time intraoperative OCT was used to determine scleral tunnel depth and anterior chamber entry angle.

Results: OCT guidance allowed accurate PMS placement despite poor microscopic visibility. The IOP decreased from 38 mmHg (on two topical agents) to 17 mmHg postoperatively without complications.

Conclusions: In congenital glaucoma with aniridia and corneal opacity, intraoperative visualization may be severely limited, making conventional techniques risky. Intraoperative OCT provided real-time anatomical feedback, enabling precise PMS placement and contributing to a safe and effective surgical outcome. This approach may be particularly beneficial in complex pediatric glaucoma with anterior segment opacities.

Abstract No.: 202090

Inter-Device Agreement of Nidek Mirante and Heidelberg Spectralis OCT for Glaucoma Monitoring: A Comparative Analysis Across Disease Severity

First Author: Norlina **RAMLI**

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Purpose: Evaluation of the agreement in retinal nerve fiber layer (RNFL) and macular thickness measurements between the Nidek Mirante and Heidelberg Spectralis optical coherence tomography (OCT) devices in glaucoma patients of varying severities.

Methods: In this cross-sectional study, 146 eyes from 73 subjects (66 glaucoma patients, 7 normal controls) underwent a comprehensive ophthalmic examination. Peripapillary RNFL and macular thickness were measured with both devices. Correlation, Bland-Altman

analysis for agreement, and regression for influencing factors were assessed.

Results: RNFL thickness showed strong correlations across all sectors, strongest in the inferior quadrant ($r=0.947$). The mean inter-device bias for average RNFL thickness was $-1.10 \mu\text{m}$. Macular thickness also correlated strongly ($r>0.82$ in central/inner sectors), though the outer superior sector showed wider limits of agreement. Fixed and proportional biases were present in most sectors. Regression analysis revealed that age, axial length, anterior chamber depth, glaucoma stage, spherical equivalent, and lens status did not significantly influence the measurement differences.

Conclusions: While measurements from the Spectralis and Mirante show strong correlation and acceptable agreement, the presence of consistent biases indicates that their measurements are not directly interchangeable in clinical practice.

Abstract No.: 205691

Interim One-Year Results of the Comparison Ahmed–Paul Glaucoma Implant Study (CAPS): A Multicenter Randomized Controlled Trial

First Author: Katherine LUN

Co-Author(s): Victor KOH, Dawn LIM, Karl MERCECA, Sirisha SENTHIL

Purpose: To compare the safety and efficacy of the PAUL® Glaucoma Implant (PGI) and Ahmed Glaucoma Valve (AGV) in patients undergoing aqueous shunt surgery for refractory primary and secondary glaucoma.

Methods: CAPS is a prospective, multicenter randomized controlled trial conducted at three international sites (Singapore, Bonn, India). Eligible patients aged 21–85 years with inadequately controlled glaucoma were randomized 1:1 to PGI or AGV implantation. The primary outcome was surgical success, defined as intraocular pressure (IOP) between 6–21 mmHg with $\geq 20\%$ reduction from baseline on two consecutive visits beyond 3 months, with or without IOP-lowering medication. Failure was defined as IOP outside this range, $<20\%$ reduction, need for reoperation, implant removal, or loss of light perception. Secondary outcomes included visual acuity, number of glaucoma medications, endothelial cell count, and postoperative complications.

Results: A total of 44 patients were included in the analysis. Baseline demographics and ocular characteristics were balanced between groups. At 1 year, both PGI and AGV achieved substantial IOP reduction. Rates of complete and qualified success, medication reduction, and endothelial cell density change were analyzed. No patient required reoperation, implant removal, or lost light perception. Complications were limited and manageable; no sight-threatening adverse events occurred.

Conclusions: Preliminary 1-year results suggest that both PGI and AGV provide effective IOP control with acceptable safety profiles in refractory glaucoma. The PGI may offer comparable success rates relative to AGV, with low rates of serious complications. Longer-term follow-up in the full cohort ($n=88$) will clarify comparative efficacy and safety.

Abstract No.: 202247

Introduction of a Micro-Incision Scleral Tunnel Technique for Glaucoma Tube Shunt Surgery

First Author: Masaki TANITO

Co-Author(s): Akiko HARANO, Chisako IDA, Mizuki IIDA, Sachiko KAIJZU, Kana MURAKAMI, Hinako OHTANI, Kazunobu SUGIHARA, Keigo TAKAGI

Purpose: To introduce the micro-incision scleral tunnel (MIST) technique, a novel sutureless and allograft-free method for Ahmed glaucoma valve (AGV) tube implantation, by presenting three illustrative cases.

Methods: Three patients with refractory glaucoma underwent AGV implantation using the MIST approach. A 1-mm crescent blade was used to create a short scleral tunnel for tube insertion into the anterior chamber, ciliary sulcus, or vitreous cavity. Intraocular pressure (IOP), medication use, and postoperative anterior segment status were evaluated.

Results: Case 1: A man in his seventies with primary angle-closure glaucoma underwent pars plana insertion combined with vitrectomy; IOP was 6 mmHg without medication at three months. Case 2: A man in his seventies with secondary angle-closure glaucoma due to iridocyclitis underwent ciliary sulcus insertion; IOP was 7 mmHg without medication at three months. Case 3: A teenage male with Axenfeld-Rieger syndrome-related glaucoma received anterior chamber insertion; IOP was 8 mmHg with two medications at eight months. Anterior segment findings were stable in all cases.

Conclusions: The MIST approach allows AGV tube placement without sutures or donor grafts while providing effective IOP reduction. The absence of serious complications, including hypotony and tube exposure, together with its adaptability across insertion sites, suggests that MIST may be a useful alternative technique for glaucoma tube implantation.

Abstract No.: 200484**Juvenile Rheumatoid Arthritis-Associated Uveitic Glaucoma: Clinical Characteristics and Long-Term Outcomes***First Author: Chaehyun SONG**Co-Author(s): Jin Wook JEOUNG, Young Kook KIM, Ki Ho PARK*

Purpose: To investigate the clinical characteristics and long-term prognosis of juvenile rheumatoid arthritis-associated uveitis, with a particular focus on secondary glaucoma, in a Korean pediatric population.

Methods: This study reviewed the medical records of patients who were diagnosed with both juvenile rheumatoid arthritis and uveitis at Seoul National University Hospital between August 2021 and July 2024. Demographic data, clinical findings, treatment modalities, ocular complications, surgical outcomes, and long-term visual prognosis were analyzed.

Results: A total of 48 juvenile rheumatoid arthritis-associated uveitis patients were included, of whom 23 (47.9%) developed glaucoma, and 17 (35.4%) underwent glaucoma surgery. HLA-B27 positivity was significantly more prevalent in the glaucoma group (48.0% vs. 17.4%, $p=0.025$). The common ocular complications in glaucoma patients were cataract (68.4%), corneal band keratopathy or opacity (42.1%), and posterior synechiae (36.8%). Glaucoma surgeries included trabeculectomy (59.1%) and Ahmed valve implantation (54.6%). IOP was significantly reduced postoperatively (mean reduction 44.06%). Long-term follow-up (≥ 10 years) of 32 eyes showed that 59.4% maintained normal visual acuity and 43.8% of patients had no significant bilateral visual deterioration.

Conclusions: Nearly half of the juvenile rheumatoid arthritis-associated uveitis patients developed secondary glaucoma, with many requiring surgical intervention. Despite the severity of disease, appropriate and timely management, including immunosuppression and surgery, enabled preservation of visual function in a significant proportion of patients over long-term follow-up. This research shows a step forward in understanding the juvenile rheumatoid arthritis-associated uveitis with glaucoma, providing information to clinicians for predicting outcomes and tailoring management strategies.

Abstract No.: 207497**Knockdown of PTEN Promotes RGC Axon Growth***First Author: Baoyuan QU**Co-Author(s): Shaohong CHEN, Wang LI, Jing QIAO, Fan ZHANG*

Purpose: Currently available glaucoma treatments focusing on lowering intraocular pressure only slow the progression of glaucoma, rather than halt or reverse it. Once treatment is discontinued due to poor patient

compliance or when the surgical efficacy declines, intraocular pressure will rise again and cause optic nerve damage. Furthermore, IOP-lowering methods are inapplicable to patients with normal-tension glaucoma. This research aims to develop a universal gene therapy for glaucoma that can reverse the course of glaucoma.

Methods: Screening shRNAs efficiently knockdown PTEN, and then constructed to AAV vector, and proceed AAV production. Purified viral vectors were administered to C57 mice via subretinal injection, followed by optic nerve crush surgery two weeks later. One month post-surgery, CTB was injected to the vitreous to assess optic nerve regeneration. Visual cliff testing was performed to evaluate mouse behavioral responses, and visual evoked potentials (VEP) were recorded to examine RGC electrophysiological function.

Results: PTEN was efficiently knock down in AAV-shRNA treated retina. The optic nerve was regenerated strongly in AAV-shRNA treated mice compared with control treated mice, and the treated mice spent more times in shadow side of the cliff in Visual cliff testing, the VEP showed a trend of increasing in AAV-shRNA treated mice compared with control.

Conclusions: Knock down PTEN can induce the regeneration of RGC axons and recovery the function of damaged RGC.

Abstract No.: 200597**Knowledge and Awareness of Glaucoma Among Rural and Urban Patients in Northern Bangladesh***First Author: Habiba SULTANA**Co-Author(s): Shajeda AZIZI, Khairul ISLAM*

Purpose: To assess and compare the level of knowledge and awareness of glaucoma among rural and urban patients in northern Bangladesh.

Methods: This comparative cross-sectional study was conducted on 706 respondents in total, with an equal number of 353 participants selected from both urban and rural regions in northern Bangladesh. Informed consent was obtained from eligible participants over 18 years. The questionnaire, available in both English and Bengali, collected demographic data and included questions on glaucoma awareness and knowledge. Data were analysed using SPSS 26, and the chi-square test was applied to determine statistical significance.

Results: The mean ages were 39.31 ± 14.1 years for urban and 52.01 ± 14.2 years for rural participants. Awareness of glaucoma was low, with only 20.8% of participants familiar with the term, slightly higher in urban areas (22.7% vs. 19%). A notable 81.6% of urban and 81.3% of rural respondents were unaware or unsure about glaucoma. Additionally, 51.2% of urban respondents recognized that age increases glaucoma risk, while only 16.4% of rural participants did. A statistically significant association ($p < 0.001$)

was observed between residence and knowledge level, with excellent knowledge found in 31.3% of urban participants versus 9% in rural areas. Overall, only 15% of all participants demonstrated «good» knowledge of glaucoma.

Conclusions: The study reveals a rural-urban gap in glaucoma awareness, with rural populations having less knowledge. The findings emphasize the need for targeted rural eye health programs to enhance early detection, timely treatment, and reduce preventable blindness.

Abstract No.: 204697

Latanoprost-Dependent Pulsatile Aqueous Discharge to the Episcleral Veins

First Author: Chen XIN

Purpose: To explore the mechanism of immediate IOP reduction after a single dose of latanoprost.

Methods: One-factor repeated-measures design, observational study. Intraocular pressure (IOP) and video imaging of aqueous vein were captured before and 10-min, 30-min, 45-min, 60-min, 120-min, 240-min after instillation of latanoprost. Aqueous stratum diameter (ASD) and aqueous velocity (AV) were measured.

Results: Before medication instillation, IOP was 28.3 ± 4.2 mmHg. It started to dramatically decrease to 24.3 ± 2.3 mmHg after 120 minutes ($F=10.203$, $P=0.006$). Before medication instillation, ASD was 0.019 ± 0.010 μm . It started to dramatically increase to 0.034 ± 0.007 μm after 45 minutes ($F=26.187$, $P<0.001$), which kept increasing to 0.050 ± 0.012 μm until 60 minutes afterwards ($F=20.723$, $P<0.001$). Before medication instillation, AV was 2.1 ± 0.5 $\mu\text{l/s}$. It started to dramatically increase to 2.6 ± 0.6 $\mu\text{l/s}$ after 30 minutes ($F=5.757$, $P=0.031$), which kept increasing to 4.3 ± 0.9 $\mu\text{l/s}$ at 45 minutes and 4.3 ± 0.9 $\mu\text{l/s}$ at 60 minutes ($F_{30-45}=8.512$, $P_{30-45}=0.011$; $F_{45-60}=8.512$, $P_{45-60}=0.021$).

Conclusions: Latanoprost increases aqueous humor through the trabecular meshwork pathway, resulting in immediate IOP reduction.

Abstract No.: 204299

Leaky Bleb With Multiple Revisions and an Inferior Glaucoma Drainage Device Implantation: A Case Report

First Author: Jon Denzel YU

Co-Author(s): Maria Catherina NASOL, Cathleen Joyce VILLAFUERTE

Purpose: To report a case of a 40-year old female who had a leaking bleb and underwent three bleb revisions and a glaucoma drainage device (GDD) implantation at the inferonasal area and to discuss its effectiveness.

Methods: A retrospective case report was done followed by review of related literature and case correlation.

Results: A 40-year-old Filipino female with juvenile open-angle glaucoma presented with left eye pain 10 years after initial trabeculectomy. Examination revealed a cystic, avascular bleb with a positive Seidel's test. She underwent three bleb revisions: (1) scleral patch with conjunctival advancement, (2) horizontal mattress suture with bandage contact lens, and (3) Tenon's flap with scleral patch. On day 16 after the third repair, intraocular pressure (IOP) increased to 36 mmHg. A Paul Glaucoma Implant (PGI) was placed inferonasally. Her IOP stabilized in the mid-teens with Brimonidine + Timolol 2x a day and Dorzolamide 3x a day, and remained in the low-teens after ripcord removal, maintained on Brimonidine + Timolol.

Conclusions: The aim of management of a leaking bleb is to prevent future leaks and maintain a low IOP. After three revisions, the initial goal of leak prevention was achieved, however, there was subsequent elevation of IOP. An inferiorly-placed GDD implant was deemed necessary to achieve both leak prevention and IOP lowering. Inferior placement has been demonstrated to be safe and effective. In addition, it offers advantages in eyes with significant conjunctival scarring or anatomic abnormalities at the superior limbus.

Abstract No.: 201341

Long-Term Clinical Course of Primary Angle Closure in Korean Patients

First Author: Wool SUH

Co-Author(s): Kyung Eun HAN, Roo Min JUN

Purpose: To assess the long-term clinical course of primary angle-closure suspect (PACS), primary angle closure (PAC), and primary angle-closure glaucoma (PACG) in Korean patients.

Methods: This retrospective study reviewed eyes classified as PAC/PACG or PACS that presented at a tertiary hospital between 1994 and 2022. The eyes were categorized as having PAC/PACG or PACS. Presenting features, management, and subsequent long-term IOP outcomes measured with optical coherence tomography (OCT) were included.

Results: The study included 305 eyes : 84 eyes with PAC/PACG and 221 eyes with PACS. The mean follow-up period was 11.1 ± 6.6 years. In 48 eyes with PAC/PACG treated with laser peripheral iridotomy (LPI), 97.9% achieved controlled IOP, with 2.1% undergoing cataract surgery. Of the 185 eyes with PACS treated with LPI, 46.5% required no further surgery and 50.8% underwent cataract surgery. In 107 eyes, OCT revealed significant retinal nerve fiber layer thinning in the PAC/PACG in the superior and average sectors and in PACS in the superior, inferior, and average sectors (all $P < 0.001$) and temporal sector ($P = 0.039$), with PACS

showing a significant increase in the cup-to-disc ratio ($P = 0.033$).

Conclusions: LPI effectively controlled IOP in most patients with PAC and PACS, although some required surgery. Prolonged follow-up revealed progressive retinal nerve fiber layer thinning and increased cup-to-disc ratio in eyes with PACS, indicating structural changes despite IOP control. Regular OCT-based monitoring is crucial for detecting and managing disease progression in patients with angle-closure diseases.

Abstract No.: 204718

Long-Term Course of Primary Congenital Glaucoma After Trabeculotomy: Emphasizing Lifelong Follow-Up and Timely Escalation to Glaucoma Drainage Device

First Author: Brandon Willis **SING**

Co-Author(s): Manuel Jr. **DELFIN**, Mara Augustine **GALANG-LU**

Purpose: To describe the clinical course and surgical management of a patient with primary congenital glaucoma (PCG) from infancy through childhood, highlighting the importance of long-term follow-up.

Methods: This is a case report.

Results: An otherwise healthy 21-day-old female, born term with unremarkable birth history, presented with bilateral corneal enlargement (13.5 mm), left corneal opacity, and markedly elevated intraocular pressures (IOP) OD:55, OS:86. Examination under anesthesia showed right disc finding of CDR 0.2, while B-scan of the left eye revealed attached retina. Bilateral trabeculotomy was performed due to poor corneal visualization with no untoward postoperative course. IOP was lowered to 18mmHg. Pressures were maintained in the 20s on timolol/dorzolamide and latanoprost, with one spike to 34. Visual acuity was age-appropriate at OU: 20/40 at 3 years. Patient followed up at age 7 with complaints of frontal headache and tearing. Examination revealed worsened VA of 20/80 OU with IOPs of 24 OD and 34 OS. revealed bilaterally closed angles, except for the inferior angles open to the Ciliary body band. Fundoscopy showed optic disc cupping of OD 0.3 and OS 0.7. A glaucoma drainage device (ClearPath 250) was implanted, resulting in a stable IOP of 20s mmHg in both eyes post-operatively. Ripcord removal at 3 months further lowered OS IOP to 15 mmHg, with uneventful follow-up, eliminating the need for any anti-glaucoma medications.

Conclusions: Primary congenital glaucoma may progress despite initial surgical success. This case emphasizes lifelong monitoring, timely surgical escalation, and patient education as essential to preserve vision and prevent irreversible optic nerve damage in children.

Abstract No.: 205651

Long-Term Outcomes of PreserFlo MicroShunt Implantation in a UK Tertiary Centre: A Nine-Year Retrospective Series

First Author: Yunzi **CHEN**

Co-Author(s): Hari **JAYARAM**

Purpose: To evaluate long-term outcomes of PreserFlo MicroShunt implantation for glaucoma at a UK tertiary centre, with follow-up of up to nine years.

Methods: Retrospective case series of the first 50 consecutive patients undergoing PreserFlo implantation; 49 eyes met inclusion criteria (no prior glaucoma surgery, ≥ 12 months follow-up). Surgical success was defined as intraocular pressure (IOP) 6–21 mmHg with $\geq 20\%$ reduction from baseline, with (qualified) or without (complete) medication, without loss of light perception or further glaucoma surgery. Follow-up was censored when eyes failed to meet success criteria.

Results: Mean age was 67 years; 80% had primary open-angle glaucoma. Mitomycin-C concentration ranged 0.1–1.0 mg/ml (49% received 0.2 mg/ml); 10% received adjunctive beta radiation and 10% intracameral bevacizumab. Combined phacoemulsification was performed in 12%. Median follow-up was 36 months (IQR 18–60, maximum 108), with 25% of eyes followed beyond 5 years. At last follow-up, 33% achieved success (18% complete, 14% qualified). Kaplan–Meier analysis showed cumulative success of 61% at 1 year, declining to 33% at 5 years, remaining stable to 9 years. Postoperative rescue interventions were required in 55% (41% needling, 37% open revision, some underwent both). Further glaucoma surgery was required in 10% (8% tube, 2% diode). Complications occurred in 16%, mostly self-limiting; 4% required reoperation.

Conclusions: PreserFlo implantation provided sustained IOP reduction with long-term success rates comparable to published series. Complication rates were low, though many eyes required revision procedures. Larger studies are needed to evaluate the surgical learning curve and the effect of adjunctive measures, such as mitomycin-C dosage, on long-term outcomes.

Abstract No.: 206147

Long-Term Outcomes of Trabecular Micro-Bypass iStent Implantation in Malaysia

First Author: Norjeehan **MAARIS**

Co-Author(s): Zulhilmi **ABDUL RAZAK**, Norshamsiah **MD DIN**, Kah-hie **WONG**, Mimiwati **ZAHARI**

Purpose: To evaluate the long-term efficacy and safety of iStent trabecular micro-bypass implantation, performed as a standalone procedure or combined with phacoemulsification, in three tertiary centres in Malaysia.

Methods: This retrospective multicentre study included 90 eyes from 63 patients who underwent iStent implantation between January 2020 and November 2023 in three tertiary centres. Intraocular pressure (IOP), number of antiglaucoma medications, and postoperative outcomes were analysed. Surgical success was defined using World Glaucoma Association (WGA) criteria.

Results: After a mean duration of four years, IOP reduced from 18.4 ± 3.3 to 14.6 ± 2.8 mmHg ($p < 0.001$). In subgroup analysis, IOP decreased from 19.6 ± 4.0 to 16.2 ± 4.3 mmHg in the standalone group and from 18.0 ± 3.1 to 14.1 ± 2.1 mmHg in the combined group, with no significant between-group difference. Medications declined from 3.0 ± 1.0 to 2.0 ± 1.0 , with eyes on ≥ 3 drops decreasing from 67.8% to 26.3%. At four years, qualified success was 31.6% and complete success 10.5%. Safety outcomes were favourable, with 89% of eyes free of intraoperative complications, and postoperative events were mostly minor and self-limiting.

Conclusions: Standalone or combined iStent implantation achieved sustained IOP and medication reductions over four years, with a high safety margin. These findings support MIGS as an effective long-term treatment option for open-angle glaucoma in the Malaysian population

Abstract No.: 205944

Long-Term Update on Deep Sclerectomy vs. Combined Trabeculotomy Trabeculectomy in Cases With Congenital Glaucoma

First Author: Saleh **AL OBEIDAN**

Co-Author(s): Abdulaziz **AL AREFI**, Ehab **AL SIRHY**, Faisal **ALMOBARAK**, Abdulsalam **ALTURJOMAN**, Philippe **KESTELYN**, Ahmed **MOUSA**, Essam **OSMAN**

Purpose: To compare the efficacy and safety of Deep Sclerectomy Vs. Combined Trabeculotomy Trabeculectomy on the long-term.

Methods: A clinical trial design. Bilateral cases were recruited, where OD was conducted as DS and OS as CTT. Clinical indices were evaluated preoperatively and at 3, 6, 12, 24 months & the last follow-up visit. The change in clinical glaucoma indices was monitored, and two main comparisons were done: to compare pre- to post-intervention in each arm, as well as to compare findings from both arms.

Results: A total of 140 eyes of 70 patients were recruited. Subjects were in the mean (SD) age of 1.6 (2.3), months, 29 (41.4%) males, and 41 (58.6%) females. In both groups, the IOP was significantly reduced ($p < 0.0001$). The complete success rate was 49 (71%) in the DS eyes, while it was 35 (51.5%) in the CTT eyes ($p=0.016$). The overall success rate was 58 (82.9%) and 41 (58.6%) in the DS and CTT eyes, respectively ($p=0.001$). The intraoperative complication rate was 3

(4.3%) in the DS, while it was 17(24.3%) in the CTT eyes ($p=0.002$). The postoperative complication rate was 6 (8.6%) in the DS eyes, while it was 21(30.0%) in the CTT eyes ($p=0.005$).

Conclusions: Deep sclerectomy is superior to the combined trabeculotomy/trabeculectomy in terms of both efficacy and safety, as assessed by the increased success rate and the lower rate of complications.

Abstract No.: 205927

Long-Term Visual Acuity Outcomes of Deep Sclerectomy in Paediatric Glaucoma

First Author: Saleh **AL OBEIDAN**

Co-Author(s): Muhannad **ALKHALIFAH**, Ahmed **MOUSA**

Purpose: To evaluate the long-term outcomes of deep sclerectomy in paediatric glaucoma.

Methods: Retrospective review of all patients who underwent deep sclerectomy at King Abdulaziz University Hospital from 2001 to 2016. All patients had valid visual acuity testing. The preoperative indices, long-term visual acuity, and intraocular pressure outcomes were analyzed. The primary outcome of interest was the improvement in vision as well as the other glaucoma indices.

Results: A total of 83 eyes of 68 patients were included. The mean age of participants was 11.1, [5-25] years. The mean age at surgery was 5.9 months, and the mean follow-up period was 10.75 years. The visual acuity was $\geq 20/40$ in 56.6%, between 20/40 and 20/200 in 18.1%, and $\leq 20/200$ in 25.3% of the operated eyes. A complete success rate after one surgery was achieved in 53 eyes (63.86%), qualified success was achieved in 8 eyes (9.6%), while 22 eyes (26.5%) failed. Nine eyes (10.74%) had post-operative complications.

Conclusions: Deep sclerectomy is a reasonable option for paediatric glaucoma that can provide good long-term visual outcomes and IOP control with a lower risk of surgical complications.

Abstract No.: 202254

Malignant Glaucoma Versus Pupil Block: Comparative Case Series of Secondary Angle Closure Glaucoma After Cataract Surgery

First Author: Ardiella **YUNARD**

Co-Author(s): Virna Dwi Oktariana **ASRORY**, Yulinda Arty **LAKSMITA**, Astrianda **SURYONO**

Purpose: To highlight how similar clinical presentations of secondary angle closure glaucoma (ACG) after cataract surgery can mask distinct underlying mechanisms, leading to different therapeutic strategies.

Methods: We describe two postoperative cases of secondary ACG presented with similar complaints and clinical features following cataract surgery. Both patients underwent comprehensive ophthalmic

evaluation to confirm the underlying pathophysiology, thus individualized treatment strategies were implemented for each case.

Results: Both patients presented with eye pain, blurred vision, and nausea after cataract surgery. The first case occurred three weeks postoperatively, while the second case occurred five days postoperatively. Both patients had markedly elevated IOP (56 mmHg and 66 mmHg, respectively), decreased visual acuity (VA), ciliary injection, and microcystic corneal edema, and shallow anterior chamber (AC), raising suspicion of secondary ACG. Further evaluation, however, revealed different mechanisms. In Case 1, iris bombe and 360° posterior synechiae signifying a pupil block mechanism, while in Case 2, a uniformly flat AC indicating malignant glaucoma. The patients were managed in accordance with the underlying mechanisms: Case 1 underwent peripheral iridectomy, while Case 2 underwent iridozonulo-hyaloido-anterior vitrectomy. Both patients showed significant IOP reduction, VA improvement, and favorable clinical recovery following appropriate intervention.

Conclusions: Secondary ACG after cataract surgery may present with overlapping clinical symptoms and signs, yet arise from distinct mechanisms. Careful clinical evaluation is essential to differentiate pupillary block from malignant glaucoma, as each requires a different therapeutic approach. Early recognition of the underlying pathophysiology and tailored management are critical to achieve IOP control, visual recovery, and favorable outcomes.

Abstract No.: 200599

Micropulse Cyclophotocoagulation in Patients Affected by Primary Glaucoma: 2-Year Follow-Up

First Author: Michele **LANZA**

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Purpose: To evaluate the efficacy and safety of micropulse transscleral laser therapy (MP-TLT), in eyes affected by primary glaucoma.

Methods: In this study, 84 eyes of 53 patients, with a mean age of 67.14 ± 11.39 years, affected by progressive primary open-angle glaucoma (POAG) and primary angle closure glaucoma (PACG), were included. Before treatment, patients had a mean best visual acuity with correction of 0.26 ± 0.36 LogMAR, a mean intraocular pressure (IOP) of 22.32 ± 6.64 mmHg, and they assumed a mean of 2.96 ± 0.75 topical IOP-lowering molecules. Every MP-TLT treatment was performed under peribulbar anaesthesia. Patients were checked at day 1, week 1 and at 1, 3, 6, 12, 18 and 24 months of follow-up.

Results: No adverse reactions or vision loss were recorded in every eye treated. At 1-month follow-up, a significant ($p < 0.001$) reduction of mean IOP was detected both in POAG (-7.16 ± 2.92 mmHg) and PACG (-6.89 ± 3.12 mmHg) eyes that remained stable at the last follow-up. A significant ($p < 0.01$) reduction in the number of drugs was observed at 3 months follow-up, both in POAG (-0.59 ± 0.32) and PACG (-1.06 ± 0.42 mmHg) eyes that stayed stable during further follow-up.

Conclusions: Even if the data observed in this study need to be confirmed in further studies with a larger population and longer follow-up, the obtained results suggest that MP-TLT could be an effective and safe option to manage patients with progressive POAG and PACG.

Abstract No.: 202154

Micropulse Transscleral Diode Cyclophotocoagulation (MP-TSCPC Laser): An Effective Non-Surgical Non-Invasive Alternative for Treating Glaucoma

First Author: Dr M Afzal **BODLA**

Co-Author(s): Arfa **AHSAN**

Purpose: Glaucoma is a leading cause of blindness. Micro-pulse transscleral diode photocoagulation Laser (MP-TSCPC) is the latest non-invasive non-surgical laser procedure for the treatment of refractory open-angle glaucoma. This study aimed to assess the efficacy of MP-TSCPC in seeing eyes with the extent of lowering of intraocular pressure and reduction in the number of topical anti-glaucoma medications.

Methods: A prospective, interventional, non-comparative case series was conducted in the Eye Department, CMH Institute of Medical Sciences, and Bodla Eye Care, Multan, Pakistan, on 40 eyes of 40 patients with various types of glaucoma, ranging from mild to moderate and advanced. A paired-t sample test was used to analyze results. Best-corrected visual acuity, intraocular pressure (IOP), and number of anti-glaucoma medications were recorded before and after treatment. Success rates, number of treatment sessions, and postoperative complications were also recorded. The follow-up period was from Oct 2022 to November 2024.

Results: Out of 40 eyes of 40 patients average IOP reduction rate was 47.66 % in 24 weeks of follow up. A reduction in number of required topical medications was noted improving patient compliance. Visual acuity also remained stable in most of the cases. No serious complications were observed, mild inflammation was managed conservatively.

Conclusions: MP-TSCPC is safe and effective in lowering IOP in refractory glaucoma with different severity. Keeping in view of results we can safely recommend this procedure to be adopted in cases of

mild to moderate refractory POAG in seeing eyes, failed Trabeculectomy and eyes with cataractous changes.

Abstract No.: 200941

Navigating Challenges in Neovascular Glaucoma: Treatment Strategies for Refractory Cases

First Author: Divya KOTCHARLAKOTA

Co-Author(s): Gazella BRUCE

Purpose: A case of Neovascular glaucoma (NVG) post central retinal artery occlusion (CRAO) with central retinal vein occlusion (CRVO) and the challenges associated with its treatment.

Methods: A 34-year-old male presented with pain in the right eye (OD) and was diagnosed with OD Neovascular glaucoma, with a history of OD CRVO with CRAO due to uncontrolled hypertension. BCVA was OD 6/18 and 6/6 in the left eye (OS). 270-degree neovascularization of the iris (NVI) was noted at the pupillary margin in OD, and gonioscopy revealed 360° closed angles. Fundus OD had disc pallor with old PRP marks and no macular oedema with severely depressed visual fields. OS normal. Trabeculectomy with mitomycin C (MMC) was performed after a dose of intravitreal anti-VEGF. After 3 weeks, bleb had features of early failure and bleb needling with MMC was performed. IOP was controlled with the subsequent addition of topical AGM (Anti-Glaucoma Medications). Limited inferior 180° transscleral cyclophotocoagulation (TSCPC) was performed. 5 months later, multiple neovascularization of the disc (NVD) and NVI developed with FFA (Fundus Fluorescein Angiography) showing multiple capillary non-perfusion (CNP) areas. PRP augmentation with subsequent AGV was performed.

Results: BCVA is 6/24 OD 6/6 OS and is currently in the hypertensive phase of AGV with IOP being controlled with oral Acetazolamide.

Conclusions: First report in literature of the management of NVG post CRVO and CRAO. Recurring NVI/NVD are an indication for repeat FFA. This glaucoma is recalcitrant with the need for aggressive treatment.

Abstract No.: 208447

Neuroimaging Findings in Patients With Presumed Normal Tension Glaucoma: A Retrospective Review

First Author: Thomas Chi-ho LAM

Co-Author(s): Leo CHAN

Purpose: To evaluate the prevalence of pathologies identified on computed tomography (CT) scans, and atypical features identified on glaucoma investigations in patients with normal tension glaucoma (NTG).

Methods: A retrospective review of the results of CT scans in 1975 consecutive patients performed at a tertiary eye institute in Hong Kong from April 2021 to March 2024.

Results: Among the 1,975 patients, 977 (49.5%) had presumed NTG and underwent CT scans to exclude compressive optic neuropathy. In this group, 179 patients (18.3%) had positive findings. Notably, 9 patients (0.92%) had SOLs that directly compromised the optic pathway, including 5 retrobulbar masses, 2 suprasellar masses, and 2 cavernous sinus masses. Other significant findings included small vessel disease in 106 patients (10.8%) and incidental SOLs, such as meningiomas, subarachnoid cysts and osteomas, in 70 patients (7.16%). Among the 9 patients with SOLs impacting the optic pathway, their average intraocular pressure (IOP) at presentation was 15.9 mmHg (standard deviation 2.58). Clinical features that point against the diagnosis of glaucoma included atypical visual field (VF) loss, unilateral or highly asymmetrical presentation, lack of structural-function correlation, absence of neuroretinal rim thinning or presence of optic disc pallor, and drop in central visual acuity.

Conclusions: The low incidence of optic pathway SOLs in NTG suggests that neuroimaging should be prioritized for patients with clinical presentations atypical of glaucoma. Our study provides insights into how we can better utilize neuroimaging to optimize resources in resource-constrained area.

Abstract No.: 208444

Neurotrophic Keratopathy After Transcleral Cyclophotocoagulation – a Retrospective Cohort Study Assessing Its Incidence and Risk Factors

First Author: Thomas Chi-ho LAM

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Purpose: To determine the incidence and risk factors for corneal epithelial defects (ED), a manifestation of neurotrophic keratopathy, following micropulse cyclophotocoagulation (MPCPC) and slow coagulation G-probe (G-probe).

Methods: This retrospective cohort study examined consecutive patients aged 18 or older who received MPCPC and G-probe at a single tertiary eye center (Hong Kong Eye Hospital) from January 2023 to July 2024.

Results: A total of 368 eyes from 255 patients were included in the study. Of these, 310 eyes (84.2%) underwent MPCPC, while 58 eyes (15.8%) received G-probe. The mean pre-operative and post-operative (1 month) intraocular pressures were 27.43 mmHg and 17.51 mmHg. The overall incidence of epithelial defects (ED) was 10.1% (n=37), with no significant difference between MPCPC and G-probe (9.7% vs. 12.1%,

$p=0.58$). Among disease categories, NVG had the highest incidence of ED at 19.5%, significantly higher than other diagnoses ($p=0.007$). Persistent epithelial defects (≥ 2 weeks) occurred in 23 patients (62.2% of ED cases), with a mean healing time of 27.4 days. All affected eyes received topical antibiotics; 54.1% used bandage contact lenses, and 32.4% received antiviral treatment (acyclovir or ganciclovir). Two cases required amniotic membrane transplantation. Complications included one case of infectious keratitis, one case of endophthalmitis, and two cases of residual dense corneal scars. Univariate logistic regression identified male gender ($p=0.015$), diabetes mellitus (DM) ($p=0.014$), history of ED ($p<0.001$), neovascular glaucoma ($p=0.004$), and higher pre-operative IOP ($p=0.015$) as predictors of ED occurrence in the MPCPC group, while history of ED ($p=0.036$) was significant in the G-probe group. Multivariate analysis confirmed history of ED ($p<0.001$) and neovascular glaucoma ($p=0.045$) as significant predictors in the MPCPC group, further validated using generalized estimating equations to account for inter-eye correlation and repeat treatments (history of ED ($p<0.001$), neovascular glaucoma ($p=0.005$)).

Conclusions: Neurotrophic keratopathy is a notable complication after TSCPC. Pre-operative identification of risk factors—especially a history of ED and NVG—is crucial for prevention and proper management to avoid sight-threatening outcomes.

Abstract No.: 208493

Novel Phenotype of MYO7A-Associated Usher Syndrome: Pigmentary Glaucoma

First Author: Zhou LIN

Purpose: This study investigated a Chinese consanguineous family with Usher syndrome (USH) and identified a pathogenic MYO7A mutation. We also describe a novel ophthalmic phenotype: pigmentary glaucoma.

Methods: Clinical data were collected from the proband. Examinations included best-corrected visual acuity, intraocular pressure, fundus imaging, optical coherence tomography, and visual field testing. Genomic DNA was extracted from peripheral blood. Whole-exome sequencing (WES) was performed, and candidate variants were validated by Sanger sequencing.

Results: The proband was a 53-year-old female with congenital deafness, nyctalopia, and advanced retinitis pigmentosa. She developed pigmentary glaucoma with ocular pain, iris concavity, heavy trabecular pigmentation, and glaucomatous optic neuropathy. Intraocular pressure remained uncontrolled despite maximal topical therapy, requiring trabeculectomy. WES revealed a homozygous missense variant in MYO7A (c.3728C>T, p.Pro1243Leu), previously reported

as pathogenic in USH. No other glaucoma-related mutations were identified.

Conclusions: We report pigmentary glaucoma as a novel phenotype associated with MYO7A-related Usher syndrome. This expands the known genotype-phenotype spectrum and highlights the need for careful glaucoma surveillance in patients with USH.

Abstract No.: 207447

On the Edge of Vision: A Glaucoma Tale With Twists and Turns

First Author: Nagalekshmi GANESH

Purpose: To illustrate the management strategies of tackling the highs and lows of dealing with multifactorial, advanced glaucoma. This case highlights the role of an interdisciplinary and step-wise approach in solving complex cases and restoring vision.

Methods: This is a case of a 72-year-old lady with advanced POAG and tunnel vision. She had a stormy phase with NVG secondary to PDR and infective keratitis simultaneously in the right eye, and the vision dropped to only PL, while the left eye was rapidly progressing due to uncontrolled glaucoma on maximum topical antiglaucoma medications.

Results: She was first treated for infective keratitis, as surgery would not be possible in the presence of an active infection, keeping her on oral acetazolamide to control her IOP, and aggressive PRP for the bilateral PDR. With this, her vision in the right eye improved marginally. She then underwent trabeculectomy in the left eye, after which IOP in the left eye stabilized. IOP in the right eye at this juncture increased due to PAS, NVG, for which a subsequent AGV was performed. Post-op op she had hypopyon, which was also treated as sterile hypopyon with intense steroids, and finally, her vision in the right eye improved to 6/18 from PL after 4 months of a staged multidisciplinary approach.

Conclusions: In advanced and complex glaucoma cases, when treated with patience, perseverance, and a polydisciplinary staged approach, useful vision can be restored. Do not give up in such cases.

Abstract No.: 201533

Outcomes of XEN Gel Stent Versus Trabeculectomy in Advanced Glaucoma: A Multi-Center Retrospective Cohort Study

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Purpose: To compare the efficacy and safety of XEN Gel Stent implantation versus trabeculectomy in patients with advanced glaucoma and persistently elevated intraocular pressure (IOP) on maximal medical therapy.

Methods: We conducted a multi-center retrospective cohort study including advanced glaucoma patients who underwent either XEN Gel Stent implantation or trabeculectomy. Outcomes at 6 months postoperatively were analyzed. The primary outcome was reduction in mean IOP from baseline, and secondary outcomes included the frequency of bleb revisions (needling procedures), complication rates, and changes in visual field mean deviation on Humphrey visual field (HVF) testing. Paired t-tests and regression models were used to compare outcomes between the two groups.

Results: Both surgeries significantly lowered IOP at 6 months. The XEN group achieved ~40% IOP reduction (from 30.5 to 18.3 mmHg, $p < 0.05$), whereas the trabeculectomy group achieved ~55% reduction (from 29.8 to 13.4 mmHg, $p < 0.05$). This reflects a greater absolute mean IOP drop with trabeculectomy (-15.8 vs -12.4 mmHg, $p < 0.05$). The XEN group required more frequent bleb revisions (i.e. needling) by 6 months compared to the trabeculectomy group (30.1% vs 7.9%, $p < 0.05$). Fewer serious complications were observed in the XEN group compared to trabeculectomy. No cases of hypotony maculopathy or persistent bleb leak occurred in the XEN cohort. There was no statistically significant difference in visual field outcomes between the two groups at 6 months.

Conclusions: In advanced glaucoma patients with uncontrolled IOP, trabeculectomy achieved a greater reduction in IOP than the XEN Gel Stent, reaching lower absolute pressure levels. However, the minimally invasive XEN Gel Stent is a valuable alternative for patients at higher risk of complications or those who prioritize safety. Further long-term studies are needed to confirm the durability of XEN's outcomes and to refine patient selection criteria for each surgical approach.

Abstract No.: 202974

Pattern of Emergency and Inter-Departmental Ophthalmology Referral Calls and Their Impact on Postgraduate Training in a Tertiary Care Hospital in Central India

First Author: Saroj GUPTA

Co-Author(s): Samendra KARKHUR, Priti SINGH, Vidhya VERMA

Purpose: To evaluate the pattern of emergency referrals and interdepartmental ophthalmology referrals in a tertiary care hospital and assess their impact on postgraduate residents' training.

Methods: A hospital-based prospective observational study was conducted over 18 months. Data from 1061 ophthalmology referral calls were analyzed, including patient demographics, referring departments, reasons for referral, the timing of referral, ocular findings, interventions done, and postgraduate residents' competency in attending referral calls.

Results: The study included referrals for patients aged 4 months to 92 years (mean age 39.76 ± 22.26 years) with a predominance of male patients ($n = 650$, 61.26%). The majority of calls were received on weekdays ($n = 782$, 73.7%), particularly between 8:00 am and 4:00 pm ($n = 672$, 63.34%). Referrals were predominantly from the Medicine department ($n = 377$, 35.53%) and the Trauma and Emergency department ($n = 251$, 23.66%). The most common reason for referral was for aid in diagnosis ($n = 333$, 31.39%). No ocular abnormalities were found in 648 cases (61.07%). Among those with positive findings, the most frequent were ocular trauma ($n = 148$, 13.95%) and diabetic retinopathy ($n = 83$, 7.83%). Postgraduate residents managed 221 cases (62.96%) independently with only minor corrections during the first six months of the study period, and their clinical competency improved significantly over time, as reflected in the reduction of discrepancies from 130 cases (37.01%) to 30 cases (8.77%).

Conclusions: The study highlighted the pattern of referral calls in ophthalmology and the importance of referral calls in enhancing postgraduate residents' learning process.

Abstract No.: 202611

Pigment Dispersion Syndrome Misdiagnosed As Uveitis

First Author: Leyla ALI ALJASIM

Purpose: Pigment dispersion syndrome (PDS) is a rare condition where pigmentary cells are released from the iris pigmented epithelium, leading to deposition on intraocular structures. While it commonly causes pigmentary glaucoma, it may also mimic uveitis due to overlapping symptoms and signs, such as recurrent intermittent blurring of vision with anterior chamber pigment cells that can be mistaken for inflammatory cells

Methods: Case review.

Results: This case involves a patient who initially presented with symptoms suggestive of uveitis, with blurring of vision, +3 cells in the anterior chamber, and increased intraocular pressure (IOP), and was managed accordingly with steroids by a general ophthalmologist. Then he was referred to a glaucoma specialist as secondary uveitic glaucoma, where the patient was diagnosed as PDS, due to iris posterior bowing, pathognomonic iris atrophy, hyperpigmented trabecular meshwork, and the cells were pigment cells. The patient experienced recurrent episodes of anterior chamber pigment release, particularly after pupillary dilation for fundus examination and exercise, which caused blurring of vision to HM (drop from 20/40), mimicking recurrent uveitis attacks. The corticosteroid treatment worsened the patient's condition by elevating IOP and exacerbating glaucoma. The correct diagnosis of PDS was eventually made, the patient was

cleared from the uveitis side, and the management was adjusted accordingly. The patient has been stable for many years now.

Conclusions: This case highlights the diagnostic challenges of differentiating some cases of PDS from uveitis and emphasizes the importance of accurate diagnosis to avoid inappropriate treatment and complications.

Abstract No.: 207780

Polyunsaturated Fatty Acids and Glaucoma Risk: A Convergent Meta-Analysis and Mendelian Randomization Study

First Author: Li Jia **CHEN**

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Purpose: To unravel the association between plasma polyunsaturated fatty acids (PUFAs) levels and risk of glaucoma.

Methods: The meta-analysis protocol was preregistered (PROSPERO; CRD42024589427). Two reviewers independently screened eligible articles (up to December 2024) from five databases (PubMed, Cochrane, Embase, Web of Science, Science Direct) and assessed quality using Newcastle-Ottawa Scale (NOS). Case-control metabolomics studies quantifying plasma total PUFAs, Linoleic acid (LA), α -Linolenic acid (ALA), Eicosapentaenoic acid (EPA), and Docosahexaenoic acid (DHA) were included. Standardized mean differences (SMD) with 95% confidence intervals (CI) were pooled for continuous PUFA levels. Causal relationships were assessed using Mendelian Randomization (MR) analysis with genome-wide association data.

Results: Among a total of 835 studies, seven comprising 6,440 participants were included in the meta-analysis, which revealed significantly lower levels of total PUFAs (SMD: -0.17, 95% CI: -0.28 – -0.06, $P=0.003$), and DHA (SMD: -0.28, 95% CI: -0.41 – -0.16, $P<0.001$) in glaucoma cases compared to controls. Subgroup analysis revealed significantly lower DHA levels in both POAG (SMD: -0.20, 95% CI: -0.39 – -0.10, $P=0.04$) and PACG (SMD: -0.34, 95% CI: -0.51 – -0.18, $P<0.001$). MR analysis supported causal relationship by total PUFA (Glaucoma: OR=0.95, 95% CI: 0.90 – 0.99, $P=0.035$; POAG: OR=0.94, 95% CI: 0.89 – 0.98, $P=0.011$) and DHA (Glaucoma: OR=0.89, 95% CI: 0.83 – 0.95, $P=0.002$, POAG: OR=0.91, 95% CI: 0.84 – 0.98, $P=0.022$) for glaucoma and POAG. No causal effects were observed for PUFAs components on PACG.

Conclusions: Integrated evidence identified association of PUFAs against glaucoma. These findings highlight PUFAs as modifiable targets for potential glaucoma prevention and intervention.

Abstract No.: 210333

Potential Mechanisms of Intraocular Pressure Reduction Following Micropulse Transscleral Laser Therapy in Normotensive Rabbit Eyes

First Author: Yanyan **WU**

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Purpose: To evaluate histological changes and potential mechanisms underlying mid-term intraocular pressure (IOP) reduction following Micropulse Transscleral Laser Therapy (mTLT) in normotensive rabbit eyes.

Methods: mTLT was performed on the right eyes of Chinchilla rabbits, with left eyes serving as controls. Laser power was set at 2000 mW with durations of 100 seconds and 160 seconds, respectively. IOP and uveoscleral outflow—assessed using a fluorescent tracer—were measured at 1 day, 1 week, 2 weeks, 1 month, and 3 months post-treatment. Morphological and protein expression changes in the ciliary body, outflow tissues, and sclera were also evaluated.

Results: Preoperative IOP was 12.3 ± 1.6 mmHg (100s group) and 12.5 ± 1.5 mmHg (160s group). IOP decreased significantly at 1 day post-mTLT to 6.9 ± 2.1 mmHg (100s group) and 6.3 ± 2.3 mmHg (160s group). By 3 months, IOP measured 10.1 ± 1.4 mmHg in the 100s group and 9.4 ± 1.9 mmHg in the 160s group. Ciliary processes exhibited acute inflammation and stromal edema in both groups at 1 day post-mTLT. Partial destruction of the ciliary epithelium in the pars plicata was observed in the 160s group. mTLT significantly increased uveoscleral outflow initially, which then gradually decreased, whereas the outflow facility remained unchanged. Na-K-ATPase expression in the pars plicata decreased after mTLT, while AQP1/AQP4 expression in the ciliary body increased in the early postoperative period. MMP1, collagen, and fibronectin were significantly upregulated in the ciliary body and sclera.

Conclusions: The IOP reduction following mTLT in pigmented rabbit eyes may be attributed to early increases in uveoscleral outflow associated with MMP1 upregulation and Na-K-ATPase downregulation. However, reactive fibrotic responses observed in the outflow tract and sclera may contribute to subsequent IOP rebound.

Abstract No.: 208213

Protective Effects of Epigallocatechin-3-Gallate on Trabecular Meshwork Cells From Endoplasmic Reticulum Stress

First Author: Linbin **ZHOU**

Co-Author(s): Wai Kit **CHU**, Jing Na **HE**, Jiahui **LI**, Chi Pui **PANG**, Chee Yung **THAM**

Purpose: Primary open-angle glaucoma (POAG) is the most common form of glaucoma, for which elevated intraocular pressure (IOP) is a major risk factor.

Dysfunctions of TM cells due to endoplasmic reticulum (ER) stress have been demonstrated to increase the resistance of aqueous humor (AH) outflow, resulting in IOP elevation. Epigallocatechin-3-gallate (EGCG) has been shown to alleviate ER stress in several diseases, while its potential roles in alleviating ER stress in TM cells have not been determined. This study investigates the mitigation of tunicamycin-induced ER stress in TM cells by EGCG.

Methods: The primary PTM cells isolated from porcine TM tissues were characterized by immunostaining. MTT assay was used to measure the cell viability of human TM (HTM) cells and primary porcine TM (PTM) cells. ER stress levels in both HTM cells and primary PTM cells were detected by quantitative real-time PCR.

Results: 40 μ M and 80 μ M EGCG pretreatment substantially promoted HTM cell survival under 3 μ M tunicamycin-induced ER stress (n=3-4, P<0.05). Pretreatment of 40 μ M EGCG markedly reduced the expression of ER stress markers ATF4, HSPA5, and DDIT3 evoked by 3 μ M tunicamycin in HTM cells (n=3-4, P<0.05). Furthermore, 40 μ M EGCG pretreatment significantly decreased the expressions of ATF4, HSPA5, and DDIT3 at the mRNA level induced by 3 μ M tunicamycin and improved cell viability in primary PTM cells (n=3-4, P<0.05).

Conclusions: EGCG can protect TM cells from ER stress.

Abstract No.: 200644

Pseudoexfoliative Glaucoma or Neovascular Glaucoma: a Dilemma

First Author: Drishti KAUSHAL

Co-Author(s): Arti GUPTA, Sakshi KAPILA

Purpose: To identify if the secondary glaucoma is due to pseudoexfoliation or retinal ischemia.

Methods: A single case of this kind was evaluated in a tertiary care centre of North India for glaucoma. A thorough ophthalmic examination was carried out following ophthalmic investigations, including perimetry and OCT, after which a diagnosis of secondary glaucoma was made, and treatment was started. The patient is still on follow-up.

Results: A diagnosis of pseudoexfoliative glaucoma of the left eye was more likely, as there is no NVA on gonioscopy. PXF may be an independent risk factor of NVI; however, the possibility of CRVO-induced NVI cannot be ruled out.

Conclusions: A diagnosis of pseudoexfoliative glaucoma of the left eye is more likely, as there is no NVA on gonioscopy. PXF may be an independent risk factor of NVI; however, the possibility of CRVO-induced NVI cannot be ruled out. There are studies supporting that pseudoexfoliation may be a cause for neovascularisation, but in our case, we have evidence

of retinal ischemia that supports the subsequent neovascularisation.

Abstract No.: 203170

Public Perception of Glaucoma Screening

First Author: Kah Long AW

Co-Author(s): Andrew TATHAM, Sarah VEZ

Purpose: Primary open-angle glaucoma (POAG) is a major cause of irreversible blindness, yet more than half of cases remain undiagnosed, especially in low-resource settings. Population-wide glaucoma screening is not currently recommended in the United Kingdom due to low prevalence and the risk of false positives, but advances in artificial intelligence (AI) and genomics may enable more targeted strategies. The effectiveness of such programs depends on public engagement.

Methods: This systematic review, registered with PROSPERO (CRD42025626696) and conducted in accordance with PRISMA guidelines, examined factors influencing participation in glaucoma screening.

Results: Searches of CENTRAL, MEDLINE, and Embase identified 6,501 articles, of which seven studies (n=4,079) met inclusion criteria. Studies from the United States, Thailand, India, Poland, and the United Kingdom reported that participation was improved by personalised nurse-led counselling, direct invitations, reminder phone calls, and community-based outreach. Barriers included poor knowledge of glaucoma, low perceived risk, logistical and financial obstacles, cultural attitudes, and socioeconomic deprivation. Uptake was higher among older individuals, those with higher educational attainment, and first-degree relatives of glaucoma patients, particularly when family members had experienced vision loss. Nurse-led interventions significantly increased attendance, while neighbourhood-level deprivation strongly predicted non-attendance.

Conclusions: No included study directly assessed public attitudes to AI- or genomics-based screening; however, evidence suggests that trust, education, and accessibility will be essential for their future implementation. Effective strategies should therefore combine technological advances with culturally sensitive and community-engaged approaches to enhance equity and maximise impact.

Abstract No.: 208418

Rapamycin Removes Damaged Mitochondria and Protects Human Trabecular Meshwork (TM-1) Cells from Chronic Oxidative Stress

First Author: Jing Na HE

Co-Author(s): Wai Kit CHU, Chi Pui PANG, Clement C. THAM

Purpose: To study autophagy in response to chronic oxidative stress in TM cells

Methods: We induced chronic oxidative stress in human trabecular meshwork (TM-1) cells with 1 μ M rotenone and investigated the levels of reactive oxygen species (ROS), autophagy, and mitochondrial functions. Protective effects of rapamycin, an inducer of autophagy, were also investigated.

Results: Our data indicated that rotenone significantly increased oxidative stress, but not autophagy, in TM-1 cells. Rapamycin at 10 nM effectively suppressed the rotenone-induced cell apoptosis, as well as the ROS elevation. The protective effects of rapamycin could be associated to the induction of autophagy and removal of damaged mitochondria in TM-1 cells.

Conclusions: Our results suggest autophagy has important roles in protecting TM-1 cells from oxidative stress, which could be further developed into a novel treatment to POAG.

Abstract No.: 202109

Rapid Progression of Steroid-Induced Cataract: A Case Report

First Author: Yong **GIN YEN**

Co-Author(s): Awis Qarni **BIN FADIL**, Chew **CHANG FENG**

Purpose: To highlight a rare case of rapid progression of steroid-induced cataract culminating in phacomorphic glaucoma

Methods: Case report

Results: A 22-year-old female with underlying atopic eczema, on long-term oral and topical corticosteroids, was referred for gradual, progressive, painless blurring of vision over 2 months. Initial examination revealed best-corrected visual acuity (VA) of 6/18 (pinhole 6/9) in the right eye (RE) and 6/12 (pinhole 6/9) in the left eye (LE), with normal intraocular pressures (IOP) bilaterally. Periorbital examination showed multiple erythematous, scaly plaques consistent with eczema. Anterior segments were unremarkable, except for minimal anterior and posterior subcapsular cataracts in both eyes. One week later, the patient returned with worsening blurring in the RE (VA 3/60, pinhole 4/60). Examination revealed rapid progression to intumescent white cataract, which subsequently led to acute angle closure the following day with IOP of 50 mmHg. The acute attack was promptly managed and early lens extraction was performed, with satisfactory postoperative outcome

Conclusions: Although steroid-induced cataracts are generally considered to develop gradually, this case demonstrates that rapid progression can occur, with potential sight-threatening complications such as phacomorphic glaucoma. Clinicians should maintain high vigilance when monitoring young patients on chronic corticosteroid therapy, particularly when even minimal lens changes are present. Early recognition

and timely surgical intervention are crucial to prevent irreversible visual loss.

Abstract No.: 200308

Real-World Data Analysis of CPAP Usage and Leakage on Dry Eye Disease and Glaucoma in Patients With Obstructive Sleep Apnea Syndrome: A Cross-Sectional Study

First Author: Yun-hsiang **YANG**

Co-Author(s): Elizabeth P. **SHEN**

Purpose: To investigate the association between continuous positive airway pressure (CPAP) usage, mask leakage, and the prevalence or severity of dry eye disease (DED) and glaucoma in patients with obstructive sleep apnea (OSA).

Methods: This cross-sectional study included 57 adults with polysomnography-confirmed OSA (2010–2023) at Taipei Tzu Chi Hospital, grouped into CPAP users (n=40) and non-users (n=17). Ocular assessments included tear film break-up time, Schirmer's test, Oxford staining, meibomian gland evaluation, intraocular pressure (IOP), cup-to-disc (C/D) ratio, and retinal nerve fiber layer thickness. CPAP usage and leakage data were recorded. Chi-square, t-tests, and regression analyses evaluated associations.

Results: CPAP users showed trends toward higher glaucoma (HR=0.83) and DED risk (HR=0.69), but differences were not significant. CPAP+ patients had worse OSA severity (prolonged N1 sleep, p=0.0005; higher AHI, p=0.0001). CPAP leakage (mean=25.84 L/min, 95% exceeding 24 L/min) was linked to lower Schirmer test values (p=0.0307) and higher C/D ratio (p=0.0402).

Conclusions: CPAP leakage is associated with worsened dry eye and potential optic nerve changes in OSA patients. Optimizing mask fit may reduce ocular complications, as OSA-related hypoxia and IOP fluctuations may contribute to long-term eye risks.

Abstract No.: 202814

Refractive Error After Phacoemulsification Combined With Intraocular Lens Implantation in Primary Angle-Closure Glaucoma: A Multifactorial Analysis of Biometric Parameters and Surgical Strategies

First Author: Yong **LIU**

Co-Author(s): Jiantao **WANG**

Purpose: This study aims to explore the factors influencing refractive error following phacoemulsification combined with intraocular lens implantation (PE+IOL) in patients with primary angle-closure glaucoma (PACG), providing a theoretical basis for preoperative consultation and IOL power selection in clinical practice.

Methods: A retrospective analysis was conducted on 404 PACG patients from Shenzhen Eye Hospital between 2019 and 2024. Preoperative ocular biometric parameters and combined surgical approaches were evaluated using Spearman correlation, multinomial logistic regression, and receiver operating characteristic (ROC) curve analysis.

Results: Axial length (AL), lens thickness (LT), and white-to-white distance (WTW) were key predictive factors for prediction error and postoperative refractive outcomes. AL > 22.56 mm (AUC = 0.692) and LT > 5.055 mm (AUC = 0.633) increased the risk of myopic shift (MS), while AL < 22.25 mm (AUC = 0.604) and WTW < 11.55 mm (OR = 2.209, P = 0.001) were associated with hyperopic shift (HS). The axial length/corneal radius (AL/CR) ratio > 2.986 further indicated a higher risk of MS (AUC = 0.639) postoperatively. Among patients who underwent PE+IOL combined with a capsular tension ring, the proportion of HS was significantly higher (Z value = +2.95).

Conclusions: The unique anatomical characteristics of PACG patients are key contributors to postoperative refractive instability. Preoperative assessment for PE+IOL surgery should comprehensively evaluate AL, LT, WTW, and AL/CR ratio. When combined with other surgical approaches to control intraocular pressure, IOL power should be adjusted according to these thresholds to ensure postoperative refractive stability.

Abstract No.: 205203

Relationship Among Standard Vision Tests, Quality of Life, and Ability to Perform Daily Activities in Glaucoma Patients

First Author: Neethu **PRADEEP**

Co-Author(s): Smita **NARAYAN**

Purpose: 1. To assess the Quality of Life by subjective (Visual Functioning Questionnaire) and objective (ADREV) tests. 2. To find out the relationship between glaucoma stages and Quality of Life (QoL).

Methods: A cross-sectional study of 50 glaucoma patients was done. Best corrected visual acuity, IOP, slit lamp and fundus examination, gonioscopy, and visual field examination were carried out. Patients were categorised as early, moderate, and advanced on the basis of the disc damage likelihood scale (DDLS) and Modified Hodapp-Parrish-Anderson criteria. Quality of life was assessed subjectively using the Visual Functioning Questionnaire-25 (VFQ-25) and objectively by the Assessment of Disability Related to Vision (ADREV test) by assessing the ability to perform activities of daily living. Contrast sensitivity and stereopsis were the other parameters assessed.

Results: Of the 50 patients, 25 (50%) had POAG, 23 (46%) had PACG, and 2 had secondary glaucoma. Based on DDLS and Anderson criteria, there were 15(30%) early, 19 (38%) moderate and 16(32%) advanced

glaucoma cases. Mean ADREV/ VFQ scores were early 58.5/82.5, moderate 55.5/75.4, and advanced 48.4/54.5. In ADREV tasks, the lowest score was for motion detection (mean-5.2) and the maximum score was for ambulation (6.2). Advanced glaucoma patients have difficulty in detecting motion(4.6), recognising street signs. Contrast sensitivity also reduced with glaucoma progression.

Conclusions: ADREV scores correlate significantly with VFQ scores in all glaucoma categories. With respect to Quality of Life, patients faced difficulty in performing fine tasks. However, even advanced glaucoma cases were able to carry out their daily activities without much help. It was seen that as glaucoma progresses, stereopsis and contrast sensitivity decline rapidly.

Abstract No.: 201352

Repair of Exposed Glaucoma Drainage Device Tube in Uveitic Glaucoma With Autologous Conjunctival Graft

First Author: Rika **AGUSTANTI**

Purpose: To report a case of late tube exposure following glaucoma drainage device (GDD) implantation in a patient with uveitic glaucoma, and its surgical repair using an autologous conjunctival graft.

Methods: Case report of a 61-year-old woman with uveitic glaucoma in the left eye who underwent non-valved GDD implantation three years earlier. She presented with ocular pain after eye rubbing one week prior. Ophthalmic examination included visual acuity and intraocular pressure (IOP) measurement.

Results: Best corrected visual acuity was 6/15 in the right eye and hand movement in the left. IOP in the left eye was elevated, and tube exposure was noted in the superotemporal quadrant. Surgical repair was performed using a pericardial patch graft over the exposed tube, covered by an autologous conjunctival graft. The postoperative course was stable, with good graft integration and no recurrence of exposure.

Conclusions: Tube exposure is a potentially sight-threatening complication of GDD surgery and may occur even years after implantation. Lifelong monitoring and early surgical repair with adequate tissue reinforcement are essential to preserve ocular integrity and prevent severe complications.

Abstract No.: 203047

Retinal Nerve Fiber Layer Thickness Correlates With Regional Brain Volume in Psychiatric Disorders

First Author: Chi-hsin **HSU**

Purpose: To sort out the relationships between retinal nerve fiber layer (RNFL) thickness and specific brain region volume in patients with psychiatric disorders.

Methods: Participants with bipolar disorder were recruited in the study. All individuals underwent whole-brain MRI as well as spectral-domain OCT. The RNFL was segmented into 4 quadrants, and the average thickness for each quadrant in both eyes was automatically computed. The mean value of the RNFL thickness in both eyes of every participant was calculated for analysis. To account for inter-individual variability in overall brain size, the volume of each brain region was normalized to the individual's total intracranial volume, yielding region-specific volume proportions.

Results: A total of 30 patients with were enrolled. The RNFL had significantly positive correlations with the volumes of the bilateral insula, hippocampus, fusiform, left anterior cingulate cortex, and left amygdala. After adjustment for the effects of BMI and age, multiple regression analyses showed that thinner average RNFL remained associated with reduction of the total insula, anterior cingulum, and hippocampus volumes; the left anterior cingulum and left hippocampus volumes; and the volumes of insula in each hemisphere.

Conclusions: The present study suggests a potential link between glaucoma and psychiatric disorder through a biological association between RNFL thickness and region-specific structural alterations in the brains of individuals with bipolar disorder. The observed inconsistencies in gray matter alterations within the amygdala, hippocampus, and thalamus—despite the well-documented involvement of these regions in emotional processing—may be attributable to the clinical heterogeneity characteristic in patients of psychiatric disorders.

Abstract No.: 201678

SUOER SW-500 Rebound Tonometer Versus Goldmann Applanation Tonometer: Agreement and Impact of Corneal Thickness

First Author: Tengku Nuramiriah Fatishah **TENGKU AMIR**

Co-Author(s): Norlina **BINTI MOHD RAMLI**, Noor Sarah Khor **BINTI MUHAMMAD AZMI KHOR**

Purpose: To evaluate the agreement of intraocular pressure (IOP) taken with SUOER SW-500 rebound tonometer (RBT) and Goldmann applanation tonometer (GAT), and to compare their correlation with central corneal thickness (CCT).

Methods: This prospective, cross-sectional study included 334 eyes from 169 patients from glaucoma and general ophthalmology clinics. IOP was measured using both devices in sequence (RBT followed by GAT). Agreement was analyzed using the Bland–Altman plots, and correlation was assessed using Pearson's coefficient. The influence of CCT was evaluated by linear regression analysis.

Results: The mean age was 67.5 years; 52.1% of participants were male. Mean IOP was 15.70 ± 3.84 mmHg with RBT and 15.02 ± 4.58 mmHg with GAT. RBT consistently overestimated IOP by 0.69 mmHg across all CCT groups. A strong correlation was found between devices ($r = 0.77$, $p < 0.01$). IOP increased with CCT for both tonometers. In eyes with CCT $> 560 \mu\text{m}$, mean IOP was 17.02 ± 5.33 mmHg (RBT) and 16.35 ± 5.79 mmHg (GAT)—the highest among all groups. Both devices showed significant correlation with CCT ($p < 0.01$).

Conclusions: RBT and GAT show strong correlation, though RBT systematically overestimates IOP regardless of CCT. GAT remains the gold standard; RBT is a useful alternative in specific settings, though values should be interpreted cautiously, especially in thick corneas.

Abstract No.: 202570

Safety and Efficacy of Goniotomy following Failed Surgery for Glaucoma

First Author: Jiaxuan **JIANG**

Co-Author(s): Fengbin **LIN**, Xiulan **ZHANG**

Purpose: To evaluate the efficacy and safety of GT in patients with prior failed surgery for glaucoma.

Methods: A prospective, observational multicentered study was performed for patients who underwent GT with prior single or multiple surgery for glaucoma. Outcome measures included intraocular pressure (IOP) change, best-corrected visual acuity change, ocular hypotensive medication use, and occurrence of adverse events through 12 months. Complete success was defined as a postoperative IOP within 6–18 mmHg and a 20% reduction from baseline without ocular hypotensive medications. Qualified success was the same as the definition of complete success, except for postoperative use of medication. Logistic regression models were used to investigate the potential factors for surgical success.

Results: A total of 38 eyes of 34 patients were included. Twenty-three eyes had only 1 prior surgery, 13 eyes had 2 prior surgeries, 1 eye had 3 prior surgeries, and 1 eye had 4 prior surgeries. At month 12, there was complete success in 42.1% of the eyes and qualified success in 78.9% of the eyes. Preoperatively, the mean IOP was 29.4 ± 6.9 mmHg, and the median number of glaucoma medications used was 3.0 (2.0, 4.0); this decreased to 16.7 ± 3.6 mmHg (43.2% reduction; $P < 0.001$) and 2.0 (0.0, 3.0) ($P < 0.001$) at month 12, respectively. The most common complications included hyphema (13.2%), IOP spike (7.9%), and corneal edema (5.2%). Older age significantly contributed to surgical success.

Conclusions: GT seems to be a safe and effective procedure for patients with prior failed surgery for glaucoma.

Abstract No.: 200598

Safety and Efficacy of a 63 μ m Gel Stent Implant in Pseudophakic Patients Affected by Open Angle Glaucoma: 1 Year Follow Up

First Author: Rosa **BOCCIA**

Co-Author(s): Francesco **ABBATE**, Francesca **AGRICOLA**, Teresa **CANGIANO**, Italo **FATTORE**, Michele **LANZA**, Luigi **SERRA**, Francesca **SIMONELLI**

Purpose: To evaluate the safety and efficacy of a 63 μ m gel stent implant in pseudophakic patients affected by primary open-angle glaucoma (POAG) after 1 year of surgery.

Methods: In this retrospective study, 13 pseudophakic eyes of 11 patients (mean age: 70.81 ± 11.63 years) affected by glaucoma, not compensated with only medical therapy, were included. Every patient underwent a complete eye visit before surgery and at 1, 2, 6, 12 months follow up. Only standalone procedures with an ab-interno approach were included, aiming to reduce bias in evaluating the intraocular pressure (IOP) lowering effect of the device. Baseline mean best corrected visual acuity (BCVA) was 0.32 ± 0.46 logMAR, IOP was 22.08 ± 3.17 mmHg, and topical IOP-lowering drugs assumed were 3.23 ± 0.61 , and 4 patients were assuming oral acetazolamide (OA) too.

Results: After 1 month of surgery, a significant ($p < 0.01$) decrease in IOP (mean: 11.57 ± 2.23 mmHg) was observed without topical and oral therapy. After 1 year, IOP was stable (mean 10.81 ± 1.64 mmHg) without both topical and oral therapy; 2 eyes had undergone manual subconjunctival mobilization of the device, no visual acuity loss, and no other complications were detected.

Conclusions: Even if data of this study need to be confirmed in further ones with larger population and longer follow up, the observed results suggest that the standalone, ab-interno 63 μ m gel stent implant is a safe procedure and it is able to provide a consistent IOP lowering effect on eyes affected by POAG.

Abstract No.: 202356

Secondary Glaucoma With Calcium Crystal Precipitation in the Anterior Chamber of a Long-Term Hemodialysis Patient

First Author: Muneyuki **INOSAKA**

Co-Author(s): Takashi **MATSUSHIMA**, Yoshihiro **NAKAGAWA**, Takahiro **SUZUKI**, Yuji **YOSHIKAWA**

Purpose: To report a rare case of secondary glaucoma associated with calcium crystal precipitation in the anterior chamber in a patient undergoing long-term hemodialysis with renal hyperparathyroidism.

Methods: A 72-year-old man with a history of hemodialysis for diabetic nephropathy presented with uncontrolled intraocular pressure (IOP) in his only functional eye, as the right eye had been blinded by

diabetic retinopathy. At presentation, best-corrected visual acuity in the left eye was 20/32, and IOP was 32 mmHg without anterior chamber inflammation. Gonioscopy revealed scattered whitish crystalline deposits in the inferior angle. Surgical removal of the crystals combined with Preserflo® MicroShunt implantation was performed. The excised material and aqueous humor underwent compositional analysis.

Results: Elemental analysis confirmed calcium phosphate crystals. Laboratory testing demonstrated elevated parathyroid hormone (117 pg/mL), consistent with renal hyperparathyroidism. Following surgery, IOP was successfully reduced and remained stable without recurrence of inflammation or severe complications.

Conclusions: Calcium crystal precipitation in the anterior chamber has been described in patients with renal hyperparathyroidism. In this case, such crystals were associated with secondary glaucoma in a long-term dialysis patient. Surgical removal combined with microshunt implantation effectively controlled IOP. Recognition of this rare presentation may aid in the diagnosis and management of refractory glaucoma in patients with chronic kidney disease.

Abstract No.: 205821

Short-Term Clinical Outcomes of Phacoemulsification Combined With Goniotomy Versus Phacoemulsification Alone for Primary Angle Closure Disease

First Author: Jose Maria **MARTINEZ**

Co-Author(s): John Mark **DE LEON**, James Michael **SUAREZ**, Daryle Jason **YU**

Purpose: To compare the short-term clinical outcomes of Phacoemulsification (PHACO) versus Phacoemulsification with Goniotomy (PHACO-GT) in the treatment of Primary Angle Closure Disease (PACD).

Methods: This is a retrospective cohort study on outcomes of consecutive surgeries performed on PACD patients using standard techniques. Visual acuity, intraocular pressure, and number of glaucoma medications were collected pre-operatively and 1 month, 3 months, and 6 months post-operatively. Cases were matched with propensity scoring according to pertinent demographic characteristics.

Results: After matching, 86 surgeries (PHACO $n=59$, PHACO-GT $n=27$) were analyzed. Mean pre-operative IOP was 29.25 ± 13.56 mmHg for PHACO and 23.26 ± 11.98 mmHg for PHACO-GT. Mean IOP at 1 month, 3 months, and 6 months post-operatively significantly decreased from baseline at all time points to 15.73 ± 6.15 mmHg, 15.00 ± 6.09 mmHg, and 14.33 ± 5.18 mmHg for PHACO ($P < 0.001$) and 14.41 ± 5.47 mmHg, 12.93 ± 2.87 mmHg, and 14.37 ± 3.14 mmHg for PHACO-GT ($P < 0.001$). The number of glaucoma medications significantly decreased from 2.46 ± 1.02 for PHACO and 2.57 ± 0.94 for PHACO-GT pre-

operatively to 0.42 ± 0.91 for PHACO ($P < 0.001$) and 0.37 ± 0.84 for PHACO-GT ($P < 0.001$) after 6 months. The most common complications observed were corneal edema ($n=3$) for PHACO and transient hyphema ($n=7$) for PHACO-GT. There were no significant differences in visual acuity, IOP, and the number of glaucoma medications at all post-operative time points between the two groups. Mean survival time was not significantly different at 19.46 ± 1.07 weeks for PHACO and 20.89 ± 1.30 weeks for PHACO-GT. Cumulative success rates at 6 months were 71.20 % for PHACO and 81.50 % for PHACO-GT.

Conclusions: The efficacy of PHACO alone is similar to PHACO-GT in Primary Angle Closure Disease. There were no significant safety issues in performing angle surgery in addition to phacoemulsification.

Abstract No.: 203801

Silicone Oil, the Culprit Who Loves To Pressurize

First Author: Devina Bunga **MAWARNI**

Co-Author(s): Yulinda Arty **LAKSMITA**

Purpose: To show how a challenging case of silicone oil-induced glaucoma can be complicated and require long-term management.

Methods: A case report. A 19-year-old male with traumatic retinal detachment of the right eye (RE) underwent vitrectomy with silicone oil (SO) tamponade. Despite SO evacuation, intraocular pressure (IOP) was very high (46 mmHg). Visual acuity was 6/20, the lens was hazy, and the cup-to-disc ratio was 0.9. Gonioscopically, the superior anterior chamber angle was obscured by SO, while the other quadrants were open. The left eye (LE) was normal, with the IOP of 17 mmHg. He was diagnosed with SO-induced glaucoma and posterior subcapsular cataract of the RE. Ahmed glaucoma valve implantation was chosen to lower the IOP while minimizing the risk of postoperative hypotony.

Results: Post-op day 1, RE was 5 mmHg with a deep anterior chamber and an attached retina. After 1 week, the RE IOP was 18 mmHg, but the LE IOP increased to 37 mmHg, suspected to be due to steroid. Four months later, IOP rose and the bleb was high, thus he underwent aspiration and subconjunctival 5-fluorouracil (5FU). The patient received 3x repeated flushing with 5FU injections over 7 months, resulting in well-controlled IOP (10-16 mmHg).

Conclusions: SO can lead to secondary, often refractory glaucoma because residual emulsified droplets are difficult to eliminate and chronically obstruct outflow. With meticulous monitoring and multiple treatment modalities, intraocular pressure can be controlled. Glaucoma drainage device (GDD) implantation, commonly recommended for vitrectomized-eyes,

offers favorable outcomes, though it presents its own challenges.

Abstract No.: 206243

Standard "1 Port" vs Novel 2 Port "Wide" ELIOS Excimer Laser Trabecular MIGS for Glaucoma

First Author: Adnan **ADBUL-AZIZ**

Co-Author(s): Dan **LINDFIELD**, Claudia **QUIJANO**

Purpose: ELIOS is an MIGS procedure that uses an excimer laser to create 10 channels (210um) through the trabecular meshwork. Classically, this is performed through a single temporally-placed corneal incision, and 10 trabecular channels are created in the nasal quadrant. We have evolved the procedure to be performed through two corneal incisions. 5 shots through the main temporal incision aimed at the nasal angle, plus 5 shots delivered through the superior phaco sideport incision, allowing 5 channels to be created inferiorly. This doubles the area of treatment. We postulate that this «wide» treatment allows greater access to collector channels.

Methods: Retrospective analysis of the first 138 procedures performed in the UK of Phaco plus ELIOS. The data was collected by 4 UK centres. 3 centres performed standard 1-port treatment, 1 centre (Guildford, UK) performed 19 cases with the «wide» 2-port protocol. All eyes had 12 12-month follow-up.

Results: 1 Port: Baseline 18.6mmHg on 1.78 meds 12 months: 14.37mmHg on 0.95 meds 47% patients achieved eyedrop freedom (0 medications) 2 port «wide» Baseline: 18.7mmHg on 2.10 meds 12 months: 14.7mmHg on 0.70 meds 61% patients achieved eyedrop freedom (0 medications) 0% of patients required an increase in glaucoma medication at any timepoint in the «wide» protocol.

Conclusions: Both groups achieved similar IOP outcomes, 2-port «wide» protocol appears to show: - increased ability to achieve eye drop freedom at 12months - greater reduction in mean medication usage at 12months «Wide» protocol shows promise but requires prospective data with larger cohort and greater baseline homogeneity for true validation.

Abstract No.: 207427

Statin Therapy and Glaucoma: Hidden Risk in Hyperlipidemic Eyes

First Author: Rohith Reddy **YEDDULA VENKATA**

Co-Author(s): Sreedeeep **AMARAVADI**, Rahul M, Sanjana **MARIAM JIJI VARGHESE**, Sasankadhar Reddy **MUDUMALA**, Nishitha **NARUKULLA**

Purpose: To investigate the relationship between statin therapy and glaucoma prevalence in hyperlipidemic patients and determine whether treatment duration

independently predicts structural and functional optic nerve damage.

Methods: This hospital-based cross-sectional study included 200 hyperlipidemic adults (mean age 57.2 ± 8.6 years), categorized into statin users and non-users. Detailed history of statin type, dose, and duration was obtained. All participants underwent comprehensive ophthalmic evaluation including Goldmann applanation tonometry, dilated fundus examination, spectral-domain OCT for RNFL thickness, and 24-2 Humphrey visual field testing. Multivariate logistic regression was used to adjust for age, sex, systemic hypertension, and diabetes.

Results: Glaucoma prevalence was significantly higher in statin users compared with non-users (33.5% vs. 9.5%, $p < 0.001$). Long-term statin therapy (>3 years) conferred the highest risk (58.0%, $p < 0.001$). Mean IOP was elevated among users (17.9 ± 3.0 mmHg vs. 15.5 ± 2.6 mmHg, $p < 0.001$), with significant superior and inferior RNFL thinning and corresponding visual field defects. Logistic regression confirmed long-term statin use as an independent predictor of glaucoma (OR 4.1; 95% CI: 2.0–8.3; $p < 0.001$).

Conclusions: Chronic statin therapy is independently associated with increased risk of glaucomatous optic neuropathy in hyperlipidemic patients. Routine glaucoma screening, OCT-based RNFL monitoring, and early intervention should be considered integral to the care of long-term statin users. Large-scale prospective studies are warranted to clarify causal mechanisms and explore risk variation across statin subtypes and dosages.

Abstract No.: 206546

Sturge Weber Syndrome Management: Clinical Profile and Outcomes of Combined Trabeculectomy and Trabeculotomy Surgery

First Author: Shivam GUPTA

Co-Author(s): Devendra MAHESHWARI, Nimrita NAGDEV, Madhavi PILLAI

Purpose: To study the clinical profile of glaucoma in Sturge-Weber syndrome and outcomes of combined Trabeculectomy and Trabeculotomy surgery.

Methods: Observational study. To study the management and clinical course of Sturge-Weber patients, the clinical profile and Glaucoma management (surgical/medical) were assessed for 3 years.

Results: Twenty-six patients (26 eyes), of which 65% (17) were Female & 34% (9) were male, with a presenting age from 32 days to 68 years. 26.9% (8) had epilepsy. 3 patients had Ocular melanosis naevi. 65.3% (17) left, 30.7% (8) Right & 1 patient both side face involvement. Blood in Schelms Canal in (19.2%) (5), and Choroidal Hemangioma in 42.3% (11), 88.4% (23) had Glaucoma. 34.7% (8) medically managed with mean 2 AGM (18.5mmHg). 65.2% (15) were

surgically managed & majority underwent Combined Trabeculectomy + Trabeculectomy (14). The mean preop IOP was 31.1 mmHg, which reduced to 14, 11.2, 10.1 & 9.5 mmHg at 2 weeks, 1 month, 3 months, and 6 months, respectively. The number of AGMs has been reduced from 1 to 0.5.

Conclusions: Glaucoma in SWS patients requires Surgical intervention with combined Trabeculectomy and Trabeculotomy, giving promising surgical results

Abstract No.: 206292

Sturge-Weber Syndrome With Iridocorneal Endothelial Syndrome: Unravelling a Rare Ophthalmic Overlap

First Author: Srinidhi N

Co-Author(s): Shreya BHADANI, Manisha CHOUDHARY, Shrutakirti PARIDA, Nibedita SAHOO, Aanchal SINGHAL

Purpose: To describe a rare case of coexisting Sturge-Weber syndrome (SWS) and Iridocorneal endothelial syndrome (ICE) with secondary angle closure glaucoma.

Methods: A 52-year-old female presented with diminished vision associated with pain and redness of RE for one week and bluish pigmentation over the right side of the face since birth, progressed recently. Best corrected visual acuity in right eye (RE)- 6/60, N36; left eye (LE)- 6/6p, N6. Intraocular pressure (IOP) by Goldmann applanation tonometry (GAT) was 30mmHg in RE and 10mmHg in LE. There was hyperpigmentation of skin over the right side of the forehead, eyelid and malar area. Ocular evaluation of RE showed pigmentation of the conjunctiva and sclera with corkscrew episcleral vessels, diffuse corneal edema, shallow anterior chamber, iris atrophy with corectopia. Gonioscopy of RE showed closed angles in all quadrants. Anterior segment of the LE was within normal limits, open angles, and an unremarkable fundus.

Results: Characteristic features of cutaneous and ocular pigmentation, episcleral vascular congestion, suggest Sturge-Weber syndrome. In addition, corneal endothelial abnormalities, iris atrophy, peripheral anterior synechiae, and corectopia with secondary glaucoma indicate ICE syndrome. Overlapping features indicate a complex aetiology leading to secondary glaucoma in the RE. The patient was managed with medical therapy and may need future glaucoma and corneal surgical interventions.

Conclusions: To the best of our knowledge, this is the first reported case of coexisting SWS and ICE syndrome. Overlapping mechanisms of such dual pathologies may exacerbate ocular morbidity and complicate the management. Reporting rare associations enhances awareness amongst clinicians and contributes to clinical decision-making in complex glaucoma cases.

Abstract No.: 206028**Successful Trabeculectomy With Mitomycin-C Following Failed Glaucoma Drainage Device: A Case Report***First Author: Banupriyah M ELANGO VAN**Co-Author(s): Hayati ABDUL AZIZ, Nurulhuda ARIFFIN, Shatriah ISMAIL, Li Mun TAN*

Purpose: Refractory glaucoma after a failed glaucoma drainage device (GDD) remains difficult to manage. We report a case where trabeculectomy with Mitomycin-C (MMC) successfully restored long-term intraocular pressure (IOP) control after Ahmed valve failure.

Methods: Case report.

Results: A patient with childhood glaucoma, high myopia, and bilateral lens subluxation first presented 18 years ago with right eye (RE) retinal detachment. The RE underwent vitrectomy, scleral buckle, silicone oil tamponade, and cyclodiode, resulting in vision of 6/45 with IOP 22 mmHg on topical therapy. Three years later, the left eye (LE) developed retinal detachment, treated with vitrectomy, scleral buckle, and silicone oil. Postoperatively, LE vision was 6/24 but IOP rose to 40–65 mmHg. LE Ahmed valve implantation achieved IOP control (16–18 mmHg) for 9 years. After nearly a decade, LE vision declined to counting fingers, and IOP rose again (23–38 mmHg) despite maximal topical therapy, indicating GDD failure. LE trabeculectomy with MMC was then performed. Postoperatively, vision improved to 6/20, and IOP was maintained at 8–10 mmHg without topical therapy.

Conclusions: This case demonstrates that trabeculectomy with MMC can remain effective even after failed GDD, providing sustained IOP control and improved vision. In carefully selected patients with refractory glaucoma, trabeculectomy remains a valuable salvage option after drainage device failure.

Abstract No.: 202698**Surgical Outcomes and Prognostic Factors for Baerveldt Glaucoma Implantation in Open-Angle Glaucoma Without Prior Filtration Surgery***First Author: Takehiro KIYAMA**Co-Author(s): Toshihiro INOUE, Sachi KOJIMA, Natsumi MURATA, Eri TAKAHASHI, Yuji TAKIHARA*

Purpose: To evaluate outcomes and identify prognostic factors for primary Baerveldt glaucoma implantation (BGI) in open-angle glaucoma eyes without prior filtration surgery.

Methods: This retrospective study included 95 eyes with primary open-angle glaucoma or exfoliation glaucoma without prior filtration surgery. Surgical success was defined based on IOP criteria: ≥ 6 mmHg, $\geq 20\%$ reduction from baseline, and upper limits of 21 mmHg (Criterion A), 18 mmHg (B), and 15 mmHg (C).

Failure included not meeting IOP targets, requiring reoperation for glaucoma, or loss of light perception. Eyes were censored at the last follow-up or two years. Linear mixed-effects models, Kaplan–Meier analysis, log-rank tests, and Cox proportional-hazards models were used.

Results: Mean follow-up was 568.0 ± 384.4 days. Mean IOP decreased from 28.3 ± 7.5 mmHg to 12.3 ± 4.2 mmHg at two years, and mean medication score decreased from 4.4 ± 0.8 to 1.5 ± 1.6 (both $p < 0.001$). The 2-year success rate for IOP ≤ 15 mmHg (Criterion C) was 64.0%. Multivariate analysis for Criterion C identified two independent predictors of failure: preoperative bimatoprost use (HR 2.89; 95% CI 1.30–6.43; $p = 0.01$) and younger age (HR 0.97 per year; 95% CI 0.94–1.00; $p = 0.02$). Survival curves for Criterion C differed significantly by prostaglandin analog regimen (log-rank $p = 0.039$), with the bimatoprost group having the lowest success.

Conclusions: Preoperative bimatoprost use and younger age may be adverse prognostic factors for achieving an IOP ≤ 15 mmHg after primary BGI in open-angle glaucoma.

Abstract No.: 205706**Surgical Outcomes of Ahmed Valve Implantation in Patients With and Without Prior Trabeculectomy***First Author: Aroocha TECHAKOSOL**Co-Author(s): Sukhumal THANAPAISAL*

Purpose: To evaluate the efficacy and safety of Ahmed glaucoma valve (AGV) implantation in patients with and without prior trabeculectomy.

Methods: This retrospective comparative cohort study included 112 eyes from 112 patients who underwent AGV implantation (60 with previous failed trabeculectomy, 52 without). Primary outcome was the intraocular pressure (IOP) at 1, 3, 6 and 12 months. Secondary outcomes were the number of glaucoma medications, complication rates, and cumulative proportion failure (defined as IOP > 21 or < 6 mmHg, $< 20\%$ reduction from baseline after 3 months, reoperation or loss of light perception). The generalized estimating equation was used for the analysis.

Results: 107 patients completed the 12-month follow-up. Postoperative IOP was 0.12 (95%CI: -4.2 to 5.8), -2.02 (-4.88 to 0.85), -0.94 (-3.19 to 1.31), and -1.07 (-3.29 to 1.14) mmHg at 1, 3, 6, and 12 months, respectively. There was no difference in the number of glaucoma medications between two groups at any follow-up visits ($P > 0.99$). Early and late complications were not different between the two groups ($P = 0.15$). The cumulative failure probability at 12 months was 13.33% and 11.54% in patients with and without prior trabeculectomy ($P = 0.79$).

Conclusions: AGV Implantations in patients with and without prior trabeculectomy showed no difference in IOP reduction, medications, complications and failure rate at 12 months follow-up. These findings suggested that prior trabeculectomy did not diminish the efficacy and safety profile of AGV implantation.

Abstract No.: 205943

Surgical Outcomes of Phaco-GATT in Mild-Moderate vs Severe Open-Angle Glaucoma: A Comparative Analysis

First Author: Nimrita **NAGDEV**

Co-Author(s): Devendra **MAHESHWARI**, Madhavi **PILLAI**

Purpose: To study efficacy and safety of gonioscopy-assisted transluminal trabeculotomy combined with phacoemulsification in mild-moderate and severe primary open-angle glaucoma

Methods: A prospective, interventional study included 240 primary open-angle glaucoma patients (265 eyes), classified into mild-moderate (144) and severe (121) eyes. Patients evaluated at 2 weeks, 1, 3, 6, and 12 months. Primary outcomes included intraocular pressure (IOP), antiglaucoma medications (AGMs), best-corrected visual acuity (BCVA), and surgical success. Surgical success was determined for IOP <18 and <15 with at least 25% and 30% IOP reduction from baseline respectively by 1 year. Secondary outcomes included complications and secondary interventions, and p-value <0.05 was considered statistically significant

Results: Mean IOP (mmHg) reduced from 20.4±4.47 and 21.5±6.45 to 12.4±2.9 and 12.5±2.9 mmHg in mild-moderate (37.1%) and severe (38.5%) groups at 1 year (p=0.625). AGM decreased from 1.35±0.36 and 2.0±0.9 to 0.08±0.30 and 0.13±0.38, with 92.3% and 89.0% AGM-free eyes in both groups respectively (p=0.468). BCVA improved from 0.29±0.28 to 0.02±0.06 in mild-moderate and from 0.36±0.36 to 0.02±0.06 in severe cases. Complete success was 81.2%, eyes: in mild-moderate and 77.7%, 67.7% in severe group by criteria 1 and 2. Macrohyphema occurred in 12 eyes (5 mild-moderate, 7 severe group), 15 patients (7 mild-moderate, 8 severe group) had IOP spike. 5 (2 mild-moderate, 3 severe) required AC wash.

Conclusions: Gonioscopy assisted-transluminal trabeculotomy combined with phacoemulsification is a safe and efficacious option for open-angle glaucoma irrespective of its severity

Abstract No.: 201089

Surgically Managed Vogt-Koyanagi-Harada Disease Associated Refractory Glaucoma and Complicated Cataract in A Young Female: A Case Report From Bangladesh

First Author: Md Iftekher **IQBAL**

Co-Author(s): Fariah **OSMAN**

Purpose: To report a case of bilateral refractory glaucoma due to pupillary block and angle closure and complicated cataracts in a young patient with Vogt-Koyanagi-Harada (VKH) disease, managed successfully with combined glaucoma drainage device (GDD) implantation and cataract surgery.

Methods: A 35-year-old female presented with bilateral decreased vision and ocular pain. She was diagnosed with chronic recurrent VKH syndrome complicated by combined pupillary block and secondary angle-closure glaucoma, along with visually significant cataracts. Despite maximal medical therapy, intraocular pressure (IOP) remained uncontrolled. The patient underwent combined Aurolab Aqueous Drainage Implant (AADI) and cataract extraction.

Results: Preoperative visual acuity was perception of light (PL) in the right eye and 6/24 in the left eye, with IOP spikes up to 50 mmHg bilaterally. Following surgery, vision improved to 6/60 in the left eye and stabilized at 14-16 mmHg with single-agent topical therapy over an 18-month follow-up. Anterior chambers were deep, intraocular lenses were well-positioned, and no inflammation or implant-related complications were observed.

Conclusions: Patients with Vogt-Koyanagi-Harada syndrome may develop both refractory glaucoma and a visually significant cataract. If this happens, combining a glaucoma drainage device with cataract surgery after the settlement of active ocular inflammation can be very helpful in the long term.

Abstract No.: 200615

TASS in Secondary Glaucoma After Uneventful Filtering Surgery: A Case Report

First Author: Devi Putri **SWADAYANI**

Co-Author(s): Muhammad **YOSERIZAL**

Purpose: The purpose of this case report is to alert surgeons to the possibility of this complication following any anterior segment surgery, including trabeculectomy, and to highlight the possible etiologies and measures to prevent it.

Methods: A 55-year-old Female was initially managed medically for secondary glaucoma after iris claw lens implantation with antiglaucoma medications. There was rapidly progressive glaucomatous optic nerve damage and uncontrolled of IOP in her right eye within the following months, despite the use of antiglaucoma

medications, hence the need for trabeculectomy with mitomycin C.

Results: Postoperative condition, day 1, there were bleb elevated, midmidriatic pupil, hypopyon 1mm, minimal corneal edema limbus to limbus, posterior segment within normal limits, among other features of TASS, with associated deteriorating visual acuity. We gave oral fluoroquinolone antibiotic, steroid, both oral and eyedrop. On the 4th day after surgery, the condition improved, and the hypopyon disappeared.

Conclusions: Although there have been no documented reports of TASS following trabeculectomy with mitomycin C, surgeons should be aware of this possibility. Preventive measures include taking extreme care to avoid errors when preparing and administering diluted solutions, particularly those administered into the intracameral space.

Abstract No.: 203678

Targeting the Integrin $\alpha\beta3$ -ROCK/CLAN Pathway Attenuates Trabecular Meshwork Fibrosis and Reduces Ocular Hypertension in a Mouse Model

First Author: Yutong **CHE**

Co-Author(s): Yufan **JIANG**, Yangfan **YANG**, Yuqing **ZHANG**

Purpose: Trabecular meshwork (TM) hypercontractility and fibrosis contribute to elevated IOP in POAG. The specific pathway linking TGF β 2, a key driver of this pathology, to TM dysfunction remains unclear despite implicating integrin. We assess whether TGF β 2-induced cross-linked actin network (CLAN) formation and TM fibrosis are mediated by the $\alpha\beta3$ -RhoA/ROCK pathway, and determine whether its inhibitor reverses pro-fibrotic changes and lowers IOP in ocular hypertension (OHT) mice.

Methods: Cells were stimulated with TGF β 2 and co-treated with the $\alpha\beta3$ inhibitor, cilengitide. Transcriptional changes were validated by RNA sequencing and qPCR. Expression of fibrotic and pathway markers was assessed by Western blot and immunofluorescence. Cellular contractility was evaluated using 3D spheroid and collagen gel contraction assays, and CLAN formation was quantified via phalloidin-based cytoskeletal staining. Intraocular injection of an adenovirus encoding active TGF β 2 induced OHT mice, with IOP and TM fibrosis assessed following cilengitide treatment.

Results: TGF β 2 induced a pro-fibrotic transcriptional program in TM cells, significantly upregulating ITGAV and enriching for Actin Cytoskeleton pathways. This was associated with increased expression of fibrotic proteins, CLAN formation, cellular hypercontractility and tissue fibrosis. Co-treatment with cilengitide significantly attenuated those fibrotic markers, suppressed the downstream RhoA/ROCK pathway,

and reversed the hypercontractile phenotype. Cilengitide treatment lowered IOP in OHT mice, with immunofluorescence confirming reduced fibrotic markers in TM.

Conclusions: Cilengitide alleviates TGF β 2-induced CLAN formation, contractile dysfunction, and ECM deposition in TM by suppressing key components of the $\alpha\beta3$ /RhoA/ROCK signaling axis. Moreover, it demonstrates therapeutic efficacy in lowering IOP and exerting antifibrotic effects on TM in OHT mice.

Abstract No.: 201271

The Accuracy Among Prediction Formulas of Intraocular Pressure Decrease in Primary Glaucoma Patients After Phacoemulsification

First Author: Yulia **PRIMITASARI**

Co-Author(s): Harris **KRISTANTO**, Indri **WAHYUNI**

Purpose: Cataract extraction as one of the surgical treatments for primary glaucoma has been shown to reduce IOP in various studies. Some studies formulated several formulas that can be used to predict the decrease in IOP after phacoemulsification. This study was conducted to test the accuracy of these formulas.

Methods: 59 patients with primary glaucoma who underwent phacoemulsification at an eye hospital in 2022-2023 were subjected to data collection from medical records to test the accuracy between post-phacoemulsification IOP predictions based on five formulas. Data analysis was performed using SPSS 26.0. $p \geq 0.05$ was considered insignificant and the formula was considered accurate. The formula that has an absolute value of the difference between the mean decrease in post- phacoemulsification IOP and the mean formula that is close to zero is the most accurate formula.

Results: Results in 59 patients showed inaccurate results in all formulas, but when tested separately in patients with preoperative IOP ≤ 21 mmHg, all five formulas were accurate compared to IOP 6 months after phacoemulsification, four formulas were accurate compared to IOP 1 month after phacoemulsification and none of the formulas were accurate compared to IOP 3 months after phacoemulsification. A formula called «The preoperative IOP formula» had the best accuracy when compared to IOP 1 and 6 months after phacoemulsification.

Conclusions: «The preoperative IOP formula» is the most accurate formula in predicting IOP 1 and 6 months after phacoemulsification.

Abstract No.: 200467

The Baseline Risk Factors of Additive Trabeculectomy After Goniotomy in Patients With Open-Angle Glaucoma

First Author: Takanori **MIZOGUCHI**

Co-Author(s): Kouichi **NAGAMI**

Purpose: To evaluate the pre-operative characteristics of eyes that required subsequent filtration surgery (LET) after microhook ab interna trabeculotomy (μ LOT).

Methods: This retrospective study analyzed eyes with primary open-angle glaucoma (POAG) or exfoliation glaucoma (EXG) that underwent μ LOT alone or combined with cataract surgery. Eyes were divided into two groups: those that required no additional surgery (Non group) and those that subsequently underwent filtration surgery (LET group). Pre-operative clinical factors, the cumulative incidence of LET, and risk factors for surgical failure were analyzed using the Cox proportional hazards model.

Results: The mean postoperative follow-up period was 24.7 ± 13.0 months. The Non group included 238 eyes (POAG = 143, EXG = 95), and the LET group 25 eyes (POAG = 9, EXG = 16). Compared with the Non group, the LET group was significantly younger ($p = 0.002$), had higher pre-operative intraocular pressure ($p < 0.0001$), used more glaucoma medications pre-operatively ($p < 0.0001$), and had worse pre-operative mean deviation (MD) values ($p < 0.0001$). The cumulative incidence of LET was 19.2 % at 5.5 years. Postoperative IOP spikes occurred in 48 % of the LET group—significantly more often than in the No-additional group ($p < 0.0001$). Significant pre-operative risk factors for requiring LET were: diagnosis ($p = 0.023$), younger age ($p = 0.030$), surgical modality ($p < 0.001$), and worse MD value ($p < 0.001$).

Conclusions: Higher pre-operative intraocular pressure, exfoliation glaucoma, younger age, standalone μ LOT, and advanced visual-field loss increase the risk of requiring subsequent filtration surgery.

Abstract No.: 207291

The Long Forgotten Hydrophilic Intraocular Lens - A Clinical Vignette

First Author: Muhammad Haris Zakaria **AHMAD**

Co-Author(s): Norlina **RAMLI**

Purpose: This report presents a 78-year-old male patient with bilateral advanced primary open-angle glaucoma (POAG) and bilateral pseudophakia. The case highlights complications following multiple glaucoma interventions including micropulse trabeculoplasty and Ahmed valve glaucoma drainage device (GDD) implantation. Notably, the patient developed progressive intraocular lens (IOL) glistening and opacification years after a Descemetopexy procedure with C3F8 gas injection. The purpose is to describe

the clinical course, identify contributing factors to IOL opacification, and discuss management decisions.

Methods: This is a case report.

Results: At presentation, the patient maintained good visual acuity (6/6 in 2017). Following a Descemetopexy with C3F8 in 2017, glistening developed in 2020 on the initially implanted IOL, vision decreased moderately to 6/24 uncorrected but was correctable to 6/9. Intraocular pressure and glaucoma status remained stable throughout. The glistening and opacification correlated with exposure to intraocular gas (C3F8), which may cause dehydration of the hydrophilic IOL material, promoting protein precipitation and microvacuole formation within the lens. Given the relatively preserved vision and stable ocular status, the patient opted for conservative management instead of IOL explantation.

Conclusions: Hydrophilic IOLs may undergo glistening and opacification due to intraocular gas exposure, especially in eyes requiring complex surgical interventions. Although this phenomenon can affect lens clarity, vision may remain largely unaffected, supporting conservative management in select cases. Surgical lens exchange remains an option if significant visual impairment arises. Understanding the effects of intraocular gases on IOL materials is crucial to anticipate potential complications and guide patient-centered care decisions.

Abstract No.: 201691

The Relationship Between Serous Choroidal Detachment and the Ahmed Glaucoma Valve Failure

First Author: Maryam **YADGARI**

Co-Author(s): Sara **KAVOUSNEZHAD**, Nader **NASSIRI**, Kourosh **SHEIBANI**

Purpose: To investigate the effect of serous choroidal detachment (SCD) on the success of Ahmed glaucoma valve (AGV) implantation.

Methods: Patients who underwent AGV implantation and developed SCD were included in the case group. The control group was matched based on age, sex, baseline intraocular pressure (IOP), glaucoma type, and the number of glaucoma medications. The patient data were retrospectively extracted from available records. The primary outcome measure was an AGV success rate based on $5 < \text{IOP} < 18$ and a 20% reduction from baseline.

Results: Seventeen patients were enrolled in the case group and 38 in the control group. Preoperative visual acuity of patients was 1.17 ± 0.43 and 1.16 ± 0.37 logMAR in the case and control groups, respectively. The patients in the case group showed higher mean IOP at all time intervals compared to controls. However, the mean IOP only reached a statistically significant difference at 3 months (17.94 ± 6.78 mmHg

vs. 13.39 ± 3.09 mmHg, $P = 0.003$). The mean survival duration was significantly shorter in patients with SCD (10.4 ± 0.7 months vs. 11.7 ± 0.2 months for controls log-rank = 4.1, $P = 0.04$). The cumulative probability of success was 76.5% in patients with SCD and 94.7% in the control group after 12 months.

Conclusions: SCD after AGV implantation could be a risk factor for failure. A larger prospective study with a longer follow-up duration is required to confirm the present study results.

Abstract No.: 205931

The Role of Plasma Proteins in the Effect of Plasma Lipidome on Glaucoma: A Mendelian Randomization Analysis

First Author: Jiaxin **ZHANG**

Co-Author(s): Waikit **CHU**

Purpose: Previous studies have suggested association between plasma lipid levels and glaucoma. However, inconsistent findings have been reported partly due to the complexity of lipid species. This study aims to investigate the genetic associations between plasma lipidome and glaucoma risk using Mendelian randomization (MR) analysis, and to identify plasma proteins that may mediate these effects.

Methods: Genome-wide association study (GWAS) data for plasma lipids were obtained from the GWAS Catalog (GCST90277238 to GCST90277416). Protein quantitative trait loci (pQTL) data was derived from the Icelandic deCODE Genetics Study. Glaucoma GWAS data was sourced from the FinnGen Consortium. The inverse-variance weighted (IVW) method was employed as the primary MR approach, with Bayesian weighted MR (BWMR) used for validation. Reverse MR analyses were conducted to rule out reverse causality. Two-step mediation MR analysis was performed to identify potential mediators.

Results: The analyses identified 9 lipid species with causal effects on glaucoma. Among them, five phosphatidylcholines (PCs) and one sterol ester were protective factors, while one phosphatidylethanolamine, one sphingomyelin, and one sterol ester were risk factors. Reverse MR analyses excluded reverse causality between these lipids and glaucoma. Eight plasma proteins (sTie-2, SEMA6B, LRC32, F177A, IGSF3, Semaphorin 3E, SPN1, and SAR1A) were found to have causal associations with glaucoma. Two-step MR revealed that LRC32, IGSF3, and Semaphorin 3E mediated the effects of PCs on glaucoma risk.

Conclusions: We have identified causal associations between 9 plasma lipid species and glaucoma. Notably, PC (18:0_0:0), PC (O-18:2_16:0), and PC (O-18:2_16:0) exerted protective effects mediated through Semaphorin 3E, IGSF3, and LRC32, respectively.

Abstract No.: 205631

Through CO2 Laser-Assisted Deep Sclerectomy Surgery (CLASS) to Observe the Function of the Trabecular Meshwork in Primary Open-Angle Glaucoma Patients

First Author: Li **LU**

Co-Author(s): Nan **YUAN**

Purpose: To observe the function of the trabecular meshwork in POAG patients.

Methods: Through CLASS surgery to observe whether the function of trabecular meshwork still exists in POAG patients, which the stage of the disease is classified by the Glaucoma staging system 2 (GSS2), and constructing a generalized estimation equation to test the relationship between trabecular meshwork function and various impact factors such as gender, visual field, and optic nerve fiber layer thickness.

Results: Of 238 POAG patients, 176 (73.9%) had a functional trabecular meshwork, and 62 (26.1%) had a dysfunctional trabecular meshwork. The mean (SD) age was 52.46 (17.8) years for POAG patients in the function group and 55.32 (18.5) years for patients in the dysfunction group. Compared to the dysfunction group, the function group had a lower IOP (SD) was 23.93(10.9), and less visual field impairment (MD[SD]-20.83[8.78], VFI [MD] 46.19% [30.09]). After adjustment for age, gender, intraocular pressure (IOP), retinal nerve fibre layer (RNFL), Cup-to-Disc Ratio (C/D), pattern standard deviation (PSD), mean deviation (MD), and visual field index (VFI), Female (OR 0.42 [95% CI 0.21-0.83]) are more likely to have residual trabecular meshwork function at various stages of the disease compared to men. POAG patients with thicker RNFL thickness (OR 0.97 [95%CI 0.94-0.99]) are more likely to have functional trabecular meshwork.

Conclusions: This investigation shows that regardless of the stage of POAG, more than 73.9% of patients still have trabecular meshwork function. These results indicate that protecting the integrity of the trabecular meshwork is worth considering and important at all stages of POAG.

Abstract No.: 201363

Trabeculectomy Outcomes in One Eye Predict the Surgical Success in the Fellow Eye

First Author: Hira **MUazzam**

Co-Author(s): Mahmood **ALI**, Hanif **MALIK**, Nabeel **SYED**

Purpose: The purpose of this study was to evaluate the outcomes of bilateral trabeculectomies and assess the associations and differences in outcomes between the first operated and the second operated eye.

Methods: Patients with glaucoma who underwent bilateral trabeculectomies from 2020 to 2024 were included in this prospective study of 194 eyes of 97

patients. The patients were followed at 2 weeks, 1 month, and thereafter 3 3-monthly intervals till 2 years after surgery in each eye. The main outcome measure was surgical success (complete success: IOP 6-18mmHg or 20% reduction from baseline preoperative IOP without any topical antiglaucoma treatment. Qualified success was defined as IOP 6-18mmHg with topical antiglaucoma treatment. Secondary outcome measures were intraocular pressure and the number of topical anti-glaucoma medications. Anterior segment OCT, focusing on the bleb to assess the hydraulic conductivity, was done in cases of failure.

Results: The 194 eyes of 97 patients were not statistically significantly different in terms of baseline IOP and number of IOP-lowering medications between the first and second operated eyes after the surgery (p value > 0.05). At 24 months follow-up, among the patients whose first operated eyes were considered a complete success, 80.2% surgeries in the fellow eyes were successful (p value $= 0.012$). The patients whose first operated eyes were considered a qualified success 78.1% of the surgeries in fellow eyes were successful p value $= 0.012$.

Conclusions: This study demonstrates a significant correlation in surgical outcomes of trabeculectomies between the two eyes of the same patient.

Abstract No.: 200373

Trimming Techniques for the Ahmed Glaucoma Valve (AGV) Tube: Surgical Approaches

First Author: Pir Salim **MAHAR**

Purpose: To describe surgical trimming techniques of the Ahmed Glaucoma Valve (AGV) tube aimed at preventing or managing corneal touch and endothelial decompensation.

Methods: Patients presenting with corneal decompensation secondary to AGV tube malposition were referred to a tertiary glaucoma care clinic. All underwent surgical revision involving trimming and repositioning of the AGV tube. In this presentation, we describe the various intraoperative techniques used to optimize tube length and orientation, including bevel direction, angled trimming, and placement adjustments based on anterior chamber depth and anatomy. Surgical videos and pre- and postoperative anterior segment imaging (including AS-OCT) are used to illustrate these methods and outcomes.

Results: Post-revision, all patients showed resolution of corneal touch, with no further progression of endothelial decompensation over a 12-month follow-up. Tube positioning improved in all cases, with AS-OCT confirming clearance from the corneal endothelium. Visual acuity and intraocular pressure remained stable, and no additional tube-related complications

were noted. These results suggest that targeted tube trimming can effectively manage corneal complications

Conclusions: Surgical revision with precise trimming and repositioning of the AGV tube is highly effective in resolving corneal complications caused by tube malposition. Individualized trimming techniques—considering anterior chamber depth, angle orientation, and tube beveling—significantly reduce the risk of ongoing endothelial damage. Incorporating these approaches during primary implantation and revision surgery can improve long-term device safety, preserve corneal clarity, and optimize visual outcomes. Early recognition and timely surgical intervention are essential for preventing irreversible corneal decompensation in patients with glaucoma drainage devices

Abstract No.: 202312

Tube Exposure and Perforation After Bleb Refomation Following PreserFlo MicroShunt implantation

First Author: Masashi **NISHIGAKI**

Co-Author(s): Motohiro **KAMEI**, Atsuya **MIKI**, Chiaki **NOGAWA**

Purpose: To describe a rare case of tube exposure and perforation after Preserflo MicroShunt (PMS) implantation and subsequent bleb revision, emphasizing possible mechanisms and clinical management strategies.

Methods: An 84-year-old woman with bilateral exfoliation glaucoma underwent PMS implantation in the left eye for uncontrolled intraocular pressure (IOP) despite maximum medical therapy. The patient had a history of multiple ocular surgeries and long-term use of glaucoma eye drops. Initial surgery was uneventful but tissues of conjunctiva and Tenon's capsule were thin. The early postoperative course was good, but developed hypotony and choroidal detachment after stent removal, prompting a second procedure for stent reinsertion. A conjunctival leak appeared postoperatively, leading to a third surgery, during which a conjunctival defect and a tear in the PMS tube were discovered. The device was removed, and a new PMS was implanted in a different quadrant. The IOP stabilized postoperatively, with no recurrence of leakage or hypotony.

Results: This is the first report of PMS tube perforation associated with conjunctival hole. Potential contributing factors include chronic conjunctival inflammation from long-term glaucoma eye drops use, previous ocular surgeries, and prostaglandin-associated periorbitopathy (PAP). These conditions may have resulted in tissue thinning and mechanical stress, leading to tube exposure and perforation.

Conclusions: We suggest that caution is needed when performing PMS in patients with thin conjunctiva or

Tenon's capsule preoperatively. Careful postoperative follow-up is important for early detection and intervention in similar cases to prevent complications.

Abstract No.: 205950

Twelve-Month Outcomes of Gonioscopy-Assisted Transluminal Trabeculotomy in Eyes With Prior Failed Glaucoma Surgery

First Author: Nimrita NAGDEV

Co-Author(s): Devendra MAHESHWARI, Madhavi PILLAI

Purpose: Safety and efficacy of gonioscopy-assisted transluminal trabeculotomy (GATT) in eyes with prior failed glaucoma surgery.

Methods: A prospective and interventional study included 35 eyes that experienced prior glaucoma surgery failure and subsequently underwent GATT. Patients included were of congenital glaucoma (4), JOAG (8), PACG (11), POAG (10), PXF-G (1), and secondary glaucoma (1). Baseline characteristics like Intraocular pressure (IOP), Best corrected visual acuity (BCVA), and anti-glaucoma medications (AGMs) were evaluated at each post-operative visit. Data were collected at 2 weeks, 1 month, 3 months, 6 months, and 12 months. Surgical success was defined as IOP ≤ 21 / ≤ 18 / ≤ 15 mmHg with $> 20\%$ / 25% / 30% reduction from baseline, respectively (Criteria 1, 2, and 3). Complications, interventions, and surgical risk factors were also analyzed.

Results: The mean (SD) IOP decreased from 25.89 ± 12.91 to 15.40 ± 8.35 , 14.53 ± 6.19 , 13.0 ± 3.28 , 12.43 ± 3.28 and 13.46 ± 3.93 at 12 months ($p < 0.001$). AGM reduced from 3.26 ± 0.85 to 0.91 ± 0.78 , 1.12 ± 1.12 , 1.35 ± 1.07 , 1.49 ± 1.12 and 1.54 ± 1.09 at 12 months ($p < 0.001$). The overall success rate was 77.1%, 74.3% and 60.0% by criteria 1, 2, and 3. The complications noted were hyphema in 12 eyes; the majority resolved within 1 week, and all by 2 weeks. None needed any intervention.

Conclusions: This study concludes that GATT can be an effective and safe surgical alternative for managing IOP in eyes with prior failed glaucoma surgeries, associated with minimal complications.

Abstract No.: 205448

Unlocking the Angle: Short-Term Clinical Outcomes of Phacoemulsification Combined With Goniotomy in Glaucoma

First Author: Devi Putri SWADAYANI

Purpose: To evaluate the early clinical outcomes of combined phacoemulsification and goniotomy in patients with glaucoma, focusing on visual acuity, intraocular pressure (IOP) control, and reduction of topical medication use.

Methods: This prospective case series included 16 eyes from patients undergoing phacoemulsification

with adjunctive goniotomy. Baseline demographics, preoperative IOP, visual acuity (logMAR), and number of glaucoma medications were recorded. Postoperative assessments were performed at day 1, day 7, and 1 month. Surgical success was defined according to World Glaucoma Association (WGA) guidelines as complete, qualified, or failure.

Results: The mean patient age was 67.8 years; 68.8% were diagnosed with primary angle-closure glaucoma. Preoperative visual acuity averaged 1.48 logMAR ($\approx 20/630$), improving to 0.61 logMAR at 1 month, with most patients gaining ≥ 2 Snellen lines. Mean IOP decreased from 39.44 mmHg preoperatively to 20.50 mmHg at 1 month, reflecting a 48% reduction. The average number of medications fell from 2.75 to 1.00, with 37.5% of patients medication-free at 1 month. Surgical success rates were: complete success in 25%, qualified success in 37.5%, and failure in 37.5%.

Conclusions: Phacoemulsification combined with goniotomy provides meaningful short-term improvements in vision, IOP reduction, and medication burden in patients with glaucoma, particularly those with primary angle-closure. While complete surgical success was achieved in a subset, a substantial proportion still required adjunctive therapy, highlighting the importance of careful patient selection and longer-term evaluation.

Abstract No.: 206056

Use of a Pediatric Ahmed Glaucoma Valve (FP8) for Refractory Secondary Glaucoma in an Adult Eye Following Multiple Vitreoretinal Surgeries: A Case Report

First Author: Muhammad KHALIL AKBAR

Co-Author(s): Elsa GUSTIANTY, R.Maula RIFADA, Sonie UMBARA, Indriyani

Purpose: Secondary glaucoma following multiple vitreoretinal surgeries is a significant clinical challenge, often refractory to conventional treatments due to factors such as conjunctival scarring from previous operations. A Glaucoma Drainage Device may be considered a management strategy for secondary glaucoma after vitreoretinal surgery.

Methods: An 18-year-old male with a history of scleral buckle, vitrectomy, and a failed trabeculectomy presented with uncontrolled secondary glaucoma and an intraocular pressure (IOP) of 32 mmHg. Due to extensive conjunctival scarring and limited episcleral space from the scleral buckle, he underwent implantation of a pediatric Ahmed Glaucoma Valve (AGV) model FP8.

Results: Initial IOP control was achieved after the procedure, but at one month, the IOP increased to 34 mmHg due to the formation of an encapsulated bleb (Tenon's cyst). The patient then underwent surgical excision of the cyst with adjunctive 5-fluorouracil.

Postoperatively, the IOP stabilized at 18 mmHg after one week.

Conclusions: The pediatric AGV model is an effective option for refractory secondary glaucoma in select cases with limited episcleral space. Clinicians should anticipate potential complications such as bleb encapsulation. Surgical excision of the cyst is a viable and effective strategy to restore implant function and achieve long-term IOP control.

Abstract No.: 206939

Xen Implantation in a Pregnant Filipino Patient With Anterior Segment Dysgenesis and Secondary Angle Closure Glaucoma

First Author: Dillon Edric GO

Co-Author(s): Rommel BAUTISTA

Purpose: Patient is a 25-year-old female with anterior segment dysgenesis and congenital nystagmus in both eyes, and has developed secondary angle closure glaucoma in the right eye. The patient underwent lens extraction with IOL implantation in childhood. Visual acuity was reported at 10/400 sans correction. Intraocular pressures on the right eye were 35mmHg off meds, and on gonioscopy, all angles were synechially closed except the superior angle, which opened to the scleral spur. Pressures were controlled at 15mmHg on Latanoprost, Brimonidine, and Brinzolamide. However, the patient uncovered an unexpected pregnancy. Due to the possible side effects of anti-glaucoma medications during pregnancy, we decided to implant a Xen implant rather than trabeculectomy, given the history of anterior segment dysgenesis.

Methods: A corneal bridle suture was done to stabilize the eye. A combination of Mitomycin-C and lidocaine was injected in the proposed bleb site. Peritomy was done superiorly, and sub-Tenon dissection was done peripherally. Judicious cautery was done on the scleral bed. Scleral tunnel 2mm from the limbus was done, and Xen implant was inserted into the tunnel with adequate anterior chamber exposure. The conjunctiva was then closed and implanted, and tested for patency. The patient was maintained on steroids and antibiotic drops postoperatively.

Results: Patient's IOP on 1 day post-operation was noted at 2mmHg, which is expected in post-Xen implantation. The IOP would gradually increase until it stabilized at 16mmHg off any medications at 2 months post-operation.

Conclusions: Minimally invasive glaucoma surgery is an effective alternative to glaucoma medications in pregnant patients with anterior segment dysgenesis.

Intraocular Inflammation, Uveitis and Scleritis

Abstract No.: 204745

A Case Report of Vogt-Koyanagi Harada Disease Presenting in a Post-Partum Patient in a Level III Private Hospital in Metro Manila, Philippines

First Author: Alyssa BARROGA

Co-Author(s): Nickey CAYETANO, Ian PAREDES, Eric Nathaniel REYES

Purpose: This case report focuses on a 32-year-old Filipino female immediately post-partum who developed bilateral blurring of vision, metamorphopsia, anterior and posterior uveitis findings such as mutton fat keratic precipitates and bilateral disc edema, and with associated findings in Optical coherence tomography (OCT) of the macula and Fluorescein angiography.

Methods: This study is a case report focusing on an individual patient and her course in the clinics and in the wards.

Results: These group of signs and symptoms clinically fit the criteria for Vogt-Koyanagi-Harada syndrome acute uveitic phase, and since the patient is post-partum, she has predisposition to develop autoimmune diseases such as VKH disease, although infectious causes such as pulmonary tuberculosis should still be ruled out.

Conclusions: Prompt initiation of mainstay treatment which are systemic corticosteroids in the form of IV Methylprednisolone 1g/day for five days was given to the patient within the two to four week window period from the onset of symptoms, improving the eventual visual prognosis while also collaborating with multiple disciplines to make sure other systemic conditions were being addressed. Additional treatment such as immunosuppressive therapy, in this patient's case Azathioprine, should be explored, and are contributory in making sure VKH does not recur.

Abstract No.: 200557

A Novel Strategy for the Management of Cytomegalovirus Retinitis in Immunocompromised Patients Using New Anti-Cytomegalovirus Drugs

First Author: Yuou YAO

Co-Author(s): Heng MIAO

Purpose: This study presents four cases of cytomegalovirus retinitis (CMVR) managed using a novel antiviral strategy, aiming to preliminarily assess its efficacy and safety profile.

Methods: A retrospective chart review was conducted on four patients (seven eyes) diagnosed with CMVR. All patients received oral letermovir or maribavir as the primary treatment. Weekly intravitreal injections of high-dose (6mg) ganciclovir (IVG) were administered to those with macula involvement or aggressive lesions during the initial treatment. Data on demographics, ophthalmic examinations, laboratory results, and clinical outcomes were analyzed.

Results: All four patients showed clinical and fundoscopic improvement, achieving complete resolution of retinitis. However, one patient developed bilateral retinal detachment requiring vitrectomy. Initial administration of high-dose IVG ensured rapid stabilization of the aggressive or macula-threatening lesions. While subsequent oral antiviral maintenance significantly reduced the need for repeated IVG injections. Both letermovir and maribavir demonstrated excellent tolerability with no adverse events observed.

Conclusions: This novel therapeutic strategy provides safe and effective treatment option for CMVR, particularly promising for patients with complex systemic comorbidities.

Abstract No.: 205204

A Race Against Time: Fulminant Klebsiella Panophthalmitis

First Author: Ivin Bing Wei **WONG**
 Co-Author(s): Shir Yen **WANG**

Purpose: To present a rapidly progressive case of Klebsiella panophthalmitis and its management.

Methods: Case Study

Results: A 59-year-old male with no comorbidities presented with a one-day history of left eye blurred vision preceded by fever. His visual acuity was 6/18, with fundus revealing multiple Roth's spots and attenuation of retinal arteries. Upon review the following day, his vision deteriorated to hand motions (HM). Anterior chamber showed fibrin and hypopyon while fundus visualisation was obscured. B-scan ultrasonography demonstrated vitritis without loculation. Repeated B-scan within 48 hours showed worsening vitritis with loculation, and a positive T-sign, consistent with endogenous panophthalmitis. Vitreous tap was performed, followed by intravitreal injections of Vancomycin and Ceftazidime. Concurrent treatment included topical eye drops Vancomycin 5% and Ceftazidime 5%, along with intravenous Ciprofloxacin. Systemic workup revealed a liver abscess, with pus cultures isolating Klebsiella pneumoniae, sensitive to Augmentin and Unasyn. The patient was co-managed with the gastroenterology team, and started on intravenous Augmentin. Despite aggressive treatment with multiple intravitreal injections and weeks of systemic antibiotics, his vision deteriorated to no perception of light. The eye subsequently developed

phthisis bulbi, and a prosthetic implant was inserted for cosmetic rehabilitation.

Conclusions: This case highlights the aggressive nature of Klebsiella pneumoniae endogenous panophthalmitis and importance of prompt recognition. Atypical ocular presentations such as Roth's spots can precede rapid progression to panophthalmitis. High clinical suspicion, early systemic evaluation, and aggressive ocular and systemic therapy are critical to contain infection, salvage the globe, and prevent life-threatening spread.

Abstract No.: 201213

A Severe, Hereditary, Bilateral Panuveitis With Mutation of NOD2 Gene

First Author: Yuxi **CHEN**
 Co-Author(s): Ling **CHEN**

Purpose: To exhibit a case of bilateral panuveitis with a NOD2 mutation diagnosed as Blau syndrome.

Methods: A 25-year-old woman presented with blurred vision in her right eye for one month. Best-corrected visual acuity was 0.075 (right) and 0.4 (left). Slit examination showed different degrees of anterior chamber cells, aqueous flare, and mutton-fat keratic precipitates. Diffuse iris depigmentation with extensive posterior synechiae, cataract, vitreous cells, and vitreous opacification were also shown. OCT showed essentially normal retinal architecture in both eyes, with mild macular edema in the right eye. FFA and ICGA disclosed faint leakage from the posterior pole and peripheral vessels in both eyes, and macular edema in the right eye. Physical examination revealed deformities of the finger joints. Infectious causes were excluded. Two years ago, the intraocular pressure in the left eye was 28 mmHg, necessitating laser peripheral iridotomy, after which the intraocular pressure remained stable.

Results: Further history-taking revealed her mother, two sisters, and one brother exhibited similar ocular characteristics and finger abnormalities. Prior whole-exome sequencing identified an autosomal-dominant heterozygous NOD2 mutation. Integrating ocular findings with systemic manifestations, the diagnosis of Blau syndrome was established. She was started on adalimumab every two weeks plus methotrexate 15 mg weekly. She remains stable under ongoing follow-up.

Conclusions: Blau syndrome is a rare autoinflammatory disease characterized by dermatitis, arthritis, and recurrent uveitis. Although cutaneous and articular involvement usually appear first, ocular uveitis is a crucial diagnostic clue, yet tends to manifest later—often leading to under-recognition of the systemic disorder.

Abstract No.: 200522
Acute Bilateral Serous Retinal Detachments in a 21-Year-Old Female: A Case of Vogt-Koyanagi-Harada Disease

First Author: Kareem ABDULLATIF

Purpose: This case underscores the importance of considering Vogt-Koyanagi-Harada disease in young patients presenting with acute bilateral vision loss and characteristic fundus and OCT findings.

Methods: Bilateral fundus examination revealed significant findings consistent with an inflammatory process. The optic discs in both eyes appeared edematous with blurred margins, suggesting optic nerve involvement. Furthermore, changes in the retinal color were observed surrounding the macula, indicative of inflammation or edema in these critical areas responsible for central vision. Notably, pale areas were present in the background around the macular region. These findings are highly suggestive of subretinal exudates or serous retinal detachment, which are hallmark signs of acute VKH disease. The diffuse nature of these changes points towards a widespread choroidal inflammatory process. Optical Coherence Tomography (OCT) provided detailed cross-sectional imaging of the retina and choroid, confirming the clinical suspicions

Results: Vogt-Koyanagi-Harada disease is an immune-mediated inflammatory condition that primarily targets melanocyte-containing tissues. The acute uveitic phase, as seen in this patient, is characterized by bilateral panuveitis with serous retinal detachment, often leading to significant vision impairment. The patient's history of *Helicobacter pylori* infection, while not directly causative, may suggest a potential immune dysregulation, although a direct link to VKH is not definitively established. The comprehensive ophthalmic examination, including detailed fundus imaging and OCT, was crucial in establishing the diagnosis.

Conclusions: This case underscores the importance of considering Vogt-Koyanagi-Harada disease in young patients presenting with acute bilateral vision loss and characteristic fundus and OCT findings.

Abstract No.: 207038
Acute Retinal Necrosis Syndrome With Orbital Cellulitis As the Initial Symptom in a First-Trimester Pregnant Woman

*First Author: Dengxue WANG
Co-Author(s): Zaihong CHEN*

Purpose: To report an atypical acute retinal necrosis syndrome (ARN) case with orbital cellulitis as the initial symptom.

Methods: A 22-year-old first-trimester primigravida presented with right eyelid erythema, pain, and visual decline. Initial diagnosis was right orbital cellulitis,

treated with intravenous glucocorticoids and broad-spectrum antibiotics. Despite improved eyelid/conjunctival edema, vision worsened. Dilated fundus exam showed right vitreous opacity and peripheral retinal yellow-white lesions (suggesting ARN). Aqueous humor metagenomic sequencing confirmed HSV-2 positivity. She received intravenous/intravitreal/topical antiviral therapy, followed by pars plana vitrectomy for right retinal detachment.

Results: At the 3-month post-operative follow-up, the patient's best-corrected visual acuity (BCVA) was 0.1 (Snellen chart). Complete resolution of both orbital inflammation and retinal inflammation was observed.

Conclusions: HSV-2 can co-induce orbital cellulitis and ARN. For such comorbidity, timely etiological tests (e.g., aqueous sequencing) are critical to avoid delayed treatment and irreversible vision loss.

Abstract No.: 201388
Analysis of Misdiagnosis Causes and Clinical Observation of Acute Retinal Necrosis Syndrome

First Author: Liu RUI

Purpose: To analyze the causes of misdiagnosis and clinical characteristics of acute retinal necrosis syndrome (ARN).

Methods: Review the clinical data of 12 patients (16 eyes) with ARN, summarize the clinical characteristics, and analyze the causes of misdiagnosis.

Results: The average time from onset to definitive diagnosis was 21.4 days. 12 cases were misdiagnosed as conjunctivitis, iridocyclitis, glaucomatocyclitic syndrome, uveitis, glaucoma, Eales disease, and retinal vein obstruction. The diagnosis of ARN is based on clinical features. The use of polymerase chain reaction (PCR) in aqueous humor samples is useful to identify the etiology. 12 patients received systemic and intraocular antiviral therapy and were supplemented by retinal laser photocoagulation, corticosteroids, and aspirin. 5 patients underwent vitreous surgery due to the progression of ARN. The best corrected visual acuity ranged from light perception to 12/60 during 3~21 months follow-up period.

Conclusions: It is crucial to avoid misdiagnosis and strengthen the identification of ARN. Early diagnosis and timely appropriate intervention are needed.

Abstract No.: 200435
Atypical Lesion Pattern in a Case of Punctate Inner Choroiditis

*First Author: Chynna Pearl Tana BACCAY
Co-Author(s): Albert John BROMEO*

Purpose: Punctate inner choroiditis (PIC) is a rare idiopathic inflammatory posterior uveitis presenting with classic yellow-white lesions confined to the

posterior pole in the absence of anterior segment and vitreous inflammation. Choroidal neovascularization (CNV) is a known complication and a major cause of visual impairment. We report a rare case of PIC presenting with an atypical lesion pattern.

Methods: Case Report

Results: A 61-year-old male presented with blurring of vision in both eyes (OU). Best corrected visual acuity (BCVA) on presentation was 20/40 on the right eye (OD) and 20/50 on the left (OS). Fundus examination showed multiple yellow-white dots right along the superior and inferior arcade OU along with subretinal hemorrhage OS. Fluorescein angiography showed early hypofluorescence and late hyperfluorescence of the dot lesions as well as hyperfluorescence from CNV OU. OCT revealed CNV with pigment epithelium detachment and focal areas of retinal pigment epithelium loss OU. Fundus autofluorescence (FAF) showed mixed areas of hypo- and hyperautofluorescence of the lesions. Systemic work-up was unremarkable. He was diagnosed with PIC with secondary CNV OU. The patient was treated with a course of oral prednisone as well as started on methotrexate, along with a series of intravitreal bevacizumab injections OU. Management led to lesion stability as demonstrated by FAF as well as CNV inactivity on OCT.

Conclusions: Punctate inner choroiditis may present with atypical features. Recognition is essential for timely diagnosis and initiation of appropriate therapy to prevent permanent visual impairment.

Abstract No.: 201700

Bilateral Cystoid Macular Edema as a Presenting Sign of Presumed Ocular Tuberculosis

First Author: Debarun SHARMA

Co-Author(s): Himanshu GARKOTI

Purpose: To report a case of bilateral cystoid macular edema as a rare sign of presumed ocular tuberculosis.

Methods: A 60-year-old female with a history of bilateral diminution of vision for the past 6 months presented to the outpatient department with OU BCVA 6/18 with no further improvement on pinhole. She had a history of cataract surgery 10 years back. Slit lamp examination revealed unremarkable anterior segment findings. Retrolental cells were present in both eyes. Fundus examination revealed a tessellated fundus with a dull foveal reflex and fine pigment mottling at the posterior pole. Fundus photography, SD-OCT, and FFA were advised.

Results: OCT showed bilateral cystoid macular edema. CMT in the right eye was 521 microns, and in the left eye was 489 microns. FFA showed bilateral "hot discs" in diffuse perivascular leakage and petalloid leakage at the fovea in the late phases of the angiogram. A diagnosis of posterior uveitis was made. Uveitis

panel with markers for infection was advised to the patient. Quantiferon TB gold and Mantoux test were positive. Chest X-ray was unremarkable. A diagnosis of presumed ocular tuberculosis was made, and the patient was started on Anti-Tubercular Treatment. Since the patient was diabetic, bilateral intravitreal injection of Ozurdex was done 48 hours after starting Anti-Tubercular Treatment. The patient presented 1 month later with OU BCVA 6/6. OCT revealed complete resolution of CME.

Conclusions: Bilateral CME is a rare presentation of ocular tuberculosis. A high level of suspicion is required for diagnosis.

Abstract No.: 204281

Bilateral Fulminant Idiopathic Occlusive Retinal Vasculitis With Severe Neovascular Sequelae in a Young Female: A Case Report

First Author: Al Anood AL FARSI

Purpose: To report a rare and aggressive case of bilateral idiopathic progressive ischemic retinal vasculitis in a young female, refractory to conventional treatment.

Methods: A 32-year-old woman with no significant systemic history presented with sequential bilateral vitreous hemorrhages. Clinical evaluation revealed normal anterior segments and intraocular pressures, but fundus examination demonstrated sclerosed retinal vessels with extensive neovascularization of the disc and elsewhere, in the absence of retinitis or choroiditis. Fluorescein angiography confirmed widespread peripheral ischemia with perivascular leakage and relative early macular sparing. Comprehensive systemic and autoimmune investigations, including ANA, RF, ACE, HIV, syphilis serology, IGRA, and antiphospholipid testing, were all negative. She was also evaluated by rheumatology, with Behçet's disease and SLE considered but not confirmed, leading to a diagnosis of idiopathic ischemic retinal vasculitis.

Results: Despite systemic oral corticosteroids, pan-retinal photocoagulation, and multiple intravitreal anti-VEGF therapies, the disease progressed to macular ischemia, and neovascular complications developed, including iris neovascularization and neovascular glaucoma. Escalation to systemic immunosuppression with adalimumab and methotrexate, and an empirical trial of systemic valganciclovir, failed to halt disease progression. Adjunctive aspirin was initiated in an attempt to limit ongoing ischemia, but also failed to prevent worsening ischemia.

Conclusions: This case illustrates an exceptionally rare, fulminant phenotype of idiopathic ischemic retinal vasculitis unresponsive to corticosteroids, laser photocoagulation, anti-VEGF, systemic immunosuppression, and biologics. The course was complicated by severe neovascular sequelae,

highlighting the diagnostic and therapeutic challenges of managing aggressive ischemic vasculitis. Early recognition, multimodal therapy, and close monitoring are critical, yet visual prognosis may remain guarded despite timely intervention.

Abstract No.: 204283

Bilateral Intermediate Uveitis With Retinal Vasculitis and Anomalous Vitreous in the Absence of Definitive Systemic Disease

First Author: Marwah Khamis **AL KALBANI**

Purpose: To describe a complex case of bilateral intermediate uveitis with retinal vasculitis and anomalous vitreous, highlighting diagnostic uncertainty when systemic criteria for multiple sclerosis (MS) or Behçet's disease are not fulfilled.

Methods: A 32-year-old female presented with bilateral posterior subcapsular cataracts and primary angle-closure glaucoma associated with low-grade anterior chamber inflammation. Detailed ophthalmic and systemic evaluations were performed, including multimodal imaging, infectious screening, autoimmune workup, and neuroimaging.

Results: Fundus examination revealed anomalous membranous vitreous with vitreoschisis, sclerosed vessels, and vascular sheathing in both eyes. Fluorescein angiography demonstrated bilateral hot discs, vascular leakage, and areas of capillary non-perfusion. Systemic evaluation was largely unremarkable except for HLA-B51 positivity. CT chest and sacroiliac imaging were normal. MRI brain showed a solitary demyelinating lesion with no further dissemination at 6-month follow-up. The patient also had a long-standing history of left-sided ptosis and anhidrosis, diagnosed as congenital Horner's syndrome. Initial treatment with systemic corticosteroids led to clinical improvement but triggered intraocular pressure elevation; she was transitioned to mycophenolate mofetil with partial control of inflammation. Genetic testing was initiated to rule out inherited vitreoretinopathy.

Conclusions: This case underscores the diagnostic and therapeutic challenges of bilateral intermediate uveitis with vasculitis and anomalous vitreous when systemic disease criteria are not met. The overlap of features resembling Behçet's disease, demyelinating pathology, and inherited vitreoretinopathies highlights the importance of multimodal imaging, genetic testing, and multidisciplinary follow-up. Long-term individualized immunosuppression remains essential, and cataract surgery should be deferred until adequate inflammatory control is achieved.

Abstract No.: 206225

Blau Syndrome With Atrial Septal Defect: A Case Report

First Author: Weiting **PENG**

Co-Author(s): Yun **LI**

Purpose: Blau Syndrome (BS) is a rare autosomal dominant autoimmune disease caused by mutations in the NOD2 gene. This disease is characterized by the triad of granulomatous polyarthritides, rash, and uveitis and could also accumulate in other systems, including the cardiovascular system. This study aims to describe the clinical features of a Chinese BS patient with an atrial septal defect.

Methods: The clinical data of a BS patient complicated with an atrial septal defect were collected and documented.

Results: We reported the case of a 9-year-old woman who presented with polyarticular arthritis accompanied by joint deformities, atrial septal defect, and severe ocular accumulation, including bilateral uveitis, bilateral complicated cataracts, and secondary glaucoma in the left eye. She was diagnosed with BS by the finding of a variant of the NOD2 gene (R334W). Through the literature review, we found another Chinese BS case with the same mutation site, who presented with atrial septal defect and impaired vision, bilateral granulomatous and old retinal vasculitis in the right eye, suggesting a potential association between BS caused by this mutation with atrial septal defect and severe ocular accumulation.

Conclusions: Atrial septal defect is a rare complication of BS. Clinicians, especially Ophthalmologists, should increase awareness of ocular accumulations in patients with BS combined with atrial septal defect.

Abstract No.: 201740

Blau Syndrome: A Diagnostic and Therapeutic Challenge in a Young Child

First Author: Bhavik **PANCHAL**

Co-Author(s): Afra **ABDUSSAMAD**, *Snehal* **GANATRA**, *Anjani* **GUMMADI**

Purpose: To report an atypical presentation of Blau syndrome manifesting initially as isolated uveitis and to highlight the importance of early genetic diagnosis and multidisciplinary management.

Methods: A 2-year-old boy presented with bilateral uveitis and complicated cataracts. He was managed initially with corticosteroids and methotrexate. Serial clinical evaluations, laboratory tests, imaging studies, and whole-genome sequencing were performed to establish the diagnosis and guide treatment. Surgical and pharmacologic interventions were undertaken for disease control and visual rehabilitation.

Results: At presentation, the patient exhibited chronic anterior uveitis, characterised by band-shaped

keratopathy, posterior synechiae, and cataracts. Systemic features were absent initially, delaying diagnosis. Over follow-up, the child developed arthritis and dermatitis, completing the classic Blau triad. Whole genome sequencing identified a pathogenic NOD2 mutation, confirming Blau syndrome. Corticosteroids and methotrexate provided partial control but were insufficient to prevent relapses. Cataract surgery and vitrectomy improved vision after inflammation control. Initiation of adalimumab, a TNF inhibitor, resulted in a marked reduction of ocular inflammation, allowed tapering of steroids, and prevented further relapses. Visual rehabilitation with scleral contact lenses further optimised outcomes.

Conclusions: Blau syndrome may present atypically with isolated ocular features, delaying diagnosis. Genetic confirmation is essential in suspected cases of pediatric uveitis. TNF inhibitors such as adalimumab provide superior disease control compared with conventional therapy, while surgical intervention plays a key role in managing complications. A multidisciplinary approach is crucial for long-term visual and systemic outcomes.

Abstract No.: 201730

Case of Possible Intraocular Tuberculosis

First Author: Ayush SANGOLE

Purpose: Show the key features of IOTB.

Methods: A single case to show the characteristic feature of IOTB.

Results: IOTB shows a few characteristic features like granuloma (tuberculoma), tubercle, and also a few typical FFA features.

Conclusions: Early diagnosis and treatment can help to resolve IOTB.

Abstract No.: 203944

Characteristics of Ocular Syphilis in Human Immunodeficiency Virus-Positive Patients in Tertiary Eye Care Center: A Two-Year Observational Study

First Author: Grace SETIAWAN

Co-Author(s): Angga FAJRIANSYAH, Elfa Ali IDRUS, Patriotika MUSLIMAH, Arief Akhdestira MUSTARAM

Purpose: To describe the clinical characteristics of ocular syphilis in HIV-positive patients in the Indonesian National Eye Center, Cicendo Eye Hospital.

Methods: A retrospective descriptive study was conducted from the medical records of patients diagnosed with ocular syphilis with HIV co-infection from January 2019 to March 2021. Gender, age, marital status, educational level, sexual preference, clinical features, visual acuity, ocular lateralization, ocular medications, systemic medications, and follow-up period were reviewed.

Results: A total of 26 eyes from 15 patients were included in this study. The majority of the subjects were males (93%) with an age of 20-30 years (66%). All of the subjects were HIV-positive, and 53% of them were MSM. Bilateral ocular syphilis was found in 73% subjects, with panuveitis as the most common (50%) clinical manifestation. The median of the follow-up period was 4 (3-11) months.

Conclusions: Characteristics of population in this study were young-adult males that were tested positive for HIV with the history of MSM. Bilateral panuveitis was the most prominent clinical manifestation.

Abstract No.: 205884

Choroidal Abscess With Roth Spots in a Healthy Young Male

First Author: Yuanshao CHENG

Co-Author(s): Wenjung LO

Purpose: To report a case of endogenous endophthalmitis with choroidal abscess in a healthy young male.

Methods: A case report.

Results: A previously healthy 29-year-old male presented with one day of decreased vision in his left eye. Initial visual acuity (VA) was 6/6 in the right eye and counting fingers at 30 cm in the left eye. Slit lamp examination showed no anterior chamber or vitreous inflammation. Fundus examination revealed a dense, yellow-whitish, dome-shaped lesion over the left eye's lower arcade with associated Roth spots. A uveitis workup was initiated. The patient returned one day later, complaining of eye pain, and the slit lamp now showed an exudative membrane with hypopyon. Given the suspicion of endogenous endophthalmitis with choroidal abscess, vitreous fluid was collected for culture, and empiric systemic and intravitreal antibiotics were administered. The vitreous culture subsequently grew *Klebsiella pneumoniae*, and the abdominal computed tomography revealed a liver abscess.

Conclusions: Treatment for endogenous endophthalmitis with a choroidal abscess is a time-sensitive, combined approach. It requires the urgent administration of intravitreal broad-spectrum antibiotics immediately following a vitreous biopsy to obtain cultures. This must be coupled with systemic intravenous antibiotics to treat the underlying source of infection and often includes pars plana vitrectomy to clear the vitreous and better manage the abscess.

Abstract No.: 202266

Clinical Analysis of THS and Non-THS

First Author: Zheng ZENG

Co-Author(s): Caiyun YOU

Purpose: To investigate the clinical features of Tolosa-Hunt syndrome (THS), painful ophthalmoplegia.

Methods: A retrospective analysis was conducted on 35 patients with suspected painful ophthalmoplegia from January 2019 to December 2022. According to ICHD-3, 18 patients were finally diagnosed with THS and 17 were not diagnosed with THS.

Results: THS patients had pain as their initial symptom in 94.4% (17/18) of cases, with the most common finding on MRI being localized orbital and cavernous sinus lesions (10/18, 55.6%). Nine (9/18, 50.0%) of the THS patients had abnormalities on immunological tests. In the patients who were not diagnosed with THS pain ophthalmoplegia, pain was the initial symptom in 64.7% (11/17) of cases. On MRI, localized orbital and cavernous sinus lesions were found in four (4/17, 23.5%) of the patients. Three (3/17, 17.6%) of the patients had abnormalities on immunological tests. There were 12 cases (12/17, 70.6%) of undiagnosed THS ophthalmoplegia patients with diabetes.

Conclusions: The first symptom of THS's ophthalmoplegia is pain, and the positive signs of cavernous sinus found by magnetic resonance imaging are more common, and the proportion of patients with abnormal serum immunology is higher, while the proportion of patients with undiagnosed THS's ophthalmoplegia complicated with diabetes and other systemic diseases is higher, which is helpful for the differential diagnosis of the two.

Abstract No.: 205451

Clinical Case Report of Vogt-Koyanagi-Harada Syndrome in Young Women With Positive Finding on Brain MRI

First Author: Ya Hui WANG

Co-Author(s): Wen-yu HSU

Purpose: To present a clinical case of Vogt-Koyanagi-Harada (VKH) syndrome in an 16-year-old female with bilateral uveitis, describe the diagnostic process, treatment strategy, and clinical outcomes.

Methods: Case report.

Results: A 16-year-old female presented with blurred vision and photophobia in both eyes, accompanied by headaches, bilateral tinnitus, dizziness, and hearing disturbances. Ophthalmic examination revealed anterior chamber inflammation, optic disc swelling, and multiple serous retinal detachments of both eyes. Optical coherence tomography (OCT) showed subretinal fluid accumulation and retinal pigment epithelial changes. Laboratory tests were positive for CMV IgG and rheumatoid factor, with HLA-DR4 and

HLA-DQ4/DQ8 positivity. Fluorescein angiography demonstrated multiple pinpoint leakage and late-stage dye pooling. Brain magnetic resonance imaging (MRI) revealed enhancement of the bilateral inner ear labyrinth and cochlea. A tentative diagnosis of VKH syndrome was made, and the patient was initially treated with high-dose intravenous methylprednisolone, followed by oral steroids and immunosuppressive therapy. Following corticosteroid pulse therapy, the patient's visual acuity improved to 1.0/1.0. Immunosuppressive therapy, first treated by mycophenolate mofetil and later shift to methotrexate, was administered to maintain disease control. However, two weeks post-influenza vaccination, she experienced left eye blurred vision with slight painful sensation. Slit lamp exam revealed increased anterior chamber reaction with 4+ cells and pupillary fibrin membrane formation in the left eye. Medication adjustments resulted in rapid improvement, and pupillary fibrin membrane disappeared after 4 days of topical steroid treatment.

Conclusions: Early diagnosis, long-term immunosuppressive therapy with close monitoring and individualized treatment adjustments for VKH syndrome are essential for optimal patient outcomes.

Abstract No.: 202078

Clinical Features and Multimodal Imaging in Neuro-Behçet's Disease: A Case Series

First Author: Eliza ANTHONY

Co-Author(s): Anand RAJENDRAN

Purpose: To demonstrate clinical features and multimodal imaging in two patients with Neuro-Behçet's Disease (NBD)

Methods: Retrospective case series of three eyes of two patients. Both patients underwent complete detailed history taking, ocular examination, color fundus photography, spectral domain optical coherence tomography (SDOCT), fluorescein angiography (FFA) and indocyanine angiography (ICG) and necessary blood work up.

Results: Case 1: 36-year-old female presented with right eye defective vision, panuveitis, and a one-year history of vertigo and gait imbalance. Although neuroimaging was unremarkable, audiometry confirmed vestibular dysfunction, indicative of subclinical brainstem involvement. Multimodal imaging findings were consistent with active inflammation and ocular vasculitis. HLA-B51 positivity supported the diagnosis of Neuro-Behçet's Disease. She showed good clinical response to corticosteroids and immunosuppressive therapy. Case 2: 45-year-old male had bilateral panuveitis, disc edema, and persistent headaches. SDOCT revealed cystoid macular edema and an epiretinal membrane. FFA showed vasculitis. Magnetic resonance imaging showed dilated ventricles. Patient was diagnosed with idiopathic

intracranial hypertension (IIH), likely to be presentation of non-parenchymal NBD with HLA B51 positivity. Ocular inflammation was stabilized with systemic immunosuppressants and biologicals. However chronic papilledema, which was secondary to IIH, resolved only after oral acetazolamide treatment.

Conclusions: This case series highlights the varied ocular presentations of NBD and crucial role of multimodal modal imaging in unveiling features of both ocular and neurological involvement in NBD. Early identification and timely initiation of therapy are critical to preserving visual function and improving overall prognosis.

Abstract No.: 200364

Clinical Features and Prognosis of Fuchs' Uveitis Syndrome in Yemen

First Author: Khaled **AL-HEMYARI**

Co-Author(s): Mahfoud **BAMASHMUS**

Purpose: To explore the clinical patterns and prognosis of FUS among Yemeni patients.

Methods: Retrospective Cross sectional study targeting 80 patients diagnosed as FUS in Magrabi Hospital at 2024.

Results: Results end with similar features of other researches with some modifications.

Conclusions: FUS is a diagnosis of exclusion. Heterochromia and iris nodules are uncommon in Yemeni FUS patients. PHACO+PC IOL implantation in Fuchs' Uveitis resulted in good visual outcomes, so early diagnosis and regular follow-up are very important.

Abstract No.: 201353

Clinical Observation of Long-Term Misdiagnosis of Ocular Toxoplasmosis

First Author: Liu **RUI**

Purpose: To analyze the causes of misdiagnosis and clinical characteristics of ocular toxoplasmosis (OT).

Methods: Review of clinical data of 3 cases (3 eyes) of OT misdiagnosed as summarize the clinical characteristics and analyze the causes of misdiagnosis.

Results: The average time from onset to initial misdiagnosis of Glaucoma in 3 patients was 15.5 days. The average time from onset to definitive diagnosis was 21.5 months. After confirming the diagnosis of OT, 3 patients received systemic antiparasitic agent therapy and were supplemented with local glucocorticoid drugs. The follow-up period was from 6 to 22 months. The best corrected visual acuity ranged from 0.05 to 0.4.

Conclusions: It is crucial to avoid misdiagnosis and strengthen the identification of OT because of recurrent illness, poor prognosis, and high blindness rate. Early

diagnosis and timely appropriate intervention are needed.

Abstract No.: 201688

Collateral Damage: A Case Report on Sympathetic Ophthalmia in a 35-Year-Old Female Filipino Patient

First Author: Pia Jejame **MAMARIL**

Co-Author(s): Angelique **CHIU-ANG**, Janis **FERRER-BERNARDO**

Purpose: Sympathetic Ophthalmia, is a rare autoimmune ocular inflammatory, with an incidence of approximately 0.03 per 100,000 persons per year. This case report details the progression, diagnosis, and management of SO, specifically analyzing the sequential blurring of vision in the fellow eye.

Methods: A 35-year-old Filipino female initially presented with a one-month history of bilateral sequential progressive painless blurring in the left eye, following a prior traumatic injury on the right eye. Initial ophthalmic examination revealed poor light projection and an intraocular pressure of 8 mmHg in OD, along with a supraorbital scar, enophthalmos, and Grade I traumatic hyphema. Visual acuity in OS was counting fingers, best corrected to 20/200, with granulomatous keratic precipitates, an IOP of 12 mmHg and optic nerve swelling. Despite multiple consultations and an initial impression of non-penetrating globe injury with intraocular hemorrhage on OD and optic disc edema on OS, further diagnostic workup- including an orbital MRI with contrast- led to the final diagnosis of a ruptured right globe, and Sympathetic Ophthalmia in OS.

Results: Early enucleation of the injured OD was performed, a measure known to improve the visual prognosis of the fellow eye. Also, following treatment with high-dose intravenous steroids, and immunosuppressive therapy, vision in OS improved to 20/20.

Conclusions: The incidence of SO following traumatic eye injury is approximately 0.19%. Management requires prompt hospitalization, administration of high-dose corticosteroids, and Immunosuppressive therapy, which are key to improving visual outcomes in affected patients.

Abstract No.: 205094

Cotrimoxazole Monotherapy With Steroid Cover as a Practical Alternative for Toxoplasma Chorioretinitis in Resource-Limited Settings: A Case Report

First Author: Adianne **ROSALIE**

Co-Author(s): Eka **WARNERIN**, Lely **WULANDARI**

Purpose: Standard therapy for toxoplasma chorioretinitis relies on pyrimethamine-sulfadiazine

or spiramycin, often unavailable in low-resource settings. Evidence on cotrimoxazole monotherapy is limited, particularly regarding outcomes and steroid integration. This report highlights cotrimoxazole as an accessible, affordable, practical alternative as the sole antiparasitic agent.

Methods: A 61-year-old patient with active toxoplasma chorioretinitis received oral cotrimoxazole (trimethoprim 160 mg/sulfamethoxazole 800 mg) twice daily for six weeks. Methylprednisolone 8 mg three times daily was added after antiparasitic initiation. Serial best-corrected visual acuity (BCVA), fundus findings, and intraocular pressure (IOP) were documented. Informed consent was obtained.

Results: BCVA improved from 0.50/0.10 at baseline to 0.63/0.32 by 10 weeks. IOP remained normal. Fundus exams showed progressive regression of retinal lesions and resolution of intraretinal edema with no systemic or ocular adverse effects. Cotrimoxazole acts by sequential inhibition of dihydropteroate synthase and dihydrofolate reductase, blocking tetrahydrofolate synthesis and parasite DNA replication with good ocular penetration. Compared with pyrimethamine-sulfadiazine it is cheaper, more available, and easier to administer. Favorable response likely reflects prompt initiation, adherence, lesion characteristics, host immunity, and adequate drug levels.

Conclusions: Cotrimoxazole monotherapy with steroid cover achieved meaningful visual and anatomic recovery and was well tolerated. This case supports cotrimoxazole as a practical, safe, and cost-effective option for ocular toxoplasmosis where standard regimens are unavailable. Planned follow-up includes visits at 3, 6, and 12 months with consideration of intermittent prophylaxis to reduce recurrence.

Abstract No.: 201397

Critical Crossroads: Where the Right Diagnosis Makes All the Difference

First Author: Sashwanthi MOHAN

Purpose: To highlight the importance of accurately differentiating between multifocal central serous chorioretinopathy (CSCR) and Vogt-Koyanagi-Harada (VKH) disease, as their management differs significantly, and to illustrate how detailed clinical and imaging evaluation guides timely treatment.

Methods: A 38-year-old female presented with headache and progressive bilateral visual blurring. Comprehensive ophthalmologic evaluation was performed, including fundus examination, fluorescein angiography (FA), optical coherence tomography (OCT), and systemic workup. Indocyanine green angiography (ICGA) was unavailable. Imaging and clinical findings were used to distinguish between CSCR and VKH, which both present with serous retinal detachments.

Results: FA showed multiple areas of early pinpoint hyperfluorescence and disc leakage. OCT confirmed choroidal thickening and serous retinal detachments. The patient's systemic symptoms, including headache, along with imaging findings, supported a diagnosis of VKH. Prompt treatment with intravenous methylprednisolone (1 g × 3 days) followed by tapering oral steroids resulted in significant visual improvement and near-complete resolution of serous detachments within 3 days.

Conclusions: Accurate differentiation between CSCR and VKH is critical due to vastly different treatment strategies. While CSCR may resolve with observation and stress management, acute VKH requires immediate high-dose corticosteroid therapy to prevent permanent vision loss. Multimodal imaging and thorough clinical assessment are essential for appropriate diagnosis and timely intervention.

Abstract No.: 200846

Cytomegalovirus Uveitis–Associated Endothelial Cell Damage: Clinical Outcomes and Long-Term Follow-Up

First Author: Chan-wei NIEN

Co-Author(s): Tsai-wei LIN

Purpose: To evaluate the impact of cytomegalovirus (CMV) anterior uveitis on corneal endothelial cell density (ECD) and to assess the efficacy of antiviral treatment in preventing progressive endothelial loss.

Methods: This retrospective observational study included 18 eyes of 18 immunocompetent patients in the period of 2020 to 2024 diagnosed with CMV anterior uveitis confirmed by anterior chamber paracentesis and viral PCR study. All patients underwent serial specular microscopy to measure ECD at baseline, during active inflammation, and after antiviral therapy with oral valganciclovir and topical 2% ganciclovir. Clinical parameters, including visual acuity, intraocular pressure, anterior chamber reaction grading, and fundus condition were also recorded.

Results: At diagnosis, mean ECD was significantly decreased compared to the contralateral unaffected eyes (2110 ± 328 vs. 2750 ± 290 cells/mm², $p < 0.01$). During active inflammation, further reduction in ECD was observed (mean loss $14.6\% \pm 4.2\%$). Following antiviral therapy, disease activity subsided and ECD stabilized, but complete recovery of cell counts was not achieved. BCVA decline (0.9 to 0.6), and IOP elevation (15.2 to 26.5 mmHg, $p < 0.001$) were also noted.

Conclusions: CMV anterior uveitis causes significant corneal endothelial cell damage, which can progress rapidly without prompt treatment. Early diagnosis with aqueous humor PCR and timely initiation of antiviral therapy are essential to control inflammation and preserve endothelial function. Long-term monitoring

remains necessary due to the high risk of recurrence and cumulative endothelial loss.

Abstract No.: 206046

Delayed Onset of Sunset Glow Fundus and Skin Manifestations in Vogt-Koyanagi-Harada Syndrome

*First Author: Syecha Tsania **ALAYDRUS***

*Co-Author(s): Halida **WIBAWATY**, Gagan Vihari Izzan **YULIANTO***

Purpose: To report a case of Vogt-Koyanagi-Harada syndrome with delayed onset of sunset-glow fundus and skin manifestations after eight months of treatment.

Methods: A 47-year-old male presented with a recent history of blurred vision, headache, ocular pain, and redness. Examination showed decreased visual acuity (UCVA 0.6/0.4), bilateral iris synechiae, and cataracts. The patient was subsequently diagnosed with uveitis with complicated cataracts and treated with oral and topical corticosteroids. Despite initial worsening, UCVA gradually improved from the third month of treatment. However, by the eighth month, the patient began to exhibit signs such as vitiligo, poliosis, and a sunset-glow fundus, leading to a diagnosis of Vogt-Koyanagi-Harada syndrome.

Results: The patient showed improvement in visual acuity from the third month of treatment and remained stable thereafter, demonstrating a good response to treatment and controlled ocular inflammation. Nevertheless, the skin manifestations appeared along with the sunset-glow fundus, which indicates loss of melanin granules in the choroid. It can appear alongside good UCVA if the depigmentation is mild or located away from the macula, the inflammation is well-controlled, and there are no significant vision-threatening complications.

Conclusions: This case illustrates that systemic and ocular depigmentation in VKH can arise much later than expected, reinforcing the need for prolonged follow-up and awareness that early resolution does not preclude late-stage manifestations.

Abstract No.: 205871

Development of Transparent Triamcinolone Acetonide Solution for Uveitis Treatment

*First Author: Yuanshao **CHENG***

*Co-Author(s): Wenjung **LO***

Purpose: Intravitreal corticosteroid therapy can be useful for noninfectious uveitis that involve the posterior segment of the eye. However, triamcinolone acetonide (TA) is a low water soluble suspension. It remains as white crystalline deposits in the vitreous and can cause visual disturbances. The aim of our research was to evaluate the efficacy of intravitreal

triamcinolone acetonide in conjunction with hyaluronic acid (HA) for the treatment of uveitis which involved the posterior segment.

Methods: TA is modified by amino acid using esterification, and the HA-based conjugates was synthesized from precursor using the carbodiimide coupling agent. The structure was identified by ¹H-NMR spectroscopy. After the purification and characterization, the anti-inflammatory effect was evaluated in the endotoxin-induced uveitis (EIU) animal model. EIU was induced by a single intravitreal injection of LPS using a Hamilton microinjector under a dissecting microscope. Phosphate-buffered saline and HA conjugates were administered to the eyes. Aqueous samples were collected at the start of vitrectomy by limbal paracentesis using a 30-gauge needle and stored at -80°C for further cytokine determination.

Results: The designed HA-TA coupling reaction reveals >98 % conjugation efficiency in the dimethyl sulfoxide/water system. The HA-TA conjugates is water soluble and transparent which is different from the commercial TA suspension. The cell number and protein in aqueous humor were significant decreased in EIU model.

Conclusions: HA-TA was successfully synthesized and revealed transparent parties compared with Shincort. Potential treatment effects of HA-TA conjugates were observed in EIU animal model.

Abstract No.: 201435

Diagnosing Multiple Evanescent White Dot Syndrome: A Case Study and Clinical Considerations

*First Author: Crystal **CHEONG YIJING***

*Co-Author(s): Manoharan **SHUNMUGAM**, Hwei Yin **TEOH**, Hon Seng **WONG***

Purpose: To present a case study of Multiple Evanescent White Dot Syndrome (MEWDS), an uncommon, benign retinal disorder.

Methods: A 30-year-old male presented with a three-week history of temporal 'veil-like' disturbance in his right eye. A comprehensive ophthalmologic evaluation was performed, including Optos widefield fundus photographs and fundus autofluorescence (FAF), optical coherence tomography (OCT), fundus fluorescein angiography (FFA), indocyanine green angiography (ICGA), and visual field testing. The clinical features were compared to the current literature on MEWDS to analyze the diagnostic approach and outcomes.

Results: The patient exhibited unilateral, right-eye characteristic findings of MEWDS: multiple small, whitish dots visualized through ultra-wide field imaging. Ultra-wide field imaging is crucial for MEWDS, offering a full retinal view to detect peripheral white dots often missed by standard imaging. FAF revealed these lesions as hyperfluorescent areas. FFA also showed

hyperfluorescent leakage, while ICGA demonstrated peripheral choriocapillary leakages in the initial phase. OCT showed foveal granularity, and slit-lamp examination revealed grade 1–2 anterior vitreous cells. Visual field testing demonstrated a temporal scotoma. The patient was prescribed oral prednisolone tablets to be tapered over a course of six weeks.

Conclusions: This case highlights the need for early MEWDS recognition, timely diagnosis, clear communication, and more research.

Abstract No.: 201537

Diagnostic Value of Arm-to-Retina Time in Fundus Fluorescein Angiography in Patients With Uveitis

First Author: Aneena Anna **THOMAS**

Co-Author(s): Padmamalini **MAHENDRADAS**

Purpose: Fluorescein angiography (FFA) is essential for evaluating retinal circulation and monitoring treatment response in uveitis. Arm-to-retina time (ART), which reflects systemic circulation, may be prolonged in both systemic and ocular inflammation, serving as a potential marker of vascular dysfunction and hemodynamic changes.

Methods: A retrospective review was conducted of electronic medical records from 94 patients from the uveitis department. Those with increased ART during FFA were included in this study.

Results: The study included 93 patients (mean age: 44.3 years; 55% female, 45% male). ART measurements, the mean ART decreased from 21.6 seconds to 19.3 seconds, indicating improved retinal perfusion following treatment. ART positively correlated with age but showed no sex-related differences. Posterior uveitis was the most common anatomical diagnosis (48%), followed by panuveitis (13%) and intermediate uveitis (12%). The most common clinical diagnoses included idiopathic uveitis (21.5%), retinal vasculitis (17.2%), and tubercular uveitis (12.9%). Notably, delayed ART led to the diagnosis of hyper-homocysteinemia in addition to inflammatory causes.

Conclusions: Prolonged ART was observed in cases of posterior uveitis and panuveitis, supporting its role as a functional biomarker for posterior segment inflammation/ circulation, which got better following targeted therapy.

Abstract No.: 205982

Drug-Induced Anterior Uveitis: A Case to Remember

First Author: Hitisha **MITTAL**

Co-Author(s): Sangeeta **ABROL**, Harinder **SETHI**, Himani **SHARMA**, Ritu **SINGH**

Purpose: To report a rare case of late onset brimonidine associated granulomatous anterior uveitis in a patient with primary open angle glaucoma (POAG).

Methods: We report a single case of a 57-year-old female with bilateral primary open-angle glaucoma on topical brimonidine and timolol for 2 years, who presented with a 2-month history of blurred vision, redness, glare, and pain in the right eye. Comprehensive ophthalmic evaluation (including slit-lamp biomicroscopy, intraocular pressure measurement, fundus examination) and detailed systemic investigations were performed to detect the underlying etiology and instill appropriate and timely treatment.

Results: Her right eye workup revealed ciliary congestion, 1+ AC cells and diffuse non-pigmented mutton fat keratic precipitates suggestive of granulomatous anterior uveitis with an IOP of 20, CDR of 0.8, no vitritis and normal fundus. Left eye did not reveal any signs of inflammation. Systemic tests revealed normal blood counts, ESR and CRP. Mantoux, TB Gold, HRCT chest, serum ACE, serum calcium, HIV, TPHA were negative. All investigations were negative which led to suspicion of brimonidine associated AAU. Brimonidine was withheld for a week without initiating steroids. At 1 week follow up, the mutton fat keratic precipitates (KPs) reduced dramatically and IOP reduced to 12 mm Hg. The KPs showed complete resolution at 3 weeks, with no recurrence at 1.5 year follow up.

Conclusions: Patients on long term brimonidine can rarely present with features of granulomatous anterior uveitis, which is completely reversible after cessation of the offending drug. Such patients often do well without long term treatment with steroids.

Abstract No.: 203757

Early Immunomodulatory Therapies for Noninfectious Anterior Scleritis

First Author: Chansathya **KHIEU**

Purpose: The objective of this case report is to use early immunomodulatory drugs to reduce pain and activity caused by non-infectious anterior scleritis and also monitor the time to non-activity.

Methods: Clinical cases of non-infectious scleritis, collected between March and September 2024, were given high-dose oral corticosteroid and methotrexate as first line to treat non-infectious scleritis. Scleritis grading was documented after the instillation of the

2.5% phenylephrine test. Photography grading on every follow-up, clinical examination was done for each visit until the patient achieved a period of inactivity without any medication.

Results: Period to inactivity: 4.87 weeks 6 weeks: 3 patients (4 eyes) 4 weeks: 5 patients (5 eyes) 2 weeks: 1 patient (1 eye) Recurrences/Relapses 1 patient received a cataract surgery and a recurrence of anterior scleritis in one eye: 12 weeks 1 patient had an episode of recurrent 24 weeks

Conclusions: Early cocktail therapy of corticosteroid and methotrexate is a safe and effective first-line treatment for non-infectious anterior scleritis. In such cases, it can help patients reduce signs (redness) and symptoms (pain) in a more rapid time frame and, as a result, improve quality of life.

Abstract No.: 201346

Efficacy and Safety Profiles of Immunomodulatory Therapies in the Management of Vogt-Koyanagi-Harada Disease

First Author: Yunhua LOO

Co-Author(s): Anita CHAN, Soon Phaik CHEE, Milton CHEW, Jay SIAK, Shaan WIRYASAPUTRA

Purpose: Early initiation of immunomodulatory therapy (IMT) is advocated in Vogt-Koyanagi-Harada (VKH) disease. The increasing availability of biologics has expanded the repertoire of treatment options and drug selection is determined by physician preference and patient response. This study was aimed at evaluating the clinical efficacy and safety profiles of IMT in VKH patients.

Methods: We performed a retrospective review of 48 patients receiving IMT between 2005 and 2025 at a single tertiary center in Singapore.

Results: Azathioprine (AZA) was the most frequently prescribed first-line agent (83.3%), followed by methotrexate (MTX; 8.3%) and mycophenolate mofetil (MMF; 6.25%). Escalation of therapy occurred in 34 patients due to drug intolerance or suboptimal response. In patients who achieved clinical quiescence, there were no significant differences in final visual acuity or time to quiescence between AZA, MTX and MMF. However, patients who required biologics for disease control took a significantly longer time to reach quiescence. Adverse events (AEs) were most frequent with AZA (65.8%), particularly transaminitis and leukopenia. Comparatively, reports of AEs were significantly lower with MMF (19.2%), MTX (15.8%) and TNF α -inhibitors (12.5%).

Conclusions: Efficacy outcomes were comparable across AZA, MTX, MMF, and biologics, although biologics were associated with delayed disease control. AZA was linked to higher AE rates, but this could be due to reporting bias, as it was preferentially prescribed

first-line due to its lower cost. These findings underscore the importance of close monitoring in patients receiving IMT. Ultimately, treatment decisions should be individualized, balancing factors including clinical efficacy, safety and cost.

Abstract No.: 201230

Electrodiagnostic Findings in Nine Patients With Multiple Evanescent White Dot Syndrome

First Author: Chin Pey YAP

Co-Author(s): Andrew BROWNING, Joanna DACOSTA, Ranjeet PANDIT, Stephanie QUINN

Purpose: To describe the electroretinographic (ERG) abnormalities in patients with multiple evanescent white dot syndrome (MEWDS) and their evolution during follow-up.

Methods: Nine patients diagnosed with MEWDS were retrospectively reviewed. Clinical presentation, associated systemic history, and multimodal imaging were collected. Full-field ERG, multifocal ERG (mfERG), and pattern ERG (PERG) were analysed during the acute and recovery phases.

Results: The cohort comprised eight females and one male, with a mean age of 41 years (range 22-87). The majority presented with unilateral disease, though one patient demonstrated subclinical fellow eye involvement. Eight of nine patients showed ERG abnormalities. The most frequent finding was reduction of both a- and b- wave amplitudes on photophobic and scotopic testing. Isolated b-wave reduction was seen in two patients, while one patient had preserved ERG responses bilaterally. mfERG and PERG were commonly reduced, with some cases showing foveal sparing. In one patient, interpretation was limited by a coexisting epiretinal membrane. Triggers included recent viral illness (n=2) and COVID-19 infection or vaccination (n=2). Follow-up ERGs showed partial or complete recovery in most cases, although residual deficits persisted in some, particularly in photopic responses.

Conclusions: MEWDS is associated with transient generalised photoreceptor dysfunction on ERG, predominantly affecting cone-driven responses. mfERG and PERG further highlight macular and ganglion cell involvement. While most patients showed recovery in parallel with clinical improvement, incomplete convalescence was observed in some. ERG provides valuable objective evidence of retinal dysfunction in MEWDS and may assist in monitoring disease course and functional recovery.

Abstract No.: 206971

Evaluation of the Intraocular Total IgE Level and Its Ratio With Serum IgE Level for the Diagnosis of Ocular Toxocariasis in Children and Adults: A Retrospective Comparative Study

First Author: Jing **FENG**

Co-Author(s): Yong **TAO**, Shuang **ZHANG**

Purpose: Ocular Toxocariasis (OT) is characterized by complicated clinical manifestations, which make it difficult to diagnose. In this study, we mainly evaluated the diagnostic values of intraocular fluid (IF) total IgE level and IF/Serum IgE ratio in OT and compared the differences between child and adult patients.

Methods: Seventy-six patients with 52 children (<16 years) and 24 adults with clinically diagnosed OT and 64 patients with non-OT uveitis were enrolled in this study. The paired IF and serum samples were collected for total IgE, total IgG, and specific IgG testing. The IF IgE levels and IF/Serum IgE ratios were compared between child and adult patients. The area under the curve (AUC) was generated to assess the diagnostic performance of the above indicators.

Results: The IF IgE level was significantly higher in child patients than in adult patients (1671.79 ± 1425.97 versus 784.44 ± 544.73 ng/ml, $p=0.015$). Besides, the IF/Serum IgE ratio showed a similar trend with 24.02 ± 6.10 in children and 7.68 ± 5.05 in adults ($p=0.001$). The best cutoff value of the IF IgE concentration was 10.65 ng/ml, yielding 77.6% (95%CI, Confidence Interval, 66.4–86.1%) sensitivity and 98.4% (95%CI, 90.5–99.9%) specificity. The IF IgE level showed lower AUC than that of IF specific IgG level (0.925 versus 0.975, $p=0.037$). However, the AUC of IF/Serum IgE ratio for OT was significantly higher than that of GWC (0.934 versus 0.527, $p<0.0001$). The best cutoff value of IF/Serum IgE ratio was 0.48 with the sensitivity of 78.4% (95%CI, 67.0–86.8%) and specificity of 98.4% (95%CI, 90.5–99.9%). For the diagnosis of child OT, the cutoff value of IF IgE level of child OT was 13.10 ng/ml with the high sensitivity of 82.7% (95%CI, 69.2–91.3%) while the best cutoff value of 10.65 ng/ml for adult OT yielded only 66.7% (95%CI, 44.7–83.6%) sensitivity. However, the sensitivity of IF/Serum IgE ratio for child OT (86.3%, 95%CI, 73.1–93.8%) was close to that for adult OT (87.0%, 95%CI, 65.3–96.6%).

Conclusions: Both IF IgE level and IF/Serum IgE ratio demonstrated good diagnostic performance for ocular toxocariasis and higher sensitivity of IF IgE level was noted for the diagnosis of child OT.

Abstract No.: 201326

Examining the Relationship Between Ocular Manifestations and Systemic Autoimmune Diseases: A Meta-Analysis and Systematic Review

First Author: Mosaab **MOHAMED ELMAHDI**

Co-Author(s): Gong **YU**

Purpose: To quantify the prevalence and risk associations of ocular manifestations in patients with systemic autoimmune diseases and to evaluate how specific disease subtypes influence ophthalmic outcomes.

Methods: A systematic literature search of PubMed, Embase, and Cochrane Library was performed for studies published from January 2000 to June 2025. Eligible studies reported ocular findings in adults with rheumatoid arthritis, systemic lupus erythematosus, ankylosing spondylitis, and other systemic autoimmune disorders. Data extraction included study design, patient demographics, ocular manifestations (e.g., uveitis, scleritis, keratoconjunctivitis), and systemic disease activity. Meta-analyses were conducted using a random-effects model to calculate pooled prevalence rates and odds ratios (ORs). Heterogeneity was assessed with I^2 statistics, and publication bias was evaluated via funnel plots and Egger's test.

Results: Forty-five studies encompassing 12,634 patients met inclusion criteria. The overall pooled prevalence of any ocular manifestation was 29% (95% CI, 24–34%; $I^2 = 68\%$). Uveitis occurred in 12% (95% CI, 9–15%; OR vs. controls, 3.6; 95% CI, 2.8–4.6), scleral inflammation in 7% (95% CI, 5–9%; OR, 2.4; 95% CI, 1.8–3.2), and keratoconjunctivitis sicca in 18% (95% CI, 14–22%; OR, 4.1; 95% CI, 3.2–5.2). Ankylosing spondylitis patients exhibited the highest uveitis risk, while Sjögren's syndrome had the greatest dry eye prevalence. No significant publication bias was detected.

Conclusions: Ocular involvement is common across systemic autoimmune diseases, with disease-specific patterns that warrant tailored ophthalmic screening and management. Early detection of eye complications may improve visual prognosis and overall disease control.

Abstract No.: 201934

From Dengue to Lupus: Lupus Vasculitis Presenting as Acute Visual Loss During Dengue Fever

First Author: Dinda **ZHAFIRA**

Co-Author(s): Mochammad **SJARIFUDHIN**

Purpose: Retinal vasculitis may result from infectious or non-infectious causes, requiring different management approaches. In dengue-endemic regions, ocular vasculitis can be associated to dengue, yet systemic lupus erythematosus (SLE) can present similarly and

cause misdiagnosis. We report a case initially suspected as dengue-related vasculitis but ultimately diagnosed as SLE-associated vasculitis.

Methods: A 28-year-old woman was admitted with headache and intermittent fever with thrombocytopenia five days before admission. On admission, she developed blurred vision and was referred to ophthalmology department. Ophthalmic evaluation was supplemented by systemic investigations including autoimmune serologies.

Results: On presentation, best-corrected visual acuity was 6/7.5 in the right eye and 6/9 in the left eye. The anterior segment was unremarkable. Fundus examination revealed white exudates, hemorrhagic spots and vascular sheathing. A presumptive diagnosis of dengue vasculitis was made, and the patient received high-dose systemic corticosteroids for three days, with no visual improvement. Subsequent autoimmune workup returned a positive ANA 2 (antinuclear antibody 2), supporting a diagnosis of SLE. She was started on hydroxychloroquine and azathioprine under care of the internal medicine team. On follow-up, vision remained stable without further deterioration.

Conclusions: In dengue-endemic settings, retinal vasculitis manifesting during or after febrile illness may lead to an initial misdiagnosis to dengue-related ocular complications. This case illustrates the necessity of considering underlying autoimmune etiologies such as systemic lupus erythematosus especially in a young woman. Early diagnosis and immunosuppressive therapy may help preserve vision.

Abstract No.: 204377

Frosted Branch Angiitis Masquerading As Primary Vitreoretinal Lymphoma: A Case Report

First Author: Arnold Shau Hei **CHEE**

Co-Author(s): Mary **HO**, Sophia Ling **LI**, Andrew Chun Yue **MAK**, Alvin **YOUNG**

Purpose: To report an atypical case of primary vitreoretinal lymphoma (PVRL) presenting as frosted branch angiitis (FBA), to describe its clinical course and treatment outcome.

Methods: A case report.

Results: A 65-year-old woman with a history of stage 3 diffuse large B-cell lymphoma in complete remission presented with one month of progressive left eye blurring, with a visual acuity of 20/100. Examination revealed temporal FBA, mild vitritis, retinal blot hemorrhages and subretinal infiltrates. An initial diagnosis of viral retinitis was made, and intravitreal Foscarnet was given. However, aqueous polymerase chain reaction was negative for viruses. Her condition progressed despite four foscarnet injections, with worsening of subretinal infiltration, vitritis, and the

development of exudative retinal detachment. OCT-M also revealed interval increase in subretinal pigmented epithelium infiltrates and vitreous hyper-reflectivity, leading to the suspicion of PVRL. MRI Brain did not show lymphoma infiltration, whereas diagnostic vitrectomy yielded atypical cells, suggestive of PVRL. Treatment was switched to intravitreal methotrexate (MTX), leading to improvement in exudative retinal detachment and infiltrates after twice weekly induction and weekly consolidation MTX injections. A complication of MTX-induced keratopathy developed and was managed successfully with bandage contact lens and topical lubricants.

Conclusions: FBA can be a rare presenting feature of PVRL. A high index of suspicion is crucial in lymphoma patients presenting with atypical retinitis, particularly when there is resistance to antiviral therapy. OCT-M can provide invaluable diagnostic cues, while intravitreal MTX demonstrated efficacy in local tumor control, but clinicians should be aware of potential ocular side effects such as keratopathy.

Abstract No.: 206446

Green Tea Extract Regulates Th1 and Th17 Sub-Populations in Experimental Autoimmune Uveitis

First Author: Bo Man **HO**

Co-Author(s): Lin **DU**, Jiahui **LI**

Purpose: Green tea extract (GTE) has been shown to reduce experimental autoimmune uveitis (EAU) by suppressing T helper 1 (Th1) and T helper 17 (Th17) cell-related gene expression. Its main catechin, Epigallocatechin-3-gallate (EGCG), also inhibits Th1 and Th17 differentiation and has anti-inflammatory effects. Our previous work found GTE impedes in vitro Th1 and Th17 differentiation. This study investigated the effects of GTE on the viability, migration, and proliferation of Th1 and Th17 cells, as well as changes in T cell subset distribution in EAU animals treated with GTE.

Methods: Naïve CD4⁺ T cells from healthy C57BL/6J mice were cultured with Th1 or Th17 polarising cytokines and GTE for 3 days, then analysed by flow cytometry. EAU was induced in C57BL/6 mice, which received 13 doses of GTE during disease induction. Disease progression was monitored by fundus imaging, confocal scanning laser ophthalmoscopy, and optical coherence tomography. On day 21 post-induction, eye and lymph node cells were collected for flow cytometry.

Results: T cell proliferation and Th17 cell migration were reduced under GTE treatment. The apoptotic sub-populations under Th1 or Th17 polarisation were rescued by GTE treatment. Cell viability, however, was suppressed after GTE incubation, with Th17 cells showing a higher survival rate. Systemic pathogenic Th cell and Th17 sub-populations were also suppressed by GTE in the EAU model.

Conclusions: Our study provides additional support for GTE as a potent agent for alleviating EAU-induced intraocular inflammation. We also supplemented that GTE also modulates other cellular mechanisms apart from impeding differentiation in T cell sub-populations.

Abstract No.: 208396

Growth Hormone Releasing Hormone Signaling Drives Th17 Differentiation and Autoimmune Ocular Inflammation

First Author: Lin DU

Co-Author(s): Wai Kit CHU, Bo Man HO, Jian JIAN LI, Chi Pui PANG

Purpose: Th17 dysregulation fuels tissue inflammation in autoimmune eye disease. We investigated whether growth hormone-releasing hormone receptor (GHRH-R) signaling regulates Th17 differentiation and contributes to autoimmune ocular pathology.

Methods: GHRH-R expression was profiled during in vitro CD4⁺ T-cell polarization. Pharmacologic gain- and loss-of-function (GHRH agonist vs antagonist) and genetic deficiency of Ghrhr were used to modulate the pathway. Downstream signaling was assessed by STAT3 phosphorylation and Th17 transcriptional programs. Functional relevance was tested in Th17-mediated models of ocular and neural autoimmunity, with clinical scoring, leukocyte infiltration, and cytokine analysis (IL-17A, GM-CSF) as readouts.

Results: Naïve CD4⁺ T cells lacked detectable GHRH-R, which was robustly induced during Th17 polarization. Activating GHRH-R enhanced STAT3 phosphorylation, upregulated Th17 lineage genes, and promoted both non-pathogenic and pathogenic Th17 differentiation in vitro. Conversely, pharmacologic blockade or Ghrhr deficiency reduced pSTAT3, constrained Th17 commitment, and dampened the pathogenic Th17 transcriptional signature. In vivo, augmenting GHRH-R signaling exacerbated Th17-driven inflammation, whereas antagonism or receptor deficiency mitigated disease severity, with reduced ocular inflammatory scores, diminished inflammatory cell infiltration, and lower IL-17A/GM-CSF production. These effects were consistent across Th17-mediated ocular and neural models, supporting pathway generalizability.

Conclusions: GHRH-R signaling is a critical extrinsic cue that licenses STAT3 activation, Th17 lineage specification, and downstream tissue inflammation in the eye. Targeting GHRH-R offers a mechanistically grounded strategy to modulate Th17 pathogenicity in autoimmune ocular disease.

Abstract No.: 203382

Herpes Simplex Virus Reactivation Masquerading As Anterior Nodular Scleritis and Keratitis With Excellent Antiviral Response: A Case Report

First Author: Joyce Teo WEI TING

Co-Author(s): Bashajan SOWKATHALI

Purpose: To describe a case of herpes simplex virus (HSV) reactivation presenting as anterior nodular scleritis with secondary keratitis in an immunocompetent patient.

Methods: A 56-year-old lady with no systemic illness presented with two days of redness and pain in the right eye. Best corrected visual acuity was 6/7.5 in the right eye and 6/6 in the left eye. Slit-lamp examination revealed temporal and superior conjunctival injection of the right sclera without corneal or anterior chamber involvement. The left eye was normal.

Results: Initial treatment with topical corticosteroids and oral anti-inflammatory medications was ineffective. Oral prednisolone was started after unremarkable autoimmune and infectious workups, leading to improvement of sclera inflammation within a month. One month later, she developed recurrent blurred vision in the right eye, with visual acuity dropping to 6/10. Slit lamp examination showed a geographic epithelial defect with terminal blubs. Steroids were discontinued, and topical and oral acyclovir were initiated, resulting in marked improvement with resolution of scleritis. However, she experienced recurrent right eye redness two weeks after stopping oral acyclovir, prompting re-initiation of oral acyclovir and a tapering course of topical corticosteroids.

Conclusions: This case highlights the diagnostic challenges of scleritis and emphasizes the importance of considering infectious causes, including herpes simplex virus, in patients unresponsive to standard therapy, even in immunocompetent individuals. Early recognition and prompt antiviral treatment can rapidly resolve inflammation, prevent vision-threatening complications, and preserve vision.

Abstract No.: 201725

Intravitreal Ranibizumab for the Treatment of Cystoid Macular Edema Secondary to Cytomegalovirus Retinitis

First Author: Milton CHEW

Purpose: Cytomegalovirus (CMV) retinitis is typically managed with systemic and intravitreal antivirals. Some patients subsequently develop reactive cystoid macular edema (CME), leading to visual decline. Local steroid injections are contraindicated in immunocompromised patients due to the risk of worsening or reactivating the underlying CMV infection. Intravitreal anti-VEGF (Vascular Endothelial Growth Factor) therapy offers a potential alternative.

Methods: We report the case of a monocular renal transplant patient on systemic immunosuppression with known CMV viremia. He presented with zone 1 CMV retinitis in his only functional eye, confirmed by positive tetraplex on aqueous testing and a CMV viral load of 930,380 copies/ml. Treatment consisted of oral valganciclovir (900 mg BD), as well as intravitreal ganciclovir injections twice weekly for 1 month, followed by weekly injections for 2 months, until complete resolution of the retinitis.

Results: Following resolution of CMV retinitis, the patient subsequently developed CMO with a decrease in visual acuity. There was no evidence of retinal ischemia on fluorescein angiogram. The CMO initially responded with Intravitreal ranibizumab with improvement in vision. However, he failed a treat-and-extend regime at 8-weeks mark. He was subsequently switched to Intravitreal aflibercept with sustained anatomical and functional response, and has since remained dry. His visual acuity was maintained at 6/12.

Conclusions: Intravitreal anti-VEGF agents are effective for managing CMO secondary to CMV retinitis in immunocompromised patients, where corticosteroids are contraindicated. This case supports a non-ischemic mechanism of underlying reactive CMO in CMV retinitis.

Abstract No.: 208472

Ketogenic Diet Modulates Immune Cell Transcriptional Landscape and Ameliorates Experimental Autoimmune Uveitis in Mice

First Author: *Runping DUAN*

Purpose: Uveitis manifests as an immune-mediated inflammatory disorder within the eye, posing a serious threat to vision. The ketogenic diet (KD) has emerged as a promising dietary intervention, yet its impact on the immune microenvironments and role in uveitis remains unclear.

Methods: Utilizing single-cell RNA sequencing (scRNA-seq) data from the lymph node and retina of mice, we conduct a comprehensive investigation into the effects of KD on immune microenvironments. Flow cytometry is conducted to verify the potential mechanisms.

Results: This study demonstrates that KD alters the composition and function of immune profiles. Specifically, KD promotes the differentiation of Treg cells and elevates their proportion in healthy mice. In response to experimental autoimmune uveitis challenges, KD alleviates the inflammatory symptoms, lowers CD4+ T cell pathogenicity, and corrects the Th17/Treg imbalance. Additionally, KD decreases the proportion of Th17 cells and increases Treg cells in the retina. Analysis of combined retinal and CDLN immune cells reveals that retinal immune cells, particularly CD4+ T cells, exhibit heightened inflammatory responses, which KD partially reverses.

Conclusions: The KD induces inhibitory structural and functional alterations in immune cells from lymph nodes to retina, suggesting its potential as a therapy for uveitis.

Abstract No.: 201529

Long-Term Outcome of Myopic Choroidal Neovascularization Treatment and Its Correlated Factors

First Author: *De-kuang HWANG*

Co-Author(s): *Yu-chieh WU*

Purpose: To evaluate the long-term visual and anatomical outcomes of anti-VEGF therapy for mCNV in a tertiary referral center and to identify factors associated with treatment response.

Methods: This retrospective study was conducted at Taipei Veterans General Hospital and included patients diagnosed with mCNV who received anti-VEGF treatment. The primary outcome was the change in best-corrected visual acuity (BCVA) from baseline to three years, along with recurrence and blindness rates. Secondary outcomes included changes in central macular thickness (CMT), grading of myopic maculopathy, presence of subretinal fluid (SRF), intraretinal fluid (IRF), hemorrhage, subretinal hyperreflective material (SHRM), number of injections, and factors predictive of visual outcomes.

Results: A total of 125 eyes from 118 patients with mCNV were included. The mean patient age was 55 years, with a female predominance (75.2%). Treatments included bevacizumab (30.4%), aflibercept (40.8%), and ranibizumab (28.8%). At the three-year follow-up, the BCVA improved significantly from logMAR 0.57 to 0.42 ($p < 0.05$), and the CMT decreased from 302.18 μm to 264.51 μm . The recurrence rate was 29%. Older age, better baseline BCVA, and higher initial myopic maculopathy grade were significantly associated with less visual improvement. Among these, initial myopic maculopathy grading was significantly associated with final blindness. Additionally, increased choroidal thickness was correlated with a higher recurrence rate.

Conclusions: aVEGF therapy for mCNV provides sustained improvements in both visual acuity and anatomical outcomes over three years. Baseline age, BCVA, and myopic maculopathy grade were significant predictors of long-term outcomes.

Abstract No.: 202518

Management of Hypotonic Choroid Detachment Following Uneventful Pars Plana Vitrectomy in a Juvenile Idiopathic Arthritis-Associated Uveitis Case

First Author: Ming-chieh TSAI

Co-Author(s): Shu-chun KUO

Purpose: Ocular hypotony is a rare but challenging complication in juvenile idiopathic arthritis-associated uveitis (JIA-U). We report a case of intractable postoperative hypotony and discuss its management in the context of current literature.

Methods: A 21-year-old woman with long-standing JIA-U presented with multiple ocular complications, including posterior and peripheral anterior synechiae and cyclitic membrane formation. She underwent synechiotomy, anterior chamber reconstruction, and vitrectomy with intravitreal dexamethasone implant. Postoperatively, persistent hypotony with choroidal detachment developed. Intravitreal SF6 injections failed to restore intraocular pressure (IOP). Silicone oil tamponade was subsequently performed.

Results: Silicone oil tamponade successfully stabilized IOP, consistent with prior reports that it may serve as a temporary measure in uveitic hypotony. However, the effect is often transient, and repeat procedures are frequently required. The Multicenter Uveitis Steroid Treatment (MUST) Trial identified risk factors for hypotony, including younger age of onset, long disease duration, history of vitrectomy or cataract surgery, synechiae, and iris abnormalities. JIA-U is particularly associated with higher risk and poor outcomes. Our patient exhibited several of these features, explaining the refractory course. Despite aggressive treatment, the visual prognosis in uveitic hypotony remains poor.

Conclusions: Postoperative hypotony in JIA-U remains a therapeutic challenge. Silicone oil tamponade can temporarily restore IOP, but long-term outcomes are guarded. Early recognition of risk factors and timely intervention are essential to prevent irreversible vision loss.

Abstract No.: 205246

Management of Severe Post-Injection Endophthalmitis: A Case Series

First Author: Inara HAJI

Co-Author(s): Lala SAIDOVA

Purpose: To describe diagnosis, management strategies, and long-term outcomes in three patients who developed severe infectious complications (keratitis/endophthalmitis) after intravitreal anti-VEGF injections, and to emphasize lessons for empirical antibiotic coverage.

Methods: We retrospectively reviewed three consecutive cases with post-anti-VEGF infectious

complications. For each case we document patient demographics, ophthalmic and systemic history, time course, microbiologic findings, treatment protocols (medical and surgical), and one-year follow-up outcomes. Empirical intravitreal vancomycin + ceftazidime was initially used; therapy was adjusted based on culture and sensitivity results. Vitrectomy was attempted when ocular status permitted.

Results: All three patients were diabetic, two of them presented with corneal epithelial defects and stromal infiltration, hypopyon, the third showed corneal edema without epithelial loss, hypopyon, hyphema and rubeosis. B-scan revealed vitreous opacities in all cases. Gram-positive organisms were isolated in all cases; in vitro sensitivity showed strong susceptibility to vancomycin and resistance to ceftazidime only in second case. First patient underwent multiple intravitreal vancomycin+ceftazidime injections, the second - intravitreal vancomycin injections; third patient underwent vitrectomy + intravitreal vancomycin+ceftazidime, anti-VEGF injections + air. At final follow-up, no eye required enucleation or developed phthisis; pain resolved in all. Best recorded visual outcomes ranged from light perception to 1,3 logMAR, stable relative to presentation.

Conclusions: Post-anti-VEGF infections can be vision-threatening, particularly in diabetic patients. Prompt microbiological sampling, targeted intravitreal antibiotics, and individualized surgical intervention are crucial. Early recognition and tailored management can preserve ocular integrity and optimize outcomes in complex post-injection infections.

Abstract No.: 200970

Metabolic Reprogramming Enables Ocular Persistence of *Klebsiella pneumoniae* via Glycolysis and Iron Acquisition

First Author: Lu PING

Purpose: To determine how *K. pneumoniae* adapts metabolically to the intraocular environment and the roles of glycolysis and siderophore-mediated iron acquisition in endophthalmitis.

Methods: Proteomics compared a clinical isolate in vitreous-mimicking medium vs. LB. Glycolytic (pfkA, pykF) and siderophore (entB) mutants were assessed for growth under hypoxia/iron depletion and in a murine intravitreal infection model measuring bacterial burden, cytokines, visual acuity, lactate, and iron.

Results: Vitreous-like conditions upregulated PfkA, PykF, and EntB. Mutants showed impaired growth, reduced intraocular colonization, attenuated IL-6/TNF- α responses, and better visual outcomes. Double mutants were nearly avirulent. Lactate and iron were decreased in mutant-infected eyes.

Conclusions: Glycolysis and iron acquisition are essential for *K. pneumoniae* persistence and virulence

in the eye. Targeting metabolic reprogramming may offer adjunctive therapy for bacterial endophthalmitis.

Abstract No.: 201698

Outcomes of Anti-Tubercular Therapy in Patients With Ocular Tuberculosis: A Retrospective Study

First Author: Sunil THAKALI

Co-Author(s): Hom Bahadur GURUNG, Mohini SHRESTHA, Smita SHRESTHA

Purpose: Ocular tuberculosis (TB) is an extrapulmonary manifestation of TB that can cause significant visual morbidity if undiagnosed or inadequately treated. This study evaluated the outcomes of anti-tubercular therapy (ATT) in patients with ocular TB.

Methods: This retrospective study analyzed data from 17 patients diagnosed with ocular TB and treated with ATT between January 2018 and December 2022. Patients received 9-12 months of ATT along with adjunctive steroids. Demographic information, clinical manifestations, diagnostic test results, treatment details, and outcomes were collected from medical records. Primary outcomes included changes in visual acuity and disease recurrence at 1-year follow-up.

Results: The mean age of patients was 40 years, and 58.8% were female. Unilateral involvement was more common (64.7%). The most frequent clinical presentations were serpiginous choroidopathy, sclerokeratitis, and anterior uveitis (17.6% each). A majority of patients (70.6%) received 12 months of ATT. Adjunctive therapy included oral steroids (70.6%) and topical steroids (82.4%). Tuberculosis-specific tests were positive in 29.4% of patients, with a median Mantoux induration of 20.5 mm.

Conclusions: Patients with ocular TB presented with varied clinical manifestations and responded favorably to prolonged ATT with adjunctive corticosteroids. Structured treatment and follow-up are crucial for improving visual outcomes and reducing recurrence rates.

Abstract No.: 203055

Postviral Multiple Evanescent White Dot Syndrome: A Case Report

First Author: Jessica

Co-Author(s): Mia, Qilin

Purpose: To report a rare case of Multiple Evanescent White Dot Syndrome (MEWDS) following a febrile illness in a young female patient.

Methods: A 17-year-old female presented with acute vision loss and visual field defects in the right eye after a fever. Comprehensive ophthalmic examination included dilated fundus examination, fluorescein sodium angiography, fundus autofluorescence, and optical coherence tomography (OCT).

Results: Clinical features included faint perimacular yellowish-white lesions, wreath-like hyperfluorescence on angiography, and disruption of the ellipsoid and interdigitation zones on OCT. The patient was diagnosed with MEWDS and treated with periocular and topical corticosteroids. After three months, best-corrected visual acuity recovered to 1.0.

Conclusions: MEWDS may occur following systemic viral infection and can lead to significant visual impairment. A thorough ocular evaluation is crucial for diagnosis. The condition may have a favorable visual outcome with appropriate treatment.

Abstract No.: 202240

Presentation and Management of Bilateral Lipid Retinopathy and Proliferative Diabetic Retinopathy in a Patient With Gaucher's Disease: A Case Report

First Author: Daliya SARI

Co-Author(s): Susan MACCALLUM, Amy PAI

Purpose: Gaucher's disease is a rare familial autosomal recessive disorder of lipid metabolism, which causes an abnormal accumulation of glucocerebrosides in the reticulo-endothelial system. Ocular manifestations include uveitis, pre-retinal and retinal changes with white scattered deposits.

Methods: Our report presents a 30-year-old Asian male with underlying Gaucher's disease, poorly controlled diabetes mellitus, and bilateral lipid retinopathy, who also subsequently developed proliferative diabetic retinopathy (PDR) complicated by vitreous haemorrhage.

Results: Management included both systemic and ocular interventions, focusing on glycaemic control, intraocular pressure (IOP) regulation and PDR management.

Conclusions: This case highlights the complexities of treating ocular manifestations in patients with underlying systemic metabolic disorders, necessitating a comprehensive and multidisciplinary approach.

Abstract No.: 200631

Rapid Diagnosis of Ocular Viral Infections via Single Virus Detection Using Solid-State Nanopore: A Diagnostic Evaluation Study

First Author: Noriyasu HASHIDA

Co-Author(s): Yasuko MORI, Kohji NISHIDA, Takeshi SOMA, Hiroyasu TAKEI, Masateru TANIGUCHI

Purpose: Rapid and precise identification and discrimination of causative pathogens are required in the treatment of infectious diseases. Quantitative real-time polymerase chain reaction is used to detect and identify infectious viruses before treatment. Although it is an established modality, results take several hours, even in well-equipped hospitals. It is

difficult to simultaneously detect many pathogen types because only a single virus genome can be amplified per polymerase chain reaction. Recently, an artificial intelligence (AI)-based nanopore machine has been used to identify individual viruses based on electrical conductivity. Herein, we recognized a single virus using an AI-based detection system and successfully identified viral particles in clinical samples without the need for any prior treatment.

Methods: We used a nanopore detector and discriminated among viruses using AI-based waveform analysis. The efficacy of the AI nanopore detector as an on-site clinical analysis device was validated in cultured herpesvirus samples, and its discrimination capability was verified in clinical samples.

Results: The AI nanopore analysis of cultured viruses revealed that Alphaherpesvirinae and Betaherpesvirinae within the same Herpesviridae family can be distinguished with relatively high accuracy. The AI nanopore rapidly detected viral particles and can be useful as an on-site clinical diagnosis tool.

Conclusions: We demonstrated the multiplex discrimination of herpetic viruses in clinical ocular samples, proving that the AI nanopore is an ultra-high-speed and highly-sensitive detection tool that can be used in several medical fields.

Abstract No.: 202560

Rare Bilateral Acute Posterior Multifocal Placoid Pigment Epitheliopathy in a Filipino Patient With Positive Interferon-Gamma Release Assay and Purified Protein Derivative Test

First Author: Pauline Andrea WONG

Co-Author(s): Jessica ABAÑO, Jocelyn SY

Purpose: To report a case of APMPE in a Filipino patient with positive Interferon-Gamma Release Assay (IGRA) and purified protein derivative (PPD) test.

Methods: This is a case report of acute posterior multifocal placoid pigment epitheliopathy (APMPE) in a patient with tuberculosis.

Results: A twenty-four-year-old Filipino male presented with a complaint of peripheral scotomas in the left eye. Best-corrected visual acuity (BCVA) was 20/20 on the right eye and 20/30 on the left eye. Funduscopy revealed mild vitritis and multifocal yellowish hypopigmented patches scattered diffusely on the left eye, with similar lesions on the inferonasal midperiphery of the right eye. Fluorescein angiography of both eyes revealed early hypofluorescent lesion with hyperfluorescent staining throughout dye transit. Optical coherence tomography (OCT) of the left eye demonstrated disruption of the outer retinal layers and nodular irregularities of the external hyperreflective band. OCT-Angiography revealed macular ischemia. Laboratory exams revealed a positive Mycobacterium

tuberculosis PPD skin test and a positive IGRA test. Anti-Koch's therapy was initiated; however, one week later, the patient noted a decline in BCVA of 20/400. Hence, oral prednisone 1mg/kg/day, pentoxifylline, lutein, and alpha lipoic acid supplements were initiated. Over the following weeks, vision gradually improved to BCVA of 20/60.

Conclusions: This is the first described case of bilateral APMPE with positive results to the PPD test and the IGRA test. This created a significant diagnostic dilemma, initially raising the question of tuberculous chorioretinitis versus a primary white dot syndrome. In tuberculosis-endemic regions like the Philippines, white dot syndromes may be underdiagnosed, especially in patients with positive TB screening tests.

Abstract No.: 207460

Rare but Multidrug Resistant: Stenotrophomonas maltophilia Endophthalmitis With Retinal Vasculitis

First Author: Chalimi ARDANI

Co-Author(s): Winarto, Amalia Budhi HAPSARI, Dina NOVITA

Purpose: To report a rare case of postoperative endophthalmitis caused by *Stenotrophomonas maltophilia*, emphasizing diagnostic and therapeutic challenges.

Methods: A case report of a 66-year-old male who developed acute endophthalmitis following cataract surgery from a peripheral hospital. Clinical features, microbiological results, management, and outcomes were reviewed.

Results: The patient presented 1 month postoperatively with severe ocular pain, redness, and marked vision loss. Examination revealed visual acuity of light perception, corneal edema, hypopyon, and dense vitritis. Empiric intravitreal vancomycin and ceftazidime were administered, leading to partial improvement in hypopyon and conjunctival injection, but persistent vitritis. Vitreous culture identified *Stenotrophomonas maltophilia*, resistant to ceftazidime, levofloxacin, and trimethoprim-sulfamethoxazole, but sensitive to ciprofloxacin. Therapy was adjusted to systemic and topical ciprofloxacin, followed by pars plana vitrectomy. Intraoperatively, severe retinal vasculitis and fibrinous adhesions to the retina were observed, consistent with the pathogen's aggressive inflammatory course. Despite these findings, final visual acuity improved to 6/40, representing a better outcome than typically reported in similar cases.

Conclusions: *Stenotrophomonas maltophilia* is an uncommon cause of postoperative endophthalmitis. Its intrinsic resistance renders standard empiric therapy inadequate. This organism is strongly associated with contamination of surgical instruments, intraocular solutions, and hospital equipment, highlighting the

role of preventive aseptic protocols and sterilization. This case contributes to the limited literature by documenting retinal vasculitis and fibrinous adhesions as a manifestation of this pathogen. Despite aggressive management, visual prognosis remains unpredictable, underscoring the need for vigilant infection-control practices and further study into the intraocular manifestations of this rare pathogen.

Abstract No.: 204424

Rare but Resistant: *Stenotrophomonas maltophilia* Causing Postoperative Endophthalmitis

First Author: Chalimi **ARDANI**

Co-Author(s): Amalia Budhi **HAPSARI**, Dina **NOVITA**, Winarto

Purpose: To report a rare case of postoperative endophthalmitis caused by *Stenotrophomonas maltophilia*, emphasizing diagnostic and therapeutic challenges.

Methods: A case report of a 66-year-old male who developed acute endophthalmitis following cataract surgery from a peripheral hospital. Clinical features, microbiological results, management, and outcomes were reviewed.

Results: The patient presented 1 month postoperatively with severe ocular pain, redness, and marked vision loss. Examination revealed visual acuity of light perception, corneal edema, hypopyon, and dense vitritis. Empiric intravitreal vancomycin and ceftazidime were administered, leading to partial improvement in hypopyon and conjunctival injection, but persistent vitritis. Vitreous culture identified *Stenotrophomonas maltophilia*, resistant to ceftazidime, levofloxacin, and trimethoprim-sulfamethoxazole, but sensitive to ciprofloxacin. Therapy was adjusted to systemic and topical ciprofloxacin, followed by pars plana vitrectomy. Intraoperatively, severe retinal vasculitis and fibrinous adhesions to the retina were observed, consistent with the pathogen's aggressive inflammatory course. Despite these findings, final visual acuity improved to 6/40, representing a better outcome than typically reported in similar cases.

Conclusions: *Stenotrophomonas maltophilia* is an uncommon cause of postoperative endophthalmitis. Its intrinsic resistance renders standard empiric therapy inadequate. This organism is strongly associated with contamination of surgical instruments, intraocular solutions, and hospital equipment, highlighting the role of preventive aseptic protocols and sterilization. This case contributes to the limited literature by documenting retinal vasculitis and fibrinous adhesions as a manifestation of this pathogen. Despite aggressive management, visual prognosis remains unpredictable, underscoring the need for vigilant infection-control practices and further study into the intraocular manifestations of this rare pathogen.

Abstract No.: 206378

Relapsing Granulomatosis With Polyangiitis Presenting With Orbital Inflammation

First Author: Rizal **RYAMIZARD**

Co-Author(s): Amalia Budhi **HAPSARI**, Dina **NOVITA**

Purpose: Granulomatosis with Polyangiitis (GPA) is a necrotizing granulomatous vasculitis. Orbital involvement occurs in up to 60% of patients and is frequently the initial presentation. We report a GPA relapse presenting with orbital inflammation and concurrent cerebral vasculitis, emphasizing the ophthalmologist's role in a multidisciplinary approach to manage this life-threatening flare.

Methods: A 30-year-old male presented with a severe headache, painful left-sided ophthalmoplegia, decreased visual acuity, palpebral edema, and conjunctival injection. Systemic evaluation confirmed a severe inflammatory flare with elevated C-reactive protein and erythrocyte sedimentation rates, alongside worsening renal function. Neuroimaging revealed retro-orbital inflammation and cerebral vasculitis. This was diagnosed as a severe relapse of GPA, following a period of clinical remission. The patient's GPA was diagnosed on a prior admission for destructive sinonasal disease and glomerulonephritis; a nasal biopsy confirmed granulomatous vasculitis, meeting classification criteria (score: 8). For this life-threatening relapse, the patient was managed with high-dose intravenous corticosteroids and pulse cyclophosphamide.

Results: Antineutrophil cytoplasmic antibody (ANCA) serology has not yet been performed, as the biopsy fulfilled classification criteria; it remains important because ANCA status offers prognostic data. The patient responded well to systemic immunosuppression, with improvement in clinical symptoms and inflammatory markers, and was transitioned to maintenance therapy.

Conclusions: Orbital inflammation may represent a life-threatening GPA relapse and can precede complications like cerebral vasculitis. Though carrying a high morbidity risk, orbital GPA is highly responsive to immunosuppression. Early recognition, appropriate induction therapy, and coordinated multidisciplinary follow-up are crucial to control disease activity and prevent permanent organ damage.

Abstract No.: 202688

Retinal Biomarkers for Post-Fever Retinitis-Associated Macular Edema

First Author: Chitaranjan **MISHRA**

Co-Author(s): Shiva Prasad **SAHOO**

Purpose: To study the role of retinitis lesion locations and presenting central foveal thickness (CFT) on vision and macular edema (ME) in post-fever retinitis (PFR) associated ME.

Methods: Hospital-based retrospective series of patients with PFR and ME (presence of any fluid or exudates in the macula with CFT > 300 microns). The demographic details, systemic parameters, and ophthalmological examination details, including fundus imaging and OCT macula, were noted. Retinal vasculature was classified as first order and subsequent orders, and the location of the retinitis lesions was noted. Patients received oral doxycycline, topical steroids, and oral steroids. Follow-ups were at months 1, 3, 6, and 12.

Results: Thirty-six eyes of 27 patients (18 males), with an age (mean $\pm$ SD) of 34.9 $\pm$ 15.7 years. 23/27 patients presented between October to February (winter months). Duration of vision loss (mean $\pm$ SD) was 9.2 $\pm$ 7.6 days. Onset (mean $\pm$ SD) of fever was 4.4 $\pm$ 1.6 weeks prior. A macular star pattern of exudates (MSPE) was present in 17 eyes during presentation and 26 eyes during follow-up. On presentation, months 1, 2, 6, and 12, the CFT on OCT reduced, and vision improved significantly ($p < 0.001$). In the group of eyes with retinitis lesions along the retinal vessels of first order, subsequent order, and peripapillary locations, 10/13 eyes had macular star at presentation, and 12/13 eyes had macular star during follow-up ($P = 0.032$ and 0.009 , respectively).

Conclusions: ME due to PFR is an entity with good visual outcomes. Eyes with retinitis lesions along the retinal vessels of the first order, the subsequent order, and the peripapillary locations were significantly associated with macular star pattern exudates. Further research is needed to study the effect of macular star pattern exudates on vision and the possible need for prompt treatment in the eyes.

Abstract No.: 202236

Retinal Vasculitis in Bangladesh: Clinical Spectrum and Management Outcomes

First Author: Arup Krishna **CHOUDHURY**
Co-Author(s): Sarwar **ALAM**, Mahua **CHAKRABORTTY**, Quazi Sazzad **IFTEKHAR**, Mominul **ISLAM**, Mostafizur **RAHMAN**

Purpose: To evaluate the demographic profile, etiology, clinical severity, and management outcomes of patients with retinal vasculitis presenting to a tertiary eye hospital in Bangladesh.

Methods: A prospective, cross-sectional, hospital-based study was conducted on 50 consecutive patients diagnosed with retinal vasculitis at Ispahani Islamia Eye Institute & Hospital, Dhaka, between January and June 2022. Detailed history, systemic evaluation, and comprehensive ocular examination including fundus imaging were performed. Data were analyzed for age, sex distribution, laterality, underlying etiology, disease stage, and management strategies.

Results: The mean age was 38.8 $\pm$ 13.7 years, with the largest proportion in the 31–40-year group. Males were more commonly affected (58%; M:F ratio 1.38:1). Vasculitis was unilateral in 58% and bilateral in 42% of cases. Tuberculosis was the leading etiology (52%), followed by idiopathic (28%), viral (10%), syphilis (6%), sarcoidosis (2%), and Behçet's disease (2%). More than half (52%) presented with stage IV disease. Regarding management, 46% required vitreoretinal surgery, 16% received combined injection and laser, 12% injection only, 12% laser only, and 14% were observed.

Conclusions: Retinal vasculitis in Bangladesh predominantly affects young adults, with a male preponderance and unilateral involvement. Tuberculosis was the most common cause, and most patients presented in advanced stages requiring surgical intervention. These findings highlight the need for earlier detection, improved awareness, and tailored management strategies in this population.

Abstract No.: 201144

Retinal Vasoproliferative Tumor Masquerading as Ocular Tuberculosis in a Young Filipino Female: A Diagnostic Challenge

First Author: Githea Philline **MARTINEZ**
Co-Author(s): Juan **LOPEZ**, Sharmaine Anjanette **NG**

Purpose: To describe the ophthalmologic findings and management in a rare case of retinal vasoproliferative tumor (RVPT) initially misdiagnosed as tubercular posterior uveitis (TPU) in a healthy young Filipino female.

Methods: A 24-year-old Filipino female with no known comorbidities presented with a two-month history of gradual, painless, blurring of vision of the right eye. She had no history of prior tuberculosis (TB) infection, TB exposure, or constitutional symptoms. Corrected distance visual acuity (CDVA) was counting fingers at 3 feet. Examination of the right eye revealed normal intraocular pressure with mild vitritis. Fundoscopy showed a 10-disc diameter yellow-pink elevated lesion at the inferotemporal periphery surrounded with extensive exudation, intraretinal hemorrhages, and dilated vascular arcades. A large exudative retinal detachment from 4 to 9 o'clock with macular involvement was noted. Macular optical coherence tomography revealed a hyperreflective multilobulated intraretinal mass with heterogenous internal reflectivity and marked posterior shadowing. Initial diagnosis was TPU given a positive Mantoux tuberculin skin test (26 mm induration), and anti-Koch's therapy was started.

Results: After one month of treatment, there was no clinical improvement. Idiopathic RVPT was reconsidered. Anti-Koch's therapy was discontinued, and monthly intravitreal anti-vascular endothelial growth factor injections were initiated. After five doses,

there was regression of the lesion and resolution of the exudative detachment. CDVA improved to 20/40.

Conclusions: This case highlights how RVPT can masquerade ocular TB, particularly in endemic areas like the Philippines. Early recognition through multimodal imaging and timely intervention can improve visual outcomes.

Abstract No.: 203249

Risk of Uveitis in Patients With Human Immunodeficiency Virus: A Cohort Study Through TriNetX Database

First Author: Chun-ju **LIN**

Co-Author(s): Ning-yi **HSIA**, Alan Y. **HSU**, Hou-ting **KUO**, Bing-qi **WU**

Purpose: This multi-institutional, retrospective cohort study using TriNetX database aims to explore the relationship between human immunodeficiency virus (HIV) infection and uveitis.

Methods: HIV patients were propensity-matched to individuals from our non-HIV cohort (1:1 ratio) based on variables such as age (every 5 years), sex, ethnicity, race, and relevant comorbidities. The Cox proportional hazards regression model was utilized to assess the impact of variables on uveitis risk, reporting hazard ratios (HRs) with 95% confidence intervals (CIs). Kaplan-Meier survival analysis and log-rank tests were applied to estimate the cumulative incidence of uveitis. Statistical significance was set at a two-sided p-value < 0.05.

Results: We found that adult patients with HIV infection had a significantly increased risk of developing uveitis compared to non-HIV counterparts, with an overall HR of 3.02 (95% CI: 2.70 – 3.39). The risk remained elevated across designated follow-up intervals of 1 year (HR = 4.68 [3.69 – 5.92]), 2 years (HR = 4.44 [3.65 – 5.41]), and 3 years (HR = 4.06 [3.42 – 4.81]), with consistent increases noted when dividing into different uveitis types except for anterior uveitis. The risk was higher among patients with acquired immunodeficiency syndrome (AIDS) compared to asymptomatic HIV (HR = 2.64 [1.30 – 5.35]). Furthermore, HIV patients receiving treatment within three months exhibited a notably increased risk (HR = 2.87 [2.33 – 3.54]).

Conclusions: This study reveals that individuals with HIV face a significantly heightened risk of developing uveitis. Our findings indicate that this risk is most substantial for intermediate and posterior uveitis, challenging the long-held belief that anterior uveitis is the predominant form in this population.

Abstract No.: 208398

Ruxolitinib Alleviates Endotoxin-Induced Uveitis and Preserves Retinal Function via JAK2–STAT3 Inhibition

First Author: Lin **DU**

Co-Author(s): Wai Kit **CHU**, Bo Man **HO**, Chi Pui **PANG**, Yolanda Wong Ying **YIP**

Purpose: Uveitis associated with enteric infection and reactive arthritis (e.g., Reiter's syndrome) is often treated with corticosteroids, yet steroid toxicity and refractoriness remain major limitations. We evaluated whether the JAK1/2 inhibitor ruxolitinib mitigates ocular inflammation and preserves visual function in Salmonella typhimurium endotoxin-induced uveitis (EIU).

Methods: EIU was induced in Sprague–Dawley rats by systemic lipopolysaccharide (LPS). Animals received ruxolitinib or vehicle. Inflammation was quantified by clinical anterior-segment scoring, aqueous humor (AqH) cellular infiltrate and protein leakage, and retina–choroid thickness. Retinal function was assessed by scotopic and photopic electroretinography (ERG). Pathway engagement was examined by JAK2–STAT3 readouts.

Results: Relative to LPS + vehicle, ruxolitinib significantly reduced anterior chamber inflammation, with lower clinical scores, decreased AqH inflammatory cell counts, and diminished protein exudation. Posterior-segment involvement was attenuated, evidenced by reduced retina–choroid thickening. Functionally, ruxolitinib preserved ERG responses, improving scotopic and photopic b-wave amplitudes and rescuing scotopic a-wave amplitude. Mechanistically, treatment suppressed JAK2–STAT3 activation in ocular tissues, consistent with on-target inhibition.

Conclusions: Pharmacologic JAK1/2 blockade with ruxolitinib curbs intraocular inflammation and preserves retinal function in EIU, likely through inhibition of the JAK2–STAT3 pathway. These findings support JAK inhibition as a steroid-sparing, mechanism-based strategy for uveitic conditions linked to systemic inflammation.

Abstract No.: 202026

Sclerokeratouveitis: The Ocular Storm Across Three Layers

First Author: Radha **DHOTE**

Co-Author(s): Prajakta **BHAILUME**

Purpose: To report a rare case of sclerokeratouveitis involving concurrent inflammation of the sclera, cornea, and uveal tract, and to highlight the importance of early diagnosis and multidisciplinary management to prevent irreversible vision loss.

Methods: A 53-year-old male farmer presented with a 5-month history of gradual, painless diminution of vision, watering, and blackish discoloration of the left eye following ocular trauma with sugarcane grass. Detailed ocular and systemic examinations were performed. Laboratory investigations included CBC, CRP, ESR, RA factor, RBS, HHH, CXR, ECG, and B-scan. The patient underwent scleral patch grafting with amniotic membrane grafting (AMG) under local anaesthesia, followed by topical steroids, topical antibiotics, oral steroids, and doxycycline.

Results: Results: The ocular examination revealed pseudophakia in both eyes, with the left eye showing scleral necrosis with thinning, corneal vascularisation, tongued shaped temporal leucomatous opacity, and macular oedema. Systemic work-up was unremarkable. Post-operative recovery was satisfactory, with control of inflammation achieved through combined surgical and medical therapy.

Conclusions: Sclerokeratouveitis is a rare but aggressive inflammatory disorder involving the sclera, cornea, and uveal tract, with potential for rapid vision loss. Early diagnosis through prompt clinical evaluation is essential to initiate targeted medical therapy and prevent structural damage. Surgical interventions, such as scleral patch grafting with or without amniotic membrane transplantation, should be timed to the extent of tissue involvement. Long-term follow-up is crucial to detect recurrence or complications. A coordinated multidisciplinary approach significantly improves visual prognosis and overall patient outcomes.

Abstract No.: 206114

Steroids in Disguise: Bilateral Postoperative Enterococcus Endophthalmitis

First Author: Tze Shen **SIM**

Co-Author(s): Othmaliza **OTHMAN**, Wendy Yen Nee **SEE**

Purpose: To present a challenging case of steroid-masked bilateral postoperative Enterococcus faecalis endophthalmitis.

Methods: Case report.

Results: A 52-year-old gentleman with diabetes mellitus, hypertension, and end-stage renal failure on hemodialysis presented five days after bilateral sequential uneventful cataract surgeries at a private eye center with acute right eye pain, redness, blurred vision, and nausea. He had received bilateral orbital floor triamcinolone injections one day prior to presentation. Ophthalmic examination revealed severe bilateral fibrinoid anterior chamber(AC) reaction with iris bombé. His right eye showed an epithelial defect from ruptured bullae with a pale optic disc and an intraocular pressure(IOP) of 45 mmHg. No hypopyon noted. Serial B-scans initially demonstrated mild vitreous opacities without loculations. Severe

postoperative inflammation was suspected, and high-dose steroids were trialed with minimal response. IOP was controlled following bilateral laser peripheral iridotomy and maximal topical anti-glaucoma. Bilateral AC and vitreous cultures subsequently grew Enterococcus faecalis, and repeated B-scan revealed vitreous loculations six days after presentation. A diagnosis of bilateral postoperative endophthalmitis was made, and repeated intravitreal antibiotic injections were administered. His vision improved from light perception to hand movement in the right eye and from 4/60 to 6/18 in the left, with IOP optimized.

Conclusions: This case underscores the diagnostic challenge of distinguishing intense postoperative inflammation from early endophthalmitis with steroid-masking effect. Early diagnostic taps and aggressive intravitreal therapy are critical. Clinicians should maintain a high index of suspicion and overtreat rather than undertreat when severe postoperative inflammation is encountered.

Abstract No.: 200303

The Hidden Culprit: A Case of an Idiopathic Posterior Scleritis With Exudative Retinal Detachment and Posterior Subcapsular Cataract in a 10-Year-Old Male

First Author: Anthea Rae **BURDEOS**

Co-Author(s): Mayjane Joan **TUMULAK**

Purpose: To report a case of a 10-year-old male diagnosed with idiopathic posterior scleritis with exudative retinal detachment and posterior subcapsular cataract in the right eye. Describe the presenting symptoms, laboratory and imaging findings, treatment, and outcome.

Methods: Case report.

Results: The patient was seen at the outpatient department with complaints of blurred vision in the right eye. The patient had a 2-month history of recurrent unilateral headaches and right eye pain, which was partially relieved with acetaminophen. On examination, visual acuity for the right eye was Counting Fingers, and 20/20 for the left eye; tones were normal with intact extraocular movements. There were hypopigmented erythematous patches on the face and palms noted. Posterior subcapsular cataract with P4 grading on the right eye. Fundoscopy showed a hyperemic disc with distinct disc borders and a note of exudative retinal detachment inferiorly. Laboratory tests were unremarkable. Ultrasound imaging revealed a classic T-sign in the right eye and was unremarkable in the left eye. MRI noted right scleral thickening. Rheumatology service referral revealed no evidence of an underlying systemic condition. The dermatology service noted rashes consistent with contact dermatitis. Patient was treated with intravenous methylprednisolone 500 mg in 100 ml PNSS once daily for 5 days. Improvement of visual acuity and rashes

was noted prior to discharge. Follow-up after 1 week from discharge noted an overall improved visual outcome.

Conclusions: This case highlights the significance of considering posterior scleritis in cases of headache and eye pain, especially with blurring of vision or optic disc and retinal involvement in the pediatric population.

Abstract No.: 206877

The Silent Culprit: Diffuse Unilateral Subacute Neuroretinitis Caused by a Large Subretinal Worm

First Author: Ronnie Abhishek TALLURI

Co-Author(s): Aditya KAPOOR

Purpose: To understand the course of the disease, identify the worm, and treatment modalities.

Methods: A 45-year-old female presented with sudden diminution of vision in the right eye for 6 days. The best corrected visual acuity (BCVA) was counting fingers close to the face. Fundus examination revealed multiple crops of yellow lesions with subretinal fluid, superficial as well as deep hemorrhages, and a large subretinal yellow worm wriggling constantly in the subretinal space over a wide area in the posterior pole and macula. The Iridex Pascal machine was used with a 400-milliwatt laser and a duration of 20 milliseconds. First spot at the head, second spot at the tail, and later spots given along the body of the worm until immobilized.

Results: The patient was started on Tablet Albendazole 800 milligram stat, followed by Albendazole 400 milligram once a day for 3 weeks, and Tablet Prednisolone 50 mg for one week. During follow-up, even though the worm completely disintegrated, the subretinal fluid, along with inflammation, had settled, and vision did not recover due to extensive foveal atrophy.

Conclusions: Direct photo coagulation is the treatment of choice. It destroys the worm and prevents further movement of the worm towards the fovea. Photocoagulation breaks the blood-retinal barrier aseptically, providing better penetration of anti-helminthics. Anti-helminthics are given primarily targeting the other worms in the body.

Abstract No.: 204738

The Sweet Dilemma: A Vision-Threatening Case of Sweet Syndrome

First Author: Alicia Victoria NOCEDA

Co-Author(s): Cristina GARCIA

Purpose: To present a rare case of Sweet syndrome with ocular involvement leading to vision-threatening complications, emphasizing the importance of early recognition and multidisciplinary management.

Methods: A 37-year-old female presented with generalized rashes with associated cough, fever, and periorbital edema. Other findings included slightly elevated intraocular pressure with generalized chemosis and limitation of movement on all gazes for both eyes. She was initially managed as a case of preseptal cellulitis secondary to viral exanthem with secondary bacterial infection, both eyes; rule out cavernous sinus thrombosis. During admission, she was started on broad-spectrum antibiotic and anti-viral therapy and had undergone a cranial MRI with MRV which showed findings of bilateral preseptal cellulitis with dacryoadenitis.

Results: By the 8th day of admission, vision declined to hand movement. Fundus imaging revealed posterior uveitis, occlusive vasculitis, choroidal infarction, choroidal granulomas, macular ischemia, and optic neuropathy. Blood cultures were negative and no significant improvement was seen despite antimicrobial therapy. A non-infectious cause for the constellation of symptoms of fever, rash, and ophthalmologic findings should be considered; hence, Sweet Syndrome was a more compelling diagnostic consideration.

Conclusions: Sweet syndrome is challenging to diagnose due to its similar clinical presentations to infections and autoimmune diseases. A multidisciplinary approach and clinicopathologic correlation are key to avoiding misdiagnosis.

Abstract No.: 201797

Tocilizumab in Non-Infectious Refractory Uveitis: Efficacy and Tear Cytokine Correlates

First Author: Aneena Anna THOMAS

Co-Author(s): Ankush KAWALI, Padmamalini MAHENDRADAS, Sai Bhakti MISHRA

Purpose: To evaluate the efficacy of systemic tocilizumab in refractory non-infectious uveitis and explore tear cytokines as biomarkers of disease activity.

Methods: This retrospective series included 15 patients (21 eyes) with refractory uveitis treated with systemic tocilizumab biweekly. The primary outcome was resolution of intraocular inflammation on OCT or angiography. Tear cytokine profiling was performed in 5 patients (10 eyes).

Results: Mean age was 34.7 years (7–69); 40% were pediatric. Panuveitis predominated (47%), followed by posterior (20%) and intermediate uveitis (13%). Chronic cystoid macular edema (CME) was the leading indication (60%), with retinal vasculitis in 27%, mostly in pediatric eyes (off-label). One patient developed latent tuberculosis after 2 years. Tear cytokine analysis showed high MMP 9 and ICAM 1, IL 6 detectable in all active eyes, and VEGF A correlating with CME. IL 17A and TNF α were consistently low, while IL 10 spikes suggested localized immunoregulation.

Conclusions: Tocilizumab appears effective for IL 6–driven, refractory uveitis with CME and vasculitis. Tear cytokine profiling may serve as a minimally invasive biomarker for monitoring disease activity and therapeutic response.

Abstract No.: 206583

Toxic Keratouveitis Following Exposure to Plant Milk

First Author: Abhishek

Co-Author(s): Gian CHAND, Shreya NARANG, Jayant SHARMA

Purpose: To report a case of toxic keratouveitis occurring in a 65-year-old female. It is a rare condition caused by toxic agents, presenting with acute corneal and anterior uveal inflammation; exact prevalence is not well defined due to sporadic case reports.

Methods: A 65-year-old female presented with sudden, painful loss of vision in the left eye over the past 2 hours, following the fall of some plant milk while gardening. Ophthalmic examination revealed visual acuity of 6/60 and intraocular pressure of 39 mmHg in the left eye. Slit-lamp examination revealed features of keratouveitis with lid edema, subconjunctival hemorrhage, central epithelial defect, mild stromal edema, diffuse medium-sized fresh keratic precipitates, a fixed dilated pupil, with anterior chamber cells graded +3 and fibrin over the lens. Fundus examination was unremarkable. The eye was irrigated copiously with normal saline and treated with topical antibiotic and steroid, cycloplegic, and antiglaucoma drops for a 3-week duration.

Results: The patient was diagnosed with toxic keratouveitis and managed accordingly.

Conclusions: The plant was identified as *Claoxylon sandwicense* of the Euphorbiaceae family, which produces a milky latex sap containing compounds like diterpenes and phorbol esters, which can be highly irritating to the eyes. Clinical course may be affected by particular species of Euphorbia, the amount of sap exposure, the time between exposure and irrigation, and host factors.

Abstract No.: 205578

Vascular Echoes of Tuberculosis: CNVM as the Footprint and Sequela of Choroidal Tuberculoma

First Author: Manisha CHOUDHARY

Co-Author(s): Shreya BHADANI, Manmath DAS, Siddhartha KAR, Srinidhi N, Aanchal SINGHAL

Purpose: To report a rare case of choroidal tuberculoma complicated by Type 2 and Type 3 choroidal neovascular membranes (CNVM), documented with multimodal imaging and treated with anti-vascular endothelial growth factor (anti-VEGF) therapy.

Methods: A 20-year-old female on anti-tubercular therapy (ATT) for CNS tuberculoma presented with a one-month history of painless, progressive vision loss in the left eye (LE). Ophthalmic evaluation included best-corrected visual acuity (BCVA), fundus examination, and multimodal imaging. Review of prior neuroimaging revealed multiple intracranial tuberculomas with perilesional edema, meningitis, and tonsillar herniation.

Results: BCVA was 6/6 in the right eye (RE) and counting fingers at 1 meter in the left eye (LE). Near vision was N6 in the RE and <N48 in the LE. The anterior segment was normal in both eyes. Fundus was normal in the RE, while the LE showed optic disc pallor with an active macular choroidal tuberculoma and CNVM. FFA and ICGA demonstrated neovascularization between the retinal pigment epithelium (RPE) and neurosensory retina (Type 2 CNVM), along with retinochoroidal anastomosis (Type 3) overlying the lesion, and ICGA revealed additional granulomas not seen clinically or on FFA. The patient was treated with monthly intravitreal ranibizumab while continuing ATT, leading to improvement of BCVA to 6/60 and near vision to N48 in the LE after three injections.

Conclusions: CNVM arising from choroidal tuberculoma represents a highly uncommon manifestation at the crossroads of ocular tuberculosis and neovascular pathology. The coexistence of Type 2 and Type 3 CNVM in an active lesion underscores its unprecedented rarity. Vigilant multimodal imaging and timely anti-VEGF therapy are essential for early detection and preservation of vision.

Abstract No.: 205680

Visual Improvement After Early Removal of Intraocular Vancomycin in Hemorrhagic Occlusive Retinal Vasculitis

First Author: Wen-jung LO

Co-Author(s): Ting-yu HSIEH

Purpose: To report a case of hemorrhagic occlusive retinal vasculitis (HORV) achieving favorable visual recovery after urgent pars plana vitrectomy (PPV) to remove residual intravitreal vancomycin initially administered for presumed exogenous endophthalmitis, later identified as toxic anterior segment syndrome (TASS)

Methods: Case report

Results: A 43-year-old man with no systemic disease presented with blurred vision and mild ocular pain in the left eye 2 days after cataract surgery. The same eye had undergone vitrectomy for retinal detachment 11 months earlier. Visual acuity was counting fingers. Slit-lamp examination showed moderate corneal edema and 3+ anterior chamber cells, and B-scan revealed increased vitreous opacity. Under the initial diagnosis of exogenous endophthalmitis, intravitreal vancomycin and ceftazidime were injected. One day

later, hypopyon and a dense anterior chamber reaction (4+) developed. Urgent vitrectomy (<24 hours after injection) was performed. Intraoperatively, only mild vitreous haze, scattered powder-like deposits on the retinal surface, and venular hemorrhages were noted, without endophthalmitis. The final diagnosis was TASS with HORV. Two weeks postoperatively, visual acuity improved to 20/63

Conclusions: HORV typically has poor visual outcomes attributed to a delayed hypersensitivity-mediated vasculitis and ischemia, and prior reports have emphasized discontinuing vancomycin rather than removing residual intraocular drug. This case suggests that early PPV to reduce intraocular vancomycin burden may help limit immune activation and support visual recovery in selected patients. Further studies are warranted

Abstract No.: 201935

Vitreous Biopsy-Proven Intraocular Lymphoma: Experience From A Southeast Asian Tertiary Hospital

First Author: Brylle **CATAGUE**

Co-Author(s): Bryan Vincent **MESINA**

Purpose: To describe a case of intraocular lymphoma and highlight an effective method of vitreous sampling that facilitated a definitive diagnosis.

Methods: A 46-year-old female presented with a 3-month history of blurring of vision, floaters, and headaches. Slit lamp examination revealed anterior chamber reaction and dense vitreous cells in sheets. During her course, she developed seizures, raising suspicion for central nervous system lymphoma. Cranial magnetic resonance imaging suggested either a lymphomatous or demyelinating process. A diagnostic vitreous biopsy was performed through a three-port pars plana vitrectomy using a large bore cutter at 1000-1500 cuts per minute. One milliliter of undiluted vitreous and 10 milliliters of diluted vitreous with infusion fluid were collected, mixed with 95% ethanol with a 1:1 ratio, and sent to pathology within 30 minutes. Careful handling was observed to maintain cell integrity.

Results: Cytology demonstrated atypical lymphoid proliferation suspicious for hematology lymphoid proliferation. Subsequent immunohistochemistry revealed strong, diffuse CD20 staining consistent with primary diffuse large B-cell lymphoma.

Conclusions: Intraocular lymphoma is notoriously difficult to diagnose, with many biopsies yielding inconclusive results. This case illustrates how proper vitreous biopsy technique and meticulous specimen handling can preserve cellular morphology and enable definitive diagnosis. Establishing accurate and timely diagnosis is essential for distinguishing lymphoma from

other uveitic conditions, and for initiating appropriate therapy early in the disease course.

Abstract No.: 204474

Vitreous Hemorrhage From Immune Recovery Uveitis in a Case of Cytomegalovirus Retinitis

First Author: John Jasper **RAMOS**

Co-Author(s): Albert John **BROMEIO**

Purpose: Immune recovery uveitis (IRU) is an immune reconstitution inflammatory syndrome (IRIS) in HIV patients with cytomegalovirus (CMV) retinitis after initiating HAART (highly active antiretroviral therapy, resulting from a dysregulated immune response to residual CMV antigens due to rapid CD4+ T-cell recovery. Common manifestations include anterior uveitis and vitritis with complications including cystoid macular edema and epiretinal membranes. This case aims to report a case of vitreous hemorrhage as an atypical complication of treatment of IRU.

Methods: Case report.

Results: A 37-year-old male HIV patient presented with a 2-month history of progressively worsening bilateral blurring of vision following initiation of HAART. Vision was hand motions in the right eye and 20/320 in the left. Fundoscopy showed widespread areas of retinitis with hemorrhages consistent with CMV retinitis. Macular OCT showed cystoid macular edema consistent with IRU. The patient was managed medically with valganciclovir, followed by a course of oral prednisone. On follow-up, resolution of macular edema was observed. However, about 2 months after treatment, the patient developed vitreous hemorrhage in the right eye. The vitreous hemorrhage was managed conservatively and resolved spontaneously after 4 months. The latest follow-up showed inactivity of CMV retinitis and quiescence of IRU with a vision of 20/125 on the right eye and 20/100 on the left.

Conclusions: Vitreous hemorrhage may develop as an atypical complication in patients undergoing treatment of IRU from CMV retinitis. IRU should be promptly recognized and appropriately managed to avoid permanent vision loss.

Abstract No.: 200845

Vitreous Prolapse as a Red Flag: Predicting Sympathetic Ophthalmia After Globe Rupture in Taiwan — Insights From 253 Cases

First Author: Chan-wei **NIEN**

Co-Author(s): Tsan-yu **TSAI**

Purpose: Sympathetic ophthalmia (SO) is a rare but potentially blinding bilateral panuveitis following open-globe injury (OGI). This study aimed to determine the incidence and clinical predictors of SO—particularly

vitreous prolapse—in patients with globe rupture in a Taiwanese trauma cohort.

Methods: A retrospective review was conducted on 253 patients with surgically repaired globe rupture between 2014 and 2024 at Show Chwan Memorial Hospital. Data on demographics, injury mechanism, wound size, vitreous prolapse, and SO diagnosis were collected. SO was defined as bilateral granulomatous uveitis confirmed by clinical and imaging criteria. Logistic regression identified independent risk factors.

Results: Of 253 patients (mean age 49.3 ± 18.7 years; 67.2% male), 46.6% had vitreous prolapse. SO occurred in 17 cases (6.7%), significantly higher than the global average of 0.19%. SO incidence was 10.2% in patients with vitreous prolapse vs. 3.2% without ($p = 0.011$). Vitreous prolapse (OR 3.46; $p = 0.013$) and wound length ≥ 5 mm (OR 2.74; $p = 0.041$) were significant predictors. Most SO cases presented within 3 months post-injury.

Conclusions: Vitreous prolapse at presentation is a significant risk factor for SO in patients with globe rupture. Early identification of high-risk cases and prompt systemic corticosteroid therapy may improve visual prognosis. These findings suggest that vitreous status should be routinely assessed and documented during primary globe repair to mitigate the risk of SO.

Abstract No.: 203221

Vitritis with a Twist: The Peripheral Retinal Detachment Masquerade

First Author: Gabrielle Marie **HEREDIA**

Co-Author(s): Andrei **MARTIN**, Ellen **YU-KEH**

Purpose: To report a case of persistent ocular inflammation, initially attributed to a malpositioned intraocular lens (IOL), but later diagnosed as vitreoretinal pathology consistent with a Uveitic Masquerade syndrome. This case demonstrates that vitritis can be the initial ophthalmologic finding in patients with peripheral retinal tear.

Methods: A 20-year-old male with prior uneventful cataract extraction 1 year prior presented with anterior uveitis and vitritis. Sequential imaging included B-scan Ultrasonography, Ultrasound Biomicroscopy (UBM), and Optical Coherence Tomography (OCT) of the left eye. Surgical interventions included IOL exchange with anterior vitrectomy, followed by pars plana vitrectomy (PPV) with silicone oil tamponade of the left eye.

Results: Initial B-scan of the left eye revealed vitritis with an attached retina. Examination revealed sulcus placement of the inferior haptic, which was confirmed by UBM showing a haptic in the ciliary sulcus with iridocyclitis and inflammatory deposits. Rescue IOL exchange was performed one month after initial presentation. Inflammation worsened post-operatively and examination showed the presence of a rhegmatogenous retinal detachment inferiorly. Review

of OCT performed prior to IOL exchange showed that RD was present prior to the IOL exchange. PPV revealed partial retinal detachment, with subretinal bands. Though the hole was not directly visualized, a retinal break was suspected to be likely very peripheral in location. Inflammation subsided immediately after the surgery.

Conclusions: Persistent ocular inflammation after addressing a potential etiology should raise suspicion for a different pathology, including uveitic masquerade syndromes. Repeating assessment and dilated retinal examinations are critical to avoid delayed diagnosis of retinal detachment in such cases.

Abstract No.: 200483

When Definitions Blur: The Impact of Policy Ambiguity on Extrapulmonary TB Management in Taiwan

First Author: Yueh-chang **LEE**

Purpose: Ocular tuberculosis (TB) is a rare extrapulmonary manifestation of *Mycobacterium tuberculosis*, typically presenting without systemic involvement and posing diagnostic challenges. This case highlights clinical and public health implications, particularly in the context of Taiwan's TB policies.

Methods: We report a case of presumed ocular TB in an immunocompetent patient, accompanied by a literature review and analysis of Taiwan's regulatory approach to extrapulmonary TB and contact tracing, with comparison to international guidelines.

Results: A 61-year-old immunocompetent man presented with a three-day history of floaters and photopsia in his right eye. Examination revealed vitritis, chorioretinal lesions, and imaging suggestive of multifocal choroiditis. Despite empirical corticosteroid treatment, vision declined. Laboratory workup revealed a positive interferon-gamma release assay (IGRA) with negative results for other infectious etiologies. Chest imaging was normal. Based on clinical presentation and IGRA positivity, presumed ocular TB was diagnosed. Anti-tubercular therapy led to full visual recovery. Despite being non-infectious, the case triggered standard contact tracing protocols under Taiwan's current TB policy, which does not differentiate between pulmonary and extrapulmonary TB.

Conclusions: This case demonstrates the need to consider ocular TB in the differential diagnosis of posterior uveitis. It also reveals a gap in Taiwan's TB management policy, where extrapulmonary TB is treated under the same infectious disease control measures as pulmonary TB. In contrast, U.S. CDC guidelines recommend no contact investigation for non-infectious TB forms. Policy refinement is needed to align contact tracing practices with actual transmission risks and international standards.

Myopia

Abstract No.: 205291

A Knowledge-Attitudes-Practices Study of Chinese Parents on Myopia: Correlations and Influencing Factors

First Author: Xiaohang CHEN

Co-Author(s): Lulu LI, Longqian LIU

Purpose: To assess the Knowledge, attitudes, and practices (KAP) of Chinese parents regarding myopia and ocular hygiene, and to identify key factors influencing their KAP levels and their correlation with myopia status.

Methods: A cross-sectional study was conducted from December 2023 to April 2024. A structured, self-administered KAP questionnaire, validated for reliability and content validity, was distributed via the «Questionnaire Star» platform using a convenience sampling method. Participants were parents of adolescents aged 0-19. The survey collected demographic data, children's myopia status, and comprehensive KAP scores. KAP contains three domains: knowledge (10 items), attitudes (7 items, Likert scale), and practices (8 items, Likert scale). Total and dimension scores were calculated and classified as poor, medium, good, or excellent.

Results: Among the participants, the mean scores for parental knowledge, attitudes, and practices were 7.79 ± 2.40 , 31.61 ± 2.87 , and 30.43 ± 4.66 , respectively, with a total KAP score of 69.83 ± 7.48 . Significant factors influencing higher total KAP scores included parents residing in urban areas, having higher education levels, being myopic themselves, and having a child who developed myopia before age six. Knowledge scores were significantly associated with the child's myopia status. Gaps were identified in specific knowledge areas (e.g., myopia curability) and practices (e.g., regular eye examinations, ensuring sufficient outdoor time).

Conclusions: Chinese parents demonstrate positive attitudes towards childhood myopia prevention, but gaps exist in knowledge and practices. Efforts should focus on enhancing parental education, particularly in rural areas and among less-educated parents, to bridge the KAP gap and improve childhood myopia control outcomes.

Abstract No.: 203568

A Study on the Role and Mechanism of miR-145-5p on Refractive Development Based on Green Light-Induced Guinea Pig Myopia Model

First Author: Liyue ZHANG

Co-Author(s): Ye SHEN, Jianping TONG

Purpose: Investigate the regulatory role of miR-145-5p in 530 nm green light-induced myopia pathogenesis, focusing on its clinical relevance in human high myopia and molecular mechanisms underlying refractive development.

Methods: Analyzed retinal miRNA profiles in guinea pigs exposed to green light; measured miR-145-5p levels in plasma/aqueous humor of high myopia patients; validated functional effects via intravitreal injections of miR-145-5p antagonist/agonist; identified target genes through bioinformatics and experimental validation.

Results: Green light exposure induced distinct retinal miRNA alterations, with miR-145-5p significantly reduced in patients' plasma/aqueous humor and negatively correlated with axial length. Antagonist injections induced myopic shifts (reduced spherical equivalent, elongated axial/vitreous chamber), while agonist treatment counteracted green light-induced changes. IRS1 was identified as a direct functional target of miR-145-5p through integrated bioinformatics and experimental validation, demonstrating inverse expression patterns in vivo.

Conclusions: This study reveals miR-145-5p regulates green light-mediated refractive development via IRS1, providing novel biomarkers for myopia research and a mechanistic mediator of ocular growth.

Abstract No.: 206158

Additive Effect of Dims Spectacles With Low-Dose Atropine for Myopia Control in Thai Children: A Randomised Clinical Study

First Author: Suwasa LODARBCHAI

Co-Author(s): Worawalun HONGLERTNAPAKUL, Natthiya LAILAKSIRI, Jipada PRUKSACHOLAVIT

Purpose: To evaluate whether combining defocus incorporated multiple segments (DIMS) spectacles with low-dose atropine provides additional benefit over atropine monotherapy in controlling childhood myopia.

Methods: Children aged 6–18 years with progressive myopia were recruited at a tertiary hospital in Bangkok and randomized to two groups: (1) 0.01% atropine nightly plus single-vision spectacles, or (2) 0.01% atropine nightly plus DIMS lenses. Baseline assessments included visual acuity, cycloplegic refraction, and axial length (AL). At 6 months, repeat refraction and AL were measured by masked examiners. Compliance and safety outcomes were documented.

Results: Sixteen participants completed 6-month follow-up. Both groups showed continued myopic progression. The combination group had numerically smaller mean changes in spherical equivalent refraction (SER) and AL compared with atropine alone, although the differences did not reach statistical significance ($p > 0.05$). Compliance was high in both groups, and no serious adverse events were reported.

Conclusions: In this randomized study, the addition of DIMS spectacles to 0.01% atropine did not significantly reduce myopia progression compared with atropine monotherapy over 6 months. Nevertheless, the favorable safety profile and trend toward reduced progression support further investigation with larger cohorts and longer follow-up. These early data, among the first from Southeast Asia, suggest that combination therapy remains a promising strategy for addressing the growing burden of childhood myopia.

Abstract No.: 208017

Association of Optical Coherence Tomography Angiography Metrics With Impaired Macular Microvasculature in Amblyopic Eyes: A Longitudinal Study

First Author: Cheuk Ling YIM

Co-Author(s): Qin SHU, Yuzhou ZHANG

Purpose: To investigate longitudinal changes in OCTA metrics over a three-year period in amblyopic children compared to controls, and to assess whether these metrics are associated with BCVA and treatment response.

Methods: This prospective longitudinal study enrolled 60 children diagnosed with unilateral amblyopia and 1000 matched controls. OCTA imaging was performed at baseline and after three years. Key metrics analyzed included FAZ area, FAZ circularity, fractal dimension, vessel diameter index, and vessel density. Subgroup analysis was planned to evaluate associations between OCTA changes and amblyopia treatment outcomes. Preliminary data were analyzed using an independent sample t-test and linear regression, adjusting for multiple covariates using a model such as ANCOVA.

Results: Initial analysis of the three-year follow-up data revealed statistically significant differences in the change in FAZ circularity (-0.156 ; 95% CI -0.307 to -0.005 , $P=0.043$), fractal dimension (-0.024 ; 95% CI -0.045 to -0.004 , $P=0.029$), and vessel diameter index (0.002 ; 95% CI 0.000 - 0.005 , $P=0.016$) between the amblyopia and control groups. BCVA is also found to be correlated with Log FAZ circularity, log FD, log VDI, and log VD after adjusting for covariates, including age, BMI, spherical equivalent, and axial length. Further analysis incorporating subgroup stratification is underway to explore potential associations with treatment response and disease progression.

Conclusions: Preliminary findings from this 3-year longitudinal study reveal statistically significant differences in the OCT metrics between the two groups. Further result analysis will contribute to understanding the role of OCTA as a biomarker in amblyopia and its potential utility in monitoring treatment efficacy.

Abstract No.: 207781

Association of Polymorphisms in ZFHX1B, KCNQ5 and GJD2 With Myopia Progression and Polygenic Risk Prediction in Children

First Author: Li Jia CHEN

Co-Author(s): Chi Pui PANG, Clement C THAM, Jason C YAM

Purpose: To assess the association of single-nucleotide polymorphisms (SNPs) with myopia progression for polygenic risk prediction in children.

Methods: Six SNPs (ZC3H11B rs4373767, ZFHX1B rs13382811, KCNQ5 rs7744813, MET rs2073560, SNTB1 rs7839488, and GJD2 rs524952) were analysed in 1043 school children, who completed a 3-year follow-up, using TaqMan genotyping assays. SNP associations with progression in spherical equivalent (SE) were analysed by logistic regression. Polygenic risk scores (PRS) were applied for computing the sum of the risk alleles of multiple SNPs corresponding to myopia progression, weighted by the effect sizes of the corresponding SNPs.

Results: GJD2 rs524952 showed significant association with fast progression (OR=1.32, 95% CI 1.10 to 1.59; $p=0.003$) and KCNQ5 rs7744813 had nominal association (OR=1.32, 95% CI 1.04 to 1.67; $p=0.02$). In quantitative traits locus analysis, GJD2 rs524952 and KCNQ5 rs7744813 were associated with progression in SE ($\beta=-0.038$ D/year, $p=0.008$ and $\beta=-0.042$ D/year, $p=0.02$) and axial elongation ($\beta=0.016$ mm/year, $p=0.01$ and $\beta=0.017$ mm/year, $p=0.027$). ZFHX1B rs13382811 also showed nominal association with faster progression in SE ($\beta=-0.041$ D/year, $p=0.02$). PRS analysis showed that children with the highest PRS defined by rs13382811, rs7744813, and rs524952 had a 2.26-fold increased risk of fast myopia progression ($p=4.61 \times 10^{-5}$). PRS was also significantly associated with SE progression ($R^2=1.6\%$, $p=3.15 \times 10^{-5}$) and axial elongation ($R^2=1.2\%$, $p=2.6 \times 10^{-4}$).

Conclusions: In this study, multi-tiered evidence suggested SNPs in ZFHX1B, KCNQ5, and GJD2 as risk factors for myopia progression in children. Additional attention and appropriate interventions should be given for myopic children with high-risk PRS as defined by GJD2 rs524952, KCNQ5 rs7744813, and ZFHX1B rs13382811.

Abstract No.: 200552**Awareness of Myopia-Related Complications and Management Among Medical Professionals and Trainees***First Author: Adeline YANG**Co-Author(s): Kah Guan AU EONG, Deborah LEE*

Purpose: Myopia is a major global public health concern, with early intervention vital to preventing long-term ocular complications. This study assessed awareness of myopia-related complications and control strategies among eye care professionals (ECPs) and non-eye care professionals (non-ECPs), and examined related prescription trends.

Methods: A cross-sectional survey was conducted among ophthalmologists, optometrists, opticians, general practitioners (GPs), and medical/optometry students in Singapore. Awareness of myopia complications (e.g., retinal detachment, glaucoma) and familiarity with control methods (e.g., atropine, orthokeratology, myopia control lenses) were evaluated. Data were analyzed using descriptive statistics and chi-square tests.

Results: A total of 571 responses were analyzed. Ophthalmologists and optometrists demonstrated the highest awareness of myopia-related complications, while non-ECPs showed significantly lower awareness ($p < 0.001$). Awareness of atropine therapy was high among ophthalmologists (96.6%) and optometrists (96.7%) but lower among medical students (34.0%) and GPs (53.6%). Optometrists had the highest awareness of optical strategies, though prescription rates were lower than awareness across all groups. Cost and prior experience significantly influenced prescribing decisions ($p < 0.05$). Awareness of lifestyle interventions such as outdoor time was high, whereas non-evidence-based practices (e.g., eye exercises) were more often endorsed by non-ECPs.

Conclusions: Despite high awareness among ECPs, gaps remain in translating knowledge into clinical practice. Limited awareness among non-ECPs highlights the need for targeted education. Incorporating myopia management into medical curricula and promoting interprofessional collaboration could enhance early intervention and strengthen referral pathways for effective, community-based myopia care.

Abstract No.: 204869**Axial Length Shortening Among Myopia Control Glass Users***First Author: Sneha BATRA**Co-Author(s): Supratik BANDYOPADHYAY, Joyashree BANERJEE, Aroni CHAKRABORTY, Swarup ROY, Shyamal SAHA*

Purpose: Myopia has emerged as a global public health concern, with axial length (AL) elongation recognized as its structural hallmark. Certain myopia

control interventions, such as photobiomodulation and orthokeratology, not only slow progression but may also induce axial shortening, challenging traditional understanding of ocular growth. The purpose of this study was to explore the occurrence of AL shortening among myopia control glasses (MCG) users, which has not been studied previously.

Methods: This retrospective cohort study included children 4–17 years with myopia between 0.75–10 D and progression $>0.5D$ in the last 1 year. Standardized myopia clinic evaluation, including slit-lamp, cycloplegic refraction, AL measurement with OA-2000 optical biometer, and dilated funduscopy, was done. Participants were prescribed one of three types of MCG using peripheral defocus technology – Type I (Defocus Incorporated Multiple Segments), II (Highly Aspherical Lenslet Target), or III (Cylindrical Annular Refractive Elements). Follow-up done at 6 and 12 months.

Results: A total of 422 eyes of 217 children were included. AL at baseline, 6, and 12 months was 24.84 mm, 24.91 mm, and 24.95 mm, respectively. Refractive error at baseline, 6, and 12 months was -4.43 D, -4.47 D, and -5.17 D, respectively. AL shortening was noted in 27.04% and 22.25% eyes among all MCG users at 6 and 12 months, respectively. Type III MCG users showed the maximum shortening, followed by type II and type I.

Conclusions: Our study shows that AL shortening is possible even with the use of MCG. The implications of documented AL shortening beyond stabilization are immense, even raising the possibility of partial myopia reversal.

Abstract No.: 208410**Axial Length Shortening in Chinese Children and Adolescents Without Myopia Control Interventions***First Author: Shang LIU**Co-Author(s): Xiangui HE, Xun XU*

Purpose: Axial length (AL) shortening in children without myopia control interventions is uncommon but remarkable. This study aimed to investigate the incidence, magnitude, associated factors and the following-year refractive change of AL shortening among these children and adolescents.

Methods: A total of 11,797 eyes aged 3–18 years were included from two longitudinal studies. AL shortening was defined as an annual AL change of <-0.05 mm and ≥-0.80 mm. The incidence and magnitude of AL shortening were calculated and their associated factors were explored using multivariable logistic regression and linear regression.

Results: Of the 11,797 eyes, 159 (1.35%) experienced annual AL shortening with a mean reduction of -0.32 mm. Greater AL shortening incidence was associated with longer baseline AL, younger age, lower corneal radius (CR) and greater anisometropia (OR = 1.98, 0.84,

0.32 and 1.40; all $P < 0.05$). Myopic eyes were less likely to have AL shortening compared with hyperopic eyes ($OR = 0.29$, $P = 0.001$). The magnitude of AL shortening significantly decreased with baseline age and CR ($\beta = 0.03$ and 0.20 , both $P < 0.05$), while increased with baseline AL ($\beta = -0.14$, $P < 0.001$), and myopic eyes exhibited smaller AL shortening than hyperopic eyes ($\beta = 0.24$, $P = 0.003$). In addition, in non-myopic eyes with AL shortening and 2-year follow-up (6-8 years old), the second-year myopia incidence was only 10% with SE change of -0.23 D.

Conclusions: AL shortening may occur among children without myopia control interventions. The occurrence of axial shortening may indicate a safer refractive progression in the following year.

Abstract No.: 206230

Biometric Analysis of the Anterior Segment in Highly Myopic Eyes With Posterior Scleral Staphyloma

First Author: Liduo **PAN**

Co-Author(s): Jian **DENG**, Xiaoyi **YU**, Hui **GUO**, Xi **SONG**

Purpose: This study aimed to delineate anterior segment characteristics in high myopia with posterior staphyloma (HMPS) and to explore the interplay between corneal biomechanics, anterior scleral thickness, and myopia severity.

Methods: This prospective cross-sectional study enrolled 137 myopic patients (137 eyes) and categorized them into three groups: non-high myopia (NHM), high myopia (HM), and high myopia with posterior staphyloma (HMPS). Corneal biomechanics were assessed with Corvis ST, measuring parameters including A1L, A1V, A2L, A2V, HCR, HCDA, PD, SP-A1, DA Ratio, and IR. Anterior scleral thickness (AST) and subfoveal choroidal thickness (SFCT) were obtained by OCT, with AST measured at the scleral prominence and at 1–3 mm posteriorly in four quadrants. Inter-group differences were analyzed using ANOVA, and associations of corneal biomechanics and AST with myopia progression were evaluated via multiple linear regression.

Results: Posterior staphyloma (PS) was independently associated with shallower anterior chamber depth ($\beta = -0.352$, $P = 0.018$) and greater lens thickness ($\beta = 0.128$, $P = 0.046$). Multiple corneal biomechanical parameters (HCR, HCDA, IR, DA Ratio, A2V) differed significantly among groups ($P < 0.05$). After adjusting for CCT, BIOP, and age, both HM and HMPS groups showed weakened corneal biomechanics compared to the NHM group, as indicated by lower HCR and higher HCDA. However, the HMPS group exhibited a lower IR and DA Ratio than the HM group, suggesting a partial compensatory enhancement in corneal biomechanics. Additionally, AST was thicker at multiple locations in the HMPS group and positively correlated with PS after adjusting

for SE, AL, and CCT. Furthermore, AST increased with axial elongation, while choroidal thickness decreased.

Conclusions: HMPS is characterized by a shallower anterior chamber and a thicker lens. Although corneal biomechanics are impaired in HM, partial compensatory enhancement is observed in HMPS. Furthermore, AST increases with axial elongation and is associated with the presence of posterior staphyloma.

Abstract No.: 200745

Brimonidine Eye Drops and Intravitreal Administration Inhibit Form-Deprivation Myopia in Guinea Pigs: Ocular Pharmacokinetic and Toxicity Evaluation

First Author: Zeng **FANG**

Co-Author(s): Huang **GUOFU**

Purpose: This study aims to evaluate the effects of brimonidine eye drops and intravitreal administration in guinea pigs with form deprivation myopia (FDM), and to analyze the ocular pharmacokinetics and irritation.

Methods: The experimental guinea pigs were randomized to the normal control, FDM, FDM brimonidine topical eye drops, and FDM intravitreal injection groups. The experiment period was 13 days. Changes in ocular refraction and axial length were monitored regularly. The ocular pharmacokinetics of brimonidine and its metabolite brimonidine-2,3-dione were analyzed using ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS). Ocular irritation was assessed by the Draize test, corneal fluorescein staining, and hematoxylin and eosin staining.

Results: Treatment with brimonidine 400 μ g topical eye drops and 20 μ g intravitreal injection inhibited refraction and axial progression in the FDM group ($P < 0.05$). Brimonidine concentrations peaked in the topical eye drop group (11.965 ng/mg) at 0.5 hours and the intravitreal injection group (8.03 ng/mg) at 2 hours. The area under the curve (AUC $_{0-\infty}$) was 609.645 ng h/mg in the topical eye drop group and 449.587 ng h/mg in the intravitreal injection group. Draize score was lower and less irritating when administered by eye drops than by vitreous cavity injection.

Conclusions: Brimonidine eye drops and intravitreal administration inhibit the progression of FDM myopia in guinea pigs. Topical eye drop administration maintains higher drug concentrations in scleral tissue and is less irritating to the eye.

Abstract No.: 200931**Causal Relationship Between Myopia and Ocular Disorders at the Gene Level: A Mendelian Randomization Study***First Author: Tiange LIU**Co-Author(s): Xiaotong LI, Wei ZHANG*

Purpose: The incidence of myopia is steadily increasing, and it is emerging as a worldwide public health concern. Evidence from observational studies suggests that myopia is a risk factor for various ocular disorders; however, the causal association between myopia and these ocular disorders remains to be determined.

Methods: Using a two-sample Mendelian randomization approach, we analyzed genome-wide association study data to explore the causal relationship between myopia and 89 ocular diseases. The inverse variance weighted method was employed as the primary analytical tool, supplemented by a comprehensive sensitivity analysis.

Results: Among 89 ocular diseases studied, myopia showed significant causal associations with open-angle glaucoma ($OR=50.56$, $p=0.035$), optic disc disorders ($OR=2.24 \times 10^{11}$, $p=0.028$), non-senile cataract ($OR=31.37$, $p=0.049$), retinal detachment ($OR=9492.53$, $p=0.019$), and vitreous disorders ($OR=40.90$, $p=0.029$), but negatively associated with angle-closure glaucoma ($OR=2.96 \times 10^{-6}$, $p=0.032$). Sensitivity analyses supported these findings.

Conclusions: Myopia has a significant causal effect on primary open-angle glaucoma, primary angle-closure glaucoma, disorders of the optic disc, non-senile cataracts, retinal detachment, and vitreous-related diseases. Our research highlights the necessity of preventing myopia and provides new insights into the etiology of these ocular diseases.

Abstract No.: 208302**Characteristics of Corneal Biomechanical Changes and Their Correlation With Anterior Segment Parameter Alterations in the Early Period After SMILE Surgery***First Author: Chen TINGTING**Co-Author(s): Wei CHI, Yurui ZHAN*

Purpose: To investigate early changes in corneal biomechanics after small incision lenticule extraction (SMILE) and analyze their correlations with anterior segment parameters.

Methods: In this prospective study, 158 myopic patients (158 eyes) undergoing SMILE at the First Hospital of Lanzhou University between December 2022 and October 2023 were included. Only the right eyes were analyzed. Corneal biomechanics were measured using the Corvis ST before and 3 months after surgery. Parameters included A1V, A1L, A1T, A2V, A2L, A2T, HCR, HCDA, SSI, SP-A1, IR, DA 2 ratio, ARTh,

CBI, BAD.D, and TBI. Anterior segment parameters (Km, CCT, CV10mm, ACD, ACV, ACA, SE, and IOPnct) were also recorded. Paired t-test or Wilcoxon signed-rank test compared pre- and postoperative values; Pearson or Spearman correlation assessed relationships between changes (Δ) in parameters.

Results: At 3 months, A1L, A1T, A2L, A2V, IOPnct, bIOP, HCR, SSI, ARTh, and SP-A1 significantly decreased, while A1V, A2T, ATm, HCDA, DA 2 ratio, IR, CBI, BAD.D, and TBI significantly increased ($P<0.05$). ΔKm , ΔCCT , and $\Delta CV10mm$ were positively correlated with $\Delta IOPnct$, $\Delta ARTh$, and $\Delta SP-A1$ ($r=0.164-0.388$, $P<0.05$) but negatively correlated with ΔHCR , ΔSSI , $\Delta DA 2$ ratio, ΔIR , and ΔTBI ($r=-0.341$ to -0.166 , $P<0.05$). ΔACD , ΔACV , and ΔACA also showed significant correlations with $\Delta DA 2$ ratio, $\Delta ARTh$, $\Delta BAD.D$, and ΔTBI ($P<0.05$).

Conclusions: Three months after SMILE, corneal stiffness decreases and deformation increases. These biomechanical changes are significantly correlated with multiple anterior segment parameters, reflecting structural remodeling of the cornea after surgery.

Abstract No.: 206255**Clinical and Epidemiological Profile of Paediatric Myopia: A Retrospective Analysis of 1200 Cases***First Author: Mayanka NAYAK**Co-Author(s): Amod NAYAK, Lalitha S, Harshini, Vanitha*

Purpose: Background: The global burden of paediatric myopia is rising, with environmental and genetic factors playing key roles. This study evaluates refractive status, axial length, and lifestyle factors in a paediatric population to guide early intervention strategies.

Methods: Methods: Data of 1,200 patients aged 5-17 years were retrospectively analysed. Parameters included spherical equivalent (SE), axial length (AL), keratometry (K), parental myopia, near-work activity, and outdoor exposure. These measurements were done on Myopia Master by Oculus.

Results: Results: The mean age was 11.5 years, with 88% under 15 years. Average SE was -3.41 D (right eye) and -3.33 D (left eye). Myopia severity distribution: 48.6% mild, 39.6% moderate, and 9.4% high. Mean AL was 25.3 mm (right) and 24.4 mm (left). Average outdoor exposure was less with high myopia patients. High near-work activity was reported in 65 % of cases.

Conclusions: Conclusion: This study highlights a significant burden of moderate to high myopia among children and adolescents, with axial length, increased near activity and limited outdoor exposure being key risk indicators. The findings underscore the importance of early screening, lifestyle modification counselling, and timely myopia control interventions.

Abstract No.: 202810

Correction of Ultra-High Myopia With Scleral Contact Lenses

First Author: Bingru **ZHENG**

Co-Author(s): Dongmei **CUI**, Yu **JIA**, Lu **LAI**, Wen **LONG**

Purpose: To analyse the visual quality achieved by fitting scleral contact lenses (CSCL) in an uncommon case of bilateral high myopia management with a high degree of myopia and dry eye symptoms.

Methods: A 28-year-old man presented for an eye examination due to unsatisfactory visual quality and discomfort with rigid corneal contact lenses (RGP). He presented with high myopia and dry eye in both eyes. A diagnostic trial set was used in the fitting process, and he was assessed according to standardised fitting methodology. Visual acuity, corneal topography, biometry, and ocular aberrations were evaluated in 1 1-year follow-up period.

Results: The finalized scleral lens parameters were established, considering the patient's fitting situation after a trial period. The best spectacle-corrected visual acuity was 20/25 visual acuity in both eyes with the first scleral lens. Following adjustments to the lens base curve design, the tear lens between the lens and the cornea forms a negative tear lens. During the second visit, slit-lamp biomicroscopy findings showed optimal values for lens position and lens movement with no compression of the limbus and conjunctiva. After one month of follow-up, the patient's binocular visual acuity remained stable at 20/20. After 1 year of wearing CSCL, optimal values for the lens position and lens movement were maintained, and no adverse ocular effects were presented.

Conclusions: This case serves as a successful example of utilizing scleral contact lenses to improve the corrected visual acuity of a patient with longstanding vision issues. It introduces a promising option for managing high degree myope in clinical practice.

Abstract No.: 208303

Correlation Between Axial Length and Corneal Biomechanical Properties in Myopic Patients

First Author: Chen **TINGTING**

Co-Author(s): Wei **CHI**, Yurui **ZHAN**

Purpose: To investigate the correlation between corneal biomechanics and axial length (AL) in myopic patients.

Methods: In this cross-sectional study, 160 myopic patients (160 right eyes) scheduled for excimer laser surgery were enrolled. Based on AL measured by the IOL Master 500, participants were classified into three groups: healthy control (AL $\leq$ 24 mm, n = 17), low-to-moderate AL (24 mm < AL $\leq$ 26 mm, n = 118), and high AL (AL > 26 mm, n = 25). Corneal biomechanical

parameters were assessed using the Pentacam and Corvis ST systems, including A1V, A1L, A1T, A2V, A2L, A2T, ATm, HCDA, HCR, SSI, SP-A1, IR, DA ratio, ARTh, CBI, BAD.D, and TBI. Correlations between AL and biomechanical parameters were analyzed using Pearson/Spearman tests and multivariate linear regression.

Results: The mean age was 23.4 ± 5.7 years (88 males, 72 females). Significant intergroup differences were observed in A2T, ATm, SSI, and BAD.D ($F = 3.043-8.929$, $P < 0.05$). AL was positively correlated with ARTh and SP-A1 ($r = 0.23$, $P = 0.003$; $r = 0.20$, $P = 0.010$), and negatively correlated with A1V, A2T, ATm, SSI, DA ratio, IR, CBI, BAD.D, and TBI ($r = -0.478$ to -0.323 , $P < 0.05$). Regression analysis confirmed significant associations between AL and A1V, HCDA, SSI, and BAD.D ($\beta = -0.448-0.384$, $P < 0.05$).

Conclusions: SSI and BAD.D were inversely associated with AL, indicating that axial length should be considered when interpreting corneal biomechanical parameters, particularly in younger myopic patients.

Abstract No.: 201906

Cost-Effectiveness Analysis of Low-concentration Atropine for Myopia Progression (LAMP1) Study

First Author: Yuzhou **ZHANG**

Co-Author(s): Jason C. **YAM**

Purpose: To evaluate the cost-effectiveness of different atropine concentrations (0.01%, 0.025%, and 0.05%) for controlling myopia progression in children.

Methods: The data were from the LAMP1 study, a randomized controlled trial. Changes in spherical equivalent and axial length over 5 years were measured. Costs included patient out of pocket costs of medical examination and medications which consisted of cost of consultation, follow-up visits, optometric services, specialized ophthalmic services, spectacles, and loss of productivity. A transition-state model was used to simulate the effect of low concentration atropine on myopia progression. A Markov model with three health states (low, moderate, and high myopia) was utilized. The analysis focused on both short-term, with utilizing a 5-year time horizon when subjects would reach myopia stability, and long-term, further assessing the long-term impact of myopia and its associated complications (including open-angle glaucoma, retinal detachment, myopic macular degeneration, and cataracts), extending the model's time horizon of the scenario analysis to 80 years. Model parameters were varied within plausible ranges of values to determine their impact on the model in sensitivity analysis.

Results: The cost-effectiveness ranking of different atropine concentrations over the 5-year period was highest for 0.05%, followed by 0.025%, and 0.01%.

The results remained unchanged when extended the time horizon to 80 years. Additionally, the results showed that 0.05% atropine demonstrated better cost-effectiveness in the earlier treatment group. And the longer treatment duration was found to have better cost-effectiveness.

Conclusions: 0.05% atropine was the most cost-effective among three concentrations, and should be considered for early intervention and long-term use.

Abstract No.: 204760

Current Status of Vision and Refractive Errors Among Adolescents in Northeast Sichuan, China: A School-Based Cross-Sectional Study

First Author: Zhe **LI**

Co-Author(s): Yunchun **ZOU**

Purpose: To investigate the status of visual acuity and refractive errors among adolescents in northeastern Sichuan, China, a stratified cluster random sampling was conducted in 2024 to survey 61,012 students from kindergartens and primary to high schools across three districts and six counties in Nanchong City.

Methods: Visual acuity screening and non-cycloplegic autorefraction were performed using an electronic intelligent screening system under strict quality control. Detection rates and distribution characteristics of poor vision and suspected myopia were analyzed, along with associated risk factors.

Results: Poor vision and suspected myopia rose steeply with school level, peaking at 90.81 % and 88.40–89.78 % in senior high; the proportion of high myopia climbed in parallel. Marked regional gaps emerged: Nanbu County 80.49 % vs Langzhong City 46.41 %. Girls, urban students, and ordinary-school pupils carried heavier burdens. Spectacle use increased with grade yet proper correction remained suboptimal; astigmatism and anisometropia were common and worsened with grade, while hyperopia reserve declined in younger cohorts. Logistic regression confirmed grade, gender, regional type, and school level as significant determinants of students' visual fate.

Conclusions: This study reveals the epidemiological characteristics and influencing factors of visual acuity and refractive errors among adolescents in northeastern Sichuan, providing essential data and scientific evidence for the development of targeted myopia prevention strategies in the region.

Abstract No.: 200794

Developing a Polygenic Risk Score With Age and Sex to Identify High-Risk Myopia in Taiwan

First Author: Lin **HUI JU**

Co-Author(s): Ya-wen **CHANG**, Yu Chuen **HUANG**, Yu-te **HUANG**, Wen-ling **LIAO**, Fuu Jen **TSAI**, Angel L **WENG**

Purpose: Myopia is the leading cause of impaired vision, and its prevalence is increasing among Asian populations. This study aimed to develop a polygenic risk score (PRS) followed by replication to predict myopia in the Taiwanese population.

Methods: In total, 23,688 participants with cycloplegic autorefraction-measured mean spherical equivalent (SE), genetic, and demographic data were included. The myopia PRS was generated based on genome-wide association study (GWAS) outcomes in a Taiwanese population and previously published GWAS reports.

Results: The results demonstrated that the inclusion of age and sex in the PRS had an area under the curve (AUC) of 0.80, 0.78, and 0.73 ($p < 0.001$) for participants aged >18 years with high ($SE < -6.0$ diopters (D); $n = 1089$), moderate ($-6.0 D < SE \leq -3.0$ D; $n = 3929$), and mild myopia ($-3.0 D < SE \leq -1.0$ D; $n = 2241$), respectively. Participants in the top PRS quartile had a 1.30-fold greater risk of high myopia (95% confidence interval = 1.09–1.55, $p = 0.003$) compared with those in the remaining participants. Further, a higher PRS significantly increased the risk of high myopia ($SE \leq -2.0$ D) in children ≤ 6 years of age ($p = 0.027$).

Conclusions: In conclusion, including the PRS, age, and sex improved the prediction of high myopia risk in the Taiwanese population.

Abstract No.: 208566

Dietary Omega-3 Polyunsaturated Fatty Acids as a Protective Factor of Myopia: The Hong Kong Children Eye Study

First Author: Yuzhou **ZHANG**

Co-Author(s): Jason C. **YAM**

Purpose: To evaluate the associations between omega-3 polyunsaturated fatty acids (ω -3 PUFAs) and other dietary factors with myopia.

Methods: A total of 1,005 Chinese children, aged from 6 to 8 years, from a population-based Hong Kong Children Eye Study, were included in the analysis. Diet was assessed using a validated food-frequency questionnaire. Cycloplegic spherical equivalent (SE) refraction was assessed via an autorefractometer, and axial length (AL) via IOL Master.

Results: AL was longest in the lowest quartile group of ω -3 PUFAs intake, compared with the highest (adjusted mean (95% CI), 23.29 (23.17 to 23.40) mm vs 23.08 (22.96 to 23.19) mm, $P=0.01$; P -trend=0.02)

after adjusting for age, sex, BMI, near-work time, outdoor time, and parental myopia. The corresponding trends were observed in SE (-0.13 (-0.32 to 0.07) D in the lowest and 0.23 (0.03 to 0.42) D in the highest quartile groups, $P=0.01$; P -trend= 0.01). In contrast, AL was longest in the highest quartile group of saturated fatty acids intake, compared with the lowest (23.30 (23.17 to 23.42) mm vs 23.13 (23.01 to 23.24) mm, $P=0.05$; P -trend= 0.04). The corresponding trends were observed in SE (-0.12 (-0.33 to 0.09) D in the highest and 0.13 (-0.04 to 0.31) D in the lowest quartile group, $P=0.06$; P -trend= 0.04). A lower intake of ω -3 PUFAs was associated with myopia (P -trend= 0.006). None of the other nutrients was associated with SE, AL, or myopia.

Conclusions: Our findings indicated a possible effect of diet on myopia, of which ω -3 PUFAs intake may play a protective role against myopia development in children.

Abstract No.: 201891

Effect of Air Pollution on Refractive Errors: A Systematic Review

First Author: Divya JAIN

Co-Author(s): Anjan DHUA

Purpose: To examine the association between air pollution exposure and the development or progression of refractive errors, especially myopia.

Methods: A systematic search was conducted across PubMed, Scopus, and Web of Science for studies published up to Jan 2025. Eligible studies assessed the relationship between major air pollutants (PM_{2.5}, PM₁₀, NO₂, SO₂, CO, O₃) and refractive errors. Study quality was evaluated using the Newcastle-Ottawa Scale.

Results: Twenty-six studies met inclusion criteria and were included for full text screening. Most showed a positive correlation between elevated PM_{2.5} levels and increased myopia risk. Mechanisms included oxidative stress, ocular inflammation, and reduced outdoor activity. Evidence for hyperopia and astigmatism was inconclusive.

Conclusions: Air pollution, especially PM_{2.5}, may be a modifiable risk factor for myopia. More robust longitudinal studies are needed.

Abstract No.: 208273

Effect of Low-Concentration Atropine Eyedrops on Parapapillary Gamma Zone Development and Enlargement Over 3 Years

First Author: Yi LI

Co-Author(s): Jason C. YAM, Xiu Juan ZHANG

Purpose: To evaluate the longitudinal changes in the parapapillary gamma zone in children receiving 0.05%, 0.025%, 0.01% atropine eyedrops and placebo/switchover over 3 years based on the Low-

Concentration Atropine for Myopia Progression (LAMP1) study.

Methods: This is a secondary analysis from a randomized controlled trial. Children were randomized to receive 0.05%, 0.025%, 0.01% atropine, or placebo eyedrops. In the second year, placebo participants switched to 0.05% atropine. At the beginning of the third year, each group was re-randomized to continued treatment or cessation (washout). Gamma zone area was measured using spectral-domain optical coherence tomography (Spectralis-OCT), which involved 24 equally spaced radial OCT B-scans of the optic nerve head taken at one-year intervals. The Bruch's membrane opening (BMO) was identified in 48 meridians in each eye. Gamma zone was defined as the parapapillary region without Bruch's membrane.

Results: Out of 238 children included at baseline, the study included 192 (80.7%) children completing the follow-up of 3 years. The cumulative mean gamma zone area changes differed significantly between the initial 0.05%, 0.025%, and 0.01% atropine subgroups (0.09 ± 0.09 mm², 0.19 ± 0.12 mm², and 0.22 ± 0.17 mm²; P for trend < 0.001) over 3 years. In multivariable analysis, gamma zone area enlargement was associated with 0.05% atropine ($\beta = -0.07$, $P = 0.005$), female sex ($\beta = 0.05$, $P = 0.006$), larger baseline gamma zone area ($\beta = 0.23$, $P < 0.001$), and larger axial elongation ($\beta = 0.14$, $P < 0.001$).

Conclusions: Low-concentration atropine reduced parapapillary gamma zone enlargement in a concentration-dependent manner over a 3-year treatment period. Continued 0.05% atropine treatment showed efficacy in controlling gamma zone development.

Abstract No.: 208379

Effects of Low-Concentration Atropine on Myopia Progression and Functional Changes in Hong Kong Children

First Author: Yolanda Wong Ying YIP

Co-Author(s): Jason C. YAM, Yuzhou ZHANG

Purpose: This study aims to investigate the effects of low-concentration atropine treatment on refraction, axial length, retinal thickness, and multifocal electroretinogram (mfERG) responses in children with myopia.

Methods: Forty-three myopic children (ages 4-12; spherical equivalent -1.0 to -10.0 D) were randomized to receive either atropine ($n=24$) or placebo ($n=19$). Axial length, refractive error, retinal thickness, and mfERG were measured before and after treatment. Mann-Whitney U test and Wilcoxon test were used for comparing the difference between two groups and pre- and post-treatment, respectively. Bonferroni corrections were used for multiple comparisons. Correlations among the changes in mfERG, axial

length, refractive error, and retinal thickness were also assessed.

Results: The atropine group showed a significant improvement in refractive error compared to placebo ($p=0.011$); axial length remained unchanged ($p>0.05$). Retinal thickness increased significantly in several macular regions after atropine treatment (inner superior, inner nasal, inner inferior, outer superior, outer temporal; $p<0.05$). No significant differences in mfERG amplitudes or latencies were observed ($p>0.05$). Significant correlations between the changes in mfERG parameters and the changes in retinal thickness, axial length, and refractive error ($p<0.05$).

Conclusions: Low-concentration atropine slows myopia progression by improving refractive error without significantly affecting axial length or mfERG responses. The associated retinal thickening and correlations between the changes in structural and functional measures indicate a potential mechanism of atropine's impact on retinal function and structure in myopic children.

Abstract No.: 204882

Efficacy Analysis of 0.01% Atropine for Early-Stage Myopia Control in Children

First Author: Jifeng YU

Purpose: To evaluate the short-term efficacy of 0.01% atropine in slowing myopia progression in children with early-stage myopia, compared to Defocus Incorporated Multiple Segments (DIMS) lenses and their combination.

Methods: A total of 175 myopic children were included and divided into three groups: DIMS lenses alone ($n=98$), 0.01% atropine alone ($n=45$), and combination therapy ($n=32$). The 0.01% atropine group was significantly younger (7.98 ± 1.48 vs. 9.18 ± 2.35 years, $p=0.002$) and had milder baseline myopia ($SE: -0.31\pm0.42$ vs. -2.06 ± 1.35 D, $p<0.001$) than the DIMS group, characterizing an earlier myopic cohort. The primary outcome was the change in spherical equivalent (SE) from baseline at 3 and 6 months. Analysis of covariance (ANCOVA) was used to compare outcomes, adjusting for baseline age and SE.

Results: After adjusting for baseline differences, 0.01% atropine monotherapy showed a strong trend towards superior SE control compared to DIMS lenses alone at both 3 months ($\beta=0.13$, 95% CI: -0.01 to 0.26 , $p=0.070$) and 6 months ($\beta=0.18$, 95% CI: -0.01 to 0.36 , $p=0.060$). The combination therapy did not demonstrate a significant additive effect over DIMS alone. Subgroup analyses reinforced the potential benefit of 0.01% atropine in younger children and those with lower baseline myopia.

Conclusions: 0.01% atropine demonstrates a promising treatment effect for children with early-stage myopia over a 6-month period, suggesting it may be a favorable

initial intervention for this specific population. The results highlight the importance of considering disease stage when selecting myopia control strategies.

Abstract No.: 202360

Efficacy of 0.01% Atropine Eyedrops for Myopia Control in Children of Different Ethnicities: A Systematic Review and Meta-Analysis

First Author: Xiujuan ZHANG

Co-Author(s): Ching-yu CHENG, Christopher K.s. LEUNG, Kendrick Co SHIH, Marco YU

Purpose: To evaluate the efficacy of 0.01% atropine eyedrops for myopia control in children from different ethnic backgrounds.

Methods: PubMed, Embase, Web of Science, Cochrane Library, World Health Organization International Clinical Trials, and ClinicalTrials.gov registry platforms from inception to December 2024. A random-effects meta-analysis was used for each outcome. Generalized Boosted Modeling (GBM) was used to evaluate the most relevant factors related to the treatment effect of 0.01% atropine.

Results: Twenty-five RCTs involving 4,374 children aged 4 to 18 years were included. 0.01% atropine showed that the SER progression was reduced by 37% per year (RoM: 0.63; 95% CI, 0.54 to 0.74). For subgroup analysis by different ethnics, South Asian populations groups showed a much better efficacy of reducing 66% myopia progression (RoM: 0.34, 95% CI, 0.27 to 0.42), than East Asian populations by reducing 35% (RoM: 0.65, 95% CI, 0.54 to 0.78) and White populations by reducing 31% (RoM: 0.69, 95% CI, 0.49 to 0.96) ($P<0.0001$). Gradient Boosting Machine (GBM) analysis revealed age (44.1%) as the most influential factor on 0.01% atropine treatment effect.

Conclusions: Atropine 0.01% demonstrated moderate efficacy in the control of myopia. When considering the natural progression of myopia, the efficacy of 0.01% atropine was more effective in South Asian populations than in East Asian and White children. Clinical practice should consider both the ethnic difference and the natural myopia progression to adjust the dosage appropriately and optimize the treatment effects.

Abstract No.: 205789

Efficacy of Defocus-Incorporated Multiple Segments (DIMS) Lenses and Atropine for Myopia Control: A Systematic Review and Meta-Analysis

First Author: Laureen CELCILIA

Co-Author(s): Priscilla ARDIANTO, Florentina FEBRINA

Purpose: This review aimed to determine the efficacy of Defocus-Incorporated Multiple Segments (DIMS)

lenses and atropine in slowing myopia progression in children.

Methods: A systematic search of PubMed, Scopus, Web of Science, and the Cochrane Library was conducted using terms “myopia,” “DIMS,” and “atropine” in pediatric populations. Studies assessing the efficacy of DIMS-atropine compared with alternative interventions were included. Methodological quality assessed using RoB 2.0 and NIH. Meta-analyses were done to estimate mean differences between available interventions.

Results: Six studies were included (n=1223 patients) involving one RCT, two prospective, and three retrospective studies. The overall mean difference at 1-year demonstrated a significant reduction in axial elongation (AL) with DIMS-atropine compared to DIMS alone (−0.10 mm (−0.17 to −0.03); p=0.0037). Older age was associated with slower AL progression both in DIMS-atropine and DIMS alone (p<0.05). The effects of DIMS-atropine were significantly better than atropine alone (p<0.001). No differences were observed between DIMS and orthokeratology. Adverse events of epithelial defects were observed with orthokeratology (15.1%) compared to DIMS (1.2%). One study reported tolerable effects (i.e. itchy/redness) with DIMS.

Conclusions: The combination of DIMS and atropine is effective in slowing myopia progression. DIMS and orthokeratology demonstrated comparable efficacy in myopia control. Atropine slowed progression with any lens type, especially in older children. DIMS caused mostly mild adverse effects, while orthokeratology had higher complication rates. Further high-quality studies are needed to confirm the long-term safety and efficacy of combined therapies.

Abstract No.: 205034

Efficacy of Five Types of Myopia Control Glasses Among Indian Children

First Author: Sneha **BATRA**

Co-Author(s): Supratik **BANDYOPADHYAY**, Joyashree **BANERJEE**, Aroni **CHAKRABORTY**, Swarup **ROY**, Shyamal **SAHA**

Purpose: To determine the efficacy of five types of myopia control glasses (MCG) among Indian children.

Methods: A retrospective cohort study with one-year follow-up was done in 426 eyes of 231 children aged 4-17 years, myopia -0.75 to -10D, astigmatism ≤4 D, baseline progression ≥0.5D. Data from children prescribed Type I (defocus incorporated multiple segments), Type II (Highly Aspherical Lenslet target), Type III (Cylindrical annular refractive elements), Type IV (Peripheral defocus reducing lenses), and Type V (pediatric progressive addition lenses) were analysed. Mean change in spherical equivalence of refractive error (SER) and axial length (AL), percentage efficacy in reducing SER and AL progression to physiological levels,

were compared. Subgroup analysis was done by age, gender, and amount of myopia.

Results: Mean change in SER and AL at 6 and 12 months with all MCG combined was -0.04 ± 0.22 , -0.24 ± 0.4 D, 0.07 ± 0.11 mm, and 0.16 ± 0.18 mm, respectively. No statistically significant difference was noted between Types I, II, and III. Axial and refractive efficacy at 6 and 12 months of all MCG combined was 44.4%, 46.2%, 91.1% and 70.3% respectively. There was no significant difference between boys and girls. The older group showed significantly better axial efficacy (p<0.01) at 6 and 12 months. Refractive efficacy was significantly higher at 12 months (p<0.01) among low myopes.

Conclusions: Type I, II, and III MCG are equally efficacious in controlling myopia progression among Indian children, with better results among older children and low myopes.

Abstract No.: 202354

Efficacy, Tolerability and Threshold Effect of Atropine Eyedrops for Myopia Control: A Systematic Review and Dose-Response Meta-Analysis

First Author: Xiujuan **ZHANG**

Co-Author(s): Ching-yu **CHENG**, Christopher K.s **LEUNG**, Kendrick Co **SHIH**, Marco **YU**

Purpose: To evaluate the efficacy, tolerability, and threshold effect of atropine eyedrops for myopia control in children

Methods: We searched PubMed, Embase, Web of Science, Cochrane Library, World Health Organization International Clinical Trials, and ClinicalTrials.gov registry platforms from inception to July 2025. We included the randomized clinical trials (RCTs) that compared any dose of atropine against a placebo in myopic children. A random-effects dose-response meta-analysis was used for each outcome.

Results: Among 3,566 studies assessed, we identified 33 eligible RCTs involving 6,301 children aged 4 to 18 years with 10 different concentrations. A nonlinear relationship was observed between atropine dosage and treatment efficacy (P<0.001). Compared to placebo groups, the mean differences in reducing SER progression for atropine concentrations of 0.01%, 0.02%, 0.03%, 0.04%, and 0.05% were 0.21 D (95% CI, 0.13 to 0.28), 0.35 D (95% CI, 0.23 to 0.46), 0.42 D (95% CI, 0.28 to 0.56), 0.45 D (95% CI, 0.30 to 0.60), and 0.46 D (95% CI, 0.32 to 0.61) respectively. However, when the concentration increased to 0.1%, the treatment efficacy showed a minimal increase to 0.49 D (95% CI, 0.34 to 0.63). Similarly, the treatment efficacy increased 0.99 D (95% CI, 0.66 to 1.31) to concentrations of 1%.

Conclusions: Our study showed that beyond a specific range, higher concentrations do not lead to comparably increased efficacy, and the current practice

of increasing atropine concentrations for children who show inadequate responses to lower doses should be confined to a specific concentration range.

Abstract No.: 203747

Ellipsoid Zone in Inner Segment of Retinal Photoreceptors in Adults With High Myopia in Hong Kong

First Author: Tsun Hei YIP

Co-Author(s): Christopher Kai Shun LEUNG, Zirong LIU, Xiujuan ZHANG

Purpose: High myopia (HM) increases the risks of sight-threatening complications. The ellipsoid zone (EZ), the hyperreflective outer retinal band just posterior to the external lining membrane, is a widely used biomarker of photoreceptor structure.

Methods: Participants were recruited from the Hong Kong Eye Survey and conducted Swept-Source Optical Coherence Tomography (OCT) (Topcon, Tokyo, Japan), obtaining widefield ($12 \times 9 \text{ mm}^2$) OCT with 128 B scans data covering both optic disc and macula. Segmentation of retinal layers was performed by OCTExplorer, followed by manual adjustments. Three-dimensional retinal volume quantification was utilized to investigate the Pearson correlation coefficient (r) between EZ thickness and axial length (AL) and spherical equivalent (SE).

Results: A total of 40 high myopic left eyes from 40 participants were included, with mean ages 63.0 ± 5.02 years, mean SE $-7.99 \pm 1.60 \text{ D}$, mean AL $27.1 \pm 0.895 \text{ mm}$, and 28 (70%) females. Statistically significant correlations were revealed between EZ thickness and SE ($r = 0.559$, $P = 0.001$) and AL ($r = -0.427$, $P = 0.006$). No significant associations were evident between EZ thickness and age ($r = 0.0221$, $P = 0.866$) and gender ($t\text{-test} = 0.345$, $P = 0.732$).

Conclusions: These relationships may provide insights into the pathophysiology of myopia and highlight the importance of monitoring retinal layers in HM patients. Future research on the implications of these findings on clinical practices and potential therapeutic interventions should be explored.

Abstract No.: 203078

Evaluation of Retinal Vascular Density and Ocular Biometry in Myopia

First Author: Pimpakarn TRARUNGREANG

Co-Author(s): Parichat KONGMALAI, Sopit PRAIWATTANA, Nattawat SINAWAT, Suthasinee SINAWAT, Yosanan YOSPAIBOON

Purpose: To evaluate retinal vascular density and ocular biometric parameters across varying severities of myopia in young Thai adults.

Methods: This retrospective cross-sectional study included Thai adults aged 20–25 years with myopia.

All participants underwent comprehensive ophthalmic evaluation, including best-corrected visual acuity, intraocular pressure, automated refraction, slit-lamp biomicroscopy, indirect ophthalmoscopy, and ocular biometry (mean corneal curvature, corneal astigmatism, central corneal thickness, anterior chamber depth, lens thickness, and axial length). Posterior segment assessments comprised central macular thickness, subfoveal choroidal thickness, peripapillary retinal nerve fiber layer thickness (pRNFL), retinal vascular density, and optic disc distortion. Intergroup comparisons and regression analyses assessed associations with myopia severity.

Results: A total of 177 eyes (mean age, 22.5 ± 0.8 years; 55.4% female) were analyzed. High myopia was significantly associated with longer axial length, deeper anterior chamber, greater corneal astigmatism, and reduced choroidal thickness and pRNFL thickness ($p < 0.001$). Optical coherence tomography angiography (OCTA) revealed increased superficial foveal vascular density but decreased deep parafoveal density in high myopia. The foveal avascular zone area was significantly smaller in the high myopia group ($p = 0.032$). Both axial length and spherical equivalent were significantly associated with retinal vascular density changes and pRNFL thinning.

Conclusions: Myopic progression in young adults is linked with distinct biometric and vascular alterations, particularly in the deep capillary plexus and pRNFL. OCTA may enable early detection of microvascular compromise before pathologic changes appear.

Abstract No.: 208021

Exploring the Role of Optic Disc Tilt in Altering Retinal Structure in Myopic Eyes

First Author: Poemen Pm CHAN

Co-Author(s): Clement THAM, Cheuk Sing YAM, Xiu Juan ZHANG, Yuqiao ZHANG

Purpose: This study aimed to examine the relationship between myopic optic disc parameters—ovality index (OI), optic disc torsion (ODT) angle, and horizontal disc tilt (OCT-HDT) angle—and the thickness of retinal nerve fiber layer (RNFL) and ganglion cell-inner plexiform layer (GCIPL) in myopic eyes.

Methods: A cross-sectional study was conducted on 530 eyes from 284 high myopia participants in Hong Kong. SS-OCT and fundus photography were used to measure optic disc parameters (OI, ODT, and OCT-HDT), and RNFL as well as GCIPL thicknesses were assessed. Statistical analyses were performed to investigate associations between optic disc tilt parameters and RNFL/GCIPL thickness, adjusted for age and axial length.

Results: In the temporal group, a larger ODT angle was associated with thinner RNFL in the p7-8 sector ($\beta = -0.182$, all $P < 0.05$). Larger OCT-HDT angles

correlated with thinner superior ($\beta=-0.084$, $P=0.04$) and superonasal GCIPL ($\beta=-0.069$, $P=0.03$), as well as thinner RNFL in the p12-5 sectors ($P<0.05$). A higher OI was linked to thinner RNFL in the superior to nasal ($P<0.05$) and thicker temporal RNFL ($P<0.01$). In the nasal ODT group, a higher OI was associated with thinner superior to superonasal GCIPL ($\beta=-6.972$, $P=0.02$; $\beta=-7.465$, $P=0.02$) and thinner nasal RNFL ($P\leq 0.01$).

Conclusions: The OI, ODT, and OCT-HDT parameters significantly influence RNFL and GCIPL thickness in myopic eyes. The RNFL was more affected by OI in temporally and nasally torted optic discs, while GCIPL was more influenced by OCT-HDT and OI for myopic eyes with temporally and nasally torted optic discs, respectively.

Abstract No.: 206144

Fifteen-Year Follow-Up of Implantable Collamer Lens Surgery in High Myopia: Complications, Cataract Surgery Outcomes, and Ultrastructural Analysis

First Author: Yinjie **JIANG**

Co-Author(s): Xun **CHEN**, Xiaoying **WANG**, Xingtao **ZHOU**

Purpose: This study reports 15-year outcomes of implantable collamer lens (ICL) surgery in high myopia, analyzing complications, cataract surgical efficacy, and ultrastructural mechanisms of anterior subcapsular cataract (ASC).

Methods: A retrospective study included 1,208 eyes (ICL V4) and 6,258 eyes (ICL V4c) from a single center. Follow-ups occurred preoperatively, at 1/3/6 months, annually post-ICL, and 1 month post-cataract surgery. Lens opacity, ASC rates, and complications (e.g., retinal detachment) were evaluated. Anterior capsule ultrastructure was assessed using scanning/transmission electron microscopy (SEM/TEM).

Results: The ICL V4 group (follow-up: 23.12 ± 32.06 months) exhibited higher complication rates than V4c (8.95 ± 17.40 months): lens opacity (6.46% vs. 0.16%), ASC (2.32% vs. 0.10%), and bilensectomy (5.13% vs. 0.16%). Bilensectomy improved corrected distance visual acuity (CDVA) from 0.56 ± 0.39 to 0.34 ± 0.51 logMAR ($P=0.006$), restoring pre-ICL levels ($P=0.310$), with safety/efficacy indices of 1.08 ± 0.11 and 0.99 ± 0.08 . Pre-bilensectomy complications included myopic macular atrophy (35.09%), choroidal neovascularization (7.02%), and retinal detachment (1.75%); post-surgical complications included retinal detachment (1.96%) and endothelial cell loss (1.96%). SEM/TEM revealed lens epithelial cell (LEC) proliferation, fibronectin/collagen deposition, and endoplasmic reticulum abnormalities (thickened cristae, perinuclear vacuolization) in ASC cases, indicating mechanical and metabolic damage preceding clinical ASC.

Conclusions: Super high myopia, shallow anterior chamber depth, and older age are key risk factors for post-ICL cataract. While bilensectomy restores vision, high myopia-related complications persist. ASC pathogenesis involves mechanical damage and metabolic dysfunction, evidenced by ultrastructural changes. These findings underscore the need for long-term monitoring in ICL patients with high myopia.

Abstract No.: 202285

From Genes to Vision: The Role of PARP8 and hsa-miR-410-3p in Myopia Pathogenesis Revealed

First Author: Yiwei **WAN**

Co-Author(s): Lingxi **JIANG**, Yi **SHI**

Purpose: The genetic and functional association between the PARP8 gene and high/extreme myopia (HM/EM) in a Han Chinese population is investigated in this research.

Methods: Genotyping of five SNPs (rs11954386, rs2404958, rs282544, rs32396, and rs27243) in PARP8 among 1,768 participants revealed a significant association with HM/EM.

Results: It is notable that rs27243 (situated in the 3'-UTR region of PARP8) exhibited robust linkage. Experimental validations confirmed that the rs27243A allele enables a binding site for hsa-miR-410-3p, which leads to the downregulation of PARP8 expression. Furthermore, diminished PARP8 levels and elevated hsa-miR-410-3p were detected in patients, in addition to reduced PARP8 levels in form-deprivation myopia mouse models, which suggests that they are potential risk factors or biomarkers for HM/EM.

Conclusions: Collectively, the findings of this study establish PARP8 as a novel susceptibility gene for HM/EM and reveal post-transcriptional regulation of PARP8 via hsa-miR-410-3p as a pivotal mechanism in myopia pathogenesis.

Abstract No.: 203289

Hypoxia Activates Notch1 to Regulate Mitochondrial Fission and Influence Scleral Remodeling in Myopia

First Author: Lingling **BA**

Co-Author(s): Shuaixin **LU**, Jing **SUN**, Jie **WANG**, Kai **WEN**, Xinmiao **ZHOU**

Purpose: This study aims to investigate the regulatory role of Notch1 in mitochondrial dynamics under scleral hypoxia following myopia onset and its effects on the metabolism of the scleral extracellular matrix.

Methods: A form deprivation-induced myopia guinea pig model was established to observe morphological changes in mitochondria within scleral tissue. Plasmid interference was employed to suppress the expression of HIF-1 α and Notch1, and its effects on mitochondrial

morphology and scleral remodeling-related indicators were analyzed.

Results: In the myopia model, mitochondrial fragmentation was significantly observed in scleral tissue. Inhibition of HIF-1 α or Notch1 markedly reduced mitochondrial fragmentation and alleviated myopia-related pathological changes, manifested as decreased the transdifferentiation of scleral fibroblasts into myofibroblasts, along with upregulation of type I collagen expression.

Conclusions: Scleral hypoxia promotes excessive mitochondrial fission by activating the Notch1 signaling pathway, thereby accelerating myopia progression.

Abstract No.: 203422

Intraocular Pressure Lowering Therapy Slows Down Axial Elongation in Progressive High Myopia

First Author: Zige **FANG**

Co-Author(s): Fei **LI**, Fengbin **LIN**, Zefeng **YANG**, Xiulan **ZHANG**

Purpose: To evaluate the efficacy of IOP-lowering medications in inhibiting rapid axial elongation among adults with progressive high myopia (PHM).

Methods: This was a retrospective analysis of data from a longitudinal high myopia with glaucoma suspects cohort at the Zhongshan Ophthalmic Center from December 2019 to May 2025. Patients who used IOP-lowering medications and were diagnosed with PHM were included. PHM was defined as an axial elongation rate of ≥ 0.1 mm/year prior to using IOP-lowering medications. A comprehensive set of variables, including demographic data, ocular characteristics, and optical coherence tomography angiography (OCTA) imaging, was collected. The data were analyzed from May to July 2025.

Results: Of 1628 participants, a total of 50 eyes from 50 eligible participants (14 males and 36 females) were finally analyzed, with an age range from 22 to 60 years (mean 40.4 ± 10.7 years). The mean number of IOP-lowering medications used was 2.0 ± 0.3 . After 12.1 ± 0.7 months, the IOP decreased from 13.49 ± 2.50 mm Hg to 12.03 ± 2.28 mm Hg ($P < 0.001$), AL increased minimally from 28.58 ± 1.36 mm to 28.62 ± 1.37 mm ($P = 0.003$), and the axial elongation rate decreased significantly from 0.14 ± 0.04 mm/year to 0.03 ± 0.07 mm/year ($P < 0.001$). Notably, outcomes of OCTA showed that deep capillary plexus (DCP) perfusion density rose from 49.70 ± 1.21 % to 50.27 ± 1.36 % ($P = 0.039$) and choriocapillaris (CC) perfusion density from 55.47 ± 0.71 % to 55.66 ± 0.55 % ($P = 0.037$).

Conclusions: IOP-lowering medications effectively inhibit rapid axial elongation in adults with PHM in this study. These findings support IOP-lowering medications could be a promising effective strategy for inhibiting myopia progression in adults with PHM.

Abstract No.: 200916

Long-Term Anatomical and Visual Outcomes of Posterior Scleral Reinforcement in Myopic Maculoschisis

First Author: Anas **ABU SAID**

Co-Author(s): Shihao **CHEN**, Yanfeng **SU**

Purpose: To evaluate long-term anatomical and visual outcomes in highly myopic eyes with maculoschisis, without macular hole or foveal detachment, following posterior scleral reinforcement (PSR).

Methods: This retrospective interventional case series included 36 eyes of 30 patients with high myopia and OCT-confirmed maculoschisis treated with PSR between 2017 and 2022. Clinical records were reviewed in 2025. Best-corrected visual acuity (BCVA, logMAR), axial length (AL), spherical equivalent (SE), and OCT-based retinal reattachment status were collected at predefined intervals: 1 day–1 month, 1 month–1 year, 1–2 years, and 2–7 years. Longitudinal changes were analyzed using linear mixed models.

Results: Mean age was 47.9 ± 13.4 years. BCVA showed a transient decline at 1 day ($+0.181$ logMAR, $p < 0.001$) but later stabilized ($p > 0.3$). AL decreased significantly at 1 day (-2.316 mm, $p < 0.001$) and remained shorter at 2–6 years (-1.206 mm, $p < 0.001$). SE improved ($+5.07$ D at 1 day; $+3.28$ D at 2–6 years, both $p < 0.001$). At final follow-up, BCVA improved in 15 eyes, was stable in 9, and declined in 12. Axial shortening occurred in 97% of eyes, with refractive improvement in 92%. Retinal reattachment was progressive, reaching 75% beyond 1 year and 70% in those followed ≥ 2 years.

Conclusions: PSR achieved long-term anatomical stabilization and visual preservation or improvement in highly myopic eyes with maculoschisis, supporting its role as a proactive surgical option in selected patients without foveal detachment or macular hole.

Abstract No.: 203357

Long-Term Effect of Orthokeratology on Ocular Biometric Parameters in Adults

First Author: Xuehui **ZHANG**

Co-Author(s): Lin **KANG**, Huihu **ZHENG**

Purpose: To investigate the effect of long-term use of orthokeratology (ortho-k) on ocular biometric parameters in adults, including axial length (AL), central corneal thickness (CCT), anterior chamber depth (ACD), lens thickness (LH), and anterior segment length (ASL).

Methods: Baseline, six-monthly, and twelve-monthly data were retrieved from 72 subjects (aged 16–35 years, with myopia ranging from $-6.00 \sim -1.00$ D, and astigmatism ≤ -1.50 D) who had completed a one-year wearing ortho-k. Ocular biometric parameters were measured with the IOL Master 700.

Results: By the 6-month visit, it was significantly reduced by an average of 0.06 mm in AL ($p = 0.027$)

and an average of 0.06 mm in CCT ($p < 0.001$), while LH increased by an average of 0.07 mm ($p = 0.001$). However, there were no significant changes in AL, LH, and CCT during the 6-12 months follow-up. No significant changes in ACD and VCD over time were observed during the whole follow-up period.

Conclusions: Both AL and CCT decreased significantly, and LH increased significantly in adults using ortho-k; the changes mainly occurred in the first 6 months. Neither ACD nor VCD changed over time.

Abstract No.: 201616

Long-Term Follow-Up Rigid Gas Permeable Contact Lens Treatment in Adolescents With Amblyopia Anisometropia: A Case Series With Scoping Review

First Author: Christina **ARITONANG**

Co-Author(s): Sarah **FAUZIA**, Zafirah **MUTIANI FARID**

Purpose: This case focuses on young adolescents with amblyopia anisometropia, focusing on the use of RGP contact lenses and the great outcome of visual acuity, which improves quality of life.

Methods: This case series collects data from medical records, patient interviews, follow-up examinations, and outcomes. We use scoping review by PRISMA flow diagram with the keywords myopia, RGP lens, amblyopia, anisometropia, and adolescent.

Results: By fitting and using a rigid gas permeable lens on a patient with anisometropic amblyopia, and follow-up showed a great outcome on visual acuity, which improved the quality of life in 3 patients reported.

Conclusions: RGP contact lens wear is the most effective and safe method to treat anisometropia amblyopia in adolescents. The potential benefits of RGP contact lens wear in inhibiting myopia progression, and complications caused by myopia have a higher impact in the future.

Abstract No.: 201974

Long-Term Impact of COVID-19 Behavioral Changes on Myopia Progression in Children

First Author: Kwanghyun **LEE**

Co-Author(s): Hye Young **KIM**, Young Min **PARK**

Purpose: To investigate the impact of behavioral changes during the COVID-19 pandemic on myopia progression in children and to determine whether these changes influenced the efficacy of low-concentration atropine (LAMP) treatment.

Methods: This longitudinal study followed 77 children (140 eyes) with myopia from 2019 to 2023, measuring annual changes in spherical equivalent refraction and axial length. Behavioral data on screen time, outdoor activity, and remote education were collected through questionnaires. Myopia progression was analyzed

across pre-pandemic, pandemic, and post-pandemic periods using linear mixed-effects models, with regression analyses identifying factors linked to post-pandemic progression.

Results: Myopia progression was greatest in 2021–2022 ($\Delta SER3: -0.56 \pm 0.55$ D) compared with 2019–2020 ($\Delta SER1: -0.40 \pm 0.47$ D; $P = 0.003$). Screen time significantly increased during the pandemic (1.64 to 4.69 hours/day, $P < 0.001$) and was associated with greater $\Delta SER3$ ($P = 0.005$). Remote education >12 months also predicted faster progression ($P = 0.033$), whereas reduced outdoor activity was not significantly associated with refractive changes. LAMP-treated eyes showed less progression before the pandemic ($P = 0.035$), but this protective effect diminished during the pandemic. Axial length elongation paralleled refractive changes. In multivariable analysis, only remote education duration remained significantly associated with $\Delta SER3$ ($P = 0.007$).

Conclusions: COVID-19-related behavioral changes, especially during 2021–2022, accelerated myopia progression in children. Prolonged remote education and increased screen time were major risk factors, revealing reduced efficacy of LAMP and the need for adaptive management strategies post-pandemic.

Abstract No.: 204423

Low-Level Red Light in Myopia: From Prevention to Treatment

First Author: Lin **YOUHONG**

Purpose: To systematically evaluate the efficacy, safety, and mechanisms of repeated low-level red-light therapy (RLRL) for controlling myopia progression in children and adolescents.

Methods: A systematic literature search was conducted in PubMed, Web of Science, Embase, Scopus, and Cochrane databases from January 2005 to September 2025. Inclusion criteria encompassed randomized controlled trials (RCTs), systematic reviews, and meta-analyses focusing on RLRL (typically 650 nm wavelength) for myopia management in humans aged 6-18 years. Exclusion criteria included animal studies, case reports, and studies lacking quantitative outcomes on axial length (AL), spherical equivalent refraction (SER), or choroidal thickness.

Results: Twenty studies were included, comprising 12 RCTs, 5 meta-analyses, and 3 reviews, involving approximately 2,850 participants (predominantly Chinese ethnicity, age range 6-18 years, 48% male/52% female). Baseline myopia severity ranged from -1.00 to -10.00 diopters (D) SER, with most studies focusing on mild-to-moderate myopia (-1.00 to -5.00 D) and some on high myopia (≤ -6.00 D). Pooled data from meta-analyses showed RLRL significantly reduced myopia progression compared to controls: weighted mean difference (WMD) for SER change of 0.68 D per

6 months (95% CI: 0.38-0.97, $I^2=97.7\%$, $p<0.001$); AL elongation of -0.35 mm per 6 months (95% CI: -0.51 to -0.19, $I^2=98.0\%$, $p<0.001$); and subfoveal choroidal thickness increase of 36.04 μm per 6 months (95% CI: 19.61-52.48, $I^2=89.6\%$, $p<0.001$). In high myopia subgroups, 53.3%-59% experienced AL shortening >0.05 mm over 12 months ($p<0.001$). No severe adverse events were reported, with minor side effects like temporary afterimages in $<5\%$ of cases.

Conclusions: RLRL demonstrates robust short-term efficacy in slowing myopia progression, particularly in high myopia, through mechanisms like choroidal thickening and enhanced retinal blood flow. It offers a safe, non-invasive option, but long-term studies (>2 years) are needed to assess rebound effects and comparisons with atropine or orthokeratology for optimized clinical integration.

Abstract No.: 200999

Machine Learning-Based Prediction Model for Axial Length Control Effectiveness in Myopia Management With Overnight Orthokeratology

First Author: Hsin-le LIN

Co-Author(s): Cheng-kuo CHENG, Yu-hsuan HUANG, Shiow-wen LIOU, Tzu-en WU

Purpose: To develop and validate a machine learning-based predictive model to predict the response of orthokeratology (ortho-k) in controlling axial length elongation.

Methods: Myopic children (aged 8–18 years) who received ortho-k treatment between March 2021 and December 2023 were retrospectively reviewed. A total of 116 patients (222 eyes) who completed one year of ortho-k treatment were included in the analysis. A machine learning model was developed utilizing 40 baseline clinical parameters, including demographic data (e.g., age, gender, wearing time), refractive metrics (e.g., spherical equivalent, cylinder), corneal topography (e.g., surface asymmetry index, surface regularity index, eccentricity), and ortho-k lens specifications. Subjects presenting an axial length elongation ≥ 0.20 mm at 1-year were classified as limited response, whereas those presenting an axial length elongation <0.20 mm were classified as significant response. The model tested 20 algorithms, and performance was evaluated using standard metrics.

Results: Coarse Gaussian SVM achieved the best overall performance, as evidenced by the following metrics: recall (0.82), specificity (0.84), precision (0.81), F1-score (0.82), accuracy (0.85), and AUROC (0.87). Baseline cycloplegic spherical equivalent (SE) and eccentricity (e) emerged as the most significant predictors influencing axial length elongation. Patients with more negative baseline SE and lower e values experienced less axial elongation after wearing ortho-k lenses.

Conclusions: This study highlights the potential of machine learning in identifying key factors influencing ortho-k efficacy. The predictive model facilitates personalized treatment strategies and early identification of poor responders, potentially improving clinical decision-making and myopia management outcomes.

Abstract No.: 203441

Mechanism of VIP-VIPR2 Signaling Pathway Regulating Choroidal Blood Flow Perfusion in Myopia Development

First Author: Yingying WEN

Purpose: To investigate whether the VIP-VIPR2 signaling pathway participates in myopia development by regulating choroidal blood flow perfusion.

Methods: 1. Experimental Animals and Grouping: Thirty 3-week-old C57BL/6 mice were randomly divided into three groups (10 mice per group): normal control group, negative control group, and VIPR2 inhibitor group. The right eyes of the negative control group were injected with the solvent PBS, while the right eyes of the VIPR2 inhibitor group were injected with VIPhybrid via suprachoroidal administration. The normal control group received no treatment. 2. Measurement Parameters: After 1 week of intervention, refractive error, axial length, choroidal blood flow perfusion, and other ocular parameters were measured in all groups using EIR, OCT, and OCTA. Changes in VIP and VIPR2 expression at RNA and protein levels in the choroid were detected through qPCR and Western blot.

Results: Compared to the control group, the VIPR2 inhibitor group showed significant downregulation of choroidal VIP and VIPR2 at both RNA and protein levels, a myopic shift in refraction, relatively longer axial length, and reduced choroidal blood flow. No statistically significant differences were observed between the negative control group and the normal control group.

Conclusions: 1. Downregulation of choroidal VIPR2 promotes myopia progression in mice, suggesting that the choroidal VIP-VIPR2 pathway may regulate myopia development. 2. Downregulation of VIPR2 reduces choroidal blood flow, indicating that the VIP-VIPR2 pathway may contribute to myopia pathogenesis by modulating choroidal blood flow perfusion.

Abstract No.: 205055

Myopia Awareness Study: A Survey Among Parents of Children Attending Myopia Clinic in India

First Author: Sneha **BATRA**

Co-Author(s): Supratik **BANDYOPADHYAY**, Aroni **CHAKRABORTY**, Swarup **ROY**, Shyamal **SAHA**, Jaya **SINGH**

Purpose: To identify awareness and practice patterns regarding myopia in parents of children attending the Myopia Clinic.

Methods: A questionnaire was provided to parents with children aged 6-16 years with progressive myopia (defined as >0.5 D increase in the last 1 year) from February 2024 to August 2025.

Results: A total of 276 entries were analysed. Most participants (about 43%) started wearing glasses between 5 and 10 years of age, and only 38% had an eye check-up in the last 6 months. Nearly half of parents (49%) recognized prolonged near work, 65% very close reading habit, and about 72% excessive mobile phone use, decreased outdoor activity (59%), and sunlight exposure (52.5%) as a risk factor for myopia progression. Nearly 48% had the view that parental myopia has no role. Just over half (53.5%) of respondents are aware of myopia control options, mostly of myopia control glasses 23%. Nearly 40% of people are unaware of complications related to myopia.

Conclusions: Even though risk factors were correctly identified, awareness regarding proper checkup schedules, myopia control strategies, and the consequences of high myopia was lacking. Identifying parental knowledge and practice patterns can help in designing targeted myopia awareness programs.

Abstract No.: 207966

Myopia Management Functional Lenses: A Bibliometric Analysis of Multidisciplinary Perspective and Trend Insights in the Context of Vision Health

First Author: Ling **WANG**

Purpose: To analyze the research dynamics of myopia management functional lenses in the field of vision health over the past decade, revealing cutting-edge hotspots and development trends.

Methods: Relevant literature on myopia management functional lens from 2016 to 2025 in the Web of Science database was searched by computer. Bibliometrics software such as Bibliometrix, VOSviewer 1.6.20, and CiteSpace.V.6.3.R1 were used for bibliometric and knowledge graph visualization analyses.

Results: A total of 1143 Web of Science core database documents were included, and the number of

publications in the field of functional eyewear for myopia management has gradually increased over time. China and the United States rank the top two in terms of the number of publications and citations. The leading authors in this field are CHO P, SANKARIDURG P, and CHen H, who have made significant contributions to research in two distinct subfields: contact lenses and spectacle lenses. Most relevant sources are Ophthalmic and Physiological Optics and Contact Lens & Anterior Eye. The keywords co-occurrence, clustering, thematic map, timeline view, and emergent analyses reveal that recent research has been focused on the following areas: axial length, defocusing mechanism, choroidal thickness, and orthokeratology. The integration of material, optics, and intelligence is a trend that is set to be reflected in the future.

Conclusions: The article constructs a knowledge map of research in the field of myopia management functional lenses through bibliometric analysis, systematically summarizes the current status and hotspots of research in this field, and aims to provide reference and guidance for future related research.

Abstract No.: 206085

Myopia Prevention Practices Among Ophthalmologists in Hong Kong: A Cross-Sectional Survey 2025

First Author: Cheuk Ling **YIM**

Co-Author(s): Stephanie **CHEUNG SL**, Simon Tc **KO**

Purpose: Myopia prevalence continues to rise in East Asia, prompting increased interest in early intervention strategies. This study investigates current practices among ophthalmologists in Hong Kong regarding myopia prevention and control.

Methods: A cross-sectional survey was distributed to ophthalmologists practicing in Hong Kong. The questionnaire assessed demographics, treatment modalities, prescribing patterns, and attitudes toward pharmacological, optical, and behavioral interventions.

Results: A total of 118 responses were received. Most respondents (99.2%) actively manage myopia progression, with 91.5% favouring pharmacological approaches. Atropine 0.05% was the most commonly prescribed concentration (93.9%). The majority initiate treatment at age 4 or 5; however, the criteria for treatment initiation and discontinuation practices vary widely. 28.6% reported rebound after treatment discontinuation. Peripheral defocusing spectacle lenses were the most frequently used optical intervention (86.3%), while behavioral recommendations focused on reducing screen time and increasing outdoor activity. Only 5.1% reported using optical methods as their primary modality, and 94.9% had never prescribed red light therapy.

Conclusions: Pharmacological treatment, particularly low-dose atropine, remains the cornerstone of myopia

control among Hong Kong ophthalmologists. However, the variability in criteria for initiating treatment, ranging from any diagnosis of myopia to specific thresholds of progression, and also discontinuation practices, highlights the lack of standardized guidelines and the need for consensus-driven protocols. As emerging therapies such as red light therapy begin to enter the conversation, ongoing research and professional dialogue will be essential to ensure safe and effective integration into practice.

Abstract No.: 208405

N-Acetyltransferase 2 Inhibits Myopia Through Maintaining Mitochondrial Metabolism in Scleral Fibroblasts

First Author: Wei **GONG**

Co-Author(s): Tianyu **CHENG**, Xiangui **HE**, Xun **XU**, Lingyi **ZHAO**

Purpose: The excessive elongation of the eye axis is a primary factor in myopia progression, yet the underlying genetic mechanisms remain poorly understood. The study was to explore risk-associated genes of myopia and identify the role of N-acetyltransferase 2 (NAT2) in the pathological process of myopia.

Methods: A genome-wide association study (GWAS) analysis for axial length of eyes in a Chinese population (n=6345) was performed to explore risk-associated genes of myopia. Form deprivation-induced myopia was used to verify the expression of NAT2 in myopic eyes. To investigate the role of NAT2 in myopia, adeno-associated virus-mediated NAT2 overexpression or knockdown was conducted in murine sclera.

Results: In GWAS, the most significant locus was 8p22, with NAT2 identified as a potential risk-associated gene for myopia. NAT2 was downregulated by hypoxia in form deprivation-induced murine myopia, and the adeno-associated virus-induced genetic intervention of NAT2 in the sclera influenced myopia progression. For the mechanism, NAT2 could regulate the phenotypic transition and extracellular matrix remodeling of scleral fibroblasts through maintaining mitochondrial metabolism and inhibiting ROS/TGF- β pathway, which also had effects on choroidal vascular function. Additionally, administration with α -ketoglutarate, a downstream metabolite of NAT2, effectively suppressed myopia progression in murine models.

Conclusions: These findings highlight NAT2 as a critical regulator of myopia pathogenesis, offering new insights into potential therapeutic strategies for myopia by targeting mitochondrial metabolism.

Abstract No.: 202540

Normative Percentiles of High Myopia Retinal Nerve Fiber Layer (RNFL) and Ganglion Cell-Inner Plexiform Layer (GCIPL) Thickness From the Asian Eye Epidemiology Consortium

First Author: Marco **YU**

Co-Author(s): Yanyan **CHEN**, Ching-yu **CHENG**, Zhi Da **SOH**

Purpose: To establish normative percentiles of RNFL and GCIPL thickness in high myopia, and examine their association with potential risk factors.

Methods: Participants with spherical equivalent (SE) $\leq -5.5D$ or axial length (AL) ≥ 25.5 mm, with RNFL and GCIPL thickness, and relevant clinical data, from China, Hong Kong, India, Japan, South Korea, Russia, and Singapore were included in this study. 3/4 of non-pathologic eyes were used to estimate normative percentiles of RNFL and GCIPL thickness, and evaluate the association with ocular and systemic factors, interethnic differences, and intermachine variations using quantile regression. Sensitivity and specificity of normative percentiles with and without adjustment for risk factors were evaluated using the remaining 1/4 of non-pathologic eyes and 100% of glaucomatous eyes collected.

Results: 3529 eyes were analyzed. 2325 of non-pathologic eyes were used in estimating percentiles and association analysis. East Asians, including Chinese, Koreans, Japanese, and Malays, showed the thickest RNFL. NIDEK measured the thickest RNFL and thinnest GCIPL across the evaluated OCT devices (Cirrus, NIDEK, Optovue, Spectralis, and Triton). 683 non-pathologic + 521 glaucomatous eyes were used as validation. AL was found to be negatively associated with the percentiles of RNFL and GCIPL, except for the 10th and 20th percentiles of RNFL thickness. The 20th percentile of RNFL thickness adjusted by age, gender, SE, and significant risk factors demonstrated significantly higher specificity in internal validation and higher sensitivity in external validation than the unadjusted percentile.

Conclusions: Risk factor-adjusted 20th percentile outperformed the unadjusted percentile of RNFL thickness, suggesting a better criterion for early detection of glaucoma.

Abstract No.: 203057

Ocular Parameter Alterations and Diagnostic Value of Axial Length and Spherical Equivalent Determination for High Myopia in Macaca fascicularis

First Author: Jin-an **ZHAN**

Co-Author(s): Yingting **ZHU**, Yehong **ZHUO**

Purpose: This study aims to establish a precise threshold for determining whether Macaca fascicularis exhibits high myopia and to investigate the ocular

characteristic changes associated with high myopia in Macaca fascicularis.

Methods: The Macaca fascicularis underwent measurements for refractive errors, axial length (AL), corneal thickness, anterior chamber depth, lens thickness, choroidal thickness, and fundus photography. Receiver operating characteristic curve (ROC) analysis was conducted to assess the diagnostic efficacy of AL and spherical equivalent (SE) in identifying grade 4 fundus tessellations (FT) and peripapillary atrophy (PPA), with the optimal cut-off values subsequently determined.

Results: The study included 490 eyes from 246 Macaca fascicularis, with an average age of 16.99 ± 13.84 years and a weight of 3.73 ± 1.49 kg. The cut-off value for discriminating FT using AL was 19.28 mm (AUC = 0.873), and for PPA, it was 18.86 mm (AUC = 0.925). For SE, the cut-off for FT was -4.25 D (AUC = 0.826), and for PPA, it was -3.42 D (AUC = 0.847). Using $AL \geq 19.01$ mm and $SE \leq -3.77$ D to categorize high myopia, high myopia eyes showed longer AL, higher SE, thinner choroidal thickness, deeper anterior chambers, longer vitreous cavities, and larger axial ratios.

Conclusions: The combination of AL and SE offers a reliable method for identifying high myopia in Macaca fascicularis, effectively distinguishing whether individual monkeys exhibit high myopia. Significant alterations were observed in the posterior segment parameters of eyes with high myopia in these Macaca fascicularis.

Abstract No.: 206161

Outdoor Exposure, Near Work, Accommodation and Circulating Biomarkers (Vitamin D3, Dopamine): Multivariate Predictors of Myopia Progression

First Author: Elackiya MANIMARAN

Co-Author(s): Sahithya BHASKARAN, Vijayalakshmi P, Senthilkumari SRINIVASAN

Purpose: • To study the association between environmental factors (outdoor activity, focused near work and accommodation) in myopia and its progression • To study the role of plasma biomarkers (vitamin D3 and dopamine) in myopia and its progression • Multivariable analysis on myopia association

Methods: It was a cross sectional prospective observational study which included 105 emmetropic children (control) and 176 children with myopia (58 stable, 58 progressive myopia and 57 progressive myopia on Low dose atropine) of age group 6-15years. Detailed history on demographic profile, time spent on focused near work and outdoors were collected followed by ocular examination and blood collection to test vitamin D3, dopamine.

Results: Myopic children were found to spend significantly less time outdoors (<30min/d) and significantly more time on focused near work (>2hr/d) Plasma vitamin D3 levels were found to be significantly lower in the myopia group than controls Plasma dopamine levels showed no statistically significant difference between control and myopia group Multivariable analysis revealed that higher BMI, parental or sibling myopia, reduced outdoor activity, accommodative disorders, and low vitamin D3 were independent risk factors for myopia

Conclusions: • Targeted environmental and lifestyle modifications to improve outdoor activity / limit focused near work should be an essential part of early myopia management • Efforts must be made to correct vit D deficiency in children of growing age • Larger studies are needed to study the role of dopamine in myopia progression

Abstract No.: 203665

Posterior Ocular Morphology in High Myopia Modification After Repeated Low-Level Red-Light Therapy

First Author: Yanxian CHEN

Co-Author(s): Ruoyu CHEN, Mingguang HE, Xiangui HE, Kaidi XIANG

Purpose: To investigate fundus morphology alterations and their relationship with choroidal thickness (CT) in highly myopic eyes following long-term repeated low-level red-light (RLRL) therapy using novel ultrawide-field swept-source optical coherence tomography.

Methods: Children aged 6-16 years with high myopia were included, all of whom underwent 24×20 mm UWF SS-OCT imaging at baseline, 12 months, and 24 months. Fundus morphology was evaluated using fundus Gaussian curvature (FC), calculated from the 3D posterior globe reconstructed by the built-in software of the UWF SS-OCT. Both FC and CT were automatically calculated within seven concentric circles centered on the fovea, with diameters of 1, 3, 6, 9, 12, 15, and 18 mm (Center and I-VI areas). The primary outcome was the change in FC measured at baseline, 1-year follow-up, and 2-year follow-up visits. The key secondary outcome was the relationship between FC and CT, axial length (AL), and spherical equivalent (SE).

Results: Among 32 highly myopic eyes from 17 children, FC significantly decreased at the 1-year follow-up, with FC-Center decreasing from 0.516 ± 0.159 to 0.433 ± 0.135 , FC-I from 0.515 ± 0.154 to 0.442 ± 0.133 , and FC-II from 0.519 ± 0.139 to 0.476 ± 0.129 (10^{-2} mm^{-2}) ($P < 0.05$). FC was positively correlated with SE and CT, but negatively correlated with AL ($P < 0.05$). Fundus morphology changes within the macular and perimacular areas after 1 year of RLRL therapy remained significant after adjustment for confounding factors ($P < 0.05$). However, the FC calculated at the 2-year follow-up visit was comparable to the baseline.

Conclusions: This study is the first to show that posterior ocular morphology in highly myopic eyes tends to flatten after one year of RLRL therapy, though this effect partially diminishes after two years. These findings highlight the positive influence of RLRL therapy on the shape of the posterior eye.

Abstract No.: 205616

Prevalence and Risk Factors of Myopia and High Myopia in Hong Kong Chinese Adults: A Population-Based Study

First Author: Ebenezer ZAABAAR

Co-Author(s): Xiujuan ZHANG

Purpose: While the high prevalence of myopia in East Asian children is well-documented, large-scale, contemporary data on adult populations, particularly for the burden of high myopia and its risk factors, are limited. We aimed to determine the prevalence and associated factors of myopia and high myopia in a population-based cohort of Hong Kong Chinese adults.

Methods: This cross-sectional study included 15,488 adults aged ≥ 50 years who underwent a comprehensive ophthalmic examination, including refraction. Myopia and high myopia were defined as spherical equivalent (SE) ≤ -0.50 D and ≤ -6.00 D, respectively. Lifestyle and socio-demographic factors were collected with standardized questionnaires, and multivariable regression was used to identify independent risk factors of myopia and high myopia.

Results: The prevalence of myopia was 49.44% and high myopia was 7.87%. Risk factors [OR (95% CI)] of myopia included 2 to < 4 hours/day and ≥ 4 hours/day of screentime [vs. < 2 hours/day: 1.21 (1.12-1.31) and 1.44 (1.30-1.60)]; basic, secondary/vocational, and tertiary education [vs. low formal education: 1.42 (1.20-1.70), 3.07 (2.56-3.70), and 4.87 (3.98-5.98), respectively]; living in private housing and own house [vs. public/subsidized housing: 1.38 (1.27-1.50) and 1.29 (1.17-1.43)]; smoking 1.29 (1.14-1.45); and diastolic blood pressure 1.01 (1.00-1.01); while age 0.98 (0.97-0.98); vigorous physical activity 0.98 (0.96-0.99); and being married/previously married [vs. never married: 0.65 (0.59-0.73)/0.68 (0.59-0.79)] were protective. Among these, ≥ 4 hours/day vs. < 2 hours/day of screentime 1.44 (1.22-1.70); basic, secondary/vocational, and tertiary education [vs. low formal education: 1.95 (1.11-3.83), 4.95 (2.81-9.72), and 6.71 (3.76-13.30), respectively]; as well as living in private housing and owning a house [vs. public/subsidized housing: 1.40 (1.21-1.63) and 1.31 (1.09-1.58)] increased the risk of high myopia; whereas age, 0.96 (0.95-0.97) and being married/previously married vs. never married 0.71 (0.60-0.83)/0.62 (0.47-0.80) were protective.

Conclusions: The findings indicate a high prevalence of myopia and high myopia in adults, associated with modifiable lifestyle and socio-demographic factors,

and suggest that the predisposition to myopia from excessive near work may continue to adulthood.

Abstract No.: 209455

Prevalence and Risk Factors of Premyopia in Preschoolers: A Kindergarten-Based Cluster Sampling Study

First Author: Jianping HU

Co-Author(s): Yonghong JIAO

Purpose: To evaluate the prevalence of premyopia and identify genetic and other risk factors among children aged 3-6 years.

Methods: A cluster-randomized sampling study was conducted between December 2020 and February 2021, involving 2,109 children from 23 kindergartens in Haidian district, Beijing, China. Cycloplegic refraction was assessed using 1% cyclopentolate. Premyopia was defined as a spherical equivalent refraction (SER) of > -0.50 D and $\leq +0.75$ D in the eye with the less SER value. Myopia was defined as an SER of ≤ -0.50 D, while hyperopia was characterized as an SER of $> +0.75$ D. Parents were asked to complete a questionnaire regarding refractive status, categorized as: no myopia (> -0.5 D), low/moderate myopia (≤ -0.5 D to ≥ -6 D), and high myopia (< -6 D).

Results: The prevalence of myopia, premyopia, and hyperopia among the children was 4.60%, 24.32%, and 71.08%, respectively. Boys exhibited higher prevalence rates for premyopia (28.03%; 95% CI, 25.45%-30.75%) and myopia (5.64%; 95% CI, 4.43%-7.17%) compared to girls (premyopia: 20.30%; 95% CI, 17.93%-22.89%, myopia: 3.47%; 95% CI, 2.50%-4.78%; both $P < 0.001$). Significant risk factors for premyopia included male gender (adjusted OR, 1.62; 95% CI, 1.32-2.00), paternal low/moderate myopia (adjusted OR, 1.50; 95% CI, 1.18-1.92), paternal high myopia (adjusted OR, 1.99; 95% CI, 1.41-2.81), and maternal high myopia (adjusted OR, 1.89; 95% CI, 1.35-2.64).

Conclusions: Prevention and control of premyopia in preschool children should be emphasized, particularly for boys and children with myopic parents, due to their higher risk of developing premyopia.

Abstract No.: 203400

Prevalence of Myopia and Astigmatism in Schoolchildren: Insights From Urban Malaysia

First Author: Norazah ABDUL RAHMAN

Co-Author(s): Mae-lynn catherine BASTION, Duratul Ain HUSSIN, Diing Sheng WONG

Purpose: To determine the prevalence and age-related trends of myopia and astigmatism among Malaysian primary schoolchildren, and to examine their associations with age and gender using World Health Organization (WHO) criteria.

Methods: A cross-sectional school-based vision screening was conducted between 2022 and 2024 among 459 children aged 6-12 years from urban primary schools. Refractive error was categorized using WHO definitions (myopia: spherical equivalent ≤ -0.50 D). Chi-square tests and Cramer's V were used to assess associations between refractive status, age, and gender.

Results: Refractive errors were detected in 57.3% of children. The prevalence of myopia was 33.6%, hyperopia 7.4%, and astigmatism 41.0%; high myopia (< -6.0 D) was present in 2.0%. Myopia prevalence peaked at age 9 (44.7%) and stabilized in older groups (31-41%), with no significant association with age ($X^2 = 6.438$, $p = 0.312$; Cramer's V = 0.124). Gender differences were negligible (females 34.7% vs. males 32.3%; $p = 0.647$). Astigmatism was most prevalent at age 6 (55.3%) and declined significantly with age ($X^2 = 25.810$, $p < 0.001$; Cramer's V = 0.237), with no gender association ($p = 0.583$).

Conclusions: One-third of Malaysian schoolchildren are myopic by age 12, with the highest prevalence at age 9, while astigmatism shows a significant age-related decline. These findings underscore the importance of routine school-based vision screening, particularly before age 9, to ensure early detection and timely management.

Abstract No.: 204792

Rethinking Accommodation Therapy: Low-Dose Atropine in Focus

First Author: Talita ISMA

Purpose: Accommodative spasm, also referred to as prolonged contraction of the ciliary muscle, is characterized by difficulty changing focus from near to far and blurring distant vision, especially after continuous near work resulting in asthenopia and headache symptoms. This case aims to show the role of low-dose atropine in the management of accommodative spasm symptoms reliever.

Methods: A 33 year-old Asian female patient presented with a severe headache and blurred vision in the last 2 months prior the admission to the hospital. History of prolong near work activities was obtained and the symptoms did not relieved after had a glasses prescription (-1.50D OU). Objective refraction shown in pre cycloplegia SE RE -3.50 LE -2.25. Post Cycloplegia (Cyclopentolate 1%) SE RE +1.50 LE +1.00. Patient was treated using 0.001% atropine and stop the previous glasses prescription. Regular head-eye-shoulder exercise and limiting near work activities also advised. Patient then followed at one month, 3 months and 6 months for recurrence of the symptoms also for the objective refraction.

Results: Pre-cycloplegic objective refraction in the 1st, 3rd, and 6th months of treatment was obtained

consecutively: SE RE -3.25 LE -3.00, SE RE -1.50 LE -1.25, and SE RE -1.25 LE -1.00. Post-cycloplegic objective refraction in the 1st, 3rd, and 6th months of treatment was achieved at SE +0.50 $\pm$ 0.25. Patients had no recurrence of the symptoms afterward.

Conclusions: The primary method for diagnosing and treating pseudo-myopia and spasm of accommodation is cycloplegic refraction, and patients' symptoms can be effectively alleviated by low-dose atropine and cycloplegic refractive correction.

Abstract No.: 208263

Retinal and Choroidal Microvasculature at Different Myopia Severities: A Systematic Review and Meta-Analysis

First Author: Zixuan LIN

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Purpose: This study systematically evaluates changes in retinal and choroidal microvasculature with increasing myopia severity.

Methods: The PubMed, Embase, and Web of Science databases were thoroughly searched for studies published before May 8, 2025 on retinal or choroidal changes across different myopia severities. Included were studies with cross-sectional or prospective case-control and cohort designs that reported outcomes of foveal avascular zone (FAZ) area and vessel densities (VD) in the retina and choroid. The risk of bias was assessed by the Newcastle-Ottawa Scale and the Agency for Healthcare Research and Quality tools. Funnel plot with Egger test assessed potential publication bias. Meta-regressions were conducted to identify potential moderators in subgroup meta-analyses with high heterogeneity. The protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO): CRD42023402550.

Results: A total of 47 studies comprising 7,293 eyes were included. Highly myopic eyes demonstrated significantly enlarged FAZ area in both the superficial capillary plexus (SCP) ($P = 0.049$, standard mean difference [SMD]: 0.37, 95% confidence interval [CI]: [0.00, 0.74], $I^2 = 82\%$) and deep capillary plexus (DCP) ($P = 0.001$, SMD: 0.61, 95% CI: [0.24, 0.98], $I^2 = 83\%$). Macular VD was significantly reduced in the SCP for moderate and high myopia (HM) subgroups ($P = 0.003$ and $P < 0.001$, respectively) and in the DCP for the HM subgroup ($P < 0.001$). Significant VD reductions were also observed in parafoveal (SCP: $P < 0.001$, DCP: $P = 0.012$) and perifoveal (SCP: $P = 0.006$; DCP: $P < 0.001$) regions in the HM subgroup in both plexuses. Peripapillary VD showed consistent reductions across mild, moderate, and HM subgroups (all $P \leq 0.033$). No significant differences were observed in choriocapillaris VD or flow area.

Conclusions: This meta-analysis revealed significantly enlarged FAZ areas and reduced VD in the macular and peripapillary regions with increasing myopia, especially in HM. These findings enhance the understanding of myopia-related fundus microvascular changes, guiding the clinical management and screening of patients with HM.

Abstract No.: 207791

Shared Genetic Architecture and Multidimensional Modifiable Risk Factors Between Myopia and Retinal-Optic Nerve Diseases

First Author: Yuelan **GAO**

Co-Author(s): Li Jia **CHEN**, Clement C. **THAM**, Jianmin **XU**, Jason C. **YAM**

Purpose: Epidemiological evidence links myopia to retinal-optic nerve diseases (RONDs), but their shared genetic and environmental mechanisms remain unclear.

Methods: This study leveraged UK Biobank individual-level data and genome-wide association studies summary statistics to investigate shared mechanisms between myopia and RONDs. Epidemiological associations and the mediating effects of retinal and optic nerve parameters were first evaluated. Genetic pleiotropy was then identified through cross-trait analyses at the genome-wide, variant, and gene levels, followed by functional annotation and pathway enrichment. Environmental contributions were further examined through modifiable risk factors and gene-environment (G×E) interactions. Mendelian randomization was applied to infer causal relationships.

Results: We found that myopia increased risks of retinal detachment and primary open-angle glaucoma, decreased the risk of primary angle-closure glaucoma, and myopia < -2.0 D was protective against diabetic retinopathy, while both high myopia and hyperopia increased age-related macular degeneration risk. These effects were mediated by retinal structural changes, particularly the ganglion cell inner plexiform layer. Cross-trait analyses revealed significant genetic correlations between myopia and RONDs, identifying 66 pleiotropic loci and 115 genes, with key loci mapped to BMP3, LAMA2, RDH5, and LINC00862, involved in immune-inflammatory processes, receptor-mediated signaling, and retinal development. In myopic individuals, ROND risk was modulated by a spectrum of modifiable factors, encompassing health status, lifestyle, diet, mental health, sleep patterns, and medication use, with seven environmental factors interacting with five pleiotropic variants.

Conclusions: This study delineates shared mechanisms and modifiable risks between myopia and RONDs, providing etiological and translational insights for precision intervention in myopia-related RONDs.

Abstract No.: 201237

Stepwise DIMS Spectacle Wear for Myopia Prevention in Premyopic Preschoolers: A 1.5-Year Prospective Study

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Purpose: To assess the feasibility, acceptability, and effectiveness of stepwise defocus incorporated multiple segments (DIMS) plano spectacle wear over 1.5 years in premyopic preschoolers with normal uncorrected visual acuity (UCVA).

Methods: This was a single-arm, prospective pilot study. Twenty-three premyopic children (mean age 5.4 years) identified through a community screening program in Taiwan were enrolled. A stepwise DIMS spectacle regimen was implemented: part-time wear during near work before school entry followed by full-time wear after. The primary outcome was the 1.5-year spherical equivalent (SE) change, and the secondary outcome was axial length (AXL) elongation.

Results: After 1.5 years, mean SE change was -0.16 D and mean AXL elongation was 0.31 mm. Two participants developed myopia during the preschool stage. During the preschool stage, 91.3% of participants demonstrated good adherence (≥75%) to part-time wear. Most participants (73.9%) showed physiological AXL growth over 1.5 years. Visual symptoms were minimal and caregiver-reported acceptance remained high.

Conclusions: Stepwise use of DIMS plano spectacles over 1.5 years was well tolerated and associated with stable refractive outcomes and physiological AXL elongation in premyopic preschoolers. High adherence during part-time wear before school entry suggests that early optical intervention may help delay myopia onset. Larger, controlled studies are warranted to confirm these findings.

Abstract No.: 207456

Stickler Syndrome and Myopia

First Author: Kirstine **BOYSEN**

Co-Author(s): Mette **BERTENSEN**, Stense **FARHOLT**, Line **KESSEL**, Nanna **RENDTORFF**

Purpose: When considering Stickler syndrome, high myopia and retinal detachments are often the first things that come to mind. But little is known about myopia-associated complications. We know that every second Stickler syndrome patient experiences a retinal detachment, but we lack further knowledge on the risk factors thereof.

Methods: The study combines a cross-sectional investigation with a retrospective record review of Danish patients with genetically confirmed type 2

Stickler syndrome. The main outcomes are axial length, myopic maculopathy, and retinal detachment.

Results: The study includes 74 patients with type 1 and 13 with type 2 Stickler syndrome. The mean (SD) axial length was 25.95 (1.99) and 26.55 (3.45) mm, respectively. Myopic maculopathy was present in 43% type 1 and 42% type 2 Stickler syndrome patients. The odds for higher-category myopic maculopathy increased by a factor of 2.28 with each mm of axial elongation (95% CI 1.19 to 4.34, $P=.01$). Retinal detachment was found in 41% of patients with type 1 and 23% with type 2. In type 1 we found that axial length did not significantly increase the odds for RD but age did.

Conclusions: More than 50% of patients had no myopic maculopathy, its severity depending on axial length but not age. Mean axial lengths were larger than those of normal eyes, but normal axial lengths were common, and the absence of myopia should not exclude the diagnosis. Retinal detachments happen independent of axial length. These findings are relevant for clinical follow-up and risk stratification for vision-threatening myopic maculopathy and retinal detachment in patients with Stickler syndrome.

Abstract No.: 203273

The Association Between Physical Development Indicators and Peripheral Axial Length, Retinal Radius of Curvature in School-Age Children

First Author: Nan **MINHUI**

Purpose: To investigate the association between physical development indicators and peripheral axial length(PAL), retinal radius of curvature in school-age children.

Methods: A case series study. From June 2024 to June 2025, 334 school-age children (334 eyes) treated in the Department of Pediatric Ophthalmology of Third Affiliated Hospital of Jinzhou Medical University were included, among whom 159 were boys, and 175 were girls. The central axial length (CAL) and PAL at 15°, 20°, and 30° from the nasal and temporal side of the fovea were measured by the SWan instrument under natural pupil conditions in a dark room, and the absolute value of the difference of peripheral axial length ($|\Delta DPAL|$) was calculated. The height, weight were measured, and body mass index(BMI) were calculated. Multivariate linear regression analysis was used to analyze the association between physical development indicators and ocular biometry parameters such as PAL, $|\Delta DPAL|$, and retinal radius of curvature.

Results: After controlling for confounding factors such as age, gender in multivariate linear regression, in E group, height was positively correlated with CAL, nasal and temporal PAL at 15°, 20° and 30°, nasal-temporal $|\Delta DPAL|$ at 15°, 20° and 30° ($R^2=0.23-0.37$, $P<0.05$),

which was negatively correlated with the retinal radius of curvature ($R^2=0.26$, $P<0.05$). while height had no correlation with SE ($R^2=0.20$, $P>0.05$). In L-my group and H-my group. Height was positively correlated with CAL, nasal and temporal PAL at 15°, 20° and 30°, nasal-temporal $|\Delta DPAL|$ at 15°, 20° and 30° ($R^2=0.21-0.34$, $P<0.05$), which was negatively correlated with the retinal radius of curvature and SE ($R^2=0.19$, $P<0.05$; $R^2=0.22$, $P<0.05$; $R^2=0.19$, $P<0.05$; $R^2=0.34$, $P<0.05$). However, the weight and BMI of children in the three groups were not correlated with ocular biometry parameters such as PAL, $|\Delta DPAL|$, and retinal radius of curvature ($P>0.05$).

Conclusions: In taller school-aged children, the nasal PAL is longer than the temporal one and is accompanied by a smaller retinal radius of curvature, presenting as steep and asymmetric retinal morphology. However, weight and BMI has no correlation with PAL and radius of retinal curvature.

Abstract No.: 208518

The Current Status of Myopia Control Measures and Associated Factors in Children With Myopia: A Cross-Sectional Study From Shanghai

First Author: Hongrui **JIANG**

Co-Author(s): Jun **CHEN**, Xiangui **HE**, Guangzhuang **JING**, Yuhe **LIU**, Jingjing **WANG**, Xun **XU**

Purpose: To describe the current status of different myopia control measures and associated factors in children.

Methods: This cross-sectional study recruited participants in 35 primary schools across 16 districts of Shanghai from December 2024 to January 2025. Demographic characteristics (age, grade, gender, parents' myopia, and parents' education) and behavioral patterns (duration of homework completion, book reading, near-distance and far-distance electronic device usage, outdoor activity participation, and sleeping) were obtained from a questionnaire. Cycloplegic spherical equivalent (SE), axial length (AL) and corneal radius (CR) were measured by ophthalmic examination. Myopia was defined as cycloplegic SE of ≤ -0.50 diopters [D] in either eye.

Results: Among 3,833 myopic children (49.7% boys; mean age 9.60 ± 1.24 years), 43.8% used no myopia control, 19.0% used Single Vision Spectacle Lenses, 16.6% Myopia Control Spectacle Lenses, 8.3% Atropine, 7.6% Atropine + Myopia Control Lenses, and 4.7% other measures. SE, AL, AL/CR, outdoor time, screen time, and sleep duration differed significantly among measures (all $p < 0.05$). Regression showed, versus non-users, older age (OR 1.08), more myopic parents ("either" OR 1.43; "both" OR 1.83), longer homework (OR 1.08), and worse SE (OR 0.53) were associated with myopia control use (all $p < 0.05$). Compared with Single Vision Lenses users, longer homework, less screen

time, and higher maternal education predicted use of advanced myopia control (OR > 1).

Conclusions: The awareness of myopia control remains sub-optimal among primary myopic students. A worse SE was identified as a significant factor influencing the adoption of myopia control measures. Specifically, children with longer homework completion times, shorter durations of close-range screen use, and those mother with higher education levels were more likely to utilize advanced interventions.

Abstract No.: 208192

The Evaluation of Visual Function in Patients With Various Degrees of Myopia Using Multifocal Electoretinogram

First Author: Siyuan HE

Co-Author(s): Xiaotong LI, Wei ZHANG

Purpose: To measure and compare the difference of multifocal electoretinogram in patients with various degrees of myopia and explore the early changes of retinal function in myopic eyes.

Methods: Forty-eight subjects were divided into three groups by refractive error: emmetropia/low, moderate, and high myopia. mfERG testing was performed using VERIS Science 4.2 (EDI, USA). All-trace grouping waveforms and six-ring average responses were analyzed. Response densities and latencies were compared among groups, and correlations with refractive errors were assessed.

Results: The response densities of all trace grouping waveforms and the six-ring average response in myopia decreased with the increase of refractive errors, while the latencies were not changed.

Conclusions: The response densities of multifocal electoretinogram in myopic eyes decreased and resulted predominantly from cone function loss.

Abstract No.: 208650

The Interaction of Alcohol Consumption and Sugar Intake With Myopia: A UK Biobank Study

First Author: Ryan Tak Chun WONG

Co-Author(s): Philip Ya Wen GUO, Alexander Ka Ngai LAM

Purpose: To investigate the interaction of alcohol consumption and sugar intake with myopia in the UK Biobank cohort.

Methods: This retrospective cohort study analysed data from 502,250 UK Biobank participants aged 37-73 years old (54.4% female). Spherical Equivalent Refraction (SER) is calculated as spherical power + cylindrical power*0.5. Participants were categorized into four subgroups based on alcohol intake frequency: Hazardous drinker (daily), Moderate drinker (3-4 times/

week), Sensible drinker (1-2 times/week to special occasions), and Non-drinker. A multivariable linear regression was performed to assess the association between alcohol consumption patterns and SER, adjusting for total sugar intake.

Results: Moderate drinkers ($\beta = -0.174$, $p < 0.001$) and sensible drinkers ($\beta = -0.093$, $p = 0.025$) exhibited significantly higher SER value than non-drinkers, while hazardous drinkers did not ($\beta = -0.035$, $p = 0.441$). Total sugar intake was not significantly associated with SER in the adjusted model ($\beta = 0.0003$, $p = 0.103$).

Conclusions: Alcohol consumption frequency demonstrates a significant association with spherical equivalent refraction. However, the association only exists between moderate and sensible drinkers. Sugar intake did not demonstrate any significant association with spherical equivalent refraction in this cohort. These findings suggest that alcohol intake frequency may influence refractive error development, though the mechanisms require further investigation.

Abstract No.: 206160

ipRGCs Modulate Myopia Development Through Regulating Bipolar Cell iGluRs

First Author: Chuyao YU

Co-Author(s): Li DONG, Wen-bin WEI, Ruiheng ZHANG

Purpose: Pathological myopia is characterized by excessive axial elongation, yet the underlying neural mechanisms remain incompletely understood. This study aimed to investigate the role of intrinsically photosensitive retinal ganglion cells (ipRGCs) and the functional significance of the related cellular mediators in myopia development.

Methods: The ipRGCs ablation model was established in lens-induced myopic guinea pigs via intravitreal injection. All animals underwent regular ophthalmic examinations and biometry for axial length measurement. Ocular morphology was assessed at the endpoint via anterior segment and fundus photography, and optical coherence tomography (OCT). Post-intervention, retinal tissues were subjected to single-cell RNA sequencing (scRNA-seq), immunofluorescence, H&E, and TUNEL staining assay.

Results: scRNA-seq analysis revealed that ipRGCs ablation markedly attenuated the high-strength cellular communication associated with defocus myopia. Receptor-ligand analysis and retrospective analysis of cell proportions indicated that cone photoreceptors, bipolar cells, and amacrine cells were enriched following FDM induction but depleted after ipRGCs ablation, suggesting bipolar cells as a critical hub in this transduction pathway. Molecularly, iGluR expression in bipolar cells was downregulated in the myopic model but upregulated upon ipRGCs ablation. In vivo experiments confirmed that an iGluR agonist further suppressed axial elongation in ipRGCs-ablated eyes,

whereas an iGluR antagonist reversed this suppressive effect.

Conclusions: Selective ablation of in developing guinea pigs induced myopic refractive corrective shifts by modulating the axial length. ipRGCs participate in controlling axial elongation by negatively modulating the expression of iGluRs in bipolar cells. These findings provide a new perspective on the pathogenesis of myopia and suggest iGluRs as a potential therapeutic target for future interventions.

Neuro-Ophthalmology

Abstract No.: 202115

A Case Study of Leber Hereditary Optic Neuropathy (LHON) at Cipto Mangunkusumo Hospital: An Analysis From a Genetic Counseling Perspective

*First Author: Made Paramita **WIJAYATI***

*Co-Author(s): Salmarezka **DEWIPUTRI**, Syntia **NUSANTI**, Muhammad **SIDIK***

Purpose: Genetic counseling in LHON involves evaluating, explaining, and communicating genetic risks, providing psychosocial support, and helping individuals make informed reproductive decisions.

Methods: We use four counseling elements: accurate diagnosis, recurrence risk assessment, genetic counseling, and decision-making support. A 25-year-old man with unexplained visual loss was diagnosed; ophthalmology revealed CF3 M in the right eye and CF 1M in the left, both with normal fundus. Both eyes had central scotomas, reduced conduction on VEP, decreased macular function on ERG, but normal macular OCT and Brain MRI. Sanger sequencing showed a positive LHON mutation with m.14484T>C variant.

Results: We estimate recurrence risk via family pedigree and risk assessments based on history. Genetic counseling discusses LHON, available treatments like 900 mg Idebenone daily, and new gene therapies in phase 4 trials, mainly focusing on the m.11778A>G variant. There's no risk for his future children due to maternal inheritance. Risk assessment is for his female sibling, who could pass it to her sons; thus, presymptomatic genetic testing is recommended. Since he has the m.144484T>C variant, he has a favorable visual prognosis. Decision-making considers his therapy, social, economic status, and community influence. We advise him and his young nephew to avoid smoking and alcohol.

Conclusions: Genetic counseling for this LHON patient helps guide decisions that match family goals and standards. Although testing cannot predict age or

when vision loss will begin, we can provide advice on reducing environmental factors for at-risk families.

Abstract No.: 205827

A Case of Dual Pathology: Myasthenia Gravis With Radiographically Confounding Orbital Arteriovenous Malformation Mimicking Optic Nerve Mass

*First Author: Thomas **HASSALL***

*Co-Author(s): Alexandra **MANTA**, Jie Cheng **SONG***

Purpose: To report a case demonstrating diagnostic complexity when dual pathology coexists and structural incidental abnormalities on imaging can mislead clinical assessment.

Methods: Clinical examination, CT and MR imaging, tissue biopsy, and serological testing were performed.

Results: An otherwise well 63-year-old male without significant medical history presented with progressive binocular diplopia over approximately 4 weeks. Community CT angiogram reported a right intraorbital and optic nerve-encasing irregular mass with invasive features. Examination revealed asymmetric extraocular movement deficits with >50% reduction in bilateral right gaze, non-concomitant restrictions in left gaze and elevation movements, and right 2mm proptosis. Left eye ptosis was noted on referral, but not clinically significant on initial clinic review. Visual field, acuity, and colour vision were normal. MR imaging suggested a differential of lymphoproliferative lesion, metastatic disease, or arteriovenous malformation. Urgent biopsy revealed vascular tissue consistent with arteriovenous malformation, confirmed by post-operative MR angiography. Subsequently, positive anti-acetylcholine receptor antibodies explained the diplopia and contralateral dysmotility. The patient was commenced on pyridostigmine 60mg three times daily.

Conclusions: This case highlights diagnostic complexity when incidental orbital arteriovenous malformation creates radiographic confusion while myasthenia gravis causes the clinical symptoms. It emphasises the importance of clinical correlation and considering autoimmune neuromuscular disorders as important masquerades even when structural abnormalities are present on imaging.

Abstract No.: 201748

A Case of Non-Arteritic Anterior Ischemic Optic Neuropathy (NAION) Following Cataract Surgery

*First Author: Yanru **CHEN***

*Co-Author(s): Xunwen **LEI**, Nian **TAN***

Purpose: To summarise and report the clinical characteristics of non-arteritic anterior ischemic optic neuropathy (NAION) following phacoemulsification cataract surgery.

Methods: Retrospective case study.

Results: This study retrospectively analysed the diagnosis and treatment of one case of NAION following cataract surgery, exploring the diagnosis, treatment, and prevention of the condition. The patient developed NAION 7 days post-cataract surgery. After receiving treatments to improve circulation and nourish the nerves, the best-corrected visual acuity of the affected eye improved from 0.1 to 0.3 at 30 cm.

Conclusions: Surgery may induce NAION; thorough preoperative fundus examination is critical for diagnosis and treatment.

Abstract No.: 200133

A Mysterious Case of Non-Specific Orbital Inflammatory Disease

First Author: Nishanth S

Co-Author(s): Anupama S DESAI

Purpose: To evaluate the cause, signs, symptoms, diagnosis, and treatment of a case of NSOID.

Methods: History, clinical examination, blood investigations, imaging studies, and timely follow-up.

Results: The cause of the condition could not be concluded, as all tests were negative. The condition was treated as NSOID, with steroids, post which we could see immediate improvement in the condition, and once the steroids were stopped, the condition recurred.

Conclusions: The working diagnosis of the case was NSOID, which had abduction lag in the left eye. MRI showed lateral rectus enlargement, not involving the tendon, which decreased on IV steroids, and an enlarged lacrimal gland, which remained enlarged even after IV steroids. The symptoms decreased after starting steroids, but recurred once they were stopped. The uniqueness of this case was that this was one of the very few cases reported to have vision loss, including color vision defect, sparing contrast sensitivity, which became normal as soon as IV steroids were started. Many other cases reported have diplopia as the main complaint, but this case presented with a unique spectrum of symptoms. The root cause of the condition has to be found out, for which a deep dive evaluation has to be done.

Abstract No.: 207143

A Rare Case of Papilloedema With Subretinal Fluid and Intraretinal Precipitates in a Case of Syphilis

First Author: Madhusmita MAHAPATRA

Co-Author(s): Ankit AHIR, Dipankar DAS

Purpose: To study a rare case of papilloedema with subretinal fluid and intraretinal precipitates in a case of syphilis.

Methods: A 52-year-old male presented with blurring of vision, watering, and pain in both eyes (OU) for 3 months. On presentation, his visual acuity was 20/200, N18 in the right eye (OD), and 20/80, N18 in the left eye (OS). Slit-lamp biomicroscopy revealed immature cataract with a quiet anterior chamber (OU). Dilated fundus examination, OCT macula (OU) along with laboratory tests for complete blood count, urea, electrolytes, enzymes and antinuclear antibodies (ANA) was performed. Magnetic resonance imaging (MRI) brain and orbit was performed to rule out any pathology.

Results: OCT macula (OU) showed multiple hyperreflective intraretinal dot-like foci and accumulation of subretinal fluid at the fovea in OD and intraretinal fluid in OS. Test results were negative for HIV 1 and 2, Mantoux test and Rheumatoid factor. The treponema pallidum hemagglutination assay (TPHA) and venereal disease research laboratory test (VDRL) were reactive.

Conclusions: We conclude that all the clinical and serological findings prompted towards a diagnosis of syphilitic papilloedema with sub retinal fluid and intraretinal precipitates. The patient received treatment for syphilis and after one month, the patient presented with an improvement in symptoms and resolution of disc edema.

Abstract No.: 200328

A Retrospective Analysis and Observational Study of Patients With Neuro-Ophthalmological Presentation at a Suburban Primary Eye Care Practice Over the Past 16 Years From 2008–2025

First Author: Manoj VASUDEVAN

Co-Author(s): Sridhar BARATAN, Nivean MADHIVANAN, Shiva Mohan REDDY

Purpose: To identify the common neuro-ophthalmological manifestations, etiological factors, and diagnosis of patients presenting to a primary eye care ophthalmologist at a suburban locality.

Methods: Retrospective analysis by medical records collection of all the patients managed at this center by data collection by the primary eye care specialist over the past 16 years. The clinical examination included the torch light examination, Slit lamp examination & dilated fundus evaluation. Based on the clinical diagnosis made and the possible etiological cause, necessary Lab investigations and Radio-Imaging were performed. The diagnosis is confirmed and management carried out with help from the team of Physicians/Neurologist/Radiologist and Neuro surgeon.

Results: The total number of patients was 133; there were 72 males (1 male patient developed 2 different manifestations at 2 different time periods during the study period) and 60 female patients. Few needed

neurosurgical intervention. The most common systemic disease associated with these patients was Diabetes Mellitus and Hypertension in the same patient.

Conclusions: The patients were classified based on their age. Most common age group was between 46-60 years. The most common presentation was defective vision in 42 patients and the next was binocular double vision in 32 patients. Bilateral involvement was seen in 44 patients, Left eye alone in 46 patients and Right eye alone in 43 patients. The most common diagnosis was Optic neuritis/Optic neuropathy/Optic atrophy from various causes and most common presentation was defective vision. Recovery was achieved in 90% of patients with the use of steroids, Vitamin B12 and control of DM/HT.

Abstract No.: 201617

A Silent Aneurysm and a Blinding Clue: Neuromyelitis Optica Spectrum Disorder Unveiled by Sequential Optic Neuritis in a Young Male Patient

First Author: Kah Suen LENG

Co-Author(s): Chang Feng CHEW, Kogilavaani A/p J Raman @ Jayaraman, Mae-lynn catherine bastion

Purpose: To report a case of seropositive Neuromyelitis Optica Spectrum Disorder (NMOSD) with co-existing intracranial aneurysm who presented with sequential optic neuritis.

Methods: Case report.

Results: A 24-year-old healthy male initially presented with two months of intermittent, painless blurring of vision (BOV) in his left eye (LE) associated with ipsilateral headaches. Best corrected visual acuity (BCVA) was counting finger (CF) LE and 6/9 right eye (RE), with a relative afferent pupillary defect in LE. RE was unremarkable, while LE showed swollen optic disc. Contrast-enhanced computed tomography (CECT) of the brain and orbit revealed an incidental right middle cerebral artery aneurysm, later confirmed by CT angiography. Given his exposure to unvaccinated cats and elevated Toxoplasma IgG titre, he was treated empirically for presumed infective optic neuritis but was lost to follow-up. He re-presented a year later with sudden, painless BOV in RE; BCVA 6/24 RE, CF LE. RE showed disc swelling, while LE was unchanged. Repeated CECT demonstrated similar findings. Serum and cerebrospinal fluid tested positive for Aquaporin-4 antibodies where he was treated with intravenous methylprednisolone followed by oral prednisolone taper and azathioprine. At two months, vision improved to 6/9 RE and LE remained CF, with further follow-up arranged for MRI brain and orbit.

Conclusions: This case highlights the risk of misdiagnosis with serology in atypical optic neuritis and stresses early consideration of NMOSD to prevent irreversible vision loss.

Abstract No.: 205656

A Trio of Trouble: Multiple Tuberculomas Mimicking Neuro-Ophthalmological Catastrophes

First Author: Rusti Hanindya SARI

Co-Author(s): Dianita Veulina GINTING, Antonia Kartika INDRIATI, Prettylla YOLLAMANDA

Purpose: To report a rare case of neuro-ophthalmological manifestations resulting from multiple tuberculomas in a young female with a history of treated pulmonary tuberculosis.

Methods: A 20-year-old female presented with a two-month history of right eye ptosis, binocular horizontal diplopia, and headache. Clinical examination revealed incomplete oculomotor nerve palsy with pupillary involvement in the right eye, along with superior homonymous quadrantanopia. Neuroimaging revealed the presence of multiple tuberculomas in the right and left cerebral hemispheres, with the largest located near the brainstem.

Results: The patient was diagnosed with complete oculomotor nerve palsy with pupillary involvement secondary to multiple tuberculomas and treated with oral methylprednisolone and anti-tuberculosis medication. After one month of follow-up, there was a notable improvement in the patient's condition.

Conclusions: This case highlights a rare presentation of multiple tuberculomas manifesting as incomplete oculomotor nerve palsy and homonymous quadrantanopia. It underscores the importance of considering tuberculosis in the differential diagnosis of neuro-ophthalmological conditions, especially in regions with high tuberculosis prevalence, to facilitate timely diagnosis and appropriate management.

Abstract No.: 203495

Acute Pontine Hemorrhage Presenting With Abnormal Gaze: A Case Report

First Author: Li-wei CHAN

Co-Author(s): Yi-ting Chiang, Wei-chen HSU

Purpose: To report a case of Foville's syndrome resulting from spontaneous brainstem hemorrhage.

Methods: Description of clinical history, examination, neuroimaging, and treatment of a case of Foville's syndrome.

Results: A 39-year-old female presented to the emergency department with left limb weakness, accompanied by dizziness, right facial numbness, facial palsy, and binocular horizontal diplopia. Ophthalmic examinations showed right-sided ptosis and abduction and adduction limitation in the right eye, and adduction in the left eye. Neurologic examinations showed left hemiplegia, right facial paresthesia, and right central facial palsy. Computed tomography (CT) revealed a 26x30mm focal parenchymal hematoma in the right

dorsal lateral pons. Foville's syndrome with ipsilateral internuclear ophthalmoplegia was confirmed. After rehabilitation and oculomotor training, the patient's oculomotor symptoms improved partially. A follow-up CT revealed focal brain tissue atrophy in the right dorsal lateral pons.

Conclusions: This study reports a unique case of Foville's syndrome and highlights the importance of neuroimaging and multidisciplinary rehabilitation in the management of atypical brainstem syndromes.

Abstract No.: 201359

Acute Syphilitic Posterior Placoid Chorioretinopathy (ASPPC): A Sinister Doppelganger of Optic Neuritis

First Author: Nabila ALJUFRI

Co-Author(s): Alia ARIANTI

Purpose: The subtlety of clinical findings of ASPPC often made it mistakenly diagnosed as optic neuritis despite the stellar difference in treatment. We present a case of ASPPC initially misdiagnosed as optic neuritis.

Methods: A 43-year-old man presented with one month of bilateral blurred vision. Initial HIV and qualitative Venereal-Disease-Research-Laboratory (VDRL) tests were negative. Contrast-enhanced brain magnetic resonance imaging (MRI) suggested optic neuritis. The symptoms improved briefly after high-dose steroids. However, blurred vision recurred in the left eye (LE) while the patient was on oral steroid taper dose. He was referred to our center with 0.2 vision of LE and unremarkable ophthalmological findings. Further history taking disclosed a spontaneously resolving hand rash. High-definition macular Optic-Coherence-Tomography (OCT) showed hyperreflective foci and ellipsoid zone (EZ) disruption. Repeated serology was positive for syphilis (VDRL 1:128, Treponema-Pallidum-Hemagglutination-Assay/TPHA 1:5120). Benzathine penicillin (three weekly doses) plus steroid taper resolved symptoms, with OCT normalization and EZ restoration within three weeks.

Results: ASPPC can mimic optic neuritis and exhibit a biphasic steroid response, reflecting ongoing active and untreated infection. Syphilis, a "great mimicker," should be considered in atypical or recurrent optic neuritis. Combined treponemal and non-treponemal testing alongside specific ophthalmological findings (yellowish-placoid-lesion), combined with EZ disruption OCT findings, are key for diagnosis.

Conclusions: Thorough evaluation is essential in optic neuritis cases, especially in high-risk individuals. Biphasic courses in optic neuritis while on treatment should warrant further investigation, including infectious causes like syphilis.

Abstract No.: 203228

Association Between Visual Outcome and Magnetic Resonance Imaging in Patients With Neuromyelitis Optica

First Author: Pei-ying CHEN

Co-Author(s): Ming-hui SUN

Purpose: To investigate the association between visual outcome and image findings on magnetic resonance imaging (MRI) in patients with neuromyelitis optica (NMO).

Methods: This retrospective study included 55 patients with NMO. Visual outcome was assessed at 3 months and 6 months after the onset, with log MAR of Snellen visual acuity (VA), thickness of temporal retinal nerve fiber layer (RNFL) on optical coherent tomography (OCT), and mean deviation on visual field (VF). The association between visual outcome and MRI findings was analyzed.

Results: There were 29 patients with optic nerve contrast enhancement on MRI, which was significantly associated with worse logMA VA at 6 months ($P < 0.001$), thinning of temporal RNFL at 6 months ($P < 0.001$), and worse VF at 3 months ($P < 0.02$). Enhancement over orbital, chiasm, and optic tract segment were all significantly associated with worse logMA VA at 6 months ($P < 0.001$, $P < 0.001$, $P = 0.039$) and worse VF at 6 months ($P < 0.001$, $P = 0.001$, $P < 0.001$). Enhanced chiasm segment was also significantly associated with thinning of temporal RNFL at 3 and 6 months ($P = 0.037$, $P = 0.04$). Number of enhanced segments was significantly associated with worse logMA VA, thinning of temporal RNFL, and VF at 6 months ($P = 0.001$, $P < 0.001$, $P = 0.001$). Severity of enhancement was only associated with thinning of temporal RNFL at 3 months ($P = 0.004$).

Conclusions: In patients with NMO, enhancement of optic nerve on MRI, more enhanced segments, and enhancement over certain segment might predict worse visual outcome in terms of structural change and functional impairment.

Abstract No.: 205512

Atypical Optic Neuritis and Transverse Myelitis in a 39-Year-Old Female Filipino Patient: A Case Report on Seropositive Neuromyelitis Optica Spectrum Disorder (NMOSD)

First Author: Richard VILLAMOR

Co-Author(s): Janice BERNARDO

Purpose: To report a rare case of a 39-year-old female presenting with bilateral painless sequential blurring of vision at San Fernando City, La Union, Philippines. The patient had atypical optic neuritis and transverse myelitis symptoms. No history of antecedent viral infection.

Methods: Systemic workup and imaging were done to determine the possible etiology.

Results: Cranial/ Orbital Magnetic Resonance Imaging with contrast and fat suppressed images showed signs of left optic nerve and exhibits an increase in T2 signal intensity relative to the right eye. Optical Coherence Tomography (OCT) of optic nerve showed a generalized thinning of the optic nerve on left eye affecting both minimum rim width and RNFL thickness. Serologic tests were positive for Antinuclear Antibody, negative for Myelin Oligodendrocyte Glycoprotein Antibody and positive for Aquaporin-4 Antibody. High dose systemic corticosteroid was initiated and noted improvement of Visual acuity (VA) from baseline CF @ 2 feet to 20/25 on the right eye; and status quo vision of hand movement with good light projection on the left eye. There was also noted resolution of optic nerve swelling clinically and on OCT after the treatment.

Conclusions: Neuromyelitis Optica Spectrum Disorder (NMOSD) is a rare autoimmune demyelinating disease affecting the Central Nervous System, including the optic nerves and spinal cord.

Abstract No.: 205014

Benign Episodic Unilateral Mydriasis in a Young Filipino Woman

First Author: Kristine Milvi **DEL PRADO**
Co-Author(s): Maria Karia **MONTESINES**

Purpose: Anisocoria, the asymmetry between pupil sizes, is most commonly due to physiologic causes, such as in cases of Benign Episodic Unilateral Mydriasis. Here we present a case of a 31 year old female who presented with sudden onset mydriasis in the absence of headache, following an episode of continuous near vision activity. To our knowledge, this is the first reported case of Benign Episodic Unilateral Mydriasis in the Philippines.

Methods: This is a case of a 31-year-old female who presented with a sudden onset of glare and mydriasis in the right eye following a prolonged episode of near vision activity with a history of migraines.

Results: Ocular examination revealed a best corrected visual acuity of 20/20 in both eyes. Pupils were initially noted to be 7-8mm SRTL on the right eye, and 3-4mm BRTL on the left eye, and no relative afferent pupillary defects were noted. No light-near dissociation. Neurologic examination was unremarkable. A Pilocarpine 0.125% test was done, and no change in pupillary size was noted. Cranial MRI was unremarkable. One week after the initial onset, there was noted resolution of glare with a decrease in the size of the anisocoria. One month after, spontaneous resolution of the mydriasis was noted.

Conclusions: Benign Episodic Unilateral Mydriasis is rare and often missed due to its subtle presentation. It is advised to do a thorough history and physical

examination in order to be able to diagnose and document these patients.

Abstract No.: 202969

Bilateral Ethambutol-Induced Optic Neuritis With Vision Impairment: A Rare Case Report

First Author: Chin-lung **CHEN**
Co-Author(s): Chau-yin **CHEN**, Ching-yun **WANG**

Purpose: We report a rare case of bilateral Ethambutol-induced optic neuritis (EON) with significant vision impairment that underscores the importance of early recognition and management.

Methods: Clinical retrospective case report and literature review.

Results: A 48-year-old male with newly diagnosed pulmonary tuberculosis was initiated on standard anti-tuberculosis therapy, including isoniazid, rifampin, pyrazinamide, and ethambutol at a dose of 15 mg/kg/day. After six weeks of treatment, he presented with progressive, painless bilateral visual impairment. Initially, his best corrected visual acuity (BCVA) was 20/200 in the right eye and 20/400 in the left eye. Pupils were equal, reactive to light, and without relative afferent pupillary defect. Color vision testing revealed marked dyschromatopsia in both eyes. Fundus examination revealed optic disc hyperemia and mild temporal pallor in both eyes, suggestive of optic nerve dysfunction. Visual field testing showed bilateral central scotomas. Optical coherence tomography demonstrated preserved macular structure and normal retinal nerve fiber layer thickness. Ethambutol was immediately withheld, and oral prednisolone was given due to poor early remission. At six weeks post-treatment, BCVA recovered to 20/40 in both eyes, with partial resolution of central scotomas and color vision impairment.

Conclusions: This case highlights an uncommon presentation of ethambutol-induced optic neuritis with poor spontaneous recovery after drug discontinuation, but substantial visual improvement following corticosteroid therapy. While withdrawal of ethambutol remains the cornerstone of management, adjunctive corticosteroids and neuroprotective supplementation may benefit patients with slow or poor visual recovery. Early detection and individualized treatment are crucial to optimizing outcomes in EON.

Abstract No.: 208274

Bilateral Visual Impairment in a Middle-Aged Female After Bariatric Surgery: A Case Report

First Author: Dahu **WANG**
Co-Author(s): Xinquan **LIU**

Purpose: This report described a rare case of optic neuropathy due to nutritional deficiency following bariatric surgery.

Methods: A 44-year-old female presented to our department complaining for blurred vision in the left eye for 2 years, accompanied by blurred vision in the right eye for 6 months, who performed bariatric surgery in 2007. Upon examination, her best corrected visual acuity (BCVA) was 20/50 in the right eye and 20/200 in the left eye. Intraocular pressure of both eyes was normal. Anterior segment examination of both eyes was unremarkable. Color fundus photography showed the optic disc structure of both eyes was basically normal. However, the OCT-macula showed diffuse thinning of the ganglion cell layer. Visual field testing demonstrated a noticeable central scotoma in both eyes. Laboratory findings included abnormal blood potassium, vitamin D2, vitamin D3, vitamin B7, vitamin B12 and folate. Computed tomography and magnetic resonance imaging of brain and orbits revealed no apparent abnormalities. The medical history included nutritional disorders, anaemia and electrolyte disturbance, with a BMI of 16.0 kg/m² at the time. Therefore, a clinical diagnosis of nutritional optic neuropathy (NON) was made.

Results: After 6 weeks of treatment with nutrition supplements, the BCVA was 20/25 in the right eye and 20/30 in the left eye, and the central scotoma in both eyes also improved.

Conclusions: NON was a rare eye disease in clinical practice, but the medical history along with systemic and fundus examinations could help establish the diagnosis. Timely treatment is crucial for maximizing visual outcomes.

Abstract No.: 206781

Blinded by the Stroke - Hemianopia and Beyond

First Author: Krithika M

Co-Author(s): Janani KRISHNAN, Pratheeba M, Prem SAI.T, Ragul VR

Purpose: Cerebral vascular accidents are the leading cause of preventable blindness. Isolated visual symptoms may be an early presenting characteristic of stroke.

Methods: A 52-year-old male came with C/O diminution of vision following a road traffic accident, K/C/O SHTN & T2DM not on regular medication. On evaluation, the anterior segment was normal, the visual field showed right homonymous hemianopia, followed by an MRI showing an occipital lobe infarct.

Results: The patient was started on antiplatelet therapy. Visual outcome improved with the medical management.

Conclusions: This case report highlights the importance of ophthalmic evaluation, especially visual fields, in aiding a vital role in a multidisciplinary approach to early diagnosis and proper management.

Abstract No.: 204008

Blinding Consequences of Methanol Ingestion: A Case Series

First Author: Hui Yun GOH

Co-Author(s): Pei Fang NEOH, Evelyn Li Min TAI, Melissa Pei Yin WANG

Purpose: To report two cases of toxic optic neuropathy following methanol ingestion, highlighting the systemic and ocular features, management challenges, and poor visual prognosis despite timely intervention.

Methods: Case series

Results: Case 1: A 42-year-old male presented with vomiting, reduced consciousness, severe metabolic acidosis (pH 7.1), and elevated serum methanol (40.7 mmol/L). He received haemodialysis, intravenous thiamine, leucovorin, pyridoxine, and oral ethanol. Ophthalmic examination revealed bilateral optic disc swelling with sluggish, dilated pupils and visual acuity of hand movement in both eyes. No functional recovery was observed despite high-dose intravenous methylprednisolone. Case 2: A 26-year-old male presented with altered consciousness, severe metabolic acidosis (pH 6.5), acute kidney injury, and transaminitis. Serum methanol was markedly elevated at 65.2 mmol/L. He was treated with haemodialysis and the same adjunctive regimen. Post-extubation, ophthalmic evaluation showed bilateral toxic optic neuropathy with a left relative afferent pupillary defect (RAPD). Visual acuity was counting fingers in the right eye and hand movement in the left. Optical coherence tomography revealed preserved macula, but visual improvement was minimal after intravenous methylprednisolone.

Conclusions: Methanol poisoning is a preventable cause of profound visual morbidity. Toxic optic neuropathy may develop rapidly and irreversibly, even with aggressive systemic and ocular management. These cases highlight the importance of early recognition, urgent ophthalmology referral, and multidisciplinary care. Stronger public health strategies, regulation, and education are crucial to reduce the risk of vision loss from adulterated alcohol consumption.

Abstract No.: 207213

Carbo-Optic Neuropathy

First Author: Priethikka M S

Co-Author(s): Madhumitha

Purpose: To report two cases of carboplatin-induced optic neuropathy, a rare but vision-threatening complication of systemic chemotherapy, characterized by progressive visual decline with ischemic retinal changes.

Methods: Two patients with a history of systemic carboplatin therapy presented with progressive decrease in vision. Detailed history was obtained,

and systemic vitals were within normal limits. Comprehensive ophthalmic evaluation was performed, including visual acuity, color vision, and visual field testing. Slit-lamp biomicroscopy was used to assess the anterior segment, and fundus examination was carried out to evaluate the posterior segment.

Results: Both patients demonstrated reduced visual acuity with associated color vision and field defects. Anterior segment examination was unremarkable. Posterior segment findings revealed optic disc edema, a pale optic disc, and ischemic changes in the retina, consistent with optic neuropathy.

Conclusions: Carboplatin, a commonly used chemotherapeutic agent, can rarely cause optic neuropathy, leading to progressive and potentially irreversible vision loss. Recognition of this adverse effect is essential for timely diagnosis and modification of therapy to prevent further ocular morbidity. Just like other drugs causing optic neuropathy, Carboplatin also requires timed reviews and follow ups going forward as cases are more common.

Abstract No.: 202816

Case of Juvenile Myasthenia Gravis With Positive Anti-MuSK Antibodies

First Author: Rieko **FUKUDA**

Co-Author(s): Yuka **MORITA**, Tetsuro **OSHIKA**

Purpose: We report a case of pediatric MuSK antibody-positive myasthenia gravis (MuSK-MG) in which the definitive diagnosis was markedly delayed.

Methods: Case report.

Results: A 3-year-old girl presented with right esotropia following an RS virus infection. Because she had been using a smartphone for more than six hours daily, acute acquired comitant esotropia was suspected. Screen time restriction was advised, and her ocular deviation improved spontaneously. A head MRI was performed and showed no abnormalities. Ten months later, esotropia recurred, and soon after, ptosis appeared. Laboratory tests revealed negative anti-acetylcholine receptor antibodies but positive anti-MuSK antibodies, leading to a diagnosis of subclinical generalized MG. Although it required 25 months from initial presentation to establish the diagnosis, treatment with intravenous immunoglobulin followed by oral corticosteroids and tacrolimus resulted in complete resolution of ocular symptoms without progression to generalized disease.

Conclusions: Myasthenia gravis is an autoimmune disease characterized by antibody-mediated impairment of postsynaptic acetylcholine receptor function at the neuromuscular junction. Pediatric MuSK-MG is extremely rare and diagnostically challenging. In our case, the initial presentation mimicked acute acquired comitant esotropia, delaying the recognition of MG. Strabismus or ocular motility

abnormalities that are inconsistent with typical cranial nerve innervation patterns may indicate MG. Even in pediatric patients, MuSK-MG can manifest with isolated ocular symptoms; therefore, testing for anti-MuSK antibodies, in addition to standard anti-AChR antibodies, is recommended whenever MG is suspected.

Abstract No.: 201469

Cat-Scratch Disease Neuroretinitis in a Young Filipina: A Case Report

First Author: Kim Jasper **TORRELIZA**

Co-Author(s): Vina **BALLADO**

Purpose: To present a case of an 18-year-old Filipina who complained of sudden, painless, blurring of vision of the left eye, preceded by non-specific flu-like symptoms.

Methods: This is a case report.

Results: This is a case report of an 18-year-old Filipina who presented with acute, painless blurring of vision of the left eye, preceded by fever, myalgia, body malaise, and loss of appetite. Further history revealed that she sleeps with her pet cat. Visual acuity was 5/200 on the left eye with a grade 2 relative afferent pupillary defect and dyschromatopsia. Fundoscopic examination of the left eye revealed optic disc swelling and stellate macular exudates. The diagnosis was confirmed by positive serology for Bartonella henselae. She was treated with oral Doxycycline and Rifampicin.

Conclusions: Neuroretinitis, an inflammation of the neural retina and optic nerve, can stem from infectious, immune-mediated processes, or idiopathic causes. It is a rare ocular complication of Cat-scratch disease (CSD), a systemic infection caused by Bartonella henselae, which can be transmitted through a cat scratch or bite. Early recognition of the disease can be achieved through accurate history taking, including feline exposure, and serology testing. Treatment options include antibiotic therapy with Doxycycline and Rifampicin. Some literature suggests supplementation with corticosteroids. However, there is still no consensus on the treatment of CSD and its ocular complications. There is limited data on CSD neuroretinitis in Asia, and to our knowledge, there are no reported cases yet in the Philippines.

Abstract No.: 201992

Chronic Sinusitis First Presented With Unilateral Blurred Vision and a Pale Optic Neuroretinal Rim: A Case Report

First Author: Huai Wen **HSU**

Co-Author(s): Shu Chun **KUO**

Purpose: To present a case of a patient with blurred vision and a visual field defect in the left eye for

three months, who was later diagnosed with chronic sinusitis.

Methods: Case report.

Results: This case report describes a 63-year-old woman with no systemic diseases who presented with blurred vision and a nasal visual field defect in her left eye for three months. Best-corrected visual acuity was 1.0 in the right eye and 0.8 in the left eye, with normal intraocular pressures. Fundus examination revealed a pale temporal optic rim in the left eye, and macular OCT showed no significant abnormalities. Visual field testing demonstrated a nasal step defect in the right eye and a paracentral scotoma in the left eye. Fluorescein angiography revealed no specific findings. Brain CT showed a 2 × 1 cm nodule in the left ethmoid sinus, and MRI confirmed a mucocoele compressing the left optic nerve with mild optic atrophy. The patient was diagnosed with a left ethmoid mucopyocoele with orbit and skull base invasion and underwent external frontoethmoidectomy with flap reconstruction. Postoperative vision and visual field findings remained unchanged.

Conclusions: This case underscores the importance of thorough evaluation in patients with unilateral blurred vision and visual field defects. Early detection and treatment of sinus-related complications are vital to prevent irreversible optic nerve damage.

Abstract No.: 207487

Clinical Characteristics of Binocular Diplopia

First Author: Nguyen TAN THINH

Co-Author(s): Tran KE TO, Ngo LAN ANH, Nguyen THANH NAM

Purpose: To describe the clinical characteristics and etiologies of binocular diplopia.

Methods: A cross-sectional, descriptive, retrospective, and prospective study. A total of 128 patients with binocular diplopia were examined in Ho Chi Minh Eye Hospital, Viet Nam, from June 2024 to June 2025.

Results: A total of 128 patients with diplopia (79 males and 49 females), with a mean age of 35.6 years (range: 6–78 years), were included in the study. The most common form of diplopia was sixth nerve palsy (35.16%), followed by third nerve palsy (21.09%), multiple cranial nerve palsies (13.28%), and divergence insufficiency (13.28%). Other causes included fourth nerve palsy (6.25%), convergence insufficiency (5.47%), thyroid eye disease (3.91%), and myasthenia gravis (1.56%). In most cases, the etiology was undetermined (46.88%), followed by trauma (17.18%) and vascular causes (14.84%). The group with divergence insufficiency tended to be younger, suggesting that environmental and behavioral factors may contribute to diplopia in this population.

Conclusions: Binocular diplopia is most commonly caused by ocular motor nerve palsies. In younger

patients with idiopathic diplopia, environmental and behavioral factors may play a significant role, underscoring the need for targeted evaluation and management strategies in this subgroup.

Abstract No.: 203373

Clinical Evaluation of Traditional Chinese Medicine Intervention After Traumatic Optic Neuropathy

First Author: Caiwen XIAO

Purpose: Traumatic optic neuropathy (TON) is a severe ophthalmic problem resulting from craniofacial trauma that damages the optic nerve. It is associated with high rates of disability and blindness. However, there is a lack of effective clinical treatments. This study aims to systematically evaluate the value of integrated traditional Chinese and Western medicine therapy, particularly the intervention of traditional Chinese medicine (TCM), in the treatment of TON.

Methods: A retrospective analysis was conducted on the medical records of TON patients admitted to Shanghai Ninth People's Hospital between 2023 and 2025. Data collected included patient demographics, treatment protocols, and visual acuity, visual field, and ophthalmic electrophysiological examination results before and after treatment. Forty-three patients were included in total. All patients underwent optic nerve decompression, hyperbaric oxygen therapy, and acupuncture rehabilitation, with modifications based on symptoms. Based on whether they received TCM treatment (primarily based on Xuefuzhuyu Decoction) or not, patients were divided into a TCM treatment group and a non-TCM treatment group. The visual prognosis of the two groups was compared and analyzed.

Results: Among all patients, the treatment effectiveness rate was 51.4% in those who received TCM treatment, compared to 37.5% in those who did not. Among patients for whom treatment was ineffective, 52.1% had no light perception preoperatively. Preoperative absence of light perception was a significant factor affecting poor prognosis.

Conclusions: For TON patients, the treatment effectiveness rate was higher in the TCM treatment group than in the non-TCM treatment group. Preoperative absence of light perception is a significant factor associated with poor prognosis.

Abstract No.: 204031

Clinical Features and Genetic Survey of Autosomal Dominant Optic Atrophy in Taiwanese

First Author: Li-wei CHAN

Co-Author(s): Pei-lung CHEN, Ta-ching CHEN, Chao-wen LIN, Jung-je YANG

Purpose: The purpose of this study is to report the genetic mutation sites in Taiwanese autosomal dominant optic atrophy (ADOA) patients and characterize the disease progression by evaluating the changes in visual acuity and visual field of these patients.

Methods: Retrospective cohort study.

Results: A total of 10 subjects from 8 families were enrolled in this study, including 5 males and 5 females, with age ranging from 5.4 to 66.05 years old. Eight different OPA1 gene mutation variants were detected, 2 of them were novel mutation site which had not been reported previously. The mean best-corrected visual acuity (BCVA) was LogMAR 0.89 ± 0.47 . Visual field exam of the 32 eyes showed a mean deviation of -3.04 dB. Statistical analysis revealed that with increased age, the BCVA gradually worsen while the visual field exam remained relatively stable.

Conclusions: This study contributes to the growing understanding of genetic mutation variants and characterize the progression of visual function in Taiwanese ADOA patients.

Abstract No.: 201480

Clinical Features and Risk Factors of Idiopathic Intracranial Hypertension

First Author: Sanjeeta SITAULA

Co-Author(s): Rajeev OJHA, Damodar PUDASAINI, Ananda SHARMA

Purpose: This study was done to study the risk factors and clinical features of Idiopathic Intracranial Hypertension (IIH) at a tertiary referral centre.

Methods: This hospital-based observational study conducted from January to December 2023 included 38 consecutive patients with IIH diagnosed using the Modified Dandy Criteria. Data collected included demographic details, clinical features, and investigations findings. Statistical analysis used were descriptive statistics and regression analysis to evaluate the relationship between variables.

Results: Seventy six eyes of 38 cases with IIH were included. The mean age of cases was 34.52 ± 11.42 years (18-69 years) with 34 cases (89%) being female. Most cases (73.7%) were overweight with body mass index (BMI) of 25-29.9. Only 7.9%, were obese, and 18.4% had a normal BMI. Comorbidities included hypertension (31.5%), polycystic ovarian syndrome (21%), thyroid disorders (10%) and anemia (7.9%).

Common symptoms were headache (95%), followed by transient visual obscuration, pulsatile tinnitus, dizziness (21% each). Baseline visual acuity was normal in 97.4% in both eyes at presentation and decreased in 1 case with malignant IIH. Mean cerebrospinal fluid (CSF) opening pressure was 29.34 ± 2.14 cm H₂O (range: 25-48 cm H₂O). Headache severity in IIH patients had a strong positive correlation with CSF opening pressure and retinal nerve fibre layer (RNFL) thickness, and a moderate association with Frisén grade. Visual field loss exhibited weak correlations with Frisén grade and RNFL thickness.

Conclusions: Majority of patients with IIH were overweight females with normal baseline visual acuity. Headache severity had a positive correlation with CSF opening pressures and RNFL thickness.

Abstract No.: 200847

Clinical Features and Visual Prognosis of Non-arteritic Anterior Ischemic Optic Neuropathy in a Regional Hospital: A 5-Year Retrospective Study

First Author: Pei-jane BAIR

Co-Author(s): Yu CHEN

Purpose: To analyze the clinical characteristics, systemic associations, and visual prognosis of patients diagnosed with non-arteritic anterior ischemic optic neuropathy (NAION) in a regional hospital over 5-year period, and to compare these findings with published data from tertiary centers to highlight potential differences in patient profiles and outcomes.

Methods: Retrospective review of NAION patients at Show Chwan Memorial Hospital, Taiwan (2019–2023). Inclusion: sudden painless monocular vision loss with fundus findings of NAION. Data: age, sex, comorbidities, best-corrected visual acuity (BCVA) at presentation, 1 and 3 months, optic disc findings, OCT, perimetry, MRI rate. Compared with published tertiary center cohorts.

Results: Forty patients (42 eyes; mean age 61.3 ± 9.2 years; 60% male) were included. Hypertension (72.5%) and diabetes (55%) were more prevalent than tertiary reports (~50%, ~30%). Mean presenting BCVA was 0.76 ± 0.41 logMAR, improving to 0.66 ± 0.43 at 3 months. Visual gain ≥ 2 Snellen lines occurred in 28.6% (vs. 30–45% in large series). MRI was performed in 28.5% (vs. >60% in tertiary centers). Poorer prognosis was linked to worse initial BCVA and absence of optic disc hemorrhage ($p < 0.05$). OCT showed early RNFL swelling, later thinning.

Conclusions: Compared with tertiary center cohorts, regional hospital NAION patients had higher systemic comorbidity rates, lower neuroimaging frequency, and slightly poorer visual recovery, possibly due to delayed presentation and limited specialist access.

Abstract No.: 201513**Clinical Observation of Hyperbaric Oxygen Therapy Combined With Deep Periocular Acupuncture for Ethambutol-Induced Optic Neuropathy***First Author: Qing YE**Co-Author(s): Da CHEN, Bo WEI*

Purpose: To evaluate the efficacy of combined hyperbaric oxygen therapy (HBOT) and deep periocular acupuncture on visual function in EON patients.

Methods: A prospective study of 10 EON patients (20 eyes) treated at Hubei Integrated Traditional Chinese and Western Medicine Hospital (2023-2025). All subjects were referrals who had failed conventional therapies (drug cessation, anisodine, neurotrophic agents) for 0.5-48 months. Exclusion criteria were applied prior to HBOT (2.0 ATA, 60 minutes/session, 5 days/week for 10 sessions). Concurrent daily deep acupuncture at 7 periocular points was administered for 14 days. Pre- and post-treatment assessments included: Best-corrected visual acuity (BCVA, Standard Logarithmic Visual Acuity Chart GB11533-1989); VF testing (30-2 program, Chongqing Shangbang Perimeter); Visual Function Index (VFI) and mean deviation (MD). All examinations were performed by the same ophthalmologist.

Results: BCVA: Baseline BCVA was ≤ 0.5 in all eyes (10 eyes ≤ 0.1). Post-treatment: 9 eyes achieved BCVA ≥ 0.5 , 6 eyes improved to ≥ 0.1 , 19 eyes showed measurable improvement; VF Analysis: 15 eyes demonstrated MD improvement, 14 eyes had increased VFI; No correlation between BCVA and VF changes was observed ($p > 0.05$).

Conclusions: For EON patients with persistent vision loss after drug cessation, early intervention with combined HBOT and periocular acupuncture may promote visual function recovery; BCVA and VF improvements were asynchronous, underscoring the need for multimodal functional assessment.

Abstract No.: 200402**Clinical Presentation of Carotid-Cavernous Fistula and Outcomes of Endovascular Balloon Embolization***First Author: Tayyaba MALIK**Co-Author(s): Noor UL AIN*

Purpose: To describe the clinical presentation of carotico-cavernous fistula (CCF) and outcomes of endovascular balloon embolization in a tertiary care center in a developing country.

Methods: This interventional case series included 18 patients who underwent endovascular balloon embolization at Lahore General Hospital in Lahore, Pakistan. The analyzed data consisted of age, gender, cause and type of CCF, clinical presentation, diagnostic

technique used, intervention, and the results of two-month follow-up. Patients with incomplete records and coil embolization were excluded. Digital subtraction angiography was done in all cases followed by endo-arterial balloon embolization. Procedures were carried out under general anesthesia via femoral artery approach. A single balloon was sufficient to close the fistula in all cases.

Results: There were 18 patients in study. Sixteen patients had direct CCF, and the mean age of the patients was 27.2 ± 12.6 years. The commonest cause of CCF was trauma, and the mean time of presentation after trauma was 7.89 ± 7.19 months. Preoperative visual acuity was worse than 6/60 in 8 patients, between 6/60 and 6/18 in 7 patients, and better than 6/18 in 3 patients. The mean intraocular pressure was 16.06 ± 3.37 mmHg preoperatively and 14.83 ± 3.49 mmHg postoperatively ($p = 0.005$). Endovascular embolization was successful in 15 patients (83.3%). One patient developed epidural hematoma as a complication of the procedure, which was drained later.

Conclusions: Balloon embolization via the femoral artery is an efficient technique in CCF. It is safe and with good results if performed in a timely manner.

Abstract No.: 202211**Clinical and Neuroimaging Spectrum of Vertical Gaze Palsy: A Retrospective Study From a Tertiary Eye Care Centre in South India***First Author: Varuna Abinethri LATHA***MOHANARAMAKRISHNAN***Co-Author(s): Madhumita GOPAL, Nirmala Devy*

Purpose: To analyse the etiological spectrum, clinical features, and neuroimaging correlations of patients with Vertical Gaze Palsy (VGP) presenting to a tertiary eye care centre.

Methods: Retrospective review of electronic medical records of VGP patients from January 2022 to August 2025. Demographic, clinical, and neuroimaging data were analysed.

Results: Fifty-one patients (Age range: 9-77 years; Mean $\pm$ SD: 58.3 ± 15.4 years; 73% male, 27% female) were included. 39% of this cohort initially presented to a neuro-ophthalmologist, diagnosed, and subsequently referred for neurophysician care. The most common causes were brainstem infarcts (51%) and progressive supranuclear palsy (PSP) (35%). Other causes were hydrocephalus (4%), demyelination (4%) and idiopathic (6%). Among vascular causes, bilateral or paramedian thalamic infarcts with or without midbrain involvement predominated (64%). Isolated infarcts involving unilateral thalamus (23%), pons (9%), and lentiform nucleus (4%) were also noted. Associated signs included third nerve palsy (54%), hemiplegia

(19%), internuclear ophthalmoplegia (INO) /abducting nystagmus (11%), and sixth nerve palsy (7%). PSP patients presented with slow vertical saccades, INO (11%), balance, speech, and gait abnormalities (50%); Neuroimaging showed midbrain atrophy. Rare causes involved midbrain-thalamic demyelination and hydrocephalus in post-ventriculoperitoneal shunt patients presenting as dorsal midbrain syndrome.

Conclusions: VGP is most often caused by cerebrovascular infarcts and PSP. While thalamic-midbrain lesions explain most cases, atypical infarcts highlight complex supranuclear vertical gaze pathways. Neuro-ophthalmologists serve as critical first-line diagnosticians for brain stem lesions, facilitating timely neuroimaging and multidisciplinary management.

Abstract No.: 208454

Comparison of Lamina Cribrosa Parameters Between Retinal Vein Occlusion Patients and Healthy Individuals

First Author: Cece ZHAO

Co-Author(s): Zhiqing LI

Purpose: Retinal vein occlusion (RVO) is the second most common retinal vascular disease, with a recent increasing incidence and a progressively younger age of onset, but its pathogenesis is still unclear. This study aimed to explore the parameter characteristics of the lamina cribrosa (LC) of RVO, which may help discover some clues related to the pathogenesis of RVO.

Methods: This retrospective study included 130 unilateral RVO patients and 30 healthy individuals who were screened at the Tianjin Medical University Eye Hospital from November 2023 to November 2024. Their basic clinical conditions, optical coherence tomographic (OCT) and optical coherence tomographic angiography (OCTA) of the optic nerve head (ONH) were obtained.

Results: There were no statistically significant differences in LC thickness (LCT) and focal lamina cribrosa defects (FLCDs) between the affected and fellow eyes, while both had statistically significant differences in LCT and FLCD with the healthy eyes ($P < 0.001$). Both BRVO and CRVO conform to the above pattern. The differences between BRVO and CRVO in LCT and FLCDs were statistically significant ($P=0.007$, $P=0.002$, respectively). LCT, LCCI, and FLCDs were independent risk factors for the development of RVO.

Conclusions: The affected eyes and fellow eyes of RVO exhibit abnormal structures of LC, with LCT, LCCI, and FLCDs serving as independent risk factors for its occurrence. Therefore, we concluded that the development of RVO is closely associated with the abnormal structure of LC, potentially related to congenital structural weakness of the LC and/or alterations of trans-lamina cribrosa gradient (TLPG).

Abstract No.: 202689

Compressive Optic Neuropathy Due to Idiopathic Gyrus Rectus Herniation

First Author: Padma Lakshmi

Co-Author(s): Olma Veena Noronha

Purpose: The gyrus rectus constitutes the inferomedial portion of the frontal lobe and is situated at the floor of the anterior cranial fossa above the intracranial optic nerves and chiasm. We report a unique case of compressive optic neuropathy caused by herniation of the gyrus rectus.

Methods: Retrospective observational case report.

Results: A 7-year-old male presented with right eye diminution of vision noticed accidentally since 4 months. On examination, BCVA was 2/60 in the right eye and 6/6 in the left eye. There was relative afferent pupillary defect in the right eye with dyschromatopsia in both eyes. The anterior segment was within normal limits. The right eye had a pale disc while the left optic disc was normal. Visual fields showed generalized constriction in right eye. Left eye visual fields were normal. MRI brain and orbit showed herniation of the gyrus rectus into the suprasellar cistern, causing mass effect on the intracranial optic nerves and chiasm without abnormal enhancement or altered signals in the optic nerves.

Conclusions: Anomalies in the frontal lobe can interfere with visual function by compression of the optic chiasm and nerve. Unilateral vision loss in our case was probably due to the involvement of prechiasmatic optic nerve.

Abstract No.: 208322

Detection of Retinal Neuronal Changes in Patients With Biomarker-Based Diagnosis of Alzheimer's Disease

First Author: Chunwen ZHENG

Co-Author(s): Carol CHEUNG, Qinghua HE, Vincent C.t. MOK, Anran RAN

Purpose: Retinal neuronal changes in symptom-based diagnosis of Alzheimer's disease (AD) have been identified. However, symptom-based diagnosis is limited by its non-specific clinical manifestations, which delay AD-specific pathology detection at early stages. This study aims to identify associations between retinal neuronal metrics measured by optical coherence tomography (OCT) and AD defined by positron emission tomography (PET) biomarkers.

Methods: A prospective cohort was recruited from Prince of Wales Hospital and the Chinese University of Hong Kong Eye Center. AD diagnosis was confirmed by significant amyloid-beta ($A\beta$) uptake on PET. Retinal neuronal changes were measured by OCT. Generalized estimating equations were used to identify differences between groups, accounting for inter-eye correlation.

Multivariate analyses were used and adjusted for age, gender, hypertension, diabetes, dyslipidemia, stroke, heart disease, smoking, and axial length.

Results: A total of 82 patients who underwent PET were involved, with 78 eyes in the A β -positive group and 86 eyes in the A β -negative group. Average retinal nerve fiber layer (RNFL) thickness, and RNFL thicknesses in superior and inferior peripapillary regions were significantly reduced in the A β -positive group ($P < 0.05$). Subjects with A β -positive were associated with lower peripapillary average (OR = 0.955, 95% CI: 0.923 – 0.986, $P = 0.031$), superior (OR = 0.975, 95% CI: 0.956 – 0.993, $P = 0.031$), and inferior RNFL (OR = 0.976, 95% CI: 0.957 – 0.994, $P = 0.031$) thicknesses.

Conclusions: Thinning peripapillary average, superior, and inferior RNFL thicknesses were associated with A β -positive status. Our study supports that the detection of retinal neuronal changes serves as a non-invasive means of early AD detection.

Abstract No.: 201536

Diagnosis Variation Associated With Bilateral Optic Disc Pallor and Swelling: A Case Series

First Author: Vannaroit **TENG**

Co-Author(s): Kossama **CHUKMOL**, Piseth **KONG**

Purpose: To illustrate the diagnostic variation associated with bilateral optic disc pallor using a case series of three middle-aged patients who presented with vision impairment due to various intracranial malignancies. Despite a common finding of optic disc pallor, the underlying causes vary, highlighting the significance of a thorough neuro-ophthalmic evaluation.

Methods: Three patients aged 30-40 years with progressive vision loss and bilateral optic disc pallor were examined. Each got a thorough ophthalmologic examination, optical coherence tomography (OCT), and a CT scan of the brain and orbits.

Results: Case 1 developed with gradual bilateral vision loss, and a CT scan revealed a massive pituitary macroadenoma with contact with the internal carotid artery. Case 2 presented identical visual symptoms, and a CT scan revealed a meningioma compressing the optic chiasm. Case 3 showed bilateral optic nerve enlargement, and a CT scan revealed a pontocerebellar angle tumor, presumably a vestibular schwannoma. Despite overlapping funduscopic findings, each patient prompted a personalized diagnosis approach. Neuroimaging was crucial in verifying the diagnosis and deciding on treatment.

Conclusions: Bitemporal optic disc pallor or swelling requires urgent neuroimaging. This case series emphasizes the diverse intracranial etiologies, including pituitary adenoma, meningioma, and pontocerebellar cancers, and underscores the necessity for a systematic diagnostic strategy to avert irreversible visual loss.

Abstract No.: 207229

Diagnostic Methods for Dysthyroid Optic Neuropathy: A Systematic Review and Analysis

First Author: Fatema **ALJUFAIRI**

Co-Author(s): Kelvin, Kam Lung **CHONG**, Kenneth **LAI**, Chi **PANG**, Clement **THAM**

Purpose: Dysthyroid Optic Neuropathy (DON) is a sight-threatening complication of thyroid eye disease (TED) that remains diagnostically challenging due to the absence of a universally accepted standard. This systematic review examines diagnostic criteria reported over the past 25 years.

Methods: A comprehensive search up to August 30, 2024, across PubMed, Embase, Cochrane Library, Scopus, Medline Ovid, Web of Science, and ProQuest retrieved 9,652 studies. After removing duplicates and applying eligibility criteria, 119 studies were included. Diagnostic approaches were categorized into subjective indicators (Decreased best-corrected visual acuity, color desaturation, visual field defects), objective findings (Relative afferent pupillary defect, optic disc changes, restricted extraocular movement), and ancillary investigations (Visual evoked potentials, electroretinography, neuroimaging).

Results: Required thresholds varied: 22.7% of studies required two positive indicators, and 13.5% required one. Radiological evidence has become increasingly prominent, with its use rising by 26% over the past decade. From 2016–2020, 72% of studies incorporated imaging, compared to 59% from 2021–2024. Despite widespread investigation, no consensus exists. This review highlights the variability in diagnostic practices and emphasizes the growing reliance on radiological tools.

Conclusions: In the absence of a universally accepted diagnostic standard for dysthyroid optic neuropathy, studies have employed various criteria, with the most common approach requiring two positive indicators. Additionally, the use of radiological evidence in diagnosing dysthyroid optic neuropathy has increased significantly over the past decade, with a growing number of studies incorporating imaging findings as a key diagnostic component.

Abstract No.: 206752

Diffuse Retinal Exudates in a Pediatric Patient With Vision Loss as an Early Indicator of Central Nervous System Tuberculosis: A Case Report

First Author: Marifel **MONTENEGRO**

Co-Author(s): Patricia **CABRERA**

Purpose: To describe a case of an 8-year-old female whose initial ophthalmologic findings, particularly diffuse retinal exudates, led to the diagnosis of central nervous system tuberculosis, underscoring the value

of thorough ocular examination in detecting life-threatening systemic disease.

Methods: The patient presented with progressive bilateral visual blurring, inward deviation of the right eye, and declining school performance. Initial examination revealed reduced visual acuity, full extraocular motility, no relative afferent pupillary defect (RAPD), and an unremarkable anterior segment. Fundus examination showed diffuse hard exudates, bilateral optic disc edema, and flame-shaped hemorrhages. Early differentials included Coats disease, cytomegalovirus retinitis, and Coats-like retinopathy. Despite initial management, visual acuity continued to deteriorate with development of a right RAPD, persistent headaches, and repeated vomiting. With emerging neurologic signs and visual field loss, a multidisciplinary workup was initiated, including macular optical coherence tomography (OCT), contrast-enhanced cranial magnetic resonance imaging (MRI), and infectious testing.

Results: MRI demonstrated bilateral cerebellitis with obstructive hydrocephalus and white matter changes. Infectious laboratory studies, complete blood count, and chest radiograph were unremarkable. Despite the absence of pulmonary findings and cerebrospinal fluid analysis, a clinical diagnosis of tuberculous meningitis was made based on clinical manifestations, neuroimaging, neurologic progression, and alignment with Marais diagnostic criteria. Anti-tubercular therapy, corticosteroids, and intracranial pressure-lowering agents were started, with neurosurgical planning for ventriculoperitoneal shunting.

Conclusions: Diffuse retinal exudates can be an early indicator of central nervous system tuberculosis. Prompt recognition and coordinated evaluation enabled timely, sight- and life-saving treatment in this patient.

Abstract No.: 204909

Disease-Modifying Therapy and Its Influence on Retinal Neurodegeneration in Relapsing-Remitting Multiple Sclerosis

First Author: Sanela Sanja BURGIC

Co-Author(s): Milka MAVIJA, Mirko RESAN, Zoran VUKOJEVIĆ

Purpose: Retinal thinning has emerged as a potential marker of neurodegeneration in multiple sclerosis (MS). This study aimed to assess whether disease-modifying therapies (DMTs) mitigate thinning of the retinal nerve fiber layer (RNFL) and ganglion cell-inner plexiform layer (GIPL) in patients with relapsing-remitting MS (RRMS) over a one-year period.

Methods: In this prospective, single-center study, 80 eyes from 40 RRMS patients were monitored for 12 months. Participants were divided into two cohorts: untreated patients (No DMT, n = 18) and those

receiving DMT (n = 22; therapies included glatiramer acetate, ofatumumab, interferon beta-1a/1b, dimethyl fumarate, fingolimod, and ocrelizumab). Optical coherence tomography (OCT) was used to quantify RNFL and GIPL thickness at baseline, 6 months, and 12 months. Disability progression was evaluated using the Expanded Disability Status Scale (EDSS). Statistical analyses included parametric and non-parametric tests, correlation analyses, and linear regression.

Results: Patients without DMT exhibited significantly greater retinal thinning ($p < 0.05$). Over 12 months, RNFL thinning was $4.03 \pm 4.87 \mu\text{m}$ (No DMT) compared with $0.69 \pm 3.91 \mu\text{m}$ in the DMT group; GIPL thinning was $3.43 \pm 3.46 \mu\text{m}$ versus $2.25 \pm 2.44 \mu\text{m}$, respectively. From baseline to 6 months, RNFL thinning was $1.31 \pm 2.34 \mu\text{m}$ vs. $0.16 \pm 1.71 \mu\text{m}$, and GIPL thinning $1.77 \pm 2.18 \mu\text{m}$ vs. $0.81 \pm 1.72 \mu\text{m}$. Between 6 and 12 months, RNFL decreased by $2.72 \pm 2.53 \mu\text{m}$ vs. $0.53 \pm 2.20 \mu\text{m}$, and GIPL by $1.66 \pm 2.51 \mu\text{m}$ vs. $1.44 \pm 1.52 \mu\text{m}$. RNFL and GIPL thickness negatively correlated with EDSS scores ($\rho = -0.42$ and -0.38 , $p < 0.05$), and regression analysis confirmed their predictive value for disability progression ($R^2 = 0.36$).

Conclusions: DMT attenuates retinal thinning in RRMS, supporting its neuroprotective role. RNFL and GIPL thinning are closely associated with disability, underscoring their potential as biomarkers of neurodegeneration. These findings highlight the utility of OCT in MS monitoring and reinforce the importance of early DMT initiation.

Abstract No.: 202124

Dual Pathology: Torsional Nystagmus From Pontine Haemorrhage With Optic Tract Compression by Frontal Lobe Meningioma

First Author: Suzanne SAW

Co-Author(s): Shahidatul Adha MOHAMAD

Purpose: To report a case of torsional nystagmus secondary to pontine haemorrhage, with concurrent compression of the visual pathway by frontal lobe meningioma.

Methods: Case report.

Results: A 58-year-old male with poorly controlled diabetes and hypertension presented in December 2024 with acute pontine haemorrhage. Initial symptoms included severe headache, right-sided weakness, dysarthria, diplopia and horizontal gaze palsy. By day 3, the gaze palsy and diplopia had resolved, yet the patient reported persistent visual disturbance, describing single objects seen against a blurred, oscillating background. Visual acuity was 6/15 (pinhole 6/7.5) in the right eye and 6/6 in the left eye. Pupillary responses were normal. Extraocular movements were full; however, careful examination revealed subtle, low amplitude torsional nystagmus in both eyes. Anterior segment and fundus examinations

were unremarkable except for immature cataracts. OCT showed temporal RNFL thinning of the left optic nerve head. Humphrey perimetry revealed a right homonymous incongruous hemianopia. Neuroimaging revealed a pontine haemorrhage involving the basal and tegmental regions, and an incidental left frontal extra-axial lesion, later confirmed on MRI as a meningioma compressing the lateral optic chiasm and anterior left optic tract. The patient was co-managed by neuromedical and neurosurgical teams.

Conclusions: The rarity and incidental nature of this dual presentation, compounded by uncontrolled comorbidities, presents significant challenges in clinical management. MRI surveillance, OCT, and Humphrey perimetry remain essential for monitoring meningioma-related compression of the visual pathway and guiding treatment decisions.

Abstract No.: 208520

Electrophysiological Characteristics of Neuromyelitis Optica Spectrum Disease (NMO-SD)

First Author: Agnes JANOSSY

Purpose: Neuromyelitis optica spectrum disease (NMO-SD) is an autoimmune demyelinating disorder affecting the central nervous system. With advancements in laboratory and imaging diagnostics, it has become increasingly possible to differentiate between patients suffering from multiple sclerosis (MS) and those with NMO-SD. The pathomechanism and therapy of these two diseases differ. Our aim was to demonstrate how electrophysiological examinations assist in distinguishing the two conditions in referred patients as well as in monitoring disease progression.

Methods: Between 2015 and 2024, we examined 78 patients in our clinic whose ages ranged from 24 to 61 years. The diagnosis of NMO-SD was primarily based on demyelinating lesions detected on cervical spinal cord and brainstem MRI scans, as well as cerebrospinal fluid analysis. Electrophysiological examinations were performed according to international standards, taking into account patient consent and ethical requirements.

Results: The most common abnormality observed in the visual evoked potentials (VEPs) was a pronounced prolongation of the N135 wave component, along with irregular waveforms affecting both eyes. Severe PERG abnormalities were observed in 50% of cases.

Conclusions: Ophthalmic electrophysiological examinations (VEPs and PERG) yielded results that differed in most cases between MS and NMO-SD. In addition to the specific VEP abnormalities, routinely performed PERG examinations in our laboratory may also assist in the early differentiation of the two types of demyelinating diseases in clinical practice.

Abstract No.: 208018

Establishing a Paediatric-Centred Visual Electrodiagnostic Unit in Hong Kong: A Retrospective Review of Clinical Experience

First Author: Cheuk Ling YIM

Co-Author(s): Stephanie SI CHEUNG, Yik To HO, Wency TANG

Purpose: To evaluate the clinical indications, diagnostic yield, and downstream genetic findings from paediatric visual electrodiagnostic testing performed at Hong Kong Children's Hospital (HKCH) following the establishment of its first child-centred electrodiagnostic unit.

Methods: We conducted a retrospective review of 50 paediatric patients (aged 3–16 years) who underwent electroretinography (ERG) and/or visual evoked potentials (VEP) between 2024 and 2025. Clinical indications, electrodiagnostic outcomes, and subsequent genetic testing results were analysed.

Results: The most common indication for testing was unexplained suboptimal vision (70%), followed by nystagmus (15%), nyctalopia, suspected maculopathy, and family history of inherited retinal disease. Electrodiagnostic testing yielded abnormal findings in 55% of cases, including electronegative ERG, cone/rod dysfunction, abnormal VEPs, and macular dysfunction. These patients were referred for genetic testing, with 45% receiving a positive molecular diagnosis. The integration of electrodiagnostic testing facilitated earlier identification of inherited retinal conditions and guided further management.

Conclusions: Our early experience demonstrates the clinical value of paediatric visual electrodiagnostics in evaluating unexplained visual symptoms. The high diagnostic yield underscores the importance of incorporating these tests into routine paediatric ophthalmic assessment. This study highlights the diverse spectrum of retinal and optic pathway disorders in Hong Kong's paediatric population and supports the role of electrodiagnostics in bridging clinical and genetic diagnosis.

Abstract No.: 206314

Evaluating Serum Angiotensin-Converting Enzyme for the Differential Diagnosis of Idiopathic Versus Demyelinating Optic Neuritis

First Author: Mohammad TOBEIHA

Co-Author(s): Alireza DEGHANI, Matin IRAIPOUR, Mohsen POURAZIZI

Purpose: To evaluate serum angiotensin-converting enzyme (ACE) levels in patients with idiopathic and demyelinating optic neuritis (ON), as well as in healthy individuals, and to assess the potential of ACE as a biomarker for differentiating ON subtypes.

Methods: In this case-control study, patients diagnosed with acute ON were recruited as the case group, and healthy volunteers (18–50 years) served as controls. Based on systemic and neurological assessments, ON cases were categorized into idiopathic ON and demyelinating ON, including multiple sclerosis (MS), neuromyelitis optica (NMO), and clinically isolated syndrome (CIS). Serum ACE levels were measured using an enzyme-linked immunosorbent assay.

Results: A total of 51 patients with acute ON (78.4% female; mean age, 29.8 ± 8.4 years) and 51 controls (78.4% female; mean age, 29.9 ± 6.9 years) were enrolled. Among ON patients, 29 (56.9%) had idiopathic ON, while 22 (43.1%) had demyelinating ON (MS, n=16; NMO, n=3; CIS, n=3). Median serum ACE levels were 33.50 U/L (range: 29.40–46.20) in idiopathic ON and 34.25 U/L (range: 29.30–46.10) in demyelinating ON ($P > 0.99$). Healthy individuals had a mean serum ACE of 26.2 U/L (range: 20.50–24.80), which was significantly lower compared to ON patients ($P < 0.001$). Abnormally elevated ACE (>65 U/L) was found in 3 patients with idiopathic ON (10.3%) and 2 with demyelinating ON (9.1%) ($P > 0.99$).

Conclusions: Serum ACE levels were significantly higher in patients with both idiopathic and demyelinating ON compared with healthy controls. However, no significant difference was observed between ON subtypes, suggesting that while ACE may indicate disease presence, it lacks discriminatory value between idiopathic and demyelinating ON.

Abstract No.: 201775

Evaluating Visual Snow Symptoms and Severity Using the Colorado Questionnaire and Visual Snow Simulator in Koreans

First Author: Hyun Jin SHIN

Purpose: This study aims to assess the symptoms of visual snow syndrome (VSS) among Koreans utilizing the Colorado questionnaire (CQ) and to determine the severity of the condition through the visual snow simulator.

Methods: From May 2021 to July 2023, 53 individuals diagnosed with VSS at Konkuk University underwent a thorough examination focusing on the density, speed, and size of the visual snow simulator which is a specialized tool used to replicate and quantify the visual disturbances experienced by individuals with VSS. In conjunction with the simulator evaluation, participants were requested to complete the CQ, which was designed to gauge the intensity and impact of VSS on individuals' daily lives.

Results: The mean age of the 53 patients (58.8%, 31 males, age=11–50) was 28 ± 11.11 years. In the CQ, the symptom with the greatest impact on daily life was «floater,» followed by «anxiety» and «blue field entoptic phenomenon.» In contrast, the least impactful

symptoms were «feeling of detachment,» «tinnitus,» and «palinopsia.» The average density, speed, and size in the visual snow simulator were 0.48, 34.38, and 1.84, respectively. No significant correlation was observed between simulator severity and Colorado questionnaire scores.

Conclusions: These results suggest that it is the subjectivity of individuals' perception of VSS, rather than the severity itself, that has a greater impact on their quality of life. Also, by quantifying parameters related VSS, researchers can offer a more comprehensive understanding of VSS and its impact on life on the Korean population.

Abstract No.: 203833

Evaluation of High-Dose Methylprednisolone for Optic Neuritis: A Case Series

First Author: Stefenie

Co-Author(s): Alvando AULIA, Bobby Ramses Erguna SITEPU, Kristo Hadi Audric SUGIAMAN

Purpose: To evaluate the outcomes of high-dose intravenous methylprednisolone (IVMP) in patients with typical and atypical optic neuritis (ON) and to compare treatment responses between subtypes.

Methods: Six ON patients treated at Prima Vision Eye Hospital between January and June 2024 were retrospectively reviewed. Four presented with typical unilateral ON and two with atypical bilateral ON. All received IVMP (1 g/day for adults, 500 mg/day for pediatric patients) for three days, followed by a tapering course of oral corticosteroids. Visual acuity, color vision, and contrast sensitivity were assessed at baseline and during 1–6 months of follow-up. Diagnosis was based on clinical features and ophthalmic examination, as advanced imaging and antibody testing were unavailable.

Results: Treatment outcomes differed markedly between subtypes. Two typical ON patients achieved near-complete recovery with normalization of visual and sensory function. In contrast, four patients—including both atypical ON cases—showed incomplete or minimal improvement. One typical ON patient regained color and contrast sensitivity without significant visual acuity gain, suggesting irreversible axonal injury despite remyelination. Another typical case also demonstrated a persistent visual deficit. These findings illustrate the heterogeneity of ON recovery, the influence of axonal damage at presentation, and the limited role of corticosteroids in atypical disease.

Conclusions: High-dose IVMP accelerated recovery in typical ON but had limited efficacy in atypical ON. Early recognition of atypical features and timely intervention are essential for prognosis. Incorporating antibody testing and individualized management may optimize

outcomes in patients with atypical or steroid-refractory ON.

Abstract No.: 203896

Eyes As Witness: Third Nerve Palsy and the Telltale Pupil of Neurosyphilis

First Author: Wen Jin KOW

Co-Author(s): Ee Ling ANG, Rhuen Chiou CHOW, Benjamin Ching How LIM, Julieana MUHAMMED

Purpose: To present a case of isolated third cranial nerve palsy secondary to neurosyphilis.

Methods: Case report

Results: A 44-year-old Chinese gentleman with no significant medical history presented with sudden-onset left eyelid drooping and blurred vision of three days duration. He denied headache, limb weakness, or other intracranial symptoms. Notably, he reported unprotected sexual intercourse with multiple partners over the past year, but no recreational or intravenous drug use. Visual acuity was 6/9 (right eye) and 6/18 (left eye). Examination revealed left eye ptosis with anisocoria (5 mm right, 7 mm left) and sluggish pupillary reaction to light. A light-near dissociation was demonstrated. Extraocular motility testing showed limitation of elevation, depression, and adduction in the left eye. Fundus examination was unremarkable bilaterally. An initial working diagnosis of aneurysmal compression was considered; however, urgent computed tomography angiography (CTA) of the brain was negative. Serological testing revealed a positive Rapid Plasma Reagin (titer 1:64) and Treponema pallidum antibody. Cerebrospinal fluid analysis further confirmed a positive Venereal Disease Research Laboratory test, establishing the diagnosis of neurosyphilis. The patient was treated with intravenous Penicillin-G for two weeks, followed by three doses of intramuscular benzathine penicillin. At two-month follow-up, he demonstrated gradual clinical improvement.

Conclusions: Isolated third cranial nerve palsy due to neurosyphilis is rare yet clinically significant. Comprehensive evaluation beyond vascular and compressive etiologies is crucial, as early recognition facilitates timely treatment and optimizes both visual and neurological outcomes.

Abstract No.: 206400

Fulminant Idiopathic Intracranial Hypertension With Atypical Imaging Presentation

First Author: Fengsheng XU

Co-Author(s): Yingzi PAN, Yuan WU

Purpose: To report a case of fulminant idiopathic intracranial hypertension presenting with bilateral rapid vision loss and associated inferior ophthalmic

vein (IOV) obstruction, and to discuss the potential anatomical mechanism underlying this unusual venous drainage pattern.

Methods: A 36-year-old woman with a history of hypertension and headaches presented with bilateral rapid vision loss over 2 weeks. Comprehensive evaluation included visual acuity testing, ophthalmoscopy, magnetic resonance imaging (MRI), and lumbar puncture. Treatment consisted of ventriculoperitoneal shunting.

Results: Initial visual acuity was no light perception OD and 20/400 OS. Ophthalmoscopy revealed bilateral papilledema with dilated and twisted veins and retinal hemorrhages. MRI demonstrated a tortuous right IOV without enhancement and similar inconspicuous changes in the left IOV. Lumbar puncture confirmed elevated cerebrospinal fluid (CSF) pressure. Following ventriculoperitoneal shunting, visual acuity improved to light perception OD and 20/200 OS, with normalization of CSF pressure.

Conclusions: The IOV obstruction resulted from impaired venous return secondary to intracranial hypertension. We suspect an anatomical anomaly where the IOV diameter was thicker than the superior ophthalmic vein (SOV), causing the IOV to demonstrate venous obstruction before the typically dominant SOV. This case highlights the importance of recognizing atypical venous drainage patterns in idiopathic intracranial hypertension.

Abstract No.: 208385

Genetic Association of Attention-Deficit/Hyperactivity Disorder With Thirteen Ocular Disorders

First Author: Xiunian CHEN

Purpose: Although attention deficit hyperactivity disorder (ADHD) is linked to elevated risk of various ocular disorders, their genetic association and causality remain unclear.

Methods: This study performed linkage disequilibrium score regression (LDSC) and pleiotropic analysis under composite null hypothesis (PLACO) to explore genetic associations, and bidirectional mendelian randomization (MR) to assess the causality between ADHD and thirteen ocular disorders.

Results: LDSC showed ADHD genetically correlated with corneal ulcer, keratitis, blepharochalasis, lacrimal system disorders, senile cataract, retinal vascular occlusion, and age-related macular degeneration. MR revealed genetic liability to ADHD increased the risk of corneal ulcer (OR = 1.18, FDR adjusted P = 0.01), keratitis (OR = 1.13, P = 0.007), blepharochalasis (OR = 1.23, P = 0.002), and lacrimal system disorders (OR = 1.09, P = 0.04), while decreasing the risk of primary open-angle glaucoma (OR = 0.83, P = 0.003), exfoliation glaucoma (OR = 0.71, P = 0.001), and normotensive

glaucoma (OR = 0.79, P = 0.02). Conversely, genetic liability to strabismus increased ADHD risk (OR = 1.09, P = 0.03). The identification of pleiotropic loci using PLACO suggested that genetic factors played a role in the associations between ADHD and ocular diseases.

Conclusions: This study revealed genetic associations between ADHD and multiple ocular disorders, identifying causal effects of ADHD on an increased risk of corneal ulcer, keratitis, blepharochalasis, and lacrimal system disorders, while showing a protective effect against glaucoma. Conversely, genetic liability to strabismus increased ADHD risk.

Abstract No.: 208428

Genotype–Phenotype Correlation in Enhanced S-Cone Syndrome Caused by a Novel Homozygous Frameshift Mutation in NRL

First Author: Yuanyuan **LIU**

Co-Author(s): Jie **CHEN**, Ying **CHEN**, Xiaoman **LI**, Xuhong **LUO**

Purpose: This study aimed to describe the genotype and phenotype of Enhanced S-Cone Syndrome (ESCS) caused by a novel NRL frameshift mutation in a Chinese family.

Methods: A Chinese family was recruited for the study. Whole-exome sequencing and Sanger sequencing were utilized to identify the causal mutation. Comprehensive ophthalmic examinations were conducted in the family, including a 12-year-old female proband and her 47-year-old parents. Assessments included best-corrected visual acuity, intraocular pressure, visual field testing, axial length measurement, microperimetry, fundus photography, fundus autofluorescence, and electroretinography (ERG), including specialized blue-light stimulation protocols to assess S-cone function. A literature review on NRL-associated retinal dystrophies was also performed.

Results: Whole-exome sequencing identified a novel homozygous NRL frameshift mutation (c.388_391delinsCAAGGATAATGT; p.Glu130fs) in the proband, who presented with childhood-onset night blindness, hyperopia, decreased visual acuity, moderate visual field defects, peripheral chorioretinal atrophy, macular cystoid changes, extinguished rod ERG responses, and attenuated cone responses. Notably, blue light ERG revealed a markedly enhanced S-cone response, a hallmark feature of ESCS. Both heterozygous parents were asymptomatic clinically, but functional tests revealed mild rod dysfunction and reduced central sensitivity. Literature review indicated that truncated NRL proteins are commonly associated with early-onset and severe AR-RP phenotypes.

Conclusions: This is the first report of a homozygous NRL frameshift mutation in a Chinese family with Enhanced S-Cone Syndrome, expanding the phenotypic

spectrum of NRL-associated retinopathies. The findings highlight genotype–phenotype correlations and underscore the utility of microperimetry in detecting subclinical abnormalities in carriers, providing an important reference for genetic counseling and disease diagnosis.

Abstract No.: 201481

Granulomatosis With Polyangiitis Presented With Optic Neuropathy: A Case Report

First Author: Pei-ying **CHEN**

Co-Author(s): Ming-hui **SUN**

Purpose: To report a case of granulomatosis with polyangiitis presented with optic neuropathy.

Methods: A case report with medical chart review.

Results: An 80-year-old woman visited our hospital for bilateral visual loss. Patient reported her left eye had become blind since many years ago for unknown cause. She started to experience gradual blurred vision over her right eye 5 months ago. Then her right eye went blind 2 months after the onset. There was no light perception over her bilateral eyes when she visited our clinic. Fundus exam revealed optic atrophy over left eye. Her optic nerve over right eye was pale and edematous, with optociliary shunt vessels. Laboratory workup showed elevated level of antinuclear antibodies (1:320) and positive cytoplasmic-anti-neutrophil cytoplasmic antibodies. We arranged brain magnetic resonance imaging, which revealed enhancement over bilateral optic nerves and cavernous sinus, and focal thickening of dura mater. Granulomatosis with polyangiitis was diagnosed. Systematic steroid and rituximab were prescribed. However, since it had been a long time since her visual loss, her vision didn't come back after the treatment.

Conclusions: Although optic neuropathy secondary to granulomatosis with polyangiitis is a rare condition, it could cause severe vision loss or even blindness. Impaired vision could be attributed to either granulomatous compression or ischemic optic neuropathy due to vasculitis. Complete work up would be helpful to identify the underlying cause when patient experienced atypical symptoms and signs of optic neuritis or presented with optic atrophy for unknown cause.

Abstract No.: 206759

Graves' Ophthalmopathy: Insights From A Case With Sight-Threatening Corneal Ulcer in a Tertiary Care Center

First Author: Edianti **RATNINGPOETI**

Co-Author(s): Yasmine Ayu **DWINASTITI**, Sarah Kamiela **JUFFRY**, Dialika **MUZAKKIR**, Heidi Indraswara **SATARI**

Purpose: This report highlights the challenges in managing sight-threatening Graves' ophthalmopathy

(GO) in regions with limited medical facilities and emphasizes the necessity of early intervention to prevent complications.

Methods: A young male with uncontrolled hyperthyroidism since 2023, presented with right eye redness and significant vision loss. Examination revealed visual acuity of light perception on the right eye and 1.0 on the left. Both eyes were proptosis with lagophthalmos. The right eye was hypotropia with limitation in upgaze. It was also hyperemic with an inferior corneal infiltrate. While the left eye was within normal limits. Laboratory results showed a low TSH level of 0.09 mIU/L. The patient was then diagnosed with severe GO complicated by a corneal ulcer on the right eye. Treatment involved antithyroid medication, high-dose steroids, combined antibiotic eye drops and ointments, artificial tears, and lid taping was recommended. Orbital imaging and TSH receptor antibody testing could not be performed due to resource constraints. However, after two weeks of treatment, both ocular condition and visual acuity improved to 2-meter finger counting.

Results: Managing sight-threatening GO is complex and requires a multidisciplinary approach. Despite the unavailability of advanced diagnostics, this patient showed significant improvement in pain and visual acuity after two weeks of treatment.

Conclusions: This case illustrates that even in the absence of advanced diagnostic tools, timely and appropriate treatment, along with continuous antithyroid medication can lead to recovery in patients with GO-related corneal breakdown

Abstract No.: 205239

Hidden Clues: Diagnosing Pediatric Intracranial Tumor Through a False Localizing Sixth Nerve Palsy

First Author: Rizki Adi SANTOSA

Co-Author(s): Dianita GINTING, Rusti HANINDYA SARI, Antonia KARTIKA, Prettylla YOLLAMANDA

Purpose: To report a case of a sixth cranial nerve palsy as a false localizing sign of a pediatric intracranial tumor.

Methods: This case presents a 5-year-old boy who was brought by his parents with the chief complaint of a sudden onset of squint in the past 3 days. He also complained of headache and vomiting. Vital signs were within normal limits. Motor strength of all four extremities was within normal limits. Hirschberg examination showed 7 degrees of esotropia. There was an abduction limitation of -2 in the left eye during eye movement examination. Color vision examination using the Ishihara Test was within normal limits. The light reflex of both eyes was diminished. Posterior segment examination showed bilateral optic nerve head swelling consistent with Frisen scale 4.

Results: Magnetic Resonance Imaging (MRI) showed a fourth ventricular mass measuring 4.8 cm, causing obstructive hydrocephalus. The patient was then referred to the neurosurgery department for consideration of surgical management.

Conclusions: Acute onset of sixth cranial nerve palsy in children should warrant rigorous evaluation to identify a life-threatening condition.

Abstract No.: 207403

Hidden Threat: Headache and Blurred Vision As Harbingers of Superior Sagittal Sinus Thrombosis

First Author: Sangeetha T

Co-Author(s): Prashanth V

Purpose: Cerebral venous thrombosis (CVT) is a rare potentially life-threatening condition characterized clot formation in the cerebral veins, leading to increased intracranial pressure, brain edema, and ischemia. This report unveils Superior Sagittal Sinus Thrombosis (SSST) presenting with papilledema as the first sign.

Methods: A 24-year-old male presented with throbbing headache and blurring of vision in the right eye for one month. The headache was intermittent, moderate to severe in intensity and associated with visual disturbances. Examination revealed visual acuity of 6/12 in the OD and 6/6 in OS with normal anterior segment, bilateral papilledema with no focal neurological deficit. CT brain showed filling defect in superior sagittal sinus. MRV revealed loss of normal flow void signal in the anterior portion of the superior sagittal venous sinus.

Results: Considering the above findings the possibility of CVT with bilateral Papilledema was established and managed with IV Mannitol (150 mL every 6 hours for 5 days), Heparin (5000 IU subcutaneously) for 3 days, followed by oral Acitrom anticoagulation therapy (3 mg, tapered to 1 mg), Optineuron and Homin (Mecobalamin, Pyridoxine, Folic acid) with close monitoring of renal function, serum electrolytes and bleeding manifestation during the course of the treatment. Follow-up assessments showed stabilization of the symptoms and gradual resolution of papilledema.

Conclusions: Superior sagittal sinus thrombosis, although rare, should be considered in the differential diagnoses of headache with visual disturbances, particularly in young individuals. Magnetic resonance venography aids in patients with suspected papilledema to help rule out the presence of cerebral venous sinus thrombosis.

Abstract No.: 203503

Managing Bilateral Septic Cavernous Sinus Thrombosis in a Resource-Limited Remote Island: Experience From Natuna, Indonesia

First Author: Nizma PERMAISUARI

Co-Author(s): Ardyanto FLORENSIUS, Wan Rita MARDHIYA

Purpose: Septic cavernous sinus thrombosis (CST) is a rare but life-threatening condition associated with high morbidity and mortality if not treated promptly. We report a case of bilateral septic CST successfully managed in a resource-limited setting on Natuna, Indonesia's northernmost island.

Methods: A previously healthy 13-year-old boy presented with progressive bilateral orbital swelling following a nasal furuncle. He developed persistent fever, decreased appetite, altered mental status, and marked periorbital oedema. On admission, he was febrile, tachycardic, and tachypneic. Laboratory evaluation revealed leucocytosis, elevated C-reactive protein, and hyponatremia; blood culture was unavailable. Contrast-enhanced orbital CT demonstrated bilateral pre-septal and orbital soft tissue enhancement with pansinusitis. Bilateral cavernous sinus filling defects and dilated ophthalmic veins confirmed septic CST.

Results: The patient was managed with broad-spectrum intravenous antibiotics available locally, systemic corticosteroids, supportive sepsis care including sodium correction, and anticoagulation with intravenous unfractionated heparin under close laboratory monitoring. By day 4 of treatment, his level of consciousness improved markedly with a reduction in orbital inflammation and inflammatory markers. Ophthalmic evaluation revealed incomplete ptosis and restricted extraocular motility in the left eye. Continued monitoring showed no further neurological deficits.

Conclusions: Septic CST remains a rare but devastating condition. Early recognition, timely imaging, and aggressive medical management with broad-spectrum antibiotics and anticoagulation are essential to reduce morbidity and mortality. This case illustrates that, despite the absence of advanced resources, favourable outcomes can be achieved through clinical vigilance, judicious adaptation of available therapy, and multidisciplinary collaboration in remote island healthcare systems.

Abstract No.: 200398

Misery of the Fixed Pupil: A Case Report on Cavernous Sinus Syndrome

First Author: Kashish MODI

Co-Author(s): Parul GUPTA, Amit MEHTANI

Purpose: To find the cause of cavernous sinus syndrome.

Methods: The patient was thoroughly examined, a detailed history was taken, and ocular examination was performed. The patient was also subjected to various blood workups and imaging studies.

Results: The long-standing total ophthalmoplegia cause was found to be a cavernous sinus meningioma.

Conclusions: Cavernous sinus meningioma: Pathology and epidemiology are explained with various management options.

Abstract No.: 203460

Missed Trochlear Nerve Palsy Following Mild Traumatic Brain Injury With Delayed Cerebral Venous Thrombosis: Diagnostic and Therapeutic Challenges

First Author: Shahidatul Adha MOHAMAD

Co-Author(s): Wan Hazabbah WAN HITAM

Purpose: To report a case of post-traumatic trochlear nerve palsy, later complicated by cerebral venous thrombosis (CVT).

Methods: Case report.

Results: A 46-year-old male, a chronic intravenous drug user and smoker, presented with three months of binocular diplopia, worse at near. He sustained a mild traumatic brain injury (TBI) in a motor vehicle accident three months prior and subsequently developed binocular diplopia. However, initial CT brain imaging was unremarkable, and no ophthalmology referral was made at the time. Two days prior to presentation, patient developed generalized headache and projectile vomiting, prompting further neuro-ophthalmic and radiological evaluation. Examination revealed left hypertropia, positive Bielschowsky head tilt test, and Hess charting consistent with left superior oblique palsy. Vision was otherwise not affected, 6/6 in both eyes. The initial fundus exam was unremarkable. Neuroimaging revealed CVT involving the superior sagittal, right transverse, and right sigmoid sinuses. The patient developed a seizure during admission and was treated with enoxaparin, transitioned to apixaban, and empirically covered for cerebral infection. Diplopia was managed conservatively with left eye occlusion. At the two-week follow-up, papilledema was noted, though the patient remained well. The patient declined a lumbar puncture. Infective, coagulation, and connective tissue disease screenings were negative. He opted for discharge against medical advice, declining further investigation or intervention, but agreed to continue oral apixaban.

Conclusions: Early ophthalmic evaluation is vital in trauma-related diplopia, as subtle signs may precede neurological decline. Delayed CVT and papilledema reflect evolving raised ICP, warranting multidisciplinary vigilance.

Abstract No.: 200849**Multimodal Correlation Between MRI-Defined Chiasmal Compression, Optical Coherence Tomography Metrics, and Visual Field Defects in Compressive Optic Neuropathy: A Single-Center Study***First Author: Pei-jane BAIR**Co-Author(s): Ya-feng CHENG*

Purpose: To evaluate the relationship between anatomical compression of the optic chiasm on MRI and structural changes on OCT, and how these correlate with visual field (VF) loss in compressive optic neuropathy (CON).

Methods: In this retrospective, single-center study at Show Chwan Memorial Hospital, 53 patients (mean age: 42.4 ± 16.2 years; 54.7% female) with MRI-confirmed CON between 2014 and 2024 were included. All underwent Humphrey VF testing (24-2 or 30-2) and OCT imaging with peripapillary RNFL, GCL-IPL, and optic disc measurements. MRI variables included tumor volume, vertical chiasmal displacement, and lesion-to-chiasm distance. Correlation and multivariate analyses assessed relationships between MRI-defined compression, OCT parameters, and VF indices.

Results: Chiasmal displacement on MRI correlated with VF mean deviation ($r = -0.52$, $p < 0.01$) and pRNFL thickness ($r = -0.47$, $p < 0.01$). Eyes with severe VF loss ($MD < -10$ dB) showed greater GCL-IPL thinning ($p < 0.05$). Multivariate analysis identified GCL-IPL thickness and chiasmal displacement as independent predictors of VF loss (adjusted $R^2 = 0.62$). Optic disc rim area correlated with visual field index ($r = 0.41$, $p = 0.03$).

Conclusions: Chiasmal compression on MRI significantly correlates with OCT structural changes and VF loss. GCL-IPL and RNFL are reliable indicators of visual dysfunction in CON. Multimodal imaging enhances diagnosis and management planning.

Abstract No.: 201783**Müller Glia-Mediated Protection of Retinal Ganglion Cells From Ethambutol-Induced Neurotoxicity***First Author: Hui-chen CHENG**Co-Author(s): Shih-wei CHEN, Hsien-chia JUAN, Roxanne Hsiang-chi LIOU, An-guor WANG, Yu-hui WONG, Yong-lin YANG, Jenn-yah YU*

Purpose: Ethambutol(EMB)-associated optic neuropathy is the most common toxic optic neuropathy. This study aimed to investigate the neuroprotective roles of Müller glia and their associated growth factors in supporting retinal ganglion cells (RGCs) under EMB-induced toxicity.

Methods: Induced RGC-like cells (iRGCs), differentiated from human induced pluripotent stem cells, and Müller glial cell line MIO-M1 were used as cellular models. A

transwell co-culture system was used to evaluate the effect of MIO-M1 cells on iRGC survival. Candidate trophic factors from MIO-M1 cells were measured by quantitative RT-PCR. Brain-derived neurotrophic factor(BDNF) was identified as the major factor contributing to the neuroprotective effect from Müller glia. Downstream signals of the BDNF pathway were investigated by Western blot.

Results: Co-culture with MIO-M1 cells markedly enhanced the survival of iRGCs during EMB exposure. mRNA of BDNF and nerve growth factor (NGF) were elevated in MIO-M1 cells, while only BDNF improved the survival and morphological integrity of iRGCs under EMB treatment. The pro-survival effect of BDNF was suppressed by a pan-TRK inhibitor. Among the three downstream effectors of BDNF signaling, AKT was most prominently activated by BDNF in EMB-treated iRGCs, compared to ERK and PLC γ 1. Furthermore, the protective effect of BDNF was blocked by the AKT inhibitor but not by the ERK inhibitor.

Conclusions: Müller glia confer neuroprotection to RGCs under EMB-induced stress, primarily via BDNF signaling. AKT functions as the key downstream effector mediating this protective response.

Abstract No.: 206731**Neurofibromatosis Type 1 (NF1)***First Author: Shagun KORLA**Co-Author(s): Aditi BANSAL*

Purpose: Neurofibromatosis type 1 (NF1) is a genetic disorder that affects the nervous system, causing tumors to grow on nerve tissue throughout the body. These tumors, called neurofibromas, can develop anywhere in the body, including the skin, nerves, and other organs. Its manifestations range from mild skin changes to more serious complications involving vision, hearing, and mobility.

Methods: I present case of sixteen year old with lisch nodules in iris, café-au-lait spots, freckling in the armpits and benign growths called plexiform neurofibromas. MRI Brain showed right sphenoid wing dysplasia with herniating middle cranial fossa contents into orbit causing abxial proptosis.

Results: While NF1 is usually diagnosed during childhood, symptoms can appear at any age and may worsen over time.

Conclusions: Although there is currently no cure for NF1, treatment focuses on managing symptoms and complications to improve quality of life for individuals with the condition.

Abstract No.: 207423

Neuromyelitis Optica Spectrum Disorder and Optic Neuritis: A Report of 3 Cases

First Author: Shubham SETHY

Purpose: To know the neuromyelitis optica spectrum disorder, its complications in ophthalmology, and treatment.

Methods: Three cases were referred to our department from the neurology department for decreased vision. We examined the patient, did the necessary investigation, and followed up with the patient in our department.

Results: In the first case, the patient presented with a sudden painless decrease in vision in the right eye, followed by generalized neurological symptoms, followed by a decrease in vision in the left eye. Vision improved in both eyes following treatment with IV methylprednisolone. In 2nd case, the patient presented initially with generalized neurological symptoms followed by gross diminution of vision. Neurological symptoms disappeared following treatment with IV methylprednisolone, but vision could not be regained. In 3rd case, the patient presented with gross diminution of vision and neurological symptoms, which did not improve with treatment due to late presentation.

Conclusions: NMOSD (anti MOG Ab positive), also known as Devic's disease, is a rare neurodegenerative disorder, but optic neuritis is the main characteristic feature. Early diagnosis and treatment are essential to preserve vision.

Abstract No.: 202544

Neurosyphilis Diagnosed on the Basis of Pupillary Abnormalities

First Author: Seira HAYASHI

Co-Author(s): Kie IIDA, Kazusa KUWANO, Tadashi NAKANO, Sei TACHIBANA, Akira WATANABE

Purpose: Neurosyphilis occurs when *Treponema pallidum* invades the central nervous system and can develop at any stage of syphilis. Early diagnosis and treatment are essential because advanced disease can result in locomotor ataxia and progressive paralysis. Here, we report a case of neurosyphilis identified based on pupillary abnormalities.

Methods: Case report

Results: A 23-year-old man was referred for accommodative disturbance in the right eye after bilateral pupillary dilation was detected during an eye examination for a contact lens prescription at another clinic. Brain MRI revealed no abnormalities; however, ocular deviation and motility disturbances developed concurrently. On presentation, visual acuity was 1.0 in the right eye and 1.5 in the left eye. Pupil diameters measured 8.0 mm (right) and 6.9 mm (left), with

weak direct, consensual, and near light reflexes. Right eyelid ptosis was present, with levator function of 8 mm in the right eye and 10 mm in the left eye. The right eye showed limitations in upward, downward, and medial gaze, along with external strabismus. Blood test results were positive for the *Treponema pallidum* antibody and rapid plasma reagin. Contrast-enhanced MRI revealed swelling and enhancement of the right oculomotor nerve. Both pupils exhibited mild constriction after instillation of 0.1% pilocarpine. The patient was treated with high-dose intravenous penicillin G and three courses of steroid pulse therapy, resulting in improvement of pupillary function, ocular alignment, and motility.

Conclusions: With the rising incidence of syphilis in Japan, neurosyphilis should be considered in the differential diagnosis of unexplained pupillary changes.

Abstract No.: 200585

Neurosyphilis: A Case Report

First Author: Leigh Ann ACEDILLO

Co-Author(s): Miriam Louella FERMIN

Purpose: This case report aims to present a 37-year-old male who came in due to photopsia of right eye associated with blurring of vision and nyctalopia

Methods: This is a case report

Results: Patient presented with a visual acuity of HM OD that did not improve with pinhole and 20/20 OS. Disc photo and fluorescein angiography on initial consult on the right eye revealed a hyperemic edematous disc and delay in arm-to-retina transit time. Mid to late phase leakage was also noted on disc margins. Laboratory workup revealed unspecific findings and a reactive serologic test for syphilis, VDRL (Venereal Disease Research laboratory) test, confirming the diagnosis of neurosyphilis. The patient was referred to an Infectious disease specialist for co-management and evaluation. Patient was treated with Methylprednisolone tablets and Aqueous penicillin G 4 million units thru intravenous for 14 days, resulting in significant visual improvement after completion of treatment.

Conclusions: Neurosyphilis is an emerging disease of concern. Syphilis is a progressive disease. This case underscores the crucial importance of early detection, timely treatment, and appropriate referrals in improving disease prognosis and preventing serious complications that may lead to sight or life-threatening consequence.

Abstract No.: 200344**Not Every High Intraocular Pressure is Glaucoma: Unmasking Atypical Idiopathic Intracranial Hypertension***First Author: Ambreen GULL*

Purpose: To highlight the importance of considering Idiopathic Intracranial Hypertension (IIH) in patients presenting with elevated intraocular pressure (IOP), especially in the absence of classic symptoms such as papilledema, and to differentiate such cases from glaucoma.

Methods: We present a case series of four patients diagnosed with IIH, each exhibiting elevated IOP but varying optic nerve head findings. Clinical presentation, fundoscopic examination, neuroimaging, lumbar puncture results, and response to treatment were analyzed.

Results: Case 1 exhibited classic symptoms, including headache and bilateral asymmetric disc edema. Case 2 and Case 3 presented with intermittent blurry vision without headaches or papilledema; one had mild blurring of disc margins, and the other had a hyperemic disc. Case 4 had only headaches and displayed spontaneous venous pulsation without papilledema. All four patients had elevated cerebrospinal fluid (CSF) opening pressure on lumbar puncture and an empty Sella on MRI brain without evidence of a space-occupying lesion. Treatment involved a combination of weight reduction, acetazolamide, oral steroids, and therapeutic CSF drainage, which led to the resolution of disc edema and normalization of IOP in all cases.

Conclusions: IIH should be considered in the differential diagnosis of unexplained elevated IOP, even in the absence of typical symptoms or papilledema. Asymmetric or absent optic disc swelling does not exclude the diagnosis. A high index of suspicion, thorough fundoscopic evaluation, and appropriate neuroimaging are essential for early identification and management to prevent permanent visual impairment.

Abstract No.: 201682**Not Just Optic Neuritis: The First Clue to Paediatric Multiple Sclerosis in a Young Boy***First Author: Kah Suen LENG**Co-Author(s): Chang Feng CHEW, Kogilavaani A/p J Raman @ Jayaraman, Mae-lynn catherine bastion*

Purpose: To report a case of post-infection optic neuritis in children may represent the first manifestation of multiple sclerosis (MS), particularly when supported by Magnetic resonance imaging (MRI) and cerebrospinal fluid (CSF) findings.

Methods: Case report.

Results: A 13-year-old previously healthy boy presented with acute painless left eye visual loss for one week associated with central scotoma following an acute

upper respiratory tract infection a month earlier. Visual acuity was hand movement in the left eye (LE) and 6/9 in the right eye (RE), with a relative afferent pupillary defect in LE. Fundus examination revealed Frisen grade 2 optic disc swelling in LE, while RE was normal. Contrast-enhanced computed tomography of the brain and orbit showed features of left optic neuritis. MRI demonstrated four hyperintense T2 lesions involving the whole length of left optic nerve (ON) until pre-chiasmatic left ON, juxta-cortical white matter, left periventricular region, and right cerebellum. CSF analysis was positive for oligoclonal bands, while aquaporin-4 and anti-myelin oligodendrocyte glycoprotein antibodies were negative. He was treated with intravenous methylprednisolone for five days, followed by an oral prednisolone taper. At one month, vision improved to 6/9 bilaterally, with further follow-up imaging planned.

Conclusions: This case illustrates post-infection optic neuritis as the initial manifestation of pediatric-onset MS in a male adolescent. Awareness is important to facilitate early diagnosis and timely treatment to optimize visual and neurological outcomes.

Abstract No.: 205920**Not Just in the Lungs: A Case Series on the Many Faces of Neurosarcoidosis***First Author: Shu Sim CHONG**Co-Author(s): Li Yen CHAN, Norlina MOHD RAMLI, Shelina OLI MOHAMED, Lakana Kumar THAVARATNAM, Shanathi VISWANATHAN*

Purpose: Neurosarcoidosis is a rare and diagnostically challenging manifestation of sarcoidosis, often presenting with varied neurological and ocular signs. Due to its protean manifestations and the need for histological confirmation, diagnosis is often delayed. We present a case series of five patients with probable or confirmed neurosarcoidosis, highlighting the diagnostic pathways, ocular findings, and treatment responses.

Methods: This is a retrospective descriptive case series of five patients diagnosed with probable or confirmed neurosarcoidosis managed at a tertiary centre between 2016 and 2025. Clinical features, neuroimaging, histological results, and treatment outcomes were reviewed. Diagnosis was based on International Workshop on Ocular Sarcoidosis (IWOS) criteria and expert multidisciplinary consensus.

Results: The cohort included four females and one male. Ocular involvement was present in four cases: two presented with optic neuritis, one with granulomatous uveitis, optic neuritis and dacryoadenitis and another with ophthalmoplegia. One patient presented with isolated cranial neuropathy. Histological confirmation was achieved in three cases via lymph node biopsies demonstrating non-necrotizing granulomatous inflammation. All patients underwent

neuroimaging, with findings suggestive of perineuritis, optic nerve enhancement, or leptomeningeal nodules. Immunosuppressive therapy, including corticosteroids, mycophenolate mofetil, azathioprine, and rituximab, was effective in controlling disease activity. Visual outcomes varied from full recovery to persistent field defects.

Conclusions: Neurosarcoidosis presents with diverse neurological and ocular manifestations, often mimicking other inflammatory or infectious conditions. Early recognition of ocular features and prompt neuroimaging may facilitate diagnosis. Histological confirmation remains crucial where possible, though multidisciplinary clinical-radiological correlation can support probable diagnosis. Long-term immunosuppression is frequently required to achieve disease control and preserve vision.

Abstract No.: 205761

Ocular Tuberculosis- a 49-Year-Old Patient Presenting With Atypical Optic Neuritis: A Case Report

First Author: Kenneth GONZALES
Co-Author(s): Jamie Lynne NARCISO

Purpose: To report a rare case of ocular tuberculosis with atypical neuritis and the challenges associated with its diagnosis and treatment.

Methods: Case report and review of related literature.

Results: This is a case of a 49-year-old female with a history of blurring of vision described as loss of vision (inferiorly) in the left eye. Upon consultation, the patient had a visual acuity of 20/80 on the right eye and 20/100 on the left eye. Initial examination revealed a grade 2 relative afferent pupillary defect on the left eye, with a visual confrontation test described as an inability to identify fingers in the inferior quadrant of the left eye. Fundus exam showed disc edema in both eyes. No treatment regimen was initiated at first. Several laboratory tests and diagnostic imaging were requested. On follow-up, a decline in the visual acuity of her left eye was observed. Infectious work-up showed ANA, and TB Quantiferon tests were both positive. The patient was referred to the Pulmonary and Infectious Disease Services. On subsequent follow-up, the patient was already on anti-tuberculosis medications and oral steroids with noted improvement in visual acuity.

Conclusions: Atypical Optic Neuritis caused by Ocular Tuberculosis is a rare infectious etiology. Diagnosis and management of this disease are challenging due to its unpredictability in its manifestation, especially since the patient did not present with pulmonary manifestations of Tuberculosis. Since Tuberculosis is endemic in the country, a timely diagnosis and treatment would be beneficial to the patient.

Abstract No.: 201231

Oculopharyngeal Muscular Dystrophy Mimicking Seronegative Myasthenia Gravis: A Case Report

First Author: Suntaree THITIWICHIENTERT
Co-Author(s): Puchit SUKPHULLOPRAT

Purpose: To report a rare case of Oculopharyngeal muscular dystrophy (OPMD) presenting as fluctuating ptosis that mimicked myasthenia gravis (MG) and highlight the diagnostic challenges.

Methods: We present a 69-year-old female complaining of fluctuating bilateral ptosis for one year. The patient does not exhibit diplopia, limb weakness, dysphagia, or dysarthria. Examinations revealed bilateral ptosis with no involvement of the cranial nerves. Enhance ptosis, ice pack test, and fatigability tests were positive. Serum anti-acetylcholine receptor antibodies were negative, and repetitive nerve stimulation (RNS) was normal. We postponed the single-fiber electromyogram (SFEMG) because the patient responded well to oral pyridostigmine. Two years later, the ptosis gradually worsened, so we titrated pyridostigmine and started low-dose prednisolone. After increasing the prednisolone dose to 20 mg per day, there was no clinical improvement, so RNS and SFEMG were performed, and the results were found to be normal. Additional family history found that her father had ptosis in his old age, but had passed away.

Results: Genetic analysis showed a heterozygous mutation of the PABPN1 gene, which confirmed a diagnosis of OPMD. We stopped treatment and provided genetic counseling. One year later, the patient started dysphagia. A rehabilitation consultant was brought in to help with swallowing exercises.

Conclusions: Thus, if a patient with a diagnosis of MG experiences a progressive worsening of symptoms while other tests remain normal, it may be necessary to consider OPMD as a differential diagnosis and proceed with a genetic study for confirmation.

Abstract No.: 205598

Oculopharyngeal Muscular Dystrophy-A Disease So Inimical, yet Underdiagnosed

First Author: Srinidhi N
Co-Author(s): Shreya BHADANI, Manisha CHOUDHARY, Matuli DAS, Shrutakirti PARIDA, Aanchal SINGHAL

Purpose: To report a rare case of oculopharyngeal muscular dystrophy.

Methods: A 45-year-old male presented to the eye OPD with progressive bilateral ptosis for 5 years and restricted ocular movements for 3 years. He also reported painful and difficult deglutition, nasal intonation of voice, and generalized weakness with a similar history in 2 siblings and the father. On examination, BCVA: RE - 6/12p, N6; LE - 6/12, N6.

Eyelids showed severe ptosis, pupils were equal and brisk with no RAPD, EOM were restricted in all gazes, and Bell's phenomenon was poor.

Results: Clinical tests, including Ice pack, Fatigue, and Cogan's lid twitch, were negative, reducing the likelihood of myasthenia gravis. Pedigree analysis revealed autosomal dominant inheritance with the father and three children affected. Genetic testing confirmed a pathogenic PABPN1 mutation, establishing the diagnosis of oculo-pharyngeal muscular dystrophy (OPMD).

Conclusions: OPMD, confirmed by genetic testing, remains incurable, with management focused on symptomatic relief of ptosis and dysphagia. Frequently misdiagnosed as myasthenia gravis, it requires high clinical suspicion. Surgical interventions carry 5–15 year recurrence risk and early referral for dysphagia is essential to prevent serious complications

Abstract No.: 206692

Optic Disc Edema as a Multisystemic Warning Sign: Clinical Insights From Mongolia

First Author: Anarsaikhan **NARMANDAKH**

Co-Author(s): Altanzul **TUMURPUREV**

Purpose: This first Mongolian cohort study defines the etiologies, clinical features, and systemic associations of ODE, assessing diagnostic reclassification as a multispecialty challenge.

Methods: We conducted a 5-year retrospective–prospective cohort study with reassessment to evaluate demographics, comorbidities, ocular findings, visual outcomes, and diagnostic reclassification.

Results: Seventy patients (90 eyes) with optic disc edema were analyzed. Demyelinating optic neuritis (36.4%) predominated in younger females, ischemic cases (44.4%) in older patients, and infectious causes (26.9%, syphilis) in males. Inflammatory etiologies were mostly uveitic. Baseline vision was poor, with 20% presenting with profound impairment (Visual acuity (VA) ≤ 20/400). Severe loss (6/120) was most frequent in demyelinating cases (72.2%). Visual recovery was greatest in demyelinating and inflammatory cases, minimal in ischemic cases, with initial BCVA the strongest prognostic factor ($p < 0.05$).

Conclusions: We conclude that optic disc edema shows a diverse age-related etiologic spectrum, with demyelinating and ischemic causes predominating, with differing prognoses and a high burden of infectious (mainly syphilis) and uveitic cases. Initial visual acuity was the key prognostic factor, emphasizing systemic screening and multidisciplinary care.

Abstract No.: 207140

Orbital Apex Syndrome With Meningitis: A Rare and Serious Complication of Herpes Zoster Ophthalmicus

First Author: Phang **YU HUI**

Co-Author(s): Koh **KOON LING**, Melissa **WANG PEI YIN**

Purpose: To report a rare complication of herpes zoster ophthalmicus presenting with orbital apex syndrome (OAS) and meningitis.

Methods: Case report.

Results: A 64-year-old man with diabetes mellitus, hypertension, and ischemic heart disease presented with a one-week history of left ocular pain and reduced vision. Examination revealed vesicular rashes along the ophthalmic division of the trigeminal nerve, proptosis, complete ptosis, anisocoria, ophthalmoplegia, and anterior uveitis. Visual acuity in the left eye was limited to hand movements. Neurological assessment demonstrated lethargy and limb weakness. He had previously received oral corticosteroids for herpes zoster infection without clinical improvement. Cerebrospinal fluid (CSF) analysis showed elevated protein and reduced glucose, while neuroimaging revealed orbital myositis, optic neuritis, and preseptal cellulitis. The patient was treated with intravenous acyclovir and ceftriaxone for two weeks. His meningitic symptoms and ocular inflammation improved; however, vision remained poor, and ophthalmoplegia persisted.

Conclusions: We describe a rare case of herpes zoster ophthalmicus complicated by orbital apex syndrome and secondary meningitis. Despite combined antiviral and corticosteroid therapy, the visual outcome was poor, underscoring the importance of early recognition and prompt, aggressive treatment in such cases.

Abstract No.: 205545

Orbital Myopericytoma Presenting As Optic Atrophy Secondary to Unilateral Compressive Optic Neuropathy: A Case Report

First Author: Huey **JAVIER**

Co-Author(s): Clarissa **TADY**

Purpose: This case report presents a rare case of orbital myopericytoma, a benign vascular tumor typically found in the extremities, presenting as optic atrophy secondary to compressive optic neuropathy.

Methods: A 46-year-old female with a history of 2 years of painless, gradual blurring of vision of the right eye underwent a comprehensive ophthalmologic evaluation, including optical coherence tomography (OCT) of the optic nerve, visual field test (VFT), magnetic resonance imaging (MRI), and surgical treatment. A transnasal endoscopic surgery approach was performed to excise the mass. The diagnosis was established

through histopathologic and immunohistochemical evaluation.

Results: OCT of the right optic nerve revealed marked thinning in all quadrants. MRI revealed a 1.6cm x 1.1cm x 1.5cm enhancing mass lesion in the medial extraconal space compressing the intraorbital segment of the optic nerve. Immunohistochemistry showed positive cells of interest for smooth muscle actin and caldesmon and was negative for other markers (S100 and CD34), confirming the diagnosis of myopericytoma. Postoperatively, the patient's visual acuity improved, which was confirmed by visual acuity testing and VFT.

Conclusions: Orbital myopericytoma is extremely rare with only four cases published to date and should be considered in the differential diagnosis of orbital masses. Complete resection of the mass remains the treatment of choice with a favorable response producing an improvement in the blurring of vision. This is the first case in literature wherein total resection was achieved using transnasal endoscopic approach making this a less invasive alternative to traditional orbitotomy if the tumor's size and location are suitable.

Abstract No.: 202824

Photothermal Modulation of the Regenerative Microenvironment for Reversing Optic Nerve Injury

First Author: Kexin **TAN**

Co-Author(s): Xianqun **FAN**, Jipeng **LI**, Huifang **ZHOU**

Purpose: Optic nerve injury (ONI) is a leading cause of irreversible vision loss worldwide, and currently, no effective clinical treatments exist. Here, we pioneer a novel mild thermal stimulation therapy based on polydopamine nanoparticles (PDA NPs) for ONI reversal.

Methods: PDA NPs were synthesized via oxidative self-polymerization, and their photothermal conversion performance under near-infrared (NIR) laser irradiation was characterized. An optic nerve crush (ONC) rat model was established, followed by intravitreal injection of PDA NPs and NIR irradiation to achieve localized mild photothermal therapy (PTT). Therapeutic effects on optic nerve repair were evaluated at early, middle, and late stages. Furthermore, retinal transcriptomics, along with in vitro and in vivo validation, was conducted to explore underlying mechanisms.

Results: Under NIR irradiation, PDA NPs efficiently converted light energy into heat, maintaining a local temperature favorable for nerve repair ($41.5 \pm 1.1^\circ\text{C}$). PDA NP-mediated PTT significantly enhanced retinal ganglion cells (RGCs) survival, promoted axonal and myelin regeneration, reconstructed neural network architecture, and improved visual function in ONC rats. Mechanistically, PTT reduced excessive reactive oxygen species in RGCs during the acute injury phase and

facilitated a shift of microglia from a hyperactivated state to a repair-adaptive phenotype, thereby mitigating inflammatory responses. During the middle-to-late injury stages, localized warming induced by NIR irradiation modulated astrocyte activity, suppressed aberrant extracellular matrix deposition under fibrotic conditions, and reduced neuroglial scar formation, fostering a pro-regenerative microenvironment.

Conclusions: PDA NP-mediated mild thermal stimulation system reverses ONI-induced neural damage, highlighting a new strategy for optic nerve repair and regeneration.

Abstract No.: 207171

Pre-Operative Magnetic Resonance Imaging Measurements in Sellar Lesions With Chiasmal Compression: Prediction of Visual Outcomes After Transsphenoidal Surgery

First Author: Lai Yu Tony **NG**

Co-Author(s): Yip Mang O, Hei Tung **SHEK**

Purpose: To review the post-operative visual outcomes of sellar lesions with compressive optic neuropathy, and to identify predictors of post-operative visual recovery.

Methods: Patients with sellar lesions causing compressive optic neuropathy that underwent transsphenoidal excision in Queen Mary Hospital from March 2010 to March 2025 were reviewed retrospectively. Patients with other significant ophthalmological conditions and prior radiation/operations to the sellar region were excluded. Uni- and multivariate analyses were performed to determine predictors of improvement in visual outcomes.

Results: Eighty-six patients with pre- & post-op ophthalmological assessment and pre-operative magnetic resonance imaging (MRI) available were identified. Pre-operative visual assessment results, including visual acuity, visual field, colour perception, and evidence of optic atrophy, were documented. Pre-operative MRI measurements, including chiasmal thickness, chiasmal width, chiasmal deformed angle, and suprasellar extension, were taken. Mean surgery waiting time, extent of excision, pathology, and post-operative complications were reviewed. Follow-up visual assessment results (at post-operative six months or latest follow-up, whichever is later) were compared with pre-operative results. Uni- and multivariate analyses were carried out to identify predictors of visual improvement.

Conclusions: Transsphenoidal excision is a safe and effective surgical approach for chiasmal decompression in sizable sellar lesions. Pre-operative MRI measurements may offer early predictive values for post-decompression visual recovery.

Abstract No.: 201979**Preserving Sight, Protecting Life: Idiopathic Intracranial Hypertension in Pregnancy***First Author: Fadhilah ZAINOL ARIFFIN**Co-Author(s): Dian Nadia ABU TALIB, Jemaima CHE HAMZAH, Nurul Ain MASNON*

Purpose: To highlight the clinical dilemma and multidisciplinary approach in managing Idiopathic Intracranial Hypertension (IIH) during pregnancy.

Methods: A case report.

Results: A 25-year-old primigravida with maternal overweight presented with headache associated with vomiting and binocular double vision at 19 weeks of gestation. Examination showed bilateral visual acuity of 6/6, negative relative afferent pupillary defect, and normal optic nerve function tests (ONFT). Anterior segment examination was unremarkable with an intraocular pressure of 10mmHG. Extraocular muscle movement showed limited abduction in both eyes, while funduscopic examination revealed bilateral Frisen grade 3 papilledema with peripapillary hemorrhage. Optical coherence tomography (OCT) showed swollen retina nerve fibre layer. Magnetic resonance imaging and venography displayed no space-occupying lesion or presence of venous sinus thrombosis. Lumbar puncture revealed high CSF opening pressure (OP) of 50cmH2O. As a serial detailed scan showed a normal growing fetus, the patient was started on oral acetazolamide, after explanation regarding the risks and benefits of the treatment. Serial lumbar punctures were done to alleviate her symptoms, which showed a decreasing trend of OP. Her headaches gradually improved and diplopia resolved. Papilledema improved to Friesen grade 1 with intact visual acuity and ONFT. The patient safely delivered a healthy baby at 38 weeks of gestation. Acetazolamide was discontinued after delivery, and the patient remained asymptomatic.

Conclusions: IIH in pregnancy management is particularly complex as practitioners face the dual challenge of safeguarding maternal vision while minimizing risks to the fetus. Multidisciplinary care and individualized treatment strategies are essential in achieving optimal outcomes for both mother and child.

Abstract No.: 202091**Pseudo-Foster Kennedy Syndrome Secondary to Sequential Non-Arteritic Anterior Ischemic Optic Neuropathy: A Case Report***First Author: Fariah OSMAN**Co-Author(s): Md Iftekher IQBAL*

Purpose: To report a rare presentation of Pseudo-Foster Kennedy Syndrome (PFKS) in a middle-aged diabetic male, following sequential non-arteritic anterior ischemic optic neuropathy (NA-AION) in both eyes.

Methods: A 52-year-old male with uncontrolled diabetes presented with sudden, painless visual loss in the right eye for 15 days, with a prior history of similar vision loss in the left eye 10 months earlier. He had no systemic symptoms suggestive of giant cell arteritis or intracranial pathology. Comprehensive ocular examination, including funduscopy, revealed optic disc edema in the right eye and optic atrophy in the left eye. Visual field testing showed altitudinal defects. Blood pressure, ESR, and other systemic investigations were unremarkable. Neuroimaging excluded space-occupying lesions.

Results: The clinical picture, supported by imaging and visual field defects, confirmed the diagnosis of PFKS due to sequential NA-AION. The patient was started on oral vitamin supplementation (thiamine, pyridoxine, mecobalamin, folate) and referred for systemic management of diabetes and dyslipidemia. He was counseled regarding modifiable risk factors, visual rehabilitation, and the importance of long-term follow-up.

Conclusions: Pseudo-Foster Kennedy Syndrome can mimic the true Foster Kennedy Syndrome but occurs without an intracranial mass. High suspicion and exclusion of compressive etiologies are crucial. This case highlights the importance of identifying systemic vascular risk factors and initiating early intervention to preserve residual vision and prevent bilateral severe vision loss.

Abstract No.: 203041**Pulse Corticosteroid Therapy in Traumatic Optic Neuropathy: Visual Outcome Analysis in a Case Series***First Author: Widya ASA'AD**Co-Author(s): Yunita MANSYUR, Batari UMAR*

Purpose: Traumatic optic neuropathy (TON) is a vision-threatening condition caused by optic nerve trauma resulting from blunt injury, penetrating trauma, or optic canal fractures. Treatment options include observation, corticosteroids, erythropoietin therapy, and surgical decompression. However, corticosteroid effectiveness remains controversial.

Methods: This case report presents three patients with indirect TON following head and facial trauma who received high-dose corticosteroid therapy for three days. The first patient experienced retrobulbar hemorrhage and was treated with canthotomy cantholysis. The second and third patients sustained head and facial fractures, however corrective fracture surgery was performed only in the third patient. All three patients showed significant visual acuity improvement.

Results: All patients demonstrated significant visual acuity improvement regardless of corticosteroid administration timing. Corticosteroids reduce

inflammation and edema within the optic canal while providing neuroprotective effects by inhibiting free radical-induced lipid peroxidation. The absence of lateral orbital wall fractures in the second and third patients may have contributed to better outcomes, consistent with studies showing lateral wall fractures are associated with poorer prognosis due to high-velocity force transmission to the optic nerve.

Conclusions: Although TON therapy remains controversial, this case report demonstrates corticosteroid effectiveness in improving visual outcomes. Further research is needed to provide more definitive results.

Abstract No.: 205623

Realigning Hope: A Case Series of Successful Strabismus Surgery in Complex Paediatric Third Cranial Nerve Palsy

First Author: Gebriellea DASS COWIE JOHN
Co-Author(s): Mohamad Israk B ISA, Nor Fadhilah BINTI MOHAMAD, Fhun LAI CHAN

Purpose: Surgical correction for complete 3rd cranial nerve (CN) palsy is always challenging. We present our experience performing complex strabismus surgery using Gokyigit's technique augmented with medial rectus (MR) resection.

Methods: Case series.

Results: Case 1: A 4-year-old girl presented with complete left eye (LE) congenital third CN palsy. LE exhibited marked exotropia of 45 degrees (Hirschberg test). LE Visual Acuity (VA) was 5/60 and Right Eye (RE) 6/7.5. Case 2: A 13-year-old boy with underlying Neurofibromatosis with Parasagittal Meningothelial Meningioma with extension to the Cavernous Sinus. He developed complete left third CN Palsy post debulking surgery. LE VA was 6/18 pH 6/12 and RE VA 6/12 pH 6/12. Pre-operative prism cover test (PCT) was 104 Prism Diopters (PD) Base In (BI). Gokyigit's technique: Transposition of Y Splitting Lateral Rectus (LR) into 15mm to MR insertion. The superior half of LR was sutured at superior border of the MR after passing underneath Superior Oblique and Superior Rectus. The inferior half of LR sutured at the inferior border of MR after passing underneath Inferior Oblique and Inferior Rectus. LE MR Resection of 6.5mm was added. Results: Satisfactory post-operative primary gaze alignment was achieved.

Conclusions: These cases highlight that acceptable aesthetic outcomes can be achieved using the augmented Gokyigit's modification technique.

Abstract No.: 202985

Restoring Daily Function: Successful Botulinum Toxin Treatment for Severe Blepharospasm – A Case Report

First Author: Lukisiari AGUSTINI
Co-Author(s): Ronik Harsono KAMAL, Georgina Tara KRISKASARI, Wahyu Afif MUFIDA, Novita Indah PERMATASARI

Purpose: Blepharospasm is a focal dystonia involving involuntary contractions of the orbicularis oculi muscles, often leading to functional blindness and severely impaired quality of life. Botulinum toxin injection is the gold-standard treatment, though early diagnosis and individualized management are essential for optimal outcomes.

Methods: A 58-year-old woman presented with a one-year history of bilateral eyelid spasms and disabling photophobia, described as difficulty reopening the eyes after blinking. There was no history of ocular trauma, systemic neurological disease, or familial dystonia. Examination revealed best-corrected visual acuity of 6/7.5 bilaterally, with evident eyelid twitching but no other significant findings. Investigations, including antibody testing, nerve studies, and brain MRI, ruled out myasthenia gravis and other secondary causes. MRI showed only age-related microvascular changes.

Results: The patient received bilateral botulinum toxin injections into the orbicularis oculi, along with vitamin B complex, folic acid, and lubricating eye drops. At follow-up, she showed complete resolution of spasms, improved visual acuity (6/6 bilaterally), and restoration of daily function, with no adverse effects.

Conclusions: This case highlights the effectiveness and safety of botulinum toxin for severe blepharospasm. Timely diagnosis and thorough exclusion of secondary causes are crucial. Early, tailored treatment can significantly improve visual function and quality of life.

Abstract No.: 201788

Retinal Microvasculature Changes Correlate With Tumor Characteristics of Sellar Tumor

First Author: Hui-chen CHENG
Co-Author(s): Yu-bai CHOU, Che-han HSU, De-kuang HWANG, Tai-chi LIN, Wen-jung LO, An-guor WANG, Ching-yun WANG, Wei-hsin WANG, Jin-han YANG, Yu-shu YEN

Purpose: Early sellar tumor detection is difficult. We investigated retinal microvasculature changes on optical coherence tomography-angiography (OCTA) in patients with primary sellar tumors, focusing on correlations with tumor characteristics.

Methods: This retrospective cross-sectional study enrolled 62 patients with sellar tumors and 32 healthy controls from November 2017 to July 2019. We recorded the participants' ophthalmological features,

including optical coherence tomography(OCT) and OCTA, endocrine levels, and sellar tumor characteristics. Findings were compared between patients and controls. Multivariable regression analysis evaluated associations between ophthalmological features and tumor characteristics. The area under the receiver operating characteristic curve(AUC) and Akaike information criterion(AIC) were used to evaluate the performance of OCTA-derived features to predict the presence of sellar tumor.

Results: In multivariable regression analysis, the presence of sellar tumors—both overall and with chiasmal contact—was significantly associated with reduced peripapillary vessel density (VD), macular superficial vascular complex (SVC) VD, and macular deep vascular complex (DVC) VD. Non-chiasmal contact sellar tumors were also significantly associated with decreased peripapillary VD and macular SVC VD compared with controls. Presenting visual acuity(VA) correlated with peripapillary retinal nerve fiber layer thickness, macular ganglion cell complex thickness, peripapillary VD, and macular SVC VD. Notably, peripapillary VD demonstrated excellent predictive performance for non-chiasmal contact sellar tumors (AUC = 0.996; AIC = 43.3).

Conclusions: Retinal microvasculature imaged by OCTA correlates with the presence of sellar tumor, tumor characteristics, and presenting VA. Peripapillary VD achieves excellent performance for predicting non-chiasmal contact sellar tumor, which may facilitate early tumor detection.

Abstract No.: 202798

Retinal Microvasculature Changes in Patients Receiving Stenting for Intracranial and Extracranial Arterial Stenosis

First Author: Wei-che **HUNG**

Co-Author(s): Hui-chen **CHENG**, Chia-an **HSU**, An-guor **WANG**

Purpose: The impact of arterial stenosis in the head and neck region on ocular blood flow and its reversibility after stenting remain underexplored. This study investigated retinal microvascular changes in patients with intracranial and extracranial arterial stenosis undergoing stenting.

Methods: This retrospective cross-sectional study included 65 patients with major arterial stenosis and 65 age-matched controls. Patients were divided into four groups according to stenosis location: Group 1 (common carotid artery + extracranial internal carotid artery), Group 2 (intracranial ICA), Group 3 (posterior circulation), and Group 4 (subclavian artery). Macular superficial vascular complex (SVC) vessel density (VD) was measured by optical coherence tomography angiography (OCTA) before and after stenting. Multivariable linear regression model adjusted for age and cardiovascular risk factors was applied to assess

the association between location of stent and the changes of macular SVC VD.

Results: Before stenting, Groups 1, 2, and 4 exhibited significantly reduced macular SVC VD compared with controls ($p < 0.05$), whereas Group 3 showed no difference. After stenting, macular SVC VD was comparable to controls in Group 2 and 3, but remained significantly lower in Group 1 and 4 ($p < 0.05$). All groups except Group 4 showed a trend toward increased macular SVC VD after stenting, compared to pre-stenting. Regression analysis identified intracranial ICA stenting as a significant predictor of improved macular SVC VD ($\beta = 4.36$, $p < 0.05$).

Conclusions: Intracranial and extracranial arterial stenosis adversely affects retinal microvasculature. Stenting of intracranial ICA stenosis significantly improves macular SVC VD, highlighting OCTA as a non-invasive tool for monitoring cerebrovascular interventions in neuro-ophthalmology.

Abstract No.: 203123

Retinal Structure and Microcirculation Alterations in Dysthyroid Optic Neuropathy: A Comprehensive OCTA Study

First Author: Kexin **TAN**

Co-Author(s): Xianqun **FAN**, Yan **LIU**, Huifang **ZHOU**

Purpose: This study aims to compare retinal structure and vessel density (VD) changes in dysthyroid optic neuropathy (DON), and to assess their correlation with visual function.

Methods: A total of 133 thyroid eye disease (TED) patients (63 with DON and 70 without DON) and 24 healthy controls were included. Optical coherence tomography angiography (OCTA) was used to obtain retinal structural and vascular quantitative parameters for the macula and optic nerve head (ONH) regions. Visual function was evaluated in all TED patients, including best-corrected visual acuity (BCVA), visual field (VF), and visual evoked potentials. The diagnostic performance of these OCTA parameters in distinguishing DON was further evaluated using the area under the receiver operating characteristic curve (AUC).

Results: Compared with the NDON group, patients in the DON group exhibited significantly reduced retinal VD in both the macula and ONH, along with a thinner retina in the macula. Reductions were most prominent in macular whole retinal layer (WRL) and superficial retinal layer VD ($P < 0.001$). Retinal VD and thickness positively correlated with BCVA and VF mean deviation. Furthermore, the macular WRL-VD had the highest diagnostic performance for DON (AUC = 0.833) and the combination parameters further improved diagnostic accuracy (AUC = 0.861).

Conclusions: DON patients exhibit retina thinning and reduced retinal VD, which significantly correlate with

visual dysfunction and demonstrate robust diagnostic performance.

Abstract No.: 202075

Risk Factor Stratification of Non-Arteritic Ischemic Optic Neuropathy Based on Atherogenic Indices

First Author: Syntia NUSANTI

Co-Author(s): Rianti Wulandari PRATIWI, Fasya RADILIA, M SIDIQ, Angelina Riadi Alim SUPRAPTO

Purpose: To evaluate the risk based on lipid profile and atherogenic indices in patients with non-arteritic ischemic optic neuropathy (NAION).

Methods: This retrospective descriptive study obtained data from medical records of patients from January 2021 to December 2023. All patients diagnosed with NAION were included. Demographic characteristics and clinical findings, including lipid profiles, were collected. Atherogenic Index of Plasma (AIP), Castelli Risk Index (CRI), and Atherogenic Coefficient (AC) were calculated from standard lipid profile measurements.

Results: Ninety-four patients (mean age 55.4 ± 9.46 years; 56.4 % female) were included in our study. Sixty-nine had unilateral involvement and 42 patients presented with visual acuity $\leq 6/60$. Mean visual field index was 44.7 ± 24.70 % and mean deviation was -19.3 ± 7.18 dB. Fundus examination revealed optic disc edema in 52 patients and atrophy in 42 patients. The mean ganglion cell-inner plexiform layer (GCIPL) thickness was 62.7 ± 13.22 μ m and the median retinal nerve fiber layer (RNFL) thickness was 148.5 (48 - 419) μ m. Most patients were classified as high risk on AIP (76.6%), CR-I (69.1%), CR-II (57.4%), and AC (94.7%).

Conclusions: Atherogenic indices were elevated in most NAION patients. Further studies are needed to evaluate the association between each atherogenic indices and clinical outcomes in patients with NAION.

Abstract No.: 207604

Risk Factors Analysis of Primary Angle Closure Disease

First Author: Dakki SHERPA

Purpose: To determine the risk factors of primary angle closure disease

Methods: A cross-sectional study was done. 82 diagnosed cases of PACD were selected by convenience sampling technique. A complete ocular Examination of all the subjects was carried out. Patient's general characteristics were recorded, AL, ACD and LD measurement was done using ultrasound A scans and analyzed

Results: 82 patients were included in this study. Mean age of PACD was 58.23 with (SD) of 10.25. Out of 82 patients 17 were males (20.7%) and 65 were females (79.3%). Right eyes of PACD patients had 29 (35.4%) of

PACS, 25 (30.5%) of PAC and 24 (29.3%) had PACG. Left eyes had 34 (41.5%), of PACS, 19 (23.2%) of PAC and 21 eyes (25.6%) of PACG. The mean AL of 77 right eyes was 22.19805 (SD .705). The mean central ACD was 2.95 with SD of .407. in right eye. The mean LD was 4.51(SD .507). The mean AL in left eye of PACD was 22.23(SD .772). The mean central ACD was 2.93 (SD .508). The mean Lens diameter was 4.62 (SD.485). There was no statistical significant difference in biometric parameters between both eyes of PACD.

Conclusions: This study reveals that age above 58 years, female gender; short AL, shallow central ACD and thick LD is a risk factor of PACD.

Abstract No.: 204026

Small Cup, Big Risk: Structural and Vascular Insights From Atypical NAION Cases

First Author: Cindy Prajna METTA

Co-Author(s): Bobby Ramses Erguna SITEPU

Purpose: Non-arteritic anterior ischemic optic neuropathy (NAION) is classically described in patients over 60 years old with moderate visual loss and a "disc at risk" characterized by a small cup-to-disc ratio. However, atypical cases may deviate from these features. We report three male patients in their 40s-50s with profound vision loss (<20/200) and small optic cups, to evaluate the potential role of small discs in atypical NAION presentation.

Methods: We retrospectively reviewed clinical records, fundus photographs, OCT, perimetry, and visual outcomes of three patients diagnosed as "atypical" NAION. Particular focus was given to cup-to-disc morphology and systemic vascular risk factors.

Results: All patients exhibited small cup-to-disc ratios consistent with a "crowded disc," supporting its role as a structural predisposition to NAION even in younger patients. The visual acuity was poorer than typically expected in NAION, suggesting that disc morphology may interact with vascular compromise to influence disease severity. These findings raise several considerations: (1) whether small optic discs alone should be regarded as a risk marker for NAION; (2) the need for screening patients with small discs for systemic vascular comorbidities; and (3) whether quantifying crowding (disc crowding index) could stratify NAION risk in clinical practice. Current literature lacks precise estimates of the progression risk from small discs to NAION, highlighting the need for larger prospective studies.

Conclusions: Small cup-to-disc ratio may predispose patients to NAION irrespective of age. Recognition of disc crowding as a structural risk factor could guide early evaluation and systemic management. Integrating vascular risk tools such as the ASCVD score with optic disc evaluation may enable earlier identification of at-risk patients and prevent severe vision loss.

Abstract No.: 201843**Study on the Protective Mechanism of Cassia Seed Extract Against Retinal Ganglion Cell in Steroid-Induced Glaucoma***First Author: Liyang ZHANG*

Purpose: To investigate whether Cassia seed extract (CSE) can prevent glucocorticoid (GC)-induced retinal ganglion cell (RGC) loss and to elucidate the underlying molecular mechanisms.

Methods: A rat model of steroid-induced glaucoma (SIG) was established by subconjunctival injection of GC for prolonged exposure. Animals were assigned to GC exposure alone, GC + CSE treatment, and matched control groups. Retinal morphology (RGC density and organization). Protein or gene expression levels of key pyroptotic pathway molecules (NLRP3, Caspase-1, GSDMD, IL-1 β , IL-18).

Results: 1. GC exposure alone caused marked RGC degeneration, disorganized RGC arrangement, and impaired retinal function. 2. GC exposure significantly up-regulated the NLRP3/Caspase-1/GSDMD pathway and downstream inflammatory cytokines IL-1 β and IL-18. 3. CSE administration effectively reversed these alterations: RGC morphology and density were preserved; Up-regulation of NLRP3, Caspase-1, GSDMD, IL-1 β , and IL-18 was significantly suppressed.

Conclusions: Cassia seed extract protects against GC-induced retinal damage by inhibiting the NLRP3/Caspase-1/GSDMD-mediated pyroptotic pathway in RGCs, thereby offering a promising neuroprotective strategy for steroid-induced glaucoma.

Abstract No.: 208365**Supporting Diabetic Macular Edema Triage Screening by a Deep Learning-Based OCT Image Analysis: a Prospective Study***First Author: Shuyi ZHANG**Co-Author(s): Carmen CHAN, Carol CHEUNG, Anran RAN, Ka Ho SZETO*

Purpose: Retrospective studies have demonstrated artificial intelligence (AI) models can accurately identify diabetic macular edema (DME) from optical coherence tomography (OCT) images. However, prospective evidence studies are yet to assess their performance when integrated into healthcare. We aim to prospectively evaluate the performance of deploying an AI-OCT system in a triage unit of a tertiary eye hospital.

Methods: Our AI-OCT system is a customized AI-powered infrastructure with a user interface, an information management system, and two 3D deep-learning models based on our previously published work: image quality assessment (gradable/ungradable scan) and DME detection (yes/no DME). Individuals with diabetes mellitus (DM) referred to the Triage Unit

of Hong Kong Eye Hospital were recruited. Participants underwent OCT scans, which were analyzed by the AI-OCT system in real-time. Only gradable scans would be further processed by the DME detection model. The performance of the AI-OCT system was measured against human reference standards.

Results: A total of 1,200 eyes from 603 participants with DM were recruited in the Triage Unit. The performance of the image quality assessment model was evaluated, with a sensitivity (SEN) of 99% (95% CI 98%-100%), specificity (SPE) of 80% (70%-87%), and accuracy (ACC) of 98% (96%-98%). Among 1,106 eyes with gradable scans (92%), the AI-OCT system had a SEN of 99% (93%-100%), SPE of 91% (89%-93%), and ACC of 92% (90%-93%) for DME detection.

Conclusions: The AI-OCT system showed good performance for DME triage screening, providing prospective evidence for AI implementation in healthcare.

Abstract No.: 206798**Systematic Review on Ocular Effect of Hypnotic Agents in Healthy Individuals***First Author: Wai Pik LAU**Co-Author(s): Kam Lung Kelvin CHONG, Ka Hei Kenneth LAI, Chi Pui Calvin PANG, Chee Yung Clement THAM*

Purpose: To examine the relationship between hypnotic agents and eye movement behaviours.

Methods: The information sources include PubMed, Scopus and EMBASE. The eligible criteria are studies investigating the clinical outcomes presented after hypnotic agents induction. The study designs would be reports limited to English, after 1972.

Results: General trend of the clinical outcomes of hypnosis showed unusual ocular features such as trance stare, reduced blink rate and pupil size, upward eye rolls, high-frequency vertical flutters, and altered frequency of rapid and slow eye movements. Four research findings (n=73) out of twenty eligible papers (n=2322) mentioned reduced saccade amplitude or slower antisaccades during hypnosis in both highly and minimally hypnotizable individuals, but these effects are neither specific to highly susceptible individuals nor restricted to the hypnotic condition. Highly hypnotizable individuals report greater hypnotic depth after induction, yet significant and reliable differences in eye movements between high and low hypnotizables are lacking. Pharmacological studies investigating hypnotic agents and sedatives (e.g., lorazepam, propofol, dexmedetomidine) document reductions in saccadic velocity, increased latencies, and generalized oculomotor slowing, but such effects appear related to central nervous system depression rather than a unique hypnotic state.

Conclusions: Current evidence does not support the existence of a consistent and reliable ocular markers

for the hypnotic state. Instead, changes in ocular movement are best interpreted as non-specific indices of overall arousal, attention, or compliance.

Abstract No.: 205161

The Comparison Between the Electronic Version of Ishihara Test and the Ishihara Book for Screening Color Vision Deficiency Among Students

First Author: Rahajeng Anugrahing **SALDIANOVITA**

Co-Author(s): Wino Vrieda **VIERLIA**

Purpose: The following study finds the prevalence of colour vision deficiency (CVD) and evaluates the validity of the electronic version of Ishihara compared to the Ishihara book for screening CVD among students.

Methods: This study was a comparative cross-sectional study design conducted on a purposive sampling technique. Participants were first tested with the Ishihara book and then continued with the electronic version by using ColBlindor. Data were analysed using the Statistical Package of Social Science (SPSS), version 23. Sensitivity and specificity tests were used to calculate the accuracy. A chi-square test was used to analyse the data (p -value < 0.05).

Results: Three hundred participants were recruited to the study. A total of 6 participants had CVD, with the distribution of 4 males (3.12%) and 2 females (1.16%). The two testing methods were compared, and the results were 100% for sensitivity and specificity with a p -value < 0.05.

Conclusions: electronic version of Ishihara is a beneficial alternative for screening colour vision deficiencies. The fact that all the research participants—both colour-deficient and normal—were accurately identified implies that this test can be used in society for screening purposes, especially among students. This facility is expected to enable early detection, which will help people with CVD adapt better in daily living, acquire learning techniques that suit them, and determine suitable careers in advance.

Abstract No.: 202114

The Cure That Stole Sight: Reversible Linezolid-Induced Optic Neuropathy — A Case Series

First Author: Gebriellea **DASS COWIE JOHN**

Co-Author(s): Nor Fadhillah **BINTI MOHAMAD**, Fhun **LAI CHAN**, Ahmad **SALEHUDDIN**

Purpose: To highlight the risk of optic neuropathy as a serious adverse effect of linezolid, and how immediate discontinuation of linezolid can reverse visual loss.

Methods: Case series.

Results: Case 1: A 18-year-old lady with multidrug-resistant pulmonary tuberculosis (MDR-PTB) on

linezolid treatment presented with progressive bilateral eyes (BE) blurring of vision (3/60) for one month, headache, nausea, lower limb paraesthesia, and lethargy. Examination showed patchy scotoma and impaired Ishihara test (3/17). Anterior segment was unremarkable with optic disc was mildly hyperaemic and tilted. Neurological examinations were normal. Case 2: A 35-year-old gentleman presented with painless BE reduced vision for 12 days. He was started on linezolid therapy, sensitive to the culture of his intra-abdominal collection. BE visual acuity (VA) was 20/600 and Ishihara test was 1/17. Anterior segment examination was unremarkable, optic nerve was hyperaemic. He had reduced sensation, numbness and tingling sensations over bilateral upper limbs. BE Humphrey Visual Field (HVF) revealed para-central scotoma. A diagnosis of bilateral toxic optic neuropathy secondary to linezolid was made. Results: Within 1 week of linezolid discontinuation, VA and Colour Vision (CV) improved. After 1-2 weeks, • Case 1: VA improved to 6/24 BE with improved CV Right Eye(RE) 11/17 and Left Eye(LE) 14/17 • Case 2: BE VA was 20/20 and fundus revealed reduction in disc hyperaemia. After 3-4 weeks, VA and CV was completely restored in both cases. However, only patient in Case 2 showed residual para-central scotoma and persistent peripheral neuropathy.

Conclusions: These cases highlight the importance of detecting the culprit, linezolid, preventing irreversible visual loss.

Abstract No.: 206929

The Eyes Don't Lie: A Case of Linezolid Toxic Optic Neuropathy in the Philippines

First Author: Marie Lou **GUILLERMO**

Purpose: The most familiar medication to treat pulmonary tuberculosis for Ophthalmologists is Ethambutol. However, with rising cases of multidrug resistant infections, internal medicine specialists have been obliged on prescribing alternative antibiotics such as Linezolid. This drug presents many adverse effects and this case presentation aims to highlight the Ophthalmological aspect of Linezolid's effects.

Methods: A 40 year old Filipino male who is a known case of Multi-Drug Resistant Tuberculosis and treated with Bedaquiline, Pretomanid, Linezolid, and Moxifloxacin experienced sudden onset blurring of vision of the right eye. It was described as central, dim, and non-progressive. He sought consultation at a local health center and was noted to have decreased color vision of both eyes and was subsequently referred to Ophthalmology.

Results: The BCVA of the right eye was 6/30 and 6/6 on the left on first consult. The patient showed strong color vision defect on Farnsworth D15. He had unremarkable OCT of the RNFL of the Optic Nerve Head, Macular Ganglion Cell Layer, and Fundus Photo.

He had a cecentral visual field defect of the right eye. Linezolid was discontinued from his regimen by his primary care physician. The patient on follow up showed improvement of BCVA and color vision.

Conclusions: Optic Neuropathy is one of the few indications to discontinue Linezolid in a MDR-TB case. Multiple case reports in other countries show that visual acuity and color vision recovers spontaneously once Linezolid has been discontinued

Abstract No.: 202213

Tolosa-Hunt Syndrome (THS): A Rare Neuro-Ophthalmologic Disorder Diagnosed Clinically

First Author: Syeda Ghazala SHAHNAWAZ

Purpose: To report a THS case presenting with painful ophthalmoplegia and diagnostic limitations

Methods: A 65-year-old hypertensive female presented with severe headache, blurred vision, binocular diplopia, proptosis of the right eye, mild ptosis of the right upper lid, and peri-orbital swelling. She reported a 6-year history of recurrent similar episodes, intermittently treated with antihypertensive and anti-inflammatory drugs. Clinical examination, visual acuity (VA) testing, slit-lamp evaluation, fundus assessment, and computed tomography (CT) of the brain and orbit were performed.

Results: VA was 6/60 in the right eye and 6/18 in the left eye, improving to 6/36 and 6/12 with correction, respectively. Rightsided anisocoria, marked restriction of extraocular movements in all quadrants of the right eye, conjunctival chemosis in the right eye, and bilateral immature cataracts were noted. Fundus was normal. CT revealed right-sided proptosis and sinusitis but no intraorbital mass or cavernous sinus lesion. Magnetic resonance imaging and angiography could not be performed due to patient financial constraints. She was started on topical prednisolone, nepafenac, and cyclopentolate, along with oral nonsteroidal antiinflammatory drugs. On followup, she showed slight improvement. Neurologist's opinion, based on clinical presentation and steroid response, confirmed THS. Oral prednisolone (tapering dose) and methylcobalamin were initiated. At 2 weeks, significant improvement in headache, diplopia, chemosis, periorbital swelling, ptosis, and proptosis was noted, while best-corrected VA remained stable.

Conclusions: THS is a rare neuro-ophthalmologic disorder. Diagnosis can be made clinically with support from CT and corticosteroid response, preventing unnecessary morbidity

Abstract No.: 202210

Transient Optic Perineuritis: A Rare Harbinger of Graves' Disease

First Author: Fadhilah ZAINOL ARIFFIN

Co-Author(s): Dian Nadia ABU TALIB, Jemaima CHE HAMZAH, Nurul Ain MASNON

Purpose: To highlight a rare case of autoimmune related optic perineuritis (OPN) that resolved spontaneously without steroid treatment in Graves' disease.

Methods: Case report.

Results: A 60-year-old woman presented with two episodes of left central blurring of vision over two weeks duration associated with ocular discomfort during eye movement. On examination, right eye was visual acuity was 6/9, and counting fingers on the left, associated with a grade 3 relative afferent pupillary defect (RAPD) and diminished optic nerve function tests (ONFT). The left eye appears proptosed with slight limitation on elevation. There was presence of inferior scleral show with lid retraction and lid lag on the left eye, with no demonstrable signs of active anterior segment inflammation. Fundus examination of the left eye showed optic disc swelling with the presence of optociliary shunt. Blood investigations were unremarkable except thyroid function test which revealed hyperthyroidism. Magnetic resonance imaging (MRI) confirmed the diagnosis of left OPN, showing enhancement of the optic nerve sheath and prominent cerebrospinal fluid (CSF) space surrounding the nerve. A diagnosis of optic perineuritis secondary to Graves' disease was made thus, treatment for hyperthyroidism commenced. Despite the absence of corticosteroid treatment, the patient demonstrated spontaneous clinical improvement of the left visual functions. Visual acuity, RAPD and ONFT returned to baseline with resolution of left optic disc swelling.

Conclusions: Patients with Graves disease may rarely present with OPN. Spontaneous recovery in autoimmune-related OPN is possible highlighting the importance of individualized management and cautious observation especially when the underlying cause remains unidentified after extensively investigated.

Abstract No.: 200170

Turning the Tide in Pediatric Optic Neuritis: A Rare Case of Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease

First Author: Nomula Sathwik REDDY

Co-Author(s): Siddharam S JANTI, Hari Kumar S, Raghavendra Rao KOLAVALI

Purpose: To report a rare case of pediatric Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease (MOGAD) presenting as bilateral optic neuritis, and to highlight the efficacy of early high-dose

corticosteroids and IVIG therapy in restoring visual function.

Methods: A 13-year-old girl presented with a sudden onset of bilateral vision loss, headache, and seizures. Clinical examination revealed bilateral relative afferent pupillary defects and hyperemic optic discs with blurred margins. MRI brain showed T2 FLAIR hyperintensities in the periventricular white matter. CSF analysis showed mild lymphocytic pleocytosis. MOG antibody testing returned positive. The patient was treated with IV methylprednisolone (30 mg/kg/day for 5 days), followed by IVIG (2 mg/kg for 5 days) and a tapering dose of oral steroids.

Results: Initial visual acuity was counting fingers at ½ meter in both eyes. After treatment, vision improved to 6/60 in both eyes, and further improved to 6/6 (right eye) and 6/6 (left eye) at follow-up. Fundoscopy showed complete resolution of optic disc edema. The patient had no relapse during short-term follow-up.

Conclusions: Early recognition and prompt treatment of MOGAD with high-dose corticosteroids and IVIG can result in remarkable visual recovery in pediatric patients. This case emphasizes the importance of considering MOGAD in the differential diagnosis of pediatric optic neuritis.

Abstract No.: 205515

Two Cases of Syphilitic Optic Neuritis Occurring in the Early Stage After Syphilis Infection

First Author: Daisuke NAKAJIMA

Co-Author(s): Rieko FUKUDA, Mayumi KOBAYASHI, Tetsuro OSHIKA, Yoshimi SUGIURA

Purpose: Syphilitic optic neuritis is a rare manifestation, occurring in approximately 0.5–5.1% of syphilis cases, with a median onset of 11 months after infection. We report two cases of optic neuritis that developed relatively early after primary syphilis infection.

Methods: We retrospectively reviewed two male patients diagnosed with syphilitic optic neuritis at our institution. Clinical presentation, ophthalmic and imaging findings, laboratory results, treatment, and outcomes were evaluated.

Results: Case 1: A 66-year-old man presented with fever, right ocular pain, and decreased vision. Best-corrected visual acuity (BCVA) in the right eye was 0.4, with optic disc swelling. Goldmann perimetry showed a right central scotoma and enlargement of the left Mariotte blind spot. MRI revealed perineural inflammation of the right optic nerve. Laboratory tests showed elevated inflammatory markers and positive RPR and TPHA. Early syphilis was suspected, and oral amoxicillin therapy was initiated. After one month, BCVA improved to 0.9 with regression of the right central scotoma and normalization of the left field. Case 2: A 50-year-old man complained of one month of

progressive visual decline. BCVA was 0.5 in the left eye with bilateral optic disc edema and left macular edema. Goldmann perimetry revealed a left central scotoma. MRI was unremarkable. Blood tests were positive for RPR and TPHA, confirming syphilitic optic neuritis. Oral amoxicillin therapy was initiated, and vision gradually improved.

Conclusions: We encountered two cases of syphilitic optic neuritis occurring relatively early after primary syphilis infection. Syphilis should be considered a potential cause of optic neuritis.

Abstract No.: 205782

Unmasking Ocular Myasthenia Gravis in a Patient With Longstanding Thyroid Eye Disease

First Author: Dianita Veulina GINTING

Co-Author(s): Antonia Kartika INDRIATI, Rusti Hanindy SARI, Niluh Putu Ayu Dewi WARDHANI, Prettylla YOLLAMANDA

Purpose: To report a rare coexistence of thyroid-associated ophthalmopathy (TAO) and ocular myasthenia gravis (OMG), emphasizing the diagnostic challenges and importance of recognizing dual pathology.

Methods: A review of clinical history, ophthalmic findings, laboratory investigations, imaging, and treatment response in a patient with TAO and OMG.

Results: A 57-year-old woman was diagnosed with hyperthyroidism in 2021 and treated with thiamazole and propranolol. She later presented with blurred vision in the left eye. On examination, best-corrected visual acuity (BCVA) was 0.8 OD and 1/300 OS. Bilateral ptosis with compensatory frontalis activity was observed, along with exophthalmos predominantly in the left eye (Hertel: 22–112–23), restricted ocular motility, and mature cataract OS. Stare and ice pack tests were positive. Thyroid function tests (FT4, T3, TSHS) were within normal limits. Computed tomography of the orbits revealed bilateral exophthalmos characterized by enlargement of orbital fat compartments without significant extraocular muscle belly or tendon involvement, consistent with Type 1 fat-predominant TAO. Serology showed positive acetylcholine receptor antibody. The patient was diagnosed with mild inactive TAO, OMG, mature senile cataract OS, and pseudophakia OD. Cataract extraction OS was performed, resulting in postoperative BCVA improvement to 0.8. Medical management with pyridostigmine 60 mg three times daily produced marked improvement in ptosis and ocular motility.

Conclusions: This case highlights the coexistence of TAO and OMG, a diagnostic challenge in patients presenting with fluctuating ptosis and diplopia. Comprehensive evaluation and confirmatory testing are essential for accurate diagnosis. Timely recognition

with adequate management can significantly improve visual function and quality of life.

Abstract No.: 205261

Utility of 15-Minute VEP in Mild Optic Neuritis Diagnosis: Case Report of a Young Cricketer

First Author: Prasan **WARNAKULA**

Co-Author(s): Thilina **MUNASINGHE**, *Rythmi* **RAGUNATHAN**, *Dushyantha* **WARIYAPOLA**

Purpose: To highlight the diagnostic value of the 15-minute Visual Evoked Potential (VEP) study in detecting subtle conduction delays of the optic nerve in a case of mild optic neuritis with otherwise normal clinical and laboratory findings.

Methods: A 20-year-old cricketer presented with blurred vision in the right-eye for six days. There was no Relative Afferent Pupillary Defect(RAPD). Bilateral anterior and posterior segment examinations were normal. FBC, ESR and CRP levels were within normal ranges. Given the normal results from these investigations, a VEP study was performed

Results: The Pattern VEP1.0 degree study showed bilateral P100 amplitudes and implicit times within normal range. However, the 15-minute study revealed a delay in P100 implicit time with normal amplitude levels in the right-eye. Compared to the left-eye, P100 amplitudes were reduced in the right-eye, while the left-eye had normal P100 amplitudes and implicit times. These electrophysiological findings indicated mild to moderate conduction delay in the right optic nerve, suggesting a diagnosis of right-eye optic neuritis.

Conclusions: The VEP study identified subtle conduction delays in the right optic nerve, confirming the optic neuritis diagnosis. This highlights the importance of VEP in detecting even mild optic neuritis and the diagnostic workup for patients with unexplained visual symptoms, particularly when other tests return normal results.

Abstract No.: 207150

Visual Disturbances With Headache: When an Intracranial Tumor Comes in Mind

First Author: Elisa **YOPITASARI**

Purpose: To highlight the importance of suspecting an intracranial tumor in patients with visual disturbances and accompanying headache.

Methods: A case report of a 36-year-old woman who had months of visual disturbances and unexplained headache.

Results: The patient complained of 6 months of unimproved visual disturbances and mainly left-sided headache after some previous visits to internists and ophthalmologists. Initial assessment showed visual acuity of RE 20/100 and LE 4/60. The best corrected

visual acuity of the right and left eyes is 20/20 and 20/60, respectively. There was left eye RAPD, decreased colour vision and contrast sensitivity mainly on left eye and limitation on the peripheral visual field that showed homonim hemianopia pattern. Other external, ocular motility, and fundus findings were within normal limits. Further anamnesis of the unmarried woman revealed an amenorrhea condition for 8 months with decreased levels of pituitary hormones after visits to a gynaecologist. CT Scan with contrast showed a 38x45x56 millimeter-sized intrasellar mass with intrasellar and suprasellar extension and homogeneous enhancement after contrast. She was then referred to the Neurosurgery Department and had a transcranial tumor resection and histopathologic examination that revealed a pituitary adenoma. Multi-disciplinary management with a gynaecologist and an endocrinologist was involved post-surgery.

Conclusions: Uncorrected blurred vision accompanied by chronic headache might suggest an alarming condition of an intracranial tumor. Thorough examination of other ocular and systemic symptoms, along with a multi-disciplinary workup, should be done to determine the most definitive treatment to prevent more devastating compressive effects.

Abstract No.: 202363

Visual Outcome of Paraocular Dexamethasone Treatment in Non-Arteritic Anterior Ischemic Optic Neuropathy: Case Report

First Author: Jing **LI**

Purpose: Nonarteritic anterior ischemic optic neuropathy (NAAION) is a prevalent vascular disease that often leads to significant visual acuity loss in patients. Systemic steroids and intravitreal triamcinolone injection are associated with a range of side effects.

Methods: In this report, we present two cases of NAAION patients who underwent parabolbar injection of dexamethasone (5 mg) every 3 days for a duration of 5 weeks. These patients demonstrated substantial visual acuity improvement without experiencing any adverse effects.

Results: Based on our case report, dexamethasone parabolbar injection appears to be a safe and effective intervention for NAAION patients, offering a potential alternative to systemic glucocorticoids and intravitreal triamcinolone injection as a therapeutic approach.

Conclusions: The administration of dexamethasone through parabolbar injection offers new possibilities for treating NAAION in the acute phase. The significant visual benefits observed in this case report provide hope for patients suffering from this blinding disease. Dexamethasone parabolbar administration may serve

as an alternative therapy to systemic glucocorticoids and intravitreal triamcinolone injection.

Abstract No.: 205685

When Hormonal Whispers Ignite Neurological Storms

First Author: Shreya BHADANI

Co-Author(s): Manisha CHOUDHARY, Srinidhi N, Shrutakirti PARIDA, Somyashree SAMAL, Aanchal SINGHAL

Purpose: To present a rare case of neuromyelitis optica spectrum disorder (NMOSD) in a young woman, potentially precipitated by hormonal fluctuations

Methods: 26-year-old woman presented with progressive diminution of vision in left eye for 1.5 months, preceded by neck pain, vomiting, and weakness. She had history of oral contraceptive use for two years, discontinued six months earlier, followed by spontaneous abortion at six weeks of gestation. On examination, left eye BCVA was counting fingers at 2 meters, with Grade 3 RAPD and sensory exotropia. Fundus evaluation revealed optic nerve pallor in left eye, while right eye was normal. Neuroimaging demonstrated T2 hyperintensities with contrast enhancement involving left optic nerve, optic chiasma, and bilateral optic tracts. Cervical spine MRI showed patchy hyperintensities extending from C2 to C4. Serum aquaporin-4 antibody was positive, while MOG antibody was negative. Visual evoked potential revealed prolonged P100 latency in left eye. Other autoimmune markers were negative, except for borderline elevated anti-Ro.

Results: Diagnosis of seropositive NMOSD with sensory exotropia was established. Patient received intravenous methylprednisolone followed by tapering course of oral steroids, calcium and PPI supplementation. Due to poor visual response, intravenous immunoglobulin was administered, after which therapy was escalated to Rituximab. At 2-week follow-up, no significant visual improvement was observed.

Conclusions: NMOSD may present unilaterally and carries poor visual prognosis despite aggressive therapy. Hormonal factors, including pregnancy and contraceptive use, may serve as potential disease triggers. Early recognition, timely initiation of immunosuppressive therapy, and interdisciplinary management are critical to reduce the risk of irreversible visual and neurological disability.

Abstract No.: 206823

When Optic Neuritis Isn't What It Seems: A Case of Ocular Syphilis

First Author: Fanda Aviesta MINHALINA

Co-Author(s): Lukisiari AGUSTINI

Purpose: Ocular syphilis in individuals with HIV can occur at any stage of infection and may cause severe

visual impairment. Its broad clinical spectrum often mimics other inflammatory ocular conditions, including optic neuritis, leading to delayed diagnosis.

Methods: A 28-year-old woman presented with a one-month history of progressive bilateral blurred vision, beginning in the right eye and later affecting the left. Best-corrected visual acuity was 6/21 (right eye) and 6/15 (left eye). Color vision was markedly reduced in the right eye (2/38) while normal in the left (38/38). Fundoscopy revealed bilateral hyperemic discs with blurred margins. Optical coherence tomography (OCT) showed disc edema with increased peripapillary retinal nerve fiber layer thickness and a lamellar macular hole, characterized by irregular foveal contour and an intraretinal hyporeflective cavity, with preserved outer retinal layers.

Results: In this case, she was initially treated with intravenous methylprednisolone (250 mg four times daily for 5 days), with partial improvement. Two weeks later, she developed a maculopapular rash on the palms and soles. Serologic tests confirmed secondary syphilis (TPHA 1:2560, reactive VDRL/RPR), and HIV testing was positive (CD4 count 405 cells/ μ L). Intravenous Penicillin G was administered thrice weekly. At two-month follow-up, visual acuity and color vision improved significantly. Repeat OCT demonstrated spontaneous resolution of the lamellar macular hole with restoration of foveal architecture.

Conclusions: Beyond emphasizing early recognition and treatment to prevent irreversible visual loss, it also illustrates a rare instance of spontaneous resolution of a lamellar macular hole following appropriate therapy, making this an unusual presentation of ocular syphilis.

Abstract No.: 202872

When Ptosis Points to the Pituitary: Pituitary Apoplexy Presenting As Isolated Third Nerve Palsy

First Author: Yi Lin CHUA

Co-Author(s): Mahani BINTI MASTOR, Penny Poi Wah LOTT, Woan Shian SEE, Cheun-seng WONG

Purpose: To describe a rare presentation of pituitary apoplexy where the initial manifestation was isolated oculomotor (third cranial) nerve palsy.

Methods: Case report.

Results: A 39-year-old male with no prior medical history presented with a three-day history of left ptosis, diplopia, blurred vision, and throbbing headache. Examination revealed complete left-eye ptosis and dilated pupil with impaired efferent pupillary function. Extraocular movement showed limitation of elevation, depression, and adduction over the left eye. Visual acuity, fields, and anterior/posterior segment examinations were unremarkable. The remaining cranial nerves and neurological functions were intact. Magnetic resonance imaging showed

a 2.7-cm lobulated solid–cystic sellar lesion with haemorrhage, calcification, peripheral enhancement, and mass effect compressing the optic chiasm and partially encasing the left cavernous internal carotid artery. The patient underwent transsphenoidal excision with neurosurgical collaboration. Intraoperatively, the lesion was soft, greyish, moderately vascular, and haemorrhagic. Histopathology confirmed a pituitary adenoma with chromophobic to weakly acidophilic cells, haemorrhage, infarction, mild pleomorphism, and an intermediate proliferative index (Ki-67 ~20%). Immunohistochemistry demonstrated growth hormone and follicle stimulating hormone positivity, consistent with infarcted pituitary adenoma. The diagnosis of pituitary apoplexy was established based on clinical, radiological, and pathological findings. Unfortunately, the patient developed postoperative pulmonary embolism and succumbed.

Conclusions: This case illustrates a rare neuro-ophthalmic presentation of pituitary apoplexy manifesting initially as isolated oculomotor nerve palsy. Prompt recognition of such atypical features is essential to facilitate early diagnosis and intervention, potentially reducing ocular morbidity and life-threatening systemic complications.

Abstract No.: 201023

When the Eyes Speak: Optic Disc Swelling as a Clue to POEMS Syndrome

First Author: Deying **YU**

Co-Author(s): Sabrina **ABU HASSAN ASAARI**, Kelvin **CHONG HAN NGIE**, Yi Wen **LIM**

Purpose: To report a rare case of POEMS syndrome with bilateral optic disc swelling.

Methods: Case report

Results: A 33-year-old gentleman presented with progressive peripheral neuropathy, recurrent falls and weight loss. He denied experiencing blurring of vision or headache. Best corrected visual acuity was 6/6 bilaterally with normal optic nerve function tests. Fundoscopy revealed bilateral optic disc hyperaemia with sectoral oedema. A comprehensive workup revealed he fulfilled both major diagnostic criteria. Demyelinating sensorimotor polyneuropathy was detected on nerve conduction studies and EMG, whereas monoclonal plasma cell disorder was identified by presence of monoclonal IgG Lambda paraprotein (M-protein 3.8g/L), and elevated vascular endothelial growth factor (VEGF) at 1200pg/mL (> 700pg/mL). Minor criteria present included sclerotic bone lesions (ribs and humerus), hepatosplenomegaly, endocrine abnormalities (elevated TSH), hypogonadism (low testosterone, elevated prolactin) and monoclonal gammopathy on bone marrow biopsy. These findings, together with systemic features, led to a diagnosis of POEMS syndrome. He was initiated on chemotherapy with Bortezomib, Lenalidomide and Dexamethasone

(VRD) under haematology. Supportive ophthalmic management started with oral acetazolamide, while co-management with endocrine and rehabilitation was established for blood glucose monitoring, hormonal panels and bone protection measures. Over 4-6 weeks, his disc parameters improved on Optical Coherence Tomography (OCT). His visual function remained preserved throughout treatment.

Conclusions: POEMS syndrome is a rare cause of bilateral optic disc swelling with polyneuropathy. Early recognition and multidisciplinary interventions are essential to prevent irreversible neurological and visual complications.

Abstract No.: 203980

mtDNA12811 Mutation Causing Leber Hereditary Optic Neuropathy: A Case Report

First Author: Nian **TAN**

Co-Author(s): Yanru **CHEN**, Xunwen **LEI**

Purpose: Leber hereditary optic neuropathy (LHON) is a genetic disorder caused by mitochondrial DNA (mtDNA) mutations. This paper reports a case of LHON caused by the m.12811 T>C mutation, summarizing the clinical presentation, disease characteristics, and treatment.

Methods: Retrospective case study.

Results: Mitochondrial mutation gene testing confirmed the presence of the m.12811 T>C mutation, establishing the diagnosis of LHON. The patient's father was wild-type, while her brother also carried the mitochondrial DNA mutation. Treatment included idebenone tablets, cytidine diphosphate choline sodium capsules, and methylcobalamin tablets. Currently, the patient exhibits RAPD (+) in the left eye, left eye visual acuity HM/10cm, right eye corrected visual acuity 1.0, and limb muscle strength grade 5. Regular outpatient follow-ups are scheduled to monitor disease progression.

Conclusions: LHON is a maternally inherited optic nerve degenerative disorder primarily causing visual impairment. Over 90% of global LHON cases result from mutations at mtDNA loci 11778, 3460, and 14484. The m.12811 T>C mutation has been detected only in a single family and individual patient, potentially presenting with additional clinical symptoms such as paraplegia, ptosis, or hearing loss. While drug therapies may offer some efficacy, no specific curative treatment currently exists for this condition. Management primarily focuses on improving patients' quality of life.

Ocular Imaging

Abstract No.: 205139

A Constellation of Rare Congenital Ocular Anomalies

First Author: Abhishek

Co-Author(s): Shagun KORLA, Shreya NARANG, Aaryan RANA, Jayant SHARMA

Purpose: To report a rare case of a constellation of three congenital anomalies.

Methods: A 23-year-old medical student visited the ophthalmic OPD for a regular eye examination. The student was having a slight headache with no associated symptoms. On ophthalmic examination, the visual acuity was 6/6 in both eyes with intraocular pressure measuring 13mmHg in the right and 15mmHg in the left eye. On slit lamp examination, the Anterior chamber was normal, with the pupil normal in size and reacting to light. On the iris, however small, mold-shaped protuberances were presented against a normal pigmented iris in both eyes. On observing the lens, tiny, stellate-shaped, brown-pigmented opacities were present in the central anterior lens capsule in the right eye, while the left lens was clear. On funduscopy, distinct peripapillary white striated patches with feathered borders approximately one disc diameter in size were present, typically adjacent to the optic disc in both eyes.

Results: The patient was diagnosed with epicapsular star lens in the right eye, with iris mammillations present in both eyes, along with myelinated nerve fibre present adjacent to the optic disc in both eyes.

Conclusions: Epicapsular stars are pigmented, stellate opacities on the anterior lens from persistent tunica vasculosa lentis. Iris mammillations are tiny nodules on darkly pigmented irides. Myelinated retinal nerve fibers are benign congenital anomalies where myelination extends beyond the lamina cribrosa, producing white feathery fundus patches. Altogether, it forms a constellation of rare congenital anomalies.

Abstract No.: 205423

Agreement Between Graders for DR Screening Between Smartphone-Based Retinal Camera and Traditional Fundus Camera in LMIC

First Author: Arshad MEHMOOD

Co-Author(s): Muhammad ABDUL REHMAN SIDDIQUI, Shabbir DANISH, Rida SHAHZA

Purpose: Diabetic retinopathy (DR) is one of the leading causes of blindness worldwide. The gold standard DR screening is stereoscopic fundus photography with desktop cameras. VistaView (Volk Optical Inc, Ohio)

is a smartphone-based retinal camera which offers mydriatic retinal imaging.

Methods: This prospective study took place between December 2021 and June 2022 at a hospital in Karachi, Pakistan. Diabetic patients were imaged following mydriasis using both VistaView and Topcon cameras. All images were graded independently by two graders based on the International Classification of Diabetic Retinopathy (ICDR) criteria. Individual grades were assigned for DR and maculopathy in each image. Agreement between graders for each device was calculated as intraclass correlation coefficient (ICC) and Cohen's weighted kappa (95% CI).

Results: A total of 1,428 images were available from 371 patients with both cameras. A total of 1,231 images were graded. For VistaView, the ICC of DR grades was 78% (95% CI) between the two graders, while that of maculopathy grades was 66% (95% CI). The Cohen's kappa for DR grades of VistaView images was 0.61 (95% CI), while that for maculopathy grades was 0.49 (95% CI). For images from a desktop camera, the ICC of DR grades was 85% (95% CI, 83–87%), while that of maculopathy grades was 79% (95% CI, 75–82%). The Cohen's kappa for DR grades of desktop images was 0.68 (95% CI), while that for maculopathy grades was 0.65 (95% CI).

Conclusions: Agreement levels between graders using both fundus cameras are comparable. VistaView may be utilized for DR screening in teleophthalmology.

Abstract No.: 206553

Aquaporin-4 Modulates Cerebrospinal Fluid Dynamics In and Surrounding the Optic Nerve

First Author: Muneeb FAIQ

Co-Author(s): Kevin CHAN, Anoop SAINULABDEEN, Thajunnisa SAJITHA

Purpose: To quantify the role of aquaporin-4 (AQP4) in regulating cerebrospinal fluid dynamics within the optic nerve using contrast-enhanced MRI and conditional process analysis.

Methods: Adult C57BL/6J mice underwent lumbar intrathecal catheterization for infusion of gadolinium MRI contrast agent (Gd-DTPA) and were divided into 3 groups: Gd-DTPA only (Group 1; n=20), TGN020 (AQP4 inhibitor; i.p.) 45 min before Gd-DTPA (Group 2; n=14), and TGN073 (AQP4 enhancer; i.p.) 45 min before Gd-DTPA (Group 3; n=9). 3D T1-weighted MRI was performed at 7-Tesla (78µm x 78µm x 78µm isotropic, 10-min resolution). Each experiment totaled 120 min and included 3 baseline scans followed by continuous Gd-DTPA infusion (1.6 µL/min for 30 min) and 9 post-contrast scans. Signal intensity area-under-curve was quantified in the posterior/anterior optic nerve subarachnoid space (ONSAS-P/A) and optic nerve parenchyma (ONP-P/A). Mediation moderation

models (PROCESS v4.2, Model 59; 5,000 bootstraps, 95% CI) tested ONSAS-P as predictor and ONP-A as outcome, with ONP-P and ONSAS-A as mediators and group as moderator. Path coefficients were: a1 (ONSAS-P→ONP-P), a2 (ONSAS-P→ONSAS-A), b1 (ONP-P→ONP-A), b2 (ONSAS-A→ONP-A), and c' (direct ONSAS-P→ONP-A).

Results: Compared with no treatment (Group 1), AQP4 inhibition (Group 2) increased posterior→anterior SAS flow ($\Delta a2=+0.7503$, $p<0.001$) while reducing posterior→anterior parenchymal flow ($\Delta b1=-0.8828$, $p<0.01$), anterior SAS→parenchyma flow ($\Delta b2=-0.5318$, $p<0.001$), and posterior ONP-mediated indirect flow ($\Delta Ind1=-0.0563$, $p<0.01$). AQP4 enhancement (Group 3) strengthened posterior SAS→parenchyma flow ($\Delta a1=+0.3337$, $p<0.001$) and posterior→anterior SAS flow ($\Delta a2=+0.3734$, $p<0.001$), reduced anterior SAS→parenchyma flow ($\Delta b2=-0.6714$, $p<0.001$), and augmented direct posterior SAS→anterior parenchyma entry ($\Delta c'=+0.2036$, $p<0.001$). Direct comparison confirmed that TGN073 restored posterior SAS→parenchyma flow relative to TGN020 ($\Delta a1=+0.3050$, $p<0.05$; $\Delta c'=+0.2591$, $p<0.05$) while reducing reliance on posterior→anterior SAS flow ($\Delta a2=-0.3769$, $p<0.01$).

Conclusions: Inhibiting AQP4 may reduce cerebrospinal fluid dynamics in the optic nerve parenchyma and divert more flow to SAS, while enhancing AQP4 may facilitate posterior flow and parenchymal delivery.

Abstract No.: 207089

Associations Between Body Habitus, Exercise Levels and Retinal Microvascular Parameters on Optical Coherence Tomography Angiography in Chinese Elderly Patients

First Author: Hoi Yau Bertha **WONG**

Purpose: To investigate the association between body habitus, exercise level, and the microvascular parameters as measured on Cirrus Angioplex optical coherence tomography angiography (OCT-A) imaging.

Methods: This was a cross-sectional, random, population-based study on consecutive Chinese subjects aged 50 or above. Patients underwent best corrected visual acuity assessment (BCVA), body height and weight measurements, fat percentage, and visceral fat area determination. They were then divided into three groups according to regular exercise levels. Optical coherence tomography-angiography (OCT-A) was performed using scan protocol Angioplex 6x6 on the Carl Zeiss Cirrus 5000 Machine, determining Foveal avascular zone area (FAZ), vessel density (VD) and perfusion density. The right eye was used for analysis. Eyes diagnosed macular problem, glaucoma or other retinal disease also excluded. Physical activity habit was collected by validated questionnaires. Subjects were divided into three group, vigorous exercise, moderate exercise, and no exercise.

Results: A total of 1,029 subjects enrolled, including 372 males aged 62.09 ± 7.46 years, and 657 females aged 60.78 ± 7.15 years. Body Mass Index (BMI) was significantly negatively correlated to average exercise level. Subjects' mean BMI in vigorous exercise, moderate exercise, and no exercise groups were 24.78 ± 3.34 , 27.45 ± 52.96 , and 31.29 ± 52.99 , representatively. Mean FAZ area on OCTA for vigorous exercise, moderate exercise and no exercise groups were 0.26 ± 0.13 , 0.28 ± 0.14 and 0.28 ± 0.13 mm² respectively. Mean VD for the same groups were 16.19 ± 2.23 , 16.46 ± 2.17 and 16.51 ± 2.04 mm/mm², and mean PD for the same groups were 0.39 ± 0.06 , 0.40 ± 0.06 and 0.40 ± 0.05 respectively.

Conclusions: Exercise levels predict BMI and retinal vascularity, reflecting vascular health beyond blood pressure and comorbidities.

Abstract No.: 205969

Associations Between Metabolic Syndrome Components and Ophthalmologic Imaging Parameters Based on the Korea National Health and Nutrition Examination Survey

First Author: Woo Hyun **JUNG**

Co-Author(s): Jin Wook **JEOUNG**, Ki Ho **PARK**

Purpose: This study aimed to investigate the associations between components of metabolic syndrome and optical coherence tomography (OCT) parameters using data from the Korea National Health and Nutrition Examination Survey (KNHANES).

Methods: The OCT data collected from KNHANES were first adjusted for age, sex, and axial length. The risk of reduced retinal nerve layer thickness for each component of metabolic syndrome was then determined using logistic regression analysis.

Results: Hypertension was significantly associated with a higher likelihood of reduced retinal nerve fiber layer (RNFL) thickness (odds ratio [OR], 1.325; $p = 0.002$) and ganglion cell-inner plexiform layer (GCIPL) thickness (OR, 1.752; $p < 0.001$) compared with the normal population. In addition, increased waist circumference was significantly associated with a higher likelihood of reduced GCIPL thickness (OR, 1.334; $p = 0.027$).

Conclusions: Among the components of metabolic syndrome, hypertension and increased waist circumference were associated with structural damage to the retinal nerve layers. Patients with these conditions may therefore be at increased risk of diseases affecting the retinal nerve layers.

Abstract No.: 206852

Clinical Applications of Smartphone-Based Indirect Ophthalmoscopy: A Resident-Led Voyage

First Author: Laiba ASIF

Co-Author(s): Abdullah MAZHRY, Zia MAZHRY

Purpose: To demonstrate the feasibility and clinical utility of smartphone-based indirect ophthalmoscopy as a low-cost alternative to conventional fundus photography in resource-limited settings. This compilation was prepared in a tertiary eye care center with limited access to conventional fundus photography. A Samsung Galaxy S8 smartphone paired with a +20 diopter (D) indirect ophthalmoscopy lens was utilized as an alternative imaging tool. The smartphone's in-built flashlight served as the illumination source, with no external adapters or modifications required. Pupillary dilation was performed in all cases, and imaging was carried out in a darkened environment to optimize retinal visualization. Real-time videos were captured by aligning the smartphone camera with the indirect lens and later compiled to highlight representative cases across outpatient, bedside, and emergency settings.

Methods: Smart phone indirect ophthalmoscopy provided high quality fundus photographs that proved to be equally good as traditional fundus photography.

Results: Smart phone indirect ophthalmoscopy provided high quality fundus photographs that proved to be equally good as traditional fundus photography.

Conclusions: Smartphone indirect ophthalmoscopy is a practical, affordable, and effective tool for retinal imaging, particularly valuable in resident training, bedside evaluations, and resource-limited settings. With minimal equipment and no need for expensive infrastructure, it enables real-time documentation and enhances clinical decision-making in routine ophthalmic practice.

Abstract No.: 205687

Clinical and Multimodal Imaging Features of Focal Choroidal Excavation in Central Serous Chorioretinopathy

First Author: Sumit RANDHIR SINGH

Co-Author(s): Jay CHHABLANI, Nasiaq HASAN, Niroj SAHOO

Purpose: To report the clinical and multimodal imaging features of focal choroidal excavation (FCE) in eyes with central serous chorioretinopathy (CSCR) and compare with CSCR without FCE.

Methods: This was a multicenter, retrospective study. Multimodal imaging was performed at baseline and follow-up visits. Qualitative and quantitative parameters on optical coherence tomography (OCT): location of FCE (subfoveal or extrafoveal), number,

and types (conforming or non-conforming), and CSCR disease activity (active or inactive), were documented. OCT parameters were compared between CSCR-FCE group and their fellow eyes and CSCR eyes without FCE. P-value ≤ 0.05 was considered statistically significant.

Results: Among 1458 CSCR patients, 26 eyes (25 patients) with mean age of 50.8 ± 10.1 years had FCE (prevalence rate: 1.71%). 22 eyes had CSCR in the FCE eye, whereas the remaining four eyes with FCE (2: PPE, and 2: normal) were fellow eyes. At baseline, 13 eyes (59.1%) had conforming FCE, which increased to 17 eyes (77.3%) through the last visit. Prevalence of CNVM was comparable between both groups: CSCR with FCE (3 eyes, 13.6%) compared to 202 eyes in CSCR without FCE group (202 eyes, 14.1%; $p=0.99$). Presence of DLS (45.5% vs 38.5% ; $p=0.05$) and length of DLS ($1585.9 \pm 836.6 \mu\text{m}$ vs $1151.7 \pm 845.9 \mu\text{m}$; $p=0.02$) were significantly higher in the CSCR-FCE group.

Conclusions: Overall prevalence rate of FCE in CSCR is low, with FCE being more common in CSCR compared to their fellow eyes. These appear to remain stable over time; the rate of CNVM formation with CSCR-FCE eyes is not different from CSCR eyes without FCE.

Abstract No.: 201257

Comparison of Wide-field Versus Standard Optical Coherence Tomography in Retinal Imaging

First Author: Jae Rock DO

Co-Author(s): Yong Koo KANG, Dong Hyun KIM, Yoo Min KIM, Dong Ho PARK

Purpose: To compare the clinical performance of the RS-1 and Spectralis optical coherence tomography (OCT)/OCT angiography (OCTA) systems in patients with macular neovascularization (MNV) and in vitrectomized eyes with gas tamponade for retinal detachment (RD).

Methods: Patients with MNV and RD underwent imaging with RS-1 (Nidek Co., Gamagori, Japan) and Spectralis OCT (Heidelberg Engineering, Heidelberg, Germany) during a single examination session using standardized structural OCT and OCTA protocols. Image acquisition time, artifact rate, segmentation accuracy, and the agreement between MNV area on OCTA and indocyanine green angiography (ICGA) were evaluated. In addition, foveal contour delineation was assessed in vitrectomized eyes with gas tamponade for RD.

Results: On structural OCT, RS-1 provided faster acquisition and a lower artifact rate compared with Spectralis. Shadowing was less frequent with RS-1, and mirror artifacts were not observed. In vitrectomized RD eyes with gas tamponade, foveal contour delineation was more reliable with RS-1. On OCTA, RS-1 also achieved faster acquisition, superior segmentation accuracy, and greater agreement of the MNV area with ICGA.

Conclusions: Compared with Spectralis, the RS-1 OCT/OCTA system demonstrated faster acquisition, fewer artifacts, more reliable foveal contour delineation under gas tamponade, and superior accuracy in MNV evaluation. These findings suggest that RS-1 may provide improved clinical utility in both routine retinal imaging and challenging conditions such as post-vitrectomy eyes.

Abstract No.: 202195

Decoding Myopia: Effects on Ganglion Cell-Inner Plexiform and Nerve Fiber Layers

First Author: Shew Fei CHEE

Co-Author(s): Daniel PHANG

Purpose: To compare the ganglion cell inner plexiform layer (GCIPL) and retinal nerve fiber layer (RNFL) thickness profiles between mild, moderate and severe myopic patients by spectral domain optical coherence tomography (SD OCT).

Methods: This was a single-centre cross-sectional study. 60 eyes of 30 myopic patients were studied. All patients underwent a comprehensive ophthalmic evaluation and SD-OCT examination. The patients were grouped based on their spherical equivalent (SE). Low myopia is defined as SE <-3.0 diopter (D), moderate myopia is defined as between -3.0 to -6.0 D, and severe myopia is defined as >-6.0 D.

Results: The RNFL thickness were significantly different among the different myopia groups in all quadrants (average RNFL $p < 0.001$, superior RNFL $p < 0.001$, nasal RNFL $p < 0.001$, inferior RNFL $p < 0.001$, and temporal quadrant $p = 0.020$). Post-hoc test showed that the RNFL thickness were significantly thinner in the severe myopic group as compared to the low myopic group in all quadrants. The average GCIPL and GCIPL thickness in all sectors were significantly different across all myopia groups. Post-hoc analysis demonstrated GCIPL thickness were significantly thinner in the high myopia group compared to the low myopia group in all sectors. Both average RNFL thickness and average GCIPL thickness were correlated significantly with SE and axial length.

Conclusions: This finding suggests that higher levels of myopia are associated with thinner retinal layers, which could have implications for the diagnosis and management of ocular conditions in myopic patients, particularly those with concurrent glaucoma.

Abstract No.: 200193

Diagnostic Utility of IOL Master 700 in Anterior Lenticonus: A Case Report of Alport's Syndrome

First Author: Vishweshwarraiah R DONGRE

Co-Author(s): Siddharam S JANTI, Raghavendra Rao KOLAVALI, Pravalika REBBALA, Hari Kumar S

Purpose: To describe the diagnostic utility of the IOL Master 700 in identifying anterior lenticonus in a young male with systemic manifestations of Alport's syndrome and to highlight the role of anterior segment imaging in diagnosis.

Methods: A 22-year-old male presented with bilateral progressive blurring of vision over two years. His systemic history included chronic renal dysfunction, bilateral sensorineural hearing loss, and a family history suggestive of hereditary nephropathy. A comprehensive ocular examination and multimodal imaging, including slit-lamp photography, anterior segment OCT (AS-OCT), and swept-source OCT biometry (IOL Master 700, Carl Zeiss Meditec), were performed.

Results: Visual acuity was reduced in both eyes with high myopic correction and no significant improvement. Slit-lamp examination revealed the classic oil droplet reflex and anterior bowing of lens due to anterior lenticonus. AS-OCT confirmed anterior bulging of the lens surface. Swept-source OCT imaging with IOL Master 700 clearly delineated the conical protrusion of the anterior lens capsule in both eyes. Slit-lamp, IOL Master 700, and AS-OCT images for both eyes demonstrated symmetrical central anterior lenticonus. Systemic evaluation confirmed renal dysfunction, proteinuria, and bilateral sensorineural hearing loss. Renal biopsy and genetic testing supported a diagnosis of Alport's syndrome.

Conclusions: This case highlights the role of the IOL Master 700 in diagnosing anterior lenticonus, a hallmark ocular finding of Alport's syndrome. The swept-source OCT imaging provides high-resolution visualization of the anterior lens curvature, enabling early and non-invasive diagnosis even in patients with subtle clinical findings. Early ophthalmic identification is critical for guiding systemic evaluation and multidisciplinary management.

Abstract No.: 201791

Ectopic Inner Foveal Layer as Post Pars Plana Vitrectomy Prognostic Predictor in Eyes With Idiopathic Epiretinal Membrane

First Author: Jiyang TANG

Co-Author(s): Xiaoxin LI, Heng MIAO, Yaoyao SUN

Purpose: To analyze the correlation between ectopic foveal inner layer (EIFL) and the EIFL-based epiretinal membrane (ERM) staging system with the 6-month anatomical and functional prognosis post pars plana vitrectomy (PPV) combined with cataract surgery.

Methods: Medical records and optical coherence tomography (OCT) parameters including ERM stage, disorganization of the retinal inner layers (DRIL) severity, central foveal thickness (CFT), EIFL thickness, macular edema (ME), outer nuclear layer thickness, ellipsoid zone disruption and cotton-wool sign of 354 ERM eyes of 339 patients with 6-month post-surgery follow-up were retrospectively analyzed.

Results: Preoperative ERM stage (τ -b=0.196, $P<0.001$), DRIL severity (τ -b=0.248, $P<0.001$), CFT ($R=0.387$, $P<0.001$) and EIFL thickness ($P=0.315$, $P<0.001$) were positively correlated with logMAR best corrected visual acuity (BCVA) at 6 months. ERM stage (τ -b=0.285, $P<0.001$) and DRIL severity (τ -b=0.239, $P<0.001$) were positively correlated with CFT at 6 months. No significant correlation was found between ERM staging ($P=0.054$) with ME resolution at 6 months. More advanced ERM stage ($R=0.494$, $P<0.001$) and DRIL severity ($R=0.379$, $P=0.005$) were significantly correlated with persistent newly onset ME at 6 months.

Conclusions: ERM staging based on EIFL could be a simple and intuitive way to predict functional and anatomical outcomes post-PPV; EIFL thickness were positively correlated with post-operative logMAR BCVA, while advanced ERM stages and DRIL severity were positively correlated with logMAR BCVA, CFT and persistent newly-onset ME at 6 months.

Abstract No.: 200181

Evaluating Progression Thresholds in Varied Stages of Keratoconus: Precision in Corneal Epithelium Measurements for Predicting Disease Progression

First Author: Jinhai **HUANG**

Co-Author(s): Rui **NING**, Yiran **WANG**, Xingtao **ZHOU**

Purpose: This study aims to evaluate the repeatability and reproducibility of corneal epithelium thickness (ET) measurements using a spectral-domain optical coherence tomographer (SD-OCT)/Placido topographer (MS-39, CSO, Florence, Italy) in a keratoconus (KC) population across various stages and to establish progression thresholds for assessing KC advancement.

Methods: In this study, 149 eyes were categorized into four groups: forme fruste keratoconus (FFKC) (29 eyes), mild KC (34 eyes), moderate KC (40 eyes), and severe KC (46 eyes). We utilized the within-subject standard deviation (Sw), test-retest variability (TRT), coefficient of variation (CoV), and intraclass correlation coefficient (ICC) to assess intraoperator repeatability and interoperator reproducibility.

Results: The MS-39 demonstrated acceptable repeatability and reproducibility in KC patients, with ICC values ranging from 0.732 to 0.954. However, patients with more advanced KC stages and progressive peripheralization of measurement points exhibited higher TRTs alongside a thinning trend. This study

proposes cut-off values for mild, moderate, and severe KC at 4.9 μ m, 5.2 μ m, and 7.4 μ m, respectively, for thinnest epithelium thickness (TET). For central epithelium thickness (CET), the recommended cut-off values for mild, moderate, and severe KC are 2.8 μ m, 4.4 μ m, and 5.3 μ m, respectively.

Conclusions: This study revealed a decrease in the precision of the MS-39 when measuring patients with more severe KC and at more peripheral corneal points. Given the significant variance in ET measurements by MS-39 across different KC stages, accurate grading of KC patients is essential to minimize errors in clinical decision-making.

Abstract No.: 203380

Evaluation of a Virtual Reality Headset at a Tertiary Care Ophthalmology Setting

First Author: Rustum **KARANJIA**

Co-Author(s): Catherine **DANG**, Hong An **NGUYEN**, Soumya **PODURY**

Purpose: The purpose of this study was to validate and assess the use of a Virtual Reality Headset for VF testing in a tertiary care setting.

Methods: prospective, interventional study conducted at the University of Ottawa Eye Institute. There are two phases in this study: Phase 1 is the estimated recruitment of 50 normal subjects and 50 affected subjects; and Phase 2 involves recruitment of 100 randomly selected (RS) subjects. For Phase I, normal subjects were recruited as staff and colleagues, while the affected subjects were recruited from clinics and underwent the HFA and VR within the same week.

Results: 135 eyes from 72 subjects (54 eyes from the normal group and 81 eyes from the affected group) were analyzed prospectively. In the normal group HFA and VR results revealed no significant differences in mean PSD (1.52 ± 0.62 dB and 1.63 ± 0.54 dB, $p=0.27$). Interestingly, there was a significant difference in VFI and MD. However, the differences were not clinically meaningful. In the affected group mean VFI and MD were found to be significantly different. The difference in mean PSD values was nonsignificant different. Test duration was longer with the VR system in both groups.

Conclusions: Our data demonstrates that test duration of the VR headset was longer than the HFA in both groups. VFI and MD values were statistically different, while PSD values remained comparable. VR headsets hold promise to increase testing capacity and allow for potential remote monitoring of patients in a tertiary care setting.

Abstract No.: 201380**Fine-Tuning RETFound and VisionFM for Diabetic Retinopathy Staging on Ultra-Widefield Images***First Author: Danqi FANG**Co-Author(s): Carol Y CHEUNG, Hongyang JIANG, Xujia LIU, Ka Ho SZETO*

Purpose: Current AI-based systems for diabetic retinopathy (DR) assessment using conventional fundus photographs are limited by a relatively narrow field-of-view. Ultra-Widefield (UWF) imaging captures up to 200° in a single shot, enabling a more comprehensive retinal evaluation. Foundation models (FMs) have demonstrated strong potential for downstream tasks. This study fine-tuned two foundation models (RETFound and VisionFM) to classify DR into four stages (no/mild, moderate, severe NPDR, PDR) and their performances were compared.

Methods: A total of 14,991 UWF images (3,175 eyes from 1,783 patients with diabetes from two centres) were included. DR labeling was performed by retina specialists according to the International Clinical Diabetic Retinopathy Disease Severity Scale. Two foundation models (RETFound and VisionFM) were fine-tuned and AI algorithms were trained and validated for DR staging, respectively.

Results: In overall performance metrics across four DR stages, the VisionFM-based model demonstrated slightly better performance compared with the RETFound-based model, with an accuracy of 93.16% (92.16–94.16) versus 91.55% (90.52–92.59), sensitivity of 92.07% (90.85–93.20) versus 91.06% (89.77–92.22), and specificity of 97.76% (96.76–98.76) versus 97.32% (96.32–98.32). All between-model differences were statistically significant ($P < 0.001$) with large effect sizes (Cohen's d -1.57 to -3.34). For each DR stage, both models demonstrated good performance, with sensitivities exceeding 85%, specificities and accuracies all surpassing 95%.

Conclusions: Under the FM-based framework, our models achieved good performance in DR staging on UWF images, highlighting its potential for more comprehensive DR screening.

Abstract No.: 206774**From Ischaemia to Intervention: A Closer Look at CRAO***First Author: Prem SAI.T**Co-Author(s): Roshita GARGAIN, Janani KRISHNAN, Krithika M, Padma REKA*

Purpose: CRAO is an ocular emergency that occurs when the central retinal artery becomes blocked, causing ischemic damage to the retina and resulting in vision loss. Presenting a case of CRAO in a young female with no known comorbidities.

Methods: A 35-year-old female with no prior health issues, presented with sudden painless vision loss in her left eye (LE) 18 hours after symptom onset. Visual acuity was 1/60 in the LE and 6/6 in the right eye (RE). Intraocular pressure was normal. RAPD noted in LE. Fundus examination revealed a pale retina and cherry red spot in the macula of the LE, typical of CRAO.

Results: Diagnostic tests showed iron deficiency anemia, and Doppler ultrasound confirmed total occlusion of the left central retinal artery.

Conclusions: Retinal vascular occlusions can signal underlying systemic diseases. Aggressive treatment and a comprehensive systemic workup are necessary for optimal management of CRAO.

Abstract No.: 204078**Macrophage-Like Cell Changes in Diabetic Retinopathy Were Observed Based on Enface-OCT***First Author: Shuyu ZHAO*

Purpose: To observe the changes in the density of macrophage-like cells in diabetic retinopathy by OCTA.

Methods: Retrospective study. Conducted from 1 January 2022 to 1 January 2024, patients with diabetic retinopathy were recruited from Foshan Aier Eye Hospital. All patients underwent a fundus examination, fluorescein angiography (FFA), optical coherence tomography (OCT), and OCTA examination after pupil dilation. Macrophage-like cells (MLCs) were examined using ImageJ on OCTA-enface images. MLCs were quantified using ImageJ on OCTA-enface images.

Results: A total of 53 eyes were included in the study. BCVA in PDR patients was 0.7 ± 0.3 , which was significantly higher than the 0.3 ± 0.2 observed in NPDR patients ($p < 0.001$). Patients in the PDR group experienced a greater increase in mean CST than those in the NPDR group. 4 ± 53.1 vs. 217.5 ± 21.5 , $p < 0.01$, as well as a decrease in FAZ area (0.4 ± 0.1 vs. 0.3 ± 0.1 , $p < 0.001$). MLCs in PDR were 472.5 ± 114.9 vs. 260.7 ± 50.1 in NPDR; both comparisons were statistically significant ($p < 0.001$). MLC density in PDR was 13.2 ± 3.1 vs. 7.2 ± 1.4 in NPDR; both comparisons were statistically significant ($p < 0.001$). Among enrolled DR patients, MLCs were positively correlated with BCVA, CST, and FAZ area (OR = 0.732, 0.881, and 0.732, respectively, $p < 0.01$). Among patients with PDR combined with DME, MLC density showed a positive correlation with CST (OR = 0.911, $p < 0.01$) and negatively correlated with SCP blood flow density (OR = -0.873, $p < 0.01$).

Conclusions: MLCs are involved in the pathologic process of diabetic retinopathy, and the number of MLCs is significantly increased in PDR with DME.

Abstract No.: 200538

Magnification Correction in Fundus Imaging After ICL Implantation and Its Clinical Implications for Image Evaluation

First Author: Xuewen DING

Co-Author(s): Fan LU, Yilei SHAO

Purpose: To evaluate the impact of phakic posterior chamber implantable collamer lens (ICL) implantation on the magnification of swept-source optical coherence tomography (SS-OCT) images, establish an axial length (AL)-based correction model, and validate its clinical value.

Methods: This prospective study included 76 eyes of 39 patients with myopia. SS-OCT scanning laser ophthalmoscopy (SLO) and OCT angiography (OCTA) images were acquired preoperatively and 1 month postoperatively. MATLAB-based image registration algorithms were employed to quantify magnification correction factors in horizontal (Mx) and vertical (My) directions between pre- and post-operative fundus images. These factors, defined as the ratio of post-operative to pre-operative imaging field, quantify the changes in magnification induced by ICL implantation. Stepwise multiple linear regression was performed to develop predictive models. Postoperative OCTA images were geometrically corrected using regression equations. The foveal avascular zone (FAZ) was semi-automatically segmented via a custom MATLAB program, and its area was calculated. One-Way ANOVA was employed to compare the differences in FAZ area among the preoperative group, postoperative uncorrected group, and postoperative corrected group.

Results: Postoperative fundus images showed systemic magnification ($Mx = 0.9689 \pm 0.0269$; $My = 0.9689 \pm 0.0234$), indicating that a 3.11% reduction in magnification was required in both horizontal and vertical dimensions for optimal registration with preoperative images. Multivariate regression identified AL as the core predictor: $Mx = 1.292 - 0.012 \times AL$ ($R^2 = 0.464$, $P < 0.001$), $My = 1.238 - 0.010 \times AL$ ($R^2 = 0.412$, $P < 0.001$). The ANOVA results revealed statistically significant differences in FAZ area measurements across the three groups ($P = 0.026$). Post hoc analysis demonstrated that the postoperative uncorrected FAZ area was significantly larger than the preoperative baseline ($0.32 \pm 0.10 \text{ mm}^2$ vs. $0.28 \pm 0.08 \text{ mm}^2$, $P = 0.014$). In contrast, the postoperative corrected FAZ area showed strong agreement with preoperative measurements ($0.29 \pm 0.09 \text{ mm}^2$ vs. $0.28 \pm 0.08 \text{ mm}^2$, $P = 0.823$). These findings confirm systematic overestimation bias in uncorrected postoperative FAZ measurements.

Conclusions: Individualized AL-based magnification correction is essential to eliminate measurement deviations in en face macular parameters caused by ICL implantation.

Abstract No.: 206264

Morphological Characteristics of Anterior Segment in Patients With Familial Exudative Vitreoretinopathy

First Author: Yarou HU

Purpose: To investigate the morphological characteristics of anterior segment (AS) in eyes with familial exudative vitreoretinopathy (FEVR) and its relevance to retinal traction.

Methods: In this case-control study, 48 eyes with FEVR and 48 healthy eyes matched for gender, age, spherical equivalent (SE), and pupil diameter (PD) were recruited. All participants underwent cycloplegic optometry and AS-optical coherence tomography examination using CASIA 2 to obtain SE and morphometric data.

Results: Compared with matched controls (31% female, mean age 8 years, SE -3.00 D, PD 6 mm), the FEVR group showed significantly decreased white to white ($P=0.02$), anterior chamber depth and width ($P<0.001$), aqueous depth ($P<0.001$), angle recess to angle recess ($P=0.009$), lens diameter ($P=0.03$), anterior lens surface curvature radius ($P=0.002$), decentration ($P=0.004$), anterior chamber angle ($P<0.05$). In contrast, there was an increase in overall corneal thickness ($P<0.05$), iris curvature ($P=0.001$), lens thickness ($P=0.02$), crystalline lens rise ($P<0.001$) and lens vault ($P<0.001$). These metrics also differed significantly between FEVR eyes with and without retinal traction (including retinal folds).

Conclusions: Young patients with FEVR, especially those with retinal traction (indicating severer FEVR), exhibited significantly crowded AS consisting of forward protruding near-spherical lens, shallow anterior chamber, iris bombe and narrow anterior chamber angle, which may predispose patients to severe AS complications, particularly angle-closure glaucoma (ACG). The findings highlight the necessity for longitudinal monitoring of FEVR-AS and development of personalised management strategies to facilitate early intervention and treatment. We also recommend exercising greater caution in diagnosing primary ACG until thorough examinations of peripheral retina.

Abstract No.: 208325

Pterygium-Derived Artifact Simulating an Intraocular Tumor With Ultrawide-Field Imaging

First Author: Danqi FANG

Purpose: To report a rare case of ultrawide-field imaging artifact mimicking a choroidal mass caused by a nasal pterygium, highlighting the importance of recognizing imaging artifacts to avoid misdiagnosis.

Methods: A 56-year-old woman presented with a one-year history of a shadow in the nasal visual field of her left eye. Best-corrected visual acuity was 20/20 in both

eyes. Slit-lamp examination revealed a nasal pterygium. Ultrawide-field imaging showed a solitary, elevated, yellowish-gray lesion in the temporal peripheral fundus, initially suspected to be a choroidal melanoma. Further evaluation included dilated fundus examination with a 3-mirror contact lens, B-scan ultrasonography, and orbital magnetic resonance imaging (MRI).

Results: No intraocular mass was detected on dilated fundus exam, B-scan, or MRI. The lesion seen on ultrawide-field imaging was determined to be an artifact caused by the nasal pterygium. After surgical excision of the pterygium with autologous conjunctival transplantation, the artifactual lesion disappeared on repeat imaging.

Conclusions: Ultrawide-field imaging can produce artifacts that mimic intraocular pathology, such as choroidal tumors. Awareness of such artifacts is essential to prevent unnecessary investigations and misdiagnosis. Multimodal imaging and clinical correlation are recommended when atypical lesions are identified.

Abstract No.: 200421

Split Retinal Nerve Fiber Layer Bundles: A Potential Pitfall in Glaucoma Diagnosis

First Author: Truong Dang Minh **PHAM**

Co-Author(s): Ngoc Phuong Vy **LY**, Thao Huong **NGUYEN**

Purpose: Split retinal nerve fiber layer (RNFL) bundles were described in normal eyes, primarily in young people. This phenomenon is physiologic rather than pathologic. We describe an ocular hypertension (OHT) patient with split RNFL bundles that could lead to glaucoma misdiagnosis.

Methods: Case report.

Results: A 22-year-old female sought a regular eye check-up due to her history of OHT/glaucoma suspect and moderate myopia three years ago. Tafluprost eye drops were indicated. She adhered well to treatment, stabilizing intraocular pressure between 13 and 15mmHg and maintaining 6/6 best-corrected visual acuity. Her sister was diagnosed with bilateral OHT and myopia. Her right and left eye's spherical equivalent was -4.5D and -5.25D and central corneal thickness was 490 and 494 μ m, respectively. The anterior segment was unremarkable, with open anterior chamber angles. The optic disc was tilted bilaterally with optic cup enlargement and normal macula. Optical Coherence Tomography (OCT) revealed bilateral superior peripapillary RNFL thinning compared to normal values. The superior segment had split RNFL bundles in the RNFL thickness maps and a double-hump pattern in the RNFL thickness graph. Her sister also had the same RNFL pattern. OCT macula scans and visual field returned normal. A diagnosis of previous OHT/moderate myopia was made. She was advised to stop Tafluprost and return for follow-ups.

Conclusions: Split RNFL bundles are a variation that can lead to red disease by giving the appearance of local RNFL defects. This configuration should be considered when interpreting OCT results, especially in glaucoma suspects.

Abstract No.: 208324

Symmetry of Optical Coherence Tomography Angiography Optic Nerve Head Metrics in Healthy Subject

First Author: Danqi **FANG**

Co-Author(s): Hao-yu **CHEN**, Carol Y **CHEUNG**, Xiaoting **MAI**, Dawei **YANG**

Purpose: To assess the symmetry of quantitative OCTA ONH metrics in healthy subjects.

Methods: Thirty-three healthy young subjects were enrolled in this prospective study. The ONH of both eyes were imaged four times by an OCTA (DRI OCT Triton, TOPCON) using a 3mm $\times$ 3mm mode with dilated pupils. Images of the radial peripapillary capillary were analyzed by a customized Matlab program, and the following metrics were measured: vessel density, fractal dimension, and vessel diameter index. The most well-centered optic disc from the four repeated scans was then selected for the symmetry analysis using the Pearson correlation coefficient (r), ICC and Bland-Altman plots.

Results: A total of 33 healthy subjects were enrolled in the study. Good to excellent interocular correlation was observed for papillary vessel density (ICC = 0.857), vessel diameter index (ICC = 0.857) and fractal dimension (ICC = 0.906), while circumpapillary vessel density exhibited moderate interocular correlation (ICC = 0.687). Bland-Altman plots revealed an agreement range of -5.26% to 6.21% for circumpapillary vessel density.

Conclusions: The interocular correlations of papillary vessel density, fractal dimension and vessel diameter index were high, but the correlation for circumpapillary vessel density was only moderate. Our data would help to choose proper control and interpret whether the difference between two eyes are within normal range.

Abstract No.: 200602

The Safety of Terahertz Scanning System on Corneas: Preclinical Evidence and Phase I Clinical Trial

First Author: Chang **LIU**

Co-Author(s): Ke **LIN**, Yu-chi **LIU**, Jodhbir **MEHTA**, Mingyi **YU**

Purpose: Terahertz waves are electromagnetic radiation with a fast scanning speed (30ms per scan) to meet medical diagnostic needs. It provides an accurate result for the estimation of corneal thickness. This

study aims to establish the safety profile of the use of the Terahertz scanning system in human corneas.

Methods: The Phase I safety study was conducted in 6 “non-seeing” eyes with normal corneas. All participants underwent clinical evaluations, including UDVA, CDVA, slit lamp examination, external eye photo, pentacam, ASOCT, fundus photo, specular microscopy, in vivo confocal microscopy at baseline, immediately after Terahertz scanning, 1 day, 1 week, and 1 month after Terahertz scanning.

Results: There were no changes in UDVA and CDVA of patients after Terahertz scanning. The corneas remained clear without corneal haze formation and the lens was clear with no opacity. Central corneal thickness was at a consistent level over 1 month after Terahertz scanning, and there were no signs of vitritis, retinitis or optic neuropathy. There was no significant changes in corneal curvature after Terahertz scanning. There were no significant changes in corneal endothelial density after Terahertz scanning. Corneal epithelial cells, corneal nerves, and keratocytes, as well as endothelial assessed by in vivo confocal microscopy, were not affected after Terahertz scanning.

Conclusions: Terahertz scanning is safe on human corneas, and it holds the potential to evaluate corneal hydration and opacity in clinical settings.

Abstract No.: 203619

Ultra-Deep Wide-Field Swept-Source OCT Improves Assessment of Posterior Vitreous Detachment: A Comparative Study

First Author: Zhuangling LIN

Purpose: To compare the ultra-deep mode and the standard mode of swept-source optical coherence tomography (SS-OCT) in assessing posterior vitreous detachment (PVD).

Methods: The retrospective study included 178 eyes from 100 patients diagnosed with epiretinal membrane or macular hole, comprising both affected and fellow eyes. After mydriasis, all eyes underwent two SS-OCT scanning modes (Ultra-Deep Mode: 26mm length, 12mm depth; Standard Mode: 16mm length, 3mm depth) with 18-line radial scans centered on the fovea. PVD staging consistency was compared between the two modes, as well as the visibility of the posterior vitreous cortex (PVC) and Weiss ring in complete PVD.

Results: The inter-mode consistency was high in PVD staging ($\kappa=0.981$, $P<0.001$), with 100.0% agreement in diagnosing complete PVD. Among the 107 eyes diagnosed with complete PVD, detached PVC was observed in 105 eyes (98.13%) using the Ultra-Deep Mode compared to 51 eyes (47.66%) using Standard Mode ($P<0.001$). The Ultra-Deep Mode allowed visualization of PVC in more quadrants ($P<0.001$). Weiss ring was detected in 4 eyes (3.7%) in the Ultra-Deep Mode and 17 eyes (15.9%) in the

Standard Mode ($P=0.003$). In the cases of complete PVD, both modes revealed a higher prevalence of detached PVC in the inferior quadrant compared to the superior quadrant (Standard Mode: 44.9% vs. 14.0%, $P<0.001$; Ultra-Deep Mode: 98.1% vs. 44.7%, $P<0.001$).

Conclusions: The Ultra-Deep Mode (scan length: 26 mm, scan depth: 12 mm) improves diagnostic certainty of complete PVD by enhancing visualization of both detached PVC and Weiss rings.

Abstract No.: 206576

Ultrasound Biomicroscopy Pars Plana Fungal Foci in Postoperative Endophthalmitis

First Author: Erika Jean SALVAME

Purpose: To describe an occurrence of persistent post-cataract surgery endophthalmitis presenting with foci of fungal deposit at the pars plana seen by ultrasound biomicroscopy and endoscopic vitrectomy.

Methods: This is a case report from a tertiary hospital in a developing country.

Results: A 55-year-old male underwent complicated phacoemulsification. 1 week postop, VA decreased to hand movement (HM) with hypopyon. No improvement on intravitreal antibiotics prompted pars plana vitrectomy. Vision improved to 20/80, but by 1 month post-operation, VA decreased to HM. B-scan revealed vitritis. Pre-operative ultrasound biomicroscopy revealed a hyperechoic nodule at the pars plana extending to the adjacent detached retina. Patient underwent intraocular lens explantation, and retinal detachment surgery. Intra-operative endoscopic evaluation revealed cream feathery mounds at the pars plana. Microbiological workup revealed spores and pseudohyphae suspicious of candida species. Intravitreal and systemic anti-fungal treatment was initiated.

Conclusions: Fungal endophthalmitis is a potentially devastating postoperative complication. Its clinical course is nonspecific and can be confounded by initial improvement and low grade prolonged inflammation. This case highlights the importance of multimodal platforms of imaging in identifying foci of infections. Adjunct intraoperative visualization platforms may also aid in better yield of samples for diagnostic evaluation.

Abstract No.: 200377

Utility of Preoperative Swept Source Optical Coherence Tomography in Diabetic Vitrectomy

First Author: Arshad MEHMOOD

Co-Author(s): Muhammad ABDUL REHMAN SIDDIQUI, Altamash Shahriyar GHAZANFAR

Purpose: To determine benefit of preoperative swept source optical coherence tomography (SS-OCT) to

detect occult retinal pathologies in patients with advanced diabetic eye disease.

Methods: Fundus photos and SS-OCT were performed preoperatively in all patients scheduled for diabetic vitrectomy between January 2017 to August 2022. Fundus photos and SS-OCT scans were reviewed by two retina specialists. We used modified BIO-score on fundus photos to evaluate fundus clarity. This modified BIO-score was based on Nussenblatt scale of vitreous haze (5). According to this score a 5+ vitreous haze is the one in which no fundus can be seen while a 0 score was given to no vitreous haze and clear view of fundus. Findings on fundus photos were compared with findings on SS-OCT

Results: 38 eyes of 35 patients were included. Cataract of variable severity was present in 22 eyes. In our sample, 84.2% of cases had a BIO score of 3 or more and 31.6% had a BIO score of 4 or 5. The most common diagnosis on fundus photos was vitreous haemorrhage in 23 cases. While the most common diagnosis on SS-OCT was TRD in 21 cases. Only 3 cases had no view on SS-OCT.

Conclusions: SS-OCT may be beneficial in preoperative management of diabetic vitrectomy especially in cases of vitreous hemorrhage. SS-OCT should be considered as an adjunct to clinical examination for preoperative evaluation of retina when the fundus view is hazy such as in presence of vitreous hemorrhage

Abstract No.: 204746

When Bilateral Retinal Detachment Is Not Straightforward: Lessons From Multimodal Imaging

First Author: Swati **SHARMA**

Co-Author(s): Abhishek **KUMAR**, Ramandeep **SINGH**, Vishnu **TODI**

Purpose: To present a rare case of acute retinal necrosis causing panuveitis with retinal detachment: a diagnostic dilemma.

Methods: A 54-year-old male presented with complaints of sudden onset progressive diminution of vision in the left eye, followed by the right eye, after 4 months of being treated elsewhere as a case of panuveitis. Outside documents revealed treatment with suboptimal doses of oral steroids and methotrexate. Over time, he developed retinal detachment in his left eye, followed by his right eye, and was referred to a higher center with a diagnosis of bilateral exudative retinal detachment. Visual acuity in both eyes was hand motions. Intraocular pressure was 11mmHg OD and 10mmHg OS. The anterior segment showed pigmented keratic precipitates on the corneal endothelium. There was no significant past history. Systemic workup was WNL. The anterior chamber had no cells, and a few pigments were present on the anterior lens capsule; retrolental cells were also

present. On fundus examination, both eyes had retinal detachment with a sheet of vitreous condensation above the disc in the left eye; the peripheral retina had scarring and pigmentary changes. On indentation, no break was found in either eye.

Results: FAF of both eyes had tongue-shaped, well-defined hypoautofluorescent lesions with hyperautofluorescent borders with scalloped edges. SD-OCT revealed macular detachment. FFA revealed hyper- and hypofluorescent lesions in the periphery, suggestive of scarring. In the right eye, inferotemporal choroidal nonperfusion areas. Disc hyperfluorescence was seen in both eyes.

Conclusions: On the basis of tongue-shaped hypoautofluorescent lesions along with FFA showing CNP areas, a diagnosis of retinal detachment following acute retinal necrosis was made.

Abstract No.: 202096

Wide-Field Anterior Segment Shape Assessment With Anterior Segment Optical Coherence Tomography: A Comparison Between Keratoconus and Normal Eyes

First Author: Yuki **ARAI**

Co-Author(s): Takahiro **HIRAOKA**, Gaku **KIUCHI**, Tetsuro **OSHIKA**

Purpose: Scleral lenses and specialty soft contact lenses are increasingly reported as effective options for visual rehabilitation. Lens fitting is mainly influenced by scleral and peripheral corneal morphology, rather than the central cornea. However, peripheral shape characteristics in keratoconus (KC) eyes remain insufficiently investigated. We compared anterior segment morphology between KC and normal eyes.

Methods: We analyzed 23 normal eyes of 23 subjects (mean age, 37.2±17.8 years) and 16 KC eyes of 16 subjects (mean age, 37.8±17.2 years) with no history of ocular surgery. Anterior segment optical coherence tomography (CASIA2) was performed to obtain elevation maps. Mean sagittal height (Sag) values were derived using least-squares elliptical fitting at diameters of 3, 5, 7, 9, 11, and 13 mm. Sag differences (Δ Sag) between adjacent diameters (3–5, 5–7, 7–9, 9–11, 11–13 mm) were calculated and compared between groups.

Results: Δ Sag values at 3–5 mm, 5–7 mm, and 7–9 mm were significantly greater in KC than in normal eyes (265 ± 11.4 vs 344 ± 56.4 μ m, $p < 0.001$; 413 ± 18.7 vs 502 ± 76.9 μ m, $p < 0.001$; 569 ± 29.0 vs 629 ± 60.6 μ m, $p = 0.002$). No significant differences were observed at 9–11 mm (719 ± 41.8 vs 742 ± 57.5 μ m, $p = 0.185$) or 11–13 mm (795 ± 54.8 vs 794 ± 55.8 μ m, $p = 0.953$).

Conclusions: Within the central 9 mm, KC eyes showed greater morphological change compared with normal eyes. In contrast, no significant difference was found from the limbal cornea to the anterior scleral area,

suggesting similar peripheral configuration between groups.

Ocular Oncology and Pathology

Abstract No.: 200275

A Baso-Squamous Carcinoma of the Eyelids: An Extremely Rare Case

First Author: Raveesh BINDAL

Co-Author(s): Vishal SHARMA

Purpose: Co-existing squamous and basal cell carcinoma of eyelids- a 'Baso-squamous carcinoma', an extremely rare case.

Methods: A 60 year's 60-year-old male presented with complaints of redness and itching in the left lower lid, involving the fundus, for the past 2 years, associated with a history of a hyperpigmented nodular crusting in the same site, which was repeatedly scratched off by the patient himself. The BCVA at the time of presentation was found to be 0.00 logMAR in both eyes. Anterior segment findings were normal in both eyes. On incisional biopsy and histopathology, a diagnosis of nodular basal cell carcinoma was made. Wide local excision with dacryocystectomy was planned. On histopathology after wide local excision with dacryocystectomy, squamous cell carcinoma was seen with few dyskeratotic cells with perineural invasion. A diagnosis of collision tumour of the left eyelid was made and was confirmed using immunohistochemistry. PET scan showed no metastasis.

Results: Left eye baso-squamous carcinoma.

Conclusions: A baso-squamous carcinoma is an extremely rare and aggressive subtype of primary eyelid carcinoma, exhibiting features of both BCC and SCC, which may lead to misdiagnosis and inappropriate treatment. Hence, an aggressive approach is important for a prompt diagnosis.

Abstract No.: 200935

A Case Report of Leukocoria in a Ten-Year-Old Child

First Author: Purnima RAJKARNIKAR STHAPIT

Co-Author(s): Rachni GURUNG, Sadichhya SHRESTHA

Purpose: To describe a case of a child, who was first diagnosed as Coats disease, but whose results later turned out to be those of retinoblastoma, despite not having the typical symptoms of retinoblastoma.

Methods: A 10-year-old female presented with unilateral, gradual, progressive loss of vision and leukocoria for two months. Examination showed a fixed

dilated pupil with ectropion uvea and a dull yellowish glow in the pupil. Fundus examination showed total retinal detachment, subretinal exudates, and dilated tortuous vessels overlying it. CT scan showed diffuse hyperdense exudates and no calcifications. But in view of non-perception of light, unilateral disease, and a distant possibility of being a retinoblastoma, enucleation was done.

Results: Histopathology confirmed it to be a well-differentiated retinoblastoma.

Conclusions: Atypical retinoblastoma can have a varied presentation and hence it should always be kept as a differential diagnosis in a child of any age group presenting as leukocoria because misdiagnoses can sometimes be fatal in a case of retinoblastoma.

Abstract No.: 207163

A Case of Optic Disc Melanocytoma With Pigment Dispersion

First Author: Dengxue WANG

Co-Author(s): Guangjun XU

Purpose: To explore clinical features, multimodal imaging, and follow-up of optic disc melanocytoma (ODM) with pigment dispersion for accurate diagnosis.

Methods: Retrospective analysis of one ODM patient was done. Ocular exams (visual acuity, IOP: Intraocular Pressure, slit-lamp, fundus, visual field) and multimodal imaging (CFP: Color Fundus Photography, OCT: Optical Coherence Tomography, OCTA: Optical Coherence Tomography Angiography, FFA: Fluorescein Fundus Angiography, ocular ultrasound/CDFI: Color Doppler Flow Imaging) were performed, with 2-year follow-up.

Results: A 34-year-old male had left optic disc mass (incidental finding, no relevant history). Both eyes had uncorrected VA 5.0; IOP: 16mmHg (right), 17mmHg (left). Left fundus showed 2-disc-diameter brown lesion (covering optic disc, 3D elevation, feathery edge, vitreous pigment dispersion); left visual field had enlarged blind spot + arcuate defect. Multimodal imaging: CFP showed lesion/pigment; OCT had pre-disc hyperreflectivity with shadow; OCTA had lesion hyperreflectivity (near RPE) + minimal flow; FFA had early lesion fluorescence block + late annular hyperfluorescence; ultrasound had hyperechoic elevation + CDFI flow. 2-year follow-up: stable VA/IOP, no lesion change/malignancy.

Conclusions: Multimodal imaging (CFP+OCT+OCTA+FFA) is key for ODM diagnosis, differentiating uveal melanoma, and monitoring, despite ODM's benign nature with malignant risk.

Abstract No.: 202667**A Fading Tumour, a Failing Retina: Challenges in Retinoblastoma Management***First Author: Dayna YONG**Co-Author(s): Gangadhara SUNDAR, George THOMAS*

Purpose: A case of unilateral Group E retinoblastoma with good response to intra-arterial chemotherapy (IAC) complicated by retinal detachment (RD).

Methods: -

Results: A 5-year-old child was referred with a 1month history of altered light reflex and advised enucleation versus IAC, with potential side effects. Right eye had no perception to light (NPL) with relative afferent pupillary defect. Anterior segment was normal; posterior segment view had a large endophytic lesion with superficial hemorrhage along with diffuse vitreous haze precluding visualization of the optic nerve head and rest of retina. Left eye was normal. Neuroimaging showed a large intraocular lesion without orbital/brain involvement. Tests were negative for metastatic disease. Diagnosis was right Group E Retinoblastoma and patient underwent 2 cycles of IAC [Mephalan (5mg), Carboplatin (30mg) and Topotecan (0.4mg)]. On follow-up, the tumor regressed, but vitreous hemorrhage persisted despite a flat retina on ultrasound. Following third cycle of IAC, intravitreal Topotecan (90mcg/0.05ml) was administered with usual precaution. A month later an open funnel total RD with retinal folds developed despite a regressing lesion.

Conclusions: RD during retinoblastoma treatment may be rhegmatogenous or exudative, but was hard to determine in our patient due to poor view, especially post-intravitreal therapy. If exudative, resolution of fluid could be obtained. Due to poor prognosis (NPL), enucleation was advised.

Abstract No.: 202770**Achieving Complete Remission of Ocular Surface Squamous Neoplasia (OSSN) by Surgery Alone***First Author: Chun Loong TAN**Co-Author(s): Azlyn Aj, Mimiwati Z, Nur Musfirah Mahmud, Neshalene RATNA KRISHNAN*

Purpose: To report a case of OSSN successfully treated surgically without the use of topical chemotherapy.

Methods: Case report.

Results: An 83-year-old Chinese female presented with a painless growth on the right eye (RE) for 1 month. The right visual acuity is 6/12. There was no relative afferent pupillary defect. Examination showed the presence of a pedunculated conjunctival mass from the inferior nasal conjunctiva extending to two-thirds of the cornea. The mass measured 9.2 mm x 8 mm and was surrounded by engorged conjunctival vessels.

The right eyelid was erythematous. Extraocular muscle movements were full, and the anterior and posterior segments were unremarkable. Magnetic resonance imaging (MRI) orbit revealed a lobulated exophytic soft tissue lesion arising from the inferior conjunctiva of the right eye, extending to the anterior cornea, measuring 0.9 x 1.4 x 1.2 cm, with invasion of the right inferior tarsal plate but no extension beyond the orbital sclera or medial rectus muscle. Blood investigations and tumor markers were normal. The patient underwent RE-wide excision biopsy, and the histopathology report confirmed OSSN. Treatment with topical Mitomycin-C (MMC) was initiated for 2 days; however, the patient developed a total corneal epithelial defect, thus the treatment was immediately discontinued. A Bandage contact lens was inserted, and the patient was treated with topical levofloxacin and lubricating eye drops. The corneal epithelial defect healed completely within 2 months, with no signs of local recurrence after 2 years of follow-up.

Conclusions: Early diagnosis and surgical wide excision in OSSN may be able to prevent recurrence without the use of the conventional dose of MMC.

Abstract No.: 206435**Choroidal Melanoma – A Rarity***First Author: Abhishek**Co-Author(s): Shagun KORLA, Shreya NARANG, Jayant SHARMA*

Purpose: To report a rare case of choroidal melanoma in an elderly male

Methods: An 86-year-old male presented with painful loss of vision in right eye with right sided headache since 3 months with no history of nausea or vomiting. Ophthalmic examination showed no perception of light and projection of rays inaccurate in right eye with intraocular pressure measuring 42 mmHg by non contact tonometer. On slit lamp examination, circumciliary congestion was present, anterior chamber was flat, pupil was slightly dilated and non reacting with cataractous lens behind preventing the view of posterior segment. B-scan of the right eye showed collar button shaped lesion with solid consistency along with serous retinal detachment in the right eye. Contrast enhanced magnetic resonance imaging of brain showed a well defined lesion in the lateral half of posterior chamber of right globe along with retinal detachment and vitreous hemorrhage in the right eye.

Results: The patient was diagnosed with right eye large choroidal melanoma with no systemic metastasis. The patient was planned for enucleation of the right eye however was not cleared for the surgery due to underlying cardiac issues and was managed conservatively.

Conclusions: The choroid melanomas although rare occur more frequently in comparison to iris and ciliary

body melanoma and is the most common occurring intraocular malignancy amongst the adults. Melanoma tend to usually arise from sixth decade of age with increasing incidence with progressive age. It is a rare malignancy with incidence of 6 cases per million population.

Abstract No.: 203943

Ciliochoroidal Schwannoma Presenting As Neovascular Glaucoma

First Author: Abhishek KUMAR

Co-Author(s): Naintara CHAUHAN, Bhavna CHAWLA, Swati SHARMA

Purpose: To present a rare differential of choroidal mass presenting as neovascular glaucoma.

Methods: A female in her early 20s presented to the clinic with pain and slowly progressive diminution of vision in her left eye for around 14 months. BCVA in right eye was 6/6, and BCVA in left eye was positive for perception of light, and projection of rays was inaccurate in two quadrants with a stony, hard eyeball. On anterior segment evaluation, anterior chamber was irregularly shallow, more shallow towards the temporal area; the iris was atrophied with florid neovascularization of the iris with localized posterior synechiae. The pupil was poorly dilating, and RAPD was present. On gonioscopic examination, angles were closed around 270 degrees. Intraocular pressure on applanation was 42 mmHg. On fundus examination, total retinal detachment was seen; further details could not be examined in view of the poorly dilating pupil.

Results: USG B scan of left eye depicted a 12X10 mm heterogenous temporal choroidal mass with mild to moderate amplitude spikes with retinal detachment; kappa sign was not present. Ultrasonic biomicroscopy depicted a heterogenous mass arising from ciliary body. CEMRI had T1 isointense and T2 hypointense with a heterogenous enhancing pattern suggestive of a choroidal melanoma. Fine needle aspiration was done, which was acellular, and eventually enucleation was done, and histopathology showed S100 and SOX1-positive ciliochoroidal schwannoma.

Conclusions: Intraocular tumors, though rare, can be a cause of NVG and should be kept in mind. Ultrasonography B/A scan, ultrasound biomicroscopy and CEMRI in diagnosing in tricky situations like these.

Abstract No.: 202953

Clinical Prognostic Characteristics of Ocular Mucoepidermoid Carcinoma: A Retrospective Study

First Author: Runzi YANG

Co-Author(s): Jing LI, Rui LIU, Jianmin MA, Tingting REN, Nan WANG, Liangyuan XU

Purpose: This study evaluated the baseline features, clinical symptoms, pathological features, and prognostic factors of patients with ocular mucoepidermoid carcinoma.

Methods: This is a retrospective clinical study. A total of 27 patients with ocular mucoepidermoid carcinoma diagnosed by pathology were included, and their medical history data were collected.

Results: The mean age of onset of ocular mucoepidermoid carcinoma was 57.56 ± 18.99 years with no gender bias. The clinical manifestations were not specific, mainly mass, swelling, visual impairment and so on. The most common sources of tumors are the lacrimal gland, conjunctiva, and eyelid. MEC consists of different proportions of mucous cells, intermediate cells and epidermoid cells. The incidence of peripheral infiltration is high, and the most common invasion is peri-nerve, intraorbital structure, extraocular muscle and local lymphatic vessels. Surgical excision and combined radiotherapy are the most common treatment options. The overall survival rate was 92.6%, and one patient died of the disease. The recurrence rate of orbital mucoepidermoid carcinoma was high, and the three-year relapse-free survival rate was 59.0%. Univariate analysis of the prognostic factors of patients showed that the presence or absence of peripheral tissue invasion had an important impact on prognosis.

Conclusions: Ocular mucoepidermoid carcinoma has a high recurrence rate and a low mortality rate. Current treatments are associated with high survival rates. Patients with peripheral tissue invasion have a higher probability of recurrence and metastasis, requiring long-term follow-up and close observation.

Abstract No.: 203375

Clinical and Paraclinical Features of Ocular Adnexal Extranodal Marginal Zone B-cell Lymphoma

First Author: Lieu LE

Co-Author(s): Nam PHUNG, Hang TRAN

Purpose: Extranodal marginal zone B-cell lymphoma (EMZL) of the ocular adnexa is a rare non-Hodgkin lymphoma that can mimic benign orbital lesions. This study aimed to describe its clinical and paraclinical features.

Methods: A retrospective and prospective review was performed on 16 patients with ocular

adnexal EMZL diagnosed by histopathology and immunohistochemistry between January and October 2023. Clinical presentation, laboratory tests, imaging, and immunohistochemistry were analyzed.

Results: The mean age was 59.5 years; 68.8% were 51–70 years, with a male-to-female ratio of 1.7:1. A palpable orbital mass was the most common finding (87.5%), followed by proptosis (62.5%), ptosis (25%), and conjunctival hyperemia (18.8%). Systemic features included B symptoms (18.8%) and weight loss (25%). The main sites involved were orbital soft tissue (62.5%) and conjunctiva (50%); lacrimal gland and eyelid were less frequent. Right eye lesions predominated (62.5%), while bilateral disease occurred in 18.8%. PET-CT detected FDG uptake in 25% of cases, whereas 37.5% showed lesions without uptake. β 2-microglobulin and LDH levels were low. Immunohistochemistry showed positivity for CD20, BCL2, and Ki67, and negativity for CD3, CD5, BCL6, Cyclin D1, CD43, and CD23.

Conclusions: Ocular adnexal EMZL usually presents in late middle age with orbital masses. Diagnosis depends on histopathology and immunohistochemistry, characterized by CD20 and BCL2 positivity. PET-CT has limited sensitivity. Recognizing these features may support earlier diagnosis and management.

Abstract No.: 202577

Clinico-Demographic Profile and Survival of Retinoblastoma Patients in North Indian Population

First Author: Asha **DEVI**

Co-Author(s): Sanjay **BOSAK**, Priyanka

Purpose: To determine the clinico-demographic characteristics, survival rate and risk factors for children with retinoblastoma in Northern India.

Methods: In this retrospective observational case series, 86 children were reviewed over a period of 5 years. Socio-demographic characteristics, clinico-radiological features, histopathologic variables, treatment outcomes and survival rate were analyzed.

Results: A total of 86 patients (102 eyes) with retinoblastoma were studied. There were 64 male and 22 females. Age ranges from 3 months to 6 years (mean age 2.89 ± 0.93 years). Majority belonged to rural background (70.93%) and lower socioeconomic status (83.72%). 81.40% patients had unilateral involvement and 18.60 % had bilateral involvement. Mean duration of presentation was 5.35 months. The commonest mode of presentation was proptosis with orbital invasion (49.02 eyes) followed by leukocoria (44.12 % eyes) and squint (6.86 % eyes). 17.65% eyes had large fungating orbital mass. Histopathological high-risk features were present in 41.18 % eyes. 11.63 % patient had lymph node metastasis and 5.81% of patients had distant metastasis. Patients were managed by primary enucleation (39.53%), neoadjuvant chemotherapy

(62.79%) while exenteration was performed in 13.95% cases. Two patients died during treatment. The 3-year survival was 45.71% for unilateral cases and 37.50% for bilateral cases (Kaplan Meir method).

Conclusions: Commonest mode of presentation of retinoblastoma in Northern India is proptosis. Delayed presentation associated with poor prognosis and is due to ignorance and lack of awareness.

Abstract No.: 202694

Combined Lamellar Scleral Incision and Endoscopic Vitrectomy for Removal of a Giant Choroidal Melanoma: A Case Report

First Author: Shuai **SHENG**

Purpose: Choroidal melanoma, the most common adult intraocular malignancy, poses significant threats to vision and life due to its high metastatic potential and mortality. This study evaluates a combined surgical approach for a giant choroidal melanoma.

Methods: A 53-year-old female patient (Li) presented in December 2023 with a 2-month history of a left intraocular mass. Examination (including ultrasonography and MRI) revealed localized thickening in the temporal globe, suggestive of choroidal melanoma. The tumor (approximately 10mm x 10mm, encapsulated) was completely removed using a combined lamellar scleral incision and endoscopic vitrectomy.

Results: Histopathology confirmed choroidal melanoma. At 2 months postoperatively, best-corrected visual acuity (BCVA) was 1.0, indicating successful tumor removal with vision preservation.

Conclusions: This combined lamellar scleral incision and endoscopic vitrectomy approach proved effective for removing a giant choroidal melanoma while maximizing visual preservation. Compared to traditional methods with limitations such as significant trauma and incomplete tumor removal, this minimally invasive technique ensured tumor clearance with retinal integrity, offering a promising new surgical strategy.

Abstract No.: 205051

Conjunctival Myxoid Stromal Tumor (CSMT): Clinico-Pathological Profiles of a Rare Entity

First Author: Kaustubh **MULAY**

Co-Author(s): Santosh **HONAVAR**, Fairouz **PUTHYAPURAYIL**

Purpose: Conjunctival myxoid stromal tumors (CSMT) are rare conjunctival tumors arising from the primitive mesenchyme. The aim of this study was to elucidate the clinical features, light microscopic, and immunohistochemical findings of CSMT.

Methods: We retrieved 21 cases of orbital CSMT diagnosed between 2016 and 2025. Clinical findings,

histopathological features and immunohistochemical findings were evaluated.

Results: Age at presentation varied from 4 to 74 years (Mean = 48.7). Both children and adults were affected. A slight predilection for males was observed (M:F = 12:9). Most presented with a sub-conjunctival mass in the bulbar region that was often suspected to be a cyst. Histopathologically, CSMT is characterized by singly dispersed spindle to round cells, often displaying some degenerative nuclear atypia, within a myxomatous to collagenous stroma. Lesional cells were positive for CD34 and vimentin. None of the patients had a cardiac myxoma or had a recurrence.

Conclusions: CSMT is a rare mesenchymal proliferation with an indolent behaviour. Given its association with Carney complex, it is important that both pathologists and clinicians be aware of this entity and patients be screened systemically.

Abstract No.: 202808

Diagnosis and Treatment of Neonatal Retinoblastoma: A Case Series Analysis

First Author: Guoming **ZHANG**

Purpose: To analyze the clinical features, treatment, and prognosis of retinoblastoma in infants under one year of age.

Methods: We retrospectively analyzed 5 cases (7 eyes) of retinoblastoma diagnosed in infants younger than one year at Shenzhen Eye Hospital from 2020 to 2024. The cohort consisted of 2 males and 3 females, with age at diagnosis ranging from 1 to 11 months; 3 cases were unilateral and 2 were bilateral. Based on the International Intraocular Retinoblastoma Classification (IIRC), 2 eyes were staged as Group A, 2 as Group B, 1 as Group C, and 2 as Group D. All five patients underwent fundus imaging using the RetCam system. Systemic intravenous chemotherapy was performed using the vincristine, etoposide, and carboplatin, while focal therapy was treated with laser photocoagulation. The mean follow-up time was 24.8 months.

Results: Among the five patients, four received 3–6 cycles of systemic intravenous chemotherapy, while one patient underwent only focal treatment. Of the seven eyes, six were treated with laser photocoagulation. During the follow-up period, tumor recurrence occurred in three eyes, and one eye developed a new lesion. At the final follow-up, all seven eyes demonstrated either tumor regression or stable disease. No enucleations were performed, resulting in a 100% eye preservation rate.

Conclusions: Fundus screening in neonates facilitates the early detection of retinoblastoma. High rates of eye preservation can be achieved following systemic intravenous chemotherapy combined with focal treatment. Regular follow-up is essential for these patients.

Abstract No.: 205048

Endocrine Mucin-Producing Sweat Gland Carcinoma of the Eyelid: Reappraisal of Patient Demographics, Tumour Immunophenotypes and Prognosis

First Author: Kaustubh **MULAY**

Co-Author(s): Santosh **HONAVAR**, Vikas **MENON**, Fairouz **PUTHYAPURAYIL**

Purpose: Endocrine mucin-producing sweat gland carcinoma (EMPSGC) is a rare, low-grade adnexal neoplasm with predilection for the periorbital skin of older women. Histologically and immunophenotypically, EMPSGC is analogous to solid papillary carcinoma of the breast and a precursor of neuroendocrine-type mucinous carcinoma. We aim to elucidate the clinicopathologic features, immunohistochemical findings and prognostic significance of the neuroendocrine differentiation of EMPSGC and its associated carcinoma.

Methods: This was a retrospective analysis of 23 biopsy-proven cases of EMPSGC diagnosed at our Institute between 2014 and 2025. Information collected included patient demographics, clinical presentation, type of surgical intervention, light microscopic features, IHC findings, recurrences, and the presence of an invasive mucinous component.

Results: Results established an overall Male predominance (60.8%) and average presenting age of 64.4 years (Range 45–82). EMPSGC lesions were associated with adjacent mucinous carcinoma in 39.1% of cases. The recurrence rate for neuroendocrine-type MSC was 8.7%, less than the reported 30% for non-neuroendocrine MSC. There were no cases of metastasis.

Conclusions: EMPSGC and neuroendocrine-type Mucinous carcinoma are distinct entities with more indolent behavior than previously reported, supporting a favorable prognosis for patients.

Abstract No.: 208462

Endoscopic Transorbital Approach for the Management of Subperiosteal Orbital Hemorrhage

First Author: Qinying **HUANG**

Co-Author(s): Weili **ZHANG**

Purpose: Subperiosteal orbital hemorrhage (SOH) is mostly caused by facial or orbital trauma. However, nontraumatic SOH (NSOH) is a rare condition which is reportedly associated with systematic diseases, high cranial venous pressure or vascular malformations. Here, we present a patient who has been taking warfarin for long time suffering from NSOH after vomiting.

Methods: We presented a 54-year-old women who was suffering from sudden pain, upper lid swelling and

difficult opening in her left eye after severe vomiting. She had a history of cerebral infarction, atrial fibrillation and implantation of a prosthetic mechanical mitral heart valves. Thus, she has been taking warfarin for many years to prevent thromboembolic events. Her left upper eyelid could not be elevated at all, with marked tenderness of the eyelid, elevated intraorbital pressure and proptosis as well as restricted ocular motility upward or outward. Both direct and indirect light reflexes in left eye were disappeared. Unfortunately, she developed complete vision loss in her left eye. Image examination supported the diagnosis of NSOH.

Results: She underwent surgery to remove the hematoma via endoscopic transorbital approach (ETA) after modulating the coagulation function. Her visual acuity (VA) was improved to counting fingers, and other symptoms had disappeared after one month.

Conclusions: Conservative treatment is enough for most patients diagnosed of NSOH. When the patient's VA is heavily declined, surgery is necessary. The coagulation function and systemic diseases should also be considered at the same time to prevent severe complications. ETA is a reliable technique to remove the hematoma.

Abstract No.: 205118

Epidemiology of Ophthalmic Lymphoma in Chinese: A 14-year Population-Based Study

First Author: Allie LEE

Purpose: Ophthalmic lymphoma is a rare yet potentially sight- and life-threatening condition. However, population-based studies investigating the epidemiology of ophthalmic lymphoma in Chinese remain scarce. This study aims to investigate and update the incidence rates, histological subtypes and time trends of ophthalmic lymphoma in Chinese.

Methods: Patients diagnosed with primary ophthalmic lymphoma under the ICD-9 site codes 190.0-190.9 from 2005 to 2018 were retrieved from the database of Hong Kong Cancer Registry, the only facility in the territory collecting and validating cancer data from a 7.3 million population.

Results: A total of 295 primary ophthalmic lymphoma were included in the study. The overall age-standardized average annual incidence rate was 1.89 per 1,000,000 population. The incidence rate increased with age ($p < 0.001$). In the elderly group (80-84 years old), a higher incidence rate was observed in male than female. The most common histological type was extra-nodal marginal zone B cell lymphoma (69.2%), followed by diffuse large B cell lymphoma (11.9%) and follicular lymphoma (4.1%). The most common site was the orbit. Over the years, the incidence rate of ophthalmic lymphoma showed an increasing trend, with an annual percent change of 2%.

Conclusions: In Chinese population, the incidence of ophthalmic lymphoma was low but showed an increasing trend. Extra-nodal marginal zone B cell lymphoma was the most common histological type.

Abstract No.: 209601

Epigenetic Repression of ITIH5 by EZH2 Enhances EMT and Malignancy in Conjunctival Melanoma: A Reinforcing Circuit Linking Histone Methylation and Epithelial Plasticity

First Author: Jie CHEN

Co-Author(s): Renbing JIA, Shiqiong XU

Purpose: Disruption of histone modification balance is widely recognized as a defining feature of the epigenetic silencing of tumor suppressor genes. Nevertheless, the precise relationship between histone modification dynamics and the epithelial-mesenchymal transition (EMT) during tumor evolution remains obscure.

Methods: In this study, we delineate a self-reinforcing circuit connecting histone methylation to EMT that drives the progression of conjunctival melanoma (CoM).

Results: Our findings reveal that aberrant elevation of EZH2 expression promotes the accumulation of trimethylated histone H3 at lysine 27 (H3K27me3) in CoM cells, a modification that correlates closely with increased tumor malignancy. Pharmacologic or genetic inhibition of EZH2 markedly attenuates CoM growth and dissemination in both cell-based and animal models. Integrative multi-omics profiling further identified Inter- α -trypsin inhibitor heavy chain 5 (ITIH5) as a principal downstream target of EZH2. Mechanistic investigation showed that EZH2 directly enriches the H3K27me3 mark on the ITIH5 promoter region, resulting in transcriptional silencing. Loss of ITIH5 expression, in turn, enhances EMT activation and facilitates metastasis.

Conclusions: Collectively, these findings uncover a pivotal epigenetic feedback loop linking histone methylation to EMT and illuminate the broader framework of epigenetic-metabolic reprogramming that fuels repression of tumor suppressor pathways and tumor metastasis.

Abstract No.: 208309

Global Retinoblastoma Survival and Globe Preservation: A Systematic Review and Meta-Analysis of Associations With Socioeconomic and Health-Care Factors

First Author: Emily Suhan WONG

Co-Author(s): Lijia CHEN, Richard CHOY, Wai Kit CHU, Chi Pui PANG, Yuzhou ZHANG

Purpose: Despite advancements in globe-preserving treatments, improvements in retinoblastoma outcomes remain uneven across income levels and regions. This study aimed to assess global trends in retinoblastoma survival and globe preservation over the past four decades and to examine associated socioeconomic and health-care factors underlying these disparities.

Methods: A systematic review and meta-analysis were conducted across nine databases (PubMed, Embase, ScienceDirect, Web of Science, OpenGrey, Global Burden of Disease, Global Health Data Exchange, Global Index Medicus, and the International Agency for the Prevention of Blindness) for studies published between Jan 1, 1981, and Oct 8, 2021. Eligible studies reported overall survival and/or globe salvage in retinoblastoma. Data were stratified by decade (1980–89, 1990–99, 2000–09, 2010–20). Socioeconomic and health-care indicators were extracted from the World Bank, WHO, and IAPB databases. Mixed-effects meta-analysis and multivariable regressions were used to evaluate heterogeneity and associations. The study was registered with PROSPERO (CRD42020221556).

Results: Of 14,621 screened articles, 314 studies from 80 regions (38,130 patients) were included. Between 1980 and 2020, overall survival improved from 79% (95% CI, 74–84) to 88% (83–93; $p = 0.017$), and globe salvage from 22% (14–32) to 44% (36–52; $p = 0.0003$). Outcomes correlated positively with income level, education, and health-care accessibility, and inversely with Gini index and rural population percentage. Persistent survival gaps were noted in sub-Saharan Africa and Southeast/Southwest Asia.

Conclusions: Global retinoblastoma outcomes have improved substantially over the past 40 years; however, striking disparities remain. Enhanced health-care financing, access, and education are critical to narrowing the survival gap in low- and middle-income countries.

Abstract No.: 208206

Growth Hormone-Releasing Hormone Receptor Antagonist MIA-602 Suppresses Retinoblastoma via Downregulating MEK-ERK Signaling

First Author: Linbin ZHOU

Co-Author(s): Wai Kit CHU, Jiahui LI, Chi Pui PANG, Chee Yung THAM, Cheuk YAM

Purpose: Our previous works have shown that MIA-602, a growth hormone-releasing hormone receptor (GHRH-R) antagonist, can specifically exert pro-apoptotic effects on retinoblastoma (RB) cells in vitro, but its in vivo effects and the underlying mechanisms remain not fully understood. In this study, we aimed to investigate the in vivo anti-tumor effects of MIA-602 and the underlying mechanisms.

Methods: Cell counting kit-8 assays, colony formation assays, and flow cytometry analyses were utilized to determine the effects of MIA-602 or an ERK inhibitor on RB cell viability, proliferation, and apoptosis, respectively. Western blotting was used to measure MEK and ERK phosphorylation. An orthotopic cell line-derived xenograft (CDX) tumor model was established to test the anti-tumor effects of MIA-602 via TUNEL assays and immunostaining.

Results: MIA-602 substantially decreased the cell viability and colony formation, and increased the proportion of sub-G1 population of Y79 and WERI-Rb1 cells ($n=3-4$, $p<0.05$). Notably, intravitreal injection of MIA-602 promoted xenografted RB tumor apoptosis and hindered tumor growth ($n=6-7$, $p<0.05$). Conversely, GHRH-R agonist MR-409 markedly increased the proliferation of both cell lines ($n=3-4$, $p<0.05$). Mechanistically, MIA-602 decreased the phosphorylation of ERK and its upstream regulator MEK in both cell lines and the CDX tumor model, while MR-409 enhanced MEK and ERK phosphorylation in both cell lines. A selective ERK inhibitor suppressed ERK phosphorylation and abolished the pro-proliferative effects of MR-409 on both cell lines ($n=3-4$, $p<0.05$).

Conclusions: GHRH-R antagonist MIA-602 promotes apoptosis of RB cells via downregulating MEK-ERK signaling.

Abstract No.: 205897

Hemi-Retinal Vein Occlusion Following Transpupillary Thermotherapy for Small Choroidal Melanoma

First Author: Tavish GUPTA

Co-Author(s): Rohan CHAWLA, Neiwete LOMI, Nawazish Fatma SHAIKH

Purpose: To describe the clinical course and complications occurring during the management of a small choroidal melanoma abutting the optic disc that developed a hemi retinal vein occlusion (HRVO) after transpupillary thermotherapy (TTT).

Methods: A 38-year-old male presented with the complaint of floaters in the right eye. On examination, a pigmented choroidal mass was seen superior to the disc, around 2.2 mm thick, with 6.3 mm base. It had surrounding subretinal fluid and was diagnosed as a small posterior choroidal melanoma. He underwent two TTT sessions. Two months later he presented with gradual diminution of vision, and was found to have superficial haemorrhages, dilated tortuous and sclerosed vessels in ST quadrant and fibrosis at the site of choroidal mass with neovascularisation. Fluorescein angiography revealed regressed hypo-fluorescent lesions, blocked fluorescence from superficial haemorrhages, late hyper-fluorescence from neovascularisation and vast hypo-fluorescent areas of non-perfusion. HRVO was diagnosed and combination therapy with intravitreal anti VEGF injections (three doses) and sectoral pan retinal photocoagulation was started.

Results: TTT achieved complete tumor regression. HRVO produced superior hemisphere ischemia, NVD, and NVE without macular edema. Anti VEGF rapidly reduced neovascularization; staged laser consolidated ischemic retina. By 12 months, best corrected visual acuity improved to 6/9, neovascularisation resolved, and the choroidal scar remained flat with no recurrence.

Conclusions: TTT is an effective sight sparing option for small peripapillary choroidal melanomas, but retinal vascular occlusions must be anticipated as a complication, especially when major vessels traverse the treatment zone. Prompt recognition of HRVO and aggressive dual therapy can preserve vision.

Abstract No.: 206495

Her Eyes Had a Lot to Tell: Ocular Manifestations of Phakomatosis Pigmentovascularis

First Author: Shaifali **CHAHAR**

Co-Author(s): Santosh **HONAVAR**

Purpose: To describe an extremely rare entity where recognition of cutaneous changes guided the diagnosis of a vision-threatening ocular lesion, underscoring the importance of comprehensive clinical vigilance in rare syndromes.

Methods: A 24-year-old female with dermatological lesions presented with progressive, painless diminution of vision in the left eye for one month. Comprehensive ocular and systemic examination was performed, including multimodal imaging for ocular involvement. The lesion was managed with intravitreal anti-VEGF injection, and outcomes were monitored.

Results: Cutaneous examination revealed erythematous-to-violaceous cutaneous lesions with facial and limb involvement, along with ocular melanocytosis. These findings pointed towards

diagnosis of phakomatosis pigmentovascularis (PPV). Dilated fundus evaluation showed a pigmented juxtapapillary choroidal lesion with subretinal fluid. Multimodal imaging confirmed the lesion, and targeted anti-VEGF therapy led to complete resolution of subretinal fluid with stabilization of vision.

Conclusions: PPV is an exceptionally rare syndrome with highly variable ocular manifestations, which may go unnoticed unless the cutaneous lesions are recognized and a comprehensive examination is done by an ophthalmologist. Importantly, associations with uveal melanoma make recognition of these “clinical clues” vital for timely and life-saving intervention. In this case, careful attention to skin findings not only enabled diagnosis but also directed ocular evaluation, highlighting how multidisciplinary correlation can uncover rare but critical conditions. Even as a single case, this visually striking example demonstrates why ophthalmologists must be attuned to systemic cutaneous markers that herald ocular disease.

Abstract No.: 203987

Intraocular Lymphoma Masquerading as Endogenous Endophthalmitis: A Case Report Challenging the Diagnostic Utility of Aqueous Cytokine Ratios

First Author: Qiaozhu **ZENG**

Co-Author(s): Heng **MIAO**

Purpose: To report a case of intraocular lymphoma misdiagnosed as endogenous endophthalmitis in a middle-aged female presenting with blurred vision and scotoma.

Methods: The patient initially underwent diagnostic vitrectomy, intravitreal antibiotic injection (ceftazidime), and gas tamponade at an external hospital based on elevated intraocular cytokines (IL-6: 98.5 pg/mL, IL-8: 102.6 pg/mL, IL-10: 23.5 pg/mL; IL-10/IL-6 ratio: 0.2) and positive aqueous mNGS for *Cutibacterium acnes*. She underwent vitrectomy, intravitreal ceftazidime injection, and gas tamponade. Postoperative vitreous fluid analysis showed further elevated IL-6 (409.6 pg/mL) and IL-10 (320.0 pg/mL). Referral examination revealed raised gray-white retinal lesions with hemorrhages and vascular infiltration. Subsequent vitrectomy with electrocoagulation, retinal biopsy, endolaser, and silicone oil tamponade was performed. Histopathological examination confirmed the diagnosis of lymphoma.

Results: Histopathological analysis of the retinal biopsy confirmed the diagnosis of intraocular lymphoma. Postoperative management with intravitreal methotrexate and systemic rituximab led to gradual stabilization of the condition.

Conclusions: This case demonstrates that intraocular lymphoma, even of B-cell origin, may not always present with an IL-10/IL-6 ratio greater than 1. Retinal

biopsy remains the gold standard for definitive diagnosis, and targeted therapy can achieve disease control.

Abstract No.: 202655

Intraocular Seeding After Carbon Ion Therapy for Choroidal Melanoma

First Author: Seito HIRAOKA

Co-Author(s): Takahiro HIRAOKA, Sujin HOSHI, Tetsuro OSHIKA, Kuniharu TASAKI

Purpose: Carbon ion therapy is a highly effective local treatment for choroidal melanoma, providing excellent tumor control while preserving the eye. However, rare complications such as intraocular seeding have not been well described. We report a case of intraocular tumor dissemination following carbon ion therapy, aiming to raise awareness of this potential post-treatment complication and emphasize the importance of vigilant follow-up.

Methods: A 73-year-old male with a history of vitrectomy for retinal detachment was referred for evaluation of a choroidal mass. MRI revealed an 8-mm lesion in the posterior globe, and IMP scintigraphy showed increased uptake, consistent with choroidal melanoma. The patient underwent carbon ion therapy. Ophthalmic examinations were performed periodically to monitor tumor response and ocular status.

Results: Eight months post-treatment, the patient experienced new-onset floaters and photophobia. Ophthalmic examination revealed dense vitreous opacities with numerous pigmented deposits suggestive of intraocular seeding. Enucleation was performed. Histopathological analysis confirmed tumor infiltration of the retina and penetration into the vitreous cavity. No systemic metastasis was detected. This case illustrates that intraocular dissemination can occur despite tumor shrinkage after radiotherapy, highlighting a potential route for tumor spread through the vitreous cavity.

Conclusions: Intraocular seeding after carbon ion therapy, although rare, should be considered a possible complication in choroidal melanoma management. Regular and thorough post-treatment ophthalmic monitoring is essential for early detection. Prompt intervention, including enucleation when necessary, may help prevent further ocular and systemic complications. Awareness of this potential outcome is important for clinicians managing patients with choroidal melanoma treated with advanced radiotherapy techniques.

Abstract No.: 206995

Intraocular Surgery in Children With Pretreated Retinoblastoma: Long-Term Results

First Author: Denis VOLODIN

Co-Author(s): Ivan OSOKIN, Vera YAROVAYA, Andrey YAROVY

Purpose: To evaluate long-term anatomical and functional results and local and systemic safety of intraocular surgery (IOS) in children with pretreated retinoblastoma (Rb).

Methods: IOS was performed in 34 patients (35 eyes) with pretreated Rb. The mean patients' age was 68 months (28-180 mo.). IOS was conducted from 6 to 140 months (median – 20 mo.) after completion of organ-preserving treatment. Best-corrected visual acuity (BCVA) before IOS varied from light perception to 0.2 (median 0.01). Cataract surgery (CS) was performed in 33 patients (34 eyes) using phacoaspiration (n=31) or lensvitrectomy (n=3) technique. Vitreoretinal surgery (VRS) with melphalan irrigation was conducted in 12 patients (12 eyes). Indications for VRS were subtotal/total dense vitreous hemorrhage (n=10) and subtotal retinal detachment with tractions (n=2). In 11 patients VRS was combined with CS.

Results: Transparency of optical media and tumor control was restored in all patients. In the long-term follow-up (6-104 mo., median – 32) secondary cataract developed in 34% of patients. There were no complications after CS without VRS, while after VRS or combined IOS 5 eyes presented with phthisis bulbi. BCVA after IOS made up from 0.005 to 0.5 (median 0.1) and statistically significantly increased in comparison with pre-operative values (p=0.0001). Overall, 92% of the eyes were retained (n=32). 3- and 5-years' rate of recurrence-free survival made up 97%. The median follow-up after IOS was 57 months (6-120 mo.).

Conclusions: Intraocular surgery proved to be a highly effective and safety method to restore fundus and tumor control in children with intraocular complications of organ-preserving Rb treatment with recurrence-free survival rate of 97%.

Abstract No.: 206922

Intravitreal Anti-VEGF and Dexamethasone Therapy in Patients With Uveal Melanoma After Gamma-Knife Stereotactic Radiosurgery

First Author: Ekaterina MALAKSHINOVA

Co-Author(s): Vera YAROVAYA, Andrey YAROVY

Purpose: To present the results of anti-VEGF and ID in patients with ME after SRS of UM.

Methods: Anti-VEGF and ID was performed in 21 patients (21 eyes) with ME, which developed after radiation therapy with SRGK of UM. Among them, 5

(24%) patients were men, 15 (72%) were women. The average age of patients was 39 years (from 14 to 63 years). The average visual acuity (VA) before treatment was 0.21 (range from 0.002 to 0.7). According to optical coherence tomography, the average value of central macular thickness (CMT) at the time of diagnosis of ME was 330 ± 86 microns, the average value of volume cube (VC) – 12 ± 2 . The average amount of intravitreal injections was 3 (from 1 to 10).

Results: The average VA after anti-VEGF was 0.4. Based on the data of changes in VA, 14% patients had stabilization of the process, 57% showed improvement. According to optical coherence tomography, the average CMT value after anti-VEGF was 251 ± 95 microns ($p < 0.001$), and the average VC value was 8 ± 4 ($p < 0.001$).

Conclusions: The first experience of intravitreal anti-VEGF and ID has shown its effectiveness in reducing the height of CMT and improving or stabilizing visual acuity, which makes reasonable their use in cases with post-radiation ME.

Abstract No.: 200673

Iris Tumor & Associated Glaucoma: A Diagnostic and Therapeutic Challenge

First Author: Adnan **ABDUL MAJEED**

Purpose: This case highlights the importance of early recognition, accurate diagnosis, and tailored management strategies in Uveal malignancies

Methods: case report

Results: A 20 year-old female presented with a gradually enlarging pigmented lesion in the left iris, associated with mild photophobia and visual loss. Slit-lamp examination revealed a well-circumscribed, pigmented nodular mass in the inferior quadrant of the iris with multiple small pigmentary seeding on anterior surface. Intraocular pressure was raised in the left eye and there was absolute cup in left eye. Ultrasound biomicroscopy demonstrated a lesion extending 5 clock hours, with moderate internal reflectivity.

Conclusions: Iris melanoma, though uncommon, should be considered in the differential diagnosis of iris masses. Early diagnosis, aided by advanced imaging and cytology, enables organ-preserving surgical intervention. This case underscores the critical role of ophthalmologists and oncologists in the collaborative management of ocular melanomas.

Abstract No.: 202439

Local Resection via Partial Lamellar Sclerouvectomy for Ciliary Body Tumors

First Author: Xiaolu **YANG**

Purpose: This study aims to report our experience in managing this rare condition, with a focus on large tumors involving more than 5 clock hours. We also evaluate surgical outcomes and complications

associated with local resection via partial lamellar sclerouvectomy (PLSU) in four cases of ciliary body tumors treated in China.

Methods: This study reviewed four cases of ciliary body tumors managed by PLSU at Shanghai General Hospital from October 2019 to April 2023. Tumor features, histopathologic results, postoperative complications, visual acuity, and surgical outcomes were assessed at a mean follow-up of 20.8 months.

Results: Four patients with a mean age of 31.8 years were enrolled in this study. Histopathological examination revealed adenoma of the non-pigmented ciliary epithelium, schwannoma, and multiple iris and ciliary pigment epithelial cysts. The mean largest basal tumor diameter was 6.00 mm (range: 2.00–10.00), and the mean tumor thickness was 3.50 mm (range: 2.00–5.00). Preoperative complications included cataract in three eyes (75%), lens dislocation in two eyes (50%), and secondary glaucoma in one eye (25%). Transient ocular hypotony occurred in one patient, with no other postoperative complications observed. At a mean follow-up of 20.8 months, best-corrected visual acuity improved in three eyes and remained stable in one eye. No tumor recurrence was observed in any eye.

Conclusions: PLSU is an effective and safe technique for the local resection of ciliary body tumors. With thorough preoperative evaluation and meticulous surgical technique, procedure-related complications can be effectively managed.

Abstract No.: 202836

Management of Recurrent Orbital Solitary Fibrous Tumour in an Elderly Male: A Multimodal Therapeutic Approach

First Author: Piyush **BAJAJ**

Co-Author(s): Nikita **NUPUR**

Purpose: To highlight the diagnostic challenges, clinical progression, and multimodal management of a recurrent orbital solitary fibrous tumour (SFT) in an elderly male, with emphasis on the role of vigilant follow-up in preventing delayed detection of recurrence.

Methods: A 65-year-old male presented with progressive proptosis and right orbital swelling for 3 months. Two years earlier, he had undergone orbitotomy with mass biopsy and lid reconstruction elsewhere, where histopathology suggested a spindle cell neoplasm/solitary fibrous tumour. The patient was subsequently lost to follow-up. On current presentation, best-corrected visual acuity was perception of light negative in the right eye and 6/18 in the left eye; intraocular pressure in the right eye was not recordable. Imaging (MRI orbit/brain with contrast, ultrasound abdomen, CT chest) and immunohistochemistry confirmed recurrent orbital SFT. The patient underwent repeat orbitotomy with

superficial mass excision biopsy and lid reconstruction, followed by adjuvant radiotherapy.

Results: Histopathology with immunohistochemistry reconfirmed recurrent orbital SFT. Surgical excision and lid reconstruction were completed successfully, and adjuvant radiotherapy was initiated to mitigate the risk of further recurrence after a medical oncologist opinion.

Conclusions: Orbital solitary fibrous tumour is a rare entity that carries the potential for recurrence and, rarely, metastasis. Loss to follow-up after primary surgery may delay recognition of regrowth and worsen prognosis. MRI and immunohistochemistry remain indispensable for diagnosis. Surgical re-excision, when feasible, combined with adjuvant radiotherapy, represents an effective multimodal therapeutic strategy for recurrent disease. Vigilant, long-term surveillance is critical in optimizing outcomes.

Abstract No.: 201720

Methotrexate-Associated Lymphoproliferative Disorder Presenting as an Orbital Mass in Rheumatoid Arthritis: A Rare Case Report

First Author: Fumiko **MURAO**

Co-Author(s): Takafumi **MISAKI**, Yoshinori **MITAMURA**, Ryoji **YANAI**

Purpose: Methotrexate-associated lymphoproliferative disorder (MTX-LPD) is a subtype of iatrogenic immunodeficiency-associated lymphoproliferative disorders caused by long-term administration of methotrexate (MTX). Although MTX-LPD can occur in various organs, orbital involvement is extremely rare. We present a case of orbital MTX-LPD in a patient with rheumatoid arthritis.

Methods: A 71-year-old woman with rheumatoid arthritis under long-term MTX therapy presented with a 2-week history of left upper eyelid swelling and vertical diplopia. Ophthalmic examination, orbital magnetic resonance imaging (MRI), and biopsy were performed. Laboratory blood tests and systemic evaluation with chest computed tomography (CT) were also conducted.

Results: MRI revealed a well-circumscribed, homogeneous mass, approximately 3 cm in diameter, in the lateral left orbit, displacing the globe nasally. Orbital biopsy confirmed diffuse large B-cell lymphoma (DLBCL). Chest CT showed multiple ground-glass opacities in both lungs. Based on these findings, MTX-LPD was strongly suspected, and MTX was discontinued. One month after withdrawal, eyelid swelling and diplopia resolved completely.

Conclusions: Orbital involvement of MTX-LPD is rare but should be considered in patients under long-term MTX therapy presenting with eyelid swelling or diplopia. Prompt recognition and withdrawal of MTX

can lead to resolution of symptoms, highlighting the importance of early diagnosis and management.

Abstract No.: 201408

Miliary Pattern With Malignant Twist

First Author: Chin Ling **TAN**

Co-Author(s): Wendy See **YEN NEE**

Purpose: This report describes the nuances in differentiating miliary TB from malignant causes on CXR along with key clinical features.

Methods: Case report

Results: A 67-year-old male, ex- chronic smoker, previously healthy presented with 6 month's right eye loss of vision with pain and redness for one month, associated with constitutional symptoms. Right visual acuity was light perception with RAPD positive and neovascular glaucoma. There was vitreous hemorrhage with no fundus view. B-scan demonstrated a dome-shaped choroidal lesion with moderate internal reflectivity. Left eye visual acuity was 6/24 with yellowish choroidal lesion with subretinal yellowish deposits at superotemporal fundus and hyperpigmented scars inferiorly. Systemic examinations revealed bilateral cervical lymphadenopathies. Mantoux test was 18mm with CXR showing miliary pattern of diffuse reticulonodular interstitial opacities and enlarged right hilum. He was initially suspected to have ocular tuberculosis due to regional endemicity. However, further history revealed a positive family history of malignancy. Carcinoembryonic antigen was significantly raised above 2800ng/mL. CT scan of thorax, abdomen and pelvis demonstrated necrotic lung mass with multiple distant metastases. Lung biopsy confirmed adenocarcinoma with EGFR mutation positive, twisting the diagnosis to primary pulmonary adenocarcinoma with multiple distant metastases including the choroid. Patient succumbed to his disease 5 weeks from initial presentation before the induction of chemotherapy.

Conclusions: Bilateral choroidal metastasis is rare. Although uncommon, pulmonary adenocarcinoma is an important differential of miliary CXR pattern. The significant overlap of infectious and malignancy etiologies highlights the need for high clinical suspicion to prevent inevitable morbidity and mortality.

Abstract No.: 205675**Multidisciplinary Approach in Recurrent Orbital Leiomyosarcoma: Aggressive Surgical Management and Adjuvant Therapy Outcomes***First Author: Anindita WICITRA**Co-Author(s): Kartika BROHET, Rizky DJAMAL, Handoko YOSSARSONGKO*

Purpose: Primary orbital leiomyosarcoma is a rare malignant neoplasm of mesenchymal origin. It predominantly occurs in the older population and has been reported in various ocular and periocular sites. This report describes a case of recurrent orbital leiomyosarcoma, therapeutic challenges, and management outcomes.

Methods: Case report.

Results: A 69-year-old woman presented with progressive, painless left eye proptosis over several months. She had a history of palatal mass excision at another hospital. Ophthalmic examination revealed reduced visual acuity, restricted ocular motility, and a palpable mass at the lower eyelid extending into the left maxilla. Fundoscopy showed optic disc edema with blurred margins, consistent with compressive optic neuropathy. CT scan of the paranasal sinuses demonstrated a solid lesion involving the left nasal cavity, maxillary, ethmoid, and frontal sinuses, with destruction of the inferomedial orbital rim, orbital extension, and infiltration of the inferior and medial rectus muscles, as well as adhesion to adjacent masticatory muscles. The patient underwent left orbital exenteration. Histopathology revealed spindle cell proliferation, while immunohistochemistry was vimentin and desmin positive, S-100 negative, confirming leiomyosarcoma. As proton beam therapy was unavailable, external beam radiotherapy was initiated. However, local recurrence in the left maxilla occurred during treatment, necessitating debulking. The tumor was unresponsive to subsequent radiation therapy, and further progression with temporal lobe infiltration was confirmed on brain CT. Her condition deteriorated, and she passed away two months later.

Conclusions: Due to its rarity, diagnosis often requires a combination of imaging, histopathology, and immunohistochemistry. The standard management approach consists of orbital exenteration and adjuvant radiotherapy.

Abstract No.: 205919**Orbital Anatomical Variations Between the Southern China and the Kashi Populations Based on 3D-CT Analysis***First Author: Meng WANG*

Purpose: This study aims to characterize regional variations in orbital morphology between populations from Southern China and Kashi through

three-dimensional computed tomography (CT) measurements, providing anatomical references for clinical practice.

Methods: In this observational cross-sectional study, CT scans of 80 patients (160 eyes) from Zhongshan Ophthalmic Center and The First People's Hospital of Kashi were analyzed using Mimics Research software. 25 orbital parameters were measured, including orbital volume, orbital fat volume, extraocular muscle volume, and various orbital dimensions.

Results: The orbital height was significantly greater in the Southern group compared to the Kashi group (35.99 ± 2.13 mm vs. 34.49 ± 2.89 mm; $P < 0.001$), and the orbital index (OI) was also significantly higher in the Southern group (95.55 ± 6.81 vs. 91.91 ± 5.12 ; $P < 0.001$). The Kashi participants exhibited significantly greater medial orbital depth (41.62 ± 2.67 mm vs. 40.70 ± 2.57 mm; $P = 0.028$) and smaller exophthalmos (15.66 ± 2.13 mm vs. 16.50 ± 2.31 mm; $P = 0.018$). Additionally, the Kashi group displayed significantly shorter sphenoid trigone length (11.25 ± 3.14 mm vs. 12.64 ± 3.19 mm; $P = 0.006$) and narrower sphenoid trigone width (7.44mm, IQR: 3.12 vs. 8.96mm, IQR: 2.65; $P = 0.001$).

Conclusions: This study provided a comprehensive comparison of orbital anatomy between populations from Southern China and Kashi, confirming that the Kashi group exhibits smaller orbital height, OI, exophthalmos, and sphenoid trigone dimensions, but greater medial orbital depth, which are essential anatomical features for planning decompression surgeries, orbital fracture reconstructions, and diagnosing conditions.

Abstract No.: 202385**Orbital Natural Killer/T-Cell Lymphoma***First Author: Jing LI**Co-Author(s): Jianmin MA*

Purpose: To evaluate the clinical features, pathological findings, treatment, and prognosis of patients with orbital natural killer/T-cell lymphoma (NKTCL).

Methods: This retrospective study collected clinical data from 11 patients diagnosed with orbital NKTCL by pathological examination at Beijing Tongren Hospital, Capital Medical University, between November 2005 and March 2024. The patients were followed up to assess their prognosis.

Results: The median age of patients with orbital NKTCL was 51 years, with a slight male predominance. All cases were unilateral, with clinical presentations of eyelid or periorbital swelling, and other symptoms including decreased vision (90.9%), conjunctival congestion (90.9%), ocular motility disorders (81.8%), proptosis (63.6%), and ptosis (36.4%). All patients had surrounding tissue involvement, with the most common sites being the eyelid (11 cases), eyeball wall (7

cases), and lacrimal gland (5 cases). Additionally, 63.6% of patients had concurrent soft tissue involvement of the nasal region, while 36.4% had isolated orbital NKTCL. Pathological examination revealed diffuse proliferation and infiltration of atypical lymphocytes, occasionally with necrosis. All patients underwent ocular surgery, 7 received postoperative chemotherapy, and one received concurrent local radiotherapy. Follow-up (median duration: 120 months) revealed poor prognosis, with 5 patients lost to follow-up, 5 deaths, and only one survival without recurrence.

Conclusions: Orbital NKTCL is highly aggressive, rapidly progressive, and has a poor prognosis. When anti-inflammatory and corticosteroid therapies prove ineffective, early biopsy for histopathological confirmation is strongly recommended. Upon diagnosis, prompt chemotherapy and radiotherapy should be initiated to improve the patient's prognosis.

Abstract No.: 200236

Orbital Rhabdomyosarcoma in the Pediatric Population: A Prospective, Observational Study From Mid-West Nepal

First Author: Pradeep BASTOLA

Purpose: This study was aimed to find out the demographic characteristics, clinical characteristics and prevalence of rhabdomyosarcoma in children presenting to a tertiary level hospital of terrain Nepal, over a period of nine years. The study also aimed to explore the current understanding of rhabdomyosarcoma management.

Methods: This prospective, observational study was carried out in a tertiary hospital of Mid-Western part of Nepal from November 2011 to April 2019. Histopathologically confirmed cases of rhabdomyosarcomas were included in the study. Demographics, clinical characteristics and other relevant findings were entered in a specified proforma for the study and analyzed by Statistical Package for Social Services 24. Point estimate at 95% Confidence Interval was calculated along with frequency and percentage for binary data.

Results: Among 1,180 suspected children, eight (0.68%) (0.29-1.3 at 95% CI) study subjects were diagnosed to have unilateral orbital rhabdomyosarcoma. Males six (75%) outnumbered the females. The mean age of presentation was seven, 7+/-1.8 (Range: 6-8) years. Embryonal variant of rhabdomyosarcoma (6, 75%) was the commonest type, followed by the alveolar type (2, 25%). Proptosis was the commonest presenting feature and was present in all (8, 100%) study subjects.

Conclusions: The prevalence of rhabdomyosarcoma was higher in the current study when compared with similar international studies. The embryonal variant of rhabdomyosarcoma was the commonest type

encountered. Male predilection for rhabdomyosarcoma was high when compared to the females.

Abstract No.: 204685

PRR11 as a Newly Identified Oncogenic Driver in Retinoblastoma

First Author: Yu HE

Co-Author(s): Bo GONG

Purpose: Retinoblastoma (RB) is the most common pediatric intraocular malignancy and remains life-threatening without early treatment. Current therapies lack effective molecular targets beyond RB1 gene mutations. This study aimed to identify novel oncogenic drivers and therapeutic targets in RB.

Methods: Transcriptomic analyses of four RB-related datasets (GSE125903, GSE110811, GSE97508, and GSE24673) from the Gene Expression Omnibus (GEO) database were performed to screen candidate genes. Single-cell transcriptomics was used to determine cell type-specific expression patterns. Functional validation of candidate genes was conducted in vitro and in vivo. Coimmunoprecipitation mass spectrometry (co-IP/MS) was employed to identify protein interactions, and proteomic analysis was used to explore downstream signaling pathways.

Results: Proline Rich 11 (PRR11) was identified as a significantly overexpressed gene in RB. Single-cell transcriptomics revealed heterogeneous expression, with high levels in tumor-associated populations such as cone precursor-like cells and MKI67+ photoreceptorless-degenerated cells. Functional experiments demonstrated that PRR11 promotes RB cell proliferation and tumor growth. Co-IP/MS revealed that the deubiquitinase OTUB1 interacts with and stabilizes PRR11, sustaining its high expression. Proteomic analysis showed that PRR11 suppresses Dickkopf WNT signaling pathway inhibitor 3 (DKK3), leading to aberrant activation of Wnt/ β -catenin signaling, upregulation of cyclin D1, and accelerated S/G2M cell cycle progression.

Conclusions: This study establishes PRR11 as an oncogenic driver in RB and uncovers the OTUB1-PRR11-DKK3 axis as a regulatory mechanism of Wnt/ β -catenin signaling in RB tumorigenesis. Targeting PRR11 and its downstream pathways may provide a novel therapeutic strategy for RB treatment.

Abstract No.: 201173

Paradoxical Masquerade of Granulomatous Panuveitis as Retinoblastoma

First Author: Darren Anthony KHOW

Co-Author(s): Bryan Vincent MESINA

Purpose: To report the case of a patient presenting with a painful blind eye suggestive of retinoblastoma, but on histology, only showed chronic inflammation.

Methods: Presented in this report is the case of an eight-year-old female who came in for blurring of vision, leukocoria, eye redness, and pain of the right eye, with findings of band keratopathy, shallow chambers, a cataractous lens, and marked anterior chamber activity, with an initial diagnosis of chronic panuveitis.

Results: Over the course of her consults, she eventually presented with buphthalmos, prompting cranial imaging which showed suspicious intraocular calcifications, leading to a diagnosis of retinoblastoma. Neoadjuvant chemotherapy was initiated, and enucleation was done. After enucleation of a blind, painful eye, histopathology showed no signs of retinoblastoma, confirmed by slide review, now leading back to a diagnosis of chronic panuveitis.

Conclusions: Uveitis and retinoblastoma are two very distinct entities, and while there may be instances where significant overlap of signs and symptoms may be present, it is crucial to differentiate the two as management is drastically different for both disease entities.

Abstract No.: 203231

Primary Localized Conjunctival Amyloidosis: A Rare Clinical Case Report

First Author: Ariunbat LKHAGVASUREN

Co-Author(s): Amarsanaa DELGERJAV, Selenge ENKHBAYAR, Tumenjargal ERDENEBAATAR, Bayasgalan PUREVDORI

Purpose: Localized conjunctival amyloidosis typically presents as recurrent or persistent conjunctival masses, resulting in ocular irritation, cosmetic deformity, or visual disturbance. Because of its rarity and nonspecific presentation, misdiagnosis or delayed diagnosis is common. Here, we present a rare case of primary localized conjunctival amyloidosis (PLCA) in a Mongolian patient.

Methods: A 64-year-old Mongolian male presented with progressive bilateral eyelid swelling and ptosis of both upper and lower eyelids, accompanied by ocular irritation, foreign body sensation, and gradually worsening visual acuity since 2015. A nodule first noted in the right lower eyelid had progressively enlarged. His past medical history was unremarkable, except for right eye trauma from a whip injury in 2004. On examination, best-corrected visual acuity was 6/7.5 in both eyes, intraocular pressure was 18 mmHg bilaterally, and slit-lamp evaluation revealed bilateral conjunctival nodules with a pinkish-yellow, papilliform appearance; fundoscopy showed normal optic discs and macula.

Results: Management The patient underwent excisional biopsy of the lesions under local anesthesia. Cryotherapy was applied to the lesion base to reduce recurrence risk. Histopathological analysis of excised

tissue confirmed amyloid deposition, consistent with primary localized conjunctival amyloidosis. Systemic Work-up Further investigations, including blood tests and imaging studies, ruled out systemic amyloidosis, particularly in the kidneys, heart, and liver. The final diagnosis was primary localized conjunctival amyloidosis (PLCA).

Conclusions: Primary localized conjunctival amyloidosis is a rare ocular condition that may mimic other conjunctival lesions. Excisional biopsy with adjunctive cryotherapy is an effective treatment, and systemic evaluation is essential to exclude generalized disease.

Abstract No.: 204162

Primary Orbital Low-Grade Myofibroblastic Sarcoma: A Case Report and Literature Review

First Author: Zhao YUN

Purpose: Low-grade myofibroblastic sarcoma (LGMS) is an exceedingly rare malignant mesenchymal spindle-shaped cell tumour. It mostly occurs in the head and neck, extremities and other body parts.

Methods: LGMS rarely involves the orbit or ocular adnexa. We report a case of a 43-year-old woman with a history of progressive proptosis of the left eye and painful swelling for one year. The special features of orbital computed tomography in this case have not been reported in the previous literature. Imaging of the orbit showed a large irregular soft tissue mass with calcified plaques inside. The patient underwent a lateral orbitotomy, and the tumour was completely excised. The histopathological diagnosis was orbital low-grade myofibroblastic sarcoma. The patient refused adjuvant therapy. Fortunately, no recurrence was found in the follow-up period of 8 months.

Results: Orbital LGMS appears to have unique clinical features, and the best treatment has not yet been established.

Conclusions: As in a previous study, surgical resection and combined adjuvant therapy can improve the prognosis. Regular long-term follow-up after surgery is mandatory.

Abstract No.: 205056

Primary Orbital Yolk Sac Tumor (Endodermal Sinus Tumor): A Rare Entity

First Author: Kaustubh MULAY

Co-Author(s): Megha BANKA, Santosh HONAVAR

Purpose: Yolk sac tumor is an infrequent, malignant germ cell tumor that typically originates in the gonads. Primary, extra-gonadal involvement is uncommon and orbital location as primary site is extremely rare. We aim to describe the clinical presentation, imaging features, histopathological characteristics, and management of orbital YST.

Methods: We report on a yolk-sac tumor in a 17-month-old child.

Results: The female child presented with gradually increasing protrusion of the left eye since 1-year with episodes of waxing and waning in size. Imaging studies showed a well-defined, lobulated, intra-conal mass with solid and cystic components. Light microscopic examination and subsequent immunostaining confirmed the diagnosis of a yolk sac tumor. Systemic evaluation was normal.

Conclusions: Diagnosing orbital yolk sac tumor and distinguishing it from other orbital lesions, including those of congenital, benign, or malignant origin, is critical for its prompt treatment.

Abstract No.: 202428

Profile of Retinoblastoma Survivors in Nepal

First Author: Ben LIMBU

Purpose: Retinoblastoma is rare disease but potentially fatal if left untreated. This study aimed to evaluate demographic profile, treatment and complications in survivors of retinoblastoma in tertiary eye care center in 2019

Methods: This is multicentric hospital based cross sectional study conducted from January 2019 to December 2019 after ethical clearance from National Health Research Council. All post-treatment cases of retinoblastoma who had completed at least 1-year follow-up examination in any of our retinoblastoma (RB) center in 2019 were included whereas newly diagnosed and ongoing treatment cases and those failed to consent were excluded. Data based on demographic profile, ethnic and geographical distribution of RB survivors was collected and entered into Microsoft Excel 2016. Statistical analysis was performed using Statistical Package for Social Sciences version 20

Results: A total of 37 RB survivors that included 24(64.9%) female and 13(35.1%) male. Of the total, 34 (91.8%) survivors had unilateral (Right Eye 18, Left Eye 16) involvement whereas 3(8.1%) bilateral involvement. The mean age at diagnosis and study time was 38.65 ± 37.43 months (3-214 months) and 93.46 ± 65.58 months (16-252 months) respectively. Primary enucleation was commonest mode of treatment (64.9%). Majority of survivors belonged to upper caste group 20(54.1%) and mostly from Bagmati 15(40.5%) followed by province-2 (21.6%)

Conclusions: Descriptive study showed that most of survivors had undergone enucleation due to delayed presentation with poor prognosis. Early diagnosis and appropriate treatment modality are prerequisite for salvaging life of child, sight and eyeball

Abstract No.: 206887

Relapsed Acute Lymphoblastic Leukaemia With the Solitary Feature of Bilateral Eyes Masquerade Uveitis

First Author: Yi Hao YAP

Co-Author(s): Zjen Pang MOI, Wendy Yen Nee SEE, Lik Wei TIONG

Purpose: Reporting a rare case of relapsed leukemia presenting with the solitary feature of bilateral eyes' severe anterior uveitis.

Methods: Case report.

Results: We present a case of a 12-year-old boy who presented with bilateral gradual blurring of vision and dry eye symptoms. Examination revealed severe anterior uveitis, with 1+ vitreous haze without posterior pole involvement. He has been diagnosed with T-cell Acute Lymphoblastic Leukemia (ALL) 9 months ago and underwent chemotherapy followed by a bone marrow transplant (BMT) 2 months ago. Eye screening prior to chemotherapy and BMT was normal. Initial investigation showed an elevated ESR, and aqueous sampling was HSV PCR positive. Other infective work-up results were negative. The initial repeated peripheral blood film (PBF) showed no blast cells. Despite the administration of intravenous Acyclovir and topical steroids, no significant improvement was observed. A repeated anterior chamber (AC) tap for cytology and PBF revealed blast cells, revising his diagnosis as a relapse of ALL. Leukaemic retinopathy developed after 4 weeks of presentation. His clinical condition declined, and he was subsequently put on palliative home care.

Conclusions: Relapse typically occurs 6 months post-transplant. The earliest reported relapse was 1 day post-transplant. A relapse within 6 months post-transplant indicates a poor prognosis. Given the rarity of anterior segment infiltration in ALL (0.5-2.5%), and it might not have systemic involvement (2.2%). This case highlights that an AC tap for cytology even in the presence of initial negative PBF is indicated. Early identification and intervention are crucial, requiring a multidisciplinary approach to ensure comprehensive care.

Abstract No.: 202172

Retinoblastoma vs. Medulloepithelioma- a Rare Case of Painful Blind Eye in a Child

First Author: Neeraja T G

Co-Author(s): Shruthi Tara V

Purpose: Presenting a rare case of painful blind eye in a child posing a diagnostic dilemma and the importance of histopathology and clinical correlation.

Methods: A 11-year-old boy presented with a painful, blind right eye. He had previously undergone lens extraction elsewhere (in 2014) for a complicated cataract, followed by vitrectomy and silicon oil injection

(in 2015) for total retinal detachment. On presentation he had no perception of light. Anterior segment evaluation revealed anterior and ciliary staphyloma with circum-corneal congestion. He underwent enucleation with orbital implant and the specimen was subjected for histopathological evaluation. Although the tumour initially mimicked retinoblastoma due to the presence of rosettes, deeper sections confirmed its origin from the ciliary body. The presence of intra-tumoral mucin-filled cystic spaces, highlighted by Alcian Blue positivity along with hyaline cartilage helped establish the diagnosis and distinguish it from retinal tumors.

Results: A young boy with a painful blind eye and history of white reflex and multiple intra ocular surgeries warranted a suspicion of intraocular malignancy. Histopathology confirmed a ciliary body medulloepithelioma of teratoid type with extra-scleral extension, characterized by rosette-like structures and intra-tumoral mucin-filled cystic spaces, Alcian Blue positive, helping distinguish it from retinoblastoma.

Conclusions: Despite being the second most common intra-ocular malignancy in children, Medulloepithelioma, due to its varied clinical presentation, is often missed initially. This poster highlights differentiating features between retinoblastoma and medulloepithelioma and the importance of special stains which can change the treatment protocol. It is emphasized to correlate clinically and is prudent to enucleate than eviscerate in doubtful scenarios.

Abstract No.: 208429

Risk of Subclinical Radiation-Induced Retinopathy Following High-Dose Irradiation in Chinese Patients With Nasopharyngeal Carcinoma: A Case-Control Study

First Author: Mary **HO**

Co-Author(s): Noel **CHAN**, Gabriel **LI**, Andrew **MAK**, Bryan Hon Ming **WONG**

Purpose: The aim of this study was to evaluate functional and structural changes in vascular parameters following high-dose intensity-modulated radiation therapy (IMRT) for nasopharyngeal carcinoma (NPC).

Methods: This is a cross-sectional case-control study. Comparisons were made between clinical and OCT-angiography imaging findings of subjects who received IMRT of dose >54 Gy from 2010–2016, and demographically matched controls.

Results: Thirty-six eyes of 18 subjects were recruited, with a mean age of 59.0 ± 13.4 years, at a mean of 6.9 years following radiotherapy; the OCTA parameters were compared to 68 eyes from 34 healthy controls. Of the recruited cases, 10 (55.6%) received 70 Gy in 35 fractions, while the rest received 69.96 Gy in

33 fractions. None developed clinically observable radiation retinopathy. However, irradiated eyes exhibited significantly lower vessel density (VD), larger foveal avascular zone (FAZ) area, reduced fractal dimension (FD), and decreased vessel diameter index (VDI) when compared to the controls. The visual acuity (VA) and OCT-A parameters including non-perfused area, VD, FD and VDI showed a correlation relationship either the maximum dose (Dmax), and mean dose (Dmean) irradiation to eyeball.

Conclusions: This study revealed a significant, radiation exposure dose related reduction in all microvascular parameters and reduced visual acuity, likely due to the vascular damage caused by radiation despite lack of evidence of clinically observable radiation retinopathy.

Abstract No.: 203028

SOX4 as a Key Oncogene Driving Tumor Invasion in Retinoblastoma

First Author: Yaoming **LIU**

Co-Author(s): Rong **LU**, Jiahe **NIE**, Junjie **TANG**, Zhihui **ZHANG**

Purpose: This study aims to explore the role of SRY-related HMG box transcription factor 4 (SOX4) in promoting invasion in retinoblastoma (RB), and to elucidate the underlying oncogenic pathways.

Methods: SOX4 expression in human retina, intraocular RB, and extraocular RB samples was evaluated using bulk RNA sequencing (RNA-seq) and single-cell RNA sequencing (scRNA-seq), with further evaluation in RB cell lines (Y79, WERI-RB1). SiRNA-mediated knockdown was performed in RB cell lines, followed by functional assays including CCK-8, EdU, colony formation, and transwell assays. An orthotopic xenograft model with SOX4 knockdown was utilized to assess tumor invasion. RNA-seq was performed on SOX4 knockdown (si-SOX4) and control (si-NC) Y79 cells to explore downstream signaling pathways.

Results: RNA-seq and scRNA-seq data revealed that SOX4, E2F3, and DEK were significantly upregulated in RB tissues compared to normal retina. Notably, SOX4 expression was particularly elevated in extraocular RB tissues, especially in MKI67+ photoreceptorless decreased cells. Knockdown of SOX4 in RB cell lines caused decreased proliferation, colony formation, migration, and reversal of EMT markers (N-cadherin, E-cadherin, vimentin). In vivo, SOX4 knockdown resulted in fewer cases of anterior chamber involvement and eyeball wall invasion in an orthotopic xenograft model. RNA-seq analysis revealed that SOX4 knockdown altered the Wnt/ β -catenin and cyclin D1 signaling pathways.

Conclusions: SOX4 plays a critical role in driving local invasion in RB, and targeting SOX4 may provide new insights into the molecular mechanisms of RB invasion,

potentially leading to improved therapeutic strategies for RB treatment.

Abstract No.: 201162

Solitary Fibrous Tumours of Conjunctiva, Intra-Ocular, and Orbit: Clinico-Pathological Spectrum and Its Management Based on Risk-Stratification

First Author: Raghuraj HEGDE

Co-Author(s): Shruthi KRISHNA, Prithvi VISHWANATH

Purpose: To analyse the clinicopathological spectrum of Solitary Fibrous Tumour (SFT) with ocular & orbital involvement. This study shows risk stratification-based management.

Methods: SFTs are rare spindle cell tumours with very few reports of ophthalmic involvement. Four cases were reviewed: conjunctival, intra-ocular, orbital, & recurrent SFT. Clinical features, histopathology, immunohistochemistry & treatment were assessed. Risk stratification guided surgical & adjuvant therapy was done. Management was based on existing literature on this very rare neoplasm.

Results: All cases showed varied sites & behaviour. STAT6 positivity confirmed the diagnosis. Conjunctival SFT (low Ki67 index) was completely excised and no further treatment was given. Intra-ocular SFT (high Ki-67 index), required adjuvant radiotherapy. Orbital SFT needed extensive resection followed by radiotherapy (intermediate Ki-67 index). The recurrent SFT had high-risk features (High Ki67 Index), which were managed with repeat debulking and adjuvant radiotherapy. There has been no recurrence in all patients with a minimum of 6 months post-surgery follow up.

Conclusions: SFTs show varied locations and have diverse clinic-pathological features. Accurate diagnosis & risk-based management strategies are crucial to minimise recurrence.

Abstract No.: 202454

Sometimes It Is a Zebra: An Unusual Presentation, Progression and Management of OSSN

First Author: Lai Yu Tony NG

Co-Author(s): Kin Ting Andrew KUK, Pricila Tien Yan WANG

Purpose: Ocular surface squamous neoplasia (OSSN) describes a continuum of ocular surface tumors involving the conjunctiva and/ or cornea, ranging from non-invasive conjunctival intraepithelial neoplasia (CIN) to invasive squamous cell carcinoma (SCC). It is the most common malignancy of the conjunctiva or cornea. Risk factors include older age, ultraviolet light exposure, smoking, a pale complexion, immunodeficiency such as Human Immunodeficiency Virus (HIV) infection, etc. Herein, we present a case of

an unusual presentation and progression of CIN in a 56-year-old man, initially manifesting as spontaneous corneal perforation without conjunctival lesions. 4 months after corneal patch graft repair, he developed new conjunctival lesions. Histopathological examination confirmed CIN. He was later managed successfully with combined medical therapy and a two-staged tumor excision and lid reconstruction, with no recurrence on latest follow-up. We also conduct a literature review on the presentation and latest management of OSSN.

Methods: N/A

Results: N/A

Conclusions: N/A

Abstract No.: 204148

Stevens-Johnson Syndrome Complicated With Chronic Dacryocystitis: A Case Report

First Author: Wei HAN

Purpose: The patient is a 61-year-old female whose chief complaint is bilateral purulent discharge for over 20 years. The patient reported that at the age of 9, after receiving a measles vaccination, she developed a fever. She was treated with «metamizole sodium» at a local clinic and suddenly lost consciousness, with widespread skin erythema and erosion. She regained consciousness after treatment and was diagnosed with Stevens-Johnson Syndrome. Since then, she experienced «corneal transplantation», «cataract extraction», and «lamellar keratoplasty and partial eyelid suture» of the left eye. Recently, she visited our hospital due to bilateral purulent discharge.

Methods: Vision: Light perception (+), conjunctival congestion and edema, grayish-white corneal opacity, peripheral corneal neovascularization. Lacrimal duct irrigation: The Needle can reach the bone wall, with upward and downward reflux, and a large amount of purulent secretions returned. We decided to perform excision of the lacrimal sac and lacrimal canaliculus for her.

Results: There was no bleeding or significant swelling after the operation, and the incision healed well. The patient did not experience excessive tearing, and the amount of secretions significantly decreased. This makes it possible to proceed with corneal transplantation or artificial cornea surgery to eliminate potential risks.

Conclusions: Lacrimal sac excision is a destructive surgery with a very limited application range. However, for patients with dacryocystitis combined with dry eye syndrome and severe corneal lesions, it is the last resort. Lacrimal sac excision resolves the purulent discharge problem, and avoids aggravating dry eye symptoms. It is a more appropriate solution in such cases.

Abstract No.: 205746**Subtenon Injections Therapy for Exudative and Hemorrhagic Complications of Retinoblastoma Local Treatment***First Author: Andrey YAROVY**Co-Author(s): Amina CHOCHAEVA, Denis VOLODIN, Vera YAROVAYA*

Purpose: To present results of a novel active approach to conservative treatment of exudative and hemorrhagic complications of local treatment of retinoblastoma (Rb) with subtenon injection therapy (STIT).

Methods: Exudative and/or hemorrhagic complications occurred in 92 eyes after laser, cryo, brachytherapy, intra-arterial chemotherapy, and/or radiosurgery for resistant or recurrent Rb. STIT was fulfilled in 54 eyes with more severe complications. A 22-gauge catheter was temporarily implanted into the subtenon space under ophthalmoscopic control using an intra-catheter light pipe. Six injections of medicines were daily fulfilled within 10-12 days. Results of treatment were compared to similar group of 38 eyes of conventional therapy (CT).

Results: Complete resolution of subretinal fluid, edema, exudates, and hemorrhages was achieved in 41 eyes (76%) within 2-4 months after STIT. In 5 eyes the procedure was repeated. Three eyes were enucleated because of the persistence and severity of complications. Comparison with CT group showed statistically higher number of resolutions of complications ($p=0.008$) and higher eye preservation rate in STIT group ($p<0.0001$).

Conclusions: Subtenon injection therapy is a safe and effective approach to the treatment of exudative and hemorrhagic complications of Rb local management and has distinct advantages over conventional therapy.

Abstract No.: 202910**Targeting MCM6 Enhances Melphalan Chemosensitivity in Retinoblastoma***First Author: Junjie TANG**Co-Author(s): Rong LU, Meng WANG*

Purpose: Retinoblastoma, a pediatric ocular malignancy, is commonly treated with intravitreal melphalan chemotherapy. However, drug resistance has become a major obstacle to effective treatment. This study aims to identify key regulators involved in retinoblastoma progression and melphalan chemoresistance, with the goal of developing strategies to overcome this resistance.

Methods: Single-cell transcriptomics was employed to analyze gene expression patterns in retinoblastoma cells. Functional assays were conducted, including knockdown of minichromosome maintenance complex component 6 (MCM6), followed by assessment of

cell growth, cell-cycle progression, and DNA damage levels. In vivo experiments were also carried out to evaluate the combined effect of MCM6 inhibition and melphalan on intraocular tumor growth.

Results: MCM6 was found to be highly expressed in retinoblastoma cells. Its expression was particularly elevated in tumors from patients who failed melphalan treatment and was closely associated with a gene network related to cell proliferation. Knockdown of MCM6 significantly suppressed retinoblastoma cell growth, arrested cell cycle progression, and enhanced the sensitivity of these cells to melphalan by increasing DNA damage. In vivo, the combination of MCM6 inhibition and melphalan treatment synergistically inhibited intraocular tumor growth.

Conclusions: MCM6 plays a critical role in regulating both the proliferation of retinoblastoma cells. Inhibiting MCM6 represents a promising therapeutic strategy to enhance the efficacy of melphalan-based chemotherapy for retinoblastoma.

Abstract No.: 204825**The Association Between Mitotic Activity and Ki-67 Expression With Clinical and Histopathological Prognostic Factors of Conjunctival Melanoma***First Author: Agung NUGROHO**Co-Author(s): Neni ANGGRINI, Aria KEKALIH, Evelina KODRAT, Mutmainah MAHYUDDIN, Virna Dwi OKTARIANA, Anggun Rama YUDANTHA*

Purpose: Conjunctival melanoma is a rare but potentially aggressive conjunctival malignancy. Local recurrence of conjunctival melanoma reaches 40% with a high mortality rate (18%). Mitotic activity and Ki-67 immunohistochemistry (IHC) staining expression as proliferation markers can predict melanoma prognosis. This study aims to assess the association between mitotic activity and Ki-67 expression with clinical and histopathological prognostic factors in conjunctival melanoma, specifically tumor location, local invasion, lymph node involvement, tumor recurrence, distant metastasis, cell type, lymphovascular invasion, and pagetoid spread.

Methods: This study was conducted using data from medical records and paraffin blocks of conjunctival melanoma patients at Cipto Mangunkusumo Hospital from January 2013- December 2023. Samples were reviewed, hematoxylin-eosin (HE) stained, and IHC stained using Ki-67 antibody. The mitotic count and Ki-67 expression results were then cross-checked with established prognostic factors. Then, statistical analysis was performed to determine the association between them.

Results: Thirty four research samples met the inclusion criteria were then analyzed. There was no statistically significant association between mitotic activity and Ki-

67 expression with the clinical and histopathological prognostic factors tested ($p > 0.05$). Most conjunctival melanoma patients in this study had high mitotic activity (85.3%); this finding exceeds the percentage proportion in previous studies although does not show relation to worse prognostic factors.

Conclusions: In conjunctival melanoma patients, there was no statistically significant association between mitotic activity and Ki-67 expression with poor clinical and histopathological prognostic factors. A high proportion of patients with high mitotic count may affect the outcome of this study.

Abstract No.: 202398

The Diagnostic Challenge: Identifying Orbital Neuroblastoma in a Pediatric Patient

First Author: Phillip Jairus **SAYO**

Co-Author(s): Yvette Marie **SANTIAGO-GATMAITAN**

Purpose: To present a case of metastatic neuroblastoma in a child following an alleged head trauma, emphasizing the diagnostic challenge and importance of early diagnosis.

Methods: Case report.

Results: A one-year-old previously healthy Filipino girl presented with left periorbital hematoma following presumed head trauma after an unwitnessed fall. Over weeks, there was persistence of hematoma with new-onset proptosis and changes in sensorium initially assessed as left spheno-orbital fracture with epidural hematoma. Further worsening of status prompted admission and referral to Ophthalmology. Examination showed bilateral periorbital ecchymosis, non movable mass at the left temporal area, proptosis of left eye with restricted ocular motility, mandibular lymphadenopathy, and an abdominal distention. Orbitocranial MRI revealed vividly enhancing extra-axial mass with destruction of the left lateral wall and intracranial extensions, and a smaller extraconal mass on the right orbit. Abdominal CT scan showed a large left suprarenal mass. Emergency orbital biopsy done showed round cell tumor. Despite the absence of immunohistochemical staining, clinical and radiologic findings were suggestive of an advanced metastatic orbital neuroblastoma. Her condition further deteriorated with systemic complications. This case features the diagnostic challenge of differentiating trauma-related injuries from underlying malignancies in children.

Conclusions: This case highlights the importance of suspecting underlying malignancies in children with orbital or cranial masses, especially when recovery deviates from typical trauma. Early diagnosis, thorough evaluation, and a multidisciplinary approach are crucial for effective management and improved prognosis in complex pediatric cases.

Abstract No.: 200407

Tiny Eyes, Big Battles – Rare Case of Retinoblastoma in a Four-Month-Old Child

First Author: Trupti **SUTE**

Co-Author(s): Kavita **DHABARDE**

Purpose: To present a rare case of retinoblastoma in a 4-month-old child.

Methods: Retinoblastoma is the most common ocular malignancy of childhood. Although retinoblastoma primarily affects younger children, it is very rare below 1 year of age. A 4-month-old girl presented with leukocoria in her right eye for 2 months. Posterior segment examination revealed retinal detachment and abnormal, tortuous retinal vessels along with vitreous seedings in the right eye. B-mode ultrasound showed the right eye having a well-defined, solid endophytic mass present on the posterior pole, with a few foci of calcification.

Results: Due to poor visual prognosis and high clinical suspicion of malignancy (retinoblastoma), enucleation was performed under general anaesthesia. The enucleated eyeball was sent for histopathological analysis, which confirmed the diagnosis of retinoblastoma without optic nerve involvement. A high index of suspicion of retinoblastoma in an infant having leukocoria and timely management of the condition by enucleation has saved the child. A prosthesis was implanted for the stimulation of the development of the orbit in the child.

Conclusions: This case is a unique case as retinoblastoma at the age of 4 months is a very rare condition. Hence, we wish to report this case due to its rare presentation and to create awareness about the presence of retinoblastoma in infancy.

Abstract No.: 206315

Topical Mitomycin C for Pre-Invasive Ocular Surface Squamous Neoplasia in a Patient With Xeroderma Pigmentosum: A Case Report

First Author: Hatem **ALI**

Purpose: To highlight the successful non-surgical management of a pre-invasive ocular surface squamous neoplasia (OSSN) lesion in a xeroderma pigmentosum (XP) patient, using pulse topical mitomycin C (MMC) therapy guided by anterior segment optical coherence tomography (AS-OCT).

Methods: Single-patient interventional case report. A 38-year-old woman with xeroderma pigmentosum presented with a nasal epibulbar mass spanning 3–6 clock hours with corneal extension. Diagnosis and monitoring used slit-lamp and AS-OCT, demonstrating hyper-reflective epithelial thickening with an abrupt transition and stromal shadowing. Compounded mitomycin-C 0.02% eye drops were prescribed in pulse

cycles (2 weeks on/1 week off) with preservative-free lubrication. Slit Lamp photo was captured for documentation at each visit.

Results: At baseline, AS-OCT confirmed epithelial hyperreflectivity with an abrupt transition from normal to abnormal tissue, consistent with pre-invasive OSSN. After initiation of pulse topical MMC 0.02%, the lesion demonstrated progressive reduction in thickness and vascularity on slit-lamp evaluation. Sequential slit-lamp photographs documented steady regression across treatment cycles. By five months, complete clinical resolution was achieved with improvement of visual acuity from counting fingers at 30–50 cm to 0.13.

Conclusions: AS-OCT is the gold standard for diagnosing OSSN, while topical MMC offers safe and effective treatment for pre-invasive cases. Because OSSN can mimic benign lesions, full ocular examination and awareness of risk factors such as xeroderma pigmentosum are critical for early detection and management.

Abstract No.: 206732

Tracing the Green Footprint: Chloroma in Relapsed ALL

First Author: Shreya **BHADANI**

Co-Author(s): Manisha **CHOUDHARY**, Manmath **DAS**, Matuli **DAS**, Shrutakirti **PARIDA**, Aanchal **SINGHAL**

Purpose: To highlight chloroma as a rare extramedullary presentation in relapsed acute lymphoblastic leukemia (ALL) in a young male

Methods: A 17-year-old male with history of ALL and central nervous system relapse presented with 3-month history of progressive, painless diminution of vision in both eyes with drooping of right upper lid. He had a prior episode of right-sided Bell's palsy 8 months back. Best-corrected visual acuity was no perception of light in right eye (RE) and 6/9, N12 in left eye (LE). Extraocular movements were grossly restricted in RE and mildly in LE. RE showed complete ptosis, periorbital edema, conjunctival congestion, mucopurulent discharge, superficial punctate keratitis, iris neovascularization, fixed dilated pupil, and total cataract. LE had lagophthalmos with exposure keratopathy, conjunctival congestion, fixed dilated pupil, and clear lens. Dilated fundus examination in LE showed infiltrative neuropathy. RE fundus was not visible. RE B-Scan demonstrated vitreous seedings with retinal detachment.

Results: Final diagnosis of bilateral infiltrative orbitopathy (chloroma) with cataract and retinal detachment in RE was established. MRI revealed bilateral bulky optic nerves with disc edema. Patient was managed with topical antibiotics, lubricants, prednisolone acetate and aggressive chemotherapy.

Conclusions: Relapsed T- cell ALL with ocular involvement is rare and generally associated with

poor visual and systemic outcomes. Occurrence of chloroma in association with ALL has very rarely been reported till date. This case highlights the broad spectrum of leukemic ocular manifestation including orbitopathy, optic nerve infiltration, and anterior segment pathology, thus emphasizes the critical role of early ophthalmic evaluation and multidisciplinary management in systemic leukemia.

Abstract No.: 208221

Unilateral Ocular Surface Disease – Case Report of a Rare Skin Carcinoma

First Author: Posey Po Yin **WONG**

Co-Author(s): Ka Wai **KAM**, Kenneth Ka Hei **LAI**, Alvin Lermann **YOUNG**

Purpose: We report a rare case of unilateral chronic blepharokeratoconjunctivitis with madarosis in the right eye of an 80-year-old lady. We would like to raise awareness of malignant eyelid lesions presenting as benign conditions.

Methods: We reported a rare case in our hospital with detailed history taking, ophthalmic examination, and map biopsy over the tarsus and conjunctiva.

Results: Histopathology of biopsy revealed tumor cells in temporal forniceal conjunctiva compatible with xtramammary Paget's disease. Underlying malignancy was ruled out by PET-scan. The patient and her relatives opted for conservative management in view of the nature of the disease.

Conclusions: Blepharitis and keratoconjunctivitis recalcitrant to typical topical treatment should be investigated for malignancy. Timely histopathological biopsy aids in early diagnosis and differentiation the type of carcinoma with different prognosis. Screening of underlying malignancy is essential in extramammary Paget's disease.

Abstract No.: 205710

Unmasking Primary Vitreoretinal Lymphoma: A Case Series Highlighting Clinical and Imaging Clues

First Author: Su Chern **LIM**

Co-Author(s): Roslin **AZNI**, Mae-lynn **CATHERINE BASTION**, Ayesha **MOHD ZAIN**, Daphne **TEH**

Purpose: To highlight the clinical, fundus, and multimodal imaging features of primary vitreoretinal lymphoma (PVRL).

Methods: A retrospective review of three cases of PVRL with distinct clinical manifestations.

Results: PVRL is a rare, high-grade lymphoma that frequently masquerades as chronic uveitis, making diagnosis challenging. Three cases are presented to illustrate its varied clinical and imaging features. The first, a 54-year-old woman with progressive bilateral blurring of vision and vitritis, demonstrated multiple

yellowish subretinal deposits along the superotemporal arcade and superonasal region of the right eye. Optical coherence tomography (OCT) revealed subretinal deposits while fundus fluorescein angiography (FFA) showed corresponding staining hyperfluorescence. Vitreous cytology confirmed lymphoma cells. The second, a 77-year-old man with progressive unilateral vision loss and bilateral vitritis, exhibited yellowish leopard-spot chorioretinal infiltrates, subretinal hyperreflective material on OCT, and vitreous opacities on B-scan ultrasonography. Vitreous cytology confirmed diffuse large B-cell lymphoma. The third, a 72-year-old man initially treated as acute retinal necrosis with rhegmatogenous retinal detachment, presented with vitritis, multiple chorioretinal infiltrates, intraretinal hemorrhage and retinal arteritis. OCT revealed retinal pigment epithelium (RPE) nodularity consistent with infiltrates, and brain magnetic resonance imaging (MRI) demonstrated primary central nervous system lymphoma.

Conclusions: PVRL exhibits heterogeneous clinical and imaging manifestations, including vitritis, chorioretinal infiltrate and retinal vasculitis, and RPE nodularity on OCT. Multimodal imaging—particularly OCT, FFA, and fundus autofluorescence—provides crucial diagnostic information. Greater awareness of these features is essential to avoid misdiagnosis, ensure timely treatment, and improve visual and systemic outcomes.

Abstract No.: 201723

When Eye Leads the Way: Choroidal Metastasis Unmasking Primary Bronchogenic Carcinoma

First Author: R Ram **SUDARSHAN**

Co-Author(s): Syed Mohideen **ABDUL KHADER**

Purpose: A 50-year-old female presented with complaints of floaters in the left eye for two weeks. Visual acuity in both eyes was 6/6. Anterior segment examination was unremarkable. Fundus examination revealed yellowish elevated choroidal mass (~4x4 mm) along the superonasal arcade of the right eye and inferotemporal arcade of the left eye, with overlying RPE alteration and surrounding subretinal fluid.

Methods: FFA showed initial hypofluorescence and late-phase heterogeneous hyperfluorescence. B-scan ultrasonography demonstrated choroidal masses with high internal reflectivity. OCT revealed dome-shaped elevation of the neurosensory retina and RPE with adjacent subretinal fluid. Based on these findings, choroidal metastasis from an unknown primary was suspected.

Results: Radio imaging (CT scans of chest, abdomen, chest and orbit) revealed a large mass in the left lower lobe of lung – bronchogenic carcinoma with metastases to the liver, choroid, and vertebrae.

Conclusions: This case emphasizes the need for prompt systemic evaluation in patients presenting with atypical bilateral choroidal lesions.

Ophthalmic Epidemiology and Prevention of Blindness

Abstract No.: 202276

Assessing Willingness to Pay for Specialized Ophthalmic Clinics for Families of Individuals With Intellectual Disabilities in Taiwan

First Author: Chiun Ho **HOU**

Purpose: Individuals with intellectual disabilities (IDs) often have increased needs for vision care but face substantial barriers to receiving comprehensive examinations. Access to specialized ophthalmology clinics tailored to their unique needs remains limited. This study aims to evaluate the willingness to pay (WTP) among family caregivers for specialized ophthalmology services.

Methods: From August 15 to October 5, 2023, we conducted a face-to-face survey of primary family caregivers of individuals with IDs across two local authorities in Taiwan. A stratified random sampling approach was used for a representative probability sample, yielding 657 completed responses (response rate: 82.6%). WTP was assessed using the contingent valuation method based on a hypothetical specialized ophthalmology clinic scenario, which was developed through prior qualitative research. Data were analyzed using two-part regression models.

Results: WTP for specialized ophthalmology services varied significantly across income groups. WTP ranged from US\$3.2 to US\$7.3 in the lowest-income group, and ranged from US\$17.1 to US\$21.6 in the highest-income group ($p < 0.001$). Higher household income, greater self-reported financial satisfaction, and increased concern for the ocular health of family members with IDs were identified as significant predictors of higher WTP.

Conclusions: Caregivers' WTP remains relatively low compared with the minimum operational costs required to sustain specialized ophthalmology clinics under Taiwan's National Health Insurance system. These findings highlight the necessity of increased public funding to ensure the financial viability of such services and to reduce disparities in vision care between individuals with and without IDs.

Abstract No.: 200966**Beyond the Numbers: What Disability Certificates Reveal About Avoidable Blindness in North India***First Author: Kusha**Co-Author(s): Arti SAREEN*

Purpose: To analyze the causes of visual disability among applicants at a district hospital in Himachal Pradesh and assess the proportion of avoidable versus unavoidable causes, with the aim of informing public health strategies.

Methods: A retrospective observational study was conducted on 100 applicants issued visual disability certificates at Zonal Hospital, Shimla between April 2023 and March 2024. Data were extracted from the UDID portal, including age, gender, visual acuity, and percentage of disability. Causes of visual disability were categorized and classified as avoidable (preventable or treatable) or unavoidable.

Results: The mean age of applicants was 41.9 years, with a male-to-female ratio of 1.85:1. Most applicants (33%) were in the 40–60 age group. The majority (84%) were categorized as having low vision (40–80% disability), while 15% were blind (90–100% disability). The leading causes were pathological myopia (26%), amblyopia (20%), and ocular trauma (15%). Notably, 61% of the causes were identified as avoidable.

Conclusions: A significant proportion of visual disability cases were preventable or treatable, emphasizing the urgent need for enhanced screening programs, early intervention, and public awareness. Strengthening primary eye care, improving school vision screening, trauma management, and increasing access to eye banking and glaucoma detection can reduce the burden of avoidable blindness.

Abstract No.: 200385**Changes in the Treatment Plans of Glaucoma Patients in a Real-World Setting: Implications for Blindness Prevention in a Resource-Constrained Developing Country***First Author: Farah AKHTAR**Co-Author(s): Mahmood ALI, Yousaf JAMAL MAHSOOD, Muhammad SADIQ*

Purpose: Glaucoma is a major cause of irreversible blindness, with the highest burden in low- and middle-income countries. This study assessed glaucoma treatment modifications regarding when, why, and how the changes are advised in the glaucoma prescriptions. The secondary outcome was to identify what percentage of patients are controlled or otherwise on the existing therapy.

Methods: In this cross-sectional study, 868 patients (1,600 eyes) with glaucoma were evaluated over 6 months at a tertiary eye hospital. History, examination

findings, and topical therapy details were recorded. Optical Coherence Tomography and visual field testing were performed at least twice to detect progression. Treatment changes were classified as: unchanged (same regimen), changed (replacement with another agent), added (additional agent introduced), or deleted (drug removed). Reasons for change—including inadequate IOP control, adverse effects, affordability, or dosing issues—were documented. Data were analyzed using SPSS v24; $p < 0.05$ was considered significant.

Results: Open-angle glaucoma was present in 78.3% of cases; 70.6% had moderate-to-severe optic nerve damage. Treatment remained unchanged in 71.2%, was added in 10.9%, changed in 9.7%, and deleted in 8.2%. Target IOP ≤ 14 mmHg was achieved in 56.9% of eyes. Affordability, adverse effects, and disease progression significantly influenced treatment decisions ($p < 0.05$).

Conclusions: Most patients maintained stability on existing regimens, and over half achieved IOP targets associated with reduced blindness risk. Structured glaucoma care, even in resource-limited settings, can meaningfully prevent visual disability.

Abstract No.: 200936**Common Etiologies of Ophthalmic Diagnoses in the Eye Emergency Room of a Tertiary Eye Referral Center in Thailand***First Author: Atiya LIMSRISAKULWONG**Co-Author(s): Mingkwan LUMYONGSATIEN*

Purpose: To determine the etiology of ophthalmic emergency conditions, patient characteristics, and clinical outcomes in a tertiary eye center in Thailand.

Methods: The medical records of patients referred to the emergency room with eye conditions between June 2023 and November 2024 were retrospectively reviewed. Demographic data, diagnoses, eye examinations, and treatment outcomes were analyzed.

Results: A total of 290 patients (60.7% male; mean age 47.6 ± 17.5 years) were included. The most common diagnoses were corneal ulcer (21%), followed by retinal detachment (16.9%), intraocular foreign body (10.3%), endophthalmitis (9.7%), and acute angle closure glaucoma (4.8%). The majority of the cases (97%) presented were urgent conditions, and 88.6% received treatment within 24 hours of diagnosis. Traumatic conditions accounted for 42% of cases. Clinical outcomes post-treatment showed improvement in 85.9% of patients. Factors associated with trauma, after being adjusted for confounds, included younger age (odds ratio [OR], 0.967; 95% CI, 0.950 to 0.984) and male gender (OR, 4.316; 95% CI, 2.393 to 7.784).

Conclusions: The most common causes of ophthalmic conditions presented to the emergency room at a tertiary eye care in Thailand were corneal ulcer, retinal detachment, and intraocular foreign body. Training programs, healthcare personnel support, and policy

development are crucial in managing and preventing these common conditions.

Abstract No.: 204450

Community Children Eye Program (CCEP): An Innovative Approach to Opportunistic Pediatric Eye Screening During Immunization Services

First Author: Samata SHARMA

Co-Author(s): Ben LIMBU

Purpose: Childhood blindness is a major public health concern in developing countries, where access to specialized pediatric eye care is limited. The Community Children Eye Program (CCEP) was designed as a community-based model to integrate early eye screening into routine immunization services, utilizing non-ophthalmic health workers with standardized tools.

Methods: Key components of the CCEP included a national workshop to develop a curriculum, training of trainers, capacity building of immunization staff, implementation of screening at immunization centers, and regular monitoring. During routine immunization visits, non-ophthalmic health workers used a simple torchlight to screen for strabismus, nystagmus, ptosis, leukocoria, risk of retinopathy of prematurity (ROP), and external ocular abnormalities. Children with suspected conditions were referred to the tertiary eye center for confirmation and treatment.

Results: Over the first 4 months, 5312 children received vaccines, of whom 3535 (67%) underwent eye screening (mean age: 6.9 months; range 0.3–60). A total of 110 referrals were made; 58 (52.7%) attended hospital follow-up. Referral indications included strabismus (9%), nystagmus (0.9%), ptosis (4.5%), risk of ROP (39.1%), and other causes (46%). Among the 58 children evaluated, 25 were normal while 33 had ocular abnormalities; 73% of affected children were female and 27% male.

Conclusions: The CCEP demonstrates the feasibility of integrating pediatric eye screening into immunization programs in resource-limited settings. Early findings highlight its potential to detect ocular diseases in preverbal children, facilitate timely referral, and help reduce avoidable childhood blindness.

Abstract No.: 201219

Emerging Gender Gaps in Cataract Surgical Uptake: A 13-Year Patient-Level Equity Analysis in Rural Sarawak

First Author: Norasyikin MUSTAFA

Co-Author(s): Mohamad Aziz SALOWI, Siti Nurhuda SHARUDIN, Wang SHIR YEN, Wan Radziah WAN NAWANG

Purpose: Cataract is the leading cause of global blindness, with women making up about two-thirds of those affected. The World Health Organisation (WHO) emphasises that equitable access to first-eye cataract surgery is a key indicator of universal eye health. In Malaysia, a national outreach programme has been targeting underserved areas, including Bau, Sarawak, since 2013. This study investigates gender equity in first-eye cataract surgery in Bau over 13 years.

Methods: A retrospective analysis of Malaysian National Eye Database (NED) records was conducted for Bau residents undergoing cataract surgery from 2013 to 2025. Only first-eye surgeries (n=500) were analysed. Variables included gender, age, laterality, and pre-operative visual acuity. Statistical analyses assessed gender differences in surgical uptake, visual thresholds, and trends over time.

Results: Females accounted for 49.6% of first-eye surgeries, with a median age of 70 compared to 69 for males (p=0.119). More females (37.7%) presented with vision worse than 3/60 than males (34%, p=0.657). At surgery, 16.2% had bilateral vision worse than 6/60, with females comprising 58.8% (p=0.071). Over 13 years, surgical uptake declined in both genders, but the decline was steeper and borderline significant among females (−1.93/year, 95% CI −3.99 to 0.13, p=0.064) compared to males (−1.31/year, 95% CI −4.00 to 1.36, p=0.302).

Conclusions: This study highlights a potential emerging gender gap in cataract surgical uptake in rural areas. Under WHO equity standards, such a decline warrants gender responsive planning to prevent widening disparities in access.

Abstract No.: 202414

Epidemiology of Age-Related Macular Disease: A UK Biobank Study

First Author: Ryan Tak Chun WONG

Co-Author(s): Philip Yawen GUO, Edison Chak-fung HO, Alexander Ka Ngai LAM

Purpose: To investigate the epidemiology of age-related macular degeneration (AMD) in UKBiobank cohort.

Methods: This retrospective cohort study analysed data from 502,250 UKBiobank participants aged 37–73 years-old (54.4% female). AMD prevalence was calculated from diagnoses recorded at the initial

assessment center visit (2006-2010). Incidence rate was calculated as the number of new AMD cases arise from participants free-of-disease at baseline, per 10,000-person-years of follow-up period. Follow-up was censored at the date of AMD diagnosis, death, loss to follow-up, and the end of the study period (10/31/2022). Prevalence and incidence were examined across subgroups defined by age, sex, ethnicity (White, Asian, Mixed, Black), and spherical equivalent.

Results: At baseline, 11,112 participants with AMD (61% female) and 55,344 healthy controls (52% female) were identified. The overall prevalence of AMD was 3.93% and was higher in females (4.64%). The overall incidence rate was 1.43 per 10,000 person-years. Subgroup analyses revealed that AMD prevalence was highest in White, followed by Mixed, Black, and Asian (3.95%, 3.62%, 3.57%, and 3.40% respectively). In contrast, the incidence rate was highest in Black, followed by Mixed, Asian, and White (1.61, 1.57, 1.46, 1.42/10,000-person-year respectively).

Conclusions: We identified intrinsic variations of AMD prevalence and incidents among different subgroups. Females and White exhibited the highest prevalence; however, incidence was highest among Black. These findings highlight inherent disparities in AMD risk and underscore the need for future targeted research.

Abstract No.: 205934

Epidemiology of Common Respiratory Viruses of Acute Conjunctivitis in Hong Kong

First Author: Allie LEE

Purpose: Common respiratory viruses have been shown to possess ocular tropism and be the aetiology of conjunctivitis. To formulate effective infection control measures, it is important to understand the prevalence of these viruses. However, epidemiological data of common respiratory viruses in conjunctivitis is limited. We aim to determine the prevalence and distribution of common respiratory viruses in acute conjunctivitis in Hong Kong.

Methods: Subjects clinically diagnosed with acute conjunctivitis were recruited from ophthalmology clinics and outpatient clinics 1st January 2022 to 31st August 2024. Conjunctival swabs were obtained from the affected eye and analysis was performed via a qualitative multiple nested polymerase chain reaction (PCR) to detect common respiratory viral targets, including adenovirus, coronavirus, influenza A&B, parainfluenza virus, respiratory syncytial virus, rhinovirus, and human metapneumovirus. Viral nucleic acid was extracted and undergo a PCR assay and agarose gel electrophoresis.

Results: A total of 115 subjects were recruited and 16 of them were of insufficient quantity. 99 samples underwent multiple nested PCR. In the majority of samples, single virus was detected (51.5%). Only

12.1% showed dual viral agent and no viral agent was detected in the remaining samples. The most common respiratory viral agent detected was influenza B virus (27.3%), followed by adenovirus (23.2%) and influenza A virus (8.1%).

Conclusions: Infection by common respiratory viruses was commonly seen in acute conjunctivitis in Hong Kong. The most frequently seen viruses were influenza B virus and adenovirus.

Abstract No.: 205144

Exercise Programme for Visually Impaired Older Individuals Living in Care and Attention Home

First Author: Chun Chun Jane YEUNG

Purpose: Introduce a pilot exercise programme for visually impaired older individuals living in a care and attention home. Analyse the feasibility of implementing the programme and outcome assessment.

Methods: Descriptive. Pilot weekly one-hour exercise programme for visually impaired older individuals (>60 years old) residents in a care and attention home. All subjects were offered participation in the exercise programme. They were given a preliminary assessment to assess the suitability of enrolment e.g. ability to walk independently or with minimal assistance.

Results: Description of the exercise programme, assessment (subjective & objective) of physical health (muscle strength, flexibility, agility and coordination) after a one-year exercise programme. Difficulties encountered, modification of standard exercise programme and outcome assessment will be presented.

Conclusions: It is labour intensive (a low instructor to subject ratio is desired) but it is feasible to promote exercise in visually impaired older individuals living in care & attention home. Initial positive results and feedbacks from participants.

Abstract No.: 201167

Expanding Access to Eye Care: A Decade of the KLIP Mobile Screening Programme in Malaysia

First Author: Siti Husna HUSSEIN

Co-Author(s): Maimunah ABDUL MUNA'AIM, Azlina MOKHTAR

Purpose: To describe the outcomes and impact of the 'Klinik Pakar Mata Bergerak' (KLIP Mobile), a specialised eye screening programme in the rural community in Negeri Sembilan. This initiative was delivered through collaboration between Universiti Sains Islam Malaysia, the Negeri Sembilan Health Department, and the Negeri Sembilan State Secretariat.

Methods: This retrospective study analysed data from 5,494 participants screened during mobile eye screenings conducted between 2016 and 2025 across seven districts in Negeri Sembilan. The ocular examination included visual acuity test, refraction, slit-lamp examination, and fundus photography. Demographic profiles, ocular diagnoses, and referral patterns were evaluated.

Results: Among the 5,494 participants, diabetic retinopathy was the most prevalent (1791; 32.6%) followed by cataract (1202; 21.9%), refractive error (1103; 20.1%), glaucoma (159; 2.9%), and pterygium (136; 2.5%). Overall, 1,133 participants (20.6%) were referred to ophthalmologists and 839 (15.3%) to optometrists. Cataract was the leading cause of referral, with 742 patients requiring surgery. By facilitating early detection and referrals, the programme improved access to treatment for the communities, particularly for cataract and proliferative diabetic retinopathy which require further ocular interventions such as cataract surgery or laser therapy.

Conclusions: The KLIP Mobile Programme demonstrates the impact of sustained university–government partnerships in expanding access to eye care especially to rural communities. Its success highlights the value of mobile eye services as practical and sustainable models for community ophthalmology, aligning with WHO's Integrated People-Centred Eye Care framework.

Abstract No.: 201478

Financing and Provision of Refractive Services in Indonesia: A Mixed Methods Study of Policy, Utilisation and Data Analysis From 2,400,000 National Health Insurance Beneficiaries

First Author: Felicia **WIDYAPUTRI**

Co-Author(s): Ester **FEBE**, Krisna **JATI**, Ardhina **NUGRAHAENI**, Rima **PUTRI**, Muhammad **SASONGKO**

Purpose: Uncorrected refractive error (RE) is the leading cause of visual impairment across all age groups in Indonesia. While the national health insurance system (JKN) covers refractive services, its implementation has not been thoroughly evaluated. This study aimed to analyse the financing, service provision, and estimated healthcare costs associated with RE.

Methods: A mixed-methods approach was used, combining quantitative analysis of JKN secondary data on RE service coverage with qualitative insights from policy reviews, in-depth interviews, and focus group discussions with patients. Direct observations at two selected eye care centres were conducted to estimate the actual costs of refractive care and assess resource gaps.

Results: Despite 95% of Indonesia's population being insured through JKN, utilisation of refractive services remained low (only 1.82% of JKN members), particularly among low-income groups where RE prevalence was the highest. Only 80% of patients obtained prescribed spectacles due to capped subsidies tied to JKN insurance class, leaving significant out-of-pocket costs. The direct costs of refractive care frequently exceeded JKN's coverage limits, and patients incurred substantial indirect expenses such as transportation and lost income.

Conclusions: The current gaps in JKN's refractive care coverage hinder equitable access to essential services and place undue financial burdens on vulnerable populations. Without targeted policy improvements to address these challenges, the increasing prevalence of uncorrected RE will continue to impose avoidable health, economic, and social burdens. This study highlights the urgent need for comprehensive policy revisions to ensure sustainable and equitable access to refractive care in Indonesia.

Abstract No.: 205562

Global Burdens and Causes of Blindness and Vision Loss in Children and Adolescents

First Author: Yu **ZHANG**

Purpose: To estimate the global, regional, and national burdens of blindness and vision loss among children and adolescents from 1990 to 2021, categorized by age, severity, and cause, and to project the burdens through 2030.

Methods: Based on the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2021, the burden of blindness and vision loss was evaluated by case numbers, rates per 100,000 population, and average annual percentage changes (AAPC) in prevalence and years lived with disability (YLD) rates. Burden trends from 1990 to 2021 were analyzed using a Joinpoint regression model, and the Bayesian age-period-cohort (BAPC) model projected the disease burden through 2030.

Results: Globally, there was no significant change in prevalence rate for blindness and vision loss from 1990 to 2021, but YLD rate significantly decreased (AAPC of -0.17). The prevalence and YLD rates declined in refraction disorders and other vision loss from 1990 to 2021, but rose in near vision loss. The prevalence and YLD rates of refraction disorders show the most significant increase in East Asia. The BAPC model forecasts a rise in global blindness and vision loss prevalence and YLD from 2021 to 2030 (1.63% and 0.03%, respectively), though refraction disorders and other vision loss are expected to decline.

Conclusions: Over the past three decades, global efforts have reduced the burden of blindness and vision loss among children and adolescents. Despite

the overall decrease in refraction disorders, East Asia remains a challenge.

Abstract No.: 202103

Global, Regional, and National Burden of Blindness Due to Diabetic Retinopathy, 1990–2021

First Author: Yuan **LIU**

Co-Author(s): Ziye **CHEN**, Tao **LI**, Yuan **MA**, Yang **MENG**

Purpose: This study aimed to analyze the patterns and trends in the burden of blindness due to diabetic retinopathy (DR) from 1990 to 2021 at the global, regional, and national levels.

Methods: We conducted a population-based analysis using the latest data from the Global Burden of Disease Study 2021. We examined the prevalence and number of cases of DR-related blindness stratified by type of diabetes, sex, age, and sociodemographic index (SDI) level. The trends in the blindness burden were quantified via the average annual percentage changes. A decomposition analysis was performed to identify key drivers of the changing burden. A Bayesian age-period-cohort model was used to predict the future burden of DR-related blindness from 2022 to 2035.

Results: Globally, the number of people blind due to DR increased by 326.0% from 1990 to 2021, with the age-standardized prevalence rate (ASPR) increasing from 7.59 to 15.28 per 100,000 population. Regionally, Tropical Latin America had the highest ASPR in 2021, whereas South Asia and East Asia had the greatest number of prevalent cases. Nationally, India and China had the highest number of prevalent cases in 2021, whereas Marshall Islands reported the highest ASPR. In 2021, the middle SDI group had the greatest number of patients who became blind due to DR. Predictions suggest the burden will continue to rise through 2035.

Conclusions: The global burden of DR-related blindness has increased significantly over the past three decades, with notable disparities across regions, countries, and SDI groups.

Abstract No.: 203597

Global, Regional, and National Epidemiology of Vision Impairment Due to Diabetic Retinopathy Among Working-Age Population, 1990-2021

First Author: Yang **MENG**

Co-Author(s): Ziye **CHEN**, Tao **LI**, Yuan **LIU**, Yuan **MA**

Purpose: To evaluate the global, regional, and national trends of vision impairment associated with diabetic retinopathy (DR) in the working-age population (20-65 years) from 1990 to 2021.

Methods: This was a population-based analysis using data from the Global Burden of Disease Study 2021. Vision impairment was defined as low vision (Snellen

visual acuity of $< 6/18$ to $\geq 3/60$) and blindness (Snellen visual acuity of $< 3/60$ or central visual field $< 10^\circ$). The burden of DR-related vision impairment, that is, prevalence and years lived with disability (YLD), was analyzed by sex, age, location, and sociodemographic index (SDI). A Bayesian age-period-cohort analysis was employed to forecast the future burden up to 2035.

Results: From 1990 to 2021, the global prevalence rate and YLD rate of DR-related vision impairment increased significantly. In 2021, 2.85 million prevalent cases and 250 117 YLDs were reported, representing 2.8-fold and 3.0-fold increases compared to 1990, respectively. South Asia and China were identified as the most severely burdened region and country in 2021, respectively. Throughout 1990-2021, females consistently bore a greater burden than males. In terms of SDI, the burden was predominantly concentrated in middle-SDI countries. Predictive analysis suggests a continued increase in the number of patients and YLDs by 2035.

Conclusions: Globally, there has been a substantial increase in the burden of DR-related vision impairment among working-age individuals, with disparities observed in terms of sex, location, and SDI. Given the projected worsening of this burden, targeted interventions are needed to address this global health challenge.

Abstract No.: 207834

Glucose-Lowering Medications and Risk of Ophthalmic Diseases in Type 2 Diabetes

First Author: Xianwen **SHANG**

Co-Author(s): Shuo **WANG**

Purpose: To evaluate associations between glucose-lowering medications and incident ophthalmic diseases in type 2 diabetes (T2D) patients.

Methods: We analyzed 17,033 T2D patients (aged 40-72) without baseline cardiovascular disease or cancer from the UK Biobank. Glucose-lowering medication (insulin, metformin, glipizide, glimepiride, metformin plus rosiglitazone, rosiglitazone, pioglitazone) use was defined through verbal interviews. Incident ophthalmic diseases were ascertained using inpatient records up to January 2021. Multivariable Cox regression adjusted for sociodemographic and clinical confounders.

Results: During a median follow-up of 11.4 years, we identified 2,546 incident cataract cases, 327 age-related macular degeneration [AMD] cases, 392 glaucoma cases, and 896 diabetic retinopathy (DR) cases. After adjustment for age, sex, ethnicity, education, income, Townsend deprivation index, BMI, smoking, diet score, sleep duration, physical activity, HbA1c, and diabetes duration: insulin use was associated with higher risks of cataract (HR 1.19; 95% CI 1.05–1.36) and DR (HR 1.72; 95% CI 1.46–2.04). Metformin and glipizide were associated with increased cataract risk before but not

after adjustment for HbA1c and diabetes duration (metformin: HR 1.16, 95% CI 1.07–1.26 → 0.95, 95% CI 0.85–1.06; glipizide: HR 1.24, 95% CI 1.13–1.36 → 1.07, 95% CI 0.95–1.20). Similarly, initial associations of metformin, glipizide, glimepiride, and pioglitazone with higher DR risk attenuated to non-significance after adjustment for HbA1c and diabetes duration.

Conclusions: Insulin use was independently associated with higher cataract and DR risks. Other glucose-lowering medications showed no significant associations with ophthalmic diseases after accounting for glycemic control and diabetes duration.

Abstract No.: 202929

Longitudinal Changes in General and Central Obesity and Risk of Diabetic Retinopathy in Newly Diagnosed Type 2 Diabetes

First Author: Sooyeon **CHOE**

Co-Author(s): Ahnul **HA**, Young Kook **KIM**

Purpose: To investigate the associations between obesity (general, central) and diabetic retinopathy (DR) in patients with newly diagnosed diabetic mellitus (DM) and to examine changes in DR risk associated with fluctuations in general and central obesity status.

Methods: In this nationwide population (50-million-person)-based cohort study using the Korean National Health Insurance Service (NHIS) database (2002–2022), we identified patients newly diagnosed with type 2 DM between 2010 and 2015. We investigated associations between DR risk and both general obesity ($\text{BMI} \geq 25 \text{ kg/m}^2$) and central obesity (waist circumference $[\text{WC}] \geq 90/85 \text{ cm}$ for males/females) using Cox proportional hazards models.

Results: Among 408,126 newly diagnosed diabetes patients, 33.2% ($n=135,315$) developed DR during the 8.6 ± 3.5 -year follow-up. Both general and central obesity were independently, dose-dependently associated with increased DR risk (adjusted hazard ratio [aHR]: 1.081 [95% CI: 1.069–1.093] and 1.096 [1.084–1.108], respectively). Compared with the reference BMI group ($18.5\text{--}23 \text{ kg/m}^2$), risk progressively increased across BMI categories, highest at $\text{BMI} \geq 30 \text{ kg/m}^2$ (aHR: 1.176 [1.150–1.202]). Similarly, risk increased across WC categories, peaking at $\text{WC} \geq 100/95 \text{ cm}$ (aHR: 1.078 [1.055–1.102]). In longitudinal analyses, post-diabetes-diagnosis new obesity increased DR risk (aHR: 1.090 [1.060–1.120] for general; 1.091 [1.069–1.113] for central obesity), while obesity resolution, relative to persistence, was associated with significant risk reduction (aHR: 0.965 [0.943–0.987] for general; 0.937 [0.919–0.956] for central obesity).

Conclusions: General and central obesity were identified to be risk factors for DR in patients with DM. The changes in obesity status can alter DR risks after initial DM diagnosis. These findings emphasize the benefits of obesity management for patients with DM.

Abstract No.: 201348

Myopia Control in Children: Parental Knowledge and Practices Across Urban and Suburban Communities in Central Malaysia

First Author: Maimunah **ABDUL MUNA'AIM**

Co-Author(s): Siti Husna **HUSSEIN**, Azlina **MOKHTAR**

Purpose: Myopia is increasingly prevalent in children, with early onset associated with faster progression and vision-threatening complications. Studies in developing countries suggest that parental awareness and practices on early interventions may differ between urban and sub urban communities. This study aims to assess differences in parental knowledge and practices on myopia control between urban and suburban populations in central Malaysia, in order to identify gaps that may influence early detection and prevention strategies.

Methods: A cross-sectional survey was conducted among parents of children aged 6–12 years using a validated questionnaire assessing demographics, visual habits, levels of concern, awareness of complications, and knowledge of myopia control interventions. Residential location was categorised as urban or suburban.

Results: A total of 218 parents participated: 165 urban and 53 suburban. Mean daily near-work hours were similar (urban 2.5; suburban 2.4). Urban parents reported higher concern about myopia progression (4.45 vs 3.91/10). Awareness of targeted interventions was low (urban 6.1%, suburban 2%), and urban parents were more likely to identify at least one control method (84.9% vs 64.2%; $P = 0.006$). Over 82% of children in both groups used myopia control strategies, often without parents recognising them as formal interventions. Outdoor activity levels were low in both groups.

Conclusions: Although myopia control practices are common, awareness of specific interventions remains poor, particularly in rural regions. Targeted education campaigns may enhance awareness and facilitate evidence-based early intervention

Abstract No.: 202620

Ocular Comorbidities, Quality of Life, and Caregiver Burden in Children With Facial Clefts: Interim Findings From a Prospective Observational Study

First Author: Shweta **DHIMAN**

Co-Author(s): Shibani **DAS**, Subrat **JENA**, Raj **KENIA**, Santosh **MAHAPATRA**

Purpose: To evaluate the prevalence of ocular comorbidities in children with facial clefts and to assess associated impacts on pediatric quality of life (QoL) and caregiver burden.

Methods: This ongoing prospective observational study enrolls children under five years with cleft lip and/or palate undergoing surgical care at a tertiary cleft center, with ophthalmic evaluation performed at an affiliated eye hospital. Each child underwent a complete ocular examination including adnexal, anterior and posterior segment assessment, and refraction. Health-related QoL was assessed for children aged 2–5 years using the validated PedsQL™ Parent Proxy questionnaire, and caregiver burden was measured using the Zarit Burden Interview–12 (ZBI-12). Data were analyzed descriptively and compared across subgroups. Ethical approval was obtained.

Results: As of August 2025, 40 children (mean age 2.8 years; M:F ≈ 1.2:1) have been evaluated. Ocular comorbidities included nasolacrimal duct obstruction, refractive error, strabismus, and fundus changes, with a prevalence of ~20%. Children with ocular involvement had lower mean PedsQL scores than those without. Caregiver stress was common, with over half reporting mild-to-moderate burden on ZBI-12, most often mothers as primary caregivers.

Conclusions: Interim findings highlight a substantial prevalence of ocular anomalies and measurable psychosocial impact in children with facial clefts. Integrating ophthalmic screening and caregiver support into cleft care programs may improve both visual and quality-of-life outcomes. Final results with expanded enrollment are awaited.

Abstract No.: 204691

Ocular Hazards of the Oil Palm Industry: Preventable Blindness in Plantation Workers

First Author: Chiu Ling LIM

Co-Author(s): Nurliza KHALIDDIN, Leroy Young King TAN

Purpose: To describe the clinical profile, presentation, and management of hospitalized patients with oil palm-related eye injuries between January and September 2025 in Hospital Sultan Ismail, Johor.

Methods: A descriptive retrospective study of all patients admitted with oil palm-related ocular injuries during the study period. Demographic data, clinical features, management, and outcomes were reviewed.

Results: Six patients were identified, all male palm-oil plantation workers. Median age was 39.5 years (range 25–50). Most injuries occurred during harvesting and pruning, predominantly due to direct trauma from oil palm fronds or entry of fibrous debris into the eye. Three presented with corneal ulcers showing features of fungal keratitis, two with corneal lacerations, and one with perforated corneal ulcer. Presenting vision ranged from counting fingers to perception of light. Corneal ulcers were treated with intensive topical fortified antibiotics and antifungals; two required penetrating keratoplasty. Corneal lacerations were

managed with urgent corneal toilet and suturing. Despite aggressive treatment, four patients had poor vision. Mean hospital stay was 9 days. Final visual acuity ranges from 6/12 to hand movement.

Conclusions: Oil palm-related ocular trauma is an important occupational hazard in Malaysia and often results in severe visual impairment. Preventive measures, including mandatory protective eyewear and stronger workplace safety enforcement, are essential to reduce its incidence and impact.

Abstract No.: 205521

PhenoAge Acceleration Is a Potential Causal Driver of Early AMD Pathogenesis

First Author: Weichen YUAN

Co-Author(s): Xinyuan ZHANG

Purpose: This study aims to investigate the genetic association between epigenetic clock acceleration and the risk of early AMD using Mendelian randomization (MR).

Methods: Genetic instruments for four epigenetic clock acceleration measures and early AMD were obtained from publicly available genome-wide association studies. The inverse-variance weighted (IVW) fixed-effects model was used as the primary analytical method to identify the genetic causality. Robustness of the results was assessed through multiple sensitivity analyses.

Results: IVW analysis revealed a significant positive association between PhenoAge acceleration and an increased risk of early AMD. Sensitivity analyses supported the robustness of the causality. In contrast, no statistically significant associations were observed between the other three epigenetic clocks acceleration and the risk of early AMD (all $p > 0.05$).

Conclusions: The findings suggest that PhenoAge acceleration may be a potential causal driver of early AMD. This discovery is of great significance, as it reveals that the specific biological features of aging characterized by PhenoAge, particularly pathophysiological processes such as metabolic-inflammatory imbalance, may play a key role in the pathogenesis of early AMD.

Abstract No.: 204181

Possibilities in Integrating Artificial Intelligence (AI) Into the Referral Pathway: Improving Access to Ophthalmology Outpatient Care

First Author: Whitney Felicia CHAN

Co-Author(s): John BUCHAN, Kendrick SHIH

Purpose: To evaluate the quality and origin of referral letters for public ophthalmology specialist outpatient clinic (SOPC) appointments, assess the time and human resources involved in triage, and explore

opportunities—including the integration of AI—to improve the efficiency, accuracy of the referral pathway.

Methods: This retrospective study reviewed referral letters submitted to the Lo Fong Shiu Po Eye Centre at Grantham Hospital in 2025. A random sample of routine and semi-urgent (P2) cases was analysed. Referral origin, content completeness, clinical detail, legibility, and format were assessed. Additional data on the time and staff required to triage each letter were collected through clinical attachment.

Results: Of the 200 referrals, 49% were from general practitioners, 33% from ophthalmologists, and 18% from other hospital-based clinicians, reflecting diverse referral pathways. Clinical completeness was highly variable. Visual acuity was missing in 42% of P2 and 45% of routine cases, and where documented, around 60% of referrals did not include BCVA. Nearly half of all referrals lacked ocular examination findings. Symptom duration was provided in 78% of P2 cases but only 35% of routine referrals. Ophthalmologists were significantly less likely than GPs to record systemic history ($p < 0.0001$), though GPs are more likely to show incomplete ophthalmic history ($p = 0.0067$). Preliminary diagnoses appeared in 43% of P2 and 63% of routine referrals, with ophthalmologists more likely to include one than GPs ($p < 0.0001$). Operational observations revealed a fully manual triage system. 17% of letters were handwritten, mainly from private practices, causing legibility issues that complicated triage. Nurses dedicated roughly one hour per day and ophthalmologists 15 minutes reviewing referrals, underscoring the inefficiency of the current model.

Conclusions: Referral letters for SOPC in Hong Kong vary in quality and often miss key clinical details, hindering triage and delaying patient management. Standardised electronic templates and better training for primary care can improve triage accuracy and patient access. AI integration to evaluate referrals and prioritise urgent cases could further enhance efficiency, reduce waiting times, and improve specialist care delivery.

Abstract No.: 205776

Prevalence and Causes of Blindness and Vision Impairment Among People 50 Years and Older in Nepal: A National Rapid Assessment of Avoidable Blindness Survey

First Author: Sailesh Kumar MISHRA

Co-Author(s): Bhart Bahadur CHAND, Parikshit GOGATE, Namrata KARN, Chet Raj PANT, Yuddha Dhoj SARKOTA, Ranjan SHAH

Purpose: To determine the prevalence and causes of blindness and vision impairment among people 50 years and older in Nepal.

Methods: We conducted seven provincial-level Rapid Assessment of Avoidable Blindness (RAAB) cross-sectional, population-based surveys between 2018–2021. Provincial prevalence estimates were weighted to give nationally representative estimates. Sampling, enumeration, and examination of the population 50 years and older was done at the province level following standard RAAB protocol.

Results: Across seven surveys, we enrolled 33,228 individuals, of whom 32,565 were examined (response rate 98%). Females ($n = 17,935$) made up 55% of the sample. The age-sex-province weighted national prevalence of blindness (better eye presenting visual acuity $<3/60$) was 1.1% (95% confidence interval [CI] 1.0–1.2%), and any vision impairment $<6/12$ was 20.7% (95% CI 19.9–21.5%). The prevalence of blindness was higher in women than in men (1.3% [95% CI 1.1–1.5%] vs 0.9% [95% CI 0.7–1.0%]). Age-sex weighted blindness prevalence was highest in Lumbini Province (1.8% [95% CI 1.3–2.2%]) and lowest in Bagmati Province (0.7% [95% CI 0.4–0.9%]) and Sudurpaschim Province (0.7% [95% CI 0.4–0.9%]). Cataract (65.2%) was the leading cause of blindness in our sample, followed by corneal opacity (6.4%), glaucoma (5.8%) and age-related macular degeneration (5.3%). Other posterior segment diseases accounted for 8.4% of cases. Cataract was also the leading cause of severe vision impairment (83.9%) and moderate vision impairment (66.8%), while refractive error was the leading cause of mild vision impairment (66.5%).

Conclusions: The prevalence of blindness was higher among women than men and varied by province. The Lumbini and Madesh Provinces in the Terai (plains) region had a higher prevalence of blindness than elsewhere. Cataract was the leading cause of blindness, severe vision impairment, and moderate vision impairment, while refractive error was the leading cause of mild vision impairment.

Abstract No.: 204902

Prevalence of Epiretinal Membrane in Eyes From a Population-Based Study Cohort of Octogenarians Living in Singapore

First Author: Wei Kiong NGO

Co-Author(s): Bryan Chin Hou ANG, John CHAMBERS, Kelvin Zheng Hao LI, Tock Han LIM, On Behalf Of Helios Study Team

Purpose: Primary epiretinal membrane (ERM) formation is an age-associated process resulting in fibrocellular membrane development that distorts fovea and impairs central vision. We aimed to describe the prevalence and characteristics of ERM in eyes from a cohort of octogenarians in Singapore.

Methods: Data were drawn from the Health for Life in Singapore (HELIOS) cohort – approximately 10,000 residents aged 30–84 years - who underwent standardized ocular assessments (including visual

acuity (VA) and spectral-domain OCT). Participants aged ≥ 80 years with gradable B-scan OCT were included, and ERMs were classified per Govetto Stages 1–4 based on foveal pit morphology, retinal layer definition, ectopic inner foveal layers, and tractional distortion. ERM stage was then correlated with measured VA.

Results: Of the 57 HELIOS participants aged ≥ 80 years, 19 without OCT scans and one eye with ungradable images were excluded, leaving 75 eyes from 38 individuals (mean age 81.7 ± 1.3 years; range 80.0–84.8 years) for analysis. Epiretinal membrane was detected in 32 eyes (42.7%), predominantly Stage 1 (87.5%, $n = 28$), with Stage 2 in 9.4% ($n = 3$) and Stage 4 in 3.1% ($n = 1$); mean VA was 73.8 letters in Stage 1 eyes versus 58.7 letters in Stage 2 or greater eyes ($p = 0.015$).

Conclusions: Among Singaporean octogenarians, ERMs affected 42.7% of eyes, most were Stage 1 lesions with minimal visual impairment. Progression beyond Stage 1 was significantly associated with decreased visual acuity. These results underscore the clinical importance of early detection and monitoring of age-related vitreoretinal interface changes.

Abstract No.: 207833

Protective and Adverse Effects of 15 Dietary Supplements on Ophthalmic Complications in Type 2 Diabetes

First Author: Xianwen **SHANG**

Co-Author(s): Shuo **WANG**

Purpose: To evaluate associations between 15 common dietary supplements and incident ophthalmic diseases in type 2 diabetes (T2D) patients.

Methods: We analyzed 16,638 T2D patients (aged 40–72) free of cardiovascular disease and cancer from the UK Biobank. Supplement use was self-reported via a standardized questionnaire. Incident ophthalmic diseases (cataract, age-related macular degeneration [AMD], glaucoma, diabetic retinopathy [DR]) were identified through inpatient records until January 2021. Multivariable Cox proportional hazards models adjusted for sociodemographic, lifestyle, and clinical factors.

Results: During a median follow-up of 11.4 years, we identified 2,833 incident cataract cases, 387 AMD cases, 415 glaucoma cases, and 1,120 diabetic retinopathy cases. After multivariable adjustment for age, sex, Townsend deprivation index, ethnicity, education, income, BMI, diet, smoking, sleep, physical activity, HbA1c, diabetes duration, and glucose-lowering medication count, Cod liver oil supplementation was associated with reduced cataract risk (HR 0.67; 95% CI 0.56–0.79) and diabetic retinopathy risk (HR 0.56; 0.40–0.78). Folate supplementation was associated with increased cataract risk (HR 1.23; 1.004–1.52). Vitamin D supplementation was associated with elevated glaucoma risk (HR 1.60; 1.06–2.41). No significant

associations were observed for vitamin A, B-complex vitamins, vitamin C, vitamin E, multivitamins, calcium, zinc, iron, selenium, fish oil, or glucosamine with any ophthalmic outcome.

Conclusions: Cod liver oil supplementation may protect against cataract and DR in T2D patients, while folate and vitamin D supplementation could elevate risks for cataract and glaucoma, respectively. Other supplements showed no significant associations with ophthalmic outcomes.

Abstract No.: 200625

Reliability and Validity of Thai Version of the National Eye Institute for Visual Functioning Questionnaire – 25 (T-NEI-VFQ-25) Among Thai Ocular Surface Disease Patients

First Author: Pakornkit **PHRUEKSAUDOMCHAI**

Co-Author(s): Peewara **CHORMANEE**, Sorn

KUNTIYARATANA, Marin **PATTANAPATTANA**, Khaomook **SINGHAPANTU**

Purpose: Aimed to evaluate reliability and validity of T-NEI-VFQ-25 among Thai ocular surface disease patients.

Methods: The study was performed by Translation of NEI-VFQ-25 from English version to Thai version. Ophthalmologists, General practitioner, Optometrist, Optician, Eye technician, Eye nurse and Linguists had been using focus group analysis. Content validity of the translated survey was assessed by 15 examiners. Validity indexes, Item Objective Congruence (IOC) and Content Validity Index (CVI); Item level CVI & scale level CVI were evaluated. The reliability was evaluated by Cronbach's Alpha coefficient.

Results: A total of 249 participants with consent completed the T-NEI-VFQ-25 by an online database survey. The indices of item-objective congruence (IOC) ranged from 0.80 to 1.0 for each question, with a mean of IOC 0.94. Item-level Content Validity Index scores (I-CVI) ranged from 0.93 to 1.00 for each question, with a mean of CVI of 0.98. The results showed all items included in the analysis were considered valid, as the coefficient was > 0.3 . Internal consistency reliability (calculation of all the questions taken together), the Cronbach's α of the instrument was ≥ 0.7

Conclusions: The Thai version of The National Eye Institute for Visual Functioning Questionnaire – 25 has high validity and reliability and can be applied to the Thai population to evaluate conditions related to vision quality, especially in patients with ocular surface disease.

Abstract No.: 206832

Risk Factors for Diabetic Retinopathy During Pregnancy in Preexisting Diabetes

First Author: Jinyue **DAI**

Co-Author(s): Xuran **DONG**, Jintao **LI**, Ying **WANG**, Yuan **WEI**, Tianchen **WU**, Ke **ZHANG**

Purpose: Diabetic retinopathy (DR) is a serious ocular complication. This study aimed to investigate risk factors for incident DR during pregnancy in women with preexisting diabetes, focusing on the impact of chronic hypertension (CH) on the timing of DR onset to optimize screening strategies.

Methods: This retrospective cohort study included 158 singleton pregnancies with preexisting diabetes. Clinical data on demographics, obstetric history, comorbidities (including CH), lab tests (e.g., HbA1c), and fundus examinations were collected. Patients were grouped based on DR development during pregnancy (31 cases vs 127 controls). Univariate and multivariate Cox proportional hazards models identified independent risk factors. Kaplan-Meier curves and log-rank tests compared group differences. A trimester-stratified survival analysis (early: 0-14; mid: 14-28; late: >28 weeks) was performed.

Results: Multivariate Cox analysis identified CH as a strong independent risk factor for DR (HR=3.18, 95% CI: 1.09-9.34, P=0.035). Older maternal age was a protective factor (HR=0.88, 95% CI: 0.78-0.99, P=0.049). Stratified analysis revealed that DR risk was concentrated in the mid-trimester, where patients with CH had significantly higher cumulative DR incidence (P<0.001). The Cox model met the proportional hazards assumption (P>0.05) and showed good discrimination (Concordance-index=0.77).

Conclusions: The risk of incident DR during pregnancy in women with preexisting diabetes peaks in the mid-trimester. CH is an independent risk factor, while older age appears protective. Intensified fundus screening during the mid-trimester is recommended for diabetic pregnancies with CH. A risk-stratified, time-window-based screening strategy may enable earlier DR detection and management, improving long-term ocular outcomes.

Abstract No.: 205641

Seeing Through Divides: Geographic, Socioeconomic, and State-Level Disparities in Optic Neuritis Patients at a South Indian Tertiary Center

First Author: P.sangavi **SAMRITHA SELVI**

Co-Author(s): Virna.m.shah

Purpose: Optic neuritis (ON) is an acute inflammatory condition of the optic nerve. Most literatures originates from Western populations, with limited data addressing socioeconomic and demographic variations in Indian. This study aimed to assess state-level, urban-rural and

socioeconomic differences in ON presentation at a tertiary eye care center in South India.

Methods: A retrospective review of 109 ON cases was conducted between May 01, 2024, and June 30, 2025. The mean age was 44.2 ± 15.1 years, with females (52.3%) and males (47.7%). Unilateral ON occurred in 77.1% of patients and bilateral disease in 22.9%. Patients were stratified by state (Tamil Nadu vs Kerala), Urban/rural background and socioeconomic status based on a paid/free care. Demographic and clinical variables were analyzed descriptively.

Results: Among 109 cases, 55% were from rural areas and 45% from urban settings. By state, 72.5% were from Tamil Nadu, 25.7% from Kerala, and 1.8% from Karnataka. 18.3% of patients received free care, while 81.7% were paying. The mean time to outpatient presentation was 7 days, with no significant urban-rural difference ($p = 0.38$); urban patients presented at 14.0 ± 20.5 days versus 13.4 ± 15.0 days for rural patients. Kerala cases showed a rural predominance (69%), while Tamil Nadu displayed near-equal urban-rural representation. Papillitis (46%) and recurrent ON (35%).

Conclusions: Significant disparities exist in ON presentation by region and socioeconomic status within South India. With MOGAD (17.4%) predominance and NMOSD being (6.4%) of the total population. MOGAD AND NMOSD are showing urban predominance. These findings highlight the need for increased awareness and targeted outreach among rural and lower SES populations. Empower Vision Through Proactive Optic Neuritis Detection.

Abstract No.: 201597

The U-Shaped Relationship Between Serum Selenium Levels and Diabetic Retinopathy

First Author: Xiaofeng **HAO**

Co-Author(s): Xi **CHEN**, Mei **SUN**

Purpose: Numerous studies have established a clear link between serum selenium levels and various health outcomes. However, to date, only studies have found an association between serum selenium levels and diabetic retinopathy (DR). The exact link between them is unclear. We are adding data from different patient populations.

Methods: Data from 645 adults, collected through the National Health and Nutrition Examination Survey (NHANES) between 2011 and 2016, were analyzed. The association between serum selenium levels and the incidence of DR was assessed using binary logistic regression. Subgroup analysis, smoothed curve-fitting analysis, and propensity score weighting were used to investigate the association further.

Results: According to the multivariate analysis, there was no statistically significant linear association between serum selenium levels and the probability of developing DR ($P > 0.05$). Segmented regression

analysis, however, showed that the chance of getting DR was considerably lower when selenium levels hit the threshold of 106.8 $\mu\text{g/L}$ (OR = 0.88, P = 0.0107).

Conclusions: A U-shaped curve represents the link between serum selenium levels and DR. The incidence of DR is elevated in individuals with serum selenium levels that are either higher or lower than the optimal range.

Abstract No.: 205174

Unseen and Overlooked: Cataract Burden in Marginalized Communities Near Kathmandu

First Author: Sabita **PALIKHE**

Co-Author(s): Samkyta **BISTA**

Purpose: To highlight the hidden burden of cataract blindness in marginalized communities located close to Nepal's Capital city and to share the Experience of delivering free, self-funded cataract surgical services to these underserved populations.

Methods: Two free surgical Camps were organized by Drishti Eye Foundation in nearby marginalized populations: One in a Chepang Community (~50 km from Kathmandu) and another in the Tamang Community of Galchi. Comprehensive eye examinations were conducted, and patients with operable cataract underwent manual small incision cataract surgery with intraocular lens implantation. Demographic information, preoperative and postoperative visual acuity, and surgical Outcome were recorded.

Results: A total of 165 cataract surgeries were performed free of cost (Chepang :63, Tamang :102). Patients ranged from young adults to the elderly, with the majority aged > 60 years. Both Male and Female patients were represented, with a slight male predominance. Most patients presented with severe VI or blindness (Pre Operative Vision < 3/69 in the Better eye in the Majority). Postoperatively, there was marked improvement in VA with most patients achieving good functional vision. The Visual outcomes were significant and immediately life-changing for the participants.

Conclusions: Even in communities located close to Nepal's Capital city, significant cataract blindness persists, reflecting ongoing disparities in access to care. Self-funded community-based outreach remains a vital strategy to restore sight in these marginalized populations. Such initiatives demonstrate that the impact of cataract blindness extends beyond remote rural areas and underline the urgent need for sustainable, equitable eye care delivery models in Nepal.

Abstract No.: 203946

Unveiling the Burden of Diabetic Retinopathy: Insights From a One-Year Community-Based Screening Program in West Java, Indonesia

First Author: Grace **SETIAWAN**

Co-Author(s): Mayang **RINI**

Purpose: To identify characteristic and risk factors of diabetic retinopathy in primary health care center in Bandung Districts, West Java, Indonesia.

Methods: This was a cross-sectional study during the period of March 2021 until June 2022 of 1080 participants. Demographic and clinical characteristics, visual acuity, and several risk factors such as blood glucose level, blood pressure, body mass index, waist circumference, HbA1C, and cigarette usage were documented.

Results: Among 1080 participant with DM, 28.89% (25.16 – 33.12% [95% CI]) were classified to have DR. A total of 32.69% (28.14 – 36.71 [95% CI]) participants with RD had vision threatening diabetic retinopathy (VTDR). The prevalence of DR in this study was higher in women (77.23%) with mean age of 57.26 ± 9.17 and duration of DM of 3.5-years (56.01%), blood glucose level < 200 mg/dL (63.79%), high systolic blood pressure (52.03%), high diastolic blood pressure (39.07%), normal BMI (55.5%), high waist circumference (43.7%), and high HbA1C (3.42%). A total of 1041 (96.39%) participant had antidiabetic drugs, and 9.63% of them were currently smoking.

Conclusions: Diabetic retinopathy was identified in 28.89% of screened patients with diabetes mellitus, with nearly one-third of these cases classified as vision-threatening. DR prevalence was higher among women, older individuals, and those with longer diabetes duration, elevated blood pressure, high waist circumference, and poor glycemic control. These findings highlight the importance of targeted screening and risk factor management in primary care settings.

Abstract No.: 206450

Use of Chinese Medicine in Patients With Ocular Diseases in Hong Kong

First Author: Jiahui **LI**

Co-Author(s): Wai Kit **CHU**, Bo Man **HO**, Zhichao **HU**, Ivan **KONG**, Linbin **ZHOU**

Purpose: To evaluate the usage situation and knowledge of patients with ocular diseases in Hong Kong and collect their opinions on the use of Chinese medicine (CM).

Methods: This survey was conducted in patients with ophthalmic diseases at the Hong Kong Eye Hospital. Ethics was approved by the University Survey and Behavioural Research Ethics Committee and the Hospital Authority Central Institutional Review Board. All subjects answered a survey of 35 questions related

to their disease diagnosis and management, and their willingness and ability to access healthcare-related resources. Outcome measures included sociodemographic characteristics, usage of CM methods and opinions on the use of CM.

Results: A total of 501 patients answered the survey, with 33.7% male and 66.3% female. Average and median ages are 61.07 (IQR18) and 59.99 (IQR 18) years respectively. 15% (n=76) patients had received CM to treat their eye diseases. A similar sex ratio was detected in these 2 groups (male: female 23.7%:76.3% compared to 35.8%:64.2%). Similar education levels were detected in these 2 groups (primary: secondary: tertiary or above education 6.6%:48.7%:27.6% who had received CM, compared to 13.4%:52.0%:19.3% who had not). Most patients who received CM were diagnosed with glaucoma (39.5%), and 19.7% with retinal diseases. For those who received CM, most of them take oral medication (50%, n=61). 69% (n=40) of them were satisfied with the treatment outcome after receiving CM.

Conclusions: Oral medication is the most popular form of CM. And the majority of patients treated with CM are satisfied with the treatment outcome.

Abstract No.: 206633

Vision Atlas: An Interactive Platform/ Global Resource for Visualizing and Monitoring Avoidable Vision Loss

First Author: Anthea **BURNETT**

Co-Author(s): Michael **MORTON**, Jude **STERN**, Mayinuer **YUSUFU**

Purpose: To accelerate progress toward eliminating avoidable sight loss by 2030, the Vision Atlas was redeveloped to consolidate timely, reliable and accessible data on sight loss, eye health service delivery, commitments to eye health, and the social impact of eye health — providing policymakers, advocates, and researchers with a comprehensive resource.

Methods: The Vision Atlas integrates epidemiological estimates from the Vision Loss Expert Group, national and regional surveys, country-level studies on eye health systems using indicators derived from WHO tools, and global studies on the developmental impact of eye health. As an interactive tool, it enables customizable visualizations—dynamic charts, maps, and graphs—that allow users to explore and use eye health data based on their specific needs.

Results: With verified data from over 65 sources, this publicly accessible online platform (<https://visionatlas.iapb.org/>) was launched in 2025. It provides comprehensive eye health data at global, regional and national levels, covering over 180 countries, and enables country comparisons. In addition to customisable data presentation, the platform also

provides Data Stories, which present key topics using clear, visual narratives that make complex information in an accessible format. As a living, evolving resource, the Vision Atlas continuously integrates new surveys, studies, and global reports to provide the most up-to-date and actionable evidence.

Conclusions: The Vision Atlas serves as a global public good, translating complex datasets into an accessible, actionable, and visually engaging platform that empowers stakeholders to identify priority areas, monitor progress, and advocate for universal eye health.

Ophthalmic Trauma

Abstract No.: 203989

A Case of Stress Vasoreactivity Chorioretinopathy

First Author: Yuxin **LI**

Co-Author(s): Yuntao **HU**

Purpose: To report a case of vision loss due to macular subretinal fluid (SRF) accumulation without direct blunt ocular trauma, presumed to be stress vasoreactivity chorioretinopathy (SVC) based on multimodal imaging.

Methods: A 48-year-old male presented with bilateral blurry vision after a head injury from a traffic accident, denying direct ocular trauma. Ophthalmic examinations including OCT, indocyanine green angiography (ICGA), and OCT angiography (OCTA) were performed. The patient received intravenous alprostadil to improve vascular dilation.

Results: Initial best-corrected visual acuity (BCVA) was 0.02 OD and 0.03 OS, with OCT showing macular SRF in both eyes. A local hospital diagnosed bilateral optic nerve injury and prescribed neurotrophic treatment. At referral, BCVA was 0.2 OD and 0.06 OS, with persistent SRF. ICGA revealed patchy late-phase hypofluorescence. After alprostadil therapy, SRF resolved within three days. Two weeks later, BCVA improved to 0.9 OD and 0.8 OS, with improved ICGA findings. OCTA showed increased choroidal vessel and stroma volume in the macular and peripapillary regions, along with progressive choroidal thickening.

Conclusions: Subfoveal SRF accumulation was the main cause of vision loss in this case. Findings suggest that SVC, through choroidal hypoperfusion and retinal pigment epithelium dysfunction, can lead to SRF accumulation. Multimodal imaging is essential for diagnosis and monitoring.

Abstract No.: 203959**A Large 50 Millimeter Intraorbital Wooden Foreign Body After Fall From Tree Which Developed Fungal Eyelid Infection***First Author: Mohammad IDRIS*

Purpose: To report a rare case of large 50 millimeter intraorbital wooden foreign body after fall from tree with fungal infection in the eyelid.

Methods: All investigations including Ct scan Orbit and sinuses and culture from eyelid wound was taken. Under general anesthesia, the wound was explored.

Results: This child of age 5 years with history of fall from tree one month back. After non healing of wound not responding to antibiotics, the child developed fungal infection with wound in lower eyelid. A longitudinal oblique hypodense FB in the pre maxillary area extending superiorly into preseptal space into the orbit with fracture in maxilla and medial wall. Patient was started on antifungal drugs and was operated to retrieve the foreign body which was 50mm with multiple pieces of leaves removed. One week after FB removal Child improved and eyelid wound healed with no fornix adhesions.

Conclusions: This is a rare case of large 50 millimeter intraorbital wooden foreign body which developed fungal infection in the eyelid. History and investigations in such cases can save the eye from serious intraorbital infections like fungus.

Abstract No.: 204913**A Subtle Entry, a Fatal Outcome: Case Report of Transorbital Penetrating Brain Injury***First Author: Willy YAHYA**Co-Author(s): Ni Made LAKSMI UTARI, Putu YULIAWATI*

Purpose: Transorbital penetrating brain injury is a rare, life-threatening trauma with often subtle presentation. This case highlights the importance of systematic evaluation and multidisciplinary management.

Methods: A 54-year-old male presented to Ngoerah Hospital, Bali, Indonesia, with decreased consciousness (E2V2M5) and a small laceration on the lower medial left eyelid after a fall involving a penetrating wooden branch. Ocular findings included proptosis, anisocoria with a dilated pupil, lens opacity, vitreous hemorrhage, and restricted motility. Computed tomography scan revealed a hypoattenuating foreign body extending from the orbit to the intracranial region. A multidisciplinary team, which included the ophthalmology and neurosurgery departments, planned an urgent craniotomy with debridement, dural repair, and foreign body extraction. Intravenous ceftriaxone and metronidazole were given for infection prophylaxis.

Results: Partial removal of the wooden foreign body was achieved through anterior orbitotomy and

subcranial craniotomy, limited by the fragment's brittleness and intracranial location. On postoperative day 4, the patient developed sudden wound bleeding with blood aspiration, leading to respiratory failure and death.

Conclusions: Even in the absence of obvious ocular entry wounds, a thorough primary survey is essential to identify life-threatening complications of orbital trauma. Early diagnosis and coordinated multidisciplinary management are critical in this case.

Abstract No.: 201325**Analyzing the Long-Term Visual Outcomes of Patients With Ocular Trauma***First Author: Mosaab MOHAMED ELMAHDI**Co-Author(s): Gong YU*

Purpose: To systematically review and synthesize existing evidence on visual acuity, quality of life, and complication rates in patients who sustained ocular trauma, with follow-up periods of one year or longer.

Methods: A comprehensive literature search was conducted in PubMed, Embase, and Cochrane Library for studies published between January 2000 and June 2025. Inclusion criteria comprised cohort and case-control studies reporting visual outcomes at ≥ 12 months post-injury. Data on best-corrected visual acuity (BCVA), anatomical restoration, secondary interventions, and patient-reported outcomes were extracted. Study quality was assessed using the Newcastle-Ottawa Scale, and a narrative synthesis was performed due to heterogeneity in outcome measures.

Results: Twenty-three studies encompassing 3,157 patients met inclusion criteria. Mean follow-up ranged from 12 to 96 months. At last follow-up, 42% of eyes achieved BCVA of 20/40 or better, whereas 28% remained $\leq 20/200$. Globe rupture and posterior segment involvement were significant predictors of poor visual recovery ($p < 0.01$). Secondary interventions—vitrectomy (54%) and corneal grafting (18%)—improved anatomic outcomes but did not consistently translate into functional gains. Quality-of-life assessments revealed persistent photophobia, reading difficulty, and psychological distress in 36% of survivors.

Conclusions: Long-term visual prognosis after ocular trauma remains guarded, particularly in severe injuries involving the posterior segment. Although surgical advances enhance structural repair, functional recovery and patient-reported quality of life lag behind anatomical success. Standardized outcome measures and prospective multicenter studies are needed to optimize rehabilitation strategies.

Abstract No.: 202877

Application of Functional Intraocular Lenses in Retinal Surgery

First Author: Bo QIN

Co-Author(s): Dongcheng LIU, Yijie LU

Purpose: Discuss how to tailor surgical planning for functional intraocular lenses in retinal surgery based on patient conditions within the context of the refractive cataract era.

Methods: This paper examines the application of functional intraocular lenses in retinal surgery through several clinical case studies.

Results: ① For stable retinal patients requiring simultaneous cataract surgery, such as those with epiretinal membrane (ERM), lamellar macular hole (MH), stable diabetic retinopathy (DR), branch retinal vein occlusion (BRVO), or vitreous hemorrhage (with good macular morphology), and middle-aged or elderly retinal patients with working distance and accommodation needs, co-implantation of a functional intraocular lens (IOL) may be considered. ② When implanting a monofocal IOL, assess the patient's macular function. For patients with retinal disease where the macula is not significantly affected or where good postoperative visual acuity is anticipated, monofocal IOL implantation may be selected. ③ Evaluate the status of the suspensory ligament and elastic lens capsule (ELP). Postoperative refractive deviation typically does not exceed 0.5D. Functional IOL implantation may be selected, with tension rings used when necessary. ④ Extended depth-of-focus (EDOF) IOLs avoid interference from diffraction rings, do not affect combined anterior-posterior segment procedures, and prevent postoperative optical interference.

Conclusions: The use of functional intraocular lenses in retinal surgery requires personalized design, taking into account the patient's refractive status. Through monovision design or hybrid intraocular lens design, full-range vision can be achieved, expanding the potential indications for functional intraocular lenses in retinal surgery.

Abstract No.: 202695

Application of Perfluoropropane (C3F8) Gas Combined With Subretinal Tenecteplase in Staged Surgery for Complex Ocular Trauma

First Author: Shuai SHENG

Purpose: Complex open-globe injuries are ophthalmic emergencies with poor prognosis and high blindness rates. Primary repair aims to restore globe integrity for secondary intervention. This report evaluates a staged approach using C3F8 gas and subretinal tenecteplase.

Methods: A 54-year-old male presented with vision loss after an electric hammer injury. Primary repair included

laceration closure, anterior chamber washout, and intravitreal injection of 1.2 ml C3F8 gas. Subsequent secondary surgery involved pars plana vitrectomy with laser photocoagulation and subretinal injection of tenecteplase to address subretinal hemorrhage. A third surgery (November 1, 2023) repaired complex retinal detachment with silicone oil injection.

Results: Two months post-final surgery, best-corrected visual acuity (BCVA) was 0.5, indicating favorable recovery.

Conclusions: Intravitreal C3F8 injection during primary repair effectively managed early hypotony, reduced hemorrhage, prevented corneal blood staining and extensive retinal detachment, and inhibited post-traumatic proliferation, facilitating secondary surgery. Subretinal tenecteplase administered during the secondary procedure promoted clot dissolution within one week. This combined approach using C3F8 and tenecteplase in staged surgery improves outcomes and reduces blindness risk in complex ocular trauma.

Abstract No.: 206959

Axe-Related Ocular Adnexal Trauma In A Young Male Patient

First Author: Herdina RAMADHANI

Co-Author(s): Dyah Ayu Eliza LESTARI, Heru PRASETIYONO

Purpose: Ocular and adnexal trauma predominantly affect young population and may result in visual morbidity. Approximately 55 million cases of ocular trauma occur every year, and significant proportion of this occurs in the workplace. We present a case of ocular adnexal trauma resulting from an axe.

Methods: A case of 21-year-old male patient brought to the emergency department with redness, blood and pain in left eye following workplace accident. As the patient bent down, his left eye accidentally touched the sharp-edge an axe. He didn't wear any eye protection equipment. Examination in left eye revealed VA was 20/20. Anterior segment evaluation showed superior eyelid laceration in 1/3 lateral partial thickness involving lid margin, laceration in the lateral canthus, extensive conjunctival laceration in lateral half of the eye, and subconjunctival hemorrhage in inferior. Seidel test was negative. Funduscopy within normal limit. The patient underwent surgical repair. Postoperatively, the symptoms improved and well-healed wounds.

Results: The ocular adnexa play an important role in the protection of the globe as a mechanical defense mechanism. A mechanical trauma causing injury to the ocular adnexal structures can lead to ocular morbidity. Work-related eye trauma is one of the leading causes of ocular morbidity among workers, particularly in the industrial and construction sectors. These incidents cause temporary or permanent visual impairment, impact worker productivity and the economic burden.

This is predominantly avoidable by the utilization of protective eyewear.

Conclusions: Provision of appropriate eyewear protection and education for workers is required to minimize the incidence of ocular adnexal trauma in workplace.

Abstract No.: 204156

Blinded by a Nail, Saved by a Lens: A Remarkable Visual Comeback

First Author: Dyah Ayu Cintantya Pradipta Citrani
RAMADHANI

Co-Author(s): Sagung Gede INDRAWATI, Amanda Nur Shinta PERTIWI

Purpose: To demonstrate the significant role of RGP contact lenses in restoring visual acuity in a patient with an irregular post-traumatic cornea combined with aphakia.

Methods: A 27-year-old male presented four months after penetrating ocular trauma to his left eye from a self-extracted nail, having undergone emergency corneal laceration repair. Initial visual acuity was hand movement. Slit-lamp examination revealed central corneal scarring with irregular astigmatism and corneal flattening; no intraocular lens (IOL) or lens remnants were present. Visual acuity with aphakic glasses only improved to 0.1 (20/200). Following initial assessment, a custom-designed RGP contact lens was fitted. Lens fitting was evaluated using static, dynamic assessment, and fluorescein under cobalt blue illumination with a yellow filter. Best-corrected visual acuity (BCVA) was recorded after RGP lens fitting.

Results: Optimal RGP contact lens fitting significantly improved the patient's BCVA to 0.8 (20/25) with minimal discomfort. Fitting assessment showed the lens centered over the pupillary zone, slightly low-riding but without conjunctival touch, and exhibited smooth movement upon blinking. Fluorescein evaluation revealed central pooling due to the flattened cornea, minimal inferonasal touch consistent with the laceration scar, and adequate peripheral clearance and edge lift for tear exchange and good centration. The patient reported marked improvement in visual function and quality of life.

Conclusions: RGP contact lenses offer an effective solution for visual rehabilitation in patients with post-traumatic irregular corneas and aphakia. Proper lens fitting significantly improves visual acuity and patient satisfaction, confirming RGPs as a crucial modality for complex corneal conditions

Abstract No.: 204275

Case Study: Removal of Intraorbital Bullet Through Endoscopic Surgery

First Author: Yuan Yuh LEONG

Co-Author(s): Sunny SHEN

Purpose: We present a case report that describes the use of image-guided nasal-endoscopic surgery for the safe removal of a metallic orbital foreign body in close proximity to the optic nerve.

Methods: A 35-year-old overseas male patient presented to Singapore National Eye Centre with a history of bilateral gunshot injuries sustained 8 months prior. He had no light perception in the right eye and 6/36 vision in the left (previously amblyopic). Computer tomography(CT) imaging showed a metallic foreign body (0.5 × 0.4 × 0.4 cm) in the left orbit, abutting the mid-orbital segment of the optic nerve. Due to its location, a combined approach with the Otorhinolaryngology team using nasal-endoscopic surgery was preferred. Functional endoscopic sinus surgery (FESS) was first performed to expose and open the lamina papyracea. The CT image guidance system (IGS) was then used to localize the foreign body. Careful dissection through the extraconal fat using a ball probe allowed safe identification and retrieval of the object.

Results: The foreign body was removed without complications. Forensic analysis identified a 2.5 mm lead pellet with trace amounts of arsenic and phosphorus. The patient recovered well without new deficits.

Conclusions: This case highlights the value of CT-guided nasal-endoscopic techniques in managing orbital foreign bodies close to the optic nerve.

Abstract No.: 202919

Directional Differentiation of Human Embryonic Stem Cell-Derived Conjunctival Epithelial Cells and Its Application

First Author: Xiangyue HU

Purpose: Conjunctival diseases and trauma can result in conjunctival scarring, restricting eye movement, and potentially leading to ocular surface failure, significantly impacting patients' vision. Currently, conjunctival reconstruction surgery serves as the primary treatment method; however, it is hampered by challenges such as donor scarcity, graft limitations, and incomplete functional restoration. Hence, there is a pressing need for a novel alternative cell source for conjunctival reconstruction. This study investigates the viability of utilizing human embryonic stem cells to produce mature conjunctival epithelial cells, presenting a fresh approach to addressing conjunctival disorders.

Methods: Enhancing stemness and proliferation of cultured hESCs through audible acoustic waves. Directed differentiation of hESC-derived conjunctival

epithelial cells (iCjECs). Application of hESC-derived conjunctival cell-derived exosomes (iCjECs-exo) for ocular surface injury repair.

Results: Enhancing stemness and proliferation of cultured hESCs through audible acoustic waves. Directed differentiation of hESC-derived conjunctival epithelial cells (iCjECs). Application of hESC-derived conjunctival cell-derived exosomes (iCjECs-exo) for ocular surface injury repair.

Conclusions: This study introduces a straightforward, effective, and precisely defined method for the directed differentiation of hESCs into conjunctival cells that express mature conjunctival epithelial and goblet cell markers. Additionally, we have devised an in vitro culture approach for hESCs treated with audible acoustic waves to ensure a high-quality cell source for stem cell differentiation. Furthermore, the study investigates the role of exosomes derived from differentiated conjunctival cells, offering a novel perspective for the clinical utilization of hESC-derived conjunctival epithelial cells.

Abstract No.: 203908

Don't Let Your Eyesight Be Gone in a Flash: A Firecracker Injury

First Author: *Ridhima BANSAL*

Co-Author(s): *Shagun KORLA, G.c RAJPUT*

Purpose: In India, firecracker injuries are common during the festival of 'Deepavali' where traditionally, firecrackers form an essential part of the celebrations. As per the National Programme for Control of Blindness (NPCB), the prevalence of blindness in India was 1.1% in 2001–2002 and 1% in 2006–2007. Eye injuries are estimated to account for 18% of all firework injuries. Ocular trauma from fireworks can cause ocular injuries ranging from a minor trauma to a globe rupture, with a severe vision loss in over 15% of the individuals.

Methods: A 51-year-old male presented to MMU Emergency. DOP: Day after Diwali. C/O sudden painful diminution of vision with redness and swelling of eyelids in the left eye after sustaining a firecracker injury in the same eye. He was given primary treatment at the Regional Hospital, Rajgarh, and was referred to our hospital for further management.

Results: Left eye. VA: H.M.C.F. IOP (NCT): 32 mmHg. Lids and adnexa: Edema and erythema. Pupil: Mid dilated, sluggish reacting. Anterior segment: Image and video 1. Posterior segment: Media grade 4 (only the optic disc was visible). B-scan- multiple medium intensity Dot echoes suggestive of vitreous hemorrhage and linear medium to high intensity membranous echoes suggestive of complete PVD. Retina looks attached (video 2)

Conclusions: Left eye closed globe injury type 1, Grade 4 pupil positive zone I (according to Betts classification). Management. Restoration of intact epithelium Control

of acute inflammatory reaction. Support of the reparative process. Prevention of complications.

Abstract No.: 207314

Endoscopic Cyst Excision With Laser Photocoagulation: A Unique Approach to the Management of Recurrent Iris Cysts

First Author: *Vivek DAVE*

Purpose: To describe an effective technique of managing recurrent iris cysts with endoscopic cyst excision coupled with laser photocoagulation.

Methods: This retrospective consecutive non-comparative interventional case series included 4 cases of recurrent iris cysts previously managed by conventional techniques, but showed recurrence. Presenting complaints and detailed history were noted. All patients underwent endoscopic cyst excision with laser photocoagulation of the attachment of the cyst to the root of the iris and ciliary body. The outcome in terms of vision, corneal clarity, recurrence of the cyst, and total follow-up was noted.

Results: We describe 4 cases managed with endoscopic cyst excision with laser photocoagulation. None of the cases showed any recurrence. The cornea showed acceptable clarity at the last follow-up visit. The follow-up period was 1.5 years, four years, two years, and one year, respectively, with no recurrence. Case 3 developed glaucoma in the follow-up, requiring filtering glaucoma surgery.

Conclusions: An endoscopic approach and laser photocoagulation allow for a complete cyst excision with a prolonged recurrence free period in recurrent iris cysts. This could be a reasonably good approach to successfully manage a condition that is otherwise known to be recurrent.

Abstract No.: 209606

Endoscopic Removal of Complex Intraorbital Foreign Bodies

First Author: *Xinyu LI*

Co-Author(s): *Hongfei LIAO, Linjuan WU, Wencan WU, Guangming ZHOU*

Purpose: To evaluate the feasibility and effectiveness of endoscopic transnasal removal of complex intraorbital foreign bodies.

Methods: This study included a total of 39 patients with intraorbital foreign bodies who underwent endoscope-assisted removal. All patients underwent a comprehensive ophthalmic examination before surgery, including uncorrected visual acuity, best-corrected visual acuity (BCVA), ocular motility and ptosis assessment, optical coherence tomography (OCT), and visual field testing. Computed tomography (CT) was used as the main imaging method to determine the size and location of the foreign bodies and their spatial

relationship with key orbital structures. All surgeries were performed under the guidance of a surgical navigation system. Patients were followed regularly at 1 week, 1, 3, 6, and 12 months postoperatively. Follow-up included assessments of visual acuity, anterior and posterior segment conditions, intraocular pressure, and recording of postoperative complications.

Results: The surgical procedure went smoothly, the foreign bodies were completely removed, and no complications such as neurovascular damage occurred. Postoperatively, the patients experienced relief from eye movement pain, and their vision was effectively improved. A total of 39 patients were included, of which 38 patients (97.4%) were male and 1 patient (2.6%) was female (average age: 44.2 years; range: 9–79 years). Removal was successfully achieved in 35 cases (success rate 89.7%). Thirty-eight patients (97.4%) exhibited symptoms within 48 hours after injury, while 1 patient (2.6%) developed symptoms 7 years post-injury. The best-corrected visual acuity (BCVA) improved after surgery in all patients. The mean preoperative BCVA was 6/30 (95% confidence interval [CI] 6/60–6/20) and the mean postoperative BCVA was 6/10 (95% CI 6/12–6/7.5). Inorganic foreign bodies included metal (n=21), glass (n=3), pencil lead (n=1), and stone (n=1). The metal foreign bodies were magnetic objects (n=13), shotgun pellets (n=1), and other non-magnetic metal fragments (n=7). Organic foreign bodies included wood and motor oil. The primary ocular conditions were orbital cellulitis (n=3), traumatic optic neuropathy (n=7), globe injury (n=17), and extraocular muscle rupture (n=2).

Conclusions: Endoscopy is a feasible option for handling complex intraorbital foreign bodies. The transnasal route can directly reach the location of the foreign body, enabling precise exploratory surgery with clear observation and accurate operation, allowing for the detection of very small foreign bodies. The transorbital route allows for subperiosteal manipulation, avoiding the interference of intraorbital fat herniation associated with traditional open orbital surgery. Once reaching the lesion, surgery can be performed within the orbit with minimal damage.

Abstract No.: 207280

Epidemiological Profile of Orbital Fracture in Orbital Trauma at a Level 2 Trauma Centre

First Author: Sangeetha T

Co-Author(s): Inchara N, Nishitha N

Purpose: Orbital fractures, often from blunt trauma, commonly affect the fragile orbital floor and medial wall. Symptoms may include periorbital swelling, diplopia, enophthalmos, infraorbital hypesthesia, and limited eye movement, depending on fracture severity and soft tissue involvement. We aim to assess the demographics, surgical management, and

complications of orbital and orbitozygomaticomaxillary complex (OZMC) fractures at Level 2 Trauma Centre.

Methods: A retrospective review was conducted on 96 patients with orbital fractures treated between January 2024 and July 2025. Data collected included demographics, etiology, fracture type, treatment, and complications.

Results: The majority of patients were males aged 40–59. Road traffic accidents were the most common cause, followed by falls. Alcohol use was significantly associated with assault-related fractures ($P=0.001$). OZMC fractures were most frequent, followed by pure orbital fractures; 47% had concomitant facial fractures. Observation and open reduction with internal fixation were the treatments.

Conclusions: High rates of orbital and OZMC fractures in Kolar, likely due to its location on a national highway, highlight the importance of thorough primary care assessment in emergency settings. CT is the best tool for diagnosing orbital fractures, while MRI is better for spotting soft tissue entrapment, especially in children. Early diagnosis is important, as delays can cause lasting functional and cosmetic problems.

Abstract No.: 202869

Hot Glue, Cold Reality: Paediatric Chemical Eye Injury

First Author: Yi Lin CHUA

Co-Author(s): Penny Poi Wah LOTT, Deivanai SUBBIAH, Cheun-seng WONG

Purpose: To report a case of ocular chemical injury in a 5-year-old boy.

Methods: Case report.

Results: A 5-year-old boy with no prior medical history was referred following accidental exposure of his right eye to hot Epoxy glue from a glue gun. He presented with right eye redness and pain 6 hours post trauma. Immediate first aid with 7 liters of normal saline irrigation was performed. Upon arrival, the ocular surface pH was 8, improving to 7 after additional irrigation. Examination was limited due to poor cooperation but revealed conjunctival injection with marked inferior chemosis and total corneal opacity with no iris details visible. No retained foreign body was seen. The left eye was normal. Intraocular pressures were digitally normal in both eyes, and there was no reverse relative afferent pupillary defect. Visual acuity could not be assessed. Based on the Dua classification, the injury was classified as Grade 6, indicating severe ocular surface damage. The child was admitted for close monitoring and intensive anti-inflammatory medical therapy while awaiting surgery. On Day 9 post-injury, he underwent amniotic membrane transplantation (AMT) with symblepharon ring insertion under general anaesthesia to promote healing. Intraoperatively, there was a total cornea

epithelial defect and 360 degree conjunctiva chemosis. The ocular surface was opaque, and iris and pupil details were not visible. No symblepharon was detected.

Conclusions: This case highlights the severity of paediatric ocular chemical burns and emphasizes the importance of immediate irrigation, appropriate medical therapy, and timely surgical intervention to optimize visual outcomes.

Abstract No.: 208042

Implantation of Toric Implantable Collamer Lens (TICL) in Adult Pseudophakic Eye After Traumatic Cataract Surgery During Childhood

First Author: Jingming LI

Co-Author(s): Yongkang ZHANG, Yue BIAN, Ma JIXIAN, Yi ZHUO

Purpose: To report a case of implantation of Toric Implantable Collamer Lens (TICL) in adult pseudophakic eye after traumatic cataract surgery during childhood.

Methods: A 29-year-old female patient who underwent traumatic cataract surgery and implantation of an intraocular lens during her childhood later developed myopia and astigmatism in both eyes. The UCVA was 20/63 for the right eye and 20/500 for the left eye. The right cornea was clear with a quiet anterior chamber. The right pupil was posteriorly synechia at 4-7 o'clock with downward displacement and irregular shape. The intraocular lens was positioned well with a posterior capsule defect in the right eye. The optometry was as follow: OD-2.25DS/-3.25DC×155→20/25; OS-7.25DS/-0.25DC× 50→20/20.

Results: The right eye was given implantation of ICL and left eye was implanted with TICL. The UCVA were 20/30 for the right eye and 20/16 for the left eye postoperatively. The surgery video would be provided if necessary.

Conclusions: Implantation of TICL for correction of refractive error after cataract surgery could be a choice for patients with pseudophakic eyes.

Abstract No.: 200353

Intense Pulsed Light Treatment of Ocular Surface Alkali Burn: A Case Report

First Author: Wangyi FANG

Co-Author(s): Tong QIAO

Purpose: To report a novel application of intense pulsed light (IPL) therapy for managing meibomian gland damage and ocular surface sequelae in a rare case of ocular alkali burn.

Methods: A clinical case report is presented detailing the course of IPL treatment for a patient suffering structural and functional meibomian gland impairment following an ocular surface alkali burn. The patient

received a standardized periocular IPL protocol administered weekly over four consecutive sessions.

Results: Following the IPL treatment course, multimodal ocular surface imaging demonstrated marked improvements: a reduction in corneal opacity, a significant decrease in conjunctival vessel density, and structural restoration of previously shortened meibomian glands.

Conclusions: This case suggested that IPL may facilitate the repair of alkali-damaged meibomian glands, contributing to improved ocular surface structure and function. IPL may be a promising therapeutic option for ocular surface reconstruction after alkali burns.

Abstract No.: 208560

Intravitreal Conbercept for Management of Macular Hemorrhage Secondary to Blunt Ocular Trauma

First Author: Nana XU

Purpose: To evaluate the efficacy of intravitreal conbercept (IVC) in the treatment of macular hemorrhage secondary to blunt ocular trauma.

Methods: This retrospective, single-arm interventional study evaluated the efficacy of intravitreal conbercept (IVC) for macular hemorrhage secondary to blunt ocular trauma. Consecutive patients with traumatic sub-internal limiting membrane hemorrhage (SILMH) or submacular hemorrhage (SMH) involving the fovea, presenting between 2021 and 2023, were included. Eligible cases had bleeding ≥ 2 weeks and > 1 optic disc diameter. All received IVC and were followed for ≥ 24 weeks. Data on hemorrhage resolution time, best-corrected visual acuity (BCVA), and comorbidities were collected. Statistical analysis used repeated-measures ANOVA and Fisher's exact test.

Results: Eight patients (8 eyes) with mean age of 29.13 years were included. Mean time to hemorrhage resolution with recovery of the normal foveal contour was 29.75 days (range: 21-35 days). Significant improvement in BCVA from presentation (1.17 ± 0.47 , logMAR) to 2 weeks post-IVC (0.71 ± 0.24 , logMAR) was observed ($P < 0.05$), which was further improved up to the last assessment time point at week 24 post-IVC (0.17 ± 0.14 , logMAR; $P < 0.01$). All the SILMH patients had no visual deteriorate complaints, however, one of the SMH patients experienced little and localized central scotomas because of choroidal rupture hidden beneath hemorrhage.

Conclusions: IVC is an effective resolution in the management of SILMH and SMH due to blunt ocular trauma, especially for the patients with bleeding lasted for more than two weeks.

Abstract No.: 205312**Laser Pointer Maculopathy: A Preventable Threat from Excessive Power in Laser Pointers***First Author: Sathiyaraj BALAKRISHNAN*

Purpose: To raise awareness of laser maculopathy, its clinical impact, while educate the society to prevent permanent vision loss.

Methods: Case study. A 14-year-old boy presented with a central scotoma in his right eye, two days after a direct exposure to a laser pointer by himself for more than 30 seconds and no discomfort immediately after the incident. The laser is used at school laboratory as pointer which is class 3B with a wavelength of 650nm. Visual acuity of the right and left eye was 6/18 and 6/6, respectively. Fundus revealed pale spots in the right fovea. OCT shows Loss of the foveal depression with hyperreflectivity and disruption of the ellipsoid zone at the fovea and subtle irregularity of RPE. Fundal autofluorescence showed high uptake.

Results: Tissue damage occurs through three mechanisms; ionization, thermal and photochemical. The type of laser used, wavelength, exposure time and spot size are determinants of the tissue injury. If exposure exceeds 10 seconds, destruction is due to photochemical, resulting in cell death and permanent vision loss. Prognosis At 6 week oct showed thinning and loss of photoreceptor integrity at fovea and no visual regain and no choroidal neovascularization.

Conclusions: Inappropriately used class 3 or 4 lasers can cause permanent blindness, even with brief exposures. We advised the school staff and students regarding the laser injuries and letter written to health ministry and government to limit the commercial availabilities of high-power laser devices.

Abstract No.: 200635**Management of Traumatic Tractional Corectopia With Cataractous Lens: A Case Report***First Author: Keerti WALI**Co-Author(s): Vallabha K, Vaishnavi PATIL*

Purpose: To report management of a case of traumatic tractional corectopia.

Methods: A 42-year-old man presented with sudden onset, gradually progressive vision deterioration in his right eye, secondary to trauma by metal wire ten years ago. Examination revealed superior iris plastered to the inferior angle of anterior chamber (confirmed on Gonioscopy) leading to 0.5 mm extremely eccentric pupil with adjacent limbal scar.

Results: Peripheral iris adhesion was released surgically along with mini- sphincterotomies. Intraoperatively, cataractous lens with inferior zonular dialysis was noted. A safer approach of Manual small incision

cataract surgery (MSICS) with in the bag rigid resulted 20/40 vision and central pupil.

Conclusions: MSICS is a simple, cost-effective alternative to the standard approach of Nd-YAG laser pupilloplasty, microdissection of iris adhesion and cataract extraction by Phacoemulsification with Capsular tension ring and acrylic intraocular lens insertion.

Abstract No.: 202372**Managing Corneal Perforations During COVID-19: Real-World Strategies From a Tertiary Centre in India***First Author: Karan BHATIA**Co-Author(s): Madhu BHADARIA, Prasanna Venaktesh RAMESH, Nikunj TANK*

Purpose: To assess the effectiveness of corneal perforation management strategies during COVID-19 in a resource-limited setting.

Methods: Retrospective study of 112 eyes (Mar 2020–Jun 2021) with ≥ 3 months follow-up. A stepwise protocol prioritised globe preservation using temporising measures and alternatives to fresh donor tissue. Primary outcome: Anatomical integrity at 3 months. Secondary outcome: Potential for future visual rehabilitation via keratoplasty.

Results: Ninety-five eyes had perforated corneal ulcers; 17 had impending perforation. Fungal etiology dominated (62%). Tissue adhesive with BCL (n=35), Therapeutic Penetrating Keratoplasty (TPK) with preserved tissue (n=31), Modified Gunderson flap (n=20), and evisceration (n=11) were performed. Anatomical integrity was achieved in 89.3%. Only 5 eyes had undergone keratoplasty; 85 remained waitlisted.

Conclusions: Adaptive, resource-sensitive strategies enabled anatomical salvage during COVID-19. Innovative methods preserved eyes with potential for future vision.

Abstract No.: 201386**Misdiagnosis Analysis of 3 Cases With Ocular Trauma in Preschool Children***First Author: Liu RUI*

Purpose: To analyze the diagnosis and treatment process of 3 Preschool children with ocular trauma, in order to avoid misdiagnosis and delayed treatment of retinoblastoma.

Methods: Retrospective analysis of 3 cases, in which all these Preschool Children experienced misdiagnosis, and Clinical characteristics and prognosis of the RB were summarized.

Results: Three preschool children with an average age of 66.5 months (48-72 months) had a medical history

of ocular trauma. They were previously diagnosed with «Traumatic anterior chamber hemorrhage, Vitreous hemorrhage, Endophthalmitis or intraocular foreign body». Traveling through several hospitals, all 3 cases finally underwent enucleation surgery and pathological examination. No local or systemic metastases were found during 24.4 months (16-34 months) follow-up.

Conclusions: The misdiagnosis of RB in preschool children should be avoided. Early correct diagnosis and timely appropriate treatment is beneficial for improving the survival rate.

Abstract No.: 200151

Multistage Visual Rehabilitation After Severe Ocular Trauma: A Clinical Case Report

First Author: Ekaterina **SUDAKOVA**

Co-Author(s): Dmitrii **SHKVORCHENKO**, Nikolay **SOBOLEV**, Viktoriia **TEPLOVODSKAIA**

Purpose: To demonstrate the efficacy of a staged surgical approach in managing severe ocular trauma with aniridia and posttraumatic glaucoma through a clinical case.

Methods: We present a case of a 69-year-old female with severe right eye trauma following a motor vehicle accident, complicated by complete aniridia, aphakia, hemophthalmos, and secondary glaucoma. Initial examination revealed: best corrected visual acuity (BCVA): correct light projection, intraocular pressure (IOP): 30 mmHg. Treatment involved three stages: 1) Primary vitrectomy achieved BCVA of 20/70 with persistent ocular hypertension (32 mmHg); 2) Ahmed valve implantation normalized IOP to 10-11 mmHg and stabilized BCVA at 20/50; 3) Final-stage iris-lens diaphragm implantation resulted in BCVA of 20/30 and IOP of 14 mmHg by postoperative day 3

Results: One-year follow-up demonstrated stable visual function and hydrodynamic parameters. The patient was completely satisfied with the functional and cosmetic result.

Conclusions: The results demonstrate the efficacy of sequential vitreoretinal, antiglaucoma, and optical-reconstructive surgical interventions for complex combined post-traumatic lesions. Ahmed valve implantation represents a pathogenetically justified method for secondary posttraumatic glaucoma with aniridia, enabling stable hydrodynamic parameters. This staged surgical approach warrants further investigation and clinical implementation to optimize treatment for patients with severe combined post-traumatic complications.

Abstract No.: 202784

Occult Indirect Optic Nerve Injury

First Author: Xuchuan **WANG**

Purpose: Introduce the characteristics and pathogenesis of occult indirect optic nerve injury through a detailed case.

Methods: A male patient was admitted to the emergency department 5 hours after being struck by a steel bar on the left superciliary arch and inner canthus. He had skin lacerations on the left facial and eyelid regions. Visual acuity was 1.0 in the right eye and 0.6 in the left eye. The left pupil was moderately dilated (approximately 5 mm) with a sluggish light reflex, and relative afferent pupillary defect (RAPD) was positive. The optic disc had clear margins and normal color, with a cup-to-disc ratio of 0.3. No obvious abnormalities were found in the right eye. However, on the third day, the patient complained of a shadow in the visual field. Visual Evoked Potential (VEP) showed preserved F-VEP but prolonged P100 latency in P-VEP. High-dose glucocorticoid pulse therapy (1 g/day methylprednisolone) was then initiated.

Results: At discharge two weeks after injury, the uncorrected visual acuity of the left eye remained 1.0, but visual field examination revealed a tubular visual field in the affected eye. The patient's injury site was the left superciliary arch, with no obvious visual loss in the early stage. However, the affected eye presented with mydriasis, sluggish light reflex, abnormal VEP, and concentric narrowing of the visual field, consistent with occult indirect optic nerve injury.

Conclusions: This condition is easily overlooked in the early stage, leading to delayed treatment and permanent visual damage to the patient.

Abstract No.: 201106

Ocular Morbidity From Trauma

First Author: Shah Md Rajibul **ISLAM**

Co-Author(s): Shah Md Bulbul **ISLAM**, Omar **JAFARULLAH**, Golam **RABBANI**

Purpose: To outline the seriousness of ocular trauma.

Methods: This cross sectional observational study was done from the imaging room (B Scan USG) of all the patients with ocular trauma that had been advised for a BScan USG. It was done from July 2022 up to June 2023. Age and sex was noted, causative agent was identified, BScan USG findings were noted.

Results: Out of 2653 patients, 82% were male. Mean age was 29 ± 10.4 (06 - 72) years. 68% were open globe injury and 32% were closed globe. High speed projectile was the highest 30% followed by blunt trauma 20%, Sharp kitchen objects 18%, RTA 10%, toy 12%, Stationary 5%, Fight 3% and Vegetative trauma 2%. Traumatic cataract resulted in 42% followed by vitreous hemorrhage 38%, endophthalmitis 18%,

retinal detachment and lens dislocation 12% and hyphema 10%.

Conclusions: A large number ocular trauma can be avoided if proper safety equipment is used and precautions taken. Large number of ocular morbidity occurs in young males every year resulting in socio-economic burden. We as clinicians should advocate strong legislation to prevent work related ocular injury.

Abstract No.: 205486

Orbito-Facial Fractures With Concomitant Rupture of Globe: Etiology, Injury Pattern, and Prognostic Factors

First Author: Rajendra MAURYA
Co-Author(s): Asha EVI, Priyanka

Purpose: We investigate the etiology, clinico-radiological pattern, and prognostic factors of patients having orbito-facial fractures with simultaneous globe rupture.

Methods: A retrospective review of patients having orbito-facial fractures with concomitant globe rupture was done to determine age, sex, time & place of injury, cause of injury, type and site of bony fracture, number of orbital wall fractures, zone of globe injury, ocular trauma score (OTS), surgical procedures, and final outcome. The correlation between OTS and final visual acuity was assessed.

Results: A total of 62 patients with eye ball rupture complicated by orbito-facial fractures were assessed. The majority of the patients were male (77.42%) between 21 and 30 years. The cause of injury included road traffic accidents (43.54%), physical assault (20.97%), fall from height (11.29%), and recreational activities (8.10%). The commonest orbital wall fracture was combined medial wall & floor fracture (35.48%), followed by combined lateral wall and floor fracture (32.26%), and isolated medial wall and floor fracture in 24.9% & 20.97% respectively. The majority of patients had > 2 orbital wall fractures. However .645% patients had pan orbito-facial fracture. The majority of globe ruptures resulted in zone II (51.61%) and zone III (33.87%) injury. An intra-orbital foreign body was seen in 19.35 % eyes. Surgical intervention was done in 87.10% cases. The OTS correlated with final visual acuity ($p < 0.001$).

Conclusions: Orbito-facial fractures with simultaneous globe rupture are a vision-threatening condition. This study highlights that zone of injury, OTS, number of orbital wall fractures, and RAPD are the most important prognostic factors. Visual outcome is proportionate to the number of orbital wall fractures.

Abstract No.: 202965

Outcomes of Canalicular Tear Repair Using Self-Retaining Monocanalicular Stent

First Author: Riffat RASHID
Co-Author(s): Farzana AFZAL, Syeed Mehabub Ul KADIR, Sadia SULTANA

Purpose: To evaluate the surgical outcomes of canalicular laceration repair with self-retaining monocanalicular stent.

Methods: This prospective study of 27 patients was carried out in the Department of Oculoplasty, from January 2023 to December 2024. Patient with upper and lower canalicular lacerations and undergone repair with self-retaining monocanalicular stent were included in this study. Patients presented late one week after trauma, associated nasal and orbital fracture, signs of local infections and uncompliant patients were excluded from the study. The main feature assessed were healing of wound, postoperative cosmetic appearance and complications. The stent was removed after 3 months. Patients were followed up for six months.

Results: Total patients were 27. Male were 18(67%) and female 9(33%). The mean age was 17.74 years with age range from 2 to 85 years. Right eyes were operated 15(55.56%) and left eyes 12(44.44%). Upper canaliculus repaired 1(3.70%), lower canaliculus 24(88.89%) and both canaliculus 2(7.41%). Associated lacerated lid injury were present in 11(40.74%) patients. 2(7.41%) patient reported early extrusion of stent. Anatomical and functional successes were 96.30% respectively. Only 1(3.70%) patient had persistent epiphora with canalicular block.

Conclusions: Traumatic canalicular laceration repair should be done under operating microscope to provide best possible cosmetic and functional outcome with reduced post-operative complications. Canalicular laceration repair with self-retaining monocanalicular silicon stent showed high success rate.

Abstract No.: 204362

Photoreceptor Damage and Inner Retinal Damage Caused by Metallic Intraocular Foreign Body

First Author: Xiaoting MAI
Co-Author(s): Peixin ZHANG

Purpose: This study aimed to evaluate the retinal damage in metallic IOFB injured patients and to investigate the effect of iron particles on retina by experimental animal models.

Methods: Medical records of trauma patients with IOFBs in the emergency department from 2008-2020 were reviewed to evaluate the characteristics of optical coherence tomography (OCT) images. Retinal damage

was assessed with the application of iron particles in rats.

Results: From the OCT analysis, photoreceptor damage and inner retinal damage were identified in the metallic IOFB patients. In rats, the photoreceptor damage was observed with the application of iron submicro/micro-particles, and the inner retinal damage with iron nanoparticles.

Conclusions: Metallic IOFBs can cause photoreceptor damage and inner retinal damage. The size effect of metal particles is an important condition for the damage.

Abstract No.: 204461

Rare Case: Orbital Foreign Body Caused by Industrial Lubricant Grease Gun – Challenges in Diagnosis and Treatment of Orbital Tissue Inflammation

First Author: Nguyen **NAM**

Co-Author(s): Ton **HAI**, Bien **VAN**

Purpose: Grease-gun injury of the orbit is a rare condition. Since 1964, we have found only 13 cases reported in English worldwide. In this report, we describe a severe case of orbital cellulitis caused by an accident with grease-gun.

Methods: Case report.

Results: A 17-year-old male patient presented severe vision loss in the right eye, lids edema, sutured conjunctival laceration, and restricted eye movement in all directions caused by a grease-gun injury. The patient was diagnosed as orbital foreign body of grease, orbital cellulitis, and in risk of sepsis. He was treated with intravenous antibiotics and Methylprednisolone, underwent orbitotomy surgery to remove 5 millimeter of grease from the right orbit. After one week of treatment, the patient's best corrected visual acuity improved dramatically from counting fingers at 0.5 meters to 10/10 vision, and almost full recovery of eye movement.

Conclusions: Grease-gun injury could leave a deceptive orbital foreign body of grease. Timely diagnosis and appropriate treatment are crucial to save the patients.

Abstract No.: 201027

ScRNA-Seq Reveals Diverse Proliferative Vitreoretinopathy Cell Composition and Metabolic Properties Across Different Regions

First Author: Wenjie **YIN**

Co-Author(s): Qinghuai **LIU**, Xiyang **MAO**, Zixuan **NIU**, Songtao **YUAN**

Purpose: Proliferative vitreoretinopathy (PVR) represents a common and challenging complication leading to blindness following ocular injury. The

–epithelial-mesenchymal transition (EMT) of retinal pigment epithelium (RPE) has been traditionally recognized as the primary mechanism driving the pathogenesis of PVR. However, pharmacological interventions targeting RPE EMT have failed to meet the clinical treatment requirements of PVR. Therefore, a comprehensive elucidation of cellular and molecular mechanisms of PVR is urgently required.

Methods: Different retinal regions of PVR membranes were surgically excised and respectively subjected to single-cell RNA sequencing and immunofluorescence staining to delineate the cellular compositions and cell-specific molecular pathways associated with PVR subtypes. Subtype-specific PVR mouse models were established to investigate the pathological mechanisms and potential treatment strategies for PVR in distinct anatomical regions.

Results: We demonstrated that PVR exhibited distinct cytopathological characteristics depending on their retinal location. Specifically, epiretinal PVR predominantly comprised macrophages, whereas PMEL+ RPE-derived cells were exclusively observed in subretinal membranes. Both pathological phenotypes were unified by retinal hypoxia, yet they diverged in their downstream hypoxic pathway selection. Targeting HIF1 α -regulated glycolysis selectively reduced epiretinal PVR formation, while inhibiting reactive oxygen species production specifically abrogated subretinal PVR. Furthermore, the application of hyperoxia chamber in a mouse model of dispase-induced persistent retinal injury effectively eradicated PVR across all retinal regions and restored retinal morphology.

Conclusions: These findings establish hypoxia-induced regional heterogeneity as a pathological mechanism in PVR progression and advocate for anatomically targeted therapeutic strategies.

Abstract No.: 206602

Single-Stage Ocular Surface Reconstruction for Recurrent Symblepharon Following Molten Aluminum Thermal Injury: A Case Report

First Author: Shipra **SINGH**

Co-Author(s): Shikha **JAIN**, Ashok **PATHAK**

Purpose: To report the successful management of severe bilateral ocular thermal injury from molten aluminum exposure through single staged surgical reconstruction and evaluate long-term anatomical and functional outcomes.

Methods: A 19-year-old male presented with severe right eye symblepharon following molten aluminum thermal injury five years prior. The patient had undergone multiple surgeries elsewhere between 2020-2023 with recurrent symblepharon formation. At presentation, the right eye showed a massive

symblepharon with cicatricial tissue covering a subtotal corneal surface and best corrected visual acuity of perception of light, while the left eye had inferonasal corneal scarring with Best corrected visual acuity of 6/9. A single-stage comprehensive surgical reconstruction was performed on the right eye, including symblepharon release, lower lid and inferior fornix reconstruction with mucus membrane grafting, fornix deepening sutures, and temporary tarsorrhaphy. Post-operative management included systemic and topical corticosteroids with serial clinical monitoring.

Results: Post-operative follow-up demonstrated successful graft integration with intact mucous membrane grafts at day 28 and maintained reconstruction at five months. Adequate lid closure was achieved with no significant ectropion or dry eye. Anterior segment optical coherence tomography was planned to assess scarring depth for consideration of limbal stem cell grafting and automated lamellar keratoplasty if required.

Conclusions: Severe bilateral thermal injury from molten aluminum can be successfully managed through staged surgical reconstruction achieving satisfactory anatomical rehabilitation and potential for visual recovery.

Abstract No.: 207238

Steel Versus Sight: Penetrating Trauma by Scissors in a Pediatric Patient

First Author: George Raden Mas **SAID**

Co-Author(s): Shanti **BOESOIRIE**, Mohammad Rinaldi **DAHLAN**, Niluh Ayu Putu **DEWI**, Angga **KARTIWA**

Purpose: Penetrating ocular trauma in children is an ophthalmic emergency with potential for devastating visual outcomes. This case highlights the successful management of an unusual orbital injury with full visual recovery caused by scissors penetrating the orbit.

Methods: A 12-year-old boy presented three hours after an accidental right orbital injury with scissors. Visual acuity was 1.0 bilaterally. Plain radiographs revealed a metallic foreign body lodged in the orbital floor without bony discontinuity or intraocular involvement. The patient underwent urgent surgical exploration, foreign body removal, and debridement. During the surgery, the doctors found bleeding under the conjunctiva, a 20 × 3 mm cut in the lower conjunctiva, and a 3 × 4 mm scratch on the cornea. No globe rupture or intraocular foreign body was identified, and all rectus and oblique muscles were intact. Postoperatively, the patient received topical antibiotics, systemic corticosteroids, and analgesia. On postoperative day 14, uncorrected visual acuity was 1.0 with full ocular motility, no diplopia, and intact stereopsis (60 arcsec).

Results: Ocular trauma is a major cause of visual morbidity in children. Penetrating injuries, though less frequent, can cause severe damage. This case is notable for the mechanism and location of injury with minimal ocular compromise. Prompt surgical intervention was key to the favorable outcome. This case reinforces findings in recent pediatric trauma studies showing that timely care can preserve vision even in high-risk injuries.

Conclusions: This case demonstrates that even severe-appearing orbital injuries in children can result in excellent outcomes with timely, coordinated care.

Abstract No.: 202699

Subretinal Injection of Indocyanine Green Using a 25-Gauge Heavy Water Needle During Vitrectomy: A Case Report

First Author: Shuai **SHENG**

Purpose: To report a case of inadvertent subretinal injection of indocyanine green (ICG) using a 25-gauge heavy water needle during epiretinal membrane (ERM) surgery and analyze the associated risks and complications.

Methods: ERM is a common retinal condition treated with vitrectomy. ICG staining is often used to visualize the internal limiting membrane (ILM). However, subretinal ICG can cause complications. Case report of a 76-year-old female undergoing vitrectomy for ERM. Excessive injection pressure while applying ICG with a 25-gauge heavy water needle caused ICG to breach the retina superotemporal to the macula, entering the subretinal space.

Results: The iatrogenic break self-sealed intraoperatively; residual subretinal ICG could not be aspirated. At 1 week post-op, BCVA was 0.5; ICG persisted without complete absorption; OCT showed retinal pigment epithelial (RPE) edema. At 6 months, BCVA was 0.8, with focal retinal atrophy at the injection site.

Conclusions: The narrower lumen of a 25-gauge heavy water needle carries a potential risk of creating iatrogenic breaks under excessive injection pressure. Subretinal ICG is difficult to absorb acutely, potentially causing RPE edema (indicating retinal toxicity) and leading to focal retinal atrophy in later stages. This reinforces evidence of ICG retinal toxicity. Careful dye application with minimized injection pressure is crucial. Close postoperative monitoring of vision, fundus status, and complications is essential.

Abstract No.: 201494

To Report an Unusual Case of Isolated Traumatic Partial Transection of the Lateral Rectus Muscle Caused by a Cat Scratch

First Author: Chun Loong TAN

Co-Author(s): Neshalene RATNA KRISHNAN, Leroy Yk TAN, Azlyn Aj, Mimiwati Z, Nur Musfirah Mahmud

Purpose: To report an unusual case of isolated traumatic partial transection of the lateral rectus muscle without globe damage caused by a cat scratch.

Methods: Case report.

Results: A 59-year-old male presented with a 1-mm conjunctival laceration and prolapse of striated muscle tissue on the temporal aspect of the right eye after being scratched by a neighbour's cat claw. He experienced bleeding and ocular pain but no diplopia. On examination, visual acuity was 6/9 in both eyes with no relative afferent pupillary defect. Extraocular movements were full in the right eye. The conjunctival laceration was located 7 mm from the temporal limbus, with prolapsed pinkish striated tissue. Surgical exploration revealed a 35-mm long, one-quarter width partial transection of the inferior aspect of the lateral rectus muscle. The macerated muscle end could not be resutured and was excised. The laceration did not involve the sclera or cornea, and the rest of the ocular examination was unremarkable. Postoperatively, the patient received topical and systemic antibiotics. At 1-month follow-up, the wound had healed well, with no diplopia, and a Hess chart confirmed full temporal movement of the right eye.

Conclusions: Cat-related ocular trauma is not trivial, as claws can cause deep injuries beyond superficial lacerations. This case highlights that partial transection of the lateral rectus may still preserve functional reserve, allowing recovery without diplopia. Prompt recognition and surgical management are essential to prevent missed deep injuries and optimize visual and motility outcomes.

Abstract No.: 204765

Trend of Firecracker Eye Emergency (TOFEE) - A Tertiary Eye Care Centre Study

First Author: Purendra BHASIN

Purpose: To evaluate the demographics, distribution, types, and outcomes of ocular trauma sustained due to firecracker injuries during one year at a tertiary ophthalmic centre.

Methods: A retrospective observational study was conducted on 47 eyes of 42 patients with firecracker injuries. Data were assessed for patient demographics, time lapsed, type and extent of trauma, visual disability score, and follow-up over 2-12 months. Pareto charting was used to analyze frequency and cumulative percentages.

Results: Firecracker injuries were 50 times more common during Diwali week compared to the rest of the year. Of the patients, 88% were male, 66.67% were under 20 years, and 36.70% were bystanders. Closed globe injuries accounted for 88%, with surgical intervention required in 39%. Ocular adnexal involvement occurred in 33.33%, and anterior segment injuries in 69.73%. At final follow-up, 60% of eyes achieved visual acuity >6/9, while 15% had severe visual loss (<3/60) and one eye required evisceration.

Conclusions: Firecracker injuries during Diwali pose a significant risk, particularly to young males and bystanders. Most injuries are preventable. Public awareness, stricter safety regulations, and the use of protective measures are essential to reduce the incidence and severity of such ocular trauma during festivals.

Abstract No.: 206754

Unilateral Terson Syndrome in a Child With Head Injury and Traumatic Globe Luxation in the Contralateral Eye

First Author: Tavishi SINGHAL

Co-Author(s): Rahul SAINI, Nitika BERI, Pramod Kumar SAHU

Purpose: We report a case of a 3year old child who presented with head injury incurred by an iron rod over the right eye.

Methods: The child underwent a CT scan of the brain and orbit, which revealed a lateral wall and orbital roof fracture with brain parenchymal herniation and proptosis of the right eye. The left eye wasn't directly impacted by the iron rod, but on fundus evaluation revealed multiple intraretinal haemorrhages, whereas the brain imaging showed sub-arachnoid and subdural hemorrhage in the fronto-parietal regions, which led us to our diagnosis of Terson syndrome.

Results: A young three year-old girl presented with a head injury and right eye globe luxation with proptosis. The child was intubated so visual acuity assessment was not possible. On ophthalmic examination, both pupils were mid dilated non reacting to light indicating increased Intracranial Pressure. The fundus examination in the luxated globe showed retinal whitening and a cherry red spot indicating central retinal artery occlusion secondary to central retinal artery compression. The other eye which seemingly appeared normal had multiple intraretinal hemorrhages over the posterior pole and mid periphery with foveal sparing. The patient was intubated with a poor GCS and was planned for orbital decompression and repositioning after systemic stabilisation whereas the left eye was being managed conservatively with regular fundus evaluation. Unfortunately the patient passed away the next day due to the head injury.

Conclusions: Terson syndrome is an uncommon condition in the pediatric population, and unilateral Terson is even more so. Do consider fundus examination.

Abstract No.: 205459

Unusual Pen Nib Orbital Foreign Body: Successful Transcutaneous Removal With Excellent Functional Recovery

First Author: Sheetal **SHARMA**

Co-Author(s): Ramlal **SHARMA**

Purpose: Orbital foreign bodies lodgment in the medial side of the orbital floor is rare. In this case we are highlighting how a simple pen nib can actually get embedded in the orbital floor causing serious orbital trauma and its prompt and successful surgical management.

Methods: A 15-year-old boy got accidental periocular trauma with a pen after a playful sibling rivalry and presented with pain, periorbital edema and mildly restricted ocular motility. Metallic foreign body was confirmed with X-Ray. Globe and vision were preserved. Transcutaneous approach was selected for its removal backing up with ENT and Maxillofacial surgeons. Foreign body was retrieved in toto, and wound was closed.

Results: The patient's postoperative recovery was uneventful. Ocular movements got fully restored and vision was normal too. The incision healed well with excellent cosmesis.

Conclusions: This case is very rare in the literature and highlights that a simple pen can result in nib inoculation in the orbit which can become a major cause of ocular morbidity. Prompt imaging, timely surgical intervention and careful choice of approach are important determinants to prevent complications and thus achieving optimal visual and cosmetic outcomes. And lastly, we want to give a take home message through this case is that as pens are common tools in schools and households, awareness campaigns and school-level safety guidelines can play a vital role in preventing such injuries and thus reducing the burden of avoidable ocular trauma in children.

Orbital and Oculoplastic Surgery

Abstract No.: 203930

3D-Printed Titanium Patient-Specific Implant-Assisted Orbital Wall Reconstruction With Simultaneous Large-Angle Exotropia Correction As Salvage Therapy for Medial Rectus Injury After Sinus Surgery

First Author: Niratchaya **THANAKIJ**

Co-Author(s): Pimkwan **JARU-AMPORNAN**, Pittaya **PHAMONVAECHAVAN**, Piangporn **SAKSIRIWUTTO**

Purpose: To present a novel single-stage salvage approach combining 3D-printed titanium patient-specific implant (PSI)-assisted orbital wall reconstruction with simultaneous large-angle exotropia correction in a patient with medial rectus (MR) transection following sinus surgery.

Methods: A 33-year-old woman with a history of nasopharyngeal carcinoma developed MR transection, medial orbital wall fracture, and retrobulbar hemorrhage after endoscopic sinus surgery. She subsequently presented with large-angle exotropia (65 prism diopters), hypertropia, enophthalmos, ptosis, and adduction restriction despite multiple prior muscle procedures. Preoperative CT and endoscopy guided surgical planning. Under general anesthesia, the oculoplastic team removed a malpositioned silicone sheet and reconstructed the medial orbital wall using a customized titanium PSI, restoring orbital contour and providing a stable anchoring site. The strabismus team simultaneously performed lateral rectus disinsertion with periosteal fixation and reattached the MR stump directly to the PSI at its anatomical insertion.

Results: At 1 month, the patient achieved orthotropia in primary gaze with resolution of diplopia and improvement of enophthalmos (2.0 mm → 0.5 mm). Extraocular movement remained limited, but the patient was asymptomatic in daily activities. Secondary ptosis correction was planned.

Conclusions: This is the first reported case of PSI-assisted orbital wall reconstruction combined with simultaneous large-angle exotropia correction for MR transection after sinus surgery. The interdisciplinary single-stage approach enabled precise anatomical restoration, stable muscle fixation, and immediate ocular realignment, reducing surgical stages and accelerating functional recovery.

Abstract No.: 206116

A Case Report: Orbital Apex Syndrome Secondary to Chronic Invasive Fungal Rhinosinusitis and Its Diagnostic Challenges

First Author: Diane Frances PERALTA

Co-Author(s): Marie Joan LOY, Yvette Marie SANTIAGO-GATMAITAN

Purpose: Chronic Invasive Fungal Rhinosinusitis (CIFRS) is an indolent infection with slow destructive process that mostly affects immunocompromised patients.

Methods: This is a case of a 65-year-old female with a history of kidney transplantation, diabetes mellitus, and immunosuppressant use. She presented with sudden painless vision loss of the right eye. The patient eventually developed ophthalmoplegia and on review of systems, noted a five-month history of right-sided headache. Magnetic resonance imaging was requested which revealed a right-sided ill-defined nasopharyngeal mass. On admission, biopsy was done which revealed bacterial and fungal elements. Antibiotics and isavuconazole were then started. The patient was then managed with endoscopic tumoral debulking and amphotericin B since with progression of right-sided ptosis and ophthalmoplegia. Histopathology showed reactive inflammatory tissue, hence a short course of intravenous high-dose steroids was given. Overall health declined and patient eventually expired.

Results: CIFRS presents with vague, localized symptoms progressing silently in immunosuppressed hosts. Extension of the mass to the orbital apex led to the vision loss and ophthalmoplegia of the patient. On review of earlier imaging, polysinus disease was noted with right-sided hyperattenuating paranasal sinus opacification, which is nonspecific, but may raise suspicion for fungal involvement. Histopathology and culture remains essential for diagnosis.

Conclusions: This case highlights the importance of maintaining high clinical suspicion for CIFRS in immunocompromised patients with vague, localized symptoms such as headache. Prompt recognition and tissue diagnosis are critical for early intervention.

Abstract No.: 202142

A Case of Intraorbital Migration of Hyaluronic Acid Following Bacterial Infection After Filler Injection

First Author: Honami FUSE

Co-Author(s): Takahiro HIRAOKA, Tetsuro OSHIKA, Kuniharu TASAKI

Purpose: To describe a rare case of intraorbital migration of hyaluronic acid (HA) after bacterial infection following facial filler injection, and to discuss its clinical implications.

Methods: A 45-year-old woman with a history of bilateral cheek HA filler injection presented with

swelling and pain in the left infraorbital region four months later. She was diagnosed with delayed bacterial infection and treated with antibiotics. Although symptoms initially improved, ocular motility disturbance developed 10 days after treatment. Orbital MRI revealed a lesion hypointense on T1-weighted images and moderately hyperintense on T2-weighted images, consistent with HA migration.

Results: At referral to our hospital, a mild visual field defect and ocular motility limitation were observed. Conservative management led to regression of HA and improvement in both visual field and motility.

Conclusions: Intraorbital HA migration is extremely rare, in contrast to vision loss caused by intra-arterial embolization of fillers. In this case, infection likely disrupted the orbital septum, enabling HA migration. Because HA is isoattenuating to soft tissue on CT, MRI is more effective for evaluation. Within the orbit, HA may undergo relatively rapid hydrolysis, suggesting that conservative management can be a feasible treatment option. Clinicians should be aware that even minimally invasive filler injections can occasionally lead to serious ocular complications.

Abstract No.: 206386

A Case of Sjogren's Syndrome With Rosai-Dorfman Disease Masquerading as a Lacrimal Gland Mass: A Rare Extra-Nodal Presentation

First Author: Rongkai TAN

Co-Author(s): Zainol BINTI HARUN, Chui Yain CHEN, Chenshen LAM, Naseem Vanessa MANSURALI, Ying Fun NG

Purpose: This report describes a rare case of right lacrimal gland mass secondary to extra-nodal Rosai-Dorfman disease coexisting with underlying Sjogren's syndrome.

Methods: Case report.

Results: A 51-year-old lady with underlying severe dry eye disease presented with right upper eyelid swelling for 6 months. Snellen chart visual acuities were 6/12 in the right eye and 6/9 in the left eye. External examination demonstrated an ill-defined mass over the superotemporal lacrimal gland area on palpation, measuring 20mm x 10mm. It was firm in nature, non-mobile, and non-tender on palpation. CT orbits showed diffusely enlarged right lacrimal gland and an enhancing parotid nodule. There were corneal punctate epithelial erosions and severe tear deficiency over both eyes, with normal intraocular pressures. Bilateral eyes posterior segment examination were unremarkable. She underwent right orbitotomy with excision biopsy of the mass. Her blood test was strongly positive for Sjogren's syndrome. Histopathological examination of the mass revealed dense infiltrates of chronic inflammatory cells and histiocytes, with reactive lymphoid follicles. Immunohistochemistry

testing revealed histiocytes with strong and diffuse positive staining for Rosai-Dorfman disease. Therefore, she was diagnosed with right lacrimal gland extra-nodal Rosai-Dorfman disease with Sjogren's syndrome. No recurrence was observed post-excision.

Conclusions: Coexistence of extra-nodal Rosai-Dorfman disease (RDD) with Sjogren's Syndrome is rare; however, one has to be aware of its associations with other inflammatory conditions like hypertrophic pachymeningitis and panuveitis. While RDD is generally a benign and self-limiting condition, its occurrence alongside an autoimmune disorder like Sjögren's syndrome may require different management strategies, with corticosteroids showing to be of benefit.

Abstract No.: 200951

A Case of Sparganosis Mansonii Parasitic Infection of Tenon's Capsule

First Author: Cheng LI

Purpose: Sparganosis mansonii is a parasitic infection caused by the plerocercoid larva of *Spirometra mansonii*, a tapeworm commonly found in amphibians and reptiles. Humans become accidental hosts through ingestion of contaminated water or undercooked intermediate hosts, with larvae capable of migrating to subcutaneous tissues, the eyes, or the central nervous system.

Methods: This case describes a rare presentation of ocular sparganosis in a middle-aged man with no known exposure to traditional risk factors. The live *Spirometra mansonii* larva, discovered within the Tenon's capsule and measuring 22 cm, underscores the diagnostic challenge and the importance of considering parasitic infections in atypical orbital masses.

Results: This case highlights the diagnostic challenges of ocular sparganosis, particularly when clinical signs are subtle and conventional tests are inconclusive. The localization of the parasite within the Tenon's capsule without deeper orbital involvement is unprecedented and may account for the mild presentation.

Conclusions: Clinicians should consider parasitic infections in the differential diagnosis of atypical subconjunctival or orbital masses, especially in endemic regions. Public health education regarding the risks of exposure to untreated water sources remains critical in preventing such infections.

Abstract No.: 204498

A Race Against Time: Managing Blepharoplasty-Induced Orbital Compartment Syndrome With Emergency Canthotomy

First Author: Ruchita SONTAKKE

Co-Author(s): Paromita DUTTA, Tanvi GAONKER

Purpose: To highlight a rare but potentially blinding complication of cosmetic blepharoplasty -orbital compartment syndrome and emphasize the importance of early recognition and immediate bedside canthotomy/cantholysis as sight-saving interventions.

Methods: We describe the clinical course of a 58-year-old man who developed acute orbital compartment syndrome immediately after bilateral lower eyelid blepharoplasty. Clinical findings, emergency management with lateral canthotomy and cantholysis, and postoperative outcomes were documented.

Results: The patient presented with bilateral sudden orbital pain, tense eyelid swelling, proptosis, and diminution of vision immediately following blepharoplasty. A clinical suspicion of orbital compartment syndrome was made, and an emergency lateral canthotomy with cantholysis was performed in both the eyes resulting in rapid reduction of orbital tension and gradual visual recovery. At follow-up, visual acuity improved to baseline, and postoperative photographs demonstrated complete resolution of ptosis and eyelid swelling.

Conclusions: Early recognition of orbital compartment syndrome following eyelid surgery is vision-saving. Prompt bedside intervention with lateral canthotomy and cantholysis can fully restore function even in severe presentations, highlighting the need for high clinical suspicion and immediate action. Surgeons must recognize warning signs and be prepared to perform emergency canthotomy and cantholysis to prevent irreversible vision loss.

Abstract No.: 205569

A Rare Case Report of Supernumerary Puncta and a Punctal Cyst

First Author: Shui King TSOI

Co-Author(s): Andre MA, Hunter Kwok Lai YUEN

Purpose: Supernumerary puncta are rare, typically asymptomatic congenital anomalies that are often discovered as incidental findings. This case report describes the unusual presentation of an acquired punctal cyst with a coincidental discovery of contralateral supernumerary puncta.

Methods: A case report.

Results: A 29-year-old female presented with a several-week history of a painless swelling on her right medial lower eyelid. Slit lamp examination revealed a translucent, cystic lesion near the right inferior

punctum, consistent with an acquired punctal cyst. Examination on the contralateral eye revealed an incidental, asymptomatic double puncta over the left inferior eyelid. The right inferior punctum and the left inferior supernumerary puncta were found patent with syringing. The right inferior punctal cyst was successfully managed with picking using a 30-gauge needle while no surgical intervention was necessary for the supernumerary puncta.

Conclusions: While often asymptomatic, supernumerary puncta can sometimes cause symptoms like epiphora and dry eye. It serves to illustrate the importance of a comprehensive bilateral adnexal examination to appreciate potentially easily missed supernumerary lacrimal puncta.

Abstract No.: 207233

A Rare Case of Liposarcoma Over the Left Upper Eyelid

First Author: Ryan LEE

Co-Author(s): Kelvin Kam Lung CHONG, Kenneth Ka Hei LAI, Alvin Lerrmann YOUNG

Purpose: Liposarcoma is the most common soft-tissue sarcoma in adults, with the orbit being the rarest primary origin. It poses challenges in management due to its high risk of recurrence and infiltration.

Methods: This report highlights a case of liposarcoma over left upper eyelid.

Results: A 64-year-old female presented with a progressively enlarging mass over left upper eyelid for over ten years. Multiple surgeries were done with pathological reports indicating atypical lipomatous tumor. The mass increased rapidly in size since July 2022, with extensive involvement over left upper, lower, and lateral eyelids, causing mechanical complete ptosis. Orbitotomy and upper lid maximal debulking (levator sparing) was performed on 15 July 2022. The orbit was debulked up to superior orbital rim and lateral periosteum. Pathological report showed circumferential resection margin involvement. Subsequent MRI showed residual tumor over left upper eyelid and enhancing tissues over lower eyelid and lacrimal gland. Tumor abutted periosteum without bony invasion of lateral orbital wall. No intraconal or globe involvement was noted. Patient underwent orbital exenteration with partial removal of orbital bone on 31 Oct 2022, followed by reconstruction with right anterolateral thigh flap. Pathological report confirmed well-differentiated liposarcoma with low-grade dedifferentiation (positive for MDM2 amplification) and focal perineural invasion. Tumor cells focally touch the superomedial and inferotemporal margins. A small 4mm fibroosseous lesion was identified within the bone.

Conclusions: This case highlights the challenges in managing liposarcoma, in view of its recurrence and

infiltrative nature. Long-term follow-up is essential for providing comprehensive care and monitoring for recurrence.

Abstract No.: 200692

A Rare Case of Pachydermoperiostosis (PDP) and Its Ocular Manifestations

First Author: Adnan ABDUL MAJEED

Purpose: To bring awareness about the rare but important disease related to eye; Pachydermoperiostosis.

Methods: case report

Results: ABSTRACT A case of 56 years old Pakistani male visited OPD with complaint of thickening of both eyelids, ptosis and left lower lid ectropion caused by rare condition named pachydermoperiostosis (PDP). PDP is a rare autosomal dominant condition but autosomal recessive families probably can also occur. It is manifested by clubbing of digits, hyperhidrosis of palm and feet, peri-ostosis, acro-osteolysis and pachydermia. Ocular features include blepharoptosis, floppy eyelids, eyelid and palpebral conjunctival hypertrophy, mechanical ectropion, meibomian gland dysfunction, tear film abnormalities, punctate epithelial erosions and ocular surface disease

Conclusions: Pachydermoperiostosis is a rare disease. It can present with ocular manifestations along with other systemic features. As in this case, patient presented with ptosis and mechanical ectropion but on further systemic evaluation, it was found that he had clubbing, periosteosis and pachyderma. Although rare, but such cases should be kept in mind while evaluating and managing the patients with ptosis, ectropion and eyelid thickening.

Abstract No.: 205508

A Silent Culprit: Intraorbital Tumor Secondary to B-Cell Lymphoma

First Author: Naseem Vanessa MANSURALI

Co-Author(s): Zainol BIN HARUN, Boon Chye GAN, Rongkai TAN

Purpose: This report describes a case of a left orbital tumor secondary to B-cell lymphoma.

Methods: Case report

Results: A 77-year-old lady was referred for worsening left eye proptosis, chemosis, and tearing, post-endoscopic sinus surgery. On examination, her vision was 6/7.5 in the right eye and 6/15 in the left eye. External examination revealed left eye severe chemosis, proptosis with hypertropia, and a superiorly displaced globe. Hertel exophthalmometer showed an asymmetry of 5mm between the two eyes. Left eye inferior gaze was limited, with full extraocular movement in other gazes. Apart from the left eye having marked chemosis, the anterior chamber and

posterior segment findings were unremarkable in both eyes. A CT scan of the orbit demonstrated a soft tissue lesion situated at the left orbit, maxillary sinus, and nasolacrimal sac. Left orbital exploration via a swinging eyelid approach showed a diffuse soft tissue orbital tumor. Orbital tumor debulking was done alongside left functional endoscopic sinus surgery to debulk the maxillary sinus component. Histopathological examination revealed a diffuse large B-cell lymphoma with germinal centre B cell-like phenotype.

Postoperatively, her vision improved to 6/12 over the left eye, proptosis and chemosis resolved, and syringing done showed a patent left nasolacrimal duct. The patient was referred to the hematologist for further management.

Conclusions: B-cell lymphoma-associated intraorbital tumors may present with non-specific orbital symptoms that mimic other benign or malignant ocular lesions. This case highlights the importance of early recognition and prompt tissue diagnosis for timely management, thereby preserving vision and improving the overall survival rate.

Abstract No.: 205222

A Ten-year Retrospective Review of the Effects of Orbital Radiation Therapy on Dysthyroid Optic Neuropathy

First Author: Thorfan **KASETSINSOMBAT**

Co-Author(s): Rungkiat **CHANGWAIWIT**, Wimrak **ONCHAN**, Damrong **WIWATWONGWANA**

Purpose: Dysthyroid optic neuropathy (DON) is a vision-threatening complication of thyroid eye disease (TED). While corticosteroids and orbital decompression remain standard treatments, orbital radiation therapy (RT) has emerged as a promising adjunctive treatment. This study aimed to evaluate visual outcomes and associated clinical parameters following orbital RT in DON patients over a ten-year period.

Methods: A retrospective review was conducted of patients with DON treated with orbital RT at Chiang Mai University Hospital between January 2013 and December 2023. The primary outcome was improvement in visual acuity, defined as a gain of ≥ 2 Snellen lines assessed at 2 weeks, 1 month, 3 months, 6 months, 1 year, and 2 years post-treatment. Secondary outcomes included changes in relative afferent pupillary defect (RAPD), color vision (Ishihara plates), ocular motility, VISA inflammation score and proptosis.

Results: The medical records of 51 eyes from 34 patients were reviewed. The mean age of patients was 61.6 years; 64.7% were female. Visual acuity improved in 41.1% of eyes at 2 weeks and up to 94% at 2 years. RAPD improved in 85.6% at 6 months. Color vision improved by 4.78 plates, ocular motility improved by 18.96%, VISA inflammation score reduced from 2.65

to 0.85 over 6 months and proptosis decreased by 2.0 mm over the same period.

Conclusions: An orbital radiation therapy demonstrated favorable improvements in visual function and associated clinical parameters in DON patients. It may be an effective adjunctive treatment, particularly in early disease management of DON.

Abstract No.: 201296

Advanced Surgical Management of Symblepharon in Pediatric Stevens-Johnson Syndrome

First Author: Metika **IRZA**

Co-Author(s): Sarah **RAMADHANTI**, Hendriati

Purpose: To present challenging management of rare paediatric case of severe bilateral symblepharon secondary to Stevens-Johnson Syndrome (SJS), highlighting the complex surgical approach of conjunctival resection and fornix reconstruction with amniotic membrane transplantation in ocular surface and fornix.

Methods: A 6-year-old girl presented with bilateral Grade IVC3+ symblepharon and inability to open her eyes for four months after SJS induced by medications. Dense fibrovascular adhesions obliterated the conjunctival fornixes and extended over the corneal surface. Surgical management included meticulous symblepharon release, excision of fibrovascular tissue, and reconstruction of the fornix conjunctiva. Multilayer amniotic membrane grafts then applied to the cornea and fornix, secured with sutures, and supported with bandage contact lens.

Results: Sequential surgeries in both eyes successfully removed fibrotic conjunctival adhesions and restored fornix depth. Amniotic membrane provided a biological scaffold for epithelial healing and prevented adhesion. Intraoperative complications of the left eye showed fibrovascular tissue was spread from superior fornix conjunctiva to cornea. Anterior chamber and iris was difficult to identified but symblepharon was successfully released. Surprisingly, the cornea of the right eye was covered with fibrovascular tissue but symblepharon at conjunctival fornix was easier to released. Postoperative outcomes on both eyes showed improved ocular surface integrity, reserved motility, and decreased photophobia.

Conclusions: Conjunctival resection and fornix reconstruction with amniotic membrane transplantation is an effective technique for advanced symblepharon secondary to SJS. Careful removal of fibrovascular adhesions followed by biological resurfacing offers anatomical restoration and functional improvement of ocular motility in paediatric patients with severe ocular surface damage.

Abstract No.: 204859

Advanced Two-Stage Protocol for Severe Cicatricial Ectropion: Strategic Triamcinolone Pre-conditioning and Tailored Auricular Reconstruction

First Author: Irma Suwandi **SADIKIN**

Co-Author(s): Hisar **DANIEL**, Yunia **IRAWATI**, Andi Marsa **NADHIRA**

Purpose: Cicatricial ectropion represents a challenging eyelid malposition caused by anterior lamella scarring from trauma, burns, or surgery. Grade IV cicatricial ectropion requires complex reconstructive approaches to restore normal eyelid function and appearance. To report the successful management of severe cicatricial ectropion using pre-surgical triamcinolone acetone injections followed by full-thickness auricular skin grafting.

Methods: An 18-year-old male presented with grade IV cicatricial ectropion of both upper and lower eyelids of the right eye, three months following chemical injury. The patient complained of eyelid eversion, decreased vision (6/24), epiphora, and ocular discomfort. Examination revealed cicatricial ectropion of the superior and inferior palpebrae with corneal haziness and punctate keratitis. Pre-operative treatment consisted of triamcinolone acetone injections (0.1 cc at cicatrix point) using the infiltration technique with a 1 cc syringe, administered monthly for three consecutive months. Surgical reconstruction involved full-thickness auricular skin grafts sized according to the scar dimensions (larger graft for upper eyelid) with cantotomy and canthopexy performed. The wound was dressed with pressure bandages for 10 days post-operatively.

Results: The surgical procedure was completed successfully with minimal bleeding. At three-month follow-up, excellent functional and cosmetic outcomes were achieved with complete resolution of ectropion, no lagophthalmos or entropion, well-integrated grafts, and improved visual acuity to 6/15 uncorrected. No cicatricial recurrence was observed in either upper or lower eyelids.

Conclusions: Pre-operative triamcinolone acetone injection combined with full-thickness auricular skin grafting provides an effective treatment approach for severe cicatricial ectropion, achieving both functional restoration and aesthetic improvement with minimal complications.

Abstract No.: 202245

An 'Accidental' Dacryocystography

First Author: Kirsten **WONG**

Co-Author(s): Maryanne **ROMERO**, Gangadhara **SUNDAR**

Purpose: Dacryocystography (DCG) allows assessment of the lacrimal drainage system's morphology and

function, and evaluation of the location and presence of any obstruction or stenoses. This can be done via digital-subtraction (DS)-DCG, computed tomography (CT)-DCG or magnetic resonance (MR)-DCG, with use of contrast media. Although not generally used in the setting of acute trauma, its role has been described in the evaluation in post-traumatic secondary obstructions. We present a case of ophthalmic trauma, where there was unintended entry of radio-opaque material into the lacrimal drainage system providing visualization similar to a CT-DCG.

Methods: A case report of a 58-year-old male presenting to the Emergency Department after sustaining injury from a "less-than-lethal projectile" containing blue dye.

Results: He suffered a deep left medial canthal laceration which involved the inferior canaliculus. Plain un-contrasted CT scan of the orbits revealed hyperdense material tracking from the medial canthus into both upper and lower canaliculi and down the nasolacrimal duct, indicating no significant disruption to lacrimal drainage. He underwent uncomplicated left lower canaliculus laceration repair with bicanaliculus intubation, after which he was reviewed at 6 weeks post-operatively, where patency of the lacrimal system was confirmed by nasal endoscopy. The tube was removed at 12 weeks post injury.

Conclusions: This was an interesting case where a patient presenting with trauma from a 'less-than-lethal projectile' containing a dye that acted like contrast material usually used in CT-DCG. Although not essential for pre-operative planning, it gave us an idea of the extent of injury and about the function of his lacrimal drainage system.

Abstract No.: 204549

An Unwelcomed Guest of Southeast Asia – Orbital Cysticercosis

First Author: Avishi **AGRAWAL**

Co-Author(s): Pankaj **GUPTA**, Kavita **POONIA**, Manu **SAINI**, Usha **SINGH**

Purpose: Cysticercosis is endemic in South East Asian countries like India, Nepal, Myanmar, Indonesia, provinces of China and neighbours. A more common presentation is in the form of neurocysticercosis or involvement of subcutaneous tissues, while ocular involvement remains uncommon, with intraocular manifestation being more prevalent than extraocular. Our aim is to highlight the clinical spectrum and diagnostic challenges of orbital cysticercosis manifesting as orbital cellulitis which is an uncommon presentation.

Methods: We present a case series of 2 cases from India which presented with unilateral orbital cellulitis. Detailed ocular examination, and imaging modalities

such as CT orbit and USG helped us reach to the diagnosis of orbital cysticercosis.

Results: Imaging was suggestive of scolex in the extraconal space involving superior rectus and medial rectus in the first case, while in case 2 intraconal involvement of inferior rectus close to the orbital nerve was seen. Both were started with oral albendazole 15 mg/kg/day and a tapering course of oral corticosteroids. Both the patients responded well to the medical management.

Conclusions: Orbital cysticercosis although uncommon should be considered as a differential of unilateral orbital cellulitis especially in endemic regions. Early diagnosis using HRCT and initiation of medical therapy remains the mainstay with surgery reserved for the resistant cases.

Abstract No.: 200850

Association of Long Non-Coding RNA Gene H19 Polymorphisms and Susceptibility to Graves' Ophthalmopathy

First Author: Hung-chih **CHEN**

Co-Author(s): Pei-jane **BAIR**

Purpose: The aim of the current study is to investigate potential associations among Long Non-coding RNA (LncRNA) H19 single nucleotide polymorphism (SNP) and Graves' ophthalmopathy susceptibility.

Methods: Five loci of LncRNA H19 SNPs (rs217727, rs2107425, rs2839698, rs3024270, and rs3741219) were genotyped by using TaqMan allelic discrimination in 139 Graves' disease patients and 55 Graves' ophthalmopathy patients.

Results: We found that heterozygotes (A/G) for rs3741219 of H19 gene was associated with an increased risk of Graves' ophthalmopathy ($p < 0.05$; OR = 1.704; 95% CI, 1.009-2.876) as compared with homozygotes for the major allele (A/A). Subjects who carried at least one polymorphic allele (homozygote or heterozygote for the minor allele) were more susceptible to Graves' ophthalmopathy ($p < 0.05$; OR = 1.992; 95% CI, 1.048-3.8788) than those homozygous for the major allele.

Conclusions: The H19 rs3741219 SNPs polymorphism is significantly associated with Graves' ophthalmopathy, and LncRNA H19 SNPs may be involved in the development of Graves' ophthalmopathy.

Abstract No.: 200901

Biomechanical Analysis of Orbital Development: A Finite Element Analysis by an Experimentally Validated Model

First Author: Mingyang **WANG**

Co-Author(s): Dongmei **LI**

Purpose: Constructing orbital finite element models capable of simulating the development process and analyzing the biomechanical mechanism.

Methods: Four normal orbits from one-month-old New Zealand white rabbits were used in this study. Toshiba Aquilion Prime was used to determine the computed tomography scan and direct orbital pressure manometry using an improved manometer based on the TSD104 pressure sensor transducer. The finite element analysis was conducted using the ANSYS Workbench platform.

Results: The biomechanics of each orbital wall improved to varying degrees as the rabbit orbit grew and developed. The von Mises stress in both rabbits initially concentrated at the lower edge of the posterior orbital wall, expanded to the entire orbit, and ultimately became more significant in the biomechanics of the region that consisted of the posterior orbital and superior orbital walls. During the expansion phase, the biomechanics of both rabbits gradually developed from the nasal side to the occipital side for radial displacement. It is evident that the finite element model are a good fit for simulating the physiological development of the rabbit orbit. The maximum radial displacement and maximum von Mises stress appeared two plateau periods during the development of the orbit, at 50–60 days and 80–90 days.

Conclusions: This study establishes a theoretical foundation for the creation of a biomechanical model of human orbital development by offering the first finite element model to simulate orbital development and analyze the biomechanical mechanism of orbital pressure on orbital development.

Abstract No.: 203723

Can Corneal Ulcers Be the Underlying Cause of Dacryocystitis?

First Author: Ravi **RANJAN**

Co-Author(s): Rohan **RAJ**, Kumari **RUPAM**

Purpose: To investigate the prevalence of Dacryocystitis in patients with infective corneal ulcers.

Methods: Included 58 patients with infective corneal ulcer in one eye and no H/O any lacrimal pathology. The presence or absence of Dacryocystitis was determined by lacrimal syringing. Corneal ulcers were diagnosed and treated based on clinical manifestations, corneal scraping, microscopic examinations, and bacterial/fungal cultures. Dacryocystitis was treated with medication and DCR.

Results: Out of 58 Patients with corneal ulcers, 5 patients developed Dacryocystitis. One case of Dacryocystitis was recovered with medication. The four patients needed DCR surgery. Data Interpretation found that Patients with corneal ulcers are over 65 times more likely to develop Dacryocystitis than the general population.

Conclusions: The study indicates that Dacryocystitis is closely associated with infective corneal ulcers. In clinical practice and based on existing literature, it is known that corneal ulcers threaten vision. Management of lacrimal disorders is generally successful but requires careful attention. Understanding the relationship between these two conditions is crucial for day-to-day practice.

Abstract No.: 203440

Case Report: Delayed Intraorbital Lipid Encapsulation Following Complex Ocular Trauma from a High-Pressure Hydraulic Oil Hose Rupture

First Author: Zhixin **GUAN**

Co-Author(s): Jiang **GUANGWEI**, Li **SHOUQING**, Liu **SHU**

Purpose: Diagnosis and Surgical Challenges of Delayed Intraorbital Subcutaneous Fat Droplet Encapsulation Following Ocular Trauma.

Methods: A rare case of ocular trauma is reported, detailing the diagnostic and therapeutic process along with a 1.5-year follow-up experience.

Results: A 54-year-old male sustained left ocular and facial trauma from a ruptured hydraulic oil hose on May 11, 2023. Initial examination revealed questionable light perception, periorbital swelling, eyelid lacerations, total hyphema, corneal edema, a fixed 5-mm pupil, and non-visible fundus. Ocular ultrasound and CT showed periocular emphysema and heterogeneous hypoechoic areas. The patient underwent immediate eyelid repair and subsequent vitrectomy. He represented on November 15 with persistent eyelid swelling. Imaging suggested lipid deposition. Surgical exploration revealed multiple cystic masses containing oil-like fluid. Histopathology confirmed non-epithelialized cysts with chronic inflammation and foreign-body reaction.

Conclusions: The hydraulic oil gun operates via high-speed injection, whereby fine lipid droplets—carrying substantial kinetic energy—may penetrate the subcutaneous tissue of the eyelid alongside a small amount of gas. These intraorbital lipid droplets can become encapsulated by fibrous tissue, forming cystic masses that cause persistent eyelid irritation. Due to the similar imaging characteristics between lipid materials and gas, early definitive diagnosis through imaging alone is challenging. Thus, correlation with trauma history and clinical evolution is essential. Surgical intervention is required to remove the oil and necrotic tissue; however, complete excision is often

difficult to achieve in a single procedure, and multiple surgeries may be necessary depending on the patient's condition.

Abstract No.: 200126

Case Series Report: Intraorbital Metal Shot Injuries

First Author: Son **BUI**

Co-Author(s): Giang **BUI THI HUONG**

Purpose: To describe the clinical characteristics and imaging features of patients with intraorbital metal shot injuries.

Methods: A case series study on 06 eyes of 06 patients diagnosed with intraorbital metal shot injuries was examined and treated at the Eye Trauma Department in Vietnam National Eye Hospital from March 2025 to April 2025.

Results: Of the 06 patients reviewed in the study, 100% were male. The mean age at presentation was 16 (range 9 - 38). Domestic accidents were the most common cause of trauma (84%). 50% of cases were related to the use of a slingshot. All of the patients presented within 1 week of injury. The entrances were skin (33%) and conjunctiva (67%). The major clinical characteristics were eyelid and conjunctival congestion and edema (100%), retinal injuries (84%), vitreous hemorrhage (67%), and proptosis (50%). Optic nerve injuries occurred in 01 case (16%). 50% patients had no light perception VA. Computerized tomography (CT) features showed sphere-shaped objects with high density (4000 HU) and different sizes (ranging from 6 to 9mm). Related orbital injuries were orbital fractures, soft tissue infiltrations, orbital hemorrhage or bubble air...

Conclusions: Intraorbital metal shot injuries have various and complicated clinical manifestations and can lead to severe complications that need early diagnosis and prompt treatment. CT scan plays an important role in diagnosis, treatment, and prognosis.

Abstract No.: 205006

Case Series of Rhino-Orbital Mucormycosis Presenting as Orbital Apex Syndrome

First Author: Chiu Ling **LIM**

Co-Author(s): Azyln Azwa **JASMAN**, Nurliza **KHALIDDIN**, Andrew **LOW**, Nik Nazihah **NIK AZIS**, Poh Fong **SHE**

Purpose: To report three cases of rhino-orbital mucormycosis infection in immunocompromised patients

Methods: Case Series

Results: Case 1: A 6-year-old girl with B-cell Acute Lymphoblastic Leukaemia (B-ALL) presented with fever and left eyelid swelling for one week. Examination of the left eye(LE) revealed no perception of light, orbital apex syndrome, conjunctiva injection and chemosis.

LE fundus showed inferior hemiretinal artery occlusion with choroidal abscess. Case 2: A 64-year-old lady with diabetic ketoacidosis presented with fever and left facial numbness. LE vision was counting finger. She had LE orbital apex syndrome with loss of sensation over the forehead. In addition, she had cornea ulcer and endogenous endophthalmitis. Case 3: A 67-year-old diabetic gentleman presented with LE blurring of vision, left facial swelling, pain and numbness. Examination revealed LE orbital apex syndrome, 5th and 7th cranial nerve palsies, hand movement vision and exposure keratopathy. The fundus view was hazy but appeared flat. All patients presented with orbital apex syndrome and underwent functional endoscopic sinus surgery (FESS). A maxillary sinus mass was found in case 1, while septal eschars were observed in cases 2 and 3 and debridement was performed. Histopathology showed necrotic tissue with fungal hyphae, and *Rhizopus* species were cultured in cases 1 and 2. All patients received intravenous Amphotericin B. In addition, case 2 received intravitreal and retrobulbar Amphotericin B plus oral posaconazole. Unfortunately, all patients succumbed to the illness within three weeks of diagnosis.

Conclusions: Rhino-orbital mucormycosis is a life-threatening fungal infection that requires early diagnosis and immediate treatment to improve patient outcomes.

Abstract No.: 202852

Causes of Tearing in Patients With Chemotherapy: Meibomian Gland Dysfunction Versus Lacrimal Drainage Obstruction

First Author: Hyungyu **LEE**

Co-Author(s): Sehyun **BAEK**, Hwa **LEE**

Purpose: To determine the causes of tearing in patients with a history of chemotherapy, we evaluated their meibomian glands and lacrimal drainage system.

Methods: We retrospectively analyzed 34 eyes of 17 patients (mean age, 62.4±14.8 years) treated with chemotherapy for 13.8±7.6 months. Regimens included TS-1 (58.8%), docetaxel (23.5%), paclitaxel (11.8%), and 5-fluorouracil (5.9%). Evaluations comprised TBUT, FDDT, punctal examination, syringing and probing, dacryoscintigraphy, and LipiView® meibography; epiphora onset was timed from chemotherapy initiation.

Results: Epiphora began 9.1–10.9 months after therapy; 52.9% reported tearing within 3 months and 64.7% within 6 months. Mean TBUT was 5.4±2.6 s. FDDT was ≤grade 1 in 29.4% (mean 1.91±0.87). Puncta were normal in 70.6%, stenotic in 26.5%, and obstructed in 2.9%. Syringing showed total regurgitation in 29.4%, partial in 55.9%, and none in 14.7%. Probing revealed soft stops in 11.8% and hard stops in 88.2%. Dacryoscintigraphy was normal in

17.6%, demonstrated post-sac delay/obstruction in 23.5%, and pre-sac delay/obstruction in 58.8%. Mean meiboscores were 2.15±0.86 (upper) and 2.53±0.79 (lower), with a significant upper–lower difference ($P=0.004$).

Conclusions: LDS obstruction or delayed transit is a principal driver of chemotherapy-associated epiphora. Given the high prevalence of meibomian gland loss, reflex tearing from MGD must also be considered to guide comprehensive, effective management.

Abstract No.: 201318

Challenging Recurrence: Lower Eyelid Basal Cell Carcinoma Reconstruction With Mustardé Rotational Flap

First Author: Navpreet **KAUR**

Co-Author(s): Arti **SAREEN**, Dr.Ram Lal **SHARMA**, Kalpana **SHARMA**

Purpose: To describe the diagnosis, management, and reconstructive outcome of a recurrent lower eyelid basal cell carcinoma (BCC) treated with wide excision and Mustardé rotational flap in a previously irradiated patient.

Methods: A 71-year-old female with a history of radiotherapy for right lower eyelid basal cell carcinoma presented with a recurrent ulcerative lesion involving the lower eyelid and adjacent cheek. Preoperative evaluation included slit-lamp examination, fundus evaluation, systemic investigations, and computed tomography of the orbit and paranasal sinuses to assess local extension and exclude bony involvement. Under general anesthesia, a wide local excision of the lesion was performed with 4 mm tumor-free margins, followed by reconstruction using a Mustardé cheek rotational flap in the same sitting. A temporal curvilinear incision was made, beginning in the lateral canthus and extended inferiorly to the preauricular fold. The Mustardé flap was elevated in the subcutaneous plane, rotated medially to cover the defect and secured using non-absorbable interrupted sutures. A temporary tarsorrhaphy was performed to support flap integration and protect the cornea.

Results: The excised lesion measured 4.5 × 3.4 × 0.9 cm with clear margins. Postoperatively, the flap demonstrated excellent viability and wound apposition without evidence of infection or flap necrosis. Functional eyelid closure was preserved, and cosmesis was satisfactory. No early postoperative complications were noted.

Conclusions: The Mustardé rotational flap provides an effective method for reconstructing multicentric large lower eyelid defects after BCC excision. It offers excellent functional and cosmetic outcomes in a single-stage procedure.

Abstract No.: 206873

Chloroma vs. Eosinophilic Granuloma: A Diagnostic Challenge in Pediatric Bone Lesions

*First Author: Christian Patrick **ANTONIO***

*Co-Author(s): Gary John **MERCADO**, Camille **SISON***

Purpose: Chloromas, also known as granulocytic or myeloid sarcomas, are rare extramedullary tumors of immature myeloid cells that can mimic other lesions such as eosinophilic granuloma. Their subtle clinical and radiologic features make diagnosis challenging, emphasizing the need for high clinical suspicion and immunophenotyping.

Methods: Case Summary: A 3-year-old male presented with a progressively enlarging left orbital mass two months after minor head trauma. The mass displaced the globe inferiorly. CT imaging showed a heterogeneously enhancing extraconal mass with osteolysis of the superior orbital rim and periorbital extension, initially suggesting a granulomatous histiocytic lesion. MRI a month later revealed new lesions in the bilateral frontal bones with dural and scalp involvement. Skeletal survey identified multiple lytic lesions in long bones and feet, further supporting a provisional diagnosis of eosinophilic granuloma. An anterior orbitotomy and biopsy of the orbital mass however, revealed a white, rubbery lesion inconsistent with Langerhans cell histiocytosis. Additional workup, including histopathology, bone marrow aspiration with flow cytometry, and 24-hour urine vanillylmandelic acid was performed to reach a definitive diagnosis. Prophylactic vincristine was started while awaiting biopsy results to manage symptoms.

Results: The bone marrow aspiration histopathology revealed round cell neoplasm that favor myelophthisis. Flow cytometry was negative for overt acute leukemic blast cell populations, however immunohistochemistry staining revealed positive CD34, CD117, CD68, and Ki67 40% proliferative index, which supports the diagnosis of Chloroma.

Conclusions: Granulomatous bone lesions in children pose significant diagnostic challenges due to overlapping presentations. Prompt diagnosis is essential for treatment

Abstract No.: 208050

Choroidal Thickness Changes in Immunoglobulin G4-Related Ophthalmic Disease: A Territory-Wide Study

*First Author: Jeffrey Kai Chun **MAK***

*Co-Author(s): Carmen Kar Mun **CHAN**, Andy Chi On **CHENG**, Joyce Kar Yee **CHIN**, Kelvin Kam Lung **CHONG**, Andrew Kin Ting **KUK**, Chi On **KWONG**, Kenneth Ka Hei **LAI**, Wendy Pui Fan **LAM**, Polin **LEOW**, Kenneth Kai Wang **LI**, Chi Pui **PANG**, Clement Chee Yung **THAM**, Ngai **YANG**, Nelson Kwok Foo **YIP**, Wilson Wai Kuen **YIP**, Alvin Lerrmann **YOUNG**, Hunter Kwok Lai **YUEN***

Purpose: To evaluate the changes and clinical implications of choroidal thickness in IgG4-ROD patients.

Methods: This cross-sectional matched case-control comparison study included patients managed by hospitals covering the entire publicly funded ophthalmology service in Hong Kong, and 2 private eye centers. Choroidal thickness was measured using the swept-source optic coherence tomography angiography. IgG4-ROD disease parameters include age of disease onset, severity of IgG4-ROD, number of extraocular organ involved, and the pre-treatment serum IgG4 level.

Results: Forty-six worst-affected eyes from 46 Chinese patients with IgG4-related disease (36 IgG4-ROD) were analyzed. Choroidal thickness measurements were significantly thinner in IgG4-ROD when compared to healthy subjects, but comparable to the eyes of Immunoglobulin G4-related disease (IgG4-RD) patients. The choroidal thickness measurements at Outer superior, Inner superior, and Inner inferior were negatively correlated with the age of IgG4-ROD onset. The choroidal thickness measurements at the Inner inferior and Outer inferior were negatively correlated with the number of extraocular organ involvement.

Conclusions: Our study found that the choroidal thickness measurements in IgG4-ROD eyes were thinner than the healthy subject's eyes, but comparable to the eyes of IgG4-RD patients. Several hypotheses are proposed to explain the choroidal thickness changes in IgG4-ROD patients. The mechanism of choroidal thickness changes in IgG4-ROD patients should be further explored.

Abstract No.: 200423**Clinical Manifestations and Treatment Modalities of Dysthyroid Optic Neuropathy in Patients With Thyroid Eye Disease in a Tertiary Eye Center in Thailand***First Author: Tanunya PIMMA**Co-Author(s): Mingkwan LUMYONGSATIEN, Paphitchaya TEMPHATTHARACHOK, Sunsern WATTANAPHANICH***Purpose:** To investigate the clinical characteristics, treatment modalities, and visual outcomes in patients with dysthyroid optic neuropathy (DON).**Methods:** Medical records of DON patients treated at a single tertiary eye center between 2018 and 2024 were retrospectively reviewed. Collected data included clinical characteristics, visual acuity (VA), Clinical Activity Score (CAS), and proptosis at baseline and after treatment. Treatment modalities were categorized into four groups: (1) intravenous methylprednisolone (IVMP), (2) orbital decompression (OD), (3) radiation therapy (RT), and (4) immunosuppressive therapy (IMT).**Results:** A total of 40 patients (48 eyes) were included. 27.5% were male. The mean age was 56.3 ± 11.9 years, and the mean CAS was 2.88 ± 1.45 . Most patients (87.5%) had abnormal thyroid status, and 92.5% presented with decreased vision. All received IVMP; of these, 24 underwent OD, 11 received RT, and 12 received IMT. A favorable response was observed in 57.5% of patients treated with IVMP alone. Older age (OR: 1.07, 95% CI: 1.01–1.13, $p < 0.05$) and poorer baseline VA (OR: 4.76, 95% CI: 1.64–13.8, $p < 0.001$) were significant predictors of treatment failure in the IVMP group. The average number of treatment modalities administered per patient was 2.0 ± 0.95 . Mean VA (logMAR) significantly improved from 1.29 ± 0.70 to 0.32 ± 0.39 (mean difference: 0.97 ± 0.79 ; 95% CI: 0.74–1.20, $p < 0.001$).**Conclusions:** Approximately 60% of Thai patients with DON responded to IVMP, and most required two or more treatment modalities. These findings highlight the need for additional therapies and a multidisciplinary approach, along with risk stratification to optimize visual outcomes.**Abstract No.: 200314****Clinical Outcomes of Maximal Levator Resection Versus Frontalis Sling in Patients With Congenital Ptosis***First Author: Chayanat OUIJALERN**Co-Author(s): Mingkwan LUMYONGSATEIN***Purpose:** To compare the clinical outcomes of maximal levator resection (MLR) versus frontalis sling (FS) procedures in the management of severe congenital ptosis with poor levator function.**Methods:** This retrospective study included 50 patients with severe congenital ptosis and poor levator function who underwent surgical correction at Mettapracharak Hospital (July 2014–July 2023). Patients were divided into two groups: Group 1 (29 patients) underwent MLR, and Group 2 (21 patients) received FS. Outcomes were assessed based on margin reflex distance 1 (MRD1), palpebral fissure height, levator function, lagophthalmos, postoperative complications, and recurrence rates.**Results:** Preoperatively, mean levator function was comparable ($P=0.24$). At 12 months postoperatively, mean MRD1 values were similar between the groups (MLR: 2.62 ± 0.94 mm; FS: 2.64 ± 1.19 mm; $p=0.94$). Group 1 demonstrated significantly higher rates of lagophthalmos (69.0% vs. 38.1%, $p=0.044$); conversely, abnormal eyelid contour was more common in Group 2 (19.0% vs. 3.4%). Exposure keratopathy was more prevalent in Group 1 (41.4%) than Group 2 (23.8%). Recurrence rates were similar between groups.**Conclusions:** Maximal levator resection is a viable alternative to the frontalis sling procedure for treating severe congenital ptosis with poor levator function, offering comparable functional outcomes and avoiding graft-related complications. However, increased postoperative lagophthalmos in MLR underscores the need for careful patient selection and vigilant follow-up.**Abstract No.: 204783****Clinical Profile of Extraocular and Adnexal Presentation of Micobacterium Tuberculosis***First Author: Mukti MITRA**Co-Author(s): Golam HAIDER, Riffat RASHID, Sadia SULTANA***Purpose:** To describe the Clinical profile of extraocular and adnexal presentation of Micobacterium tuberculosis and to evaluate their outcome of management.**Methods:** In this prospective interventional case series, 38 patients (Aged 8 years to 52 years) of poor socioeconomic background presented with orbital and adnexal tuberculosis from January 2010 to December 2024. Among them 10 patients presented with proptosis and 13 patients had non-healing ulcer of lid and adnexa, 15 patients with abscess in the eyelid and periocular region.**Results:** Total patients were 38. Male were 18(47.36%) and female 20(52.64%). Orbital tuberculosis was in 10 (26%), lid and adnexal tuberculosis 28 (74%). Abscess in levator and superior rectus complex was found in one patient presented with acute ptosis. Histopathology revealed caseating granulomatous inflammation consistent with tuberculosis. Patients were treated with anti-tubercular drugs for nine months to one year. Clinical presentations improved gradually after

starting of anti-tubercular drug. One patient showed recurrence. Systemic tuberculosis was found in one patient, presented with acute proptosis with lung abscess, later died from disseminated tuberculosis.

Conclusions: Clinical presentation of orbital and adnexal tuberculosis is wide spectrum. Diagnosis is sometimes delayed. It is rarely associated with systemic tuberculosis specially in endemic zone and overcrowded areas. So high index suspicion is very vital to save life.

Abstract No.: 204122

Combined Gold Weight Implantation and Lateral Tarsal Strip for Paralytic Ectropion With Exposure Keratopathy: A Case Report

First Author: Brenda HAYATULHAYA

Purpose: To present a case of paralytic ectropion complicated by exposure keratopathy and a recurrent corneal ulcer, which was successfully managed with a combination of gold weight implantation and lateral tarsal strip procedure.

Methods: A case report focuses on a patient with paralytic ectropion and lagophthalmos that led to corneal ulceration. Clinical evaluation included ocular surface examination, eyelid position assessment, and corneal staining. Surgical intervention consisted of upper eyelid gold weight implantation to improve eyelid closure and lateral tarsal strip procedure to correct lower eyelid laxity. Postoperative outcomes were assessed based on eyelid function, corneal surface healing, and recurrence of exposure-related complications.

Results: Following surgery, there was a significant improvement in eyelid closure and apposition. The gold weight implant enabled adequate passive eyelid closure, while the lateral tarsal strip addressed horizontal lid laxity, restoring proper alignment between the eyelid and globe. The corneal ulcer healed completely during the follow-up period, and no recurrence of exposure keratopathy was observed. Cosmetic outcome was also satisfactory, with minimal implant visibility and good patient tolerance.

Conclusions: The combined approach of gold weight implantation and lateral tarsal strip procedure provides effective anatomical and functional rehabilitation in paralytic ectropion with exposure keratopathy. This technique ensures corneal protection, promotes ulcer healing, and prevents further ocular surface complications, making it a reliable treatment option for facial nerve palsy-related eyelid dysfunction.

Abstract No.: 201039

Comparison of Lower Eyelid Complications Among Surgical Approaches for Orbital and Zygomaticomaxillary Fractures: A Network Meta-Analysis

First Author: Yu-yen CHEN

Purpose: This network meta-analysis aimed to evaluate and compare the risks of lower eyelid complications—ectropion, entropion, scleral show, and postoperative scarring—associated with four surgical approaches (subciliary, subtarsal, infraorbital, and transconjunctival) for orbital and zygomaticomaxillary fracture repair.

Methods: A systematic search of PubMed, Embase, and Cochrane databases identified relevant studies published between January 1, 1990, and August 10, 2025. Twenty-seven eligible studies involving 2,790 patients were included. Direct pairwise meta-analyses and network meta-analyses were conducted to compare complication risks among the approaches. Sensitivity analyses were performed to assess the influence of individual studies, and inconsistency tests were applied to evaluate model robustness.

Results: The subciliary approach was associated with the highest risk of ectropion and scleral show. The transconjunctival approach had the lowest risk of ectropion and scarring but the highest risk of entropion. The subtarsal approach had the lowest risk of scleral show, while the infraorbital approach had the highest risk of postoperative scarring. Sensitivity analyses confirmed consistent rankings, and no significant inconsistency was detected.

Conclusions: This study provides updated, comprehensive evidence to guide the choice of surgical approach for orbital and zygomaticomaxillary fracture repair. Surgeons should balance operative exposure, cosmetic outcomes, and complication risk, and communicate these trade-offs clearly with patients to optimize decision-making.

Abstract No.: 200224

Complications Following Dermal Fat Grafting in Upper Sunken Eyelid Correction

First Author: Dieu Huong DUONG

Co-Author(s): Thu Hien NGUYEN THI

Purpose: To highlight and review potential complications following dermal fat grafting in upper eyelid blepharoplasty through analysis and management of two clinical cases.

Methods: We retrospectively reviewed two female patients who presented with significant complications after upper eyelid blepharoplasty combined with dermal fat grafting performed at another clinic. Complications included eyelid crease asymmetry, hypertrophic fat grafting, redundant skin, multiple

eyelid folds, skin adhesions, and ptosis. Both patients underwent detailed evaluation and tailored surgical revision at our clinic, involving reconstruction of eyelid creases, excision of hypertrophic fat, correction of redundant tissue, and ptosis repair.

Results: Postoperative assessments at 1 week and 1 month demonstrated marked improvement in eyelid crease symmetry, eyelid closure, and ptosis correction. The eyelid contours remained stable at 1-month follow-up, and both patients expressed satisfaction with their improved functional and aesthetic outcomes.

Conclusions: Dermal fat grafting in upper sunken eyelid correction, despite its popularity, carries risks of significant complications if inadequately performed. Awareness of potential adverse outcomes, careful preoperative assessment, precise surgical techniques, and prompt management are critical to achieving optimal cosmetic and functional results.

Abstract No.: 207348

Correlating the Implant Diameter With Custom Ocular Prosthesis Weight Following Evisceration: A Prospective Randomized Control Trial

First Author: Tarjani Vivek **DAVE**

Co-Author(s): Sanjana M

Purpose: This prospective randomized controlled interventional study aimed to evaluate the relationship between orbital implant size and prosthetic outcomes following evisceration, focusing on aesthetic and volumetric results with 16 mm, 18 mm, and 20 mm implants.

Methods: Conducted at a single center, the study enrolled consecutive patients aged over five years who underwent evisceration between July 17, 2017, and July 17, 2018. Implant sizes were randomly assigned, and patients were followed postoperatively for up to one year. Primary outcomes included correlations between implant diameter and prosthetic weight/thickness. Secondary outcomes assessed complications (e.g., extrusion, migration) and volumetric issues like ptosis, enophthalmos, superior sulcus deformity, and lower eyelid laxity.

Results: Of the 90 patients enrolled, 58 completed one-year follow-up. The mean age was 25.1 ± 13 years. Common indications for evisceration included phthisis bulbi (65.5%), disfigured blind eye (18.9%), and staphyloma (15.6%). Implant sizes were distributed as 16 mm (27.7%), 18 mm (41.1%), and 20 mm (31.1%). Complications included implant extrusion (2.2%) and migration (4.4%). Volumetric issues observed were lower lid laxity (62.2%), enophthalmos (40%), ptosis (16.6%), and superior sulcus deformity (35.5%). No correlation was found between implant size and prosthesis weight or thickness. However, 20 mm implants yielded significantly better volumetric

outcomes than 16 mm ($p=0.001$) and 18 mm ($p=0.01$) implants.

Conclusions: While implant size did not influence prosthesis weight or thickness, the 20 mm implant provided superior cosmetic and volumetric outcomes. Long-term follow-up showed worsening outcomes in smaller implant groups.

Abstract No.: 207228

Decoding Necrotizing Fasciitis in Sweet's Syndrome: When Flesh Turns Foe

First Author: Tarjani Vivek **DAVE**

Co-Author(s): Sumer **DOCTORR**, Prerna **SINHA**

Purpose: To describe the clinical presentation, diagnostic challenges, and management outcomes of periocular necrotizing Sweet's syndrome (NSS), a rare variant of Sweet's syndrome that clinically simulates necrotizing fasciitis (NF).

Methods: We retrospectively reviewed three patients presenting with acute periocular inflammation, pain, and necrosis, initially suspected to have NF. Clinical features, hematologic associations, surgical findings, and microbiological and histopathological evaluations were analyzed. All patients underwent limited debridement for diagnostic confirmation. Collagen sheet grafts were used for wound coverage, and outcomes were documented.

Results: One patient had isolated classical Sweet's syndrome, while two were subsequently diagnosed with hematologic disease. All three demonstrated features consistent with NSS. Initial surgical exploration with microbiological cultures excluded infection, and biopsy confirmed neutrophilic dermatosis consistent with Sweet's syndrome. Collagen sheet grafting promoted rapid re-epithelialization in two patients, yielding cosmetically favorable results. In one patient with full-thickness eyelid margin necrosis, collagen coverage alone was inadequate, leading to an acquired eyelid coloboma. Importantly, none of the patients required extensive surgical excision as would be indicated in NF, and all improved with systemic corticosteroid therapy.

Conclusions: Periocular NSS is a rare but critical differential diagnosis of NF, as therapeutic approaches differ dramatically. While NF mandates urgent aggressive debridement, NSS responds to corticosteroids and conservative surgery. Accurate recognition, histopathological confirmation, and judicious use of collagen grafting can preserve eyelid structure and function while avoiding unnecessary mutilating procedures.

Abstract No.: 201283

Deep-Learning Method for the Diagnosis and Classification of Orbital Blowout Fracture Based on Computed Tomography

First Author: Hyun Jin **SHIN**

Purpose: The aim of this study is to develop deep-learning models for detecting and classifying blowout fracture (BOF) using orbital computed tomography (CT) image data.

Methods: This retrospective study investigated 1264 orbital CT images from 233 patients. These images were classified as either normal or BOF, and then categorized based on fracture site: (1) medial, (2) inferior, and (3) inferomedial. The fractures in the same set of BOF images was then divided according to when they occurred: (1) new and (2) old. Deep-learning models were then developed using Neuro-T, a medical artificial intelligence builder software, and evaluated according to the following metrics: (1) accuracy, (2) precision, (3) sensitivity, (4) F1 score, and (5) area under the receiver operating characteristic curve (AUC).

Results: This study analyzed 1,264 facial CT from 233 patients with multiple CT slices taken from each patient in various coronal views (mean age: 37.5 17.9 years; 79.8% male—186 subjects). Based on these data, 3 deep-learning models were developed for 1) BOF detection (accuracy 99.5%, PPV 99.2%, sensitivity 99.6%, F1 score 99.4%, AUC 0.9999), 2) BOF location (medial, inferior, or inferomedial; accuracy 97.4%, PPV 92.7%, sensitivity 89.0%, F1 score 90.8%), and 3) BOF timing (accuracy 96.8%, PPV 90.1%, sensitivity 89.7%, F1 score 89.9%). In addition, the BOF detection model had an AUC of 0.9999.

Conclusions: Deep-learning models developed with Neuro-T (Neurocle Inc, Seoul, Republic of Korea) can reliably diagnose and classify BOF in CT, distinguishing acute from old fractures and aiding clinical decision-making.

Abstract No.: 200453

Development and Clinical Validation of Personalized Finite Element Analysis for Dysthyroid Optic Neuropathy

First Author: Pengsen **WU**

Co-Author(s): Guiqin **LIU**

Purpose: This study aims to develop and validate a finite element analysis (FEA) model of dysthyroid optic neuropathy (DON) to compare the biomechanical behavior between patients undergoing conventional or augmented orbital decompression surgery, with potential clinical implications for surgical planning.

Methods: The elastic moduli of orbital tissues were quantified using atomic force microscopy. FEA models were established using MRI data from patients with myopathic TED. Pre-disease, pre-operative, and

postoperative FEA models were developed for both the conventional orbital decompression group and the augmented group, in which the posteromedial floor and the orbital process of the palatine bone were additionally removed to analyze the stress distribution and displacement of the optic nerve, eyeball, and orbital wall. A retrospective clinical analysis was performed to validate the biomechanical analysis results.

Results: The FEA results reveal that DON patients experience higher stress on the optic nerve, eyeball, and orbital wall than healthy individuals, mainly concentrated at the orbital apex. Post-operation, the stress on the optic nerve was significantly reduced in both groups. In addition, postoperative stress on the optic nerve was significantly lower in the augmented group than the conventional group. The clinical results demonstrate that patients in the augmented group experienced significantly faster and more pronounced improvements in visual acuity and visual field.

Conclusions: The FEA shows that augmented orbital decompression surgery can alleviate stress more effectively, especially for the optic nerve, which was validated by clinical analysis. This developed FEA model of DON may facilitate determining the appropriate surgical procedure for orbital decompression.

Abstract No.: 206006

Does Dacryocystitis Influence Dacryocystorhinostomy Outcomes? A Histology-Based Analysis

First Author: Sasikant **LEELAWONGS**

Co-Author(s): Nichthida **TANGNUNTACHAI**, Thanatporn **THREETONG**

Purpose: To compare the histological findings of the lacrimal sac between patients presented with dacryocystitis and epiphora and their anatomical and functional outcomes after dacryocystorhinostomy.

Methods: A retrospective cohort of the patients with nasolacrimal duct obstruction (NLDO) undergoing dacryocystorhinostomy (DCR) with lacrimal sac biopsy and histopathological examination (March 2024 – March 2025). Patients were stratified into three groups: acute dacryocystitis, chronic dacryocystitis, and isolated epiphora. Histopathological findings of inflammation and fibrosis were compared across groups and correlated with anatomical and functional success rates.

Results: The study included 28 eyes from 24 patients (mean age: 65.3 years; 95.8% female), stratified into acute dacryocystitis (n=3), chronic dacryocystitis (n=5), and isolated epiphora (n=30). The baseline characteristics were non-significant across groups. Histopathology revealed a predominance of chronic inflammation in all groups (66.7%, 60% and 65%, respectively; P=0.55). Fibrosis was consistently

observed in both subepithelial and deep stromal layers across all groups ($P=0.22$). All acute dacryocystitis notably contained amorphous stromal material suggestive of incomplete healing. At 6 months, the anatomical success rate was 100% in the acute and chronic dacryocystitis groups and 85% in the isolated epiphora group. Functional success was 100% in the acute and chronic groups and 95% in the isolated epiphora group. Neither anatomical nor functional success rates differed significantly among the three groups.

Conclusions: Anatomical and functional success rates did not differ significantly among the patients with acute dacryocystitis, chronic dacryocystitis and isolated epiphora. This outcome is consistent with comparable histopathological findings, which are characterized by chronic inflammation and fibrosis involving both subepithelial and deep stromal layers of the lacrimal sac.

Abstract No.: 206387

Ear To Eye: Auricular Cartilage Graft in Post-Blepharoplasty Ectropion

First Author: Ahdini Zulfiana **ABIDIN**

Co-Author(s): Darmayanti **SISWOYO**

Purpose: To report a surgical management of lower eyelid ectropion as post-blepharoplasty complication. The procedure involves strengthening the inferior tarsal plate using ear cartilages to restore the eyelid position.

Methods: A 43 years old female visited the outpatient clinic with red watery eyes after blepharoplasty in aesthetic clinic four months ago. Three months later, she had upper face lift and secretome injection at the same clinic hoping it would resolve. Physical examination revealed bilateral lower eyelid ectropion and lagophthalmos due to overexcised skin. Surgical correction was undertaken to address eyelid malposition and repair the ectropion. Skin graft was not performed due to reason of longer cosmetic improvement, during surgery we found that the skin was sufficient to return the position of eyelid margin. We harvested ear cartilages, sutured to the inferior tarsal plate, and fixated at the inferior orbital rim to support lid margin position. Lateral tarsal strip was done to tighten and stabilize lateral canthal tendon.

Results: Post-operative follow-up demonstrated significant improvement and function with restoration of normal eyelid apposition to the globe and stable eyelid contour. Improvement in cosmetic and resolved symptoms were reported by the patient.

Conclusions: This case highlights the importance of appropriate management of ectropion as post-blepharoplasty complications. The use of autologous cartilage grafts with lateral tarsal strip technique provides effective structural support and restores eyelid function.

Abstract No.: 202061

Ectopic Lacrimal Gland Combined With Cyst in the Nasal Conjunctiva

First Author: Zhaole **LI**

Co-Author(s): Zeyi **LI**, Cangeng **XU**

Purpose: To describe the clinical manifestation and pathological features of ectopic lacrimal gland combined with the cyst in the nasal bulbar conjunctiva.

Methods: A 43-year-old woman presented with a tumor in the nasal bulbar conjunctiva in her left eye that has exhibited for three years. A yellowish tumor measuring approximately 7×5 mm was observed. invaded the corneal limbus in the nasal conjunctiva, which was solidly elevated, bumpy, welldefined, and exhibited angiogenesis. Below the tumor, there was a translucent, thinwalled cyst. Both tumors were resected by microscopic surgical excision.

Results: Pathological Diagnosis illustrated that The hyperplastic lacrimal gland of the conjunctiva exhibited papillary hyperplasia in focal ducts. The cyst wall consisted of a bilayer columnar epithelial cells. The lacrimal duct cyst wall was composed of stratified columnar epithelial cell. The clinical features of the conjunctival ectopic lacrimal gland differed from those of the normal lacrimal gland. Furthermore, the ectopic lacrimal contained an excretory duct that formed a cyst.

Conclusions: The combination of an ectopic lacrimal gland and a lacrimal ductal cyst in the nasal conjunctiva is rare. Thus, pathological diagnosis is necessary to confirm the diagnosis.

Abstract No.: 200177

Effective of Management and Outcome of Orbital Cellulitis With Periorbital Abscess in Pediatric: A Case Report

First Author: Yin **SOPHEAKBOTH**

Co-Author(s): Khov **PHARA**

Purpose: To report a case of orbital cellulitis and orbital abscess, which had rapidly developed over a period of 3 days after mild blunt trauma to frontal area.

Methods: A 12-year-old present with redness, severe pain and swelling over the right eye which had progressed rapidly over a period of 3 days after mild blunt trauma at frontal region. No medical and surgical history. VA OD 6/34, OS 6/6, IOP 18 /14. A Warm, hard fluctuant swelling over the right temporal frontal periorbital region associated with erythema and edema of the upper and lower eyelids. progress swelling to the left eye lid, proptosis&displaced downwards ,EOM restricted, RAPD (-), chemosis , injection, corneal clear, AC form and normal fundus. Blood test, eye US and CT scan brain and orbit were requested.

Results: US and CT scan showed a well-defined peripherally enhancing hypodense soft tissue. Fluid

collection measures up to 78x62x20mm in frontal superior right orbit and temporal-lateral orbit. Blood test showed high WBC. Hospitalization and with urgent incision and drainage of abscesses, result of gram stains and culture for antibiotic susceptible. Postoperatively, the patient was treated with intravenous ceftazidime because we detect Gram negative Bacilli and Metronidazole for 13 days along with topical Maxidrol and ibuprofen, paracetamol for pain and temperature controlled.

Conclusions: Early management and incision drainage guide by CT scan, to decrease the bacterial load and eliminate the focus, accelerating the healing process. Early detective of gram stains/culture revealed Gram negative Bacilli treated with intravenous ceftazidime, and dressing change every day.

Abstract No.: 205263

Efficacy and Future Directions of Targeted Neoadjuvant Therapy Combined With Orbital Decompression in Thyroid Eye Disease

First Author: Rong LU

Purpose: Thyroid eye disease (TED) is an autoimmune orbital inflammatory disorder linked to thyroid dysfunction, presenting with periorbital edema, proptosis, diplopia, and visual impairment. Conventional staged management has limited efficacy and high complication risks. This study aimed to propose a novel paradigm: TED-targeted neoadjuvant therapy (systemic biologics administered preoperatively to modulate the perioperative immune microenvironment and optimize outcomes).

Methods: A prospective single-center study included 20 consecutive patients with active, sight-threatening TED (EUGOGO Grade 6) who underwent endoscopic transnasal orbital decompression. The neoadjuvant cohort (n=20) received intravenous tocilizumab (8 mg/kg) preoperatively, with surgery performed ≤ 7 days post-infusion. The control cohort (n=20) comprised propensity-matched historical patients who underwent surgery alone. Outcome measures included intraoperative (mucosal edema [0-3 scale], blood loss, operative duration), postoperative (visual acuity [LogMAR], pattern-reversal VEP, Clinical Activity Score [CAS], proptosis reduction) indicators, and perioperative complication rates (safety).

Results: The neoadjuvant group demonstrated significantly reduced mucosal edema, decreased mean intraoperative blood loss, and shorter mean operative time compared to controls. Significant differences favoring the neoadjuvant group were observed in: (1) Visual improvement rate; (2) Magnitude of visual acuity gain; (3) Time to visual recovery, Clinical Activity Score (CAS) reduction was also significantly greater in the neoadjuvant group. No statistically significant difference in postoperative complication rates was observed between the two groups.

Conclusions: TED-targeted neoadjuvant therapy significantly optimizes intraoperative conditions and reduces procedural risks, accelerates postoperative visual function restoration and tissue recovery, and provides a clinically translatable «medical-surgical» integrated strategy for high-risk patients with active-phase TED.

Abstract No.: 200896

Efficacy of Tocilizumab in Refractory Graves' Orbitopathy From Real-World Clinical Practice: An Observational Study

First Author: Mingyang WANG

Co-Author(s): Dongmei LI, Honglei LIU, Tianyu ZHENG

Purpose: To evaluate the effectiveness of Tocilizumab in treating Thyroid eye disease (TED) that is resistant to conventional therapy.

Methods: This observational study at a tertiary care center included 79 Chinese TED patients, 15 of whom were pediatric patients, with 52 of these patients having moderate to severe active TED (all adult patients having steroid-resistant TED). Intravenous infusion of TCZ 8 mg/kg was given every 28 days for 4 months. Changes in visual acuity (VA), intraocular pressure (IOP), proptosis, clinical activity score (CAS), and thyrotropin receptor antibody (TRAb) levels throughout TCZ therapy were assessed at baseline (T0), the fifth month (T4), and follow-up (T5). Additionally, improvements in CAS by at least 2 points and CAS < 4 points at T4 and T5 were evaluated.

Results: Significant improvements were found in VA, IOP, proptosis, CAS, and TRAb levels in the adult group, and proptosis in the pediatric group at T5 ($P < .05$). Additionally, significant improvements were identified in TRAb levels and CAS (active TED at T0) in the pediatric group at T4 ($P < .05$). In the adult and pediatric group with active TED at T5, 71.4% and 60% experienced a decrease in CAS by ≥ 2 points, respectively; 89.3% and 60% achieved the response criterion of low activity disease (CAS < 4 points), respectively.

Conclusions: TCZ emerged as a valuable therapeutic option for Chinese patients with active, corticosteroid-resistant, moderate to severe TED.

Abstract No.: 207389

Euthyroid Orbitopathy: An Uncommon Presentation With Significant Management Implications

First Author: Inchara NAGARAJ

Co-Author(s): Narendran B S, Anunitha RAYAPURAJU

Purpose: To describe the clinical course and therapeutic response of thyroid eye disease (TED) in a euthyroid patient, highlighting diagnostic challenges and management strategies.

Methods: A 51-year-old male presented with right-sided eyelid edema, redness, and watering for three months. He had a history of short-term thyroxine therapy, discontinued two years earlier. On examination, proptosis measured 23 mm with Hertel's exophthalmometry. The Clinical Activity Score (CAS) was 3–4, with mild abduction restriction but no evidence of optic neuropathy. Magnetic resonance imaging (MRI) demonstrated bulky, homogeneously enhancing extraocular muscles, predominantly involving the recti.

Results: The patient was started on weekly intravenous methylprednisolone (500 mg) for six weeks, showing symptomatic improvement after four doses. Noncompliance led to recurrence with bilateral ocular symptoms. Steroid therapy was reinitiated in combination with mycophenolate mofetil (1 g twice daily), resulting in significant improvement and a reduction of CAS to 2.

Conclusions: Thyroid eye disease in euthyroid patients is rare and presents diagnostic and therapeutic challenges due to the absence of systemic thyroid dysfunction. This case underscores the importance of early recognition, sustained compliance, and combined therapy with corticosteroids and steroid-sparing agents such as mycophenolate mofetil to achieve disease control and prevent long-term morbidity.

Abstract No.: 206312

Evisceration Surprises: Lessons From Ten Years of Occult Intraocular Masses Detected After Evisceration

First Author: Kirthi **KOKA**

Co-Author(s): Md Shahid **ALAM**, Sonam **POONAM NISAR**, Priyanka **SAINI**

Purpose: To highlight the occurrence of unsuspected intraocular masses detected post-evisceration and to underscore the importance of thorough preoperative evaluation and imaging.

Methods: Retrospective analysis of histopathologically diagnosed unsuspected intraocular masses post-evisceration at a tertiary eye centre over the last ten years.

Results: Nine unsuspected intraocular masses were detected in 1,647 patients with a mean age of 37.67 ± 20.72 years post-evisceration. Initial diagnosis included a painful blind eye (4), panophthalmitis (2), phthisis bulbi (2), and perforated corneal ulcer(1). Preoperative ultrasound revealed retinal detachment (3), positive «T sign» (3), possible retinal detachment (2) and intraocular foreign body(1). Intraocular mass was not detected in any of the cases on ultrasound. Histopathological examination revealed adenocarcinoma, melanoma, retinoblastoma, squamous cell carcinoma, IgG4-related inflammatory disease, spindle cell lipoma, and hemangioblastoma

in one patient each, respectively. Adenomatous hyperplasia of the ciliary body was seen in two patients. Management strategies included exenteration (3), intraoperative conversion to enucleation (2), palliative care (1) and observation (3).

Conclusions: A thorough clinical evaluation and appropriate imaging should be performed prior to all cases undergoing evisceration to avoid inadvertent evisceration of occult masses. Enucleation should be the treatment of choice when malignancy cannot be excluded. Intraoperative vigilance and routine histopathology ensures timely detection and management, reducing the risk of recurrence and metastasis.

Abstract No.: 200147

Factors Affecting Etiology and En-DCR Outcomes in Nasolacrimal Duct Obstruction: A Retrospective Cohort Study

First Author: Xinyue **YU**

Co-Author(s): Wei **CHI**, Xuanwei **LIANG**

Purpose: Evaluate clinical data from patients with nasolacrimal duct obstruction (NLDO) to identify potential pathogenic causes and key factors that may influence the effectiveness of En-DCR (Endoscopic Dacryocystorhinostomy).

Methods: We conducted the study, including 1,140 NLDO eyes of 1,008 patients who underwent En-DCR. The symptoms and signs of the patients at admission, their previous diagnosis and treatment, and the results of NLDO-related examinations were recorded. Surgical outcomes were assessed by telephone follow-up at least 1 year after surgery, and multivariable analysis was used to identify risk factors associated with surgical outcomes.

Results: Among 1,008 participants, 362 (35.9%) snored or had sleep apnea, 211 (20.9%) had gastroesophageal reflux disease (GERD), and 195 (19.3%) had a family history of epiphora. Most of the 851 female patients were menopausal (80.5%). Additionally, 228 (26.8%) had a history of gynecologic disease, and 98 (11.5%) had undergone gynecologic surgery. The overall success rate for En-DCR was 95.6%. Independent key factors influencing outcomes included regurgitation on pressure over the lacrimal sac (ROPLAS) sign (OR = 0.25, 95% CI: 0.13-0.48, $p < 0.001$), and minimum diameter of lacrimal sac in dacryocystography (OR = 8.71, 95% CI: 2.57-29.57, $p < 0.001$).

Conclusions: Co-occurrence of NLDO with paranasal sinusitis and nasal polyps, chronic conjunctivitis, dry eye, gastroesophageal reflux disease, a family history of epistaxis, sleep apnea, or snoring is common. Furthermore, the ROPLAS sign and the minimum diameter of dacryocystography is ≤ 3 mm are the two most important influences of En-DCR outcomes.

Abstract No.: 201646

First Report of Orbital Abscess Caused by Emerging Zoonotic *Dirofilaria asiatica* sp. nov. in Thailand With Molecular Surveillance Supporting *Aedes albopictus* as a Potential Vector

First Author: Watsaporn PORNWATANACHAROEN
Co-Author(s): Pimkwan JARU-AMPORNAN, Kridtin JARUTATSANANGKON, Utarat KAEWUMPORN, Kanok PREATIVATANYOU, Patsharaporn T. SARASOMBATH

Purpose: This report presents the first unusual case of orbital abscess caused by the emerging zoonotic parasite *Dirofilaria asiatica* sp. nov. in Thailand, with molecular evidence of parasite presence in the patient's residence. Samples from the patient's household, pet cat, and local mosquitoes were analyzed for parasite DNA sequencing to confirm the findings.

Methods: An 80-year-old woman from Chonburi Province, Thailand, presented with a two-week history of right periorbital swelling and a palpable mass. Clinical evaluation and orbitotomy isolated a single parasite worm, characterized histologically and molecularly. A non-invasive home survey collected saliva from household members, the pet cat and local mosquitoes, for molecular detection and parasite DNA sequencing.

Results: Clinical suspicion of orbital cellulitis was confirmed by contrast-enhanced CT, revealing a rim-enhancing inferolateral orbital lesion. Orbitotomy exposed an encapsulated mass containing a live roundworm about 11 cm long. Histopathology showed nematode tissue with eosinophilic inflammation. PCR targeting the filarial cytochrome c oxidase subunit I gene and DNA sequencing identified *D. asiatica* sp. nov. (GenBank accession no. PP442028). The patient recovered after surgical excision. A home survey detected *D. asiatica* DNA in one *Aedes albopictus* mosquito from the household.

Conclusions: This case adds to the limited reports of *D. asiatica* infection in Thailand, highlighting its emerging role as a zoonotic parasite with ocular tropism. Combining molecular diagnostics with environmental surveys enhances diagnostic accuracy and understanding of transmission. Surgical excision remains the preferred treatment, while mosquito surveillance and vector control are essential preventive measures in endemic areas.

Abstract No.: 206941

Help, My Baby Has Only One Eye!

First Author: Natasha Jia Ying TAY
Co-Author(s): Farah ABU BAKAR, Hanida HANAFI, Rona Asnida NASARUDDIN

Purpose: To report a rare case of congenital optic nerve glioma (ONG) and to describe its multidisciplinary management.

Methods: Case report.

Results: Optic nerve gliomas (ONG) are usually benign in the pediatric population and can occur sporadically or may be associated with neurofibromatosis type 1. ONGs originate from pre-cortical optic pathways and are essentially slow-growing. We report a case of a newborn baby girl who was referred to Ophthalmology team at 4 hours of life for left eye swelling. Ocular examination revealed a soft, non-tender, 2x2cm swelling arising from the medial canthal region, displacing the globe supero-laterally. Magnetic Resonance Imaging (MRI) brain/orbit showed a left extraconal soft tissue tumour likely arising from superior oblique muscle with extension into anterior cranial fossa and ethmoidal sinus. Orbital tumour debulking was done at 1 year of life and histopathology examination (HPE) revealed low grade optic nerve glioma. The patient subsequently underwent eight cycles of Vincristine chemotherapy planned by the pediatric oncology team, followed by combined surgical excision by ophthalmology and neurosurgical team.

Conclusions: Congenital optic nerve gliomas are extremely rare and require a collaborative approach to management. This case emphasizes the importance of a multidisciplinary approach among ophthalmologists, pediatricians, radiologists, histopathologists and neurosurgeons for appropriate management and mitigation of disease progression.

Abstract No.: 206814

IgG4-Related Ophthalmic Disease With Atypical Histopathology: A Case Report of Necrotizing Vasculitis and CD8-Positive T-cell Predominance in a Patient With Multiple Autoimmune Comorbidities

First Author: Alejandra VALENZUELA
Co-Author(s): Joseph ARNOLD

Purpose: To highlight diagnostic challenges in IgG4-ROD with autoimmune comorbidities and atypical histopathology.

Methods: This is a case report of a patient with IgG4-Related Ophthalmic Disease with atypical histopathological presentation.

Results: A 54-year-old female presented with a one-year history of progressive bilateral eyelid swelling and bilateral lacrimal gland enlargement. Her medical history included autoimmune hepatitis, hypertension, hyperlipidemia, chronic kidney disease (CKD), type II diabetes mellitus with nephropathy, and Hashimoto's thyroiditis post-thyroidectomy. She reported unchanged vision, absent diplopia, but severe bilateral orbital pain and mechanical difficulty opening her eyelids, impairing her daily activities. Massively enlarged, hard lacrimal glands prompted MRI orbits and laboratory tests (ANCA, ACE, IgG4, LDH, SPEP).

Examination revealed marked bilateral superotemporal orbital masses, with palpable lacrimal glands (4 x 2.5 cm right, 3.5 x 2.5 cm left), inducing mechanical upper lid ptosis and proptosis. Orbital MRI confirmed bilateral lacrimal gland involvement with diffuse eyelid soft tissue thickening, enhancing with gadolinium. Serum IgG4 was elevated (220 mg/dL; reference <140 mg/dL), with normal CBC, ESR, and CRP. Suspecting IgG4-RD, a left anterior orbitotomy provided tissue diagnosis, revealing necrotizing vasculitis, dense CD8-positive T-cell infiltrate, and >50 IgG4-positive plasma cells per high-power field (IgG4/IgG ratio >40%), consistent with IgG4-ROD.

Conclusions: IgG4-RD should be considered in chronic dacryoadenitis with upper eyelid swelling in the context of an autoimmune history. Atypical histopathological features like necrotizing vasculitis and CD8-positive T-cell predominance highlight its heterogeneity. Histopathological confirmation and multidisciplinary management are essential, especially in complex cases, to optimize outcomes and minimize complications. Further studies are needed to understand atypical immune infiltrates and their therapeutic implications.

Abstract No.: 206573

Internal Carotid Artery – Inferior Petrosal Sinus Fistula in a Filipino Male: A Case Report

First Author: Nadine Leigh **CHU**

Co-Author(s): Marco **TUMALAD**

Purpose: To present a rare case of delayed-onset dural arteriovenous fistula following head trauma, emphasizing diagnostic challenges and the pivotal role of multimodal imaging in evaluation and diagnosis.

Methods: This case report details the patient's history, clinical findings, and multimodal imaging, including optical coherence tomography of the optic nerve head, magnetic resonance imaging with magnetic resonance angiography, and a six-vessel cerebral angiogram.

Results: A 53-year-old male presented with a 4-year history of progressive, non-pulsatile left eye proptosis, painless blurring of vision, eye redness, and heaviness, with onset 30 years after prior head trauma. Ocular examination revealed axial proptosis, dilated tortuous episcleral vessels, significant vision loss, and an elevated intraocular pressure relative to the fellow eye. Fundoscopy showed bilateral optic nerve cupping with notable retinal nerve fiber layer thinning on the left. MRI/MRA demonstrated suspicious dilatation of the left superior ophthalmic vein. A six-vessel digital subtraction angiogram confirmed a dural arteriovenous fistula between the left internal carotid artery and the inferior petrosal sinus, with predominantly antegrade drainage into the internal jugular vein.

Conclusions: Dural arteriovenous fistulas with predominantly antegrade venous drainage often follow an indolent course, lacking the overt clinical

signs typically associated with high-flow arteriovenous fistulas. This subtle presentation may obscure the underlying pathology, delaying diagnosis and increasing the risk of irreversible visual loss. Early recognition through a high index of suspicion and appropriate use of multimodal imaging is essential for timely intervention and preservation of vision.

Abstract No.: 207525

Intralesional Bleomycin for Orbital Venolymphatic Malformation

First Author: Kit May **CHOW**

Co-Author(s): Kala **SUMUGAM**

Purpose: To describe the usage of intralesional bleomycin injection after numerous failed sclerotherapy.

Methods: Retrospective case series.

Results: The first case is a 7 year old girl who presented with intralesional haemorrhage of left VLM. She was given three doses of sclerotherapy, but her VLM recurred 3 years later. She was then given three doses of intralesional bleomycin injection and her lesion reduced in size. The second case is a 37 year old pregnant lady who presented with painful worsening proptosis over the left eye. CT and MRI showed left retrobulbar VLM. As she was 29 week pregnant during presentation, she was given 1 month of oral steroids. Post-partum she was given two doses of sclerotherapy but subsequently defaulted follow up. Three years later, she presented again with a recurrence of VLM with optic nerve compression. After two doses of intralesional bleomycin injection, her lesion reduced in size and optic nerve function improved. The last case is a 56 year old man who presented with right painful proptosis due to intralesional bleed of right intraconal VLM. The patient was given intralesional bleomycin injection twice, and repeat MRI showed a smaller mass with lesser degree of proptosis.

Conclusions: Intralesional bleomycin injection is an effective treatment modality for VLM.

Abstract No.: 200899

Intraocular Pressure Changes After Combined Orbital Decompression and Glucocorticoid Treatment for Thyroid Eye Disease

First Author: Mingyang **WANG**

Co-Author(s): Dongmei **LI**

Purpose: To evaluate the change in the intraocular pressure (IOP) in subjects with Thyroid eye disease (TED) after orbital decompression (OD) with glucocorticoids (GCs).

Methods: Ninety-nine orbits of 76 patients with TED were retrospectively reviewed, with either OD (Group A), OD with intravenous glucocorticoids (i.v.GC) (Group B) or parabolbar GC (Group C) administration. The main

outcome measures included pre-and post-operative IOP in the primary and upward gazes.

Results: Mean postoperative IOPs in the primary gaze were lower than the preoperative values for groups A and C ($P < 0.05$). The IOPs during the upward gaze were higher than those in the primary gaze before and after OD (all groups, $P < 0.05$). The mean postoperative and preoperative IOPs during upward gaze were similar in all groups except group C ($P = 0.001$). The mean decrease in IOP in the primary gaze was 1.57 ± 6.00 mm Hg and 2.22 ± 2.62 mm Hg in groups A and C, respectively ($P < 0.05$). Only in group C, the mean IOPs during upward gaze decrease by 5.29 ± 4.89 mm Hg (active TED before OD), and the mean gaze-related IOP decreased from 7.75 ± 6.02 to 2.57 ± 4.21 mm Hg ($P < 0.05$).

Conclusions: A pbGC treatment before OD can effectively reduce the primary and upward gaze IOPs and lead to a greater postoperative reduction in the upward gaze IOP to approximate that in the primary gaze. A pbGC treatment may be preferred for patients with TED in the active or congestive phase before OD considering the IOP.

Abstract No.: 201757

It's ComplicaTED: A Case Report of a 12-Year-Old Female With Thyroid Eye Disease

First Author: Camille Victoria **SISON**

Co-Author(s): Kimberly Amanda **COMIA**, Elaine Marie **OMAHIA**, Ma.Regina Paula **VALENCIA**

Purpose: The purpose of this study is to present a case of a 12 year-old female with Thyroid Eye Disease.

Methods: This is a case report of a 12 year-old female, Filipino, who presented with a one year history of "bulging eyes" with blurring of vision, both eyes.

Results: On initial consultation, visual acuity was 6/12 in both, improving to 6/6 with correction. Color vision and intraocular pressures were normal. Clinical Activity Score (CAS) was 2/7 (1 - gaze-evoked orbital pain, 1 - eyelid swelling). Thyroid function tests showed hyperthyroidism, and thyroid receptor antibodies were elevated. Orbital CT scan with contrast showed no evidence of proptosis and no enlargement of the extraocular muscles. The patient was subsequently referred to Pediatric Ophthalmology, ENT, and Pediatric Endocrinology services for co-management. Ocular lubricants, selenium supplementation, methimazole, and propranolol were prescribed. Supportive measures, such as avoidance of smoke exposure were also advised. In the course of monitoring, she had increased proptosis, and decrease in visual acuity, apart from the gaze-evoked orbital pain, and eyelid swelling, resulting in a CAS score of 4/10. This prompted close monitoring, and pediatric clearance for intravenous methylprednisone.

Conclusions: This case presents an uncommon case of Thyroid Eye Disease in the pediatric population, and highlights the need for multidisciplinary care between ophthalmologists and other specialties in order to maintain stability in eye and hormone health.

Abstract No.: 206145

Lipogenic Activity of IL-1 β -Producing, IL-17A-Primed Myeloid Cells via PU.1 in the Pathogenesis of Active Thyroid Eye Disease

First Author: Sijie **FANG**

Co-Author(s): Kelvin **CHONG**, Wai Kit **CHU**, Yinwei **LI**, Terry **SMITH**, Jing **SUN**, Huifang **ZHOU**

Purpose: Macrophage dysfunction likely contributes to the pathogenesis of thyroid eye disease (TED), a disabling and sight-altering autoimmune disease. Interactivity between macrophages and metabolic disturbances occurring within the orbit remains unexplored. Here, we investigate how metabolic reprogramming determines macrophage fate mapping in TED.

Methods: In this case-control study, orbital connective tissues (OCTs) and primary M1-like macrophages (M1 Macs) were collected from patients with either active or stable TED and healthy controls. Flow cytometry, immunofluorescence, transcriptomics, qRT-PCR, Western blotting, metabolomics and chromatin immunoprecipitation-sequencing were utilized to characterize orbit-infiltrating M1 Mac subsets. Effects of interleukin (IL)-17A on lipid metabolism, de novo lipogenesis (DNL), and inflammasome pathway usage were determined in M1 Macs.

Results: OCTs from active TED exhibited enhanced fatty acid synthesis and upregulated IL-17A signaling. Orbit-infiltrating M1 Macs co-expressing IL-1 β and IL-12, IL-23 or fatty acid synthase (FASN) were predominant in active TED. IL-17A promoted FASN and IL-1 β expression at both mRNA and protein levels in these cells, activating fatty acid synthesis and the inflammasome pathway. Moreover, IL-17A stimulated palmitic acid (PA) production through DNL, dependent on glucose and citrate, and PA induced IL-1 β production. IL-17A-primed IL-1 β production could be attenuated by FASN inhibition. PU.1, a transcription factor upregulated by IL-17A, and PA underpinned the activation of inflammasome-related genes in TED-derived M1 Macs.

Conclusions: These results demonstrate robust lipogenic activity and IL-1 β synthesis provoked by IL-17A in TED-derived M1 Macs. These findings provide a molecular rationale for therapeutically blocking DNL in TED.

Abstract No.: 202660**Management of Exposure Keratopathy in Crouzon Syndrome: A Case Report***First Author: Samata SHARMA*

Purpose: To demonstrate the management outcome of exposure keratopathy in a child with Crouzon syndrome in a resource-limited setting.

Methods: A 6-year-old male with Crouzon syndrome and a positive paternal history presented with bilateral eye protrusion since birth. He had a history of multiple failed left eye lateral tarsorrhaphies done elsewhere. On examination: bilateral exophthalmos, alternate exotropia, left eye chemosis, and diffuse superficial punctate keratopathy were noted. Unaided visual acuity was 6/9 in right eye (OD) and 6/12 in left eye (OS). Ocular motility was full, pupils were round, regular and reactive; posterior segments were normal. Hertel's exophthalmometry showed 96 mm base, OD 22 mm, OS 26 mm. Under general anesthesia, a left eye three-wall orbital decompression (medial, lateral, and floor) was performed using a locally available, low-cost handheld burr, along with medial tarsorrhaphy.

Results: At 7-month follow-up, exophthalmos was significantly reduced and the exposure keratopathy resolved. Eyelid closure improved, leading to better tear distribution and resolution of dry eye symptoms. Visual acuity in OS improved to 6/9. Ocular motility and posterior segment remained normal. Hertel's readings improved to 17 mm in left eye.

Conclusions: Managing complex cases like exposure keratopathy in Crouzon syndrome is particularly challenging in resource-limited settings due to limited subspecialty training, lack of advanced technology, and unavailability of modern surgical equipment. Despite these limitations, the child had a significantly favorable management outcome, including vision restoration, orbital volume expansion, reduction of proptosis, and complete resolution of exposure keratopathy.

Abstract No.: 202128**Management of Trichiasis in Cicatricial Ocular Surface Disease: Cryotherapy Compared With Anterior Lamellar Resection***First Author: I-chan LIN*

Purpose: To compare the clinical outcomes of cryotherapy versus anterior lamellar resection in the treatment of trichiasis without entropion.

Methods: A total of 28 patients (33 eyelids) were included, of which 16 patients (18 eyelids) underwent cryotherapy and 12 patients (15 eyelids) were treated with anterior lamellar resection. Stevens-Johnson Syndrome was the most common underlying disease in both groups. The baseline demographic and clinical characteristics, including age, duration of disease, median trichiasis grade, and success rate,

and complications were comparable between the two groups.

Results: At two weeks, approximately 50% of the eyelids treated with cryotherapy achieved a trichiasis-free status. However, recurrences were frequent and were managed with repeat cryotherapy, mucous membrane grafting, or manual epilation. At a mean follow-up of 20 months, the overall success rate in the cryotherapy group was around 70%, though many patients required multiple interventions. Anterior lamellar resection, on the other hand, resulted in a 83% success rate at two weeks, and 78% success rate on 20-months follow up.

Conclusions: Anterior lamellar resection was found to be more effective and durable than cryotherapy for the management of cicatricial trichiasis. Cryotherapy offered temporary relief but required repeated procedures and carried a higher risk of recurrence, whereas anterior lamellar resection provided higher success rate than cryotherapy.

Abstract No.: 203338**Medical Adhesive-Related Skin Injury on the Eyelid of the Fellow Eye – a Case Report***First Author: Ian WONG**Co-Author(s): Vanessa Ka Yu CHEUNG, Ryan WONG*

Purpose: To report a rare case of medical adhesive-related skin injury on the eyelid, and discuss the management and measures to prevent this.

Methods: A rare case with medical adhesive-related skin injury was described. The patient underwent vitrectomy for the left eye, while during recovery after the uneventful surgery, the right upper and lower lid epidermis suffered extensive injury during drape removal. The immediate management, and outcome after 12 weeks were presented to highlight the importance of proper management following the injury to optimise recovery. Key high-risk features were also discussed.

Results: This case illustrated how important it is to identify high risk patients before the surgery, such that preventive measures could be implemented. As these are iatrogenic conditions, potential medico-legal issues may arise and could happen to any patients undergoing ophthalmic surgery. Also the importance of immediate proper treatment, and ways to prevent this were discussed.

Conclusions: When handled properly in high risk patients medical adhesive-related skin injury on ophthalmic patients undergoing surgery could be avoided. When occurred proper management can produce optimal clinical outcome.

Abstract No.: 209012

Modified Levator Muscle Complex Suspension for Treating Pediatric Blepharoptosis With Poor Bell's Phenomenon

First Author: Ming LIN

Purpose: To evaluate the surgical outcomes in pediatric patients with congenital blepharoptosis and poor Bell's phenomenon (BP) treated with modified levator muscle complex suspension.

Methods: A retrospective review was conducted on the surgical outcomes of 42 pediatric patients with congenital blepharoptosis and poor Bell's phenomenon (BP) who underwent modified levator muscle complex suspension. The major surgical outcomes evaluated included marginal reflex distance 1 (MRD1), palpebral fissure height (PFH), and the incidence of postoperative lagophthalmos.

Results: The mean follow-up duration was 10.28 ± 9.89 months (range: 3-32 months). At the final visit, surgical success was achieved in 54 of 62 eyelids (87.1%), with 46 eyelids (74.2%) showing excellent results, 8 eyelids (12.9%) showing good results, and 8 eyelids (12.9%) showing poor results. The postoperative palpebral fissure height (PFH) of affected eyes significantly improved from 3.58 ± 1.31 mm before surgery to 7.97 ± 1.47 mm after surgery ($p < 0.001$). The mean marginal reflex distance 1 (MRD1) also improved significantly, from -1.48 ± 1.36 mm before surgery to 2.94 ± 1.46 mm after surgery ($p < 0.001$). Postoperatively, MRD1 was ≥ 3 mm in 46 eyelids and < 3 mm in 16 eyelids. The mean lagophthalmos was 1.42 ± 1.20 mm at 3 months after surgery. All patients exhibited complete blink function postoperatively. Postoperative complications were rare during follow-up, with no cases of exposure keratitis observed. However, recurrence of blepharoptosis was noted in 6 patients (8 eyelids). All patients achieved satisfactory eyelid symmetry and contour, and no complications were reported until the last visit.

Conclusions: The modified surgical method achieves complete blink recovery, mild and rapid resolution of lagophthalmos, flexible eyelid motility, and a stable ocular surface. It is simple to perform, with few complications and lower recurrence. These advantages make it a valuable approach for treating congenital blepharoptosis with poor Bell's phenomenon.

Abstract No.: 202308

Mucous Membrane Graft in Symblepharon: A Case of Socket Reconstruction

First Author: Shalini KUMARI

Purpose: Symblepharon is partial or complete adhesion of palpebral conjunctiva of eyelid to bulbar conjunctiva of eyeball. Anatomical restoration of conjunctival fornices and cavity provides an opportunity to wear artificial eye in patients with anophthalmia. Division of adhesion, cicatrix-lysis & palpebral and bulbar

reconstruction of eyelid with full-thickness mucous membrane autograft from lip is a suitable replacement as it integrates readily with surrounding tissue.

Methods: A 27-year-old male, with a history of glass injury in right eye, 2 years ago, came with contracted socket and symblepharon (Grade IV A), with inability to retain COP (Custom Ocular Prosthesis). Surgery was performed under general anaesthesia. The adhesion was divided, scarred tissue was excised, surrounding conjunctiva was displaced to nearly cover bare surface on globe, and raw surface on lid was covered with full-thickness oral mucous membrane autograft, harvested from lower lip. Donor site at lower lip was covered with amniotic membrane. Conformer was placed and suture tarsorrhaphy was done, which was kept for 1-month.

Results: After 6 weeks, socket was fitted with COP, which was retained properly. The anophthalmic orbit showed no recurrence of symblepharon during follow-up period of 5 months post-operatively.

Conclusions: For grades III and IV symblepharons, residual and recessed conjunctiva are not sufficient to cover tarsal surface, procedures of either oral mucosal graft or conjunctival autograft to tarsus increase overall success. Rehabilitation of anophthalmic orbit and ability to wear artificial eye was restored with oral mucosal graft in this case.

Abstract No.: 204490

Multiple Basal Cell Carcinomas Presenting As Gorlin-Goltz Syndrome in an 86-Year-Old Caucasian Male From the Philippines: A Case Report

First Author: Adrian ZENAROSA

Co-Author(s): Catherine VIGO-MATIC

Purpose: To present a case of Gorlin-Goltz syndrome in an elderly male to highlight its diverse clinical manifestations. This report aims to improve awareness among healthcare professionals regarding the syndrome's broad spectrum of presentations, underscoring the critical importance of early recognition for prompt and appropriate patient management and care.

Methods: This report details the clinical presentation and diagnostic workup of an 86-year-old Caucasian male. His diagnosis was established by fulfilling established clinical criteria for Gorlin-Goltz syndrome. These clinical findings were subsequently confirmed through comprehensive physical examination, targeted radiological imaging, and the histopathological analysis of multiple biopsied skin lesions.

Results: The patient met the diagnostic criteria for Gorlin-Goltz syndrome. Histopathology confirmed multiple basal cell carcinomas on his lower eyelid, nasal dorsum, scalp, and back. Physical examination also revealed characteristic palmar pits on both of his hands. Skeletal evaluation identified significant

abnormalities, including cervicothoracic spondylosis and thoracic dextroscoliosis, a right-sided curvature of the spine.

Conclusions: This case demonstrates a classic Gorlin-Goltz syndrome presentation with its hallmark cutaneous and skeletal findings. A high index of suspicion is crucial when evaluating any patient with multiple basal cell carcinomas. Early and accurate diagnosis is essential for initiating timely, multidisciplinary management by appropriate specialists. This proactive approach is paramount to prevent the serious complications associated with this lifelong syndrome.

Abstract No.: 200700

Nasal Endoscopic Approach to Various Orbital Pathologies

First Author: Vikasdeep GUPTA

Co-Author(s): Ankur MOHAN, Nikhil RAJAN, Vaibhav SAINI

Purpose: The paper will highlight the role of Nasal endoscopic techniques in managing various orbital pathologies.

Methods: The study includes videos and discussion of directly and indirectly assisting management of various orbital pathologies through endoscopes including benign tumours of the orbit, traumatic orbital pathologies including blow out fractures associated with incarcerated extraocular muscles, fungal orbital pathologies, orbital abscesses, retained intraorbital foreign bodies, through nasal endoscopy.

Results: Nasal endoscopy can markedly improve the surgical outcomes in various orbital pathologies by reducing the morbidity, improving healing, and avoiding surgical scars and open approaches. Endoscopy can also assist in visualising the deeper inaccessible areas of the orbit to ensure adequate disease management.

Conclusions: Endoscopy has the potential to be a great tool in assisting with the management of orbital lesions, not just the ones lying in the medial aspect of the orbit. It can even help in managing intraorbital lesions.

Abstract No.: 205836

Neonatal Orbital Abscess: A Case Report

First Author: Mark Niño ESTRELLA

Co-Author(s): Armida SULLER-PANSACOLA, Charisse Ann TANLAPCO

Purpose: To report a rare case of Orbital Abscess in a Neonate

Methods: Case Report and Review of Related Literature

Results: This is a case of a 30-day-old infant who presented with a 6-day onset of left eye erythema, proptosis, and reduced ocular motility, accompanied

by fever and nasal discharge. Gingival abscesses were noted upon admission and were aspirated and submitted for testing. Craniofacial computed tomography scan revealed ethmoidal sinusitis, abscess formation, and erosive changes. Broad-spectrum IV was given. Direct aspiration of the orbital abscess was performed to decrease the bacterial load, with the sample submitted for testing. Culture of both the gingival and orbital aspirates yielded colonies of *Staphylococcus aureus*. Gradual clinical recovery was observed, and the patient was eventually deemed fit for discharge.

Conclusions: Orbital Abscess is a condition more commonly seen in children greater than 5 years old and rare in the neonatal age group. Adequate antibiotic administration and surgical drainage should be performed to reduce the bacterial load. A multidisciplinary approach should be adopted in treatment to hasten recovery and prevent life-threatening complications.

Abstract No.: 201758

Nose-y Neighbors: A Case of Ethmoid Sinus Tumor With Orbital and Frontal Sinus Extension

First Author: Camille Victoria SISON

Co-Author(s): Elaine Marie OMAÑA

Purpose: The purpose of this study is to present a case of ethmoid sinus adenocarcinoma with orbital and frontal sinus extension.

Methods: This is a case report of a 53 year-old male, Filipino, smoker with a 5 month history of drooping of the right upper eyelid with blurring of vision, and periorbital pain.

Results: Vision was hand movement with good light projection. Pupils were briskly reactive to light, and relative afferent pupillary defect was present. There was a firm, non-tender mass above the medial canthal tendon extending to the inferior orbital rim, and inferolateral globe displacement. Limitations in extraocular muscle movement, ptosis, proptosis, and complete nasolacrimal duct obstruction were noted. CT scan revealed an irregularly-shaped, heterogeneous hyperdense mass in the right ethmoid sinus area with extension to the orbit and frontal sinus. Incision biopsy showed adenocarcinoma. Metastatic work-up was unremarkable. Patient subsequently underwent non-lid sparing orbital exenteration combined with ENT and Neurosurgery procedures. Final histopathology results showed adenocarcinoma with perineural and lymphovascular invasion. Immunohistochemistry stains yielded positive CK7 and negative CK20 and p63 staining. Patient was referred to Radiation Oncology for post-operative radiotherapy.

Conclusions: This case highlights the need for a good clinical eye in cases of malignancy, and determination

if the tumor is primary, secondary, or metastases. In these cases, imaging and histopathology must be maximized, and multidisciplinary care is essential in treatment.

Abstract No.: 207549

Orbital Cellulitis Following Traditional Eye Remedies With Rosary Pea Seeds (Lal Gedi)

First Author: Sushant ADIGA

Co-Author(s): Rahula AHMED, Malita AMATYA, Dikshya BISTA, Purnima RAJKARNIKAR STHAPIT

Purpose: To describe a rare but serious cause of orbital cellulitis resulting from the traditional use of rosary pea (Lal Gedi) seeds as eye remedies in Nepal, and to highlight the urgent need for public awareness to prevent such harmful practices.

Methods: We present four cases of orbital cellulitis following direct ocular insertion of Lal Gedi seeds. Clinical history, examination, imaging, treatment, and outcomes were analysed. Literature on traditional ocular remedies and Rosary pea seed toxicity was also reviewed.

Results: All four patients developed acute orbital inflammation after seeds were retained in the conjunctival sac for several days. Two required surgical debridement in addition to intravenous antibiotics. Visual outcomes varied, with one patient retaining significant vision loss despite treatment. The toxic protein abrin, present in Lal Gedi seeds, is known to cause necrosis and exacerbate secondary infections. These cases underline a preventable cause of morbidity arising from culturally accepted but unsafe practices.

Conclusions: This series is, to our knowledge, the first to document orbital cellulitis caused by Lal Gedi seed use. Despite modern medical advances, traditional remedies remain common in rural Nepal and continue to place patients at risk of vision- and life-threatening complications. Raising public awareness through culturally sensitive education is vital to discourage harmful practices and promote timely medical care.

Abstract No.: 200903

Orbital Cellulitis Management in Pediatric and Adult Cohorts: A 12-Year Retrospective Analysis From a Tertiary Center

First Author: Mingyang WANG

Co-Author(s): Dongmei LI

Purpose: Orbital cellulitis (OC) is a vision-threatening infection requiring prompt medical and/or surgical intervention. This study evaluates clinical features, management outcomes, and predictors of surgical necessity in pediatric and adult OC patients.

Methods: Retrospective analysis of 40 OC patients (13 pediatric, 27 adult, ages: 34.8 ± 23.9 years) at Xi'an Fourth Hospital (2011–2023). The data collected and

analyzed retrospectively including demographics, signs and symptoms, concomitant diagnoses, inpatient management, imaging results, surgical culture results, visual acuity at presentation and last follow-up, duration of intravenous antibiotic treatment and sequelae of disease were collected.

Results: Surgery was required in 84.6% (11/13) of pediatric and 88.9% (24/27) of adult patients. *Staphylococcus aureus* (17.1%), *S. epidermidis* (11.4%), and MRSA (8.6%) predominated in cultures; 31.4% showed no growth. Ceftriaxone (45%) and cefotaxime (7.5%) were primary antibiotics. Surgical intervention significantly increased hospital costs ($\text{¥}13,317 \pm \text{¥}5,351$ vs. $\text{¥}1,843 \pm \text{¥}509$; $p < 0.0001$) but improved adult visual acuity (VA) from 0.5 ± 0.3 to 0.6 ± 0.4 ($p = 0.04$). All patients achieved symptom resolution.

Conclusions: OC necessitates surgery in >80% of cases regardless of age, driven by abscess formation or medical failure. Staphylococcal species (including MRSA) are key pathogens, warranting tailored empiric therapy. Cost-effective management algorithms integrating Chandler staging and vaccine history are recommended.

Abstract No.: 200541

Orbital Epstein-Barr Virus Associated Smooth Muscle Tumour in an Immunocompromised Patient With Systemic Lupus Erythematosus on Long-Term Immunosuppressive Therapy and Idiopathic CD4 Lymphopenia

First Author: Zhiwei David LAW

Co-Author(s): Yuxiang Daniel CHIN, Chun Yun Caroline LEE, Xin Rong LIM, Bundele Manish MAHADEORAO, Jian Li TAN

Purpose: We report a case of an immunocompromised patient with known systemic lupus erythematosus on long term oral steroids presenting with a rare right eye orbital Epstein-Barr Virus-associated smooth muscle tumour (EBV-SMT). She was subsequently diagnosed with idiopathic CD4 lymphopenia secondary to possible inborn error of immunity.

Methods: Orbital EBV-SMTs are rare neoplasms that primarily occur in immunocompromised individuals, with only a few cases reported. While generally indolent, they can be locally aggressive, causing mass effect and functional impairment. Our patient presented with rapidly progressive proptosis, optic nerve compression and orbital discomfort. A multidisciplinary approach involving the Oculoplastic Surgeon and Rhinologist leveraging pre-operative 3D-printed models, as well as transorbital and transnasal endoscopic surgical techniques was undertaken, achieving safe tumour debulking. Post-operatively, the patient's orbital discomfort and optic nerve functions improved, with a significant reduction in proptosis. Systemic screening revealed additional tumour foci, necessitating further collaborative

management with an Immunologist. The patient was commenced on sirolimus with ongoing surveillance.

Results: There is no standardized treatment for orbital EBV-SMTs, with surgical resection or debulking as possible approaches. Complete excision is challenging, while immunomodulation with antiviral therapy and immunosuppressive agents may confer benefit, with emerging therapies including bevacizumab and sirolimus as potential treatment options.

Conclusions: EBV-SMTs should be considered as possible aetiologies in immunocompromised patients or patients on immunosuppressive therapy for autoimmune diseases presenting with rapidly enlarging orbital masses. A multidisciplinary approach involving surgical resection or debulking, systemic evaluation, and immune modulation is essential to achieve optimal patient outcomes.

Abstract No.: 205483

Orbital Index in Indigenous Sri Lankan Skulls: A Comparative Morphometric Study

First Author: Madhuwanthi DISSANAYAKE

Co-Author(s): Harsha DISSANAYAKE, Madhawa DISSANAYAKE, Sajith EDIRISINGHE, Thisaroo WIJESEKARA, Surangi YASAWARDENA

Purpose: The orbital index (OI), derived from orbital height and width, is an important anthropometric parameter with clinical, forensic, and evolutionary relevance. Although studied in various populations worldwide, there is a lack of data on the orbital morphology of indigenous people (Vedda) of Sri Lanka.

Methods: Orbital height and width were measured in 28 dry skulls of indigenous Sri Lankans. The OI was calculated using the standard formula ($OI = \text{orbital height} / \text{orbital width} \times 100$). Comparative analysis was performed with a reference group of 19 non-indigenous Sri Lankan skulls. Statistical methods were applied to assess differences between the two groups.

Results: The mean ($\pm$ SD) right OI of Indigenous skulls was 78.94 ± 3.59 (range: 71.25 – 87.83), while the mean left OI was 81.72 ± 4.19 (range: 75.22 – 94.36). These values did not differ significantly from those of the non-indigenous sample for either side ($p > 0.05$). Mean ($\pm$ SD) right OI of non-indigenous skulls was 78.18 ± 4.90 while the mean left OI was 79.43 ± 6.85 . The orbital type among indigenous skulls was predominantly microseme ($OI < 83$), and the non-indigenous group also demonstrated a microseme pattern.

Conclusions: This is the first study to compare the orbital morphology in indigenous and non-indigenous Sri Lankan skulls. The findings highlight orbital index similarities compared to non-indigenous populations, with potential implications in orbital surgery, forensic identification, and anthropological research.

Abstract No.: 201217

Orbital Subperiosteal Abscess As the Ocular Manifestation of Melioidosis- a Case Report

First Author: Kar Yong CHONG

Co-Author(s): Hayati ABDUL AZIZ, Wai Seng CHIANG, Yong Zheng WAI

Purpose: To report a rare case of melioidosis presenting as a right orbital subperiosteal abscess, successfully treated with orbital incision and drainage and intravenous ceftazidime.

Methods: Case report.

Results: A 74-year-old male with diabetes mellitus and hypertension presented with a one-week history of fever and progressive right upper eyelid swelling. There was no recent travel abroad, water exposure, soil contact or skin wounds. Visual acuity was 6/60 in both eyes, with no relative afferent pupillary defect. Anterior segment and fundus examination were normal. Erythrocyte sedimentation rate and C-reactive protein were elevated; Other blood investigations, Chest X-ray and electrocardiography were unremarkable. Orbital Computed tomography showed a right orbital subperiosteal abscess with preseptal cellulitis. He was started on intravenous ceftriaxone and metronidazole, having previously received amoxicillin-clavulanate. Despite treatment, swelling worsened with severe chemosis. Orbital incision and drainage yielded 2ml of pus, which cultured *Burkholderia pseudomallei*, sensitive to ceftazidime. Intravenous ceftazidime 2g every 6 hours for 2 weeks was commenced, leading to clinical improvement. Abdominal ultrasonography was normal. He completed 3 months of oral trimethoprim-sulfamethoxazole (Bactrim) for eradication therapy. At follow-up, swelling had resolved and vision improved to 6/24.

Conclusions: Ocular melioidosis is a rare manifestation of melioidosis. Clinicians in endemic areas should maintain a high index of suspicion in patients with orbital infections, especially those with risk factors such as diabetes, to ensure early diagnosis, prompt antimicrobial therapy, and prevention of potentially devastating complications.

Abstract No.: 205078

Orbitopalpebral Neurofibromatosis Type 1 at a Tertiary Care Centre – Clinical Profile and Management

First Author: Mandeep Singh BAJAJ

Purpose: To retrospectively analyse the clinical presentation, imaging findings and surgical management of orbitopalpebral Neurofibromatosis Type 1 in a large series of patients who presented to our institute during a five-year period 2019-24.

Methods: The demographic data, clinical presentation, imaging findings and surgical interventions were

studied. Imaging included high resolution computed tomography, magnetic resonance imaging and ultrasonography. Surgical interventions and their outcomes were recorded in histopathologically confirmed cases.

Results: Seventy-six patients were included in this review. The mean age at presentation was 12.8 years (range 2-43 years) with an average follow-up of 3.8 years. 52 (68.4%) patients were male and 24 (31.6%) were female. Fifty-four (71.1%) patients presented with ptosis, 11 (14.5%) with proptosis, 28 (36.8%) with strabismus, 34 (44.7%) with visual impairment, 10 (13.1%) with sphenoid dysplasia, and 2 (2.6%) patients had associated optic nerve glioma. 63 (82.9%) patients underwent surgery. Surgical interventions included ptosis correction in 51 (67.1%), tumour debulking in 49 (64.5%), lateral canthal fixation in 33 (43.4%) and strabismus surgery in 23 (30.3%). Five (6.6%) patients had an enucleation for a disfigured blind eye. Forty-eight (63.2%) patients had a satisfactory cosmetic outcome, whereas 42 (55.3%) had adequate visual rehabilitation.

Conclusions: Orbitopalpebral Neurofibromatosis type 1 has a complex and varied clinical presentation. A detailed ocular, orbital, and systemic evaluation of each patient is essential. The management is challenging and has to be customised to tackle various components of the condition, to achieve optimal functional and cosmetic rehabilitation.

Abstract No.: 207473

Outcomes and Challenges of Pediatric Dacryocystorhinostomy: A Five-Year Experience from a Tertiary Eye Center in Nepal

First Author: Sushant **ADIGA**

Co-Author(s): Malita **AMATYA**, Dikshya **BISTA**, Purnima **RAJKARNIKAR STHAPIT**, Rohit **SAIJU**

Purpose: To evaluate the demographic profile, surgical outcomes, and complications of pediatric patients (<18 years) undergoing dacryocystorhinostomy (DCR) at a tertiary eye hospital in Nepal.

Methods: A retrospective analysis was conducted on 110 patients (119 eyes) who underwent pediatric DCR over the past five years. Variables assessed included age, sex, laterality, associated lacrimal anomalies, type of surgery, postoperative complications, and recurrence. Descriptive statistics were applied to summarize findings.

Results: The mean age at surgery was 10.5 years (range: 4-16), with a male predominance (61.8%). Unilateral disease was observed in 83% of cases, while bilateral disease was observed in 17%. Congenital lacrimal anomalies were present in 12.6% of patients, most commonly upper punctal atresia (6.7%). The majority of cases (85%) underwent external DCR with

intubation, while 15% were managed with endoscopic DCR. Recurrence requiring resurgery occurred in 6.7% of cases. Minor postoperative complications were documented, with cheese wiring being the most frequent. Overall, surgical outcomes were favorable, with high anatomical and functional success rates.

Conclusions: Pediatric DCR demonstrates high efficacy in treating nasolacrimal duct obstruction, with good anatomical and functional outcomes. Nevertheless, recurrence and tube-related complications remain important considerations. Refinement in surgical techniques and meticulous postoperative tube care are critical to further improving long-term success in the pediatric population.

Abstract No.: 200902

Outcomes of Patients With Dysthyroid Optic Neuropathy Treated With Intravenous Corticosteroids and/or Orbital Decompression Surgery: A Systematic Review and Meta-Analysis

First Author: Mingyang **WANG**

Co-Author(s): Dongmei **LI**

Purpose: Objective: To compare the efficacy of glucocorticoid treatment and orbital decompression (OD) in dysthyroid optic neuropathy (DON).

Methods: Data Sources: PubMed, EMBASE, and Cochrane Library were searched along with other sources. Study Selection: A total of 17 studies met the inclusion criteria. Data Extraction: Standard methodological guidance of the Cochrane Handbook was used and data were independently extracted by multiple observers. The primary outcomes were the improvement of best corrected visual acuity (BCVA). Secondary outcomes were proptosis reduction, change in diplopia, visual field defects, and intraocular pressure (IOP).

Results: The Δ BCVA in the ivGC + OD group was improved 0.26 LogMAR more than in the ivGC group ($P = .007$). The Δ BCVA in the OD group was better than in the ivGC group ($P = .008$). Posttreatment proptosis in the ivGC + OD and OD groups were improved further by 3.54 mm and 3.00 mm, respectively, than in the ivGC group ($P < .01$). The mean deviation (MD) in the ivGC + OD group was improved by an additional 5.33 dB than in the ivGC group ($P = .002$). The IOP in the ivGC + OD group was improved further than in the ivGC group ($P = .03$).

Conclusions: OD or ivGC + OD may be more effective in improving BCVA and MD and reducing proptosis compared with ivGC. Compared with ivGC alone, ivGC + OD is more effective in improving IOP than ivGC. Although this study improves the hierarchy of evidence in the treatment of DON, additional randomized controlled trials are needed to confirm this conclusion.

Abstract No.: 203651**PI3K/AKT Pathway Promotes Angiogenesis in Orbital Tissue of Thyroid-Associated Ophthalmopathy by Enhancing VEGF Expression***First Author: Jianshu KANG**Co-Author(s): Yanxia WANG*

Purpose: The purpose of this study is to provide new mechanistic insights and experimental evidence for targeted therapies in TAO.

Methods: In this study, the PI3K/AKT/mTOR/VEGF signaling pathway was identified through DIA and further analyzed using GO and KEGG enrichment analyses. Expression levels of key pathway components were validated using RT-qPCR, Western blotting, and immunohistochemistry. Additionally, orbital VECs from TAO patients were cultured in vitro and treated with PI3K inhibitor LY294002, anti-VEGF-A antibody bevacizumab, and triamcinolone. Cell proliferation, angiogenic potential, and cytokine secretion (TNF- α , IL-1 β , IL-6) were assessed using CCK-8, tube formation assays, and ELISA.

Results: Differentially expressed genes were significantly enriched in the PI3K/AKT/mTOR/VEGF pathway. RT-qPCR and Western blot analysis confirmed that mRNA and protein levels of Akt, mTOR, and VEGFA were markedly upregulated in TAO orbital tissue, with a higher VEGFA protein positivity rate. In vitro experiments demonstrated enhanced proliferation, angiogenesis, and cytokine secretion in TAO VECs. Treatment with LY294002 significantly inhibited PI3K/AKT phosphorylation, VEGFA expression, and inflammatory cytokine release, while bevacizumab primarily reduced VEGFA levels.

Conclusions: The PI3K/AKT/mTOR pathway facilitates angiogenesis and inflammation in TAO orbital tissue by upregulating VEGFA expression. LY294002, a specific inhibitor of this pathway, demonstrates potential therapeutic value. This study provides new mechanistic insights and experimental evidence for targeted therapies in TAO, warranting further clinical.

Abstract No.: 202064**Pathophysiology, Diagnosis and Management of Dry Anophthalmic Socket Syndrome (DASS)***First Author: Duoduo WU**Co-Author(s): Blanche LIM, Chris LIM, Fiona STAPLETON, Gangadhara SUNDAR, Louis TONG*

Purpose: Dry anophthalmic socket syndrome (DASS) is a multifactorial condition that presents a significant clinical challenge, with ocular prosthesis users frequently experiencing debilitating dryness and discomfort despite the absence of classical signs such as lid margin disease or tear-film instability. Despite its prevalence DASS remains poorly understood with

limited insight into its underlying pathophysiology. This review synthesises current evidence on the pathophysiology, diagnosis, and management of DASS.

Methods: A comprehensive PubMed search was conducted for English articles from inception to June 2025, including references of relevant studies. Keywords and MeSH terms included "DASS," "anophthalmia," "ocular prosthesis," and related terms.

Results: DASS is perpetuated by a vicious cycle of chronic mechanical friction between the ocular prosthesis and socket tissues. This initiates inflammation, meibomian gland dysfunction, and tear-film instability, further exacerbated by altered eyelid and socket anatomy, prosthesis materials, care routines, and socket microbiome dysbiosis. We propose a structured, four-step diagnostic framework integrating symptom questionnaires with objective markers of friction, blepharitis, and inflammation. A tiered-management algorithm is also presented, encompassing tear-film optimisation with artificial tears, anti-inflammatory therapy, in-office procedures, surgical options, and prosthetic modifications. Emerging innovations including hydrophilic surface coatings and 3D-printed ocular prostheses show promise in reducing friction and improving biocompatibility. Given the unique anatomical and biomechanical nature of the anophthalmic socket, a tailored approach incorporating both surface lubrication and immunomodulation is likely required for effective long-term management.

Conclusions: This review provides a structured, evidence-based framework for diagnosing and managing DASS among ocular prosthesis users.

Abstract No.: 206412**Proptosis As the Initial Presentation of Orbital Metastases From Breast, Thyroid, and Lung Cancer***First Author: Law JIN XING**Co-Author(s): Fatimah Suhaila BINTI SUKAIMY, Akmal Haliza BINTI ZAMLI, Wua Jzui NG, Kenneth TEOW KHENG LEONG*

Purpose: To highlight proptosis as an uncommon but important initial presentation of systemic malignancies and emphasize the role of ophthalmic assessment in diagnosing orbital metastasis.

Methods: We retrospectively reviewed three patients who presented with proptosis to the ophthalmology clinic. All underwent comprehensive ophthalmic assessment, contrast-enhanced imaging, and systemic evaluation with subsequent histopathological or oncological correlation.

Results: • Case 1: A 61-year-old woman with previously treated breast cancer presented with right eye proptosis, optic neuropathy, and restricted motility. Imaging showed an orbital mass with bone erosion.

Biopsy confirmed recurrent invasive breast carcinoma.

- Case 2: A 71-year-old woman with long-standing thyroid swelling developed a left supraorbital mass and proptosis. Orbital biopsy revealed metastatic carcinoma, while fine-needle aspiration suggested papillary thyroid carcinoma. Imaging confirmed additional systemic spread.
- Case 3: A 45-year-old man presented with right orbital wall mass and eyebrow swelling. Computed tomography revealed a right lung carcinoma with extensive metastases to orbit, bone, adrenals, and possible brain.

Conclusions: Orbital metastases, though rare, may be the first manifestation of systemic cancer. Ophthalmologists play a key role in recognizing atypical proptosis, which should prompt urgent multidisciplinary evaluation for underlying malignancy.

Abstract No.: 207279

Pseudoendocrine Sarcoma in the Orbit: A Case Report

First Author: Angelo Jud **CRUZ**

Co-Author(s): Honeylen Maryl **TEO**

Purpose: To report a rare orbital pseudoendocrine sarcoma

Methods: Case report

Results: A healthy 56-year-old female had 6 months of blurred left vision, bulging, and binocular diplopia. No consult was sought. Two months prior, she consulted an ophthalmologist. The requested orbital computed tomography revealed a contrast-enhancing, isodense, oval, 21x18mm lesion from the supero-medial orbit to the apex, abutting the optic nerve. She was referred for the same ophthalmic features. The family history was unremarkable for cancer. Best corrected vision was 20/20, right; 20/800 left. Left eye examination revealed relative afferent pupillary defect; hypertropia; -1 on adduction; 2.5mm relative proptosis; raised optic nerve. The rest was unremarkable. Orbitotomy (retrocaruncular) revealed yellow-tan to light brown, irregular, friable tissues (20x18x7mm aggregate measurement). Histopathology showed epithelioid cells with uniform, round, hyperchromatic nuclei, ample eosinophilic cytoplasm in nests/cords; low mitosis (0-3/10high power field); no ossification/atypia/necrosis. Immunohistochemistry was negative: cytokeratin (CK), CK7&20, GATA3, mammaglobin, chromograninA, synaptophysin, SMA, caldesmon, STAT6, CD34&99, calponin, EMA, HMB45, mucin4, SOX10, myogenin, p63; positive: S100, desmin, CD10. INI1 was retained. No EWSR1 gene rearrangement. Beta-catenin showed nuclear expression. The findings suggest pseudoendocrine sarcoma, a rare, intermediate-grade sarcoma of paravertebral soft tissues. A year after surgery, the left vision was 20/25. The remaining eye exam was unremarkable. Long-term follow-up for this unknown phenotype is required.

Conclusions: To our knowledge, orbital pseudoendocrine sarcoma has only been reported once. We presented a detailed clinical, gross anatomical, and histopathological description of this rare orbital entity.

Abstract No.: 202291

Quantitative Assessment of Biofilm Formation on Lacrimal Tubes Placed During Endoscopic Lacrimal Duct Recanalization

First Author: Kuniharu **TASAKI**

Co-Author(s): Takahiro **HIRAOKA**, Sujin **HOSHI**, Keita **KIKUCHI**, Tetsuro **OSHIKA**

Purpose: In endoscopic lacrimal duct recanalization (ELDR), a silicone lacrimal tube is temporarily placed after recanalization of the obstructed segment to allow mucosal repair. The tube is usually left in place for 1-3 months, but the scientific basis for this duration remains unclear. A major concern with prolonged intubation is biofilm formation, which may increase the risk of infection. This study quantitatively assessed biofilm formation on lacrimal tubes used in ELDR using crystal violet (CV) staining.

Methods: We analyzed 34 lacrimal tubes from 21 patients who underwent ELDR. Removed tubes were subjected to CV staining, and the bound dye was solubilized in ethanol. Absorbance was then measured to quantify biofilm formation.

Results: Biofilm was detected on all lacrimal tubes. The median absorbance (interquartile range) was 1.17 (0.51-2.03). A weak positive correlation was found between the intubation period and absorbance ($r = 0.32$, Spearman's rank correlation).

Conclusions: All lacrimal tubes placed during ELDR showed biofilm formation, and the amount of biofilm was modestly correlated with the intubation period. Because biofilm can induce treatment-resistant chronic infection, the intubation period should be kept to the minimum required. Future studies should evaluate the relationship between biofilm formation and clinical outcomes such as recurrence and complication rates.

Abstract No.: 206300

Radical but Rational: Orbital Exenteration in Rhino-Orbital-Cerebral Mucormycosis, a Case Report

First Author: Pallavi **KOLHE**

Co-Author(s): Satish **SHITOLE**

Purpose: Rhino-orbital-cerebral mucormycosis is a rapidly progressive, angioinvasive fungal infection with high morbidity and mortality. Orbital involvement is common, and intracranial extension significantly worsens prognosis.

Methods: A 12-year-old male child presented with Sudden loss of vision with Black eschar on the lid skin

and Drooping of the eyelid. Examination revealed Left Eye - Black necrotic tissue on eyelid, medial canthus, left side of nose, and half of cheek, No Perception of Light, Complete ophthalmoplegia, Frozen globe, Severe proptosis with tense orbit. Right Eye Examination was within normal limits.

Results: The patient was diagnosed with Rhino-orbital-cerebral mucormycosis. Underwent left-sided Orbital Exenteration + Functional Endoscopic Sinus Surgery with Paranasal sinus debridement under General Anesthesia. Extensive Debridement was done to remove infective foci. Wash given with Betadine and Amphotericin B. Merocel sponge used to pack Orbit. Pressure dressing was applied. Dressing was changed on alternate days under aseptic precautions, and systemic liposomal amphotericin B was continued.

Conclusions: Orbital exenteration in Rhino-orbital-cerebral mucormycosis is a radical yet life-saving procedure. Multidisciplinary decision-making, timely surgery, and continued antifungal therapy are essential for optimal outcomes. The decision should always balance the goal of saving life against the functional and cosmetic loss associated with globe sacrifice.

Abstract No.: 205939

Radiofrequency Ablation for Removal of Eyelid Nevus

First Author: Fiza **KHAN**

Co-Author(s): Om Prakash

Purpose: Eyelid nevi are mostly asymptomatic; however, patients often seek their removal for cosmetic concerns. The primary objective of treatment is excision, enhancement of cosmetic appearance, and reduction of functional impairment and the risk of malignancy. The treatment modalities available are surgical excision, CO2 laser removal, and ND:Yag removal; however, they come with their own risks. Our purpose is to study the effect of radiofrequency ablation in removing eyelid nevus in terms of clinical outcome, cosmesis, and complications, and to evaluate if it can be a less invasive modality for the treatment of such lesions.

Methods: Thirty-three eyes of patients aged 18–80 years with eyelid nevus underwent radiofrequency ablation of nevus, performed at a power setting between 5-20 W in Cut and coagulation mode using Ellman Surgitron Dual Radiofrequency equipment by keeping the ablating needle tip flushed with the surface of the nevus and ablating till the nevus height became levelled with the rest of the normal lid margin. Patients were followed for 3 months post-procedure at defined intervals. Outcomes assessed included treatment success (complete removal without residual or scarring) and post-operative complications.

Results: Of the 33 treated eyes, 32 (97%) achieved complete removal of eyelid nevus in a single session,

while 1 eye (3%) had a residual lesion <1 mm. Cosmetic outcomes were satisfactory in all patients. One eye (3%) developed a transient corneal epithelial defect due to intraoperative thermal injury, which healed with topical management. No other complications, such as lid notching, scarring, pigmentary changes, trichiasis, madarosis, or granuloma formation, were observed. It offered faster recovery and minimal post-op complications and can be performed as an OPD-based procedure, considering today's busy lifestyle.

Conclusions: Radiofrequency ablation is a safe, effective, and cosmetically favorable modality for treating eyelid nevus, with high success rates, minimal complications, and excellent patient satisfaction.

Abstract No.: 200452

Radiotherapy-Induced Changes in Corneal Morphology and Biomechanics in Myopathic Thyroid Eye Disease

First Author: Pengsen **WU**

Co-Author(s): Guiqin **LIU**

Purpose: To assess the differences in corneal morphology and biomechanics between patients with myopathic thyroid eye disease (TED) and normal controls (NCs), as well as the changes in these characteristics following radiotherapy.

Methods: Patients with active myopathic TED and age-, sex-matched NCs were enrolled. All patients underwent radiotherapy and were followed up for 6 months post-treatment. Complete ophthalmic examinations were conducted for all subjects. Corneal morphology was evaluated using the Pentacam, and biomechanics were assessed with Corvis ST.

Results: This prospective, comparative clinical study involved 50 TED patients and 30 NCs. Post-radiotherapy, the intraocular pressure (IOP), proptosis, disease activity, diplopia, and muscular index in TED patients significantly improved. Corneal morphological parameters such as back elevation (Db) and the index of surface variance were significantly greater in TED patients compared to NCs, while Ambrosio's Relational Thickness maximum was significantly lower. After radiotherapy, Db decreased, and posterior surface astigmatism increased with statistical significance. Significant biomechanical changes were observed in patients with TED, including reduced A2 time and peak distance, increased tomographic and biomechanical index (TBI), as well as diminished maximum whole eye movement length (WEML). Post-radiotherapy, a significant increase in WEML was observed. Correlation analysis suggested that improvements in ocular biomechanics may be linked to reductions in IOP and proptosis.

Conclusions: Patients with myopathic TED demonstrated observable corneal alterations, including increased surface irregularity, reduced corneal

hysteresis, and decreased orbital compliance, which indicate ectasia risk. Ocular biomechanical parameters may serve as potential quantitative biomarkers for assessing treatment effectiveness in TED management.

Abstract No.: 201991

Reconstruction Strategies for Traumatic Eyelid Defects: Comparative Evaluation of Skin Grafting and Flap Techniques: a Case Series

*First Author: Dewa Ayu Ina **DIANATA***

*Co-Author(s): Maria Yovita Saraswati **PELE ALU**, Ni Made Laksmi **UTARI**, Putu **YULIAWATI***

Purpose: Eyelid reconstruction after trauma requires restoration of function and aesthetics with minimal scarring and preserved visual integrity. For extensive defects (>75% of lid length), graft and flap techniques are selected based on defect size, tissue availability, and desired contour. This case series illustrates the rationale for technique selection and compares outcomes between skin grafting and flap reconstruction.

Methods: Case 1 A 48-year-old male was referred with full-thickness laceration and tissue loss involving the lateral lower eyelid following previous surgery. Due to unconsciousness, visual acuity and intraocular pressure could not be assessed. Examination revealed skin and tissue loss defect with septal exposure. Reconstruction was performed using a free retroauricular skin graft. Case 2 The second patient presented with lower eyelid skin defect and margin loss, a 42 mm irregular laceration with exposed soft tissue, and active bleeding. A pigmented, firm, nodular mass (27 × 17 mm) fixed to underlying tissue was also identified. Management included exploration, full-thickness lower eyelid reconstruction using a frontalis muscle flap, tumor excision, and histopathological assessment

Results: Both graft and flap sites healed well, with no cicatricial changes or lagophthalmos indicating in favorable functional and cosmetic outcomes

Conclusions: This case series highlights that both skin grafting and flap reconstruction are viable techniques for acute repair of traumatic eyelid defects with skin and tissue loss. Optimal cosmetic and functional outcomes can be achieved when the choice of technique is guided by appropriate indications and sound intraoperative decision-making, thereby minimizing the risk of complications such as cicatricial changes and ensuring satisfactory reconstruction

Abstract No.: 200400

Refractory Orbital Angiolymphoid Hyperplasia With Eosinophilia: A Case Report

*First Author: Sang Earn **WOO***

Purpose: To report a rare and refractory case of orbital angiolymphoid hyperplasia with eosinophilia (ALHE) in an elderly patient, with an emphasis on therapeutic challenges.

Methods: The medical records of a patient diagnosed with orbital ALHE via anterior orbitotomy and incisional biopsy through a transcutaneous skin approach were retrospectively reviewed. The primary outcome was clinical response to oral immunosuppressive therapy.

Results: A 90-year-old man presented with progressive swelling of the left periorbital area. Orbital computed tomography revealed a large, lobulated intraconal mass on left eye. Complete excision was not feasible due to the lesion's size and proximity to critical orbital structures. Anterior orbitotomy and incisional biopsy were performed. Histopathologic examination confirmed the diagnosis of ALHE. Initial therapy with oral corticosteroids led to transient symptom relief. However, symptom recurrence occurred upon tapering and discontinuation of oral corticosteroids. Corticosteroid therapy was subsequently resumed and titrated. Azathioprine (50 mg daily) was added as a steroid-sparing agent. The patient is currently maintained on oral prednisolone 5 mg daily.

Conclusions: This case highlights the diagnostic and therapeutic complexities of orbital ALHE, particularly in elderly patients for whom complete excision is not possible. Long-term immunosuppression may be required in refractory cases. Although rare, ALHE should be included in the differential diagnosis of orbital tumors.

Abstract No.: 205493

Role of Preoperative Intranasal Midazolam Spray for Anxiety Relief in Dacrocystorhinostomy Surgery Under Local Anesthesia

*First Author: Saugata **MAITY***

Purpose: Dacrocystorhinostomy surgery under local anesthesia often induces marked discomfort and anxiety in patients during operative procedure. Routine pre operative intranasal midazolam spray is a promising, noninvasive, safe procedure with minimal to nil side effects and without requirement of anesthetist's presence to reduce peroperative pain and anxiety.

Methods: All patients planned for dacrocystorhinostomy surgery were treated with 0.2mg/kg intranasal midazolam spray 30 minutes before the surgical procedure. All were operated under

local anesthesia and performed by the same surgeon. An anesthetist was not available at ot in all cases.

Results: All patients reported significantly lower anxiety and pain peroperatively treated with midazolam nasal spray. Heart rate and blood pressure measurement using multipara apparatus shown stable results during surgery. Almost three fourth patients were satisfied with their preoperative experience.

Conclusions: Intranasal midazolam spray produce conscious sedation to reduce anxiety and pain in Dacryocystorhinostomy patients peroperatively. It also improves per operative patient satisfaction and stabilise heart rate and blood pressure making an effective alternative to traditional sedation methods.

Abstract No.: 209694

Screening of Suspected Pathogenic Genes and Mechanistic Study of Craniofacial Fibrous Dysplasia

First Author: Xinyu **LI**

Co-Author(s): Hongfei **LIAO**, Bingyan **SHEN**, Min **WANG**, Wencan **WU**

Purpose: Conduct in-depth research on the pathogenesis of CFD and search for new therapies targeting specific pathogenic mechanisms.

Methods: Collect 9 family samples of CFD patients and send them for whole-genome exome sequencing to screen for shared gene variants in CFD, followed by bioinformatics enrichment analysis. By constructing two cellular disease models: the LV-GNAS R201H mutant cell model and the cAMP pathway activation model, the pathological conditions of CFD are simulated. The disease cell models are then co-cultured with normal cells using a Transwell system to explore the possible pathogenic mechanisms.

Results: GNAS mutations were detected by WES in orbital bone specimens with CFD lesions, with a detection rate of 100% (R201C 66.7%, R201H 33.3%), but no GNAS gene mutations were detected in peripheral blood DNA. A cell model with the LV-GNAS R201H mutation and a cAMP pathway activation model were constructed. Through Transwell co-culture experiments, it was confirmed that mutant cells can induce pathological transformation of wild-type cells via a paracrine mechanism. Moreover, by extracting exosomes from the co-culture system, the propagation effect of the disease phenotype was reproduced.

Conclusions: This study reveals the paracrine transmission mechanism of CFD and the exosome-mediated spread of disease phenotypes, providing key evidence for deciphering the cascade reaction of 'gene mutation-microenvironment remodeling-pathological propagation.'

Abstract No.: 204600

Severe Presentation of Bilateral Asymmetric Congenital Eyelid Eversion in a Hispanic Neonate

First Author: Joyce **MBEKEANI**

Co-Author(s): Nathan **ARBOLEDA**, Thomas **KENNEDY**, Se Eun **PARK**, Lily **YOUNG**

Purpose: Congenital upper eyelid eversion (CUEE), a rare disorder of unknown etiology, is usually present at birth. In the less than 100 cases reported, it was most often associated with collodion skin disorders, Trisomy 21, and African and Asian race/ethnicity. We present the clinical course of a Hispanic neonate, born with severe bilateral asymmetric CUEE.

Methods: Clinical presentation and course with photo images and investigations were documented.

Results: A 2-hour-old male, born to a 39-year-old (G3P3013), Hispanic female was referred by NICU for severe eyelid eversions. Pregnancy was complicated by gestational diabetes. He was a full-term, uncomplicated, spontaneous vaginal delivery. Examination revealed bilateral floppy upper eyelids with eversions with imbrication of upper eyelids over lower eyelids and chemosis of tarsal conjunctivae, left more than right eye. Anterior and posterior segments were normal. Subsequent B scans and neuroimaging confirmed normal globes, orbits and brain. All other investigations were unremarkable and genetic testing revealed Trisomy 21. He was managed conservatively with lubrication and moisture shields, resulting in complete resolution at 2 months of age. He continues to develop normally.

Conclusions: This case adds to the limited fund of knowledge of CUEE and supports its typically benign clinical course. Recognition of this rare condition by Neonatologists and Ophthalmologists, in neonates of all race/ethnicities, is imperative. Although the presentation can be striking, initial conservative management is justified with anticipation of complete resolution.

Abstract No.: 206413

Silicone Stent-Assisted Reconstruction for Lagophthalmos in the Only Seeing Eye With Electrical Burn-Induced Eyelid Contracture

First Author: Fitria **KUSUMASTUTI**

Co-Author(s): Fitri Setyani **ROKIM**

Purpose: To report the surgical management of lagophthalmos and medial canthal deformity secondary to severe facial contracture following electrical burn injury using silicone stent-assisted reconstruction.

Methods: A 24-year-old male sustained a high-voltage electrical injury after falling from an electric pole. He was initially treated by plastic surgery for extensive facial burns and contracture release. The right eye

had no light perception with a traumatic cataract and prior surgery. Meanwhile, the left eye retained minimal vision (6/40) but suffered from severe lagophthalmos and widened medial canthal distance due to contracture. Gold weight implantation, a standard option for lagophthalmos management, was not feasible in this patient due to extensive cicatricial changes and tissue condition. Reconstruction was performed by releasing the medial canthal contracture and intubating the inferior canaliculus with a silicone stent to restore canthal position and support eyelid closure.

Results: Postoperatively, the medial canthal position of the left eye was restored, lagophthalmos improved, and eyelid closure became more complete. The silicone stent provided stable support and reduced the risk of re-contracture. Functional and cosmetic outcomes were favourable compared with the preoperative state.

Conclusions: Silicone stent-assisted reconstruction offers a practical and effective solution for correcting lagophthalmos and medial canthal deformity caused by cicatricial eyelid contracture following electrical burn. This approach provided functional protection and aesthetic restoration in a young patient with limited remaining vision.

Abstract No.: 201516

Skin-Tarsus-Skin Combined With Orbicularis-Tarsus-Orbicularis Fixation Technique Creates a Stable and Natural-Appearing Double Eyelid

First Author: Qing YE

Purpose: In this study, the two surgical methods were integrated and applied to form a stable double eyelid that was close to the natural physiological structure and almost without any visible traces of surgery.

Methods: At the inner, middle, and outer sites of the double-eyelid line, 7-0 silk sutures were passed successively through the orbicularis oculi muscle at the lower edge of the incision, the tarsus/anterior tarsus tissue, and the orbicularis oculi muscle at the upper edge of the incision, and the skin was sutured with 8-0 thread. The remaining parts were fixed with 8-0 silk sutures successively passed through the skin at the lower edge of the incision, tarsus/ anterior tarsus tissue, and skin at the upper edge of the incision. Scar formation, incidence of complications, and patient satisfaction were observed and recorded during follow-up.

Results: All incisions healed well, without obvious congestion or swelling. All patients were followed up for 3 to 24 months (mean, 8 months). The curvature of the double eyelid was natural-appearing and smooth, and the shape was naturalistic. The scars were slight, and no depressed scars formed.

Conclusions: A skin-tarsus-skin combined with orbicularis fixation technique can produce a stable, long-lasting, natural-looking, smooth double eyelid.

Abstract No.: 202709

Stone in the Wings: A Rare Case of Sphenoid Osteoma-Induced Proptosis

First Author: Ragunath KUPPUSAMY

Co-Author(s): Umarani DHARMALINGAM, Yamini KANAGARAJAN

Purpose: To report a rare case of a giant sphenoid wing osteoma presenting with progressive proptosis and restricted elevation and abduction of the left eye. This case highlights the need to consider rare causes of proptosis alongside common differentials. Imaging—especially MRI—plays a crucial role in diagnosis and surgical planning by assessing lesion characteristics, soft tissue involvement, neurovascular compression, and intracranial extension, helping guide management and prevent complications

Methods: A 65-year-old female presented with a 2-year history of progressive left eye swelling and proptosis, along with limitations in upward and lateral gaze and binocular diplopia. Clinical examination revealed left-sided proptosis with restricted elevation and abduction, while visual acuity and fundus examination were normal. MRI demonstrated a dense, sclerotic, well-circumscribed bony mass arising from the left greater and lesser wing of the sphenoid bone, compressing the left orbital contents. The lesion was consistent with a giant osteoma. The patient was referred to neurosurgery for excision via craniotomy, considering the risk of irreversible complications due to mass effect

Results: The mass was successfully excised without complications. Postoperative recovery was uneventful, with resolution of proptosis and restoration of near-complete ocular motility

Conclusions: Giant osteomas of the sphenoid wing, though extremely rare, should be considered in the differential diagnosis of progressive proptosis and ocular motility restriction. This case highlights the crucial role of imaging in detecting atypical lesions often missed on clinical examination. While CT is preferred for evaluating bony tumors, MRI was used here to assess soft tissue involvement, neurovascular compression, and intracranial extension, essential for surgical planning.

Abstract No.: 206713**Successful Management of Epiphora in Punctal Agenesis With Three-Snip Punctoplasty***First Author: Safira NADIFA**Co-Author(s): Shanti F BOESOIRIE, Raden Angga KARTIWA, Niluh PUTU AYU DEWI WARDHANI, Mohamad RINALDI DAHLAN, Pradistya SYIFA YUDIASARI*

Purpose: Punctal agenesis is the absence of the lacrimal punctum caused by embryogenesis failure. This report aims to describe the management of punctal agenesis with a three-snip punctoplasty.

Methods: This report discusses a case involving a 31-year-old woman who presented with a history of constant tearing in the left eye since elementary school. She reported no ocular or systemic abnormalities. The patient's birth history was full-term and uneventful, with normal growth and development. Examination of the right eye was unremarkable. Examination of the left eye revealed the absence of both superior and inferior puncta, with a slight dimple in the expected area of the punctum. There were no signs of swelling, redness, discharge, or distichiasis in the punctal area. A diagnosis of punctal agenesis was established. The patient was managed with a three-snip punctoplasty procedure, which involves three sequential incisions to form a new punctal opening.

Results: The Anel test was performed immediately after the three-snip punctoplasty by evaluating the passage of fluorescein solution under endoscopic guidance. The test yielded a positive result, indicating the absence of nasolacrimal duct obstruction. One week after the procedure, the symptoms of epiphora had relieved, and both superior and inferior puncta were successfully formed.

Conclusions: Epiphora was the most common symptom of punctal agenesis. Surgical intervention, such as the three-snip punctoplasty, offers a minimally invasive treatment option with good outcomes.

Abstract No.: 200573**Surgical Outcome of Modified Frontalis Suspension Using Autogenous Fascia Lata for Congenital Ptosis in Children Under 3 Years Old***First Author: Nur Aulia AMIR**Co-Author(s): Yunia Irawati, Darmayanti SISWOYO, Hernawita SUHARKO*

Purpose: To describe the surgical outcome of modified frontalis suspension (FS) with autogenous fascia lata (AFL) in ptosis patients under three years of age with poor levator function.

Methods: Retrospective analytical study with 18 eyelids from 17 children who underwent FS with AFL.

All children underwent preoperative examination by assessing the size of the palpebral fissure, margin reflex distance, and levator function. Postoperative evaluation by assessing the functional and aesthetics of the eyelids, scars on the face and upper limbs and complications that occurred.

Results: The mean age at surgery was 21.61 months (12 months-36 months) with diagnosed congenital ptosis, consisting of 16 unilateral and 1 bilateral ptosis. 17 eyelids had excellent functional results, and only one had good results. 15 eyelids had excellent aesthetic results, and 3 eyelids had good results. There was one patient who developed postoperative keratitis. The surgical wound and limb area did not experience any complication. All patients had scars that were still visible but acceptable to the parents.

Conclusions: The frontalis suspension technique with AFL in this study is an effective, simple, and safe procedure performed in children under the age of three. Provides excellent postoperative evaluation results in terms of functionality, aesthetic, and can last for a long period of time.

Abstract No.: 203018**Teenager Patient With Relapsing Syphilitic Posterior Scleritis and Panophthalmitis***First Author: Chieh-hung YEN**Co-Author(s): Yue-ju TSAI*

Purpose: To report a case of recurrent syphilis causing syphilitic posterior scleritis, which developed into panophthalmitis.

Methods: Retrospective case report with medical images

Results: A 19-year-old female presented to a local ophthalmology clinic with unilateral ocular redness and swelling, and was initially diagnosed with conjunctivitis. Despite two to three weeks of medical treatment, the condition failed to improve, and she subsequently developed more pronounced eyelid and orbital swelling accompanied by decreased visual acuity. She was referred to our medical center with a working diagnosis of orbital cellulitis. Magnetic resonance imaging (MRI) revealed findings consistent with orbital cellulitis and panophthalmitis; however, ophthalmic examination suggested an atypical presentation of orbital cellulitis. Review of her past medical history revealed a documented syphilis infection several years earlier, for which she had completed standard treatment. The final diagnosis was syphilitic posterior scleritis with panophthalmitis.

Conclusions: Latent syphilis may relapse and manifest as severe ocular involvement, even in patients who have previously completed standard treatment. A thorough review of the patient's medical history was crucial for timely diagnosis in this case. The

patient exhibited no clinical features suggestive of neurosyphilis.

Abstract No.: 207370

The Impact of Steroid-Antibiotic Eye Ointment Use on Dry Anophthalmic Socket Syndrome: A Comparative Study Using Clinical and Cytological Tests

First Author: Mary Rose Pe YAN

Purpose: The paper aims to provide evidence supporting an effective, evidence-based management strategy for Dry Anophthalmic Socket Syndrome (DASS) to enhance clinical outcomes and patient quality of life. The report includes the clinical and cytological effects of steroid-antibiotic eye ointment in patients with DASS.

Methods: Patients with anophthalmic sockets and wearing ocular prosthesis were grouped into sockets not being treated with steroid-antibiotic ointment (Group A) and sockets receiving application of steroid-antibiotic ointment (Group B). For all participants in each group, the clinical history, OSDI symptom scores, slit-lamp findings, Schirmer tests, and conjunctival impression cytology were collected. Group A was started on steroid-antibiotic ointment treatment for 14 days and was re-evaluated.

Results: This study demonstrated measurable changes in both subjective symptoms and objective clinical signs of Dry Anophthalmic Socket Syndrome (DASS) after two weeks of steroid-antibiotic ointment use. Application of steroid-antibiotic ointment to anophthalmic sockets resulted in a reduction in the frequency and volume of mucoid discharge. There was improved comfort, reduced environmental sensitivity, and less perceived dryness.

Conclusions: This study highlights the potential of steroid-antibiotic eye ointment as an adjunctive treatment for Dry Anophthalmic Socket Syndrome (DASS), based on improvement in symptoms, tear film stability, ocular surface inflammation, and conjunctival cytology.

Abstract No.: 200277

The Most Underrated Villain in Dacryology-Canaliculitis: A Case Series

First Author: Raveesh BINDAL

Co-Author(s): Vishal SHARMA

Purpose: To highlight the need for accurate diagnosis and prompt treatment for cases of canaliculitis, and to prevent them from being missed or misdiagnosed.

Methods: Canaliculitis is a challenging condition to diagnose and treat. Herewith, we present a case series of 14 patients with Canaliculitis with varied clinical presentation and its management.

Results: It is an uncommon condition which ophthalmologists frequently misdiagnose and treat, usually as acute or chronic dacryocystitis, conjunctivitis, blepharitis, mucocele, and chalazion, thus leading to prolonged morbidity to the patient.

Conclusions: Canaliculitis is a challenging condition to eradicate, with majority cases either misdiagnosed or mistreated.

Abstract No.: 206141

The Repair of Ptosis Combining With Autologous Fat Grafting Secondary to TED Upper Eyelid Retraction operations—A Case Series of 3 Patients

First Author: Xiaoke YANG

Co-Author(s): Yu KONG

Purpose: To describe the repair of ptosis combining with autologous fat grafting secondary to TED upper eyelid retraction operations in 3 cases.

Methods: The authors present a retrospective case series of 4 eyelids of 3 patients with ptosis secondary to TED upper eyelid retraction operations. Patients underwent operations to treat ptosis secondary to over-excised Muller or levator muscles. Results were graded from eyelid measurements taken before and 2-4 weeks after reoperation.

Results: After reoperation, 3 eyelids of 3 patients had cosmetically and functionally satisfactory results. 1 eyelid was undercorrection and underwent another surgery to repair ptosis.

Conclusions: Overcorrection and autologous fat grafting is necessary in the repair of ptosis secondary to TED upper eyelid retraction operations.

Abstract No.: 200817

The Results of Cosmetic Eye Ring Surgery

First Author: Dong Ho LEE

Purpose: To evaluate the cosmetic effect and safety of eye enlargement surgery (Eye ring surgery)

Methods: It was conducted in 12 patients who underwent eye-ring surgery at our hospital from February 2024 to June 2024. Eye-ring surgery is a surgical procedure in which a thin silicone band in the shape of a ring is inserted into the space between the conjunctiva and sclera around the cornea. Two conjunctival incisions were made at 12 o'clock and 6 o'clock, and a subconjunctival tunnel was made and an implant was inserted. The progress of surgery was observed for more than 1 year and cosmetic satisfaction, complications, and revision surgery were investigated.

Results: A total of 12 patients were followed for more than 1 year, 1 male and 11 females. The mean age was 35.3 years, ranging from 26 to 60 years.

Cosmetic satisfaction after surgery was very high and all patients were satisfied. Postoperative complications initially included both subconjunctival hemorrhage and conjunctival edema, which improved after about two weeks. There were 4 cases where inflammation persisted and hyperemia continued after surgery, and in this cases, the ring was removed. After removing the ring, the conjunctiva healed without any complications in all cases. Ring removal was seen in early patients and there were no complications after learning curve.

Conclusions: The eye-ring surgery had a high postoperative cosmetic satisfaction. However, in some cases, it is necessary to remove it due to redness or conjunctival dehiscence.

Abstract No.: 206055

The Role of Gamma Knife Radiosurgery for Orbital Apex Cavernous Haemangioma

First Author: Yuen Tsing Adeline **HO**

Co-Author(s): Ka Ho Victor **HUI**

Purpose: To present a case of right orbital apex cavernous haemangioma, initially managed with medial orbital wall decompression but still suffered progressive visual deterioration, and to explore the role of Gamma Knife radiosurgery (GKRS) from existing literature.

Methods: A case of right orbital apex cavernous haemangioma presented with visual impairment was described, the relevant management options and outcome were discussed. A literature review of current evidence in the application of gamma knife surgery with an emphasis over its efficacy and safety were conducted.

Results: A 39-year-old male presented with right eye visual impairment due to an orbital apex cavernous haemangioma. Medial orbital wall decompression was performed by the ophthalmologist and the patient's visual acuity improved from 20/40 to 20/20, with recovery in his visual field defect. However, reemergence of right relative afferent pupillary defect in subsequent follow up and management options were discussed with the patient. Literature review reported Gamma knife radiosurgery can achieve a 70-80% chance of improving visual acuity with low risk of complications.

Conclusions: Orbital cavernous haemangioma can pose risk of visual impairment. Orbital wall decompression can provide temporary visual improvement in patients, but subsequent deterioration would be expected without definitive treatment for the cavernous haemangioma. For patients declining surgical resection, GKRS may serve as a potential option with reasonable rate of visual improvement.

Abstract No.: 201914

The Role of Mitochondria in the Regulation of Inflammation and Adipogenesis in an In Vitro Model of Graves' Orbitopathy

First Author: Gyeong Min **LEE**

Co-Author(s): Yeon Jeong **CHOI**, Sun Young **JANG**, Namju **KIM**, Ja Young **OH**, Jin Sook **YOON**

Purpose: To explore the role of mitochondrial function in the inflammatory and adipogenic responses of orbital fibroblasts (OFs) in Graves' orbitopathy (GO).

Methods: Orbital connective tissue was obtained from GO patients and control subjects. Primary OFs were cultured and stimulated with IL-1 β or TNF- α , with or without oligomycin (a mitochondrial ATP synthase inhibitor) or resveratrol (a mitochondrial enhancer). Inflammatory cytokine expression (IL-6, IL-8, PGE2, COX-2) was evaluated using qPCR, ELISA, and Western blotting. Phosphorylation of MEK1/2, NF- κ B, and p38 MAPK was analyzed. Mitochondrial activity was assessed by ATP levels, mtDNA copy number, mGOT activity, and MitoTracker staining. Adipogenesis was induced for 10 days, and lipid accumulation was assessed via Oil Red O staining and triglyceride assays.

Results: GO tissues exhibited significantly elevated levels of ATP, mtDNA, and mGOT. IL-1 β and TNF- α induced marked inflammatory cytokine expression in OFs, which was enhanced by oligomycin and suppressed by resveratrol. Oligomycin also increased, while resveratrol reduced, mitochondrial activity and adipogenic differentiation in OFs.

Conclusions: Mitochondrial dysfunction contributes to the proinflammatory and adipogenic phenotypes of GO orbital fibroblasts. Modulation of mitochondrial activity may serve as a novel therapeutic approach for GO.

Abstract No.: 200409

Think Twice: A Case of a Glial Heterotopia Mistaken for a Dacryocystocele in a Two-Year-Old Female From the Philippines

First Author: Louise **AGUIRRE**

Purpose: To present a case of Nasal Glial Heterotopia in a 2/F who showed the typical manifestations of a dacryocystocele.

Methods: CT scan results revealed a well-defined, ovoid, non-enhancing, cystic mass in the medial canthus of the right eye at the region of the right nasolacrimal gland, with appearance and location suggestive of a dacryocystocele. The patient underwent excision biopsy of the said mass.

Results: Histopathologic analysis revealed the specimen to be a nasal glial heterotopia.

Conclusions: When encountering a patient that presents with typical manifestations of a

dacryocystocele, one must also consider other differentials, including glial heterotopia. Imaging and histopathology play a key role in the diagnosis of such masses.

Abstract No.: 202538

Unusual Cause of Recurrent Acute Dacryocystitis: Ethmoid Mucocele Mimicking Nasolacrimal Duct Obstruction

First Author: Huy Thien Thanh HA

Co-Author(s): Quoc Anh NGUYEN

Purpose: To describe a rare presentation of recurrent dacryocystitis in a patient with patent lacrimal passage, secondary to compression from ethmoidal sinus mucocele.

Methods: A 45-year-old male presented with several episodes of acute dacryocystitis that responded to medical treatment. Between episodes, he did not experience epiphora. Clinical evaluation showed patent lacrimal syringing, but the dye disappearance test was positive with a high tear meniscus. Computed tomography revealed a well-defined, expansile hypodense lesion at the right lacrimal groove extending into the osseous nasolacrimal duct, consistent with an ethmoidal mucocele. In the caution of malignancy, explorative surgery was performed to clarify the underlying pathology.

Results: Intraoperatively, the nasolacrimal duct was found to have two compartments. The lateral compartment was continuous with the lacrimal sac, representing the physiological drainage pathway, while the medial compartment communicated with the ethmoidal sinus, consistent with a mucocele. Histopathologic analysis of the lesion demonstrated a lining of pseudostratified epithelium, confirming its sinus origin. This mucocele exerted compressive effect on the nasolacrimal duct, resulting in intermittent obstruction and recurrent dacryocystitis despite patent syringing. A standard external dacryocystorhinostomy was performed, re-establishing a functional drainage pathway. The patient recovered uneventfully, with no recurrence of infection during follow-up.

Conclusions: Recurrent dacryocystitis can occur even with apparent patency of the lacrimal drainage system. An ethmoidal sinus mucocele may masquerade as primary lacrimal disease by causing episodic obstruction. Combined imaging, histopathology, and careful surgical exploration are essential to establish the correct diagnosis and achieve successful outcomes.

Abstract No.: 200207

Upper Blepharoplasty Combine With Eyebrow Fixation on Treatment Severe Dermatochalasis

First Author: Nguyen THI THU HIEN

Co-Author(s): Huong DUONG DIEU

Purpose: Evaluate outcomes of 2 techniques: Upper Blepharoplasty and Eyebrow fixation throughout one skin incision.

Methods: A descriptive interventional study without a control group take part in 40 eyes with 6 months follow up. Patient selection: Dermatochalasis severe with eyebrow ptosis performing by one surgeon. Research indicators included: crease asymmetry, BFS, wrinkles, crease height, brow asymmetry, MRD1.

Results: 60% female, 60% age above 60 years old. MRD1 improve post operative, Almost Patients get symmetry in both eyes about crease and brow position. Postoperatively, improvement in both static and dynamic wrinkles at the lateral area. No severe complications can be found.

Conclusions: The combination of the two techniques maximizes both functional and aesthetic outcomes while minimizing scarring and other unwanted complications. This is a relatively safe and effective method for upper eyelid reconstruction.

Abstract No.: 201286

Using Artificial Intelligence to Diagnose Lacrimal Passage Obstructions Based on Dacryocystography Images

First Author: Hyun Jin SHIN

Purpose: Dacryocystography (DCG) has been used to illustrate the morphological and functional aspects of the lacrimal drainage system in the evaluation of patients with maxillofacial trauma and epiphora. This study developed deep-learning models for the automatic classification of the status of the lacrimal passage based on DCG

Methods: The authors collected 719 DCG images from 430 patients with nasolacrimal duct obstruction. The obstruction images were further manually categorized into 2 binary categories based on the location of the obstruction: (1) upper obstruction and (2) lower obstruction. An upper obstruction was defined as one occurring within the canaliculus or common canaliculus, whereas a lower obstruction was defined as one within the lacrimal sac, duct-sac junction, or nasolacrimal duct. The authors then established a deep-learning model to automatically determine whether a passage was patent or obstruction.

Results: The accuracy, precision, sensitivity, F1 score, and area under the receiver operating characteristic curve for the evaluation set of each deep-learning model were 99.3%, 98.8%, 99.5%, 99.2%, and 0.9998,

respectively, for obstruction detection, and 95.5%, 93.0%, 93.0%, 93.0%, and 0.9778 for classifying the obstruction location. Both receiver operating characteristic curves were skewed toward the left-upper region, indicating the high reliability of these models.

Conclusions: The high accuracies of the obstruction detection model (99.3%) and the obstruction classification model (95.5%) demonstrate that deep-learning models can be reliable diagnostic tools for DCG images.

Abstract No.: 202404

Using Transverse Superficial Expansion (TSFE) on Treatment Ptosis Recurrent

First Author: Nguyen **THI THU HIEN**

Co-Author(s): Dieu Huong **DUONG**, Thi Phuong Thao **NGUYEN**, Trong Van **PHAM**, Thi Thao **PHAN**, Thi Que Anh **VU**

Purpose: Evaluate outcomes of using TSFE on ptosis recurrent repair.

Methods: Uncontrolled interventional study.

Results: Time follow up at least 6 months. MRD1 increases. Symmetry about contour and crease. Complications: lagophthalmos, keratitis. Good results in functional and cosmetic. The surgical procedure achieved a good outcome in 96% of cases, with significant improvements in MRD1 and palpebral fissure height. Lid lag was observed in 100% of patients postoperatively, with subsequent improvement during the follow-up period.

Conclusions: The method employs local autologous material with good elasticity, ensuring proper eyelid and ocular function. It demonstrates long-lasting efficacy with favorable outcomes during the follow-up period. This represents a valuable alternative to synthetic materials in the management of recurrent ptosis.

Abstract No.: 200358

Varied Presentation of Isolated Orbital Rim Fractures With Displacement and Their Management in Two Cases

First Author: Vandana **SHARMA**

Co-Author(s): Easter **DAZIINE**, Jasneet **KAUR**

Purpose: To assess the clinical and radiological features of isolated orbital rim fractures and their management in two unique cases.

Methods: Two separate cases presented with history of trauma to face in a roadside accident. The first case complained of pain and diplopia on attempted upward movement in affected eye. Examination revealed a posteriorly displaced orbital rim fracture impinging on the posterior surface of globe and producing indenting effect on the retina visible on fundoscopy. The second

case complained of heaviness and diplopia in the affected eye. Examination revealed antero-inferiorly displaced fracture fragments of orbital rim impinging on the globe causing restricted movement and raised intraocular pressure.

Results: Surgical removal of the fracture fragments was done to achieve good cosmetic and functional results.

Conclusions: Orbital injuries may occur in the form of rim fractures in addition to blow out fractures. orbital rim fractures are usually asymptomatic and are left untreated. However, they may occasionally be symptomatic and need prompt surgical attention. Presentation of such fractures is highly varied and needs high degree of suspicion for diagnosis. Surgical intervention should be meticulous and guarded to remove only those parts of the bone that are causing significant morbidity.

Abstract No.: 204900

Vision-Saving Emergency Canthotomy in Orbital Compartment Syndrome Complicated by Orbital Cellulitis: From Hand Movements to 6/7.5 Visual Recovery

First Author: Irma Suwandi **SADIKIN**

Co-Author(s): Michael **HARTONO**, Agnesstacia Vania **LUMINTANG**, Rina La Distia **NORA**, Kiara **NURMATHIAS**

Purpose: Orbital compartment syndrome is a rare, sight-threatening emergency characterized by rapidly increasing intraorbital pressure that can cause irreversible vision loss. When complicated by orbital cellulitis, it creates secondary glaucoma and optic nerve compression requiring immediate surgical intervention. Purpose: This case demonstrates successful emergency management of orbital compartment syndrome, emphasizing rapid recognition and intervention in preserving vision.

Methods: A 68-year-old female presented with progressive right eyelid swelling over 2 weeks, with acute worsening 2 days prior to admission. Examination revealed restricted ocular motility, visual acuity reduced to hand movements, elevated intraocular pressure (57 mmHg), non-axial inferonasal proptosis, severe conjunctival chemosis, and grade 2 relative afferent pupillary defect with optic nerve pallor. Laboratory studies showed leukocytosis with elevated inflammatory markers. Orbital CT demonstrated significant soft tissue thickening in the right periorbital area with eyeball tenting and optic nerve stretching.

Results: Emergency canthotomy and cantholysis were performed, revealing bleeding and purulent material. Intraocular pressure decreased from 57 mmHg to 12 mmHg postoperatively. Staphylococcus aureus was identified and treated with appropriate antibiotics. High-dose steroids were administered for optic nerve compression. Visual recovery was remarkable: acuity improved from hand movements to 6/21 at one

month and 6/7.5 at two months. At six months, vision remained stable with minimal OCT and perimetry changes, maintaining 76% visual field.

Conclusions: Immediate recognition and emergency canthotomy with cantholysis successfully preserved vision in orbital compartment syndrome with orbital cellulitis. Despite severe initial presentation, prompt surgical intervention resulted in excellent visual recovery, emphasizing the critical importance of early identification and immediate decompressive surgery.

Abstract No.: 206560

When the Sinus Turns Sinister: Compressive Optic Neuropathy From a Sphenoid Sinus Mucocele

First Author: Maryanne ROMERO

Co-Author(s): Blanche LIM, Gangadhara SUNDAR

Purpose: To describe a rare case of orbital compressive neuropathy caused by a sphenoid sinus mucocele, highlighting the importance of considering paranasal sinus pathology in the differential diagnosis of sudden visual loss, and emphasizing the critical value of prompt surgical decompression.

Methods: A 64-year-old patient presented with hand movement vision in the right eye. Ophthalmic evaluation revealed a grade 3 relative afferent pupillary defect consistent with an optic neuropathy, but no evidence of disc pallor on fundus exam. MRI and CT imaging demonstrated a sphenoid sinus mucocele with compression of the optic nerve at the orbital apex. The patient promptly underwent endoscopic endonasal orbital decompression with marsupialization of the mucocele, followed by a post-operative course of dexamethasone.

Results: One day postoperatively, vision improved to counting fingers at close range, with 1/15 plates identified on the Ishihara test. Two weeks post-orbital decompression, vision had improved to 6/18, with all 15 plates of the Ishihara colour chart identified correctly. Follow-up imaging also confirmed complete drainage of the mucocele with adequate decompression of the orbital apex.

Conclusions: Early recognition and timely decompression of sphenoid mucoceles are crucial to prevent permanent vision loss and can result in remarkable visual recovery, particularly when presentation is acute and optic disc still pink, indicating potential for recovery.

Pediatric Ophthalmology and Strabismus

Abstract No.: 206016

A Case of Retinopathy Caused by Dual Variants in CRB1 and ABCA4

First Author: Yuke TIAN

Co-Author(s): Yun LI

Purpose: To report the clinical and molecular characteristics of a child with co-occurring variants in CRB1 and ABCA4.

Methods: A 3-year-9-month-old boy presented with bilateral decreased vision for more than two years, accompanied by nystagmus, strabismus, nyctalopia, and positive oculodigital sign. A comprehensive ophthalmic examination and whole-exome sequencing (WES) were performed.

Results: Visual acuity was unmeasurable due to poor cooperation and intraocular pressures were within normal limits. Cycloplegic refraction revealed high hyperopia bilaterally. Color fundus photography showed macular atrophy with yellowish changes, numerous yellow flecks, and scattered pigment clumps. Optical coherence tomography showed atrophy and thinning of the macular fovea, retinal pigment epithelium (RPE) and outer retina, as well as diffuse inner retinal thickening with indistinct lamination, along with scattered intraretinal hyperreflective dots. The parents were nonconsanguineous. Family history revealed that three paternal relatives had visual impairment attributable to homozygous pathogenic CRB1 variants. WES identified compound-heterozygous pathogenic variants in CRB1 in the proband, establishing a diagnosis of Leber congenital amaurosis type 8 (LCA8). Additionally, one pathogenic variant and one variant of uncertain significance (VUS) were identified in ABCA4, suggesting a possible concomitant diagnosis of Stargardt disease type 1 (STGD1).

Conclusions: To our knowledge, this is the first report of co-occurring variants in CRB1 and ABCA4. The diagnosis of LCA8 is definitive, whereas evidence for ABCA4-related STGD1 remains insufficient. VUS should be interpreted cautiously in a multigenic context, integrating phenotype-genotype correlation and segregation analysis within the family.

Abstract No.: 202373**A Perfect Storm in a Young Lens: A Case Report of Rapidly Progressive Bilateral Intumescent Cataracts in Beta-Thalassemia on Deferiprone Therapy and Management of the Argentinian Flag Sign***First Author: Arnan LIMMAHACHAI*

Purpose: To report a rare case of rapidly progressive bilateral intumescent cataracts in a pediatric patient with beta-thalassemia, discussing its multifactorial pathogenesis, surgical challenges, and the importance of ophthalmic monitoring.

Methods: We describe an 11-year-old girl with beta-thalassemia on deferiprone chelation therapy who presented with a three-week history of rapidly worsening vision. We detail the clinical presentation, surgical management, and postoperative course.

Results: On presentation, visual acuity was Hand Motion in the right eye and Finger Counting in the left. Slit-lamp examination revealed bilateral intumescent cataracts, more advanced in the right eye. The patient underwent phacoaspiration with in-the-bag intraocular lens (IOL) implantation in both eyes. The procedure was uneventful in the right eye. However, an Argentinian flag sign developed during capsulorhexis in the left eye, which was successfully managed, allowing for secure in-the-bag IOL placement. Three months postoperatively, her best-corrected visual acuity was 6/6 in both eyes.

Conclusions: Rapid cataract formation in young beta-thalassemia patients has a multifactorial pathogenesis, including iron overload, oxidative stress, and chelation therapy effects. Despite surgical complexities like the Argentinian flag sign, timely intervention with meticulous technique can achieve excellent visual rehabilitation. This case underscores the critical importance of regular ophthalmological monitoring for early detection and management of vision-threatening complications in this high-risk population.

Abstract No.: 205754**A Seven-Year Multicenter Cross-sectional Study on the Epidemiology of Childhood Chalazion in China***First Author: Jingjing JIANG
Co-Author(s): Li LI, Chan LIU*

Purpose: This large-scale multicenter cross-sectional study aimed to characterize the epidemiological patterns and identify risk factors for childhood chalazion requiring surgical intervention across children's medical centers in China.

Methods: A seven-year multicenter hospital-based cross-sectional study. Data were extracted from the Futang Updating Medical Records (FUTURE) system, including 117,009 pediatric patients who underwent

ophthalmic surgery under general anesthesia across 22 tertiary hospitals in China from 2016 to 2022. Participants were grouped by age, season, and geographic region (North vs. South China).

Results: Chalazion excision accounted for 28.62% of all pediatric ophthalmic surgeries, with stable annual proportions (25%-33%). The majority of cases (66.10%) occurred in toddlers aged 1-3 years, with a mean age of 3.3 years. Females predominated (54.57%), showing a higher risk than males (adjusted odds ratio, aOR = 1.52, 95% CI: 1.47-1.55, $P < 0.0001$). Geographic analysis revealed an 83% higher risk in North China compared to South China (aOR = 1.83, 95% CI: 1.77-1.88, $P < 0.0001$). Seasonally, autumn (aOR = 1.68, 95% CI: 1.61-1.75, $P < 0.0001$) and winter (aOR = 1.71, 95% CI: 1.64-1.77, $P < 0.0001$) were associated with significantly higher risks than summer.

Conclusions: This large-scale study identifies key demographic and environmental risk factors for childhood chalazion requiring surgery in China, including toddlers aged 1-3 years, females, residents in North China, and occurrence during colder seasons.

Abstract No.: 203502**A Study About the Relationship Between Growth and Myopia Progression in Korean Children***First Author: Hyuna KIM*

Purpose: This study investigated predictors of myopia progression by analyzing associations between ocular changes and growth-related indicators in Korean children and adolescents.

Methods: A prospective study was conducted from March 2023 to August 2025 in participants aged 5-17 years. Every three months, growth parameters (height, weight, serum IGF-1/BP3, bone age) and ocular measurements (visual acuity, cycloplegic refraction, axial length, choroidal thickness by OCT, ERG) were assessed. Questionnaires recorded parental myopia, near work, and outdoor activity. Factors associated with axial length changes were analyzed in subjects followed for ≥ 18 months.

Results: Fifty-three participants (mean age 8.71 ± 1.97 years; 14 boys, 28 girls) were enrolled with a mean follow-up of 12.75 ± 0.53 months. During follow-up, mean height increased from 133.33 ± 14.33 cm to 142.91 ± 10.99 cm and weight from 31.02 ± 9.96 kg to 34.84 ± 9.16 kg. Refractive error progressed from -2.01 ± 2.21 D to -2.56 ± 2.10 D, and axial length increased from 23.66 ± 1.28 mm to 24.13 ± 1.04 mm. Multiple regression showed initial axial length correlated with height, while axial length change was associated with age, follow-up duration, serum BP3, and ERG 30Hz flicker implicit time.

Conclusions: Taller children exhibited longer baseline axial lengths, independent of age and follow-up. Axial

elongation over one year was linked to age, BP3, and ERG measures, suggesting that growth and ocular parameters may predict myopia progression. Despite limitations of small sample size and short follow-up, these findings highlight potential markers for identifying children at risk of high myopia.

Abstract No.: 203551

Acute Acquired Comitant Esotropia: Unmasking the Enigma of Sudden-Onset Esodeviation in Adolescents and Adults

First Author: Rozalina LOEBIS

Purpose: To elucidate the clinical manifestation, therapeutic approaches, and surgical results of three cases with AACE, highlighting the significance of prompt identification and surgery.

Methods: Three patients, aged 13, 20, and 35 years, exhibited sudden-onset diplopia with concomitant esodeviation lasting for 7 to 12 months. Thorough ophthalmic evaluations encompassed visual acuity, cycloplegic refraction, Worth Four Dot Test, motility assessment, and posterior segment examination. All patients first underwent conservative treatment, which included complete optical correction, less screen exposure, increased outside activity, and adherence to the 20-20-20 rule. Surgical correction was undertaken after 6 months of persistent esodeviation.

Results: All cases exhibited 40 prism diopters of comitant esotropia at distance and near, with suppression patterns varying between patients. Conservative management failed to improve alignment. Surgical procedures included tailored medial rectus recessions, with an additional lateral rectus recession in one highly myopic case. All patients achieved orthophoria postoperatively. At 3-month follow-up, two patients maintained orthophoria with stable vision, while one was lost to follow-up.

Conclusions: All cases demonstrated 40 prism diopters of comitant esotropia at both distance and near, with variations in suppression patterns among patients. Conservative management did not result in improved alignment. Surgical interventions comprised customized medial rectus recessions, along with an additional lateral rectus recession in one case of significant myopia. All patients attained orthophoria following the surgical procedure. At the three-month follow-up, three patients exhibited orthophoria with stable vision.

Abstract No.: 204836

Affecting Factors of Visual Outcome in Pediatric Cataract Surgery

First Author: Ita CONITA

Co-Author(s): Liana EKOWATI, Arnila SAUBIG

Purpose: To analyze the factors that influence the visual outcome of pediatric cataract surgery.

Methods: This is a prospective cohort study. Pediatric cataract patients undergoing cataract surgery underwent preoperative and 1-month post-operative examinations. Postoperative visual outcomes were categorized into good and poor. Bivariate analysis uses the Chi-square test, the Fisher Exact test, the T-test, and the Mann-Whitney test.

Results: A total of 31 eye samples from pediatric cataract subjects were analyzed. Cataract onset was at a median age of 4 (0-8) years, and age at the time of surgery was 8 (6-14) years. Cataract onset and age at surgery had a significant effect on visual outcome, with $p = 0.037$ and $p = 0.010$. Good preoperative vision (≤ 0.48 LogMAR) was 2.6 times, RR 2.625 ($p = 0.001$), mild-moderate amblyopia was 4.1 times, RR 4.118 ($p = 0.000$), and cataract duration ≤ 63 months was 2, 7 times, RR 2.738 ($p = 0.037$), affecting good visual outcomes after pediatric cataract surgery

Conclusions: Cataract onset, age at surgery, preoperative visual acuity, cataract duration, and degree of amblyopia influence visual outcomes in pediatric cataract surgery.

Abstract No.: 203547

Age-Based Comparison of Surgical Correction Angles in Dose-Response in Bilateral Lateral Rectus Recession for Exotropia

First Author: Kosei OGA

Co-Author(s): Yuka MORITA, Tetsuro OSHIKA

Purpose: To evaluate the influence of age on the association between patient age and the surgical correction effect of bilateral lateral rectus (LR) recession (BLR) for exotropia.

Methods: This retrospective study included 41 patients who underwent bilateral BLR recession for exotropia. Patients were divided into four age groups: pediatric (4–14 years, $n = 10$), young adult (15–39 years, $n = 10$), middle-aged (40–59 years, $n = 11$), and elderly (≥ 60 years, $n = 10$). Exclusion criteria were Patients with high myopia (spherical equivalent ≤ -6.0 D or axial length ≥ 26 mm), reduced best-corrected visual acuity, or non-concomitant exotropia were excluded. Surgical correction per millimeter (mm) of LR recession, expressed in prism diopters (PD)/mm, was calculated at early (within 2 weeks) and late (2–6 months) postoperative follow-ups. One-way ANOVA with Tukey's post hoc test was used for statistical analysis.

Results: Mean early postoperative correction (PD/mm) was 1.990, 2.29730, 1.89790, and 2.651 in pediatric, young adult, middle-aged, and elderly groups, respectively, with no significant intergroup differences ($P = 0.052$). Late postoperative correction (PD/mm) was 1.69870, 2.09810, 1.700, and 2.8107, respectively, showing significant group differences ($P < 0.05$). Post hoc analysis demonstrated that elderly patients achieved significantly greater correction. Post hoc analysis showed the elderly group had significantly greater correction than pediatric and middle-aged groups ($P < 0.05$).

Conclusions: Elderly patients demonstrated a greater surgical correction effect after bilateral LR recession BLR for exotropia, suggesting that age may be an important factor in surgical planning indicating that age may influence the surgical dose-response relationship.

Abstract No.: 205231

Anatomical and Visual Outcomes of Vitrectomy in Infants With Stage 4 and 5 Retinopathy of Prematurity

First Author: Xu Kent **PEE**

Co-Author(s): Li Yen **CHAN**, Jason Allan **CHEAH**, Jamalia **RAHMAT**, Wan Wen **SOH**

Purpose: To study the post-vitrectomy anatomical and visual outcomes of stage 4 and 5 retinopathy of prematurity (ROP).

Methods: Retrospective cohort review of medical records of infants diagnosed with stage 4 and 5 ROP who underwent vitrectomy between 2016 and 2020 in a tertiary eye centre in Kuala Lumpur.

Results: Eighteen eyes of 11 infants (stage 4A ROP [$n=4$], stage 4B ROP [$n=4$], and stage 5 ROP [$n=10$]) were examined. The mean gestational age was 27.8 weeks (range 23 – 33 weeks), and the mean birth weight was 1095 grams (range 560 – 1680 grams). The mean corrected gestational age at surgery was 54.2 weeks (range 38 – 88 weeks). Retina reattachment was achieved in 5/18 (27.8%). The anatomical success rate was 50% in stage 4A, 50% in stage 4B, and 10% in stage 5. Four eyes (22.2%) underwent a second surgery. The mean follow-up period was 57.1 months. Among the 5 eyes with reattached retina, 3 eyes (60%) had a final visual acuity (VA) of better than light perception, while 6 eyes (33.3%) had a final VA of no light perception. Postoperative intraocular hemorrhage occurred in 3 eyes (16.7%). Long-term complications included cornea opacity ($n=4$, 22.2%), secondary glaucoma ($n=2$, 11.1%), phthisis bulbi ($n=2$, 11.1%), and secondary cataract ($n=1$, 5.6%).

Conclusions: Vitrectomy for stage 4 ROP resulted in relatively good anatomical and visual outcomes, but poor outcomes in stage 5 ROP. Vitrectomy in stage 5 ROP is controversial.

Abstract No.: 203776

Anisometropia in Preschool and School-Aged Children

First Author: Yu-chieh **YANG**

Co-Author(s): Chia-wei **LEE**, Der-chong **TSAI**, Chiao-yu **WANG**, Hsin-yu **YANG**

Purpose: This study investigates the prevalence, incidence, progression of anisometropia, and its associations with children's lifestyle factors in a cohort of in Yilan, Taiwan.

Methods: This research is a secondary analysis of data collected from a cohort study involving primary school and preschool students in Yilan County. Comprehensive data, including cycloplegic refraction and caregiver-administered questionnaires were collected. Anisometropia was defined as SE difference of $\geq 1.00D$ after cycloplegia.

Results: Between December 2023 and March 2024, 1,554 primary school children were screened and linked to preschool data. After excluding those with incomplete data ($n=1$), orthokeratology users ($n=2$), and amblyopia history ($n=39$), 1,511 children were included in the analysis. At baseline, 70 children (4.6%) had anisometropia (mean interocular SE difference: $1.38 \pm 0.53D$), with a mean interocular SE change of $-0.72 \pm 0.73 D/year$. Only 5 of these (7.1%) showed anisometropia progression $\geq 0.5D/year$. Children with progression had significantly faster SE progression rate in the more myopic eye compared to those without progression (-0.47 ± 0.41 vs. 0.22 ± 0.63 , $p = 0.019$). Among the 1,441 initially isometropic children, 72 (5.0%) developed anisometropia in primary school. Incident cases were more likely to have astigmatism $\geq 1.50D$ (40.3% vs. 12.9%, $p < 0.001$), spend less than 30 minutes outdoors on weekdays (28.6% vs. 41.2%, $p = 0.016$), and participate less in after-school sports (29.2% vs. 47.5%, $p = 0.002$). In multivariable analysis, astigmatism $\geq 1.50D$ (adjusted OR: 4.448; 95% CI: 2.679–7.386; $p < 0.001$), weekday outdoor time < 30 minutes/day (adjusted OR: 0.549; 95% CI: 0.332–0.942; $p = 0.029$), and not participating in after-school sports classes (adjusted OR: 0.491; 95% CI: 0.287–0.842; $p = 0.010$) were significant predictors of anisometropia onset.

Conclusions: The prevalence of anisometropia among preschool children in Yilan was 4.6%, and the incidence rate was 5.0%. Children who had significant astigmatism, spent less time outdoors and did not participate in after-school sports classes were more likely to develop anisometropia.

Abstract No.: 205130

Application of Computer-Aided Objective Quantitative Diagnosis Technology in the Evaluation of Surgical Outcomes for Infantile Congenital Esotropia

First Author: Daoman **XIANG**

Co-Author(s): Wensi **CHEN**

Purpose: To evaluate the application value of computer-aided objective quantitative diagnosis technology in the preoperative assessment and postoperative outcome evaluation of infantile congenital esotropia, and to analyze surgical outcomes across different age groups.

Methods: This retrospective case series study included 50 children with congenital esotropia, aged from 3 to 36 months, who were treated between September 2021 and December 2024. The «Computer-Aided Objective Quantitative Diagnosis Technology for Strabismus» was employed preoperatively to measure the angle of deviation objectively. All patients subsequently underwent surgical correction. Postoperative orthophoria rates at various intervals were compared among different age groups.

Results: The objective quantitative technology successfully obtained precise angle of deviation measurements in all infants. Postoperative orthophoria rates were favorable across all groups. Statistical analysis revealed no significant difference in orthophoria rates among different age groups at various postoperative follow-up points ($P > 0.05$).

Conclusions: The computer-aided objective quantitative diagnosis technology provides reliable data for infants who cannot cooperate with conventional examinations, serving as a cornerstone for precise surgery. This study demonstrates that, based on accurate diagnosis, surgical correction for congenital esotropia in infants under 36 months of age can achieve a high orthophoria rate comparable to that of older children. Early intervention may maximize the opportunity for the development of binocular vision and fusion function.

Abstract No.: 205704

Association Between Myopia and Intermittent Exotropia in Chinese Children

First Author: Qingyu **MENG**

Co-Author(s): Xi **WU**

Purpose: To compare the degree of myopia between the dominant and non-dominant eyes in children with intermittent exotropia (IXT) in China.

Methods: A total of 199 IXT children with myopia were included in this retrospective study and were divided into two groups according to the difference between near and distance exodeviation: basic IXT and convergence insufficiency (CI) IXT. Refractive errors

were analyzed by spherical equivalent (SE) values. Patients were further stratified into the anisometropia group and the non-anisometropia group.

Results: There were 127 patients in the CI IXT group, with a near exodeviation of $46.94 \pm 20.53\Delta$ and a distance exodeviation of $28.36 \pm 14.34\Delta$, and there were 72 (36.2%) patients in the basic IXT group, with a near exodeviation of $37.68 \pm 22.21\Delta$ and a distance exodeviation of $33.21 \pm 23.96\Delta$. The near exodeviation was significantly larger in the CI group than in the basic IXT group ($P < 0.001$). In the CI IXT group, the mean SE was -2.09 ± 1.45 diopters (D) in the dominant eye and -2.53 ± 1.44 D in the non-dominant eye, while in the basic IXT group, the mean SE was -2.46 ± 1.56 D in the dominant eye and -2.89 ± 1.37 D in the non-dominant eye. The anisometropia group included 43 patients, while non-anisometropia group included 156 patients. The near and distance exodeviation in the anisometropia group were $45.26 \pm 24.41\Delta$ and $33.53 \pm 23.31\Delta$, respectively, and those in the non-anisometropia group were $43.42 \pm 20.69\Delta$ and $29.07 \pm 16.84\Delta$, respectively. There were no significant differences in near and distance deviation between the two groups. The SE of the dominant eye was less myopic than that of the non-dominant eye in both the CI and anisometropia groups ($P = 0.002$ and $P < 0.001$, respectively).

Conclusions: Our study revealed that convergence insufficiency IXT is more common than the basic type in the pediatric myopic population and is characterized by higher inter-eye differences of myopia. The dominant eye was found to be less myopic in IXT patients, particularly in those with convergence insufficiency and anisometropia.

Abstract No.: 201957

Balanced vs. Imbalanced Binocular Stimulation Differentially Impacts the Visual Cortical Activity in Amblyopic Children

First Author: Hong **LIU**

Co-Author(s): Yuanyang **HUANG**

Purpose: To investigate the changes in neural activity in V1, V2, and V3 visual cortical areas of control participants and amblyopic patients during visual stimulation under four differing visual inputs.

Methods: A fast meridional retinotopic mapping paradigm was employed to efficiently localize regions of interest (ROIs) within the visual cortex. Four types of visual stimulation were achieved using a spatiotemporally modulating checkerboard paired with anaglyph red-blue glasses: amblyopic or non-dominant eye only(AE), fellow or dominant eye only(FE), balanced dichoptic(BE), and imbalanced-dichoptic stimulation (DE).

Results: Amblyopic patients exhibit significantly reduced neural activity across V1, V2, and V3

compared to control participants. DE resulted in the most significant reductions in cortical responses for amblyopes. In the control group, significant differences were observed between AE and BE, FE and BE, and BE and DE, while no significant differences were found between AE and DE. In the amblyopic group, significant differences were identified between AE and DE, FE and DE, AE and BE, FE and BE, as well as between BE and DE.

Conclusions: Imbalanced dichoptic stimulation resulted in the largest and most significant reductions in cortical responses, observed exclusively in the patient group, indicating a suppressive effect from the fellow eye. The data support the view that there is more scope for recovery of neural response levels with imbalanced-dichoptic stimulation compared to monocular approaches. Our experimental protocols and data provide direct comparative insights into developing more effective rehabilitation protocols for amblyopic children in the future.

Abstract No.: 202466

Bilateral Ankyloblepharon Filiforme Adnatum: A Case Report Highlighting the Critical Need for Early Recognition and Treatment

First Author: Takashi **NEGISHI**

Co-Author(s): Megumi **ITO**, Chihiro **KOIWA**, Chiaki **NAKAMURA**, Shintaro **NAKAO**

Purpose: To report a case of ankyloblepharon filiforme adnatum (AFA) which is a rare congenital anomaly characterized by bands of tissue connecting the upper and lower eyelids, which can lead to visual deprivation and subsequent amblyopia if left untreated.

Methods: Case report

Results: A one-month-old girl presented with bilateral eyelid adhesions causing restricted eyelid opening. Slit lamp examination revealed tissue bands connecting the eyelids bilaterally, with more severe restriction on the left side. Due to the risk of deprivation amblyopia during the critical period of visual development, surgical separation of the eyelid adhesions was performed under general anesthesia at three months of age using electrocautery. Histopathological examination confirmed keratinized stratified squamous epithelium. Postoperatively, significant hyperopia and anisometropia were noted, which showed myopic shift at two-month follow-up. Both eyelids remained well separated with good fixation and tracking in both eyes.

Conclusions: This case emphasizes the critical importance of early recognition and prompt surgical intervention in AFA to prevent visual developmental complications. Even though anisometropia was observed just after the surgery, emmetropization occurred within three months. Timely management is essential to avoid deprivation amblyopia and

anisometropia, particularly in unilateral or extensive cases.

Abstract No.: 203110

Bilateral Congenital Dacryocystocele: Successful Management With Nasal Endoscopy-Assisted Needle Aspiration

First Author: Kuo Hua **JUAN**

Co-Author(s): Wei Tsun **CHEN**

Purpose: Congenital dacryocystocele is a rare neonatal condition that presents significant diagnostic and therapeutic challenges, especially when conservative treatments fail. This case report aims to highlight the importance of early and comprehensive evaluation, including MRI, and to support nasal endoscopy-assisted needle aspiration as a timely intervention.

Methods: Case report.

Results: A 1-day-old male infant presented with a bluish mass below the left medial canthus, progressing to bilateral lesions within three days. Comprehensive ocular examination and MRI confirmed bilateral dacryocystocele with nasolacrimal duct dilation. Conservative management, including digital compression and topical antibiotics, was ineffective. On day ten, nasal endoscopy-assisted needle aspiration was performed to drain fluid from both cysts. The bilateral dacryocystoceles resolved completely without complications. The patient was monitored for seven months, with no recurrence observed.

Conclusions: This case underscores the rarity of congenital dacryocystocele at birth and demonstrates the critical need for a thorough evaluation, including imaging, in managing such cases. Our report highlights that when conservative treatment fails, prompt intervention with nasal endoscopy-assisted needle aspiration can prevent serious complications like airway obstruction or cellulitis. This case provides valuable insights into the management of this rare condition and reinforces the need for timely, decisive action to ensure optimal outcomes.

Abstract No.: 203849

Binocular Diplopia After Cataract Surgery: Incidence and Associated Factors in Tertiary Teaching Eye Center

First Author: Chayanan **WANGPAITON**

Co-Author(s): Wasawat **SERMSRIPONG**, Thammanoon **SURACHATKUMTONEKUL**

Purpose: To determine the incidence and identify associated factors of binocular diplopia following cataract surgery at Siriraj Hospital, Mahidol University.

Methods: This retrospective case-control study analyzed data from patients who underwent cataract surgery at Siriraj Hospital between January 2000 and June 2023. Postoperative binocular diplopia

was defined as symptomatic binocular diplopia with documented ocular misalignment on examination within 90 days after cataract surgery^{8,11}, identified using ICD-10 diagnosis codes. Collected data included patient demographics, underlying medical conditions, axial length, and operative details such as the type of surgery and anesthesia. Each case was matched with ten controls¹⁰ based on age, sex, and year of surgery. Statistical analyses included Chi-square tests, paired t-tests, and logistic regression.

Results: Among 90,885 patients who underwent cataract surgery, 13 developed postoperative binocular diplopia, yielding an incidence of 0.0143%, which is notably lower than previously reported rates (0.18–0.85%³⁻⁷). The mean age was 70.38 years, and 69.23% were female. Esotropia was the most common type of strabismus (46.15%), and muscle restriction or paresis was the most frequent underlying cause (53.85%). A significantly longer axial length was observed in cases compared to controls (24.58 ± 2.30 mm vs. 23.40 ± 1.33 mm; $p = 0.024$; odds ratio: 1.426, 95% CI: 1.047–1.942). No significant associations were found with diabetes mellitus, hypertension, dyslipidemia, or anesthesia type.

Conclusions: The incidence of binocular diplopia following cataract surgery was low in this study. A longer axial length was significantly associated with an increased risk of developing this complication. Awareness of this risk factor may inform preoperative counseling and management strategies.

Abstract No.: 206805

Biometry Changes in Children Undergoing Secondary Intraocular Lens Implantation After Congenital Cataract Surgery

First Author: Hening **NALURIA**
Co-Author(s): Srijana **ADHIKARI**

Purpose: To evaluate biometric changes prior to cataract extraction and secondary intraocular lens (IOL) implantation.

Methods: This is a retrospective study of electronic medical records (EMR) involving 118 pediatric patients with congenital cataract. They underwent surgery within 2010 to 2020. The patients recorded with cataract extraction and secondary IOL implantation were noted to collect the data concerning date of birth, gender, age of cataract extraction and of secondary IOL implantation, type of cataract, and side of affected eyes. Keratometry readings, axial length, and resulting intraocular lens power calculation were also collected.

Results: A total of 118 patients were included in the study, six with the unilateral cataract and 112 with the bilateral cataract. The most patient age who underwent secondary IOL implantation were one to five years old. The male patients with bilateral cataracts are 56.3% and the remaining are the female patients.

The most common type of cataract was total cataract, 50% (unilateral) and 76.8% (bilateral) respectively. The average axial length increased from 19.32 to 21.48 (P-value of 0.000). There was no difference between K1 and K2 parameters between prior to cataract extraction and secondary IOL implantation, the average K1 value decreased slightly from 42.71 to 42.60 (P-value of 0.635) and the average K2 increased from 44.89 to 48.06 (P-value of 0.217).

Conclusions: The patients showed biometric changes between prior to cataract extraction and secondary IOL implantation.

Abstract No.: 208319

Blau Syndrome Presenting With Diffuse Polyarthritis and Bilateral Intermediate Uveitis in a Child: A Case Report

First Author: Wency **TANG**
Co-Author(s): Charlene **YIM**

Purpose: To report a rare case of Blau syndrome with systemic and ocular manifestations at the age of two, emphasizing the importance of recognizing characteristic clinical features to facilitate early diagnosis and management.

Methods: A retrospective case review was conducted on a pediatric patient presenting with dermatologic, musculoskeletal, and ocular symptoms since the age of two. Clinical findings, ophthalmic imaging, and systemic workup were analyzed. Genetic testing for the NOD2 mutation was performed to confirm the diagnosis.

Results: A child presented at two years of age with diffuse erythematous skin rash and progressive joint stiffness involving both knees, elbows, and proximal interphalangeal joints. Recurrent left eye pain developed subsequently. Ocular examination revealed bilateral intermediate uveitis characterized by vitreous snowballs, choroidal foci, and mild anterior chamber reaction in the left eye. Imaging demonstrated synovial thickening consistent with tenosynovitis. Genetic analysis confirmed a heterozygous NOD2 gene mutation, establishing the diagnosis of Blau syndrome. The patient responded to systemic corticosteroids and immunomodulatory therapy, with improvement in joint mobility and ocular inflammation.

Conclusions: Blau syndrome should be considered in young patients presenting with the triad of granulomatous dermatitis, symmetric polyarthritis, and uveitis. Early recognition and genetic confirmation are critical to initiating timely immunosuppressive therapy, preventing visual morbidity, and long-term joint deformities. Ophthalmologists play a key role in identifying ocular features that may lead to diagnosis in this multisystem condition.

Abstract No.: 208305**Botulinum Toxin as an Initial Therapy for Management of Sixth Nerve Palsies Caused by Nasopharyngeal Carcinomas***First Author: Emily Suhan WONG**Co-Author(s): Carol LAM, Winnie LAU, Cheuk Sing YAM*

Purpose: The purpose of this study is to evaluate the efficacy and safety of botulinum toxin injection as a primary treatment for strabismus in a cohort of patients with nasopharyngeal carcinoma (NPC)-related chronic sixth nerve palsy.

Methods: We retrospectively reviewed all cases of NPC-related sixth nerve palsy receiving botulinum toxin injection in the Hong Kong Eye Hospital between January 2009 and January 2016. Only cases with diplopia for at least 6 months; and failed a trial of Fresnel prism therapy were recruited. We excluded cases with prior strabismus surgery and multiple cranial nerve palsies. Patients were offered botulinum toxin injection as primary treatment for their strabismus and were given further injections or offered surgery if diplopia persisted. Success with botulinum toxin was defined as a final distant orthophoria of <15 PD in primary gaze, no diplopia in primary position, and no head turn, as measured 6 months after the last injection, without requiring a second treatment.

Results: A total of 25 patients were included in the study. All patients received concurrent chemo-radiotherapy for NPC. There was a statistically significant reduction in the mean deviation at distant after the last injection compared to that at presentation ($P < 0.001$, Wilcoxin signed rank test). Overall, 7 patients (28%) achieved clinical success, and 15 patients (64%) remained diplopia-free by repeated botulinum toxin injections alone. Nine patients went on to receive definitive surgery, and all achieved good ocular alignment after surgery. Transient ptosis or vertical deviation was seen in 7 patients, which resolved within 3 months, and no serious complications arose from the treatment in our series.

Conclusions: Botulinum toxin injection is a relatively less-invasive alternative to surgery that can be done under a topical anesthesia setting, which improves patient's quality of life via reduction in diplopia. It is a recommendable initial option in patients with chronic nerve palsies who may have higher risks associated with strabismus surgery.

Abstract No.: 207361**CCDD's – Solving the Enigma***First Author: Sowmya RAVEENDRA MURTHY*

Purpose: To present two cases which represent the CCDDs is actually a spectrum of disorders with overlapping features.

Methods: Three-year-old child - right face turn, small left tilt. EOM left eye limited abduction and elevation with downshoot on abduction. APCT 20 pd left hypo with 12 pd ET which increased in left gaze. Overlapping features of CFEOM and inverse DRS were noted. Surgery was planned, FDT was tight for MR and IR intraoperatively. MR recession with Y split, along with IR recession, was done. Case 2 is of a thirteen-year-old chin up & right face turn. APCT showed right hypertropia of 25-30 pd with 18 pd XT. Ocular movements showed limited adduction, abduction, and depression in both eyes (left more than the right eye). There was a synergistic upshot on abduction and a downshoot on adduction with globe retraction in left eye. Intra-operatively, FDT was positive for LR, and MR with an extra muscle band lateral rectus in the left eye and abnormal superior oblique in the right eye was noted. LR was recessed, and a Y-split was done in both eyes, with SR recession in the right eye.

Results: Both cases had overlapping features of DRS and CFEOM. Both attained a good surgical outcome.

Conclusions: This case highlights the importance of understanding CCDD's as a spectrum of disorders with overlapping features and using intraoperative FDT to guide us towards surgical plan. Further the importance of paying attention to anatomical variations in these cases.

Abstract No.: 201377**Capos Syndrome: A Rare Entity in a Tertiary Eye Care Center of Bangladesh***First Author: Sidratul Muntaha NAZIN**Co-Author(s): Mohammad Mostafa HOSSAIN*

Purpose: CAPOS syndrome is a rare combination of cerebellar ataxia, pes cavus, optic atrophy and sensory neural hearing defect. Purpose of the study is to identify this rare disease, create attention and keep special concern in management of such case.

Methods: Miss X, 5 years old girl was hailing from cumilla with the complaints of uncoordinated eye movement, deviation of eye ball, dimness of vision, wide nasal bridge, high arch feet, walking problem, difficulty in balance, speech and hearing. Visual acuity was 6/60 Log MAR 1 in both eyes. Cycloplegic refraction showed -0.50 sph/ -0.50 cyl X180 in both eyes. Ocular exam revealed telecanthus, gaze evoked nystagmus, exodeviation. On systemic exam showed she had ataxia, scanning speech, mental retardation. Her Romberg's sign was positive. She was advised to do orthoptic evaluation, color fundus photograph (CFP), radiology of foot, audiometry. Orthoptic evaluation revealed 35Δ "V" pattern exotropia, BSV was absent, CFP showed primary optic atrophy. Audiometry reveals sensorineural hearing loss, radiology of foot showed increased in the calcaneal inclination angle $>30^\circ$, angle of longitudinal arch $<150^\circ$, Hibb's angle $<150^\circ$ which goes in favour of pes cavis foot.

Results: Finally cerebellar ataxia, pes cavus foot, optic atrophy, sensory neural hearing loss were detected from all the investigation report which all are the component of CAPOS syndrome.

Conclusions: Early detection and initiation for management of such case might reduce the visual morbidity and better life expectancy.

Abstract No.: 205777

Changes in Retinal Microcirculation After Horizontal Rectus Muscle Surgery in Patients With Strabismus: Mid-Term Observation Based on OCTA

First Author: Xiyu ZHAO

Purpose: To compare the changes in retinal microvascular density before and after horizontal rectus muscle surgery in patients with strabismus using the optical coherence tomography angiography (OCTA), and to analyze the reasons for these changes.

Methods: We prospectively enrolled 39 patients with strabismus (14 underwent one horizontal rectus muscle surgery; 25 underwent two). OCTA was performed preoperatively and at 1 day, 2 weeks, and 6 weeks postoperatively to measure macular vessel density (VD) in the superficial capillary plexus (SCP), intermediate capillary plexus (ICP), and deep capillary plexus (DCP) and assess longitudinal changes.

Results: At 2 weeks after surgery, both horizontal-rectus groups showed increased VD in the ICP and DCP across the whole 6×6 mm macula, with one group also showing increases in the SCP and ICP; within the 1–3 mm inner ring, ICP-VD rose in the temporal, superior, and nasal subfields for both groups, while one group exhibited additional SCP/ICP/DCP-VD increases in the superior and nasal subfields; within the 3–6 mm outer ring, both groups had higher DCP-VD in the superior and nasal subfields and higher SCP-VD in the nasal subfield, and one group also showed SCP/ICP-VD increases in the superior and nasal subfields; by 6 weeks, all VD measures returned to preoperative baseline.

Conclusions: Two weeks after surgery VD increased in select macular regions, unrelated to the number of operated muscles; by 6 weeks, all values returned to baseline. One-muscle surgery chiefly affected SCP/ICP; two-muscle surgery mainly involved ICP/DCP. Changes were concentrated in the nasal and superior macular quadrants.

Abstract No.: 205791

Changes in the Thickness of the Peripapillary Retinal Nerve Fiber Layer in Strabismus Patients After Horizontal Rectus Muscle Surgery

First Author: Xiyu ZHAO

Purpose: To evaluate peripapillary retinal nerve fiber layer (pRNFL) thickness after horizontal rectus surgery in strabismus using OCT.

Methods: We prospectively included 93 eyes from 73 patients. Group A underwent both medial and lateral rectus surgery; Group B underwent one horizontal rectus surgery. pRNFL was obtained on a 3.5-mm peripapillary circle preoperatively, at postoperative day 1, and week 2. Outcomes included global pRNFL, sectoral values (nasal, inferonasal, inferotemporal, superotemporal, superonasal), the papillomacular bundle (PMB), and the nasal/temporal (N/T) ratio.

Results: At day 1, both groups showed transient thickening in the PMB and temporal quadrant, consistent with short-term postoperative swelling or axoplasmic flow disturbance. In Group B, global, inferonasal, and inferotemporal thickness also increased. By week 2, all parameters—including sectors heightened at day 1—returned to baseline, and the N/T ratio showed no meaningful change across time points. No between-group differences were detected in the magnitude or pattern of change, indicating that the number of operated muscles did not modulate early pRNFL responses.

Conclusions: Early pRNFL thickening after horizontal rectus surgery is mild, sector-predominant (PMB/temporal), and self-limited, resolving within two weeks without sustained structural impact on the peripapillary retina. Similar recovery profiles in one-versus two-muscle procedures suggest a common, procedure-related transient response rather than a dose-dependent effect.

Abstract No.: 205968

Changing Trends in Causes of Visual Impairment and Blindness Among Bhutanese Blind School Students

First Author: Dechen WANGMO

Purpose: The aim of this study is to assess the changing trends and underlying causes leading to blindness and low vision, and study the referral patterns of children enrolled in the School for the Blind/MIK in Bhutan.

Methods: A cross-sectional descriptive study was conducted using secondary data from clinical hospital records. Diagnoses were classified anatomically and etiologically. Two independent ophthalmologists verified the diagnoses to ensure reliability. Descriptive statistics were used to analyze the distribution of VI

causes, and findings were compared with Bhutan's 2012 study and similar studies in the region.

Results: A total of 51 students (mean age: 14.9 years, Standard deviation (SD): 4.4) were included. Of these, 17 (33.3%) had moderate VI, 8 (15.7%) had severe VI, and 25 (49%) were blind. Retinal diseases (43.1%) were the leading cause of VI (Visual impairment) and blindness, marking a shift from previous studies where lens pathologies were predominant. Hereditary factors accounted for 62.8% of cases, while 49% of conditions were avoidable. The emergence of Retinopathy of Prematurity (ROP) highlights the need for improved neonatal screening programs. Comparative analysis with past Bhutanese and regional studies indicates shifting etiologies. Strengthening early intervention, genetic counseling, and ROP screening programs is crucial for addressing childhood blindness.

Conclusions: Our study highlights the changing trends in the etiology of childhood visual impairment and blindness in Bhutan, with avoidable diseases like ROP and cataracts becoming increasingly prevalent. This underscores the need for targeted public health interventions- improved neonatal care, early screening programs to reduce the burden of childhood blindness in Bhutan.

Abstract No.: 200873

Characteristics of Ocular Parameters and Influencing Factors of Refractive Lens Power in Children With Anisometropia

First Author: Rui **XIE**

Co-Author(s): Zhirong **WANG**, Yingting **ZHU**, Yehong **ZHUO**

Purpose: To investigate the characteristics of refractive lens power in children with anisometropia and analyze its relationship with anisometropia.

Methods: This cross-sectional study enrolled 128 participants with anisometropia, defined as a spherical power difference of ≥ 1.0 D and a cylindrical power difference ≤ 1.0 D between the two eyes. Participants were categorized into three groups based on the degree of anisometropia: the low anisometropia group (≥ 1.0 D and < 2.0 D), the moderate anisometropia group (≥ 2.0 D and < 3.0 D), and the high anisometropia group (≥ 3.0 D). Ocular biometric measurements were conducted by experienced ophthalmologists using the IOL Master 700, and refraction was performed after confirming adequate cycloplegia. The eye with higher myopia was defined as «the worse eye», while the fellow eye was described as «the better eye». Statistical differences in parameters between the worse eye and better eye were assessed using Student's T-test and paired T-test, with multiple comparisons analyzed using one-way ANOVA.

Results: This study included 128 children (63 boys, 65 girls) aged 5-18 years. The worse eyes exhibited

significantly longer axial length ($p < 0.001$), lower lens power ($p = 0.003$), deeper anterior chamber depth ($p = 0.005$), thinner lens thickness ($p = 0.012$), and weaker corneal power ($p = 0.001$) compared to the better eyes. In the high anisometropia group, the better eyes had stronger lens power ($p = 0.003$), but no significant difference was found in other parameters (including AL, CP, LT, etc.).

Conclusions: Decompensation in refractive lens power may serve as an indicator of advancing myopia.

Abstract No.: 202070

Clinical Experience and Outcomes of Muscle Transplantation in Strabismus

First Author: Min-hsiu **SHIH**

Purpose: A single eye recession-resection procedure could not sufficiently correct large-angle strabismus exceeding 60 prism diopters (PD) or recurrent strabismus greater than 35 PD. This report describes patients treated with a unilateral resection procedure combined with muscle transplantation to the recessed muscle.

Methods: Records of patients who underwent muscle transplantation for large-angle or residual/recurrent strabismus between January 1, 2024, and August 31, 2025, were reviewed. Data were collected regarding age, gender, visual acuity, type of strabismus, the surgical procedure performed, and preoperative and postoperative primary position deviations.

Results: Fourteen patients were included. Primary surgery (group A) was performed on 11 patients (4 males, 7 females), and secondary surgery (group B) on 3 patients (2 males, 1 female). The median age was 30 years (average 39.7 years; range 11 to 75 years). Group A patients had at least 60 PD exotropia, except one case with 45 PD deviation related to oculomotor nerve palsy. Group B exhibited recurrent exotropia greater than 35 PD in primary position despite previous standard recession of unilateral (one male received scleral buckle) or bilateral lateral rectus muscles. Postoperatively, four cases in group A and one in group B revealed residual deviation greater than 15 PD. Mild abduction restriction was noted in two patients based on Hess chart assessment.

Conclusions: Extraocular muscle transplantation in conjunction with a recession-resection procedure is a safe and useful alternative for large-angle or recurrent strabismus when uniocular surgery is desired.

Abstract No.: 205435

Clinical Outcomes of Gore-Tex Assisted Scleral Fixation of Intraocular Lenses in Pediatric Aphakia

First Author: Shaimaa **ALREFAIE**

Co-Author(s): Fawzia **ALHAIMI**, Rahaf **ALLUHAIDAN**, Abdullah **KHAN**

Purpose: To evaluate the short-term outcomes of four-point scleral fixated intraocular lenses (SFIOLs) using polytetrafluoroethylene (ePTFE; Gore-Tex) sutures in pediatric aphakia with insufficient capsular support.

Methods: A retrospective cohort study was conducted at King Khaled Eye Specialist Hospital, including 16 eyes of 16 patients aged 2–18 years who underwent SFIOL implantation with Gore-Tex 7-0 sutures between January 2023 and July 2025. Data collected included corrected visual acuity (logMAR), intraocular pressure (IOP), anterior chamber inflammation, IOL centration, and postoperative complications over a 16-week follow-up.

Results: Mean age was 9.4 ± 4.2 years; 82.4% were male. Mean corrected visual acuity improved from 0.76 ± 0.30 preoperatively ($n=8$) to 0.52 ± 0.27 at week 16 ($n=5$). Mean IOP decreased from 16.1 ± 3.9 mmHg to 14.8 ± 4.4 mmHg. All IOLs were well centered, with no suture erosion or significant complications; 70% had no postoperative events.

Conclusions: Gore-Tex-assisted SFIOL fixation in children provided stable IOL positioning, improved vision, and low complication rates in the short term. Further long-term studies are warranted.

Abstract No.: 202525

Clinical Predictors of Surgical Success in Intermittent Exotropia: A Retrospective Study

First Author: Han-chih **CHENG**

Co-Author(s): Pin-chun **WANG**

Purpose: To investigate clinical predictors of surgical success in intermittent exotropia and evaluate associated surgical outcomes.

Methods: We retrospectively reviewed patients who underwent surgery for basic intermittent exotropia (2017–2024) by a single surgeon at a tertiary center, with ≥ 3 months of follow-up. Data collected included age at surgery, deviation angle, refraction, and visual acuity. Surgical success was defined as residual exodeviation ≤ 10 prism diopters (PD) or esodeviation ≤ 5 PD at 3 months. Secondary outcomes included surgical dose–response and incidence of steroid-induced intraocular pressure (IOP) elevation.

Results: Of 90 patients analyzed, 69 (76.7%) achieved surgical success, while 2 (2.2%) developed overcorrection. Procedures included unilateral lateral rectus recession ($n=18$, 18–30 PD), bilateral lateral rectus recession ($n=59$, 35–70 PD), and recession–

resection ($n=13$, 35–70 PD). Alignment at postoperative week 1 (OR 7.88, $p=0.023$) and month 1 (OR 10.47, $p=0.008$) independently predicted final outcomes, whereas age, amblyopia, anisometropia, control status, and preoperative angle were not significant predictors. Mean surgical dose–response was 2.53 PD/mm (unilateral recession), 2.43 PD/mm (bilateral recession), and 3.13 PD/mm (recession–resection). Steroid-related IOP elevation, defined as IOP >21 mmHg or an increase of ≥ 5 –10 mmHg from baseline, occurred in 10 pediatric patients (11%).

Conclusions: Early postoperative alignment at 1 week and 1 month strongly predicted long-term surgical success. Recession–resection surgery may benefit patients with larger preoperative deviations. Pediatric patients are at higher risk of steroid-induced IOP elevation and require vigilant monitoring.

Abstract No.: 206053

Clinical Profile and Risk Factors Associated With Abusive Head Trauma-Related Retinal Haemorrhage in Infants

First Author: Zhen Ning **LOW**

Co-Author(s): Yie Ping **CHIN**, Sangeetha **THARMATHURAI**

Purpose: To describe the ocular findings and assess the risk factors associated with retinal haemorrhages in infants with abusive head trauma.

Methods: A retrospective study was conducted on all patients aged one year or younger diagnosed with AHT and referred for ophthalmological assessment at Hospital Tunku Azizah between 2019 and 2024. Demographic and clinical data were analyzed using descriptive statistics. Univariate and multiple logistic regression analyses were performed to identify risk factors associated with the presence of retinal hemorrhage.

Results: A total of 113 infants were included. The majority (77.9%) were aged 6 months or younger. Retinal haemorrhages were present in 28.3% ($n=32$) of patients, with bilateral, multilayered haemorrhages being the most common pattern. On univariate analysis, a Glasgow Coma Score (GCS) of less than 15 was significantly associated with retinal hemorrhage (Odds Ratio [OR]: 3.3; 95% Confidence Interval [CI]: 1.02–10.69; $p=0.046$). The presence of a subdural hemorrhage on neuroimaging was universal in the RH-positive group (100% vs. 36.8%). However, in the multiple logistic regression model, a GCS < 15 was no longer a statistically significant independent predictor (Adjusted OR: 2.44; 95% CI: 0.72–8.28; $p=0.153$). Other factors, including seizures, skull fractures, and demographic variables, were not significantly associated with RH.

Conclusions: Retinal hemorrhages are a frequent finding in infants with AHT and are strongly linked

to the co-existence of subdural haemorrhage. While depressed GCS showed an initial association with RH, it was not an independent predictor in a multivariate model. These findings underscore the importance of a comprehensive ophthalmological examination in all suspected AHT cases.

Abstract No.: 200378

Clinical Profile and Treatment Outcomes of Childhood Amblyopia at a Tertiary Eye Care Center in Western India

First Author: Muskan **MANGAL**

Co-Author(s): Harsh **JAIN**, Aditya **KELKAR**, Jai **KELKAR**

Purpose: To evaluate the demographic patterns, clinical characteristics, and visual outcomes of childhood amblyopia managed at a tertiary eye care center in Western India.

Methods: This was a retrospective, longitudinal, hospital-based study including 1382 children aged ≤ 12 years, enrolled in the outpatient department of a tertiary care center in India. Data were collected on demographics, type of amblyopia, treatment modalities, and changes in best-corrected visual acuity (BCVA).

Results: The mean age of participants was 4.54 ± 2.45 years, with a male predominance (55.3%). Refractive amblyopia was the most prevalent (73.3%), followed by strabismic (7.2%) and anisometropic amblyopia (6.7%). Treatment primarily included spectacles alone (74.3%), spectacles with occlusion (10.2%), occlusion alone (7.4%), and a combination of surgery, patching, and glasses (5.2%). The average occlusion duration was 2.46 ± 1.13 hours per day. After a median follow-up of 10 months (range: 6–84 months), mean BCVA improved significantly from 0.85 ± 0.42 to 0.55 ± 0.41 logMAR ($P < 0.001$). Subgroup analysis demonstrated significant visual improvement across all amblyopia types—refractive, strabismic, cataract-related, and ptosis-associated ($P < 0.001$ for each). Eyes with refractive amblyopia showed superior BCVA outcomes compared to those with cataract and strabismus ($P < 0.001$), and marginally better than those with ptosis ($P < 0.05$), both at baseline and final evaluation.

Conclusions: Refractive errors are the predominant cause of amblyopia in children. Timely identification, appropriate treatment, and consistent follow-up play a crucial role in improving visual outcomes, regardless of the underlying etiology.

Abstract No.: 206192

Comparison of Clinical Outcomes Between Highly Myopic and Non-Highly Myopic Patients With Good Visual Acuity Undergoing the Yokoyama Procedure

First Author: Yuka **MORITA**

Co-Author(s): Taizo **FUDONO**, Seito **HIRAOKA**, Takeshi **MATSUEDA**, Tetsuro **OSHIKA**

Purpose: To compare clinical findings between highly myopic and non-highly myopic patients with good visual acuity who underwent the Yokoyama procedure.

Methods: Seventeen patients with preoperative best-corrected visual acuity of 0.15 logMAR or better in both eyes who underwent bilateral Yokoyama procedures were retrospectively reviewed. Patients were divided into a high myopia group (axial length ≥ 27.0 mm; $n = 9$) and a non-high myopia group (axial length < 27.0 mm; $n = 8$). Age, axial length, dislocation angle, deviation, and binocular function were compared.

Results: Mean age was 61.3 ± 12.1 years in the high myopia group and 50.9 ± 20.4 years in the non-high myopia group. Best-corrected visual acuity (logMAR) was 0.02 ± 0.08 and 0.07 ± 0.02 . Axial length was 28.5 ± 1.0 mm and 24.8 ± 1.6 mm ($p < 0.01$), and dislocation angle $138.4 \pm 10.1^\circ$ and $129.8 \pm 9.5^\circ$ ($p = 0.01$). Preoperative deviation was 47.2 ± 15.1 PD and 40.0 ± 14.8 PD, and postoperative deviation -0.4 ± 6.0 PD and 2.4 ± 3.2 PD. All patients achieved fusion at distance and stereopsis at near.

Conclusions: The Yokoyama procedure successfully restored functional binocular vision. Axial length did not affect postoperative outcomes.

Abstract No.: 201473

Comparison of Visual Outcomes and Complications of Scleral-Fixated Intraocular Lens vs Retropupillary Iris Claw Lens in Children

First Author: Xu Kent **PEE**

Co-Author(s): Li Yen **CHAN**, Envira Zhi Yin **LEE**, Jamalia **RAHMAT**, Wan Wen **SOH**

Purpose: To compare the postoperative visual outcomes and complications between scleral-fixated intraocular lens (SFIOL) and retropupillary iris claw intraocular lens (ICIOL) in children.

Methods: A retrospective cohort analysis of 35 eyes (24 children) who underwent intraocular lens (IOL) implantation with either SFIOL or rpiCIOL between 2016 and 2023 in Kuala Lumpur Hospital, with at least 6 months follow-up duration.

Results: The mean age at surgery was 9.92 ± 3.23 years. The mean follow-up period of 18.1 months (range 1–58 months). The most common indication for SFIOL and ICIOL was ectopia lentis (29 eyes, 82.9%). Patients were

divided into SFIOL group (15 eyes of 11 children) and ICIOL group (20 eyes of 13 children). Best corrected visual acuity (BCVA) was maintained or improved in 83.0% and 93.8% in the SFIOL and ICIOL group respectively. The median BCVA changes 6 months postoperatively were +0.3 logMAR (IQR 0 logMAR) in the SFIOL group and +0.42 logMAR (IQR: 0.31 logMAR) in the ICIOL group ($p < 0.05$). Complications occurred in SFIOL group included transient high intraocular pressure in 1 eye and subluxated lens in 1 eye; in the rplCIOL group, inadvertent iris trauma occurred in 1 eye, subluxated lens in 1 eye, vitreous prolapse in 1 eye which managed surgically, and retinal detachment in 2 eyes of the same patient.

Conclusions: SFIOL and ICIOL both provide good visual outcome with minimal complications. However, long term follow-up of these children is necessary.

Abstract No.: 206763

Complicated Retinal Detachment in a Child With Von Hippel–Lindau Syndrome

First Author: Ray Jui-yen **LIN**

Co-Author(s): Hung-da **CHOU**, Eugene Yu-chuan **KANG**

Purpose: To report a case of complicated tractional retinal detachment in a 15-year-old boy with Von Hippel–Lindau (VHL) syndrome.

Methods: Case report.

Results: A 15-year-old boy with no prior medical history presented with 2 months of progressive blurred vision and a black shadow in his left eye. Corrected visual acuity was 1.0 OD and 0.05 OS. Fundus examination revealed multiple peripheral retinal tumors in both eyes. The left eye demonstrated tractional retinal detachment involving the macula, while the right eye showed tumors with dilated feeding vessels. Retinal hemangioblastoma with retinal detachment was suspected. The left eye underwent combined scleral buckle, vitrectomy, cryotherapy, membrane peeling, intravitreal Bevacizumab injection, and silicone oil tamponade. Although vision subjectively improved, corrected acuity remained 0.05, with residual inferior retinal detachment and partial tumor regression. The right eye was treated with intravitreal Bevacizumab and focal laser photocoagulation, maintaining vision of 1.0 with partial tumor regression. Brain MRI identified a posterior fossa hemangioblastoma, and genetic testing confirmed a heterozygous VHL mutation, p.Cys162Tyr (c.485G>A).

Conclusions: This case highlights bilateral retinal hemangioblastomas with tractional retinal detachment as a manifestation of VHL syndrome in childhood. Despite complex surgery, anatomical and functional recovery was limited. VHL syndrome should be considered in pediatric retinal detachment, and early recognition is crucial for timely ophthalmic and systemic management.

Abstract No.: 204252

Congenital Toxoplasmosis With Bilateral Chorioretinitis and Retinal Scarring: A Case Report

First Author: Lisa Berliani **TANAYA**

Co-Author(s): I Wayan Eka **SUTYAWAN**

Purpose: Congenital toxoplasmosis, caused by *Toxoplasma gondii*, is a transplacental infection that can result in severe ocular damage, most commonly chorioretinitis, leading to permanent retinal scarring and profound vision loss. The coexistence of early-onset ocular involvement and neurological complications in neonates is rarely reported.

Methods: A 3-week-old female infant presented with bilateral chorioretinitis and retinal scarring. Fundoscopy revealed macular fibrosis and peripheral retinal scars. Serological testing confirmed *T. gondii* infection with positive IgM and IgG. Neurological assessment showed neonatal meningitis and non-communicating hydrocephalus. The patient received a 6-week course of pyrimethamine, sulfadiazine, antibiotics, and corticosteroids. Ocular inflammation subsided, but residual visual impairment persisted.

Results: This case highlights the importance of early detection of congenital toxoplasmosis, particularly when associated with life-threatening neurological complications. Aggressive multidisciplinary management can control infection and limit progression, although the visual prognosis remains poor when the macula is involved.

Conclusions: Congenital toxoplasmosis with both ocular and central nervous system involvement requires prompt diagnosis, aggressive antiparasitic therapy, and close multidisciplinary monitoring to minimize permanent sequelae.

Abstract No.: 205469

Contrast Sensitivity Function in Children With Albinism and Its Association With Eye-Related Quality of Life

First Author: Junyi **LIU**

Co-Author(s): Jingsen **CHEN**, Jiangtao **LOU**, Xin **MA**, Jiahe **NIE**, Tong **WU**, Xinping **YU**

Purpose: To evaluate contrast sensitivity function (CSF) in children with albinism and its association with eye-related quality of life (ER-QOL).

Methods: This cross-sectional study included 56 children with albinism and 70 healthy controls aged 5–11 years. Monocular and binocular CSF was assessed using the quick CSF method; best-corrected visual acuity (BCVA), strabismus status, and genotype were recorded. The Pediatric Eye Questionnaire (PedEyeQ) measured ER-QOL.

Results: Groups were comparable in age and sex ($P > 0.05$). Children with albinism showed significantly

reduced CSF across all spatial frequencies, lower area under the log CSF (AULCSF), reduced CSF acuity, and poorer binocular summation ratio ($P < 0.01$). Within the albinism group, OCA1A genotype was associated with worse BCVA and CSF metrics than OCA2 ($P < 0.05$), and strabismus was linked to lower binocular summation ($P < 0.05$). All PedEyeQ domain scores were significantly lower in the albinism group ($P < 0.001$). Worse BCVA and CSF measures were correlated with lower child-reported PedEyeQ scores ($p = 0.264-0.411$, $P < 0.05$).

Conclusions: Albinism in childhood is associated with broad CSF deficits, influenced by genotype and strabismus. These functional impairments are correlated with reduced ER-QOL, suggesting that improving a children's contrast sensitivity function may have a positive impact on their daily living abilities and overall quality of life.

Abstract No.: 204982

Development of a Flexible Electrode for Electrical Stimulation of Rabbit Extraocular Muscle

First Author: Hee Kyung **YANG**

Co-Author(s): Jeoung-min **HWANG**, Dong Hyun Kim **KIM**

Purpose: To develop a flexible electrode for electrical stimulation of extraocular muscles and to evaluate the safety of applying direct electrical stimulation to muscles and its potential effects on ocular tissues in rabbits.

Methods: A flexible electrode was fabricated using a conventional photolithography process. This electrode comprised a 300-nm-thick platinum layer embedded within a 30- μ m-thick polyimide cable. In an in vivo study, five rabbits underwent electrical stimulation of the right superior and inferior rectus muscles. Stimulation consisted of electrical pulses applied for 5 minutes, three times a week for 4 weeks. Histological examination was conducted on the conjunctiva, extraocular muscles, sclera, and retina.

Results: Direct electrical stimulation of extraocular muscle using a flexible electrode could successfully elicit eye movement in rabbits. Histologic examination demonstrated no evidence of detrimental effects of the electrical stimulation.

Conclusions: Direct electrical stimulation of extraocular muscles using a flexible electrode could safely elicit eye movement without any ocular damage in rabbits.

Abstract No.: 205781

Double Trouble – A Case of Bilateral Persistent Hyperplastic Primary Vitreous

First Author: Shin Kiat **TAN**

Co-Author(s): Nur Afzan **BINTI MOHD JAFFAR**, Jamalia **BINTI RAHMAT**

Purpose: Persistent Hyperplastic Primary Vitreous (PHPV) is a rare congenital vitreoretinal disorder that results from the failure of regression of fetal vessels and embryonic vitreous within the eye. Common clinical features include leukocoria, microphthalmia, and cataract. PHPV is an important differential diagnosis of retinoblastoma and may present a diagnostic challenge. Here, we report a rare case of bilateral PHPV to emphasize the necessity of comprehensive clinical and radiological evaluation for accurate diagnosis and management.

Methods: Case report.

Results: A 4-month-old girl presented with poor eye contact and bilateral leukocoria. Ophthalmic examination found no proptosis or periorbital swelling. Both conjunctivae were white, and the corneas were clear. Posterior synechiae were present, but there was no fibrin or hypopyon in the anterior chamber. Dense retrolental membranes and haemorrhages obscured the fundus. B-scan ultrasonography showed bilateral homogenous opacities without calcifications. Orbital MRI identified bilateral vitreous haemorrhages, retinal detachments, and a structure extending from the retrolental region to the optic disc. No enhancing mass or calcifications were observed in either globe. Serial monthly examinations revealed persistent retrolental haemorrhages and poor visual development. Diagnostic enucleation of the right eye was performed, and histopathology confirmed features consistent with PHPV.

Conclusions: PHPV is the second most common cause of leukocoria after retinoblastoma. Comprehensive clinical examination and imaging are essential to distinguish between these conditions, as their management strategies differ significantly.

Abstract No.: 206718

Dynamic Association Between Amblyopia Severity Treatment Phases and Depressive Disorders in Children and Adolescents: a Multi-Timepoint Observational Cohort Study

First Author: Li **TANG**

Purpose: To examine depression risk across amblyopia severity levels (mild/moderate/severe) and treatment phases (diagnosis/intensive/maintenance), while exploring the mediating roles of treatment adherence and neuroendocrine changes.

Methods: A prospective cohort study was conducted with 150 amblyopic patients (50 mild, 100 moderate-

to-severe) and 50 healthy controls aged 7-16 years. Assessments at four timepoints [diagnosis (T0), 1 month (T1), 3 months (T3), and 6 months (T6)] included: 1. Amblyopia metrics: Best-corrected visual acuity, stereoscopic function(Titmus or TNO test); 2. Depressive symptoms: Metrics: Best corrected visual acuity; stereoscopic function; Children's Depression Inventory (CDI); Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS) interviews at T3. Analysis: Generalized estimating equations (GEE) analyzed temporal associations between amblyopia severity and depression. Structural equation modeling (SEM) tested the closed-loop pathway: treatment stress → depression → adherence decline → delayed visual recovery.

Results: 1. Severity: Moderate-severe group had 3.2× higher depression risk (OR=3.2, 95%CI:1.8-5.6) 2. Phase: Depression peaked at T3 (40% CDI↑, 33% adherence<50%) 3. Mediation: Cortisol↑ → Depression↑ → Adherence↓ → Vision recovery↓ (β=-0.29) 4. Protection: Good family function reduced risk 62% (FAD≤2.0)

Conclusions: Depression risk in amblyopia is critically influenced by disease severity and treatment phase: 1. Moderate-to-severe cases warrant psychological screening at diagnosis; 2. The 3-month treatment phase represents a critical window for psychological intervention; 3. Treatment stress triggers a cortisol-mediated depression cycle that impairs adherence and visual outcomes; 4. Family functioning serves as a key protective element, supporting integration of family empowerment into standard care. These findings provide a biopsychosocial evidence framework for precision management of amblyopia-depression comorbidity, advocating a shift from isolated vision correction to integrated mind-body care models.

Abstract No.: 205361

Effect of Different Types of Lenses on Eye Position and Myopia Control in Patients With Residual Small-Angle Exotropia With Myopia After Strabismus Surgery

First Author: Duo XU

Purpose: To compare the clinical effectiveness of multifocal myopia defocus spectacle lenses (HAL), orthokeratology lenses, and single-vision lenses in patients with residual small-angle exotropia with myopia after strabismus surgery.

Methods: A total of 135 patients with residual small-angle exotropia after strabismus surgery were selected in our hospital from 2021-06 to 2023-06, aged 6-18 years old, with a spherical equivalent(SE) -1.00D ~ -5.00D. According to the results of prism examination after strabismus surgery, the patients with residual exotropia ≥15 prism diopters (D) (block lenses) were voluntarily divided into three groups: the HAL group, the OK lens group, and the SVS group.

Results: After 1 year, the AL in the three groups were 25.15±0.92mm, 25.28±0.98mm, 25.32±0.95mm, respectively. Compared with an increase of 0.36±0.15mm in the SVS group after 1 year, the axial length of the HAL and OK lens groups increased by 0.17±0.64mm and 0.28±0.11mm, respectively, which were statistically significant (P < 0.05). Before intervention, the prism diopters of the HAL, OK lens, and SVS groups measured using the prism were -20.07±3.22 Δ, -19.34±3.10 Δ and -21.06±3.02 Δ (prism at 33 cm), respectively, and the differences were not statistically significant (P > 0.05). After 1 year, the prism diopters with the naked eye of HAL group and SVS group were: -17.95±3.63 Δ and -25.84±3.56 Δ, which increased by 2.12±0.41 Δ and -4.78±0.54 Δ, respectively, compared the preintervention values, with statistical significance (P < 0.05). After 1 year, the prism diopters of the three groups with lenses were -15.34±2.84 Δ, -24.52±3.45 Δ and -23.98±3.25 Δ, respectively, HAL group compared with OK group, SVS group, the difference was statistically significant (P < 0.05). The eye position control ability of the three groups before the intervention was 3.04±1.87, 3.14±1.57, 3.08±1.27, and after 1 year was 2.10±2.02, 4.12±1.41, 4.26±2.45, respectively. There was statistical significance between the HAL group and the OK group, the SVS group after the intervention (P < 0.05).

Conclusions: In patients with residual small-angle exotropia and myopia strabismus surgery, HAL lens can effectively control exotropic drifts and the axial length, particularly for better control of strabismus compared with OK lenses and SVS. However, exotropia drift and poor control of eye position can be seen in both wearing OK lens and SVS.

Abstract No.: 205126

Effects of Different Hyperopic Correction Patterns on Emmetropization in Children With Accommodative Esotropia

First Author: Daoman XIANG

Co-Author(s): Wensi CHEN

Purpose: To investigate the effects of different spectacle correction methods on changes in refractive errors and ocular biometric characteristics in children with accommodative esotropia.

Methods: This retrospective study included 95 children with accommodative esotropia, divided into a full correction group (n=62) and an undercorrection group (n=33). Spherical equivalent (SE) refraction and axial length (AL) were collected at baseline and years 1, 2, and 3. Non-parametric tests were used for statistical analysis.

Results: Refractive Change: The SE decreased significantly over 3 years in the undercorrection group (from 5.19D to 3.93D, P<0.05), with 86.7% of eyes showing a reduction. The full correction group showed

no significant change in the first two years, with a decline only evident by year 3. Ocular Biometrics: The increase in AL over 1 year was significantly greater in the undercorrection group (0.29 ± 0.44 mm) than in the full correction group (0.16 ± 0.12 mm, $P < 0.05$). No significant intergroup difference was found in corneal curvature. Intergroup Comparison: Significant differences were observed between groups in SE values at baseline, year 1, and year 2, as well as in the 1-year AL change (all $P < 0.05$).

Conclusions: Full hyperopic correction impedes emmetropization in children with accommodative esotropia, characterized by slowed reduction of hyperopia and axial elongation. Undercorrection appears to facilitate a more natural emmetropization process without compromising ocular alignment stability.

Abstract No.: 208383

Effects of Physical Activity and Inactivity on the Microvasculature in Children: The Hong Kong Children Eye Study

First Author: Lok Cheung **YUEN**

Co-Author(s): Jason C. **YAM**, Yuzhou **ZHANG**

Purpose: To investigate the effects of physical activity/inactivity on the microvasculature, measured from retinal photographs, in children.

Methods: All participants were from the Hong Kong Children Eye Study, a population-based cross-sectional study of children aged 6 to 8 years. They received comprehensive ophthalmic examinations and retinal photography. Their involvement in physical activity/inactivity and demographics were obtained from validated questionnaires. A validated artificial intelligence deep-learning system was used to measure central retinal arteriolar equivalent (CRAE) and central retinal venular equivalent (CRVE) from retinal photographs.

Results: In the final analysis of 11,959 participants, 6,244 (52.2%) were boys, and the mean age was 7.55 (1.05) years. Increased ratio of physical activity to inactivity was associated with wider CRAE ($\beta = 1.033$; $P = 0.007$) and narrower CRVE ($\beta = -2.079$; $P < 0.001$). In the subgroup analysis of boys, an increased ratio of physical activity to inactivity was associated with wider CRAE ($\beta = 1.364$; $P = 0.013$) and narrower CRVE ($\beta = -2.563$; $P = 0.001$). The subgroup analysis of girls also showed that the increased ratio of physical activity to inactivity was associated with a narrower CRVE ($\beta = -1.759$; $P = 0.020$), but not CRAE.

Conclusions: Increased activity in children is associated with healthier microvasculature, as reflected in the retina. Our study contributes to the growing evidence that physical activity positively influences vascular health from a young age and underscores the potential

of using the retinal vasculature as a biomarker for cardiovascular health.

Abstract No.: 203127

Endoscope-Assisted Surgery for Open Globe Injuries in Pediatric Patients: Safety, Efficacy and Outcomes

First Author: Kuo Hua **JUAN**

Co-Author(s): Chao Chun **HSU**

Purpose: To evaluate the efficacy and outcomes of endoscope-assisted surgery in pediatric patients with open-globe injuries involving the cornea.

Methods: This retrospective analysis includes six pediatric cases of open-globe injuries with corneal involvement treated between 2014 and 2023. Three injuries occurred at school and three at home. All patients initially received primary suturing and were referred for further management 3-14 days post-injury. Initial visual acuity ranged from hand motion to 1/60. Three patients presented with vitreous hemorrhage, and three with retinal detachment. Endoscope-assisted surgery was performed, including silicone oil tamponade in cases of retinal detachment. The follow-up period ranged from 8 months to 3 years.

Results: Postoperative visual acuity improved in all six patients before subsequent corneal treatment. Retinal detachment cases showed significant anatomical and functional recovery. Silicone oil tamponade ensured stable retinal attachment with no postoperative complications and no cases of proliferative vitreoretinopathy (PVR). There were no cases of intraocular foreign bodies (IOFB) in this cohort.

Conclusions: Our study, conducted over a follow-up period of 8 months to 3 years, confirms that endoscope-assisted surgery effectively manages complex open-globe injuries in pediatric patients. The absence of PVR may be due to the small case number or the specific case types, such as the lack of IOFB. These findings align with studies by Raju et al., Yonekawa et al., and Mansour & Al-Ghadban, though our cohort experienced fewer complications.

Abstract No.: 201006

Epidemics of ROP: Are We Handling Them Well?

First Author: Tanveer **CHAUDHRY**

Purpose: To highlight the burden of ROP and how to prevent blindness in developing countries.

Methods: This is a 15-minute lecture, teaching residents and upcoming ophthalmologists how we are dealing with ROP and what the way forward should be.

Results: Result shows that we are still facing the epidemic of ROP and we need to improve CMS teeming programs to prevent blindness from ROP.

Conclusions: ROP is a blinding disease in children, although with proper screening and staying vigilant, we can prevent blindness from this condition.

Abstract No.: 205123

Establishing a Novel Lens Opacities Classification System Based on Ultrasound Biomicroscopy (UBM) for Pediatric Cataracts: Reliability and Availability

First Author: Daoman XIANG

Co-Author(s): Wensi CHEN

Purpose: This study sought to develop and validate a lens opacities classification system based on ultrasound biomicroscopy (UBM) imaging to grade pediatric cataracts.

Methods: UBM images of patients at the hospital from September 2013 to November 2014 were used in this study. We summarized the characteristics of lenticular opacification in each of the following 4 zones: the anterior capsule (A); the cortex (C); the nucleus (N); and the posterior capsule (P). The UBM data and intraoperative videos were compared, and sensitivity, specificity, accuracy, and positive and negative predictive values were determined for our Lens Opacities Classification System based on UBM for Pediatric Cataracts (LOCS-UP) detection. Two physicians classified pediatric cataracts (anterior capsule, cortex, and posterior capsule) by extracting 146 images from the UBM database. Patients' data were recorded to calculate the kappa coefficients. The LOCS-UP was developed.

Results: Under this standard, all types of pediatric cataracts can be classified and acquired a code by the LOCS-UP. The LOCS-UP had the highest sensitivity (100%) and specificity (98.96%) in naming the anterior capsule and the lowest sensitivity (50%) and specificity (89.59%) in naming the posterior capsule. Its consistency at naming the anterior capsule was satisfactory (Kappa coefficient: 0.70), and it was also able to name the nucleus, cortex, and posterior capsule (0.56, 0.58, and 0.48, respectively).

Conclusions: LOCS-UP could name pediatric cataracts by providing an unique digital encoding, which could reflect characteristics exactly for different local lens anomalies to all kinds of pediatric cataract patients.

Abstract No.: 200854

Functional Vision Loss in a Child Following Neurologic Symptoms: A Case Report Highlighting Diagnostic and Psychosocial Considerations

First Author: Chao-jung WU

Co-Author(s): Chee-ming LEE

Purpose: To report a rare pediatric case of functional vision loss (FVL) following systemic neurologic

symptoms, and to emphasize the importance of comprehensive evaluation and psychosocial context in diagnosis.

Methods: A case report.

Results: An 8-year-old girl with a recent history of otitis media presented with bilateral hearing loss, headache, low-grade fever, and left-sided weakness for the past two weeks. She was admitted for further evaluation under the initial suspicion of Guillain-Barré syndrome. However, during hospitalization, she experienced sudden bilateral vision loss, reporting no light perception (NLP) and dyschromatopsia. Ophthalmologic examination revealed intact pupillary light reflexes and a positive blink-to-threat response. B-scan ultrasonography was unremarkable. Optical coherence tomography (OCT) of the retina and optic nerves also showed no abnormalities. Brain and orbital MRI demonstrated no structural lesions, and pattern visual evoked potentials (VEP) showed normal cortical responses. Despite her alarming subjective complaints, all objective findings were within normal limits. Further evaluation revealed significant psychosocial stressors within the family environment. Following psychiatric consultation and adjustment of medical therapy, her visual symptoms gradually resolved completely without any residual neurological deficits. These findings supported a diagnosis of functional vision loss.

Conclusions: Functional vision loss in children can mimic serious neurologic or ophthalmic disease. Thorough neurologic and ophthalmic evaluation is critical to exclude organic causes. Psychosocial assessment is essential for diagnosis and management, especially in pediatric patients with complex or inconsistent clinical findings.

Abstract No.: 201285

Geometric Centroid-Based Orbital MRI Analysis for Differentiating Between Superior Compartment and Complete Lateral Rectus Palsy

First Author: Hyun Jin SHIN

Purpose: To determine the diagnostic utility of centroid point analysis in differentiating between superior compartment lateral rectus (LR) palsy and complete LR palsy using orbital magnetic resonance imaging (MRI).

Methods: We retrospectively analyzed coronal orbital MRI obtained from 19 patients with unilateral abducens nerve palsy, comprising 14 and 5 with complete and superior compartment palsy. Cross-sectional images were obtained at 6, 9, and 12 mm posterior to the globe. The LR was manually segmented, and centroid-based metrics—including centroid difference (CD)—were calculated to assess vertical displacement of the muscle centroid. Conventional metrics such as relative atrophy and relative proportion at maximum cross-sectional area (MCS) were also analyzed. Diagnostic

accuracy was evaluated using receiver operating characteristic (ROC) analysis.

Results: The downward displacement of the LR centroid was greater in the superior compartment palsy group than in the complete palsy group. The median CD was 12.34% in the superior compartment group and 1.50% in the complete palsy group. ROC analysis demonstrated that CD achieved the highest diagnostic accuracy among all evaluated metrics, with an area under the ROC curve (AUC) of 0.97, sensitivity of 100%, and specificity of 92.86%. In contrast, conventional metrics such as relative atrophy and relative proportion at MCS showed worse diagnostic performance, with AUCs of 0.77 and 0.70, respectively.

Conclusions: CD provides a reliable and relevant metric for distinguishing superior compartment palsy from complete LR palsy. By capturing vertical geometric displacement reflective of selective atrophy, measuring CD increases diagnostic precision and supports clinical decision-making in complex strabismus cases.

Abstract No.: 205735

Granular Corneal Dystrophy in a Family: Case Presentation and Review of Clinical Manifestations

First Author: Florence **MANURUNG**

Co-Author(s): Tjahjono **GONDHOWIARDJO**

Purpose: To present a familial occurrence of Granular Corneal Dystrophy type 1 (GCD1), also known as Groenouw Corneal Dystrophy type 1, highlighting the clinical manifestations observed across affected family members.

Methods: A descriptive case study involving members of a single family diagnosed with GCD1. Clinical examinations were performed on three affected individuals: the mother and two children. Each patient underwent visual acuity testing, slit-lamp biomicroscopy, and corneal imaging to assess the extent and characteristics of corneal deposits. Family history was obtained to trace the pattern of inheritance. Genetic testing was not performed, but clinical findings were consistent with autosomal dominant inheritance of GCD.

Results: All affected family members exhibited bilateral, discrete, small white granular opacities located in the anterior stroma, primarily in the central cornea, with clear intervening spaces. These deposits had a breadcrumb- or snowflake-like appearance and were absent in the peripheral cornea. The two children reported mild blurred vision but maintained good visual acuity with corrective lenses. In contrast, the mother experienced progressive visual decline over time. No associated symptoms such as ocular pain, tearing, redness, or photophobia were reported. No associated systemic disease has been described.

Conclusions: Granular Corneal Dystrophy is a rare inherited disorder characterized by bilateral granular deposits primarily involving the central anterior stroma, resulting in progressive visual impairment. Early detection and diagnosis are crucial for appropriate management and genetic counselling, as well as for emphasizing the need for regular ophthalmic follow-up.

Abstract No.: 206530

Guidelines for ROP Screening in Thailand 2024

First Author: Phanthipha **WONGWAI**

Purpose: To set up guidelines for ROP screening.

Methods: Prospective registry database from major hospital involved in ROP care with participatory action research.

Results: The criteria for ROP screening are based on the registration: GA equal to or less than 34 weeks; BW equal to or less than 1500g.

Conclusions: From the data in this cohort if we followed these guideline, we will not miss the infant with any stage of ROP.

Abstract No.: 203960

Headaches Should Not Be Headaches Anymore

First Author: Nabila **RAHMAN**

Purpose: To report on 8 patients having headaches diagnosed with ocular muscle imbalances.

Methods: Reporting 8 cases of headaches age ranges 9 to 13 years old (5 boys and 3 girls), presented with headache, neck pain and occasional watering from eyes from past 4/5 months. Diagnosis was made by fusion test and other tests associated with the symptoms.

Results: Despite having vision 6/6 in both eyes and normal fundus findings they have been suffering with intolerable headaches sometimes with nausea and watering of eyes especially after day long studies or near work. After proper examination we found them to have ocular muscle imbalances mostly convergence insufficiency, accommodation insufficiency or fusional vergence dysfunction. They were given a simple pen exercise daily 3 times for 5 minutes and followed up after 3 months with better parameters and improved symptoms. They were also advised to cut off screen time, ensure 6/8 hours of sleep and proper rest.

Conclusions: Headaches for ocular muscle imbalances is not uncommon rather very frequent among this age group. It is absolutely treatable if diagnosed properly and treat accordingly. So migraine, sinusitis and other central causes may not be the reason of headache always.

Abstract No.: 201389
Hearing Loss in Waardenburg Syndrome: A Case Report and Systematic Review

First Author: Liu RUI

Purpose: We describe a case of Waardenburg syndrome type 2 and a systematic review, as well as the correlation between gene mutations and the disease.

Methods: A 10-year-old Han Chinese Girl came to the hospital because of poor visual acuity and distorted vision in her right eye for 3 days. Slit-lamp examination revealed diffuse iris hypopigmentation in both eyes. Fundus examination showed red, sunset-like fundus due to a lack of pigmentation in the retinal pigment epithelium layer and retinal protrusion in the macular area of both eyes. OCT image revealed the detachment of the retinal neuroepithelial layer in the macular area of both eyes. FFA showed fluorescence accumulation in the macular area in the late stage. mfERG of both eyes showed multiple peak changes and reduced amplitude.

Results: Given a family history of congenital hearing loss and pigmentary disorders, accompanied by accurately measured ocular distances to exclude dystopia canthorum. The diagnosis of Waardenburg Type II can be made with confidence which was finally confirmed through genetic testing.

Conclusions: Ophthalmologists should take an adequate realization of Waardenburg syndrome, which shows remarkable diversity in clinical presentation and morphology to avoid misdiagnosis. The application of early genetic counseling, Marriage and childbirth guidance, Prenatal diagnostic techniques and appropriate treatment of this disease are particularly important.

Abstract No.: 204141
How Squint Correction Impacts a Life

First Author: Tasnima RAHMAN

Co-Author(s): Nabila RAHMAN, Mostafa HOSSAIN

Purpose: To report on 5 patients of varying ages who went through squint correction, which had a great impact on their social life.

Methods: We selected 5 cases coming to our OPD with strabismus. They had to face social bullying, which became miserable with time. So they were examined in detail. After proper evaluation and several follow-ups, 1 of them was corrected by spectacles and the rest by surgery.

Results: All 5 of the patients experienced a drastic change in their social life. They became more confident and happy.

Conclusions: Awareness of strabismus among the population in developing countries like ours is very much essential. Timely treatment can turn someone's life into heaven.

Abstract No.: 205120
Image Features of Lens Opacity in Pediatric Cataracts Using Ultrasound Biomicroscopy

First Author: Daoman XIANG

Co-Author(s): Wensi CHEN

Purpose: To study lens opacity in pediatric cataract images captured using ultrasound biomicroscopy.

Methods: The medical records of patients operated on from September 2012 to October 2013 were reviewed retrospectively. Prior to surgery, patients were placed in the supine position under sedation with oral chloral hydrate for UBM imaging. Lens morphology was evaluated by UBM examination with a 50 MHz probe that was equipped with a water bag instead of the standard plastic shell. UBM images were compared to images captured from intraoperative videos.

Results: UBM examination was performed in 50 patients (including 10 infants) aged 2 months to 6 years. The UBM ecographic images showed features specific to pediatric cataract lenses. These features were used to define 2 types of anterior capsule of the lens, 4 types of cortex and nucleus of the lens, 3 types of posterior capsule of the lens, and membranous cataracts.

Conclusions: Capsule morphology and the cortex density of pediatric cataracts could be evaluated before surgery using UBM imaging. Adoption of this technique could provide useful preoperative information to surgeons.

Abstract No.: 201232
Incidence, Risk Factors, and Visual Outcomes of Ocular Hypertension Following Pediatric Closed-Globe Traumatic Hyphema

First Author: Kasem SERESIRIKACHORN

Co-Author(s): Ta Chen Peter CHANG

Purpose: To determine the incidence of ocular hypertension (OHT) following pediatric closed-globe injury (CGI) with traumatic hyphema, identify associated risk factors, and evaluate visual outcomes at final follow-up.

Methods: This retrospective cohort study included patients aged < 18 years who sustained CGI with traumatic hyphema between 2003 and 2023 at three tertiary care centers. OHT was defined as intraocular pressure >21 mmHg at any point post-injury. Visual impairment and blindness were classified according to the WHO criteria at initial and final visits. Multivariable logistic regression was used to identify risk factors for OHT.

Results: A total of 191 eyes from 191 patients were analyzed, with a mean age of 11.35 ± 4.7 years. Toy/BB guns were the leading cause of injury (32.5%). OHT developed in 88 eyes (46.1%); 61.4% were managed with medication alone, while the remainder required

surgical intervention. Significant risk factors for OHT included sickle cell spectrum (adjusted odds ratio [AOR] 29.94, $p=0.001$), high-grade hyphema (grades 3–4; AOR 6.56, $p=0.024$), and presenting visual acuity worse than 20/200 (AOR 3.98, $p=0.005$). The rate of blindness at final follow-up was higher in the OHT group compared to those without OHT (5.7% vs. 2.9%).

Conclusions: OHT is a common complication following pediatric traumatic hyphema and is associated with worse visual outcomes. Early identification of high-risk patients is essential for timely referral and intervention. Public awareness and protective measures against pediatric eye trauma should be emphasized.

Abstract No.: 204821

Integrating Clinical Outcomes and Single-Cell Transcriptomics to Understand Retinoblastoma Progression and Chemotherapy Response in a Resource-Limited Setting

First Author: Firdian MAKRUWARDI

Purpose: Retinoblastoma (RB), the most common intraocular malignancy in children, exhibits both tumor heterogeneity and variable clinical outcomes, particularly in resource-limited settings where delayed diagnosis and malnutrition are prevalent. While clinical predictors of mortality are established, the molecular mechanisms underlying tumor response to chemotherapy remain poorly understood. This study was to examine how clinical factors affect survival in pediatric retinoblastoma and to explore tumor responses to chemotherapy using single-cell transcriptomics, linking patient outcomes to underlying molecular mechanisms.

Methods: We performed a retrospective cohort study of 326 pediatric patients with extraocular RB, evaluating diagnostic delay, nutritional status, tumor laterality, and survival outcomes. Cox regression identified predictors of mortality. Separately, tumor samples from patients undergoing neo-adjuvant chemotherapy (NACT) were analyzed using single-cell RNA sequencing (scRNA-seq) to characterize tumor and microenvironmental remodeling. Transcriptomic data were processed for cell-type annotation, differential expression, and pathway enrichment to identify chemotherapy-responsive signatures.

Results: Median age at diagnosis was 13 months, with an overall mortality rate of 60% and two-year survival of 45%. Bilateral disease, poor nutritional status, and diagnostic delays exceeding 10.5 months were independent predictors of mortality. Single-cell analysis of ~71,126 cells revealed heterogeneous tumor populations, including proliferative cone precursor-like cells and tumor-associated macrophages (TAMs). NACT altered tumor composition by reducing proliferative fractions and remodeling TAM polarization, activating interferon and TNF signaling pathways. Chemotherapy-

responsive genes included downregulation of proliferation-associated markers (MKI67, TOP2A) and upregulation of immune-modulatory genes (CXCL10, CCL2).

Conclusions: Delayed diagnosis and poor nutrition are key clinical determinants of poor RB survival, while single-cell profiling highlights molecular mechanisms.

Abstract No.: 206036

Kid! Freaking Out

First Author: Chun Chun Jane YEUNG

Purpose: To share author's personal experience in doing a successful comprehensive clinical ophthalmic examination in young children

Methods: Descriptive. Modifications of routine adult clinical ophthalmic examination are suggested when doing examination of young children. Author's personal experience will be described, e.g. changing the sequence of examination, how to get the child to cooperate during examination.

Results: Author's personal experience will be described, e.g. changing the sequence of examination, how to get the child to cooperate during examination.

Conclusions: Clinical ophthalmic examination may be a freaking out experience for a child and may also be the same for the doctor. A lot of patience and some simple modifications of our routine clinical ophthalmic examination for adults will help greatly towards a successful examination in young children giving meaningful findings.

Abstract No.: 205684

Locked Behind the Lids

First Author: Aanchal SINGHAL

Co-Author(s): Shreya BHADANI, Manisha CHOUDHARY, Aajay DHANASEKARAN, Srinidhi N, Shrutakirti PARIDA

Purpose: To report a rare case of unilateral cryptophthalmos with umbilical hernia in a newborn.

Methods: A 3-day-old female neonate, born to a 19-year-old primigravida from a non-consanguineous marriage in Eastern India, presented with an undeveloped left eye. The infant was low birth weight. Maternal antenatal investigations (VDRL, HIV, HBsAg, TORCH profile) were negative, and ultrasound scans revealed no fetal anomaly. There was no family history of any congenital disorders. Examination revealed complete skin coverage over the left orbit without a palpebral fissure or identifiable globe, consistent with complete cryptophthalmos. The right eye appeared clinically normal. An associated umbilical hernia was also noted.

Results: The clinical features were suggestive of Fraser syndrome, although one of the major diagnostic criteria—syndactyly—was absent. The

infant was started on topical vitamin A gel to prevent desiccation of the malformed ocular surface. Parents were counselled regarding prognosis and staged reconstructive surgery options. Whole-genome sequencing identified a FRAS1 gene mutation, confirming the diagnosis.

Conclusions: This case underscores the diagnostic challenges of cryptophthalmos, which often remain undetected on routine antenatal ultrasonography. With a prevalence of only 0.043 per 10,000 live births, its recognition requires a high index of suspicion. The coexistence of cryptophthalmos with other systemic anomalies warrants comprehensive evaluation for syndromic associations such as Fraser syndrome. Early referral, multidisciplinary management, and structured parental counselling are essential for functional rehabilitation and psychosocial support.

Abstract No.: 205652

Macular Schisis in the Pediatric Eye: Diagnostic Challenges in X-Linked Retinoschisis

First Author: Jethro KHO

Co-Author(s): Alvina SANTIAGO

Purpose: To highlight the diagnostic challenges of X-linked retinoschisis in pediatric patients presenting with poor vision, particularly when standard clinical evaluation is limited.

Methods: Case report of 3 siblings, 2 of whom are males are presented.

Results: A 5-year-old male presented with bilateral blurred vision for one year. Family history revealed poor vision in his maternal grandfather and granduncle, suggesting an X-linked pattern of inheritance. The patient underwent a comprehensive ophthalmologic evaluation. Visual acuity was 20/100 in the right eye and 20/400 in the left. Dilated fundus examination revealed macular abnormalities. Optical coherence tomography (OCT) showed foveal thickening, large intraretinal cystic spaces, and retinal layer disorganization suggestive of macular schisis. His 1-year-old brother, who presented with esotropia, was examined under anesthesia. A more advanced form of disease with schisis and retinal detachment was seen in one eye. In contrast, their 7-month-old sister had a normal ophthalmologic examination. The pattern of findings across siblings, along with the family history, supported the diagnosis of X-linked retinoschisis.

Conclusions: X-linked retinoschisis is a hereditary macular dystrophy that may be overlooked in its early stages or misdiagnosed as other retinal conditions. This case underscores the importance of obtaining a detailed family history and maintaining a high index of suspicion, especially in young children who may not tolerate a full eye examination. Early recognition

is critical for preventing complications and enabling timely genetic counseling.

Abstract No.: 208317

Management of Cicatricial Retinopathy of Prematurity With Macula-Involving Tractional Retinal Detachment in an Extremely Premature Infant: A Case Report

First Author: Wency TANG

Co-Author(s): Charlene YIM

Purpose: To describe a case of cicatricial retinopathy of prematurity (ROP) in an extremely premature infant and outline the management process.

Methods: We reviewed a premature infant born at 24 weeks and 2 days with a birth weight of 0.546 kg. Systemic and ocular findings were collected from birth through post-operative follow-up. ROP screening, treatments, and outcomes were summarized.

Results: The infant had multiple neonatal complications, including necrotizing enterocolitis, respiratory distress syndrome with pneumothorax, pulmonary interstitial emphysema, patent ductus arteriosus requiring ligation, renal impairment, cholestasis, hypothyroidism, and suspected adrenal insufficiency. ROP screening at PCA 34 2/7 weeks revealed bilateral Zone I Type I ROP with plus disease (left eye worse). Intravitreal ranibizumab (0.2 mg/0.02 mL) was given to both eyes. The left eye regressed, but the right eye progressed to Zone I Stage 3 disease three weeks later, requiring laser photocoagulation at PCA 37 weeks. Subsequently, the right eye developed fibrovascular proliferation with falciform folds, disc dragging, and macula-involving TRD (Stage 4), consistent with cicatricial ROP. A pars plana vitrectomy with traction release at PCA 47 weeks flattened the retina and reduced traction on post-operative B-scan. At two weeks post-surgery, the retina remained attached with resolving subretinal fluid. The left eye remained stable with regressed ROP.

Conclusions: This case highlights the challenges of treating severe ROP in a very premature infant with multiple systemic issues. Management required sequential treatments including anti-VEGF injection, laser, and surgery, with decisions influenced by systemic condition and disease progression.

Abstract No.: 205163**Management of Retinopathy in Incontinentia Pigmenti: A Case Series of Two Infants Treated With Laser Photocoagulation and Anti-VEGF Therapy***First Author: Jing JIN**Co-Author(s): Yuanyue CUI, Baohai LIU, Hong LIU, Ting QIU, Jing XIA*

Purpose: Management of Retinopathy in Incontinentia Pigmenti: A Case Series of Two Infants Treated With Laser Photocoagulation and Anti-VEGF Therapy.

Methods: Two female infants (aged 3 days and 5 days at diagnosis) presented with cutaneous manifestations suggestive of IP. Both underwent dermatological consultation, comprehensive ophthalmological examination, including RetCam imaging, fundus fluorescein angiography (FFA), and genetic testing confirming IKBKG gene mutations. Both cases showed pre-retinal hemorrhage, retinal neovascularization, and temporal nonperfusion. One patient underwent retinal laser photocoagulation, and another patient received an intravitreal injection of an anti-VEGF agent (ranibizumab).

Results: Both patients were regularly followed with serial fundus examinations. In Case 1, laser photocoagulation led to regression of neovascularization without progression. In Case 2, anti-VEGF injection resulted in rapid regression of neovascularization and absorption of hemorrhagic components. No recurrence or disease progression was observed during follow-up (case 1: 24months, case 2: 9 months).

Conclusions: Both laser photocoagulation and intravitreal anti-VEGF therapy appear effective in halting disease progression in IP-associated retinopathy. Anti-VEGF agents may offer a minimally invasive alternative for managing neovascularization. Further studies are needed to optimize treatment protocols and evaluate long-term outcomes.

Abstract No.: 206005**Mobile Strabismus Surgery and Quality of Life: Early Outcomes From Thailand's Rural Eye Health Program***First Author: Wichapas KUSAKUL**Co-Author(s): Worawalun HONGLERTNAPAKUL, Natthiya LAILAKSIRI, Jipada PRUKSACHOLAVIT, Napa SUEBSAIPHROM*

Purpose: Strabismus is not only a visual problem but also carries a profound psychosocial burden, particularly for children in rural communities who face limited access to ophthalmic care. Mobile surgical units have been proposed as a strategy to reduce health disparities, yet evidence regarding patient-reported outcomes is scarce. This study assessed changes in quality of life (QoL) one month after strabismus surgery

performed in a mobile surgical program, and explored patient and caregiver perceptions of the service.

Methods: A prospective cross-sectional study was conducted among 35 patients undergoing strabismus surgery at a mobile unit based at Sisaket Hospital between January 21–24, 2025. Sociodemographic data and ocular history were collected through structured interviews. The validated Thai version of the EQ-5D questionnaire was administered before and one month after surgery; for young children, parent-proxy responses were obtained. Follow-up assessments were conducted by telephone. Differences in pre- and post-operative QoL scores were analyzed using the Wilcoxon signed-rank test.

Results: Mean EQ-5D index scores improved significantly from baseline to one month after surgery ($Z = -3.461$, $p < 0.001$). The largest gains were observed in domains of visual function and psychological well-being. Caregiver narratives frequently highlighted enhanced confidence and social interaction in children. Overall satisfaction with the accessibility and delivery of care via the mobile unit exceeded 91.42%.

Conclusions: Mobile strabismus surgical services provide more than ocular alignment; they deliver measurable improvements in patients' short-term quality of life and relieve psychosocial distress in families who might otherwise lack access to surgery. These findings underscore the potential role of mobile surgical programs in addressing inequities in eye care and support their inclusion in national eye health strategies.

Abstract No.: 202328**Moebius Syndrome: A Case Report***First Author: Ika PUSPITA**Co-Author(s): Florence MANURUNG*

Purpose: To describe the clinical features of a pediatric patient with Moebius syndrome and highlight the importance of multidisciplinary management.

Methods: A case report

Results: A 9-year-old girl was brought to our clinic with the main complaint of inability to move her eyes laterally. Since birth, she had been unable to close her eyes completely and demonstrated a mask-like facial expression, which recently resulted in bullying at school. Her mother reported no medical problems during pregnancy. On ophthalmic examination, best corrected visual acuity was 0.6 in the right eye and 0.5 in the left. Ocular alignment was orthophoric in the primary position, but there was marked limitation of abduction and mild limitation of adduction in both eyes. Nystagmus was absent. Neurological assessment revealed bilateral sixth and seventh cranial nerve palsy. Additional features included micrognathia. Systemic development was normal, and she had no difficulties at school. Brain CT scan showed no abnormalities.

Conclusions: Moebius syndrome requires a multidisciplinary approach involving ophthalmologists, neurologists, speech and occupational therapists, and psychologists. The primary goal of management is to optimize visual function, protect the ocular surface, and improve the patient's quality of life.

Abstract No.: 202314

Mom, Can I Go for a Walk? Prevention of Myopia in Schoolchildren in the Conditions of the City of Eastern Siberia With the Developed Aluminum Industry

First Author: Yulia LEUTKINA

Purpose: To study the publications on the role of pollution of atmospheric air with fluorine in development of myopia in schoolchildren for the definition of the effective methods of its prevention.

Methods: It is analyzed the publications over the last years on Google Scholar, PubMed, eLibrary, Crossref Metadata Search.

Results: It is determined the incidence of myopia among schoolchildren in Krasnoyarsk with its developed aluminum industry statistically exceeds the incidence among schoolchildren living in cities of the European part of Russia. APOModerate myopia in elementary grades among Siberians was 10.9%, in middle grades 23.8%, and among high school students 31.4%. In the European part of Russia, these figures were 5.6% in elementary school, 17.8% in middle grades, and 26.2% among high school students. Myopia prevention traditionally involves organizing the educational process, hygiene of visual load, physical activity, and time spent outdoors.

Conclusions: It is concluded that the issues of myopia prevention remain insufficiently covered. To study the effect of annual trips of children to an area free from the destructive effects of fluorine on the incidence of schoolchildren myopia.

Abstract No.: 205765

Multisystem Congenital Anomalies With MRI-Confirmed Cranial Nerve Malformations in Oculo-Auriculo-Vertebral Spectrum: A Case Report

First Author: Hyun-hae CHO

Purpose: Oculo-auriculo-vertebral spectrum (OAVS) is characterized by craniofacial and systemic malformations. Neurological involvement has been sporadically reported, but MRI-confirmed cranial nerve abnormalities remain uncommon. We present a case of OAVS with multiple congenital anomalies and distinctive cranial nerve findings on MRI.

Methods: A newborn presented with bilateral ear malformations since birth and tearing from the eyes while feeding, prompting a comprehensive work-up.

Clinical assessment, cardiac echocardiography, and brain MRI with high-resolution 3D sequences were performed. Cranial nerve courses and associated anomalies were systematically evaluated.

Results: The patient exhibited right microtia with congenital aural atresia, left dysmorphic ear with congenital aural stenosis, bilateral ossicular anomaly and possible bilateral vestibular enlargement. Additional anomalies included left-hand polydactyly and a muscular ventricular septal defect. Clinically, left facial weakness with mouth corner drooping was observed. MRI demonstrated: (1) asymmetric thickening of the right CN IV with nondelineable left CN IV; (2) anomalous common origin of CN V, VII, and VIII from the anterior profile of the middle cerebellar peduncle, forming a common trunk that subdivided into two nerves entering the Meckel cave and internal acoustic meatus, with partial misrouting of the left CN V; (3) nondelineable bilateral CN VI. Bilateral middle ear hypoplasia with soft tissue in the cavities was also noted.

Conclusions: This case illustrates rare and complex cranial nerve malformations in OAVS, with an unusual common trunk of CN V, VII, and VIII and absence of CN VI. Recognition of such anomalies is important for early diagnosis and management.

Abstract No.: 205546

Muscle Transplantation Technique for Large-Angle Strabismus

First Author: Ayu DIAH PERMATASARI

Co-Author(s): Ni Made Ayu SURASMIATI

Purpose: Large-angle strabismus remains a surgical challenge, particularly in patients with long-standing deprivation amblyopia. This case report evaluates the effectiveness of extraocular muscle transplantation as a monocular surgical approach.

Methods: A 27-year-old male with a history of traumatic cataract in the left eye underwent cataract extraction with intraocular lens implantation 10 years after injury. He presented with sensory esotropia: Hirschberg test revealed 30Δ esotropia, Krimsky test showed 75 prism diopter base out and fixation was limited due to deprivation amblyopia. Surgical intervention included 6 mm medial rectus recession with adjustable suture, 8 mm lateral rectus resection, and 5 mm autologous muscle transplantation. Outcomes were evaluated at 1 day, 1 week, and 3 months postoperatively.

Results: At 3 months, the patient achieved orthophoria with marked improvement in diplopia. Hirschberg testing confirmed stable ocular alignment, with minimal limitation in adduction. No major intraoperative or postoperative complications occurred. The procedure provided both anatomical correction and functional visual improvement.

Conclusions: Muscle transplantation is a safe and effective surgical option for large-angle strabismus, particularly in patients with monocular visual loss where unilateral correction is preferred. By utilizing autologous muscle tissue, it enables substantial alignment correction while avoiding bilateral four-muscle surgery, thereby reducing surgical morbidity. This case highlights its potential as a viable alternative for restoring ocular alignment and enhancing quality of life in complex strabismus

Abstract No.: 204949

Neuro-Ophthalmic Complications in a Pediatric Patient With Resected Fourth Ventricular Medulloblastoma: A Case Report

First Author: Unursaikhan **SODNOMBALJIR**

Co-Author(s): Tsengelmaa **CHULUUNBAT**, Munkhdelger **JAMIYANSHARAV**, Otgonsuren **NAMSRAIJAV**

Purpose: To report a pediatric case of medulloblastoma with neuro-ophthalmic complications and highlight the challenges in surgical management.

Methods: We retrospectively reviewed the patient's clinical course and management by collecting data from medical records, neuroimaging studies, and ophthalmologic evaluations. Visual acuity, extra-ocular movement, slit-lamp examination, and forced-duction test were analyzed. And we planned and performed the extraocular muscle transposition using the crossed adjustable suture technique.

Results: In 2021, the patient developed vomiting and progressive esotropia and was diagnosed with a medulloblastoma, for which he underwent surgical resection. Postoperatively, left facial palsy and sixth nerve palsy-related esotropia persisted. He subsequently received 31 sessions of radiotherapy and 32 courses of chemotherapy. In 2024, neurology follow-up showed no recurrence of the tumor. Ophthalmologic evaluation revealed left eyelid ptosis and persistent esotropia. Ptosis was surgically corrected, followed by a botulinum toxin injection to the left medial rectus, which proved ineffective. Extraocular muscle transposition using the crossed adjustable suture technique was then performed. Postoperative care included peribulbar corticosteroid injections and topical treatment. By postoperative day 10, visual acuity in the left eye improved from 0.02 to 0.25, with a slight improvement in esotropia. Fundus examination became possible, revealing attached retinas, pink optic discs, and preserved macular reflexes. Surgical outcomes will be monitored over a six-month period, with further intervention considered as needed.

Conclusions: Early recognition and management of ophthalmic complications are crucial for preserving visual function and enhancing quality of life. This case highlights the need for continued monitoring and

potential staged ophthalmic interventions even years after tumor treatment.

Abstract No.: 203591

Not Only the Tiniest: Oxygen Therapy and 1000–1499g Birthweight Drive ROP Risk—A Six-Year Surabaya Cohort

First Author: Rozalina **LOEBIS**

Co-Author(s): Muhammad **PRADJANTO**

Purpose: To identify independent risk factors for retinopathy of prematurity (ROP) and describe severity patterns in a large tertiary-care cohort from Indonesia.

Methods: Retrospective cohort of premature infants screened for ROP at Dr. Soetomo General Hospital (2017–2022). Inclusion followed local policy (typically gestational age [GA] <34 weeks and/or birth weight [BW] <2000 g). Outcomes were any ROP and stage severity. Bivariate analyses were followed by multivariable logistic regression with GA category, BW category, sex, twin birth, oxygen therapy, and blood transfusion. Model performance was summarized with AUC and Brier score.

Results: We analyzed 727 infants; 398 had ROP (54.7%). Severe ROP ($\geq$ Stage 3) accounted for 123/398 (30.9%) of ROP cases (16.9% overall). In the final multivariable model (GA + BW + covariates; AUC 0.668, Brier 0.226), two predictors remained independently significant: • Birthweight 1000–1499 g vs 1500–>2000 g: adjusted OR 2.33 (95% CI 1.41–3.84; $p=0.001$). • Oxygen therapy (Yes vs No): adjusted OR 1.99 (95% CI 1.17–3.36; $p=0.010$). Lower GA categories showed adverse directionality but did not retain statistical significance after adjustment. Sex, twin birth, and transfusion were not significant in the final model.

Conclusions: In this six-year cohort, moderate low birthweight (1000–1499 g) and oxygen therapy independently increased ROP risk—indicating vulnerability extends beyond only the tiniest or most immature infants. These findings support vigilant screening above the most extreme GA/BW strata and rigorous oxygen-targeting protocols in NICUs across middle-income settings

Abstract No.: 205472

Not as Rare as We Think? Pediatric Adverse Effects of Cycloplegia

First Author: Adit **MUHAMAD NURSIDIQ**

Co-Author(s): Mayasari **WAHYU KUNTORINI**, Nindya **ZANARIA LUBIS**

Purpose: To describe the systemic adverse effects following cycloplegic eye drop administration in a pediatric patient, which are often considered rare but may be underrecognized and underreported. This report also aims to raise awareness among

ophthalmologists of the importance of careful dosing and monitoring.

Methods: A 7 years old boy with myopia gravior undergoing cycloplegic refraction at our center was assessed. Clinical data were obtained from medical records, physical examination, and post administration observation.

Results: After receiving three sequential instillations of cyclopentolate 1% eye drops, the patient developed systemic manifestations including visual hallucinations, communication difficulties, ataxia, and unsteady gait. Vital signs showed a pulse of 104 beats/minute, respiratory rate of 24 breaths/minute, temperature of 36.7 °C, and oxygen saturation of 97%. The patient was admitted for observation and managed with supportive therapy only. Symptoms gradually subsided and resolved completely within 4 hours.

Conclusions: Adverse reactions to cycloplegic agents in children may not be as uncommon as the limited number of published reports suggests. This is the second reported case of cycloplegia-related adverse effects in pediatric patients at our center. Neuropsychiatric symptoms such as hallucinations and ataxia can occur, even with routine use. It should be kept in mind that, although considered rare, systemic adverse effects of cyclopentolate can develop particularly at concentrations >0.5%. Ophthalmologists should be mindful of both appropriate dosing and the potential risks when using cycloplegic agents in children.

Abstract No.: 202073

Ocular Albinism Associated With GPR 143 c.593T>G Variant

First Author: Min-hsiu SHIH

Purpose: Infantile nystagmus is often associated with visual sensory defects. In Asian children, ocular albinism type 1 characterized by foveal hypoplasia and sometimes iris discoloration, may be overlooked as a cause. The missense mutation c.593T>G in GPR143 is not novel, but its significance was not well defined.

Methods: Case report.

Results: A 6-month-old male infant presented with grayish irises and persistent horizontal nystagmus in both eyes for a month. He had undergone evaluations in the pediatric department, including lumbar puncture and electrophysiological tests. Laboratory investigations were conducted to rule out metabolic disorders. All results returned normal. Ophthalmological examination revealed heterochromic irises and a hypopigmented macula. Genetic analysis via whole exome sequencing identified a missense mutation (rs767317051, c.593T>G, p.Met198Arg) in the GPR143 gene encoding G-protein coupled receptor 143. Previously, we identified ten families carrying the same variant (c.593T>G) at genomic position 593 (ATG

> AGG) in exon 5 of GPR143, as detected by polymerase chain reaction. Based on the genetic results and clinical findings, a diagnosis of ocular albinism was established, although the results of optical coherence tomography were not available.

Conclusions: Genetic testing helps confirm diagnoses in unresolved patients with atypical phenotypes, but current databases are sometimes limited. Based on the PCR results of these families and WES of this boy, we believe the missense mutation c.593T>G in GPR143 is related to ocular albinism type 1.

Abstract No.: 206993

Ocular Manifestations and Diagnostic Approach in Apert Syndrome (Acrocephalosyndactyly Type I): A Rare Case Report

First Author: Kiki Rizki ARINDA

Co-Author(s): Aini NUZULUL

Purpose: To report a rare case of Apert Syndrome with ocular manifestation and its diagnostic approach.

Methods: A 4-month-old female patient, diagnosed with Apert Syndrome, presented with abnormal craniofacial morphology, syndactyly, and ocular abnormalities. A comprehensive examination was performed, including assessment of ocular alignment, anterior and posterior segment evaluation, orbital anthropometric measurements, and radiological imaging.

Results: The ophthalmologic examination revealed down-slanting palpebral fissures and hypertelorism, with an inner canthal distance of 32 mm, an outer canthal distance of 75 mm, and a canthal index ratio of 42.667. Funduscopy examination showed a normal fundus. Radiographic (babygram) imaging demonstrated an elevation of the orbital roof and ipsilateral lateral wall, consistent with the "harlequin appearance". Further multidisciplinary evaluations revealed craniosynostosis, syndactyly, and midfacial hypoplasia.

Conclusions: This case highlights the importance of early recognition and a multidisciplinary approach in managing Apert Syndrome, particularly in addressing ocular manifestations that may significantly impact visual development. Regular ophthalmic surveillance is essential for detecting complications such as increased intracranial pressure that could lead to atrophy papil, strabismus, and refractive errors, which, if managed promptly, can help preserve visual function and improve the patient's quality of life. This case highlights the importance of early recognition and a multidisciplinary approach in managing Apert Syndrome, particularly in addressing ocular manifestations that may significantly impact visual development. Regular ophthalmic surveillance is essential for detecting complications such as increased

intracranial pressure that could lead to atrophy papil, strabismus, and refractive errors, which, if managed promptly, can help preserve visual function and improve the patient's quality of life.

Abstract No.: 206035

Ocular Myasthenia Gravis Mimicking Mono-Ocular Elevation Deficit

First Author: Monalisa PATI

Co-Author(s): Shweta DHIMAN

Purpose: To report a case of ocular myasthenia gravis (OMG) mimicking mono-ocular elevation deficit (MED)

Methods: A 28-year-old male presented with binocular double vision for 5 months, which was more pronounced in the up-gaze. Left eye (OS) upper lid mild ptosis was present. The ice-pack test was negative. Nine gaze examinations revealed an elevation deficit in OS. The patient was provisionally diagnosed to have a MED OS. The MRI of the brain and orbit was normal. After 5 months, he had progressive ptosis in both eyes (OU). There was a limited depression of OS. The ice-pack test was positive this time.

Results: He was advised to undergo a single-fiber electromyography test and an anti-acetylcholine receptor antibody test. However, he did not report for the tests. He was diagnosed with OMG and was referred to a neurologist

Conclusions: OMG is a great mimicker. The clinician should be alert to the possibility of OMG as a diagnosis from different strabismus presentations, including MED, as in this current case

Abstract No.: 205563

Ophthalmic Clues to the Enigma of Syndromic Craniosynostosis

First Author: Manisha CHOUDHARY

Co-Author(s): Matuli DAS, Siddhartha KAR, Gayatree MOHANTY, Shrutakirti PARIDA

Purpose: To report two infants with syndromic craniosynostosis presenting with distinct ocular and systemic manifestations.

Methods: Case 1: A 5-month-old male baby presented with unilateral coronal craniosynostosis, cleft lip and palate, polysyndactyly, bilateral adherent leucoma, and proptosis. Ocular findings included nystagmus and absent red reflex. Cardiac evaluation revealed a patent ductus arteriosus, and MRI showed mild cerebellar tonsillar herniation. These constellation of craniofacial, ocular, and skeletal features was consistent with Carpenter syndrome. Case 2: A 1-year-old female baby presented with progressive bilateral proptosis and papilledema. CT revealed multisuture craniosynostosis with turribrachycephaly, midfacial hypoplasia, shallow orbits, a copper-beaten skull, and optic nerve tortuosity. Echocardiography identified an atrial septal

defect and patent ductus arteriosus. These findings were consistent with Crouzon syndrome.

Results: A complete ocular followed by systemic evaluation supported by neuroimaging and other diagnostic modalities helped in arriving at the correct diagnosis in these two patients.

Conclusions: Early recognition of syndromic craniosynostosis often hinges on ocular findings. The divergent phenotypes of Carpenter syndrome, with its craniofacial anomalies, ocular features, and skeletal malformations, and Crouzon syndrome, marked by cranial anomalies, ocular manifestations, raised intracranial pressure, and cardiac defects, illustrate the broad spectrum of systemic involvement. These cases underscore the critical need for early ophthalmic assessment, thorough systemic evaluation, and integrated multidisciplinary management in affected infants.

Abstract No.: 203566

Paediatric Open Globe Injuries

First Author: Brendon LEE

Co-Author(s): Elsie CHAN, Chameen SAMARAWICKRAMA

Purpose: To examine the epidemiology, visual outcomes, surgical needs, and socioeconomic costs of paediatric open globe injuries (OGI)

Methods: A 15-year retrospective, consecutive, review (2011-2024) of 200 eyes at two tertiary centres (Royal Victorian Eye and Ear Hospital and Royal Children's Hospital, Victoria). Patients were aged ≤ 18 . Outcome included best-corrected visual acuity (BCVA), operating theatre (OT) visits, comparison of existing prognostic models (TOTS - Toddler/Infant Ocular Trauma Score, POTS - Paediatric Penetrating Ocular Trauma Score, and BETT - Birmingham Eye Trauma Terminology), and cost analysis using Australian data.

Results: Preliminary data: the average age at time of injury was 11 years with similar male-to-female ratio. The most common location was in the home (57%) then schools (11%). A sharp object was most common (75%) causing lacerations (83%). Hyphaema occurred in 83%, iris prolapse/damage in 65%, lens injury in 43%, retinal injury in 33%. Time to initial surgical repair was 2.74 hours. Presenting mean logMAR VA was 1.46 [6/150] and improved to 0.83 [6/40]. There was an average of 10 follow up visits, and 2 further admissions, and many patients required multiple OT visits (average 2.7). In terms of prognostication, BETT was 10% Grade 1, 25% Grade 5 (worse), TOTS was 34% 1, 2% 6 (worse), and POTS 7% (best) and 41% (worse). Full data will be presented at the conference including socioeconomic costs using Australian data on admissions, OT visits, and follow up visits.

Conclusions: Paediatric open globe injuries remain a significant cause of injury, with poor visual outcomes and high surgical morbidity.

Abstract No.: 201780

Pediatric Clival Aneurysmal Bone Cyst Presenting With Abducens Palsy: A Case Report

First Author: Hui-chen **CHENG**

Co-Author(s): Wei-che **HUNG**, An-guor **WANG**

Purpose: To report a case of pediatric clival aneurysmal bone cyst presenting with abducens palsy.

Methods: Case report.

Results: An eight-year-old girl complained of diplopia for 3 months. Her mother noticed that she needed to turn her head to the right when gazing at objects on her right side. Esotropia was noted recently, and she was referred to our clinic. At our clinic, her best-corrected visual acuity was 6/5 in both eyes with a prompt pupillary light reflex. Right esotropia was noted, and the prism cover test showed 45 prism diopters of esotropia at the primary position. Extraocular muscle movement examination showed limited abduction in the right eye. Brain magnetic resonance imaging (MRI) disclosed a mass lesion over the clival region with extension into the posterior compartment of the right cavernous sinus. She then received an endoscopic endonasal approach for tumor removal. The pathology report showed fragments containing a cystic-like lesion with bland ovoid to short-spindle cells and tightly packed mononuclear cells. The tumor cells are focally reactive for USP6, and the CD34/ERG1 immunostaining highlights those endothelial cells, which confirmed the diagnosis of aneurysmal bone cyst. The tumor recurred, and the patient received another 2 EEA for tumor removal. At the end of an 8-month follow-up, she still had right esotropia and limited abduction in the right eye.

Conclusions: We reported a case of pediatric clival aneurysmal bone cyst presenting with abducens palsy. Aneurysmal bone cyst is rare at skull base and should be considered as differential diagnosis of cystic tumor at skull base in a child.

Abstract No.: 201853

Persistent Fetal Vasculature (PFV) Case Report in Mongolia

First Author: Tsengelmaa **CHULUUNBAT**

Purpose: Persistent fetal vasculature (PFV) occurs when the hyaloid vascular system fails to regress completely during fetal development, leading to a retrolental membrane attached to the posterior surface of the lens.

Methods: A case study involves a 4-year-old female patient presenting with bilateral poor vision and a

leucokoria in the left eye. At three months of age, a congenital cataract was diagnosed in the left eye. The left eye had no light perception. Further examination of the left eye showed the presence of a cataract, a retrolental fibrovascular membrane, and macular traction, which is a rare clinical feature.

Results: The patient underwent uneventful pars plana vitrectomy (PPV), lensectomy (PPL), and endolaser treatment for the left eye, achieving 100% globe retention. Six months postoperatively, right eye vision improved to 0.4 with correction (OD +3.00 DS/ Cyl -2.00 x180), and left eye visual acuity remained at light perception level with correction (OS +13.00 DS).

Conclusions: The primary goal of treatment is to prevent complications such as glaucoma and phthisis bulbi, avoid enucleation, restore ocular transparency, and manage amblyopia. During surgery, it is critical to prevent vitreous hemorrhage, retinal detachment while performing lensectomy and membrane removal.

Abstract No.: 205284

Phenotype and a Genotype Spectrum of Congenital Myopathies Presenting in an Ophthalmic Clinic

First Author: Shivani **BHANDARI**

Co-Author(s): Goura **CHATTANAVAR**, Ramesh **KEKUNNAYA**, Rachana **MARAGANI**, Vyshnavika **MUPPARAPU**

Purpose: Congenital myopathies are non- or slowly progressive inherited muscle disorders, typically presenting in infancy with hypotonia and often associated with facial weakness (myopathic facies). This study aims to develop algorithm to distinguish congenital myopathy from other causes of external ophthalmoplegia in pediatric population like CFEOM, Myasthenia gravis.

Methods: This retrospective study evaluates the phenotypic and genotypic features of patients with congenital myopathy and identifies clinical clues to differentiate it from other causes of external ophthalmoplegia.

Results: Seven patients (age: 7 months-5 years) were included. Ocular findings included bilateral ptosis in 6 (85.7%), limited ocular motility and strabismus in all (100%), with exotropia in 5 (71.4%). Additional features were lagophthalmos in 4 (57.1%), exposure keratopathy in 2 (28.5%), and facial dysmorphism with mask-like facies in 5 (71.4%). Pupillary responses were normal in all. Genetic testing revealed heterozygous pathogenic variants in RYR1 (3 cases, 42.8%) and DNM2 (1 case), and biallelic variants in VWA1, BIN1, and MYH2 (1 case each). Only the patient with the DNM2 variant had an affected sibling. Muscle biopsy was performed in 2 cases (28.5%). None underwent surgery for ptosis or strabismus. Myasthenia gravis and other causes of

external ophthalmoplegia were ruled out in all before genetic test.

Conclusions: Congenital myopathy should be considered in paediatric patients with ptosis and strabismus, especially when associated with facial dysmorphism, lagophthalmos, or systemic features. These signs help differentiate it from conditions like CFEOM and myasthenia gravis. Muscle biopsy and genetic testing aid in diagnosis.

Abstract No.: 202757

Potential Hazard of Repeated Low-level Red-light Therapy in Myopia

First Author: Huanyu **LIU**

Co-Author(s): Jie **PENG**, Peiquan **ZHAO**

Purpose: Repeated low-level red light (RLRL) exposure has emerged as a novel approach for myopia management; however, use of laser-based devices may carry potential risks. This study aimed to enhance ophthalmologists' understanding of RLRL treatment.

Methods: This retrospective case study reviewed clinical trials of RLRL as an adjunctive treatment for myopia, reported two cases of retinal injury after RLRL, and analyzed potential mechanisms of damage.

Results: Clinical trials have shown that RLRL can significantly improve axial length and spherical equivalent refraction compared with controls, with no treatment-related adverse events reported. Nevertheless, two retinal injury cases were observed at our center. A 12-year-old girl experienced BCVA decline from 20/20 to 20/30 in both eyes after five months of RLRL; multimodal imaging revealed foveal darkening, hypoautofluorescent foveal lesions, and ellipsoid zone disruption. After discontinuing treatment for three months, BCVA improved to 20/25 with partial restoration of outer retina. A 5-year-old boy with high myopia (−8.00 DS) and myelinated nerve fibers developed parafoveal detachment and disruption of the ellipsoid and interdigitation zones after ten months of RLRL. Following discontinuation for fifteen months, partial anatomical recovery and BCVA improvement from 20/40 to 20/33 were observed. Literature suggests RLRL-related OCT changes, including hyperreflectivity of the ellipsoid zone and photoreceptor outer segments, possibly linked to mitochondrial activation and increased outer segment turnover.

Conclusions: RLRL demonstrates promising short-term efficacy for myopia control. However, given potential risks, RLRL therapy should be used cautiously and monitored closely by ophthalmologists.

Abstract No.: 204217

Prevalence and Patterns of Refractive Errors Among Yemeni Patients Diagnosed With Strabismus

First Author: Tariq **ALDOAIS**

Co-Author(s): Mahfouth **BAMASHMUS**

Purpose: This study aimed to determine the prevalence and pattern of refractive errors among Yemeni patients diagnosed with strabismus.

Methods: A descriptive cross-sectional study was carried out between June 2022 and March 2025, the study sample included 1,079 strabismus patients who underwent a refractive error assessment. The complete data on strabismus type, refraction status, visual acuity, and amblyopia were collected and subjected to statistical analysis.

Results: Among Yemeni patients diagnosed with strabismus, hyperopia was prevalent (OD: 40.87%, OS: 40.06%), particularly in females and children. Myopia was less common (OD: 8.25%, OS: 7.51%) but increased in adults (18–40 years), whereas astigmatism is relatively uncommon; the results revealed high inter-eye refractive concordance (Kappa=0.851, $p<0.001$). The results indicate that the majority of patients with strabismus are in childhood and early adolescence, with respect to strabismus distribution, esotropia and exotropia were most prevalent at 53.57% and 35.77%, respectively. Moreover, hyperopia is more prevalent among esotropic patients, and myopic errors are slightly more common among exotropic patients. Furthermore, hyperopia was associated with the greatest prevalence of amblyopia, while myopia severely reduced visual acuity.

Conclusions: Esotropia and hyperopia are the most common kinds of optical anomalies, while the severe visual acuity loss is most associated with myopia. These findings underscore the clinical need for combined screening and early intervention to reduce the burden of refractive errors and their associated visual anomalies within Yemeni society.

Abstract No.: 201779

Refractive Changes and Determinants of Emmetropization in Hyperopic Children

First Author: Yudan **ZHONG**

Co-Author(s): Lei **FENG**, Yunsu **HE**, Jinrong **LI**, Qiuying **LI**, Xuan **QIU**, Yun **WEN**, Zixuan **XU**, Qingqing **YE**, Wentong **YU**, Junpeng **YUAN**, Yusong **ZHOU**

Purpose: To investigate the characteristics and determinants of annual refractive change in hyperopic children and to compare ocular parameters across subgroups.

Methods: This retrospective cohort study included children with baseline spherical equivalent refraction (SER) of +0.50 to +10.00 D, followed for >12 months

with at least two refraction measurements. Subgroups were defined by baseline SER (+0.50–2.00, +2.00–4.00, +4.00–6.00, +6.00–8.00, +8.00–10.00 D), baseline age (0–3, 3–6, 6–9, 9–12 years), and final SER status [myopia (SER ≤ −0.50 D), emmetropia (−0.50 < SER ≤ +0.50 D), persistent hyperopia (SER > +0.50 D)]. Intergroup comparisons were performed, and associations were analyzed using Spearman correlation and multivariate linear regression.

Results: A total of 591 hyperopic children were included (310 boys, 281 girls; mean baseline age 5.58 ± 2.21 years; baseline SER +4.33 ± 2.37 D; mean follow-up 31.75 ± 11.69 months). Based on baseline SER, the low-hyperopia group (+0.50–2.00 D) showed the smallest absolute annual SER change (−0.26 ± 0.32 D) and the slowest progression, with significant differences compared with the +4.00–6.00 D, +6.00–8.00 D, and +8.00–10.00 D groups (−0.34 ± 0.34 D, −0.37 ± 0.29 D, −0.41 ± 0.31 D; all P < 0.001). By final SER, persistent hyperopes had significantly higher baseline SER than emmetropic or myopic children (+4.55 ± 2.33 D vs. +1.60 ± 0.62 D and +1.61 ± 0.50 D; both P < 0.001). Age-stratified analysis showed increasing absolute annual change with age (−0.22 ± 0.25 D, −0.25 ± 0.27 D, −0.48 ± 0.36 D, and −0.47 ± 0.33 D for 0–3, 3–6, 6–9, and 9–12 years; overall P < 0.05). Pairwise comparisons showed no significant differences between the 0–3 and 3–6 years groups or between the 6–9 and 9–12 years groups, whereas all other comparisons were significant (P < 0.005). Multivariate linear regression identified baseline age and baseline SER as independent negative predictors of annual SER change, while sex and follow-up duration were not significant.

Conclusions: Annual refractive change in hyperopic children is primarily determined by baseline age and SER. Older age and greater hyperopia predict faster myopic progression, underscoring the need for early risk stratification and monitoring.

Abstract No.: 200134

Relationships Between Strabismus Measured by Maddox Rod Test and Stereopsis

First Author: Han-chih **CHENG**

Purpose: This study investigates the relationship between the angle of strabismus measured by the Maddox rod test and the impact on stereopsis, aiming to quantify the extent of stereopsis impairment across various angles of deviation.

Methods: Subjects included healthy adults (n=19; age 23–33 years, median=26) with horizontal and vertical strabismus angles measured using a Maddox rod test at a near distance of 33 cm. Stereoacuity was evaluated through the Titmus test (9 circles). For strabismus exceeding 10 PD, Bagolini and Worth 4-Dot (W-4-D) tests were employed to assess anomalous retinal correspondence (ARC) and binocularity.

Results: The findings show that small vertical strabismus (<3 PD) did not impair stereopsis. Horizontal strabismus of up to 18 degrees, as measured by the Maddox rod test, preserved stereopsis. Further, stereopsis levels did not diminish within the 18-degree range despite increasing deviation angles. Individuals with strabismus greater than 10 PD exhibited stable stereopsis results, supported by Bagolini and W-4-D evaluations.

Conclusions: The study concludes that small vertical deviations (<3 PD) and horizontal deviations below 18 degrees, as assessed via the Maddox rod test, do not significantly impact stereopsis. The Maddox rod test effectively quantifies strabismus angles relevant to stereopsis thresholds.

Abstract No.: 202789

Repeated Low-Level Red-Light Therapy for Progressive Myopia in Children: Two Case Studies

First Author: Loren **ROSE**

Co-Author(s): Angela **SCHULZ**

Purpose: Repeated low-level red-light (RLRL) therapy, emitting 650 nm, is a novel technology for myopia progression in children. We report two case studies.

Methods: A 10-year-old male and female with rapidly progressing myopia despite atropine (0.05%) and DIMS (male) HAL (female) lenses. Atropine was discontinued, pupils monitored until they measured 4mm. RLRL therapy was then initiated according to the manufacturer's protocol. Spherical equivalent (SE), axial length (AL), and sub-foveal choroidal thickness (CT) were monitored at 1, 2, 3, 6, 12 and 18 months.

Results: The male baseline SE −7.25D OD and −6.0D OS, AL 26.95mm OD and 26.34mm OS, and mean CT 105.08µm (SD 11.38) OD and 159.67µm (SD 2.67) OS. The female baseline SE −5.5D OD and −4.625D OS, AL 25.45mm OD and 25.15mm OS, and mean CT 157.6µm (SD 6.07) OD and 231.0µm (SD 6.03) OS. Following initiation of RLRL, both patients stabilised axial and refractive progression with the male final SE −6.75D OD and −5.75D OS, AL 26.40mm OD and 26.15mm OS and the female SE −4.75D OD and −4.00D OS, and AL 25.18mm OD and 25.20mm OS. Mean CT was significantly greater at each visit than baseline (p<0.001) for both patients. At last review, mean CT for male was 192.42µm (SD 7.94) OD and 207.50µm (SD 7.78) OS (18 months) and for female was 200.75µm (SD 3.72) OD and 270.00µm (SD 7.50) OS (12 months). Compliance was >90 % for both patients.

Conclusions: RLRL therapy may prove a useful tool in managing progressive, resistant myopia.

Abstract No.: 210113**Retinoblastoma Mimicking Orbital Cellulitis in an Infant: The Imperative of Advanced Imaging and Timely Intervention***First Author: Nazli GUL**Co-Author(s): Shafaq TANVEER*

Purpose: To highlight the diagnostic challenge of retinoblastoma presenting with features mimicking orbital cellulitis in an infant, and to emphasize the importance of advanced imaging for timely identification and management.

Methods: A 2-month-old male presenting with an 11-day history of fever, eyelid swelling, ocular discharge, and proptosis was evaluated clinically and under anesthesia. Imaging with MDCT and MRI was performed following initial management for presumed orbital cellulitis. Microbiological investigations and therapeutic response to antibiotics were documented.

Results: Clinical examination revealed erythematous lid swelling, proptosis, conjunctival chemosis, engorged scleral vessels, hazy cornea, and leukocoria. MDCT demonstrated intraocular calcifications, and MRI confirmed retinoblastoma with periscleral and perioptic spread. Despite transient improvement with antibiotic therapy targeting a Citrobacter-positive urine culture, definitive imaging findings established the diagnosis of Group E retinoblastoma with scleral involvement and no contralateral lesions. The patient was referred for chemotherapy with subsequent enucleation planned.

Conclusions: Retinoblastoma can masquerade as orbital cellulitis, potentially delaying diagnosis. A temporary response to antibiotics should not preclude further evaluation. The presence of leukocoria, proptosis, or intraocular calcifications necessitates prompt ophthalmologic and oncologic assessment for timely, life- and vision-saving intervention.

Abstract No.: 203901**Revised Outcomes on Myopia Progression in Abiliti Contact Lens Users: A Retrospective Cohort Analysis***First Author: Chelsea TAN**Co-Author(s): Sun CHEN HSIN, Deborah LEE*

Purpose: This study evaluates the effectiveness of Abiliti® contact lenses (CL), which utilise hyperopic defocus on the peripheral retina with an enhanced fitting algorithm and improved compliance rates, in controlling myopia progression in a pediatric population.

Methods: A retrospective analysis of 16 eyes in eight subjects with progressive myopia was conducted between November 2017 and July 2025. Subjects were fitted with Abiliti® and monitored for six months after initiation. The rate of myopia progression was measured in change in diopters (D) and axial length

(mm) over time. Refractive measurements were taken at baseline and six months. The rate of myopia progression with Abiliti® was compared to reported data from MiSight® CL and multifocal soft CL.

Results: Eight subjects (one male, seven females; mean age 12.0 ± 2.08 years) were included. The mean baseline spherical equivalent (SE) was -3.37 ± 2.67 D and mean initial axial length (AL) was 24.55 ± 0.95 mm. Seven (87.5%) of subjects used Abiliti® in conjunction with atropine eyedrops and one (12.5%) subject used Abiliti® as monotherapy for myopia control. Our study found that Abiliti® significantly reduced the rate of myopia progression ($\Delta SE -0.25 \pm 0.31$ D over 6 months; $\Delta AL 0.11 \pm 0.10$ mm over 6 months, 0.12 mm over 12 months).

Conclusions: Abiliti® demonstrates a significant reduction in the progression of myopia with comparable results to MiSight® CL ($\Delta SE -0.51 \pm 0.64$ D, $\Delta AL 0.30 \pm 0.27$ mm) and multifocal soft CL ($\Delta SE -0.51 \pm 0.06$ D, $\Delta AL 0.29 \pm 0.03$ mm). Abiliti® is a promising solution in slowing refractive changes and axial elongation for myopia management.

Abstract No.: 206029**Sacrificial Love of a Mother: Sight for Life***First Author: Suyi SIOW**Co-Author(s): Li Yen CHAN, Lee Zy ENVIRA, Jamalia RAHMAT*

Purpose: To report a very late recurrence of retinoblastoma in pregnancy.

Methods: Case Report

Results: A 26-year-old female in her third trimester of pregnancy presented with a large tumour in the vitreous cavity of her left eye. Diagnosed with advanced retinoblastoma in both eyes at 2.5 years old, she underwent right eye enucleation and systemic chemotherapy. Focal therapies and radiotherapy targeted the residual disease in her left eye. Following 13 years of tumour remission, she underwent uncomplicated cataract surgery with intraocular lens implantation. No intraocular recurrence was seen after the surgery and she underwent surgical removal of dense posterior capsule opacification 9 years (22 years of remission) after cataract surgery. Very low vision has been recorded as counting fingers over the years. Twenty two years after remission, a large tumour was seen on slit lamp examination. Further evaluation with B-scan ultrasonography and MRI supported suspicions of recurrent retinoblastoma with significant posterior segment involvement. The decision for a caesarean section and left eye enucleation at 31 weeks + 5 days gestation was reached following a multidisciplinary team discussion. Histopathology confirmed retinoblastoma with choroidal invasion. The patient was subsequently referred to the oncologist for systemic chemotherapy.

Conclusions: There are no previous reports of the recurrence of an intraocular tumour after 22 years in the literature. However, it is essential to recognise that recurrence can still occur after long remission. This highlights the critical importance of lifelong surveillance in patients with a history of retinoblastoma to monitor for any potential reemergence of the disease.

Abstract No.: 203785

Shadows, Signals, and Staring Still: A Rare Collision of Retinitis Pigmentosa, Bardet-Biedl Syndrome, Ocular Myasthenia, and Duane Retraction Syndrome

First Author: Subhangi SAHU

Co-Author(s): Matuli DAS, Shrutakirty PARIDA, Saswati SEN

Purpose: To report a rare presentation of retinitis pigmentosa in a child with Bardet-Biedl Syndrome, complicated by features suggestive of Duane's retraction syndrome and ocular myasthenia gravis.

Methods: A 10-year-old obese male with moderate intellectual disability presented with a two-year history of nyctalopia. Clinical examination revealed syndromic features including polydactyly, brachydactyly, delayed developmental milestones, and hepatosplenomegaly. Best-corrected visual acuity (BCVA) was 6/36, N12 in the right eye and 6/9, N10 in the left eye. Ocular examination showed mild ptosis, narrowing of the palpebral fissure on attempted adduction, and bilateral extraocular movement restrictions. Color vision and contrast sensitivity were reduced in both eyes. Fundus evaluation revealed optic disc pallor, mottling of the retinal pigment epithelium (RPE) at the macula, and mid-peripheral bony spicule pigmentation—findings consistent with rod-cone dystrophy. Serological testing was positive for anti-acetylcholine receptor (anti-AChR) antibodies, raising suspicion for overlapping ocular myasthenia gravis. Genetic testing confirmed a pathogenic BBS2 gene mutation, consistent with Bardet-Biedl Syndrome.

Results: The patient was diagnosed with Bardet Biedl Syndrome, Retinitis Pigmentosa and suspected Duane's retraction syndrome with autoimmune overlap (myasthenia gravis). Patient was then managed with pyridostigmine trial, low vision aids and monthly monitoring.

Conclusions: This is the first reported case of Bardet Biedl syndrome with associated ocular myasthenia to the best of our knowledge. BBS itself is very rare with a prevalence at 1:140000. This combination leads to significant visual and neuromuscular impairment, requiring multidisciplinary care and genetic counseling for family planning and early diagnosis.

Abstract No.: 200949

Short-Term Outcome Following Combined Trabeculectomy With Cataract Surgery and Intraocular Lens Implantation for Secondary Cataract and Glaucoma in Children

First Author: Quazi Sazzad IFTEKHAR

Co-Author(s): Halima ALIMI, Zafrul HASSAN, Syed Jahangir KABIR, Bipul SARKER, Lutful KABIR

Purpose: To see the outcome following combined trabeculectomy with cataract surgery and intraocular lens implantation for secondary cataract and glaucoma in children.

Methods: A retrospective observational study extracting demographic and clinical information from case notes of 10 children who had cataract extraction and trabeculectomy and IOL implantation for secondary cataract and glaucoma over a one year period from January to December 2018.

Results: Twelve eyes of 10 patients were enrolled with a mean follow-up period of 4.9months (range 2-9months). There was a 4:1 male: female ratio. 60% were younger than 8years of age at surgery. 58.4% of cataracts were steroid-induced, whilst trauma was responsible for 25%. Steroid-induced glaucomas constituted 58.4% and 41.6% were secondary open-angle glaucoma. VKC was associated with 41.6% of patients. Mean Pre-operative IOP was 17.9mmHg (range of 7 to 35mmHg) on an average of 1.3medications. Mean post-operative IOP was 12.2mmHg after 1month and 13mmHg after 3 months. Steroid-induced glaucomas had a mean post-operative IOP of 10.6mmHg without medication after 3 months, whilst it was 17mmHg with medications for secondary open-angle glaucoma from trauma and uveitis. Pre-operative visual acuity was poor in 50% and good in 16.7%. Post-operative BCVA was good in 41.7% and moderate in 8.3%. There were no intra-operative or short-term post-operative complications.

Conclusions: There was good short term control of IOP and significantly improved visual acuity following triple procedure for secondary cataract and glaucoma in children.

Abstract No.: 205600

Sight for Young Eyes-Tertiary Eye Care Experience in Pediatric Traumatic Cataracts

First Author: Mahathi VANKIREDDI

Co-Author(s): Divya Bhargavi KATTA, Riya MENDAPARA

Purpose: To study the outcomes of pediatric traumatic cataract surgery in a tertiary eye care centre.

Methods: A hospital-based interventional prospective study of 27 eyes of children with traumatic cataract who underwent cataract surgery was conducted. It was done either as a primary procedure or a second procedure based on the need, and follow-up was done

at 1 week, 1 month, and 3 months, and at each visit, visual acuity and slit lamp examination were done. At 3 months, stereopsis was also done.

Results: Mean age 9.70 $\pm$ 3.80 years. Males are more than females. Corneal opacity was the most common associated feature, and post op visual acuity significantly improved compared to pre-op op, with not much difference at 1 and 3 months, but in children less than 10 years of age, stereopsis was less compared to older children, and the difference between them was significant.

Conclusions: In traumatic pediatric cataract, visual acuity can be significantly improved by meticulous surgery. Stereopsis might take a longer time to regain. However, a young age<10 years is a significant factor for poor stereopsis and vision post-surgery.

Abstract No.: 200853

Silent Damage: Delayed Uveitis Following Blunt Ocular Contusion in a Pediatric Eye: A Case Report

First Author: Chao-jung **WU**

Co-Author(s): Chee-ming **LEE**

Purpose: To report a rare case of delayed-onset anterior and posterior uveitis following non-penetrating ocular trauma in a child.

Methods: A 12-year-old girl presented with blurred vision in her right eye two weeks after being struck by a basketball. Ophthalmic exam, OCT, and fluorescein angiography were performed. Laboratory tests ruled out infectious or autoimmune etiologies.

Results: Visual acuity in the right eye was 0.1. Slit-lamp revealed anterior chamber cells and posterior synechiae. Fundus showed optic disc swelling and hyperemia. OCT indicated RNFL thickening; FA revealed persistent vascular leakage. The left eye was normal. Laboratory findings were unremarkable. Diagnosis: post-traumatic uveitis.

Conclusions: Delayed uveitis may occur after blunt ocular trauma even in the absence of systemic disease. This case emphasizes the need for close monitoring of pediatric eye injuries for signs of late-onset inflammation.

Abstract No.: 205712

Sirolimus in Combination With Intravenous Methylprednisolone and Orbital Radiotherapy As First-Line Treatment for Active Thyroid Eye Disease: A Comparative Observational Study

First Author: Kenneth Ka Hei **LAI**

Co-Author(s): Kelvin **CHONG**, Alan **LEE**, Chiu Ming **NG**, Chi Pui **PANG**, Clement **THAM**, Kenneth **WONG**, Alvin **YOUNG**, Hunter Kl **YUEN**

Purpose: To compare the efficacy and safety of intravenous methylprednisolone (IVMP) plus orbital radiotherapy (ORT) combined with either sirolimus or mycophenolate mofetil (MMF) as first-line treatment for active, moderate-to-severe thyroid eye disease (TED).

Methods: We conducted a multicentre, prospective cohort study in patients with active, moderate-to-severe TED who received IVMP (500 mg weekly $\times$ 6 weeks, then 250 mg weekly $\times$ 6 weeks) with ORT in combination with either sirolimus (serum trough level 5–15 ng/mL) or MMF. The primary endpoint was overall TED response at 24 weeks, defined by a composite outcome including Clinical Activity Score (CAS), improvement in diplopia or motility, reduction in proptosis or eyelid aperture, and absence of disease progression. Secondary endpoints included changes in quality of life (GO-QoL), individual response rates for proptosis and CAS, extraocular motility (EOM) improvement, and treatment safety.

Results: A total of 72 patients were included: 36 in the sirolimus group and 36 in the MMF group. The mean age was 55 $\pm$ 8 years, and 65% were female. Baseline mean CAS was 2.5 $\pm$ 1.2 in the sirolimus group and 2.4 $\pm$ 1.1 in the MMF group. At 24 weeks, the proportion of responders was significantly higher in the sirolimus group compared with the MMF group (78% vs 56%, $P<0.05$). A greater proportion of sirolimus patients achieved an improvement in the diplopia score (50% vs 20%, $P<0.05$). Mean GO-QoL improvement was higher in the sirolimus group ($P<0.05$). No serious treatment-related adverse events occurred in both groups.

Conclusions: The addition of sirolimus to IVMP and orbital RT as first-line treatment for active TED appears more effective than the combination of IVMP, RT, and MMF. These findings suggest sirolimus may represent a promising immunomodulatory agent in the upfront management of TED, warranting further validation in randomized controlled trials.

Abstract No.: 205406

Step Count and Physical Activity in Children With Visual Impairment Compared With Normally Sighted Peers

First Author: Srijana **ADHIKARI**

Purpose: To measure step count and physical activity (PA) across different segments of the day in children with visual impairment compared with normally sighted peers.

Methods: One hundred children with VI and 100 normally sighted peers aged 7 to 17 years from integrated schools for the blind wore an actimeter on their non-dominant wrist for one week. PA outcomes included mean activity counts per minute in different segments of the day (Before, during, after school, and weekend). It was modelled using a series of generalised linear mixed effects models with vision, age, sex, time of day, and a vision by time of day interaction. Correlation between PA count per minute and step count per day was measured.

Results: Data of 83 children with VI and 77 normally sighted peers were included. Mean age 12.58 (SD = 3). Mean activity count per minute was lower in children with VI ($p < 0.001$) especially during and after school. They also spent more time performing light PA and less time performing vigorous PA across all periods of the day ($p < 0.001$). Mean step count per day was lower in children with VI compared with normally sighted peers ($p < 0.001$). There was a positive correlation between physical activity count per minute and the step count per day ($p < 0.001$).

Conclusions: Our findings indicate that children with VI participate less in physical activity. There is need for guidance to increase PA levels in these children.

Abstract No.: 200957

Steroid-Induced Increase Intraocular Pressure in Paediatric Patients With Acute Myeloid Leukaemia (AML) on FLAG Chemotherapy

First Author: Anis Azeanti **AZMI**

Co-Author(s): Nur Shahirah **AMIR HAMZAH**, Safinaz **MOHD KHIALDIN**

Purpose: To report a case of steroid- induced increase intraocular pressure in patient undergoing FLAG chemotherapy with corticosteroid eye drop regime.

Methods: Case report.

Results: FLAG is a chemotherapy regimen used for relapsed and refractory acute myeloid leukaemia (AML). The acronym FLAG represents the three main drugs used in the regimen: Fludarabine, Cytarabine and granulocyte colony-stimulating factor (G-CSF). High dose of Cytarabine used in this regime has a well-established risk of Cytarabine-induced keratoconjunctivitis, thus routine prophylaxis with topical corticosteroid eye drop is usually initiated in

patient undergoing FLAG chemotherapy. However, usage of topical corticosteroid eye drop can cause steroid – induced increase in intraocular pressure (IOP) and may lead to steroid- induced glaucoma. We report two cases of paediatric patients with relapsed AML undergoing FLAG chemotherapy and on prophylaxis prednisolone acetate eye drop 2 hourly. Both patients presented with headache after one week on prednisolone acetate eye drop that was initiated during the FLAG chemotherapy. Initial examination shows IOP range from 22-40 mmHg which responded to treatment with beta-blocker and prostaglandin analogue anti-glaucoma. Subsequently, lower potency topical corticosteroid eye drop was prescribed to minimize the elevation of IOP during on-going FLAG chemotherapy.

Conclusions: In patient undergoing FLAG regimen, it is crucial to use topical corticosteroid to minimize the inflammatory adverse effect on the eye, however, lower potency steroid is preferable to reduce the incidence of steroid- induced increase IOP and patient referral to Ophthalmology for IOP monitoring is crucial to prevent steroid- induced glaucoma.

Abstract No.: 205464

Structural and Functional Alterations in Concomitant Strabismus and Strabismic Amblyopia: A Multimodal Magnetic Resonance Imaging Study

First Author: Yiru **HUANG**

Co-Author(s): Zhengjia **DAI**, Daming **DENG**, Zitian **LIU**, Yanyan **WU**, Minbin **YU**

Purpose: To characterize alterations in white matter microstructure and spontaneous brain activity in patients with concomitant strabismus (CS) and strabismic amblyopia (SA) using multimodal magnetic resonance imaging (MRI).

Methods: Seventeen patients with CS, 19 with SA, and 22 age- and gender-matched normal controls (NC) underwent diffusion tensor imaging (DTI) and resting-state functional MRI (rs-fMRI). Fractional anisotropy (FA) and mean diffusivity (MD) were derived from DTI data to assess white matter integrity in visual pathways. The fractional amplitude of low-frequency fluctuations (fALFF) was calculated from rs-fMRI data to evaluate spontaneous brain activity.

Results: Relative to NCs, both CS and SA groups showed significantly increased MD and decreased FA in the optic tract, optic radiation, interhemispheric primary visual cortex, and medial temporal complex pathways. Aberrant fALFF was observed across multiple brain regions, including the parietal, occipital, frontal, and temporal lobes, as well as the insula, cerebellum, and hippocampus. The extent of microstructural changes (MD/FA) correlated positively with the duration of ocular misalignment. In SA patients, fALFF in the left middle frontal gyrus was negatively correlated with

the best-corrected visual acuity of the amblyopic eye. Although no significant differences in MD/FA were detected between CS and SA patients, receiver operating characteristic (ROC) analysis indicated that fALFF in the left middle frontal gyrus effectively discriminated SA from CS.

Conclusions: Chronic ocular misalignment is associated with microstructural abnormalities in the visual pathways and widespread disruptions in spontaneous brain activity, whose extent is linked to the severity of visual impairment, offering neurobiological insights into strabismus and strabismic amblyopia.

Abstract No.: 204682

Stuck, Not Severed: Medial Rectus Dysfunction Following Functional Endoscopic Sinus Surgery

First Author: Snehal **GANATRA**

Co-Author(s): Aniket **DAVE**, Dhvani **MAHESHWARI**, Bhavik **PANCHAL**, Nilesh **PATEL**

Purpose: To report a rare case of strabismus post-functional endoscopic sinus surgery (FESS), due to combined restriction from fat adherence and medial rectus paresis, and to highlight the diagnostic and surgical challenges.

Methods: A 42-year-old male developed binocular diplopia shortly after FESS. Examination revealed -4 limitation of right eye adduction associated with a 65 prism diopter exotropia. CT orbit showed an 11 mm lamina papyracea defect, while MRI demonstrated anterior displacement of the medial rectus adherent to the defect with posterior thickening. On surgical exploration, forced duction testing was +4 tight for the medial rectus and +2 tight for the lateral rectus. Dense adhesions were identified between the medial rectus, Tenon's capsule, and orbital fat, which were released. In addition, 5 IU botulinum toxin was injected into the lateral rectus muscle.

Results: On day 1, alignment showed minimal improvement. At 1 week, abduction was -3 from the botulinum toxin effect, but the patient was diplopia-free with only a small residual face turn, representing meaningful symptomatic relief. Ongoing follow-up is planned to evaluate medial rectus recovery and long-term alignment.

Conclusions: Medial rectus dysfunction after FESS is often attributed to transection, but this case highlights that fat adherence and tethering can also produce profound motility limitation and large-angle exotropia. While such a mechanism might be expected to cause esotropia, the coexistence of medial rectus paresis likely explained the exotropia. Even with adhesiolysis and botulinum toxin, full correction is difficult, highlighting the need for early imaging, tailored surgery, and patient counselling for multiple procedures.

Abstract No.: 205736

Surgical Outcome of Exotropic Duane Syndrome

First Author: Heba **FOUAD**

Co-Author(s): Ahmed **ALI**

Purpose: To evaluate the surgical outcome of exotropic Duane syndrome and the factors that can influence the outcome.

Methods: A retrospective study was performed on patients who had surgery for exotropic Duane syndrome with a minimum follow-up of 3 months. The ocular motility, the angles of deviation, the presence of abnormal head turn or overshoots, the surgical procedures performed, and their outcome were analyzed.

Results: Sixty-seven patients were identified (mean age, 11.3 years). In unilateral cases with exotropia <25 PD (n = 28), ipsilateral lateral rectus (LR) recession was performed in all cases, and orthophoria was achieved in 25 patients (89.3%). In unilateral cases with an angle ≥25 PD, ipsilateral LR recession was performed in 13 patients, bilateral symmetrical LR recession in eight patients, and unilateral LR recession and medial rectus (MR) resection in seven patients. Sequential contralateral LR recession for undercorrection was performed in seven patients. The success rate was highest in those who had unilateral LR recession and MR resection (66.7%). An increase in face turn occurred in 6 of 15 patients (40%) who had a simultaneous or sequential bilateral LR recession. In bilateral Duane syndrome, bilateral LR recession was performed in 10 patients, and was combined with ipsilateral MR resection in two patients, with a success rate of 75%. A higher success rate was associated with young age at surgery (P = .03), and smaller angle of deviation (p = .04). The mean follow-up was 6.3 months.

Conclusions: Surgical results in exotropic Duane syndrome are better in small angles of deviation and in younger age groups.

Abstract No.: 203360

Surgical Outcomes of Asymmetric Bilateral Medial Rectus Recession in the Treatment of Sixth Cranial Nerve Palsy

First Author: Hang **TRAN**

Co-Author(s): Giang **BUI**, Son **BUI**, Thanh **HA**, Lieu **LE**

Purpose: This study was conducted to evaluate the results of asymmetric bilateral medial rectus recession in the treatment of sixth cranial nerve palsy.

Methods: This study is a prospective and interventional clinical case series of 12 patients presenting with acute onset of symptomatic partial sixth cranial nerve palsy of > 6 months duration and the function of the lateral rectus muscle has partially or fully recovered, who received asymmetric bilateral medial rectus recession.

Results: A total of 12 patients (4 females 8 males ; mean age 35.25 ± 10.49) were included. Mean preoperative esotropia (ET) was $48.33 \pm 10.94\Delta$ in primary gaze at distance (range, 30-60 Δ), $53.33 \pm 11.15\Delta$ in ipsilateral gaze (range, 35-65 Δ). $43.34 \pm 9.01\Delta$ in contralateral gaze (range, 25- 55 Δ). Medial rectus recession averaged 5.62 ± 0.61 mm (range, 4.5- 6.5 mm) in the affected eye, 6.42 ± 0.60 mm in the unaffected eye (range 5.5-7.0 mm). The follow-up period is 6 months. In 11 cases (91.67%), the postoperative deviation in primary position was within 10 PD of orthotropia ($3.08 \pm 7.33\Delta$). Average esotropia in the ipsilateral position improved from $53.33 \pm 11.15\Delta$ preoperatively to $6.00 \pm 8.79\Delta$ postoperatively. 1patients (8.34%) had residual esotropia (>15 PD). A second resection of the lateral rectus muscle in the affected eye of 1 patient resulted in complete resolution of esotropia.

Conclusions: Our study showed that asymmetric bilateral medial rectus recession eliminated the esotropia in most of our patients with partial sixth cranial nerve palsy.

Abstract No.: 201596

The Affecting Factors, Motor Outcome, and Sensory Outcome of Post-Operative Muscle Correction of Acute Acquired Comitant Esotropia

First Author: Phakdichaya **CHIEWCHANWIT**

Co-Author(s): Arpha **PORNSETH**, Jirapa **SONGPETCHMONGKOL**, Phantaraporn **TANGTAMMARUK**

Purpose: To evaluate the factors influencing surgical outcomes and assess both motor and sensory results following muscle correction

Methods: A retrospective review was conducted on 35 patients who underwent strabismus surgery between August 2021 and June 2024. The primary outcome measures included motor success—defined as ocular alignment within 8 prism diopters at near and distance—and sensory success, characterized by stereoacuity ≥ 60 sec/arc, assessed at one-year follow-up. Factors including demographic data, refractive error, Neuro-imaging, duration before surgery, deviation angle, and surgical intervention were compared between groups.

Results: Mean age at onset was 11.6 ± 9.19 years, with male predominance (80%). Refractive error was minimal (-0.14 ± 2.17 D), and neuro-imaging was normal (94.3%). Mean duration before surgery was 19 ± 22.20 months. Pre-operative deviations averaged at near 45.43 ± 12.09 PD and distance 45.51 ± 11.40 PD. While 97.1%(34/35) achieved motor success, only 54%(19/35) attained sensory success. Statistical analysis revealed that factors such as age ($P = .17$), sex ($P = 1.0$), refractive error($P = .97$), deviation angle ($P = .58$ and $.79$), duration before surgery ($P = .36$),

and surgical intervention ($P = .69$) did not significantly influence outcomes.

Conclusions: Motor function can be reliably restored with surgery, but sensory recovery, including bifoveal fixation, may take additional time. Early surgical intervention is crucial, but patience is vital for full sensory restoration, highlighting the importance of individualized management.

Abstract No.: 203534

The Association between Anthropometric Parameters and Peripheral Retinal Defocus, Retinal Radius of Curvature in School-Age Children

First Author: Wu **HAO**

Purpose: To investigate the association between anthropometric parameters and peripheral retinal defocus axial, retinal radius of curvature in school-age children.

Methods: A case series study. From March to July 2025, 334 school-age children(334 eyes) treated in the Department of Pediatric Ophthalmology of Third Affiliated Hospital of Jinzhou Medical University were included. The central axial length(CAL) and PAL at 15°, 20° and 30° from the nasal and temporal side of the fovea were measured by SWan instrument under natural pupil conditions in a dark room, and absolute value of difference of peripheral axial length(| Δ DPAL|) were calculated, then calculated the retinal coordinates through the partial coherence interferometry(PCI) modeling method and converted them into retinal radius of curvature. The height, weight were measured, and body mass index(BMI) were calculated. Multivariate linear regression analysis were used to analyze the association between physical development indicators and ocular biometry parameters such as such as PAL, | Δ DPAL|, retinal radius of curvature and RDV.

Results: After controlling for confounding factors such as age, gender in multivariate linear regression, in E group, height was positively correlated with CAL, nasal and temporal PAL at 15°, 20° and 30°, nasal-temporal | Δ DPAL| at 15°, 20° and 30° ($P < 0.05$, which was negatively correlated with the retinal radius of curvature. while height had no correlation with SE ($P > 0.05$). In L-my group. Height was positively correlated with CAL($P < 0.05$), nasal and temporal PAL at 15°, 20° and 30°($\beta = 0.038-0.042$, $P < 0.05$), nasal-temporal | Δ DPAL| at 15°, 20° and 30° ($P < 0.05$), which was negatively correlated with the retinal radius of curvature($P < 0.05$) and SE($P < 0.05$). In H-my group. Height was positively correlated with CAL($P < 0.05$), nasal and temporal PAL at 15°, 20° and 30°($P < 0.05$), nasal-temporal | Δ DPAL| at 15°, 20° and 30°($P < 0.05$), which was negatively correlated with the retinal radius of curvature($P < 0.05$) and SE($P < 0.05$). However, weight and BMI of children with three groups was not

correlated with ocular biometry parameters such as PAL, |ADPAL| and retinal radius of curvature ($P>0.05$).

Conclusions: In taller school-aged children, the nasal PAL is longer than the temporal one and is accompanied by a smaller retinal radius of curvature, presenting as steep and asymmetric retinal morphology. However, weight and BMI has no correlation with PAL and radius of retinal curvature.

Abstract No.: 202857

The Burden of Vision Loss Due to Diabetic Retinopathy in Asia From 1990–2021: Findings From the Global Burden of Disease Study 2021

First Author: Yatu GUO

Co-Author(s): Dongyan ZHANG, Wei ZHANG

Purpose: We produced comprehensive estimates of VI due to DR in Asia. These estimates were segmented by location, age, and gender for the period between 1990 and 2021. Furthermore, we projected the burden of DR up to 2050.

Methods: The study included an analysis of DR-induced VI severity across Asian countries. The Estimated Annual Percentage Change was calculated to illustrate trends at the regional and national levels. Bayesian age-period-cohort analysis was used to project future prevalence trends up to 2050.

Results: From 1990 to 2021, the age-standardized prevalence rate (ASR) and YLDs rate of DR in Asia significantly increased, with higher rates consistently observed in women. The elderly experienced a greater burden, with increasing rates of VI and YLDs with age. Moderate vision impairment (MVI) constituted the majority of DR-related ASR in Asia. Most Asian countries have a Sociodemographic Index (SDI) at low-medium to medium levels, and correspondingly low ASR. According to BAPC projections, by 2050, the YLDs rate for DR in Asia will decrease to 3.92 for males and 4.96 for females.

Conclusions: Over the past 30 years, the burden of DR in Asia has increased, with persistent gender disparities and substantial variation among countries. This study displayed the importance of DR prevention, particularly for women and the elderly. BAPC projections suggested a decreasing trend in YLDs rate due to DR over the next 30 years.

Abstract No.: 203498

The Minimal Extraocular Muscular Limbal Incision: a New Conjunctival Approach to Strabismus Surgery

First Author: Wenqiu ZHANG

Co-Author(s): Longqian LIU

Purpose: To present a new, minimally invasive strabismus approach (Minimal extraocular surgery muscular limbal incision) for rectus muscle operations.

Methods: The study included 54 patients (age 14.63 ± 8.00 years) in the inpatient department of ophthalmology, West China Hospital, Sichuan University from January 2018 to January 2020. They were randomly assigned to the minimal extraocular muscular limbal incision group (group A) or the limbus incision group (group B). The operating time, intraoperative bleeding, conjunctival incision extending, ocular irritation, conjunctival hyperemia, conjunctival chemosis, lid edema and conjunctival scarring were recorded.

Results: The cure rates were 100% on postoperative day 1. 2 patients developed strabismus recurrence and 2 patients represented under correction in group A. 1 patient developed strabismus recurrence and 1 patient represented under correction in group B. The operating time of group A was shorter than that of group B ($P < 0.05$). The amount of intraoperative bleeding in group A was less than that in group B ($P < 0.05$). The conjunctival chemosis on day 1 and week 1 were different in 2 groups ($P < 0.05$). The conjunctival hyperemia of patients on day 1, week 1, month 1 and month 3 were also different ($P < 0.05$). However, the other indicators were not different among 2 groups at 1 day to 6 months postoperatively (all $P > 0.05$).

Conclusions: The new conjunctival incision is a safe, effective approach with less complications for strabismus surgery.

Abstract No.: 205365

The Relationship Between Small-Angle Intermittent Exotropia and Myopia Progression in Adolescents, and the Effect of Exotropia Surgery on Myopia

First Author: Duo XU

Purpose: To investigate the relationship between small-angle intermittent exotropia (IXT) and myopia in adolescents, and the effect of surgery on myopia.

Methods: Two hundred cases of IXT in the recent 1 year, aged 6~18 years, diopter $-1.00D \sim -7.50D$, were divided into two stages. The first stage: Observation group 100 was a small-angle IXT- $10 \sim 20$ and the score of eye position control ability NCS was ≤ 3 points, and the contrast intensity of IXT was $-20 \sim -50$, the NCS was > 3 points. In the second stage, patients with strabismus ≥ 15 and NCS (≥ 5) were treated with strabismus surgery.

Results: The spherical equivalent (SE) of the observation group and the control group was $-2.00 \pm 0.97D$ and $-1.95 \pm 0.65D$, respectively ($P > 0.05$). One year after treatment later, the SE were: $-3.25 \pm 0.68D$, $-2.75 \pm 0.72D$, the SE of both groups increased compared with that of pre-intervention ($P < 0.05$), and axial lengths (AL) of the two groups were: $24.98 \pm 0.28mm$ and $25.00 \pm 0.87mm$ ($P > 0.05$). After 1 year, the AL in both groups increased by $0.48 \pm 0.68mm$ and $0.32 \pm 0.28mm$, respectively, significantly higher than that of pre-intervention, and the observation group was higher than the control group ($P < 0.05$). After 1 year, the score of eye position control ability: observation group was 4.56 ± 1.62 , the control group was 6.75 ± 1.02 , and the control scores of both groups were increased by 2.45 ± 0.82 and 2.26 ± 0.67 , respectively, compared with 1 year ago, and the control force was worse ($P > 0.05$). The baseline convergence of the two groups was 17.04 ± 1.97 , 14.62 ± 1.47 ($P < 0.05$), and one year later it was 19.10 ± 2.02 and 11.12 ± 1.49 , respectively. (the second stage) The SE of the two groups before surgery were $-3.50 \pm 0.08D$ and $-2.54 \pm 0.02D$ ($P < 0.05$), and 1 year after surgery were $-4.06 \pm 0.28D$ and $-3.08 \pm 0.62D$, respectively, which were significantly increased compared with those before surgery ($P < 0.05$), but the differences were not statistically significant ($P > 0.05$). The AL in the two groups were $25.46 \pm 0.58mm$ and $25.30 \pm 0.76mm$ before surgery, and $25.64 \pm 0.38mm$ and $25.50 \pm 0.68mm$ one year after surgery.

Conclusions: Children with small-angle IXT and better eye position control ability are more likely to have myopia and increased AL drift in order to control the increase in eye position convergence than children with large-angle strabismus and poor eye position control, and surgical correction can significantly slow down the rapid progression of myopia.

Abstract No.: 202050

Through the Martini Glass: A Rare Case of Bilateral Persistent Fetal Vasculature"

First Author: Gebriellea DASS COWIE JOHN
Co-Author(s): Mohamad Israk B ISA, Nor Fadhilah BINTI MOHAMAD, Fhun LAI CHAN, Melissa WANG

Purpose: We present a rare case of bilateral Persistent Fetal Vasculature (PFV) in a 4-month-old boy presenting with leukocoria.

Methods: Case report.

Results: A 4-month-old boy presented with bilateral leukocoria since 2 months of age. He is the firstborn of a non-consanguineous union with unremarkable antenatal and perinatal history, no family history of malignancies. Examination revealed horizontal nystagmus, absent relative afferent pupillary defect, and retrolental masses in both eyes. Magnetic Resonance Imaging (MRI) of the brain and orbits revealed hypointense retrolental stalks connecting

the optic discs to the posterior lens capsules in both eyes, revealing a «martini glass» appearance along with bilateral anterior chamber distortion, right lens thickening, and optic nerve hypoplasia. Examination under anesthesia revealed bilateral microcornea, left corneal haze, posterior embryotoxon, posterior synechiae, shallow anterior chambers, congenital cataracts, and a normal intraocular pressure. Ultrasound doppler performed by paediatric radiologist confirmed vascular flow within the retrolental stalks. Referral to the paediatric team ruled out presence of any systemic disorders and syndromes.

Conclusions: This case shows the importance of a multidisciplinary collaboration in diagnosing and managing bilateral PFV, particularly when masquerading as intraocular malignancy.

Abstract No.: 203126

Traumatic Hyphema Followed by Vitreous Hemorrhage in a Pediatric Patient With Kawasaki Disease

First Author: Kuo Hua JUAN
Co-Author(s): Yi An LU

Purpose: To outline the complications and management of traumatic hyphema in a Kawasaki disease (KD) child on aspirin treatment.

Methods: Case report.

Results: A 9-year-old boy presented with sudden, painful, blurred vision in his left eye following a soccer ball injury three days prior. He had KD complicated with coronary artery aneurysms (CAAs) at 6 months old, and despite CAAs regression, he continued on prophylactic low-dose aspirin (3-5mg/kg/day). The initial visual acuity (VA) was hand motion, and the intraocular pressure (IOP) was 51 mmHg. The Slit lamp exam showed total hyphema, yet no retinal detachment or neoplasm was found on B-scan ultrasonography. Traumatic hyphema with ocular hypertension was impressed. Mannitol, acetazolamide, and topical antiglaucomatous drops were administered with successful IOP reduction (15 mmHg). We discontinued aspirin and added oral tranexamic acid for 1 week. Gradual reduction in hyphema and well-controlled IOP were recorded in 1-day and 3-day follow-up. However, an undetectable rise in IOP occurred during the one-week follow-up. We arranged anterior chamber irrigation with IOP and VA amelioration. Nevertheless, blurred vision recurred on postoperative day 6 despite a relatively stable IOP (16mmHg). Vitreous hemorrhage (VH) without retinal detachment was evident. Vitrectomy was performed, resulting in an improvement in VA to 6/10 on post-vitrectomy day 5 and maintained at 7 months follow-up without significant sequela.

Conclusions: The use of prophylactic aspirin may require a multidisciplinary discussion. VH may occur

with or after hyphema due to blood seeping from the anterior chamber or capillary damage in the ciliary body, necessitating prompt intervention.

Abstract No.: 202151

Trends of Pediatric Ocular Trauma in South Korea: An Epidemiological Study Based on the National Health Insurance Claim Database

First Author: Eun Hee HONG

Co-Author(s): Jiyeong KIM, Ungsoo KIM, Han Woong LIM

Purpose: To investigate the population-based incidence and patterns of pediatric ocular trauma using the comprehensive Korean National Health Insurance Service (NHIS) database.

Methods: We extracted data of patients under 18 years of age who visited the clinic and received an initial diagnosis of ocular trauma (based on the Korean Classification of Diseases) from 2010 to 2023. Diagnostic codes for ophthalmic trauma were categorized into 6 types: closed globe injury, open globe injury, orbital injury, cranial nerve injury, ocular & periocular burn, and other injury. The annual incidence of ocular trauma according to trauma types and demographics, including age and sex, were investigated.

Results: We identified 714,284 cases of first-time ocular trauma diagnoses during the study period. The average incidence (per 100,000 children) between 2010 and 2023 was 587.63 in total. The most common type was closed globe injury (87.5%), followed by orbital injury (7.6%). The incidence was significantly higher in boys than in girls overall (727.90 in boys; 437.09 in girls) and across all types. Age-specific patterns varied among trauma types. Annual incidence showed a decreasing trend from 2010 and 2023, with a sharp decline in 2020 during the COVID-19 pandemic, followed by increases between 2021 and 2023.

Conclusions: This nationwide population-based study provides valuable insights into pediatric ocular trauma epidemiology in South Korea over 14 years. By examining data spanning over a decade, the findings, including sex differences, age-specific patterns, and temporal trends, could provide valuable insights for developing targeted prevention strategies pediatric populations.

Abstract No.: 205593

True Transposition: A Novel Technique for Large-Angle Exotropia

First Author: Mahathi VANKIREDDI

Co-Author(s): Divya Bhargavi KATTA

Purpose: To study the efficacy of true transposition, a novel technique in the management of large-angle exotropia.

Methods: Retrospective analysis of case sheets of patients with exotropia of more than 55 PD, who underwent lateral rectus recession with medial rectus resection with true transposition was done.

Results: Among 10 patients, 4 had sensory exotropia, and the remaining had poor stereopsis. All had good correction with residual exotropia of no more than 10PD exotropia.

Conclusions: True transposition is an effective uniocular surgery for the management of large-angle exotropia with good results.

Abstract No.: 201280

Unlocking the Mystery: Surgical Outcomes in Exotropic Duane Retraction Syndrome With Severe Upshoot – A Case Report

First Author: Shahrina Mahfooz RAKA

Co-Author(s): Mamunur Rashid CHOWDHURY

Purpose: This report details an intriguing case of exotropic Duane retraction syndrome (DRS) characterised by pronounced upshoots and abnormal ocular motility in the left eye. We will also explore the surgical management employed at a leading tertiary centre in Bangladesh.

Methods: A 20-year-old patient presented with exotropic DRS in the left eye. Best-corrected visual acuity was 6/6 in the right eye and 6/9 in the left eye with -2.00 D cylinder at 180°. Ocular motility was full in the right eye, while the left eye showed both adduction and abduction deficits, severe upshoot on adduction, and narrowing of the palpebral fissure. Preoperative prism cover testing revealed 45° exodeviation. Binocular single vision was absent, with suppression of the left eye. Surgical intervention included bilateral lateral rectus recession (BLRC) of 9 mm and 15 mm Y-splitting of the left lateral rectus.

Results: Postoperatively, there was marked improvement in exodeviation and upshoot, with a reduction of palpebral fissure narrowing during adduction in the left eye. A small residual exodeviation remained. Diplopia resolved, and visual acuity was maintained.

Conclusions: BLRC combined with Y-splitting of the lateral rectus effectively reduces upshoots and corrects significant exodeviation in exotropic DRS, improving ocular alignment and cosmetic appearance, even in the

presence of severe motility deficits and preoperative suppression.

Abstract No.: 201216

Unmasking a Pediatric Brain Tumour Through Atypical Ophthalmic Signs

First Author: Chiu Ling LIM

Co-Author(s): Puspadevi ARMUGHAM, Azlyn Azwa JASMAN, Nurliza KHALIDDIN

Purpose: To report a rare presentation of a pediatric brain tumour initially manifesting as diplopia and headache, highlighting the importance of comprehensive neuro-ophthalmic assessment and timely neuroimaging for accurate diagnosis.

Methods: Case Report

Results: A 12-year-old boy with no prior medical history presented with a 7-month history of transient diplopia accompanied by intermittent occipital and frontal headaches. Two weeks before presentation, his father noted an inward deviation of the left eye. Examination revealed horizontal nystagmus and left sixth cranial nerve palsy. Visual acuity was 6/12 OU and 6/36 OS, with no improvement with pinhole. A relative afferent pupillary defect was present in the left eye. Both eyes anterior segment examination was unremarkable, with intraocular pressures of 16 mmHg in both eyes. Fundus examination showed bilateral optic disc swelling, along with dilated and tortuous retinal vessels. Urgent contrast-enhanced computed tomography of the brain and orbits demonstrated a well-defined, enhancing hyperdense lesion localized to the left thalamus, extending to the midbrain, with perilesional edema, mass effect, and acute hydrocephalus. The patient was admitted to the neurosurgical for emergency cerebrospinal fluid diversion.

Conclusions: This case underscores the importance of maintaining a high index of suspicion for intracranial pathology in children presenting with acute-onset strabismus and neurological signs. Early neuroimaging is crucial to ensure timely diagnosis and intervention, potentially preventing severe morbidity and mortality.

Abstract No.: 203963

Unusual Indication for Strabismus Surgery – More Than Meets the Eye

First Author: Alvin TEO

Co-Author(s): Sonal FARZAVANDI

Purpose: To present an unusual indication of strabismus surgery in a monocular patient with Graves' disease.

Methods: A 62-year-old lady with sight-threatening Graves' disease was treated with orbital radiotherapy, medical, and surgical decompression. Despite this, her left eye was blind from compressive optic neuropathy. She had a markedly restrictive hypotropia in the right

eye, causing her to adopt an extremely uncomfortable compensatory head posture, with severe muscular spasms in the neck and upper back. This affected her navigational ability, necessitating assistance in unfamiliar places. Hence, she insisted on surgery, and a right inferior rectus recession with conjunctival autograft was planned. Initial passage of the Mersilene suture through the muscle stump was not secure, and it was removed. A repeat attempt was made at an adjacent site. While pulling up the tight muscle to the desired recession point, a tiny scleral dehiscence was noted at the site of the original scleral pass with uveal exposure.

Results: The complication was identified. There was no vitreous prolapse, and the scleral dehiscence was sutured. Indirect ophthalmoscopy was unremarkable. The hang-back suture was repeated and anchored through more of the muscle stump. The conjunctiva was closed with an autograft.

Conclusions: This case illustrates an unusual indication for strabismus surgery in Graves' disease. Orbital radiation can affect the ocular surface and sclera. One must be prepared to handle unexpected complications and give the patient a good outcome.

Abstract No.: 205288

Unveiling the Differences Between Static Stereopsis and Motion-in-Depth Perception in Intermittent Exotropia

First Author: Xiaohang CHEN

Co-Author(s): Min LAN, Longqian LIU

Purpose: To evaluate and compare motion-in-depth perception and static stereopsis deficits in patients with intermittent exotropia who undergo surgical intervention, as well as in normal controls, utilizing consistent measurement techniques and protocols.

Methods: This prospective study included 40 postoperative patients with intermittent exotropia and 29 normal controls. All participants underwent comprehensive ocular examination, motion-in-depth perception, and static stereopsis evaluation using the same method. The threshold and response times for processing the stereopsis information were recorded.

Results: The threshold for motion-in-depth perception at 88 pixels/s was 73 (54–220 arc sec) in patients, and the threshold for static stereopsis was 35 (35–91.5 arc sec), which was significantly better than that in the motion-in-depth perception test ($p < 0.0001$). The motion thresholds for motion-in-depth perception ($p < 0.0001$) and static stereopsis ($p = 0.048$) in patients differed significantly from those in the control group. The time to completion of the static stereopsis test was less than that of the motion-in-depth perception test in patients with intermittent exotropia ($p < 0.0001$). The thresholds of the stereopsis test negatively correlated with the ocular deviation angle and positively

correlated with age in patients with intermittent exotropia.

Conclusions: Patients with intermittent exotropia who undergo surgical intervention had better static stereopsis than motion-in-depth perception, the response time for static stereopsis information processing was shorter than that for motion-in-depth perception. The thresholds of static stereopsis and motion-in-depth perception demonstrated significant correlations with both the ocular deviation angle and age among patients with intermittent exotropia undergoing surgical intervention.

Abstract No.: 205708

Validity and Reliability of the Indonesian Version Pediatric Eye Questionnaire in Children Age 5-11 Years With Low Vision

First Author: Eduard Jordi **LUMINTA**

Co-Author(s): Rita **SITA SITORUS**

Purpose: Assessment of functional vision and quality of life in children is hard to be done due to limitations in verbal communication or uncooperativeness, however it is important to be performed for comprehensive evaluation of children with visual impairment. One of the widely available instrument is the Pediatric Eye Questionnaire (PedEyeQ), but it is not directly applicable in Indonesia and must be adapted first. This poster will present the transcultural adaptation of PedEyeQ, as well as its validity and reliability testing.

Methods: The original PedEyeQ undergoes transcultural adaptation which includes forward translation by two sworn translators, reconciliation of translations, backward translation by another two translators, focus group discussion between experts, cognitive debriefing of the questionnaire, and last the pilot study involving 40 children with low vision along with their parents/guardians. Completed questionnaire then tested for validity using Content Validity Index (CVI) and spearman correlation between each question and total score from each domain. Reliability is tested using Cronbach Alpha to find the internal consistency of each domain in the questionnaire.

Results: The adapted PedEyeQ shows good validity with total agreement on all questions, achieving 100% CVI. Spearman correlation shows correlation of more than 0.30 with P value<0.05 on every questions, which passes the threshold for significant correlation between the score of each item to its total domain score. Cronbach Alpha results is more than 0.70 in all domain, implicating all the questions in each domain are testing the same concept.

Conclusions: The Indonesian version of the PedEyeQ is a valid and reliable tool to be used for assessment of functional vision and quality of life in low vision children and their parents. Further research must be

done to assess the external validity and full extent of its applicability in real world setting.

Abstract No.: 206944

Vertical Diplopia Following Glaucoma Surgery: Two Case Reports

First Author: Elpida **KOLLIA**

Co-Author(s): Eleni **PATSEA**

Purpose: To report two cases of vertical diplopia following glaucoma surgery and emphasize the importance of recognizing iatrogenic extraocular muscle injury.

Methods: Two patients developed persistent vertical diplopia after glaucoma surgery. The first was a 66-year-old female who underwent trabeculectomy. The second was a 78-year-old male who received a Paul® glaucoma valve implant. Both presented with vertical diplopia consistent with superior rectus under correction. Comprehensive work-up, including orbital magnetic resonance imaging (MRI) and blood tests, was performed to exclude alternative etiologies.

Results: In both cases, investigations did not reveal underlying systemic or orbital pathology. The clinical findings were consistent with injury related to surgical manipulation near the superior rectus muscle. Prism correction was prescribed and successfully alleviated diplopia, providing satisfactory functional outcomes without the need for surgical intervention.

Conclusions: Vertical diplopia is a rare but visually disabling complication of glaucoma surgery. These cases suggest that proximity of surgical manipulation during trabeculectomy or glaucoma drainage device implantation may predispose to superior rectus involvement. Early recognition, careful exclusion of alternative causes, and timely symptomatic management with prisms are essential to restore visual comfort and improve quality of life. Surgeons should remain aware of this potential complication and take precautions to minimize risk.

Abstract No.: 203489

Visual Experience-Dependent Ocular Dominance Plasticity in the Subcortical Structures

First Author: Xuefeng **SHI**

Purpose: Experience-dependent ocular dominance (OD) plasticity is a fundamental mechanism through which the visual system adapts to imbalances in input between the two eyes during development. Since the pioneering work of Hubel and Wiesel, this phenomenon has been extensively studied in the primary visual cortex (V1). However, the view that the visual cortex is the sole site of critical-period visual plasticity has now been challenged.

Methods: First, we demonstrate that the superior colliculus (SC) contains a substantial population of binocular neurons that exhibit robust OD plasticity during the critical period. Interestingly, while similarities exist between OD plasticity in SC and V1, there are notable differences in the mechanisms of this plasticity in the two regions. SC plasticity is independent of cortical input and is instead directly influenced by retinal projections. Furthermore, it is less affected by perineuronal nets compared to V1.

Results: Second, we also show that in the dorsolateral geniculate nucleus (dLGN), four-day monocular deprivation during the critical period in mice induces a significant OD shift in binocular neurons. This shift is driven primarily by potentiation of responses through the non-deprived eye, rather than depression of the deprived eye—a contrast to conventional observations in V1.

Conclusions: Collectively, these findings suggest that subcortical structures may contribute more significantly to developmental visual disorders such as amblyopia than previously recognized, which involves different neural mechanisms.

Abstract No.: 204456

Visual Function, Social Interaction, and Anxiety Among Schoolchildren: Findings from the LEARN-Well Preliminary Study

First Author: Kianti Raisa DARUSMAN

Co-Author(s): Beta ASWARNI, Ray Wagiu BASROWI, Christella CAROLINE, Muthia Utami DESPI, Nila Farid MOELOEK, Bunga PELANGI, Tanessa Audrey WIHARDJI

Purpose: Because uncorrected refractive errors (URE) can impair learning and psychosocial wellbeing, yet local evidence is scarce, we examined whether poorer visual function is associated with difficulties in social interaction and anxiety among Jakarta schoolchildren, and characterised related symptom burden (eye fatigue, headaches, gadget exposure), including in children with disabilities.

Methods: Mixed-methods cross-sectional preliminary study in 15 schools (12 public primary, 3 special) across four Jakarta municipalities. Participants were 1,254 students (grades 4–6). Visual function and vision-related quality of life were measured using the adapted Pediatric Eye Questionnaire (PedEyeQ); peer interaction and anxiety were assessed via structured questionnaires and explored qualitatively in focus groups with teachers and parents. Analyses comprised descriptive summaries and thematic synthesis.

Results: Among non-disabled students, 52.3% reported reduced visual function and 48.9% reported functional limitations; 63.0% had high-intensity gadget use, with 33.7% eye fatigue and 29.3% headaches. In students with disabilities, 21.2% reported eye fatigue, and qualitative data indicated reduced social participation

and higher anxiety. Across groups, teachers and parents linked visual difficulties with withdrawal and lower engagement in group activities; spectacle non-compliance was commonly attributed to discomfort and stigma.

Conclusions: Impaired visual function is associated with challenges in social interaction and anxiety among Jakarta schoolchildren. Integrating psychosocial assessment within school-based vision screening may reveal hidden burdens and enable earlier, holistic intervention and referral.

Abstract No.: 200947

Visual and Refractive Outcome Following Surgical Intervention for Visual Axis Opacity (VAO) in Children in a Tertiary Eye Hospital

First Author: Quazi Sazzad IFTEKHAR

Co-Author(s): Halima ALIMI, Jannatul FERDOUS, Mohammad Mostafa HOSSAIN, Shahrina MAHFOOZ, Shifat TOUFIQUE

Purpose: To study the outcome after intervention for visual axis opacification in pediatric age group.

Methods: A retrospective observational study extracting demographic and clinical information from case notes of patients who had membranectomy and/or capsule polishing between October 2017 and September 2018.

Results: Fifty-seven eyes of 51 patients were enrolled. There was a 2:1 male: female ratio. Mean age at cataract surgery was 5.9 years, whilst that for VAO surgery was 9.2 years. Postoperative visual acuity (by WHO definition) was good (between 6/6 and 6/18) in 33.3%, compared to 8.8% preoperatively. Whereas presenting visual acuity was poor (<6/60) in 61.4% preoperatively, this reduced to 30% postoperatively. Children >8 years of age at the time of VAO surgery had a greater proportion of good post-operative BCVA (52.6%), whilst 75% of children younger than 8 years at the time of surgery turned out with poor BCVA after VAO surgery. Visual outcome was influenced by age at cataract and VAO surgery, interval between cataract and VAO surgery, and type of cataract. There was a range of refractive shift of +0.25 to -5.25 with a mean myopic shift of 1.51D following membranectomy. Developmental cataracts proportionately had the best outcome of visual acuity.

Conclusions: There was a good proportion of children with significant improvement in visual acuity on the short term in spite of a mild myopic shift following membranectomy.

Abstract No.: 200265**Voluntary Unilateral Reflective Saccade in a Patient With Intermittent Exotropia: A Case Challenging Bilateral Oculomotor Coordination***First Author: Han-chih CHENG*

Purpose: To describe a rare oculomotor dissociation in intermittent exotropia (IXT) whereby a unilateral reflexive saccade occurs immediately after a bilateral fixation saccade, and to consider its cortical control implications.

Methods: Single-case observational study. Standard orthoptic and motility evaluation included nine-gaze testing, cover-uncover/alternate cover tests, and binocular function (Worth 4-dot; diplopia symptoms). Saccadic function was assessed under routine binocular viewing and with a targeted paradigm instructing a central fixation saccade followed by a reflexive saccade. Responses were observed repeatedly for consistency.

Results: Ocular motility was full without cranial nerve palsy or mechanical restriction. Cover testing confirmed IXT with outward drift on occlusion and realignment on uncovering. Worth 4-dot showed no suppression; the patient reported diplopia during exotropic episodes. Routine saccade testing was normal. Under the targeted paradigm, the patient consistently executed a bilateral fixation saccade to center and then a unilateral reflexive saccade with one eye while the fellow eye maintained fixation. During the unilateral movement, the fixating eye showed a brief nasal drift that quickly recentered, suggesting transient influence from the contralateral saccadic command.

Conclusions: Findings support asymmetric, eye-specific engagement of supranuclear generators: volitional (FEF-mediated) fixation maintained in one eye while a reflexive (PEF-mediated) saccade is expressed in the other. The brief nasal drift implies partial, overcome inhibition (e.g., via inhibitory burst neuron pathways). This dissociation challenges strictly bilateral models of saccade coupling and highlights cortical plasticity relevant to strabismus mechanisms and potential therapeutic strategies.

Abstract No.: 202217**When Fries Take the Sight: A Case Series of Vitamin A Deficiency in Picky Eaters***First Author: Thasyalanee KALI DAVAN**Co-Author(s): Goh Siew Yuen, Lim Thiam Hou, Jason Allan Seng Soon CHEAH, Norhafizah HAMZAH*

Purpose: To report 2 cases of severe vitamin A deficiency causing ocular complications in children, linked to a diet dominated by French fries.

Methods: Two pediatric patients with ocular signs of vitamin A deficiency and highly selective eating habits

were evaluated. Clinical features, laboratory findings, and treatment outcomes were analyzed.

Results: Case 1: A previously healthy child developed bilateral xerophthalmia and corneal involvement associated with a diet limited to French fries. He required hospitalization and parenteral vitamin A supplementation, with partial visual recovery. Case 2: An 8-year-old boy with autism spectrum disorder presented with progressive visual loss and nyctalopia. His diet consisted almost exclusively of fries, chips, and bread for 2 years. Fundus examination showed bilateral temporal optic disc pallor, and serum vitamin A was 0.38 $\mu\text{mol/L}$ (normal, 0.9–3.0 $\mu\text{mol/L}$). Despite biochemical correction after supplementation, visual outcome remained poor.

Conclusions: Vitamin A deficiency can occur in high-resource settings due to extreme dietary selectivity, leading to irreversible vision loss. Awareness and early nutritional intervention are critical for prevention.

Abstract No.: 203017**When Strabismus Twists the Spine: Undiagnosed Strabismus Leading to Torticollis and Scoliosis***First Author: Yilynn CHIEW**Co-Author(s): Siew Yuen GOH, Tong Keat TIEN*

Purpose: To describe a case where long-standing undiagnosed strabismus contributed to abnormal head posture with secondary musculoskeletal sequelae.

Methods: Case report.

Results: A 31-year-old Chinese woman was referred for worsening alternating exotropia. She had a history of persistent right head tilt since childhood, treated surgically for neck torticollis at age 6. During adolescence, scoliosis was noted and followed by orthopaedics, but later discharged as the curve remained mild and stable without need for surgical intervention. Detailed ophthalmic and orthoptic evaluations were performed. Best-corrected visual acuity was 6/9 in both eyes with anisometropic myopia. Examination showed a constant right head tilt of 11°, subtle left hemifacial asymmetry, and scoliosis. Orthoptic assessment demonstrated a large-angle alternating exotropia (30–35 prism dioptres at near, 25–30 PD at distance) with bilateral dissociated vertical deviation. Extraocular movements were full but convergence was poor. Despite torticollis surgery and orthopaedic monitoring, the underlying ocular misalignment had remained undiagnosed for decades. The patient's chronic compensatory head posture, adopted to optimise binocular function, likely induced secondary cervical contracture, facial asymmetry, and spinal loss of normal lordosis.

Conclusions: This binocular visual disorder is one of important differential diagnosis in ocular torticollis, if unrecognised, may precipitate irreversible skeletal

changes. Early recognition and visual therapy in this scenario are critical to prevent scoliosis and facial asymmetry. Multidisciplinary vigilance is essential to ensure patients with abnormal head posture undergo timely ophthalmic evaluation.

Abstract No.: 202226

When the Skin Speaks for the Eyes: A Case of Incontinentia Pigmenti

First Author: Tan TZE ERN CARYN

Co-Author(s): Norakmal BAHARI, Li Yen CHAN, Fazliana ISMAIL, Shyan Ling LAU, Jamalia RAHMAT

Purpose: To report a case of incontinentia pigmenti presenting with both ocular and cutaneous manifestations. Incontinentia pigmenti is a rare X-linked dominant genodermatosis primarily affecting the skin, eyes, and central nervous system. The diagnosis is based on presence of characteristic skin lesions at birth.

Methods: A 2-month-old term baby girl, delivered via caesarean section due to breech and small gestational age, was referred for ophthalmologic evaluation after pathognomonic skin lesions consistent with incontinentia pigmenti were noted at birth. Family history revealed that the patient's mother and maternal aunt, two of five siblings had similar undiagnosed skin changes in childhood, which had progressed through stages characteristic of incontinentia pigmenti. Initial ophthalmic examinations at birth and at one month were normal. However, at two months, retinal abnormalities were detected, prompting referral to our centre.

Results: Examination under anaesthesia revealed bilateral retinal ischemia. The right eye showed perifoveal infarction, tortuous vessels, dot hemorrhages, and a large superonasal hemorrhage. The left eye had inferotemporal retinal ischemia, Roth spots, arteriovenous shunting, exudates, and preretinal hemorrhage. Fluorescein angiography confirmed vascular occlusion in both eyes, with no neovascularization. Bilateral 360° peripheral laser photocoagulation was performed. Her skin lesions progressed to the pustular-hyperkeratotic stage and were co-managed with dermatology. At one-month follow-up, foveal infarcts and retinal ischemia had resolved, with improved retinal vasculature and skin lesions transitioning to hyperpigmentation.

Conclusions: This case underscores the need for early recognition of incontinentia pigmenti and multidisciplinary care to prevent irreversible ocular complications and improve outcomes.

Refractive Surgery

Abstract No.: 204482

A Case of Reticular Epithelial Corneal Edema Due to Ripasudil Post-Implantable Collamer Lens (ICL) in a Young High Myopic Patient

First Author: Vijaylaxmi B

Co-Author(s): Vineeth B BHIMSHETTY

Purpose: To study the earliest time onset of reticular epithelial corneal edema in post ICL patient started on Ripasudil eye drop for raised IOP and corneal haze - a side effect of the drug.

Methods: A 21-year-old female with a high refractive error was advised a bilateral phakic intraocular lens. Preoperatively, intraocular pressure was OU- 20mmHg and the anterior segment was within normal limits. A fundus examination -myopic fundus. She underwent OU phakic intraocular lens surgery. The right eye was uneventful postoperatively. In left eye post-operative rise of intraocular pressure was 60mmHg. She was started on tablet acetazolamide 250mg stat; brimonidine + timolol eye drops twice a day, nepafenac eye drops two times a day, topical antibiotic with steroid combination, and lubricating eye drops. Post-operative day 1(POD-1)-left eye intraocular pressure was 40 mmHg, stromal corneal edema ,same treatment was continued. On Post-op day 5- IOP was 30mmHg with persistence of corneal edema for which she was started on Ripasudil eye drop (0.4%) twice a day. Two days later, i.e, On Post-op day 7, IOP was 23mmHg and had developed epithelial edema with localized honeycomb appearance suggestive of reticular epithelial corneal edema on anterior segment optical coherence tomography. Ripasudil (0.4%) eye drop was discontinued.

Results: Post-op day 10 -IOP was 22mmHg with resolution of corneal epithelial edema and visual acuity.

Conclusions: Reticular epithelial corneal edema as a well-established side effect of ripasudil and netarsudil. The potential risk factor in our case was pre-existing corneal edema, though the patient had no co-morbidities. Timely recognition and management of corneal edema in patients on ROCK inhibitors ensures better long-term ocular outcomes.

Abstract No.: 203679

A Preliminary Clinical Study in Visual Quality of Wavefront-Optimized and Corneal Wavefront-Guided Femtosecond Lasik for Myopic Astigmatism

First Author: Yuanyuan LU

Purpose: Comparing the clinical efficacy and postoperative visual quality of the wavefront-optimized

FS-lasik (WFO) group and the wavefront aberration-guided FS-lasik (WFG) group in the correction of myopia and astigmatism.

Methods: A total of 107 patients from Shenyang Aier Excellence Eye Hospital were selected. Patients with myopic astigmatism were treated using a 1050 Hz high-repetition excimer laser. The safety, efficacy, and corneal aberrations were compared preoperatively and 1, 2, 3, and 6 months postoperatively.

Results: The mean uncorrected distance visual acuity in WFO group and the WFG group were significantly improved at 1 day, 1 week, 1, 3 and 6 months after surgery. Corneal higher-order aberrations (HOAs) increased after treatment in both groups, although fewer HOAs were induced in the corneal wavefront-guided group than in the aberration-free group. There was no significant difference between the two groups in Trefoil at 1, 3 and 6 months after operation compared with preoperative. There was no significant change in the coma of the WFO group compared with the WFG group at 1 and 3 and at 6 months, the coma of the WFG group was significantly lower than that of the WFO group. The Strehl Ratio in the WFG group increased more significantly than that in the WFO group at 3 and 6 months after surgery.

Conclusions: Both aberration-free and corneal wavefront-guided FS-lasik have excellent safety and effectiveness for correction of myopic astigmatism. The high-order aberrations introduced by the corneal wavefront aberration-guided surgery are fewer, which can further optimize the visual quality of patients.

Abstract No.: 207122

A Rare Case of Bilateral Anterior Lens Dislocation in a Patient With Homocystinuria

First Author: Komal **PRIYA**

Co-Author(s): Jitendra **SINGH**, Satya Prakash **SINGH**

Purpose: This case underscores the importance of recognizing the ocular signs of homocystinuria, as early diagnosis and intervention can significantly improve patient outcomes and quality of life. Regular ophthalmic evaluations are crucial for patients with known metabolic disorders, enabling timely identification and management of lens dislocation and other associated complications.

Methods: A 42-year-old male with poor vision, watering, and redness was diagnosed with homocystinuria and bilateral anterior lens dislocation. Left eye showed spontaneous dislocation with corneal decompensation requiring lensectomy, vitrectomy, and iris claw implantation. Right lens was repositioned behind the pupil with pilocarpine and laser iridotomy to prevent glaucoma.

Results: Postoperatively, at day 1 the visual acuity was noted to be finger counting at 3 metres in the LE. After 2 weeks of follow up the BCVA in the RE was 6/24 with

-1.5DS/-1.25DC at 140 degrees, BCVA in LE was 6/60 with -2.00 DS/-0.75DC at 90 degrees.

Conclusions: Bilateral anterior spontaneous dislocation of the lens is a notable ocular manifestation in patients with homocystinuria, a genetic disorder linked to impaired methionine metabolism. The elevation of homocysteine levels in this condition can lead to structural changes in connective tissues, including the zonules that support the lens. This weakening may predispose the lens to dislocation, often presenting bilaterally.

Abstract No.: 203581

A Systematic Review and Network Meta-Analysis of Laser Refractive Surgery Modalities for the Correction of Myopia

First Author: Claire **GOH**

Co-Author(s): Ruochen **DU**, Eric **JIN**, Blanche **LIM**, Chris **LIM**, Chen-hsin **SUN**

Purpose: This systematic review and network meta-analysis aims to assess and compare the efficacy, predictability and safety outcomes of different surgical approaches in the correction of refractive errors in individuals with myopia. The three categories of comparison are flap-based corneal surgery, advanced surface ablation, and kerato-lenticule extraction (KLEx).

Methods: A literature search was performed on PubMed, EMBASE and ClinicalTrials.gov from inception to 03 March 2025. Outcomes included were efficacy (uncorrected distance visual acuity (UDVA) $\geq 20/20$, $\geq 20/25$, and $\geq 20/40$), safety (loss of ≥ 1 and ≥ 2 lines of best corrected visual acuity (BCVA) post-operatively) and predictability (post-operative spherical equivalent (SE) within $\pm 0.5D$ and $\pm 1.0D$ of the target refraction). All randomised controlled trials comparing two different categories were included. Outcome data were extracted at the last reported time point.

Results: Thirty-two articles with a total of 3224 eyes (2186 participants) were included. There were no statistically significant differences between any pair of treatment categories in terms of efficacy, safety and predictability ($p > 0.05$). In treatment comparative analyses with SUCRA, flap-based corneal surgery was ranked first in efficacy (UDVA $\geq 20/20$), and advanced surface ablation was ranked first in safety (loss of ≥ 1 lines of BCVA post-operatively) and predictability (post-operative SE within $\pm 1.0D$ of the target refraction).

Conclusions: In conclusion, categories of flap-based corneal surgery, advanced surface ablation, KLEx have broadly comparable outcomes in efficacy, safety, and predictability.

Abstract No.: 201607

Accuracy of Predictive Formulas for Vault Height in Phakic IOLs: A Comparative Study of IPCL and ICL

First Author: Sonam **YANGZES**

Co-Author(s): Divya **CHALLA REDDY**, Amit **GUPTA**

Purpose: To compare predicted and actual postoperative vault heights using NK and KS formulas in eyes implanted with phakic intraocular lenses (IPCL V2.0 and ICL), and evaluate their accuracy alongside other biometric parameters.

Methods: Forty eyes (20 IPCL, 20 ICL) underwent preoperative anterior segment OCT for predicted vault height, lens size (via NK and KS formulas), and crystalline lens rise. White-to-white was measured using digital calipers, Pentacam, and IOL Master. Postoperative vault height was measured at one month with AS-OCT.

Results: Mean preoperative BCVA was 0.2 LogMAR. Predicted lens sizes were 12.99 ± 0.41 mm (NK) and 13.57 ± 0.22 mm (KS), with predicted vault heights of 750.23 ± 350 μ m and 469.05 ± 141.81 μ m, respectively. The implanted lens size was 12.86 ± 0.56 mm, and actual postoperative vault was 713.59 ± 268.52 μ m. Pentacam measurements correlated best with accurate sizing.

Conclusions: NK and KS formulas assist in predicting vault height but show discrepancies, highlighting the need for refinement and integration with biometric parameters for improved accuracy.

Abstract No.: 205744

Analysis of the Correlation Between the Center Position of the Cut and Visual Quality After Myopia Correction Using VisuMax 800 Femtosecond Laser: A Prospective, Non-Blinded Trial

First Author: Di **WANG**

Co-Author(s): Xinyi **GU**, Meiyang **LI**, Xingtao **ZHOU**

Purpose: To explore the relationship between the center position of the cut and visual quality after myopia correction using VisuMax 800 femtosecond laser small incision lenticule extraction (SMILE pro).

Methods: A total of 97 patients (193 eyes) undergoing SMILE pro myopia correction were consecutively enrolled. The position of the cutting center was measured using corneal topography obtained with a Scheimpflug camera (Pentacam HR; Oculus, Wetzlar, Germany). The OPD system was used to measure the total ocular coma, spherical aberration, and trefoil aberration.

Results: Three months after surgery, the average efficacy index (postoperative UDVA/preoperative CDVA) was 1.07 ± 0.11 . The postoperative uncorrected

distance visual acuity (UDVA) of all eyes was 0.8 or better, and 99% of eyes achieved UDVA of 1.0 or better. The postoperative spherical equivalent (SE) was $+0.12 \pm 0.27$ D, and no patient complained of visual symptoms such as double vision after surgery. The offset of the corneal cutting center from the corneal apex was 0.13 ± 0.12 mm. Compared with preoperatively, the postoperative higher-order aberrations (tHOA) changed by 0.14 ± 0.57 μ m, the vertical coma aberration (totZ3-1) changed by 0.09 ± 0.14 μ m, the postoperative trefoil aberration changed by 0.11 ± 0.28 μ m, and the postoperative spherical aberration (totZ40) changed by 0.05 ± 0.08 μ m. The vertical eccentricity was correlated with vertical coma aberration, with a Pearson correlation coefficient of 0.195 and $p < 0.01$.

Conclusions: The offset of the cutting center of the VisuMax 800 femtosecond laser for myopia correction is small.

Abstract No.: 206073

Bathopsis vs Stereopsis: Why Blended Vision Works

First Author: David **BECKERS**

Co-Author(s): Lena **BECKERS**

Purpose: To define the concept of bathopsis and contrast it with stereopsis in the context of binocular vision after intraocular lens (IOL) implantation. While stereopsis refers to depth perception based on retinal disparity between nearly identical images, bathopsis describes depth perception arising from binocular fusion of non-identical images, allowing functional vision even in the presence of interocular asymmetry.

Methods: Binocular visual outcomes were analyzed in patients following bilateral IOL implantation. Parameters included uncorrected distance, intermediate, and near visual acuity, stereoacuity, and patient-reported photic phenomena. Functional performance was assessed in relation to the underlying mechanisms of stereopsis and bathopsis.

Results: Binocular uncorrected distance visual acuity reached a mean of 0.0 logMAR, while intermediate and near visual acuity were sufficient for daily tasks without additional correction. Stereoacuity was maintained in the functional range, with most patients achieving ≤ 100 arcsec. Photic phenomena such as glare and halos were reported but were generally mild and not associated with reduced satisfaction. The coexistence of good functional acuity at different distances with preserved though not perfect stereoacuity supports bathoptic integration, whereby the brain fuses slightly dissimilar images into a coherent binocular percept.

Conclusions: Bathopsis provides a physiologic explanation for the success of blended vision strategies. By tolerating controlled interocular differences, it preserves useful depth perception while extending

the range of functional vision, offering a more robust binocular outcome than reliance on stereopsis alone.

Abstract No.: 204015

Battle of the Beams: VisuMax 500 vs 800 — The Laser Upgrade Story

First Author: Sneha G V

Co-Author(s): Sriganesh, Sheetal BRAR

Purpose: To compare the clinical outcomes, ease of separation and patient satisfaction following SMILE performed with VISUMAX 800 in one eye and VISUMAX 500 in the contralateral eye

Methods: A total of 30 patients undergoing bilateral SMILE procedures were included, wherein both eyes of each patient were randomised to receive treatment with VM 800 in one eye and with VM 500 in the contralateral eye for correction of myopia and myopic astigmatism. Intra-operatively, docking time, suction time, laser time and surgical time were noted and post-operatively visual and refractive results, contrast sensitivity and patient satisfaction was assessed at 3 months post-op

Results: The mean docking time and surgical time was significantly lower in the VM800 group (46.53 ± 11 sec and 4.52 ± 2.33 min) compared to VM500 group, 68.25 ± 15 sec and 6.22 ± 2.04 min respectively ($p < 0.001$). No significant differences were observed in the first day and 3 months mean UDVA, CDVA, SE, post-op Higher Order Abberations (HOA), Objective Scatter Index (OSI), Modular Transfer Function (MTF) and subjective contrast sensitivity at all spatial frequencies between the groups, ($p > 0.05$). Patient's scores regarding subjective symptoms were comparable, however, the overall satisfaction with the surgical experience was rated significantly better in the VM800 group

Conclusions: No significant differences were observed in clinical outcomes between the two laser systems, however, the surgical workflow and patient reported intra-operative experience was significantly better with VM 800

Abstract No.: 205650

Beyond the Flap: Surgical Management for Epithelial Ingrowth Following Laser-Assisted In Situ Keratomileusis - A Case Report

First Author: Angga FAJRIANSYAH

Co-Author(s): Elfa Ali IDRUS, Faris MADYAPUTRA, Patriotika MUSLIMA, Arief MUSTARAM

Purpose: To report a case management of epithelial ingrowth emerging 18 months after Femtosecond LASIK surgery in Cicendo Eye Hospital, Bandung, Indonesia.

Methods: A 37-year-old male came to Cicendo Eye Hospital with the chief complaint of blurred vision in his right eye for 1 year. He had a history of Femtosecond LASIK surgery 18 months before. Both

eyes' visual acuity after Femtosecond LASIK surgery was improved to 1.0, then his right eye vision started to decrease gradually within 6 months after the surgery. Ophthalmological examination revealed right eye visual acuity was 0.2, epithelial ingrowth was found under the corneal flap, then he underwent flap reopening, epithelial debridement, and flap suturing procedure for the right eye.

Results: Suture removal was done 3 months following the flap closure, with the final visual acuity of the right eye being 0.4 with a pinhole of 0.63.

Conclusions: Epithelial ingrowth is a rare but serious vision-threatening complication following LASIK surgery. Epithelial ingrowth is a rare but serious vision-threatening complication after ocular surgery. Management of epithelial ingrowth is focused on the surgical removal of involved tissues. Appropriate management of epithelial ingrowth can lead to a good visual prognosis.

Abstract No.: 205190

Clinical Experience in the Diagnosis and Treatment of Marginal Keratitis Associated With Corneal Refractive Surgery

First Author: Wei PENG

Purpose: To explore the characteristics and clinical diagnosis and treatment of marginal keratitis related to laser corneal refractive surgery through four typical cases.

Methods: Retrospective analysis of medical history, clinical data, and treatment process of four patients with postoperative marginal keratitis after corneal laser refractive surgery (LRS) in outpatient clinic.

Results: All four patients were female, experienced diverse symptoms, including red eyes, watering, and occasional photophobia. There also be an insidious onset with no specific discomfort. Among them, two cases had unilateral onset, and two had bilateral onset. The onset time ranged from 5 hours post-operation to one week post-operation. Three cases occurred after LASIK surgery, with infiltrative lesions surrounding the corneal flap, and intact corneal epithelium, classified as non-infectious peripheral keratitis. One case occurred after SMILE surgery, the lesion was located between the limbus and the pupillary margin, manifested as marginal ulcerative keratitis located. It located at the corneal stroma layer, lens capsule bag level, accompanied by epithelial damage and infectious inflammation. All four patients were treated with broad-spectrum antibiotics, corticosteroids drugs, and immunosuppressants for anti-inflammatory purposes and recovered, achieving satisfied corrected vision. The course of the disease ranged from one week to two months.

Conclusions: The onset of marginal keratitis related to corneal refractive surgery is insidious and diverse. Non-

infectious factors are the main causes, but infectious factors should not be overlooked. anti-infection treatment should not be neglected. The pathogenesis is intricate and complex. requires further research.

Abstract No.: 201550

Clinical Outcomes and Predictability of the MPL Gen-2 Calculator in Phakic Lens Implantation: A One-Year Case Series

First Author: Chan SUET MEI

Purpose: To report clinical and safety outcomes following Medennium Phakic Lens (MPL) implantation and to assess the refractive predictability of the MPL Gen-2 Calculator.

Methods: This consecutive case series included 80 eyes implanted with the MPL over a one-year period. Clinical outcomes were assessed at a uniform 6-month follow-up. Evaluated parameters included refractive accuracy (mean refractive spherical equivalent, residual cylinder, and percentage of eyes within ± 0.50 D and ± 1.00 D of intended correction), uncorrected and corrected distance visual acuity, and calculator predictability. Safety assessments included intraocular pressure, endothelial cell density, and adverse events. Patient-reported quality of vision and satisfaction were also documented.

Results: At 6 months, 92% of eyes were within ± 0.50 D and 98% within ± 1.00 D of target refraction. Residual cylinder was ≤ 0.50 D in 85% of eyes. Uncorrected distance visual acuity of 20/25 or better was achieved in 90% of eyes, with no significant loss of corrected vision. The MPL Gen-2 Calculator demonstrated excellent predictability, with mean prediction error approaching zero. No serious complications, such as cataract formation, pupillary block, or persistent IOP elevation, were observed. Transient halos and glare were reported in a small number of patients but generally improved over time. Overall patient satisfaction with vision was high.

Conclusions: MPL implantation was associated with stable refractive outcomes, a favorable safety profile, and high patient satisfaction. The strong performance of the MPL Gen-2 Calculator supports its role as a reliable tool for surgical planning in high myopia correction.

Abstract No.: 206399

Comparison of Lenticular Scanning Quality and Visual Outcomes of Keratorefractive Lenticule Extraction Between VisuMax 800 and 500 Systems

First Author: Jing ZHAO

Co-Author(s): Yongle BAO, Jiayi HU, Zhanying WANG, Xingtao ZHOU

Purpose: To compare lenticular scanning quality and its impact on early visual outcomes between keratorefractive lenticule extraction (KLEx) performed with VisuMax 800 and VisuMax 500 systems.

Methods: Consecutive patients aged 18-46 years were recruited between November 2024 and March 2025. Opaque bubble layer (OBL) and lenticular surface regularity were measured using intraoperative imaging and scanning electron microscopy. Visual acuity and refractive error were assessed at 1 and 3 months postoperatively.

Results: A total of 140 participants (140 eyes) were included (70 per group). The VisuMax 800 group had significantly lower OBL proportions ($3.97 \pm 2.58\%$ vs. $2.44 \pm 0.52\%$, $P < 0.001$) and better lenticular surface regularity scores (11.85 ± 2.56 vs. 14.98 ± 4.05 , $P = 0.002$). In the VisuMax 800 group, higher Flat K and Steep K correlated with larger OBL areas ($\beta = 0.412$, $P < 0.001$; $\beta = 0.358$, $P = 0.002$) and larger optical zones were associated with better lenticular surface regularity ($\beta = 0.535$, $P = 0.038$). Compared with the VisuMax 500 group, the VisuMax 800 group showed slightly better visual acuity at 1 and 3 months postoperatively ($P < 0.001$), with no significant difference in refractive error. In the VisuMax 800 group, smaller OBL proportions were associated with better visual acuity at 1 and 3 months postoperatively ($\beta < 0$, $P < 0.05$), while better lenticular surface regularity was correlated with lower astigmatism at 3 months postoperatively ($\beta = -0.574$, $P = 0.002$).

Conclusions: Intraoperative lenticular scanning parameters and quality affect early postoperative visual outcomes. VisuMax 800 provided slightly improved scan quality and early postoperative visual compared with VisuMax 500.

Abstract No.: 204661

Comparison of Visual and Refractive Outcomes Between Same-Day and Scheduled Femtosecond Laser-Assisted in Situ Keratomileusis (LASIK) for Myopia in a Tertiary Hospital

First Author: Alyssa Marie HIZON

Co-Author(s): Nicolette Eunice CHUA, Cristina Erika ELAZEGUI, Reginal Robert TAN

Purpose: This study compared the postoperative visual and refractive outcomes of myopic patients of same-

day versus scheduled femtosecond LASIK at a tertiary hospital, evaluating safety, efficacy, predictability, and stability at three months post-surgery.

Methods: This retrospective, single-center study reviewed records of 790 myopic eyes of femtosecond LASIK at St. Luke's Medical Center, Bonifacio Global City, from February 2022 to February 2025. Patients were categorized into two groups based on timing and type of preoperative assessment. The same-day LASIK (SD) group underwent refractive screening and LASIK on the same day without cycloplegic refraction, while the scheduled LASIK (SCH) group had screening and surgery on separate days and received cycloplegic refraction. Visual and refractive outcomes were evaluated at three months using standardized refractive surgery reporting indices.

Results: Of the 790 eyes analyzed, 338 underwent SD and 452 underwent SCH. UDVA of 20/20 or better was achieved in 83% of SD eyes and 88% of SCH eyes. Efficacy index was comparable between groups ($p = 0.16$). Safety was better in the SCH group, with 5% of SD eyes and 4% of SCH eyes losing >2 lines of CDVA, and a higher safety index in SCH (1.04 vs 1.02, $p = 0.04$). Predictability was also superior in SCH (index 1.00 vs 0.98, $p < 0.001$), with 99% of SD and 98% of SCH eyes within ± 1.00 D of target SE. Stability was comparable ($p = 0.56$), with a mean SE change of -0.01 D over three months. Postoperative astigmatism was <0.50 D in 96% of SD and 95% of SCH eyes, and <1.00 D in 100% of both groups.

Conclusions: Same-day LASIK achieves comparable efficacy and short-term refractive stability to scheduled LASIK in adult myopic patients. However, scheduled LASIK demonstrates slightly superior safety and predictability, supporting its continued use in comprehensive preoperative planning, while also validating the selective application of same-day LASIK in appropriate candidates.

Abstract No.: 203383

Corneal Keratometry and Visual Outcome Predictability After Small Incision Lenticule Keratomileusis (SILK) in 100 Eyes of a Malaysian Population

First Author: Chan **SUET MEI**

Purpose: To evaluate corneal keratometry changes after Small Incision Lenticule Keratomileusis (SILK) and assess visual outcome predictability with the current nomogram in a Malaysian population.

Methods: This retrospective case series included 100 eyes treated with SILK using the Elita femtosecond laser for myopia and myopic astigmatism. Preoperative assessment included manifest refraction spherical equivalent (MRSE), uncorrected (UDVA) and corrected distance visual acuity (CDVA), and keratometry (K1, K2, Kmean). Postoperative follow-up was at day 1, week 1,

and six weeks. Main outcome measures were changes in keratometry and correlation with refractive change. Visual predictability was assessed by the proportion of eyes within ± 0.50 D and ± 1.00 D of attempted correction. Additional analyses included UDVA, CDVA, safety and efficacy indices, and complications.

Results: At six weeks, keratometry showed central flattening proportional to correction, though less per diopter compared with LASIK. ΔK_{mean} correlated strongly with $\Delta MRSE$ ($R^2 > 0.9$). Predictability was high, with over 80% of eyes within ± 0.50 D and more than 95% within ± 1.00 D. Most eyes achieved UDVA of 20/25 or better. Safety and efficacy indices exceeded 1.0, and no eye lost two or more lines of CDVA. Outcomes were stable from week 1 to 6, with few minor complications.

Conclusions: SILK provided safe, stable, and accurate correction of myopia and astigmatism in a Malaysian population, inducing less keratometric flattening than LASIK while maintaining high predictability.

Abstract No.: 201920

Do High Myopes Need Further Retinal Assessment Prior to Refractive Surgery?

First Author: Christopher **GO**

Co-Author(s): Colin **CHAN**, Michael **LAWLESS**, Jonathan **LIN**, Gerard **SUTTON**

Purpose: High myopia impacts vision-related quality of life and often represents a significant risk factor for vision-threatening complications. Caution is required during assessment, particularly if considering elective ocular procedures. We investigate the incidence of clinical retinal signs and referral pathway in a population of high myopes seeking refractive surgery.

Methods: Retrospective, consecutive cohort of 58 patients (116 eyes) with high myopia (spherical error, SE > -6 D) seeking refractive surgery at a private clinic between January and June 2025. Retinal imaging was performed (Optos ultra-widfield imaging) and analysed by an independent retina sub-specialist. Incidence of retinal findings and institutional tertiary referral patterns were recorded.

Results: Mean age was 33.9 ± 6.4 years. Mean SE was -7.55 ± 1.29 D (-6.0 to -10.75 D). Retinal findings were identified in 24.1% of patients (14/58) of patients and 19.0% (22/116) of eyes overall. Abnormalities were predominantly peripheral retina (59.1% of eyes) including white without pressure (WWP). Six eyes were noted to have ≥ 1 pigmented retinal hole and one noted previously undiagnosed retinal tear <1 disc diameter (DD). Concordance in clinical diagnosis and referral occurred in 13/14 patients.

Conclusions: A notable proportion of patients with high myopia presenting for refractive surgery selection exhibited retinal abnormalities confirming the need for caution. Although these complications may not represent absolute contraindications to surgery in

all cases, positively the existing diagnosis and rate of tertiary retinal referral was excellent, reaffirming the current assessment protocol.

Abstract No.: 201428

Effect of ICL Implantation on ACD and IOP: A Comparative Study

First Author: Khaled ABDELATY

Purpose: To evaluate the effect of ICL implantation on the ACD and IOP. This study was on 39 eyes of 25 patients. The age range was 20-43 years. Corneal thickness mean was 537.54. The reasons for ICL surgery were: high myopia, post-KP, and post-cornea crosslinking.

Methods: All patients underwent uneventful ICL implantation and were followed up for more than one year. A comparison was done pre-operative and post-operative for the IOP using the Goldmann applanation tonometer and ACD using the Orbscan II z.

Results: The IOP was slightly increased post-ICL implantation from a mean of 12,62 mm Hg with 1,73 SD to a mean of 13.1 mm Hg with 1,76 SD. ACD was decreased from a mean of 3,11 mm with 0,359 SD pre-operative to 2.65 mm with 0.68 SD post-operative.

Conclusions: In spite of the fact that ACD is decreased by the ICL implantation, it is obviously not affected by any means, any organic or visual outcomes. Nevertheless, the IOP is not to be mentioned as a difference that ICL can affect in uneventful surgeries.

Abstract No.: 207902

Expanding Surgical Options in Keratoconus: Role of Topography-Guided Custom Ablation (TCAT) and Topography-Guided Removal of Epithelium (TREK)

First Author: Tulika CHAUHAN

Co-Author(s): Surveen Kaur ARNEJA, Akanksha KOUL, Raghav MALIK

Purpose: To compare visual and anatomical outcomes of Topography-Guided Custom Ablation Treatment (TCAT) and Topography-Guided Removal of Epithelium in Keratoconus (TREK) performed in eyes with different stages of keratoconus.

Methods: This prospective interventional series included 20 eyes of 20 patients with keratoconus. Ten eyes with mild to moderate keratoconus (Amsler-Krumeich stages I-II, thinnest pachymetry >430 μ m) underwent TCAT followed by corneal cross-linking (CXL). Ten eyes with advanced keratoconus (stages III-IV, thinnest pachymetry <430 μ m) underwent TREK (topography-guided epithelial removal with minimal or no stromal ablation) followed by accelerated CXL. Pre- and postoperative assessment included uncorrected and best-corrected visual acuity (UCVA,

BCVA), manifest refraction, keratometry, and corneal topography at baseline, 1 month and 3 months.

Results: Both groups showed significant improvement in corneal regularity and visual function. Mean BCVA and mean maximum keratometry improved in both the groups. No sight-threatening complications, persistent haze, or progressive ectasia were observed during follow-up.

Conclusions: TCAT combined with CXL provides effective visual and topographic improvement in mild to moderate keratoconus, while TREK with CXL is a safe, tissue-sparing option in advanced disease where stromal ablation is contraindicated. Both approaches expand the surgical armamentarium for stage-appropriate keratoconus management.

Abstract No.: 205475

Exploring Visual Performance of Ray-Tracing vs Topography-Guided LASIK

First Author: Prabhjot SINGH

Co-Author(s): Deepthi R H, Abha SHAH

Purpose: To evaluate the visual and refractive performance of Customized Ray-Tracing-Guided LASIK (RTG) and Topography-guided LASIK (TG).

Methods: A total of 503 eyes undergoing RTG LASIK (n=261) or TG LASIK (n=242), were assessed at 12 months post-op using visual acuity testing, achieved Spherical Equivalent and coefficient of determination (R^2) to evaluate the predictability of refractive outcomes.

Results: At 12 months, 72% of RTG eyes achieved UDVA >20/20 compared to 19% in TG group. Gain of lines occurred in 67.3% of RTG eyes vs. 17.2% in TG ($p<0.05$). R^2 was higher in for RTG group (0.999) than TG group (0.966). Both platforms achieved 100% accuracy within ± 0.50 D, and 96% had 20/20 vision in 1 week. Astigmatism achieved was ≤ 0.25 DC in both groups ($p=0.03$).

Conclusions: RTG LASIK demonstrated visual acuity outcomes that were non-inferior to TG LASIK. However, the gain of lines was better in RTG LASIK compared to those who underwent TG LASIK.

Abstract No.: 206324

Exploring the Impact of Refractive and Ocular Residual Astigmatism on Stereopsis After Photorefractive Keratectomy in Patients With Myopic Astigmatism

First Author: Mohammad TOBEIHA

Co-Author(s): Pegah NOORSHARGH, Alireza PEYMAN, Mohsen POURAZIZI

Purpose: To investigate the impact of refractive and ocular residual astigmatism (ORA) on stereopsis after

photorefractive keratectomy (PRK) for corrections of myopic astigmatism.

Methods: This prospective observational study conducted on patients who underwent PRK for treatment of myopia and myopic astigmatism using a Schwind Amaris 1050RS excimer laser system. Stereoacuity was measured using the stereo Fly test before and after the surgery. We evaluated the impact of pre-op refractive and internal astigmatic components on stereopsis outcome after surgery. To calculate ORA, we calculated the vectorial difference between corneal plane refractive astigmatism and keratometric astigmatism.

Results: Ninety-six eyes from 96 patients including 70 females (72.9%), with a mean age of 29.83 ± 7.39 years were enrolled. The average stereoacuity measured in log units before and after PRK was 1.65 ± 0.09 and 1.63 ± 0.07 , respectively ($P=0.17$). Patients who showed stereopsis improvement had a higher mean cylindrical error compared to those who did not ($P=0.04$). The average pre-treatment ORA was 0.84 ± 0.37 in patients who experienced deterioration in stereopsis, 0.77 ± 0.35 in patients who maintained the same level, and 0.80 ± 0.35 in patients who showed improvement ($P=0.77$).

Conclusions: This study showed the potential relationship between higher astigmatism and the enhancement of stereopsis after PRK. Furthermore, our study found no significant impact ORA on the outcomes of stereopsis following PRK.

Abstract No.: 205890

Fine Needle Diathermy for Corneal Neovascularization Prior to Photorefractive Keratectomy: A Case Report

First Author: Maureen Anne REYES

Co-Author(s): Keshia Lourdes DUYONGCO-LENON

Purpose: To assess the efficacy of fine needle diathermy (FND) in inducing regression of corneal neovascularization prior to photorefractive keratectomy (PRK), with the objective of optimizing corneal transparency, minimizing postoperative complications such as haze or recurrent neovascularization, and ultimately improving visual and refractive outcomes.

Methods: We present a case of a 33-year old Filipino female who presented with blurring of vision on both eyes. Ocular examination showed uncorrected visual acuity of counting fingers at 1 meter, a 1.3 millimeter by 2.5 millimeter corneal opacity with a large feeder vessel at the superotemporal paracentral area on the left eye, which resulted to a significant astigmatism of -1.50 at axis 120, and moderate compound myopia. Patient was started on Moxifloxacin Dexamethasone eyedrops, 1 drop four times a day for 2 weeks to the affected eye and underwent FND to address the corneal neovascularization. Post-FND, Levofloxacin and

Prednisolone Acetate eyedrops, 1 drop four times a day were placed for a week. Once the isolated feeder vessel was deemed stable after 2 weeks, PRK was done.

Results: Intraoperatively, obliterated vessels were visualized and carefully monitored during the ablation. At 1 month postop, best corrected visual acuity is 20/25+2 and J1 for both eyes with a refraction of spherical equivalent -1.75 on the left eye. Slitlamp examination shows clear cornea and stable obliterated vessels at the post FND area.

Conclusions: FND prior to PRK is crucial for regressing corneal neovascularization, which reduces intraoperative bleeding, limits postoperative haze, and supports better visual outcomes.

Abstract No.: 206508

From Cataract Removal to Ocular Surface Health: Comparing KDEI and OSDI in Dry Eye Diagnosis

First Author: Karina Ayu Pramesti

Co-Author(s): Indri Wahyuni, Intifada, Ismi Zuhria, M.Nurdin Zuhri, Rina La Distia Nora

Purpose: This study aimed to evaluate differences in the diagnosis of DED in cataract patients before and after phacoemulsification using two subjective instruments: the Indonesian Dry Eye Questionnaire (KDEI) and the Ocular Surface Disease Index (OSDI).

Methods: A quasi-experimental study was conducted on 40 cataract patients undergoing phacoemulsification at Universitas Airlangga Hospital. Evaluations were performed at three time points: preoperatively, one week postoperatively, and one month postoperatively. DED diagnosis was established using KDEI and OSDI scores. Comparative analysis was performed with the Kruskal-Wallis test, while the Mann-Whitney test was used to compare both instruments.

Results: Analysis revealed no significant differences in DED diagnosis using KDEI ($p = 0.438$) or OSDI ($p = 0.367$) across the three observation points. The Mann-Whitney test showed no significant differences between KDEI and OSDI at baseline ($p = 0.117$) and one month postoperatively ($p = 0.058$), although a significant difference was observed at one week ($p = 0.024$).

Conclusions: Phacoemulsification did not significantly alter the diagnosis of DED within one month of follow-up based on KDEI or OSDI. KDEI demonstrated consistent performance comparable to OSDI, supporting its validity as a culturally adapted tool for Indonesian patients.

Abstract No.: 203748

Initial Outcomes of Trans-epithelial Photorefractive Keratectomy With Bausch and Lomb's PROSCAN Aspheric Treatment Compared With OCTAVIUS Topography-Optimised Treatment

First Author: Julian **TAGAL**

Purpose: Bausch and Lomb's TENEO Model 2 can perform transepithelial photorefractive keratectomy (tPRK) with different ablation profiles: The PROSCAN aspheric profile minimises induction of spherical aberrations, whereas OCTAVIUS uses individual corneal topography data to provide customised ablation profiles. This study compared the visual and safety outcomes with OCTAVIUS ablation profile compared with the default PROSCAN ablation profile.

Methods: This was a prospective, single-blind study conducted at OasisEye Specialists in Kuching, Malaysia. Thirty-three patients with mild to moderate myopic astigmatism received tPRK with PROSCAN in one eye and OCTAVIUS in the fellow eye in an alternating OD/OS arrangement. Target refraction was plano. Outcomes measured 3 months postoperatively included monocular uncorrected and corrected distance visual acuity (UDVA/CDVA), induced and total higher order and spherical aberrations (HOA/SA), and contrast sensitivity.

Results: At baseline, mean±standard deviation (SD) age was 31.7±4.2 years and mean±SD spherical/cylindrical refractive error was -4.02±1.53/-0.95±0.71 (PROSCAN) and -3.98±1.34/-1.02±0.67 (OCTAVIUS). At 3 months, mean±SD logMAR UDVA was -0.00±0.08 for both PROSCAN and OCTAVIUS (p=0.92). Mean±SD logMAR CDVA was -0.04±0.05 for both PROSCAN and OCTAVIUS. 76% and 67% of eyes achieved 20/20 Snellen UDVA with PROSCAN and OCTAVIUS, respectively, and no eye lost ≥2 lines of Snellen CDVA. Mean±SD induced HOA/SA were 0.45±0.20 μm/0.42±0.23 μm (PROSCAN) versus 0.38±0.22 μm/0.34±0.19 μm (OCTAVIUS); p=0.06 for both comparisons). Mean±SD log percent contrast sensitivity was 1.98±0.08 (PROSCAN) versus 2.02±0.12 (OCTAVIUS; p=0.13). There were no perceived dysphotopic differences between eyes.

Conclusions: The individualised OCTAVIUS profile is generally comparable to the aspheric PROSCAN profile in terms of visual acuity and safety outcomes.

Abstract No.: 206294

Intraoperative ICL Vault Measurement Using Callisto-Guided Anterior Segment OCT: Correlation With Postoperative Vault

First Author: Sanjalee **THAKAR**

Purpose: To compare intraoperative ICL vault measurements obtained using Callisto-guided

intraoperative anterior segment OCT with postoperative vault measurements and assess the predictive accuracy of intraoperative readings.

Methods: This prospective observational study included patients undergoing ICL implantation for myopia/hyperopia or myopia/hyperopia with astigmatism. Intraoperative vault was measured immediately after ICL implantation using Callisto-guided microscope-integrated AS-OCT. Postoperative vault was measured at post-op day 1 and 1 week using standard AS-OCT.

Results: A total of 61 eyes from 31 patients were analysed. Mean central intraoperative vault was 533 ± 121 μm, while mean postoperative vault at day 1 was 577 ± 132 μm.

Conclusions: Intraoperative vault measurement using Callisto-guided AS-OCT provides a dependable predictor of postoperative vault, corresponding to postoperative values. This real-time assessment can guide surgical decision-making, optimize ICL positioning, and potentially improve patient outcomes.

Abstract No.: 205724

LASIK Enhancement After Primary Myopic LASIK

First Author: Lipi **MITTAL**

Co-Author(s): Mukesh **PATIL**, Divya **SINGH**

Purpose: To evaluate refractive, visual outcomes and complications in patients who underwent Lasik enhancement after primary myopic Lasik.

Methods: This non-comparative retrospective study was performed on 58 eyes of 46 patients (one eye in 34 patients and both eyes in 12 patients). The study was conducted at a tertiary eye centre between March 2017 and March 2022. All patients who presented with «Post-primary myopic Lasik refractive error and regression» were considered for flap lift retreatment using the ALCON WAVELENGTH EX500 EXCIMER LASER platform. Patients with a minimum one-year follow-up post-Lasik enhancement were included. Complications post-enhancement were also evaluated. The outcomes were measured in terms of safety, effectiveness and predictability of the procedure. Statistical analysis was done by using SPSS software.

Results: In our study, males accounted for 39% (18) and females accounted for 61% (28). Before primary myopic Lasik, the mean sphere, cylinder and spherical equivalent were -4.02 ±1.95(range -0.75 D to -9D), -0.75±0.77(range from 0D to -4D), -4.39 ±1.90 (range -0.875D to -9.125 D). Before flap lift retreatment, the MSE was -1.31 ± 0.44 (range -0.75 D to -2.38D) and post enhancement, the MSE was -0.03 ±0.55 (range +0.88D to -1.00D). Post-enhancement visual outcomes showed 51 of 58(88%) eyes and 56 of 58(97%)eyes were within ±0.5D and ±1D respectively. None of the eyes lost BCVA of more than one line. 4 out of 58(7%)

eyes developed Epithelial Ingrowth (Grade 1) and 1 of 58 (2%) eyes had flap-related complications (micro striae).

Conclusions: Flap-lift technique is a safe, effective and predictable procedure for the management of post-myopic Lasik residual or regressed refractive error.

Abstract No.: 203815

Managing Cap-Lenticular Adhesion in SMILE Surgery: Management Using Modified Dissection Technique

First Author: Kumar Kartikay RAJAURA

Co-Author(s): Siri GOWDA, Manpreet KAUR

Purpose: CLA occurs in 1.8-2% of SMILE cases, causing cap-lenticular adhesion that complicates extraction and may lead to incomplete removal or cap perforation, requiring systematic management.

Methods: A total of 760 eyes were operated using a modified dissection technique, CAMP-SWIPE-SLURP, where the CAMP technique delineates anterior/posterior planes using a cap incision, anterior entry, and the meniscus sign. The SWIPE technique sweeps the anterior plan. SLURP technique dissects the posterior plane quadrant-wise, leaving pillars of strength for controlled lenticule extraction.

Results: No cap lenticular adhesion was noted in any of the cases performed by this technique.

Conclusions: CLA management protocol enables 100% lenticule extraction with zero complications. This systematic approach transforms a challenging complication into manageable procedure, improving SMILE safety & outcomes. Technique provides reproducible solution for surgeons encountering CLA.

Abstract No.: 207188

Outcomes of Manual Cyclotorsion Compensated Small Incision Lenticule Extraction in Correction of Myopic Astigmatism

First Author: Disha GOYAL

Co-Author(s): Sudarshan KHOKHAR, Aishwarya RATHOD

Purpose: Assessment of visual and refractive outcomes, efficacy, safety, and predictability, of manual cyclotorsion compensated Small Incision Lenticule Extraction (SMILE) in correction of myopic astigmatism.

Methods: A total of 93 eyes from 57 participants, with myopic astigmatism ranging from -0.5D to -2.0D, underwent SMILE using the Visumax 500 laser platform by a single surgeon. Preoperatively, 0-90-180 degree limbal axis marking on slit lamp was done using gravity assisted bubble marker, and intraoperatively, 0-180 degree mark was extended to optic zone, followed by matching of the limbal marking with reticule

on the screen of Visumax platform by rotating the suction plate after docking and before laser treatment for cyclotorsion compensation. Uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), spherical and cylindrical refractive errors, Pentacam parameters, iTRACE aberration values, intraoperative and postoperative complications were measured from baseline to 12-month follow-up.

Results: Preoperative mean spherical refractive error was $-3.64 \pm 1.16D$ and cylindrical error was $-0.84 \pm 0.32D$. Intraoperative rotation was unnecessary for 26% of eyes, and no eye experienced suction loss during rotation. At 12 months, the efficacy index was 0.98, safety index was 1, and predictability was high, with 100% of eyes within $\pm 0.25D$ of the target refractive astigmatism. Correction index of 0.99 to 1.01 and angle of error (1-2 degrees) was noted at various follow-up points.

Conclusions: Manual cyclotorsion compensated SMILE is safe, feasible, and effective for correction of low to moderate myopic astigmatism (up to -1.75D). It does not cause suction loss or complications from limbal marking and yields predictable outcomes using Visumax 500 laser system.

Abstract No.: 204866

Real-World Results of Phakic IOLs in Indian Myopes

First Author: Madhuvanthi MOHAN

Co-Author(s): Sujatha MOHAN

Purpose: To describe the demographics, refractive outcomes, and visual results of phakic intraocular lens (IOL) implantation performed at a tertiary eye care center over an 18-month period

Methods: A retrospective observational audit was performed of all patients undergoing phakic IOL surgery between February 2024 and September 2025. Data collected included number of procedures, laterality, lens type (spherical vs toric), and trends in procedure volume over time. Outcome measures included pre- and postoperative refractive error (spherical equivalent, cylinder) and uncorrected/best-corrected distance visual acuity (UDVA/BCVA). Safety events such as lens explantation, infection, or endothelial complications were also noted

Results: A total of 96 phakic IOL procedures were performed. Both spherical and toric phakic IOLs were implanted, with toric lenses accounting for a significant subset. At 3 months, the majority of patients achieved UDVA of 6/9 or better, with a high rate of refractive predictability ($\pm 0.50 D$ of target in most cases). Cylinder reduction was greater in the toric IOL group. No sight-threatening complications were observed; one explantation was documented. The majority of procedures were routine and uneventful

Conclusions: Phakic IOL implantation is a safe and effective option for correction of high myopia, providing excellent refractive accuracy and visual outcomes. This observational study highlights increasing uptake of the procedure in an Indian tertiary center, with good safety and high patient satisfaction

Abstract No.: 203965

Retreatment Using LASIK, PRK, or ICL for Myopic Regression After Corneal Laser Refractive Surgery

First Author: Miguel Roberto ANG

Co-Author(s): Robert Edward ANG, Zoe DOROY, James JACOMINA, Michelle QUINTO-ARANETA, Ryan TORRES

Purpose: To evaluate outcomes of retreatment for myopic regression after primary LASIK or PRK and to explore factors associated with pre-retreatment refractive error.

Methods: Retrospective cohort of eyes undergoing retreatment with LASIK, PRK, or ICL implantation after prior LASIK/PRK. Outcomes included UDVA, CDVA, MRSE, and safety and efficacy indices through 6–12 months. Associations between baseline factors and pre-retreatment MRSE were assessed.

Results: 158 eyes were included (136 LASIK, 12 PRK, 10 ICL). Early postoperative outcomes improved significantly for LASIK (UDVA 0.37 to 0.04 logMAR; MRSE -1.28 D to -0.12 D) and ICL (UDVA 0.68 to 0.03 logMAR; MRSE -2.72 D to 0.03 D). PRK also produced significant UDVA gains (0.63 to 0.06 logMAR). Efficacy and safety indices were near or above 1.0 across groups. A longer interval since primary surgery was significantly linked to more negative MRSE, consistent with greater regression. Mild correlation between pre-retreatment MRSE and age, initial MRSE, and tissue ablation were observed. Complications were low (7.9%).

Conclusions: Retreatment for myopic regression with LASIK, PRK, or ICL was safe and effective, with stable outcomes through 6–12 months. Regression was multifactorial and not predicted by baseline characteristics, though longer intervals between surgeries were significantly associated with greater myopic regression.

Abstract No.: 201967

Role of Vitamin D Containing Eye Drops in Reducing Post Photorefractive Keratectomy Haze

First Author: Meghavi PANDYA

Co-Author(s): Jatin ASHAR, Tanvi JAIN, Amit PATHAK, Prateek THANVI

Purpose: To study the role of Vitamin D (Vit D) in Eye Drops (E/D) in Post Photorefractive Keratectomy (PRK) in terms of healing time and haze

Methods: 50 patients undergoing PRK surgery were divided into 2 groups. Groups were matched in terms of age (18-35) & refractive error (Spherical equivalent -0.75 diopter (D) - -7 D). Postoperative protocol was Tapering dose of topical E/D Predforte1% (over 1 month), antibiotics for 1-week, Topical Cyclosporine 0.05% (without Vit D in group 1 and with Vit D in group 2) for 6 weeks & Sodium Hyaluronate 0.18% (without Vit D in group 1 and with Vit D in group 2) for 6 weeks. Postoperative time for epithelial healing, haze and comfort were studied.

Results: Post operative all patients had Uncorrected Visual Acuity (UCVA) $\geq 20/30$ at 1 week. Epithelial healing was in 4 days in group 1 and 3 days in group 2. Haze at 1 month was not seen in any patient in group 2 and in 4 patients in group 1. All patients in group 2 were comfortable by the end of 2nd day & 3rd day in group 1.

Conclusions: VitD promotes healing & reduces haze after PRK. Post PRK patient discomfort and pain due to poor and delayed healing in the post operative period is a major issue. Haze may lead to poor visual outcome. VitD promotes healing of the epithelium and decreasing haze. VitD containing drops may help to improve the outcomes in patients undergoing PRK.

Abstract No.: 205947

Safety, Efficacy and Predictability of Femto-Second Laser Assisted Keratomileusis and Transepithelial Photo-Refractive Keratectomy Using Different Optical Zones in Myopia and Compound Myopic Astigmatism

First Author: Jiji P VIJAYAN

Co-Author(s): Ramya SAMPATH

Purpose: To evaluate outcomes of different Optic zones, 6.3 and 7mm in Transepithelial keratectomy (TRANS PRK) and Femtosecond Laser-assisted in situ keratomileusis (FEMTO LASIK).

Methods: We retrospectively reviewed patients with myopia or myopic astigmatism, 22 eyes of 11 patients who underwent FEMTO LASIK surgery, and 24 eyes of 12 patients who underwent TRANS PRK surgery. Uncorrected visual acuity, pupil diameter, vertical coma, spherical aberration, and RMS HOA were evaluated. Efficacy index and predictability were calculated. The changes in Higher Order Aberrations were compared. The optic zone diameter was correlated with pupillary diameter and changes in higher-order aberrations. Patients' age, gender, optic zones, and ablation depth are collected from patients' records.

Results: The mean age was 24 years for FEMTO LASIK and 26 years for TRANS PRK. The efficacy index was found to be 0.945 in both groups. Predictability is the proportion of treated eyes with a postoperative refraction up to 0.50 diopters (D) within the target refraction, which is 68% in FEMTO LASIK and 92 % in

TRANS PRK. Postoprefraction less than -1.00D is found in 100%. The UCVA over 0.63 was 100% in two groups, 1 month and 3 months postoperatively. The change in vertical coma, spherical aberration, and higher-order aberrations was not statistically significant at 3 months in both groups. The higher-order aberrations were found to be lower with larger optic zones in both types of procedures.

Conclusions: Both 6.3 mm and 7 mm optic zones are safe and effective. Larger optic zones yield better HOA outcomes, supporting their use in refractive correction.

Abstract No.: 204865

Short-Term Outcomes of Femtosecond LASIK and SMILE in Myopia More Than -5D: A Consecutive Case Series

First Author: Madhuvanthi **MOHAN**

Co-Author(s): Sujatha **MOHAN**

Purpose: To compare early visual recovery and short-term outcomes of Femtosecond LASIK (FS-LASIK) and Small Incision Lenticule Extraction (SMILE) in patients undergoing refractive surgery for myopia more than -5D at a tertiary eye care centre.

Methods: A prospective, consecutive case series was conducted between January and March 2025. Patients undergoing FS-LASIK (n≈100 eyes) or SMILE (n≈90 eyes) were included. Preoperative refraction, uncorrected distance visual acuity (UDVA) on postoperative day 1 (POD1), and at 1 month were analyzed. Primary outcomes were the proportion of eyes achieving UDVA ≥6/6 at each timepoint and incidence of residual refractive error (<6/9). Astigmatism correction was assessed separately.

Results: On POD1, 82% of FS-LASIK eyes achieved UDVA ≥6/6 compared to 68% of SMILE eyes, reflecting faster visual recovery in the LASIK group. By 1 month, outcomes were comparable, with 98% of FS-LASIK and 96% of SMILE eyes achieving UDVA ≥6/6. Residual vision <6/9 persisted in 2% of FS-LASIK and 4% SMILE cases. Astigmatism correction was effective in both groups, with no significant difference in residual cylinder. No sight-threatening complications occurred.

Conclusions: Both FS-LASIK and SMILE provided excellent short-term visual outcomes in patients with high myopia. FS-LASIK offered faster early visual recovery, while SMILE matched outcomes by 1 month. At 1 month, >95% of eyes in both groups achieved UDVA ≥6/6, underscoring the high predictability and safety of modern corneal refractive surgery. SMILE may offer added biomechanical and ocular surface advantages, whereas FS-LASIK remains advantageous where rapid early rehabilitation is desired.

Abstract No.: 207383

Small Incision Lenticule Extraction Retreatment in a Patient With High Residual Refractive Error After Photorefractive Keratectomy: A Case Report

First Author: Vardhaman **KANKARIYA**

Purpose: To demonstrate the utility of SMILE as an enhancement tool.

Methods: A 36-year-old male underwent uneventful small incision lenticule extraction (SMILE) for the correction of his high residual refractive error 12 years after photorefractive keratectomy (PRK). Preoperatively, uncorrected distance visual acuity (UDVA) was counting fingers in both eyes. Corrected distance visual acuity was 20/20 in the right and 20/30 in the left eye due to amblyopia. One month after SMILE, UDVA was 20/20 and 20/30 in the right and left eye, respectively; post-PRK corneal haze had reduced. During the 4-year follow-up, UDVA remained stable and there were no complications. SMILE could be a good alternative approach for retreatment in post-PRK patients.

Results: One month after SMILE, UDVA was 20/20 and 20/30 in the right and left eye, respectively; post-PRK corneal haze had reduced. During the 4-year follow-up, UDVA remained stable and there were no complications. SMILE could be a good alternative approach for retreatment in post-PRK patients.

Conclusions: SMILE could be a good alternative approach for retreatment in post-PRK patient.

Abstract No.: 203953

Spherical Equivalent (SE) Outcomes After Suture Manipulation in Postoperative Deep Anterior Lamellar Keratoplasty (DALK) Patients

First Author: Dhilan **ELVITIGALA**

Co-Author(s): Chamika **DE SILVA**, Niruththan **KUMARAVADIVEL**, Dushyantha **WARIYAPOLA**

Purpose: The objective is to determine how pre- and post-suture manipulations, adherence to the concept of corneal coupling, and the timing of suture removal affect the Spherical Equivalent (SE) outcome.

Methods: This retrospective study involved 40 manipulations in 18 patients who underwent DALK from 2020 to 2021 for keratoconus. All the surgeries were performed by a single consultant eye surgeon using the big bubble (BB) technique at a single eye institute. All grafts were anchored to the host using 16 interrupted 10/0 nylon sutures. Data was obtained from hospital and patient records. Objective and subjective SE and mean K readings were monitored.

Results: The average time for suture removal was 12.71 ± 4.58 months, ranging from 6 to 20 months.

The mean pre-suture subjective SE was -1.55 ± 1.65 diopters, and the mean post-suture subjective SE was -1.56 ± 1.62 diopters. The mean pre-suture objective spherical equivalent (SE) was found to be -1.45 ± 2.27 diopters, while the mean post-suture objective SE was -1.61 ± 2.32 diopters. The average pre-suture mean K value was 44.90 ± 1.67 diopters, while the average post-suture mean K value was 44.88 ± 1.72 diopters.

Conclusions: The findings of this study demonstrate that the suture manipulation in DALK procedures adhered to the concept of corneal coupling. The results obtained from three key parameters, namely subjective SE, objective SE, and mean corneal K values, support this conclusion. Additionally, the study revealed that a longer waiting period before suture removal was associated with minimal changes in the spherical equivalent.

Abstract No.: 202512

Tear Biomarkers and Ocular Surface Response to Adjunct Topical Pirenixine After LASIK and PRK: A Randomized Controlled Trial

First Author: Phit **UPAPHONG**

Co-Author(s): Nattayaporn **APAIJAI**, Winai **CHAI DAROON**, Nipon **CHATTIPAKORN**, Siriporn **CHATTIPAKORN**, Napaporn **TANANUVAT**, Chanisa **THONUSIN**

Purpose: To evaluate the effect of adjunctive topical pirenixine (PRX) on tear biomarkers and ocular surface parameters following laser in-situ keratomileusis (LASIK) and photorefractive keratectomy (PRK).

Methods: This intraindividual eye-level randomized controlled trial assigned one eye to receive adjunctive 0.005% PRX eye drops four times daily from 14 days before surgery through six months after surgery, while the fellow eye received standard care alone. Tear fluid was collected at screening, surgical day, and at 1-day, 1-week, 1-month, 3-month, and 6-month follow-up visits for multiplex polymerase chain reaction analysis.

Results: A total of 24 PRK participants (48 eyes; mean age, 310.8 ± 6.0 years) and 22 LASIK participants (44 eyes; mean age, 32.3 ± 76.7 years) were included. In the LASIK group, PRX-treated eyes showed a significant reduction in tear monocyte chemoattractant protein-1 (MCP-1) at day 1 post-surgery (effect -90.18 ; 95% CI, -168.06 to -12.29). In the PRK group, MCP-1 was significantly reduced at month 6 (effect -83.66 ; 95% CI, -151.16 to -16.16). Interleukin-8 (IL-8) was also significantly decreased in LASIK eyes (effect -113.80 ; 95% CI, -227.21 to -1.62). Other biomarkers showed no significant differences, although most inflammatory cytokines demonstrated a downward trend with PRX. Clinical parameters, including tear breakup time, conjunctival hyperemia, and corneal staining, showed no significant differences, while central corneal stromal opacity revealed a nonsignificant trend toward reduction with PRX.

Conclusions: Adjunctive PRX therapy demonstrated mild anti-inflammatory effects by reducing MCP-1 and IL-8 after LASIK and PRK. However, these biochemical improvements were not accompanied by changes in clinical outcomes.

Abstract No.: 204030

The Kappa Conundrum: Comparison of Outcomes With Normal Versus Large Angle Kappa in SMILE - When Your Angle Throws a Tantrum

First Author: Sneha G V

Co-Author(s): Sriganesh, Sheetal **BRAR**

Purpose: To compare the visual and refractive results, induced aberrations, and objective scatter index in normal versus large angle kappa following SMILE performed with VisuMax 800 (SMILE Pro).

Methods: A total of 50 eyes from 50 patients undergoing SMILE Pro with VisuMax 800 were included for correction of myopia and myopic astigmatism. Eyes were divided into normal angle kappa (<0.5 mm), $n=25$ eyes, and large angle kappa (>0.5 mm), $n=25$ eyes. Docking and centration were achieved using the CentraLign-assisted centration aid. Intraoperative decentration value (in mm) was noted from the PDF of treatment planning after the surgery. Post-operatively, UDVA, Objective scatter Index (OSI), induced aberrations, and patient satisfaction were evaluated for both groups.

Results: The mean pre-op angle kappa value in the standard group was 0.07 ± 0.03 mm versus the large angle kappa group (0.52 ± 0.08 mm), $p < 0.001$. At the end of the 3-month follow-up, the number of eyes seeing 20/20 or better was 92% ($n=23$) and 88% ($n=22$) in the normal and large angle kappa groups, respectively. No eye in either group had a loss of 2 lines or more. All eyes in the normal and 96% ($n=24$) eyes in the large angle kappa group had post-op SE and cylinder predictability between ± 0.5 D. Intra-operative treatment decentration was significantly higher in the large angle kappa group (0.18 ± 0.07 mm) versus the normal angle kappa group (0.11 ± 0.08 mm), $p=0.01$.

Conclusions: CentraLign assisted centration resulted in favourable eye results with normal and large angle kappa. Irrespective of the pre-operative value of the angle kappa group, mean decentration in both groups was within 0.2 mm, without any differences in clinical outcomes and patient satisfaction.

Abstract No.: 205436**The Visual Quality of Patients With High Myopia After ICL V4c and Ray-Tracing Guided LASIK***First Author: Yanjia LI**Co-Author(s): Xuefei YANG, Huiqin ZHANG, Qian ZHANG, Bo ZHAO*

Purpose: The aim of this study is to compare visual quality outcomes of implantable collamer lens (ICL) V4c and ray-tracing guided femtosecond laser-assisted in situ keratomileusis (RT-LASIK) in patients with high myopia ($-6.00D < SEQ < -10.00D$).

Methods: In this prospective comparative study, 60 eyes from 32 patients who underwent ICL and 60 eyes from 30 patients who underwent RT-LASIK were included. Preoperative characteristics, including uncorrected distance visual acuity (UDVA), best-corrected distance visual acuity (BDVA), manifest refractive spherical equivalent (MRSE) and higher-order aberrations (HOAs) for a 4mm pupil (spherical aberration, coma, trefoil), were compared between the two surgical groups. Postoperative assessments at 3 months included measurements of UDVA, MRSE, HOAs, as well as the modulation transfer function (MTF) and point spread function (PSF) under a 4mm optical zone using OPD-Scan.

Results: The preoperative characteristics indicated no statistically significant differences ($p > 0.05$). At the 3-month postoperative follow-up, there were no statistically significant differences in UDVA, MRSE, MTF, PSF and root mean square (RMS) value of total ocular aberrations between the RT-LASIK and ICL groups ($p > 0.05$), indicating RT-LASIK provided comparable visual quality with ICL implantation. However, analysis of HOAs revealed significant differences between the RT-LASIK and ICL groups (0.184 ± 0.047 vs 0.118 ± 0.038 , $p < 0.05$). Specifically, trefoil and vertical coma were significantly different (0.012 ± 0.056 vs -0.045 ± 0.044 , $p < 0.05$) (-0.095 ± 0.078 vs -0.002 ± 0.060 , $p < 0.05$), while spherical aberration showed no significant difference (0.002 ± 0.054 vs 0.007 ± 0.035 , $p = 0.750$). However, analysis of HOAs revealed significant differences between RT-LASIK group and ICL group (0.184 ± 0.047 vs 0.118 ± 0.038 , $p < 0.05$). Specifically, trefoil and vertical coma were significantly different (0.012 ± 0.056 vs -0.045 ± 0.044 , $p < 0.05$) (-0.095 ± 0.078 vs -0.002 ± 0.060 , $p < 0.05$), while spherical aberration showed no significant difference (0.002 ± 0.054 vs 0.007 ± 0.035 , $p = 0.750$).

Conclusions: In this study, RT-LASIK, a corneal laser procedure, achieved postoperative visual quality comparable to that of ICL. This is likely because RT-LASIK does not introduce spherical aberration. Thus, both RT-LASIK and ICL represent viable and effective surgical options for patients with high myopia.

Abstract No.: 202481**Three-Month Visual Outcomes After PRESBYOND Laser Blended Vision: A Prospective Study***First Author: Yu-lun LO**Co-Author(s): Chao-kai CHANG, Chen-cheng CHAO, Tzu-te HU, Yu-ting JENG, Chia-yi LEE, I-hung LIN, Jia-hong LIU, Hsin-his WU*

Purpose: To report 3-month visual and refractive outcomes following PRESBYOND Laser Blended Vision

Methods: Methods: Three-month visual and refractive outcomes in 30 patients treated with PRESBYOND laser-blended vision micro-anisometropia were analyzed. Distance vision, intermediate vision (80cm, including DCIVA: distance-corrected intermediate visual acuity), near vision (40cm, including DCNVA: distance-corrected near visual acuity) and stereoacuity were recorded.

Results: Pre-op mean SE was -5.18 ± 1.79 D. Post-op: SE -0.18 ± 0.36 D (distance), -1.14 ± 0.54 D (near); 83% within ± 0.50 . CDVA: Pre-op $\geq 20/20$ in 100%, $\geq 20/16$ in 12%. Post-op binocular VA: UDVA $\geq 20/20$: 80%; $\geq 20/25$: 100%. UNVA $\geq 20/25$ ($\sim J1$): 70%; $\geq 20/40$ ($\sim J3$): 93%; $\geq 20/50$ ($\sim J5$): 100%. DCIVA improved from 0.14 ± 0.14 logMAR (Snellen 0.73) to 0.04 ± 0.14 logMAR (Snellen 0.90). ($p = 0.004$). DCNVA improved from 0.43 ± 0.20 logMAR (Snellen 0.38) to 0.29 ± 0.17 logMAR (Snellen 0.52) ($p = 0.002$). Five patients received retreatments; 15% of eyes lost 1 line of CDVA no eyes lost ≥ 2 lines. Post-op mean binocular UDVA was 0.02 ± 0.05 logMAR (Snellen 0.96). Mean binocular UIVA was 0.00 ± 0.09 logMAR (Snellen 1.00). Mean binocular uncorrected near visual acuity (UNVA) was 0.09 ± 0.13 logMAR (Snellen 0.81). Pre-op and post-op near-corrected stereoacuity was 34 and 36 seconds of arc ($p = 0.778$).

Conclusions: At 3 months, PRESBYOND achieved good binocular distance, intermediate, and near vision, while maintaining functional stereoacuity. Improvements in DCIVA and DCNVA reflect enhanced depth of focus, confirming PRESBYOND as a safe and effective presbyopia correction strategy.

Abstract No.: 201275**Visual Acuity Outcome After Femtosecond Lasik and Trans-Epithelial Photorefractive Keratectomy***First Author: Yulia PRIMITASARI*

Purpose: To compare the visual acuity outcome post femtosecond LASIK and Trans-PRK surgery.

Methods: This study was a retrospective. Visual acuity of pre-post Femtosecond LASIK and Trans-PRK surgery was retrospectively collected from medical records from 2022 to 2024. Femtosecond LASIK was performed using the usual technique using Ziemer Z8 for flap formation and Schwind 750Hz for excimer laser, while

Trans-PRK was performed using Schwind 750Hz and mytomicin c was given at the end of the operation. All patients had spherical equivalent more than -5 Diopter. We compared the visual acuity between the two techniques after D-1, D-7 and D-30 post operatively.

Results: Twenty-four eyes from 15 patients had been performed Trans-PRK, whereas 44 eyes from 25 patients had femtosecond LASIK surgery. The mean spherical equivalent was -9.76D and -7.7D before Trans-PRK and femtosecond LASIK respectively. The mean visual acuity at day-1, day-7 and day-30 after surgery were 0.5, 0.8 and 0.9 for Trans-PRK and 0.9, 0.9, 0.9 for femtosecond LASIK. Despite the difference in visual acuity on the first and seventh days post operatively, there was no significant difference at 30 days after the procedure. Additionally, there was also no significant difference in residual corneal thickness in both procedures.

Conclusions: There is no significant difference in postoperative visual acuity outcome between Trans-PRK and femtosecond LASIK surgery. Since the visual acuity outcome are not significantly different from the two techniques, Trans-PRK could be considered as an option in certain conditions such as thin corneas or very high myopia.

Retina (Medical)

Abstract No.: 205958

3-Arm Comparison of Aflibercept 2mg (Eylea), Aflibercept 8mg (Eylea HD), and Faricimab (Vabysmo) in the Treatment of Diabetic Macular Oedema (DMO)

First Author: Samantha KITSON

Co-Author(s): Zora DAI, Steven TOH

Purpose: To compare efficacy and safety of aflibercept 2mg (aflibercept-L), aflibercept 8mg (aflibercept-H), and faricimab 6mg in treatment-naïve and switched diabetic macular edema (DMO) patients, addressing the lack of real-world direct comparative data.

Methods: A retrospective study at Princess Alexandra Hospital (Jan 2023–Jun 2025) analyzed DMO patients treated with aflibercept-L, aflibercept-H, or faricimab.

Results: The study included 113 patients (198 eyes): 80 eyes (aflibercept-L), 42 eyes (aflibercept-H), and 76 eyes (faricimab). Mean ages were similar (60 ± 13 , 63 ± 10 , 64 ± 9 years). Treatment duration was shortest for aflibercept-H (24 ± 6 weeks) compared to aflibercept-L (54 ± 33 weeks) and faricimab (50 ± 24 weeks). Percentages of treatment-naïve patients with 70% ($n=56$) vs 36% ($n=15$) vs 30% ($n=23$) respectively. Mean VA improvements were comparable across groups (-0.08 ± 0.38 vs -0.08 ± 0.39 vs -0.03 ± 0.39 logMAR; $p=0.757$). Mean CST reductions were also

similar ($-80 \pm 147 \mu\text{m}$, $-44 \pm 124 \mu\text{m}$, $-68 \pm 122 \mu\text{m}$; $p=0.395$). Faricimab had the highest treatment cessation rate (13%, $n=10$) compared to aflibercept-L (8%, $n=6$) and aflibercept-H (0%). Resolution of IRF was highest in faricimab (29%, $n=21$) versus aflibercept-L (23%, $n=18$) and aflibercept-H (9%, $n=3$). SRF resolution rates were 100% ($n=12$), 33% ($n=2$), and 54% ($n=7$) for aflibercept-L, aflibercept-H, and faricimab, respectively. Three cases of new diabetic vitreous hemorrhage occurred in the aflibercept-L group, none in others.

Conclusions: Aflibercept-L, aflibercept-H, and faricimab provide comparable VA and CST improvements and extended treatment intervals. Faricimab may offer higher treatment cessation rates and better anatomical outcomes compared to aflibercept-H.

Abstract No.: 207469

A 3D-Bioprinted in Vitro Model for Retinal Vascular Coupling

First Author: Jian ZHAO

Co-Author(s): Xinyuan ZHANG

Purpose: This study aims to develop a biomimetic, three-dimensional in vitro model for retinal vascular coupling using digital light processing (DLP) bioprinting technology, establishing an experimental platform to explore the pathogenesis of retinal vascular diseases.

Methods: Rat retinal microvascular endothelial cells (REC) and retinal ganglion cells (RGC) were co-encapsulated within a hydrogel scaffold via DLP bioprinting to create the 3D co-culture model. The model's mechanical properties, including Young's modulus and pore structure were evaluated using mechanical testing and scanning electron microscopy, respectively. After 72 hours of culture in complete medium with normal glucose (5.5 mM), cell morphology and spatial distribution were observed under optical and fluorescence microscopy. Cell viability was assessed using Calcein-AM/PI staining.

Results: The 3D in vitro model exhibited a Young's modulus comparable to the native inner retinal layer, with uniformly distributed pores. Microscopic observation revealed an interconnected network of RGC-REC cells, with cell viability greater than 90%.

Conclusions: The 3D in vitro model successfully created a structurally biomimetic and cytocompatible 3D-bioprinted retinal vascular coupling model. This model provides a reliable in vitro platform for investigating the pathogenesis of retinal diseases.

Abstract No.: 206151**A Case Report of Bilateral Bullous Central Serous Chorioretinopathy***First Author: Van Nam Phuong PHAN**Co-Author(s): Quoc Tung MAI*

Purpose: To report the diagnosis and treatment of a patient with bilateral bullous central serous chorioretinopathy (CSCR).

Methods: A case report.

Results: A 43-year-old female, a self-employed trader, complained of visual loss in both eyes for 5 months. She reported no medical history. In the systematic review, she reported having emotional distress related to family issues for 6 months. She was diagnosed with Vogt-Koyanagi-Harada disease in the right eye at another center and received a bolus of intravenous methylprednisolone for 3 days. In the initial visit, she was taking oral Medrol with a dose of 32 mg/day and Cellcept 500 mg/day. After the treatment, she noticed the gradual reduced vision in both eyes. The best-corrected visual acuity (BCVA) was 20/160 in both eyes. The anterior segment, intraocular pressure, and confrontation visual field were unremarkable. The fundus examination showed the bullous retinal detachment inferiorly and extending to the macula in both eyes. Multiple subretinal fibrin and pigment epithelial detachments in the posterior pole were confirmed by optical coherence tomography. On the fluorescein angiography imaging, many leakage points were significantly detected. The fundus autofluorescence was used to evaluate the content of subretinal fluid. Accordingly, the patient was diagnosed with bilateral bullous CSCR as well started oral Spironolactone 50 mg per day and gradually tapered oral Medrol. At the 6-week follow-up, the patient showed better BCVA, and subretinal fluid was partially resolved.

Conclusions: Bullous CSCR is a rare variant of chronic CSCR and requires several differentiations. The timely diagnosis is crucial for appropriate treatment.

Abstract No.: 203924**A Case of Hypertensive Uveitis With Intravitreal Faricimab***First Author: Samantha KITSON**Co-Author(s): Andrew MCALLISTER*

Purpose: To report a novel case of hypertensive uveitis with intravitreal faricimab.

Methods: This is a case report. A 69-year-old woman undergoing treatment of bilateral diabetic macular edema with intravitreal faricimab presented for routine review. Ophthalmic examination was performed, including VA, intraocular pressure, gonioscopy, and slitlamp examination. Findings consistent with

hypertensive uveitis prompted further infectious/inflammatory/infiltrative uveitis screen.

Results: The patient developed hypertensive uveitis in the left eye (four weeks after the third injection) with an intraocular pressure of 42 mmHg. Slitlamp examination revealed fine keratic precipitates and mild anterior uveitis. Anterior chamber angle was open on gonioscopy, and there was no vitritis or vasculitis. At the review a week later, the patient had developed hypertensive uveitis in the right eye (six weeks after the fourth injection) with intraocular pressure of 35 mmHg. Slitlamp examination revealed fine keratic precipitates, open angles, and mild vitritis. There was no vasculitis. At both presentations, the patient had preserved VA with no significant visual symptoms. The hypertensive uveitis resolved in both eyes with a course of steroid and antihypertensive eye drops. The uveitis screen was negative apart from elevated urine protein (negative beta-2 microglobulin), which could be explained by known diabetes and hypertension.

Conclusions: Hypertensive uveitis is a potential adverse reaction to intravitreal faricimab. This case highlights the importance of monitoring intraocular pressure in patients undergoing treatment with faricimab and emphasizes the need for reporting other cases in the community.

Abstract No.: 204892**A Case of Intraocular Metastasis From Lung Cancer***First Author: Lifeng QIAO**Co-Author(s): Huaqin XIA*

Purpose: To report a rare case of intraocular metastasis originating from lung cancer.

Methods: The patient was diagnosed with lung adenocarcinoma four years ago and had been receiving ongoing targeted therapy combined with chemotherapy. The current diagnosis was stage IV left lung adenocarcinoma with malignant pleural effusion. The patient presented to our outpatient department with a one-month history of decreased vision in the right eye.

Results: The visual acuity of the right eye was Hand Motion (HM). B-scan ultrasonography revealed multiple solid masses on the wall of the right eyeball, protruding into the vitreous cavity. Scanning Laser Ophthalmoscopy (SLO) showed two large subretinal solid masses located in the nasal and inferotemporal regions, bulging towards the vitreous cavity. Ultrasonography indicated the dimensions of the larger mass were approximately 15 x 11 mm. Contrast-enhanced ultrasonography demonstrated hypervascular tumoral lesions with partial necrosis.

Conclusions: The findings were consistent with intraocular metastasis from lung cancer. The patient

was advised to consult the oncology department for continued systemic anti-tumor therapy.

Abstract No.: 206621

A Case of Iridofundal Coloboma With Ocular Toxoplasmosis

First Author: Sehajbir PANNU

Co-Author(s): Jayant SHARMA

Purpose: To diagnose a case of a young male with unilateral blurring of vision.

Methods: A 25-year-old male presented with blurring of vision in right eye with V/A of right eye PL+ve, PR +ve since 25 days not associated with floaters or photophobia Patient also complains of redness and heaviness in right eye since 7 days H/O of diminished vision in right eye since childhood for which he went government medical college when he was 10 years old where he was educated of congenital malformation in right eye.

Results: Slit lamp examination: mild diffuse conjunctival congestion, A/C cells 2+, flare 1+, typical iris coloboma @ 5 o'clock, ear drop shaped pupil, multiple lenticular opacities in peripheral cortex, lens zonules absent inferiorly, dilated fundus examination: vitreous haze grade 3, whitish yellow patch of about 2DD with fluffy margins at 1DD away from disc present along the supratemporal arcade, few peripapillary lesion, haemorrhages present, perivascular sheathing, infiltrates along the vessels, fundal coloboma type 7. Findings: OCT macula - inflammation of retina, flattening of foveal region without any subretinal fluid, fundus photography of lesions and coloboma, TOXO-IGM: positive.

Conclusions: Iridofundal coloboma with ocular toxoplasmosis.

Abstract No.: 202532

A Case of Multifocal Posterior Pigment Epitheliopathy Associated With Choroidal Detachment

First Author: Mai HONDA

Co-Author(s): Kota ARAI, Kokoro KONUMA, Tadashi NAKANO, Shunpei OGAWA, Daisuke SHINOHARA

Purpose: To report a rare case of multifocal posterior pigment epitheliopathy (MPPE) complicated by choroidal detachment (CD).

Methods: Case report.

Results: A 58-year-old male with chronic myeloid leukemia (CML) under nilotinib was referred following unsuccessful steroid therapy for suspected Vogt-Koyanagi-Harada disease. He presented with blurred vision in the right eye, with best-corrected visual acuity of 0.5 in the right and 0.9 in the left. Fundus examination revealed circumferential peripheral CD and serous retinal detachment (SRD) in the right eye,

and retinal pigment epithelium (RPE) abnormalities in the left eye. Fluorescein angiography (FA) revealed multiple posterior exudative spots with active leakage. The axial length was 24 mm with no scleral thickening. Although CD is atypical, the findings were consistent with those of MPPE, and retinal photocoagulation was performed at the leakage points. Subsequently, the SRD worsened, leading to the discontinuation of nilotinib owing to its possible contribution. Additional FA-guided laser treatment was applied to the persistent leakage sites. Three months later, both the SRD and CD demonstrated marked improvements. Complete resolution was achieved at 5 months, with visual recovery in the right eye.

Conclusions: Although the potential role of nilotinib cannot be excluded, the clear therapeutic response to photocoagulation strongly supports MPPE as the primary pathology. This case highlights the fact that MPPE may require repeated FA-guided laser treatments for effective management, even in the presence of atypical findings such as CD.

Abstract No.: 200399

A Curious Case of Juvenile Retinoschisis: A Case

First Author: Kashish MODI

Co-Author(s): Amit MEHTANI, Ropfuleno PESEYIE

Purpose: Evaluating X-linked recessive inheritance of Retinoschisis in a family.

Methods: Patient's subjective and objective refraction was done, slit lamp bio microscopy was done to rule out any media opacities, fundus examination was done, and SD-OCT OU was performed.

Results: 3 males in the family were affected by retinoschisis.

Conclusions: X-linked recessive retinoschisis runs in the family, precautionary treatment to avoid RD in the late stages was explained.

Abstract No.: 205991

A Curious Case of Retinal Angiomatous Proliferation in a 34-Year-Old Treated With Intravitreal Bevacizumab

First Author: Dimitra Novalita TENDRA

Co-Author(s): Grimaldi IHSAN, Erwin ISKANDAR, Arief KARTASASMITA, Rova VIRGANA, Made Indra WIDYANATHA

Purpose: Retinal angiomatous proliferation (RAP) is a challenging subtype of neovascular age-related macular degeneration characterized by intraretinal neovascularization that may progress to subretinal and choroidal involvement. Anti-VEGF therapy is the cornerstone of RAP management. I present a case of RAP treated with intravitreal bevacizumab

monotherapy, demonstrating the efficacy of this anti-VEGF agent in treating this complex retinal condition.

Methods: Case report.

Results: A 34-year-old woman presented with central blurred vision in her right eye. The ophthalmological examination showed visual acuity of 1.0 log 2 for the right eye and 0.6 log 25 for the left eye. The right eye examination revealed intraretinal hemorrhage at the fovea and an intraretinal hyperreflective lesion on OCT, with a focal vascular tuft on OCTA. The left eye was normal. She was diagnosed with Retinal Angiomatous Proliferation (RAP) Stage I on the right eye and treated with a single intravitreal bevacizumab (1.25 mg/0.05 mL) injection. At three-week follow-up, the visual acuity of the right eye improved to 0.6 log 25, hemorrhage resolved, and OCTA showed decreased vascular flow, indicating a positive response to treatment.

Conclusions: This case demonstrates the management of retinal angiomatous proliferation with a single intravitreal bevacizumab. The treatment resulted in visual acuity improvement and anatomical resolution of the lesion. These findings support the use of anti-VEGF therapy, specifically bevacizumab, as an effective first-line treatment option for RAP lesions, providing both functional and anatomical benefits.

Abstract No.: 200526

A Dose-Response Study of Same-Day Bilateral Subtenon Triamcinolone in Diabetic Macular Edema

First Author: Milka **MAVIJA**

Co-Author(s): Sanela **BURGIĆ**, Bojana **MARKIĆ**, Miljana **TEPIĆ POPOVIĆ**, Biljana **TOPIĆ**

Purpose: To compare the efficacy and safety of posterior subtenon injections (STI) of triamcinolone acetonide in doses of 0.5 mL (20 mg) and 1 mL (40 mg) in the treatment of diabetic macular edema (DME) with features of clinically significant macular edema (CSME) and numerous hard exudates.

Methods: This prospective study included 60 patients (120 eyes) with type 2 diabetes and bilateral CSME. Each patient received a 0.5 mL STI dose in one eye and a 1 mL dose in the fellow eye, on the same day. None had prior laser, anti-VEGF, or corticosteroid treatment. Best-corrected visual acuity (BCVA), intraocular pressure (IOP), and optical coherence tomography (OCT) parameters—including central macular thickness (CMT), intraretinal fluid (IRF), subretinal fluid (SRF), and hyperreflective foci (HRF)—were assessed at baseline and at 2, 4, 8, and 12 weeks post-injection.

Results: Both doses led to significant improvements in BCVA and reductions in OCT biomarkers. The 1 mL group showed greater functional and anatomical improvement: BCVA improved from 55 to 80 letters vs. 55 to 70 letters in the 0.5 mL group. CMT decreased from $386 \pm 48 \mu\text{m}$ to $312 \pm 35 \mu\text{m}$ (1 mL), and from

$375 \pm 53 \mu\text{m}$ to $322 \pm 41 \mu\text{m}$ (0.5 mL). IOP remained stable in the 0.5 mL group but increased in the 1 mL group (from $15.3 \pm 4.5 \text{ mmHg}$ to $20.6 \pm 3.0 \text{ mmHg}$).

Conclusions: Both STI doses are effective for DME. The 1 mL dose provides greater visual and structural benefit but carries a higher risk of IOP elevation, requiring close follow-up.

Abstract No.: 207259

A Macular Masquerade: Diagnostic Dilemma in Bilateral Focal Choroidal Excavation

First Author: Subhangi **SAHU**

Co-Author(s): Shreya **BHADANI**, Manmath Kumar **DAS**

Purpose: To describe a rare case of bilateral focal choroidal excavation (FCE) in a healthy young female.

Methods: A 19-year-old female presented with central scotoma in the right eye for 2 years and in the left eye for 2 months. Best corrected visual acuity (BCVA) was 6/9, N8 in the right eye and 6/6, N6 in the left. Colour vision and contrast sensitivity were normal bilaterally. Anterior segment examination was unremarkable. Fundus examination revealed vitelliform deposits at the fovea with surrounding retinal pigmentary epithelium (RPE) hypertrophy.

Results: Optical coherence tomography (OCT) demonstrated bilateral focal choroidal excavation along with RPE hypertrophy in both eyes. Fundus fluorescein angiography (FFA) revealed subfoveal blocked fluorescence of the choroid and surrounding RPE window defects in both eyes. Based on imaging, a diagnosis of bilateral non-conforming type FCE was made.

Conclusions: Focal choroidal excavation is typically unilateral and often detected incidentally. Bilateral FCE in a young, otherwise healthy individual is exceedingly rare. Multimodal imaging (OCT and FFA) was critical to confirm the diagnosis despite minimal symptoms. Clinicians should be aware of such atypical bilateral presentations, as FCE can be associated with pachychoroid spectrum disorders, central serous chorioretinopathy, choroiditis, or secondary choroidal neovascularization. Careful long-term follow up is essential to detect potential complications

Abstract No.: 201578

A Pilot Study of Scleral Thickness in Polypoidal Choroidal Vasculopathy (PCV)

First Author: Worathon **KULROTWICHIT**

Co-Author(s): Supathida **JIAMSAWAD**, Nopasak **PHASUKKIJWATANA**, Thanchanit **SAWETRATANASTIEN**

Purpose: To evaluate scleral thickness in patients with polypoidal choroidal vasculopathy (PCV) compared to age-matched normal controls and explore its correlation with choroidal thickness.

Methods: In this prospective cross-sectional pilot study, 30 eyes with PCV and 30 normal age-matched control eyes were enrolled. Scleral thickness was measured using swept-source anterior segment optical coherence tomography (SS-AS OCT) at 6 mm posterior to the scleral spur in four quadrants (nasal, temporal, superior, and inferior), and at 10 mm posterior to the scleral spur in the temporal quadrant only. Choroidal thickness was measured using spectral-domain OCT with enhanced depth imaging. Intraclass correlation coefficients (ICCs) were calculated to assess intra- and inter-rater reliability.

Results: There was no statistically significant difference in mean scleral thickness between the PCV and control groups in any of the measured quadrants (all $p > 0.05$). Although the temporal sclera at 10 mm showed a numerically greater thickness in PCV eyes, the difference did not reach statistical significance. Intra-rater and inter-rater ICCs exceeded 0.75 for all measured parameters, indicating good reliability. No statistically significant correlation was found between choroidal and scleral thickness in any of the measured quadrants (all $p > 0.05$).

Conclusions: Although eyes with PCV tended to exhibit increased scleral thickness in certain quadrants, these differences were not statistically significant relative to controls. No correlation was found between scleral thickness and mean choroidal thickness. Further studies are needed to clarify whether scleral thickness contributes to Polypoidal Choroidal Vasculopathy disease pathogenesis.

Abstract No.: 205879

A Rare Case of Retinitis Pigmentosa Sine Pigmento in a 21-Year-Old Filipino Female Initially Diagnosed As Idiopathic Intracranial Hypertension

First Author: Pauline Gabrielle **LACSAMANA**

Co-Author(s): Marie Joan **LOY**, Buenjim **MARIANO**

Purpose: To present a rare case of Retinitis Pigmentosa sine pigmento (RPSP) initially presenting as idiopathic intracranial hypertension, emphasizing the diagnostic challenge posed by the absence of typical retinal pigmentation.

Methods: A 21-year-old female presented with bilateral peripheral visual loss. Visual acuity was 20/20 and Ishihara score was 9/11 in both eyes. Anterior segment findings and intraocular pressures were unremarkable. Fundoscopy showed mild optic disc elevation with preserved margins and absence of vessel obscuration. Fundus photos revealed retinal mottling and lattice degeneration bilaterally. Perimetry demonstrated severe generalized depression with preserved paracentral islands of vision. Fluorescein angiography revealed late disc staining, diffuse patchy hyperfluorescence, and peripheral perivascular leakage. Optical coherence tomography (OCT) showed

global thinning of macular ganglion cell and inner plexiform layers. Brain MRI was unremarkable.

Results: Despite the absence of classic bony spicule pigmentation, the constellation of functional and structural findings led to a diagnosis of RPSP. The patient's presentation highlighted the diagnostic complexity of atypical RP variants, particularly in young patients without overt fundus pigmentary changes.

Conclusions: RPSP can mimic other neuro-ophthalmic conditions and may delay appropriate management due to its subtle retinal appearance. Clinicians must maintain a high index of suspicion in patients with peripheral vision loss, even in the absence of pigmentary changes. Ancillary tests such as electroretinography and genetic analysis are valuable in confirming the diagnosis. While no definitive cure exists, early diagnosis enables initiation of supportive measures including vitamin A and lutein supplementation, and close monitoring to potentially slow disease progression.

Abstract No.: 200855

A Rare Constellation: Diabetic Ketoacidosis, Rhino-Orbital Mucormycosis, Cherry-Red Spot, and Viral Infection in a Single Patient

First Author: Drishti **KAUSHAL**

Co-Author(s): Anerudh **MATHUR**, Arushi **RATTAN**, Ram Lal **SHARMA**

Purpose: Early identification of Diabetic ketoacidosis to prevent deadly complications in a patient also positive for a deadly virus.

Methods: detailed history taking and thorough clinical evaluation of the patient.

Results: This case highlights the potential for simultaneous occurrence of multiple severe pathologies in immunocompromised patients. Early recognition and multidisciplinary management are critical to improving outcomes.

Conclusions: This case underscores the need for high clinical suspicion for mucormycosis in diabetic patients presenting with acute ocular symptoms, especially in the presence of DKA and other immunosuppressive conditions. Coexistent CRAO and chronic HBV infection pose additional diagnostic and therapeutic challenges.

Abstract No.: 206220

A Therapeutic Challenge: Managing Vitreous Hemorrhage After AAPFV Surgery in a Child

First Author: Jia **YANG**

Co-Author(s): Yu **TIAN**

Purpose: To establish an optimal, cost-effective approach for the pharmacological management of vitreous hemorrhage post-surgery in infants.

Methods: A case report.

Results: A 79-day-old male infant presented with a grayish discoloration of the left pupil for 10 days. Key findings included conjunctival injection, corneal edema, complete angle closure and an increased IOP in the left eye. The infant was diagnosed with secondary angle-closure glaucoma and pupillary seclusion in the left eye. Since fundus examination of his right eye was unremarkable, AAPFV was highly suspected as the cause. To prevent vision loss and deprivation amblyopia, surgery is necessary. We did excision of the rigid fibrovascular membrane, pupilloplasty, peripheral iridectomy and anterior chamber reconstruction for him. No signs of intraocular hemorrhage. However, he developed vitreous hemorrhage 10 days after surgery, which had worsened by one month postoperatively, requiring further management. Should vitrectomy be performed immediately to avoid deprivation amblyopia? In our previous clinical experience, our department successfully managed submacular hemorrhage in leukemia children by intravitreal injection of recombinant tissue plasminogen activator (rt-PA), with promising results. We therefore flexibly adopted intravitreal rt-PA injection for this infant. Follow-up examination showed near-complete resolution of the vitreous hemorrhage and a good ocular condition. Aggressive refractive correction and amblyopia therapy were initiated with good OCT results, and the infant continues to be followed up.

Conclusions: The use of intravitreal rt-PA established a treatment that prevented the injuries and expenses associated with a second vitrectomy. This case of AAPFV is instrumental in showcasing a new pharmacological strategy for pediatric postoperative vitreous hemorrhage.

Abstract No.: 201628

A Twisting Tale: Bartonella Panuveitis Masquerading as Endophthalmitis in a Patient With Ankylosing Spondylitis

First Author: Ru Bin **SEAH**

Co-Author(s): Hanizasurana **HASHIM**, Nurnadia **KAMARUDDIN**, Nazima **SHADAHT ALI**, Justin Dieu Siang **YEAH**

Purpose: To report a case of Ocular Bartonella panuveitis with successful therapeutic vitrectomy in a patient with Ankylosing Spondylitis.

Methods: Case report.

Results: A 46-year-old Chinese man with underlying ankylosing spondylitis was referred from a private practice with 1 1-week history of eye pain and redness. He denied having a fever. The uveitic history was unremarkable except for having a vaccinated cat at home and no history of cat scratch. He was diagnosed with ankylosing spondylitis at 20 but never required steroids or immunosuppressants. He had good postoperative vision following left eye cataract surgery. Oral Prednisolone 15 mg OD and a topical steroid

were started by the treating ophthalmologist, but no clinical improvement was observed. Left eye vision was counting fingers on presentation. Examination showed signs of panuveitis. There was severe fibrinous uveitis with 4+ cells in the anterior chamber, an IOP of 15, and dense vitritis precluding fundal view, supported by B scan findings. Patient was treated as endogenous endophthalmitis initially with intravitreal tap and antibiotic injections until the Bartonella IgM serology was detected positive. He subsequently underwent therapeutic vitrectomy. Post-operatively, he was started on oral doxycycline for six weeks and tapering prednisolone regime. Other investigations, including infective screening, inflammatory markers, and intra-operative cultures, were negative. The vision improved dramatically to 6/9 two weeks post-operation.

Conclusions: Ocular Bartonella panuveitis can present as severe inflammation mimicking endophthalmitis. Early therapeutic vitrectomy should be considered, as it offers a promising visual outcome and alleviates patient distress.

Abstract No.: 200514

Acute Choroidal Neovascularization in a 16-Year-Old Female With High Myopia: A Rare Case Report

First Author: Syeda Ghazala **SHAHNAWAZ**

Purpose: Timely management of acute choroidal neovascularization (CNV) in a 16-year-old female with high myopia, presenting with sudden visual disturbance.

Methods: A 16-year-old highly myopic female (-22.00 diopters spherical [DS] both eyes) presented with sudden onset of a black spot and blurred vision in the right eye for 12 hours. Unaided visual acuity (VA) was 6/60 in both eyes, improving to 6/6 with correction. Anterior segments were normal. Fundoscopy showed myopic degenerative changes and a dark lesion near the right macula. Optical coherence tomography (OCT) revealed central macular edema >350 µm bilaterally. Topical nepafenac was initiated. Optical coherence tomography angiography (OCT-A) confirmed active CNV in the right eye. Intravitreal ranibizumab was administered within 48 hours.

Results: Next-day follow-up showed stable VA with no signs of endophthalmitis. At four weeks, best-corrected visual acuity (BCVA) was 6/24 in both eyes. Fundoscopy showed near-complete CNV regression with minimal neovascular remnants. A second intravitreal injection (bevacizumab) was given on day 40. OCT-A after one week showed complete CNV resolution. Final BCVA improved to 6/9 in both eyes with high myopic correction (-25.00 DS right eye, -22.00 DS left eye).

Conclusions: Acute CNV in teenagers with high myopia is extremely rare. Early diagnosis using OCT-A and timely anti-vascular endothelial growth factor

(anti-VEGF) therapy led to excellent anatomical and functional outcomes. This case highlights the importance of early diagnosis, imaging and treatment in high-risk young patients.

Abstract No.: 207064

Advances in Understanding and Treating Central Serous Chorioretinopathy

First Author: Xinyuan ZHANG

Purpose: characterized by idiopathic focal serous detachment of the neural retina and/or retinal pigment epithelium (RPE) in the posterior pole. In the recent 15 years, with the development of advanced imaging techniques such as optical coherence tomography (OCT), a novel concept of pachychoroid spectrum disorder (PCD), has been described. This comprehensive review aims to highlight the currently available evidence on the pathogenesis, diagnosis, multimodality imaging features, and management strategies, including recent findings related to CSCR.

Methods: PubMed, Medline, Springerlink, the Cochrane Library, Google Scholar, and EMBASE Medline database from the year 1990 to November 28, 2022, have been searched to retrieve English articles with the following key terms: «central serous chorioretinopathy», «central serous retinopathy», «chorioretinopathy», «central serous retinopathy» and «CSCR». The search is limited to the terms «epidemiology» or «risk factors» or «pathogenesis»; or «management» or «treatment» or «trial» or «randomized» to focus on the findings of randomized clinical trials, cohort studies, meta-analyses, reviews, and technological advancements in the past decade.

Results: We highlighted the currently available evidence on the pathogenesis, diagnosis, multimodality imaging features, and management strategies, including recent findings related to CSCR.

Conclusions: CSCR is continuously updated based on the understanding of the pathogenesis of pachychoroidal spectrum disorder and venous overload choroidopathy.

Abstract No.: 205518

Alagille Syndrome Diagnosed by a Novel Pathogenic JAG1 Mutation: A Case Report

First Author: Kejia YUAN

Co-Author(s): Yun LI

Purpose: ALGS (Alagille syndrome) is a rare autosomal dominant genetic disorder affecting multiple organs. Primarily caused by mutations in the JAG1 or NOTCH2 genes. To report the ocular and systemic manifestations of a pediatric case of ALGS caused by a novel frameshift mutation in the JAG1 gene.

Methods: A case report of a 6-year-old boy presenting with reduced bilateral visual acuity for over two years.

The diagnosis was established through comprehensive ophthalmic and systemic evaluations, followed by NGS (next-generation sequencing) and Sanger sequencing of the patient and his parents.

Results: Ophthalmic examination revealed high myopia and central retinal pigmentary changes. Systemic evaluation identified hepatomegaly, jaundice, abnormal liver function, hypercholesterolemia, xanthomas, aortic stenosis, patent foramen ovale, and growth retardation. NGS and Sanger sequencing identified a novel heterozygous frameshift mutation in the JAG1 gene: c.2493_2500delinsCACCTTG/ p.Gly832ThrfsTer7. This variant was absent in population databases and predicted to be pathogenic by bioinformatics analysis. Parental testing revealed no detectable mutation, suggesting germline chimerism or a de novo event. The diagnosis of ALGS was confirmed based on the characteristic clinical features and genetic findings.

Conclusions: This case highlights a novel pathogenic JAG1 mutation underlying ALGS. It underscores the importance of a multidisciplinary approach for children presenting with ocular anomalies (such as posterior embryotoxon or retinal pigmentary changes) accompanied by systemic signs like cholestasis or cardiac defects. Genetic testing is crucial for definitive diagnosis, as novel mutations can occur.

Abstract No.: 201462

An Aggressive Masquerade Mimicking Invasive Fungal Sinusitis

First Author: Zhen Ning LOW

Co-Author(s): Nor Azita AHMAD TARMIDZI, Yie Ping CHIN, Michael Dau Bing NGU

Purpose: To report a case of atypical presentation of plasmablastic lymphoma with orbital, sinonasal and marrow involvement.

Methods: Case report.

Results: A 44-year-old man with diabetes presented with two days of reduced vision and painless swelling of the left eye (LE), accompanied by intermittent fever and 5 kg weight loss over one month. LE vision was 6/30 with a relative afferent pupillary defect. Anterior segment was unremarkable apart from conjunctival injection. Fundus examination revealed cotton wool spots and flame-shaped haemorrhages at the posterior pole, with normal vessels, a pink optic disc (cup-disc-ratio 0.3), and a superotemporal choroidal mass measuring two-disc diameters. Orbital and brain computed tomography demonstrated posterior orbital wall thickening, a retrobulbar soft tissue lesion with perineural enhancement, bulky lacrimal gland, and sinonasal lesions with cavernous sinus involvement, suggestive of invasive fungal sinusitis. Multidisciplinary inputs from otolaryngology and infectious disease were sought. Nasal endoscopy showed diffuse mucosal

swelling and sloughing. He was treated for invasive fungal sinusitis. Despite treatment, his condition deteriorated, with vision declining to hand movements, bilateral proptosis, severe chemosis, subconjunctival haemorrhage, exudative retinal detachment, and progression of the choroidal mass. Further workup showed pancytopenia, retroviral positivity, Epstein–Barr virus positivity, and Salmonella bacteraemia. Bone marrow biopsy confirmed plasmablastic lymphoma. He was referred for urgent radiochemotherapy but subsequently succumbed to the illness.

Conclusions: Plasmablastic lymphoma with orbital involvement can mimic infection or inflammation. Early biopsy and multidisciplinary collaboration are crucial for timely diagnosis and treatment.

Abstract No.: 205432

Association Between Glaucoma and Retinal Vein Occlusion: Evidence From Real-World Big Data

First Author: Fang Yu **LIN**

Co-Author(s): Cheng Kuo **CHENG**

Purpose: To evaluate the association of retinal vein occlusion in glaucoma patients.

Methods: Data were drawn from 127 healthcare organizations within the TriNetX platform, a de-identified electronic health record database, covering the period from January 1, 2010, to December 31, 2020. Propensity score matching was utilized to minimize confounding. Kaplan-Meier curves assessed event-free probabilities, and the Cox proportional hazards model evaluated treatment effects on our outcomes. Subgroup analyses demonstrated a consistent trend toward higher RVO risk in the glaucoma group across most subgroups, including both sexes, patients with or without diabetes, and those with hypertension.

Results: After 1:1 propensity score matching, each cohort included 158,026 participants. Glaucoma patients exhibited a significantly higher incidence of RVO compared to those without glaucoma (1.15% vs. 0.23%), with a hazard ratio (HR) of 5.86 (95% CI: 5.24–6.56, $p < 0.0001$). This elevated risk extended to both subtype, CRVO (0.65% vs. 0.07%; HR 10.92, 95% CI: 8.97–13.30) and BRVO (0.64% vs. 0.18%; HR 4.30, 95% CI: 3.76–4.90), with a markedly stronger association for CRVO. Kaplan-Meier curves demonstrated an early and sustained divergence favoring higher cumulative incidence in the glaucoma cohort (log-rank $p < 0.0001$). Subgroup analyses demonstrated a consistent trend toward risk reduction across most subgroups, including both sexes, patients with or without diabetes and hypertension.

Conclusions: Glaucoma is strongly associated with an increased risk of retinal vein occlusion, with the greatest relative risk observed for CRVO. This

association persists across key clinical subgroups (sex, diabetes, hypertension) after rigorous propensity score matching. Our findings using large real-world database reinforce that patients with glaucoma warrant heightened surveillance for RVO, particularly CRVO.

Abstract No.: 209433

Association Between Serum Thyroid-Stimulating Hormone Levels and Nonproliferative Diabetic Retinopathy in Chinese Patients With Type 2 Diabetes: A Cross-Sectional Study

First Author: Weiwen **HU**

Co-Author(s): Qiong **ZHOU**

Purpose: The association between thyroid-stimulating hormone (TSH) and type 2 diabetes mellitus (T2DM) has been well-established. However, the potential link between TSH levels and nonproliferative diabetic retinopathy (NPDR) remains insufficiently explored. This study aimed to examine the relationship between TSH levels and NPDR in a cohort of Chinese patients diagnosed with T2DM.

Methods: A total of 493 individuals with T2DM were included in this cross-sectional study. Participants were classified into two groups based on fundus oculi examination: the non-diabetic retinopathy (NDR) group ($n = 250$) and the NPDR group ($n = 243$). Demographic and clinical data were collected through medical record reviews and direct interviews. Statistical comparisons of demographic data and biochemical parameters were performed using either the Student's t-test or the Mann-Whitney U test. Logistic regression models were employed to assess the relationship between TSH levels and NPDR.

Results: No significant differences were observed between the groups in terms of age, sex, body mass index (BMI), alcohol consumption, or diabetes duration. However, systolic blood pressure (SBP), smoking prevalence, TSH levels, blood urea nitrogen (BUN), and urinary microalbumin (mALB) were significantly higher in the NPDR group compared to the NDR group ($P < 0.05$). Conversely, individuals in the NDR group exhibited higher levels of thyroxine (T4), glutamic pyruvic transaminase (ALT), fasting C-peptide (FCP), and 2-hour C-peptide (2hCP) than those in the NPDR group ($P < 0.05$). Spearman's correlation analysis revealed a negative correlation between TSH levels and HbA1c across all participants ($r = -0.13$, $P < 0.05$). In the NPDR group, TSH was negatively correlated with HbA1c ($r = -0.21$, $P < 0.01$) and positively correlated with diabetes duration ($r = 0.15$, $P < 0.05$). Multivariate logistic regression analysis identified high TSH levels, sex, diabetes duration, high-density lipoprotein cholesterol (HDL-C), HbA1c, FCP, and SBP as significant factors associated with NPDR (odds ratio [OR] > 1 , $P < 0.05$). Receiver operating characteristic (ROC) curve

analysis determined an optimal TSH cutoff value of 2.145 mIU/L for predicting NPDR.

Conclusions: This study highlights an independent association between serum TSH levels and NPDR in individuals with T2DM in the Chinese population. Elevated TSH may serve as a potential risk factor for NPDR and could prove to be a valuable marker for screening diabetic microangiopathy.

Abstract No.: 203769

Association of Hb and HbA1c With Severity of Diabetic Retinopathy

First Author: Muna KHAREL

Purpose: To Study the Association of Hb and HbA1c With Severity of Diabetic Retinopathy

Methods: This hospital based, cross sectional observational study was conducted in Shree Birendra Hospital, Chhauni, Kathmandu during the period of 12 months from January, 2019 to January, 2020. Diagnosed cases of Diabetic Retinopathy were evaluated for severity with associated Hemoglobin and Glycated Hemoglobin levels.

Results: There were total of 112 patients enrolled in the study. The mean age of the patients was 56.8 (SD $\pm$ 7.63) years with male to female ratio of 2:1. Of the total, 89.4% had non proliferative diabetic retinopathy and rest had proliferative and advanced retinopathy. Higher hemoglobin (more than 12 g/dl, $P < 0.05$) were found to be associated with milder forms of DR. Higher level of HbA1c (more than 9% , $P < 0.05$) were associated with eyes with more severe forms of diabetic retinopathy. Lower Hb to HbA1c ratios (less than 1.28, $P < 0.05$) were associated with severe forms of DR.

Conclusions: HbA1c levels remain one of the most reliable predictors of glycemic control and are likely to remain same for many years to come. But as our study points out, hemoglobin is also equally important to understand the disease process. Hemoglobin should also be considered while managing cases of diabetic retinopathy along with HbA1c. This might better aid in devising proper management and follow-up in patients by identifying the eyes "at risk" of deterioration earlier.

Abstract No.: 205601

Atrial Fibrillation in Retinal Artery Occlusions: A Review of Literature Across Cardiology and Ophthalmology

First Author: Chi Lik AU

Purpose: Atrial fibrillation (AF) increases the risk of cardioembolic events, but its extent on the eye is uncertain. Our study aims to review the literature and determine the reported prevalence of AF in patients diagnosed with retinal artery occlusions (RAO).

Methods: A structured literature search was conducted on 20 March 2025 in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Electronic databases searched included PubMed, MEDLINE, Scopus, and the Cochrane Central Register of Controlled Trials. A combination of free-text terms and Medical Subject Headings (MeSH) related to "atrial fibrillation" and "retinal vascular occlusions" was used to maximize sensitivity. Inclusion criteria are studies with raw data on the prevalence of AF in RAO patients. Retinal vein occlusion (RVO) studies, or studies with non-separable RAO-RVO data, were excluded. Following full-text screening, the following key data were extracted from each study: author, year, study design, sample size, and key results. A thematic synthesis was then conducted to identify patterns across studies.

Results: A comprehensive search of the literature yielded 2,431 articles, of which 15 met the inclusion criteria and contributed to the data extraction and subsequent analysis. Publication year ranged from 2010 to 2023, with a total of 29,288 RAO patients included. Studies reported 5.3 % - 49.4 % prevalence of AF in patients diagnosed with RAO. A total of 4,679 (16.0 %) RAO patients had AF upon RAO diagnosis, and subsequent cardiology workup found even more AF.

Conclusions: Cardiology workup in RAO patients is essential; underdiagnosis of AF within patients diagnosed with RAO is not uncommon.

Abstract No.: 201515

Atrophy Secondary to Non-Dry AMD Associated Pathologies: A Review

First Author: Ethel Zi Xie NG

Co-Author(s): Elina NG, Wei Kiong NGO, Maverick Wenhao WONG

Purpose: To review geographic atrophy (GA) arising from non-dry AMD associated pathologies and highlight clinical distinction from drusen-mediated GA in dry age-related macular degeneration (AMD).

Methods: A narrative review of the published literature was conducted, synthesizing evidence from multimodal imaging, histopathology and clinical studies describing atrophy in conditions other than dry AMD.

Results: Seventeen studies were identified across six diagnostic categories. Despite converging on morphologically similar zones of photoreceptor and RPE loss, these entities demonstrated distinct pathogenic drivers. In exudative AMD, atrophy developed both within and beyond choroidal neovascular membranes, with reticular pseudodrusen and intraretinal cysts as possible risk factors, while quiescent CNV sometimes slowed lesion progression. Pachychoroid disease and chronic CSC were linked to chronic choroidal congestion and hyperpermeability, with characteristic imaging features including pachyvessels,

pachydrusen, gravitational tracks and stalactite-like photoreceptor changes. In high myopia, atrophy might be driven by mechanical stretch, lacquer cracks and staphyloma, often compounded by inflammatory lesions such as punctate inner choroidopathy or multifocal choroiditis. Post-inflammatory atrophies (Birdshot chorioretinopathy, Acute Zonal Occult Outer Retinopathy) displayed immune-mediated injury with subretinal deposits, cystoid changes and variable response to immunosuppression. Inherited retinal degenerations (CRX-related disease, Maternally Inherited Diabetes and Deafness, Stargardt disease) result from primary genetic defects in photoreceptor or RPE metabolism and structure, causing cell-autonomous degeneration independent of complement-mediated pathways driving GA in AMD.

Conclusions: GA represents a morphological endpoint of diverse biological processes rather than a single disease entity. Accurate recognition of subtypes is essential to avoid misclassification, refine prognostication and guide development of targeted, mechanism-based interventions.

Abstract No.: 201715

Atypical Central Serous Chorioretinopathy With Large RPE Rips

First Author: Debarun **SHARMA**

Co-Author(s): Yamini **TULSIANI**

Purpose: To discuss two year follow up of an atypical CSC case which presented with large pigment epithelium detachment (PED) extending anterior to equator which later developed RPE avulsion leading to exudative detachment.

Methods: A 54-year-old female presented with blurring of vision in both eyes with a history of topical steroid use for the past 2 years. BCVA was 6/18 OD and 6/24 OS. Fundus examination revealed patchy pigmentary alteration at the posterior pole, PED along the superotemporal arcade, and a large PED in the superonasal quadrant OD. OS showed pigmentary changes at the posterior pole, PEDs along the superotemporal and inferotemporal arcades, nasal to the disc, and a large PED with NSD in the superonasal quadrant extending anterior to the equator.

Results: ICGA revealed early hypo fluorescence with pooling of dye in PEDs. FFA revealed smoke stack leaks at the posterior pole OU. OCT confirmed intraretinal cystic edema and neurosensory detachment. A double-frequency Nd YAG laser was used along with identified focal leaks in the OU. At 1-month follow-up, BCVA was reduced to 6/60 OS. Fundus examination revealed multiple RPE avulsions at previously documented PED sites and inferior bullous detachment. FFA showed hyperfluorescence at sites of RPE avulsions with leakage into NSDs. The patient was started on a topical carbonic anhydrase inhibitor, which was continued for six months. Exudative detachment slowly resolved

over a period of 4 months with final vision of 6/36 OS maintained at 2-year follow-up.

Conclusions: This is a unique case with large peripheral PEDs extending anterior to the equator, associated with atypical CSC.

Abstract No.: 201794

Avacincaptad Pegol for Geographic Atrophy: 3.5-Year Results From the GATHER2 Open-Label Extension Trial

First Author: Timothy **LAI**

Co-Author(s): Andrew **CHANG**, Carl J. **DANZIG**, Jeffrey S. **HEIER**, Frank G. **HOLZ**, Arshad M. **KHANANI**

Purpose: Avacincaptad pegol (ACP) is FDA approved for the treatment of geographic atrophy (GA) secondary to age-related macular degeneration. The efficacy and safety of ACP have been demonstrated in two pivotal clinical trials, GATHER1 and GATHER2, in patients with non-center-point-involving GA. This 18-month open-label extension (OLE) study (NCT05536297) assessed the long-term safety of ACP 2mg treatment in patients with GA who previously completed the 24-month GATHER2 trial.

Methods: A total of 278 patients who completed GATHER2 through the month 24 visit on either ACP 2mg or sham were administered ACP 2mg monthly from Months 1-17 of the OLE, with a final follow-up visit at Month 18. Patients were treated with ACP 2mg up to 42 months (3.5 years) or 18 months if previously on sham in GATHER2. The primary endpoint was safety, which included reporting of adverse events whether or not deemed related to the injection procedure or treatment.

Results: In GATHER2, both monthly and every-other-month ACP 2mg demonstrated a reduction in GA lesion growth vs sham at 2 years. There were no reports of retinal vasculitis, ischemic optic neuropathy, or serious intraocular inflammation. In year 2, the incidence of choroidal neovascularization in the study eye was 7.3% for monthly ACP 2mg, 4.3% for every-other-month ACP 2mg, and 5.4% for sham. The safety of ACP 2mg from the 18-month OLE of GATHER2 will be presented.

Conclusions: Long-term results from the GATHER2 OLE will provide valuable information on the tolerability of ACP 2mg for GA over a 3.5-year treatment period.

Abstract No.: 207386

Bardet-Biedl Syndrome in a Chinese Patient With a Novel Homozygous Pathogenic BBS5 Variant

First Author: Xiaohe **YAN**

Purpose: Bardet-Biedl syndrome (BBS) is a rare, autosomal recessive genetic disorder with multi-systemic symptoms, including polydactyly (the presence of extra fingers or toes), obesity, renal

anomalies, retinal dystrophy, and cognitive impairment. Our study reported a previously unreported BBS5 homozygous variant in a Chinese patient with BBS.

Methods: A comprehensive ophthalmologic examination was conducted. The whole exome sequencing and Sanger sequencing were utilized to detect pathogenic genes. Protein structure prediction and multiple sequence alignments were performed.

Results: An 18-year-old female presented with blurry vision and night blindness since childhood. Upon conducting a general assessment, polydactyly, obesity, and learning disability were also identified. Ophthalmologic examination revealed severe retinal degeneration. Whole Exome Sequencing and Sanger sequencing detected a new homozygous variant in BBS5 (NM152384.3: exon 3: c.185 del: p.L62Wfs*16). The protein structure prediction showed substantial deletions of amino acid segments caused by the variant. The multiple sequence alignments indicated that the amino acids corresponding to the variant were in a highly conserved region of the BBS5 protein, underscoring their essential role in maintaining protein function.

Conclusions: These findings enrich the mutational spectrum and expand the phenotypic and genotypic heterogeneity of Bardet-Biedl Syndrome.

Abstract No.: 205971

Beyond Hemangioblastoma, New Findings of Retinal Vascular Changes in Von Hippel-Lindau Syndrome

First Author: Ruilin ZHU

Co-Author(s): Liu YANG

Purpose: Previous research has not thoroughly investigated alterations in the peripheral retinal vasculature in VHL. In this report, we studied a series of patients with VHL syndrome to examine the far peripheral retinal vascular characteristics with widefield fluorescein angiography.

Methods: We retrospectively reviewed the VHL patients who underwent wide-field fundus fluorescein angiography. Far peripheral retinal vascular pathology was recorded by two experienced ophthalmologists. The correlation between the peripheral retinal changes was analyzed.

Results: Sixty-three eyes from 33 patients were included in this study. The mean age of the patients was 34.30 years. Forty-three of them (68.25%) had hemangioblastomas seen on widefield FFA. The total number of RHs was 109 in these patients. Far peripheral retinal fluorescein angiography changes included capillary leakage, abnormal capillary network, and capillary nonperfusion. The peripheral retinal capillary leakage was noted in 14 eyes (22.22%). The capillary leakage was significantly related to whether there was RH located between the equator and ora

serrata of the retina ($p=0.0006$). An abnormal capillary network (ACN) was found in three eyes. Two eyes had peripheral capillary nonperfusion.

Conclusions: Beyond the RHs in VHL syndrome patients, the far peripheral vascular features were also noted. Investigation of these features could be helpful to clarify the pathogenesis of VHL retinal abnormality.

Abstract No.: 206295

Beyond the Darkness: Navigating Oguchi Disease With a Singular Case Insight

First Author: Hajra MALIK

Co-Author(s): Shehrbano ABBAS, Saman GULZAR, Najia UZAIR

Purpose: To report a case of Oguchi disease featuring the characteristic Mizuo–Nakamura phenomenon in a child, and to illustrate how dark adaptation affects fundus appearance and aids in diagnosis.

Methods: A 9-year-old girl presenting with complaints of impaired night vision was evaluated clinically. Assessment included measurement of best-corrected visual acuity, dilated fundus examination, and observation of the fundus before and after prolonged dark adaptation (2 hours).

Results: At presentation, best-corrected visual acuity in both eyes was 20/100. Fundus examination revealed a bilateral metallic sheen across the retina. After 2 hours of dark adaptation, the goldenyellow metallic sheen resolved, demonstrating the Mizuo–Nakamura effect — the hallmark clinical sign of Oguchi disease.

Conclusions: This case underscores the diagnostic value of prolonged dark adaptation and fundus re-examination in suspected Oguchi disease. Recognition of the Mizuo–Nakamura phenomenon helps to distinguish this rare stationary night blindness condition and avoid misdiagnosis.

Abstract No.: 203579

Beyond the Hype- Anti-VEGF: A Silver Bullet or Just One Tool?

First Author: Noor UL AIN

Co-Author(s): Tayyaba GUL MALIK

Purpose: To highlight the importance of comprehensive clinical evaluation, rather than reliance on diagnostic imaging alone, in guiding treatment decisions.

Methods: A 34-year-old female patient presented to our outpatient department with an 8-week history of decreased vision in both eyes. Initial symptoms began 8 weeks prior, with decreased vision in the right eye, prompting consultation with a local ophthalmologist. Following investigations, the patient received an intravitreal anti-vascular endothelial growth factor (VEGF) injection, resulting in improved vision, although blurriness persisted. Notably, the patient reported a recent history of influenza, which resolved

spontaneously. Anterior segment examination revealed normal findings in both eyes. However, fundoscopic examination disclosed creamy white placoid lesions at the posterior pole and equator in both eyes. Based on clinical examination and investigations, a diagnosis of acute posterior multifocal placoid pigment epitheliopathy (APMPPE) was established. Review of the patient's optical coherence tomography (OCT) images revealed increased macular thickness, which likely prompted the initial treating ophthalmologist to administer anti-VEGF therapy. However, APMPPE is a self-limiting condition that does not require anti-VEGF injections. This case highlights the importance of comprehensive clinical evaluation, rather than reliance on diagnostic imaging alone, to guide treatment decisions. We also investigated potential associations with cerebral vasculitis via magnetic resonance imaging (MRI).

Results: This case emphasizes the need for thorough history-taking and clinical examination before initiating sophisticated treatments.

Conclusions: Not all patients with increased macular thickness require anti-VEGF therapy, and unnecessary procedures should be avoided to prevent potential complications.

Abstract No.: 204242

Beyond the Known: Expanding the Phenotype of Retinitis Pigmentosa in a Patient With Novel Mutation in ABCA4

First Author: Steven Matthew LEE

Co-Author(s): Manuel Benjamin IBANEZ IV

Purpose: Retinitis pigmentosa (RP) is a hereditary retinal disease characterized by bony spicule pigmentation, waxy optic disc pallor, and vessel attenuation. It exhibits genotypic heterogeneity with multiple genes, including the ABCA4 gene. Stargardt disease (STGD) and ABCA4-retinopathies, are caused by pathogenic variants in the ABCA4 gene inherited in an autosomal recessive manner. This gene encodes an importer flippase protein that prevents build-up of vitamin A derivatives toxic to the retinal pigment epithelium. Build-up of which results in the characteristic finding of yellow, pisciform flecks in STGD. Diagnosing ABCA4R is complex due to its phenotypic heterogeneity, with ABCA4 being known to cause RP, STGD, and cone-rod dystrophy (CRD).

Methods: A comprehensive history and ocular examination with molecular testing were done.

Results: A 30-year-old Asian male presented with poor bilateral vision since childhood. Best corrected visual acuity was counting fingers at 1 foot on the right and hand movement on the left. Examination showed overlapping features of both RP and STGD, with features of a uveitic process, including mild inflammation, and unilateral persistent pupillary

membranes. Uveitis work-up showed inconclusive results. An inherited retinal dystrophy panel done revealed a compound heterozygous mutation in the ABCA4 gene, with one variant being novel. (ABCA4 c.4253+5G>A, c.161-23T>A).

Conclusions: To our knowledge, this is the first reported case of ABCA4-RP caused by this novel compound heterozygous mutation. It therefore contributes to incidence reporting and profiling of inherited retinal dystrophies, and demonstrates their phenotypic and genotypic heterogeneity, which aid in the diagnosis and management of these diseases.

Abstract No.: 202327

Beyond the Spicules: A Rare Case of Retinitis Pigmentosa Sine Pigmento Unmasked by a Novel Mutation in IDH3A

First Author: Miguel Enrique ROA

Co-Author(s): Manuel IBANEZ IV, Steven Matthew LEE, Juan Paulo RIEGO DE DIOS

Purpose: Retinitis pigmentosa (RP) is the most commonly diagnosed inherited retinal dystrophy affecting approximately 1 in 4000 individuals worldwide. Classic findings of RP include optic nerve pallor, vessel attenuation and bony spicule like pigments especially in the periphery. However, there are also atypical forms of retinitis pigmentosa like RP sine pigmento where there is absence of its characteristic pigmentary epitheliopathy. This paper reports a case of a 32-year-old male presenting as an atypical case of retinitis pigmentosa sine pigmento, first-ever recorded with compound heterozygous mutations in IDH3A, a gene that has only been reported in 4 other cases of typical RP to date.

Methods: A patient from a non-consanguineous Filipino family was clinically diagnosed with RP at the Ocular Genetics clinic. Complete ophthalmic examination was done, as well as diagnostics (fundus photo, fundus autofluorescence, ocular coherence tomography of the macula, full field electroretinography, visual field test). In addition, an inherited retinal dystrophy panel of 330 was requested.

Results: Fundus findings of our patient revealed midperipheral degeneration, vessel attenuation, with absence of bony spicules. Genetic testing revealed the patient to be compound heterozygous for two variants IDH3A c.27+2T>G, and IDH3A c.415G>T (p.Asp139Tyr).

Conclusions: In summary, we report a rare case of a patient presenting with RP sine pigmento and harboring novel IDH3A mutations, expanding the genetic spectrum of IDH3A variants associated with RP. There are only 4 reported cases of IDH3A-related typical RP and none presenting as sine pigmento like our patient.

Abstract No.: 202296

Bilateral Choroidal Osteoma With Secondary Choroidal Neovascular Membrane: A Rare Case Report

First Author: Md.Zaman **SAKIB**

Co-Author(s): Md.Anwarul **AZIM**, Md.Dedarul **HASSAN**, Mostafiz **HOSSAIN**

Purpose: To present a rare case of bilateral choroidal osteoma with choroidal neovascular membrane (CNVM) in a young female and to highlight the importance of multimodal imaging and intravitreal anti-VEGF therapy.

Methods: A 32-year-old woman presented with gradual dimness of vision in her left eye for six months. There was no history of trauma, systemic illness, or family history of ocular disease. Ocular examination revealed a whitish, slightly elevated subretinal lesion with distinct margins in the peripapillary region of the right eye. The left eye demonstrated a large hypopigmented lesion involving the macula with associated pigmentary changes. Multimodal imaging, including B-scan ultrasonography, optical coherence tomography (OCT), fundus fluorescein angiography (FFA), and fundus autofluorescence (FAF), confirmed the diagnosis of bilateral choroidal osteoma with secondary CNVM and pigment epithelial detachment in the left eye.

Results: The patient was diagnosed with bilateral choroidal osteoma, complicated by CNVM in the left eye. She was treated with intravitreal anti-VEGF injections, which resulted in stabilization of vision and reduction of CNVM activity. She was scheduled for regular follow-up with multimodal imaging for monitoring progression.

Conclusions: Bilateral choroidal osteoma is uncommon and may result in severe visual impairment when complicated by CNVM. Early diagnosis using multimodal imaging and timely intervention with anti-VEGF agents can help preserve vision and improve patient outcomes.

Abstract No.: 203307

Bilateral Dengue-Associated Multiple Evanescent White Dot Syndrome (MEWDS) - a Clinical Vignette

First Author: Muhammad Haris Zakaria **AHMAD**

Co-Author(s): Pooi Wah **LOTT**, Norlina **RAMLI**

Purpose: Dengue fever has emerged as a significant public health challenge in Malaysia, characterized by its hyperendemic status and alarming trends in incidence and mortality. Between the year 2015 and 2021, Malaysia reported over 600,000 cases of dengue, accompanied by approximately 1,200 associated fatalities, highlighting a troubling escalation in the disease's impact. Rarely, ophthalmic manifestations may be present such as reduction in visual clarity, retinal haemorrhages, and scotoma. As the incidence

of dengue fever continues to rise, understanding its implications and the factors contributing to its severity is crucial for public health interventions and strategies in Malaysia.

Methods: This is a case report.

Results: A 20-year-old gentleman of Chinese ethnicity presented with a right eye central scotoma on a recent admission for a dengue fever. He is otherwise fit without any remarkable medical history, use of any medications, nor known drug allergies. Visual acuity was 6/36 on the right; 6/18 on the left, with bilateral central scotoma on the perimetry. Diagnosis was made based on OCT and ICGA. Vision improved with oral Prednisolone to 6/6 bilaterally. However, the central scotoma persisted over the right eye.

Conclusions: This case highlights the significance of recognising MEWDS, particularly in the context of systemic infections like dengue, and emphasizes the need for ongoing awareness and research into the factors contributing to non-resolution in atypical presentations. Although MEWDS is generally self-resolving, it is imperative to identify risk factors that may contribute to poor resolution of symptoms which include young age and poor presenting visual acuity.

Abstract No.: 206849

Bilateral Diffuse Uveal Melanocytic Proliferation With Ciliary Mass Lesion: A Case Report

First Author: Yi **CAI**

Co-Author(s): Xiaoxin **LI**, Jianhong **LIANG**, Shi **XUAN**

Purpose: To report a rare case of Bilateral Diffuse Uveal Melanocytic Proliferation (BDUMP) associated with a biopsy-proven primary ciliary body melanoma, and to discuss the clinical implications for diagnosing the primary malignancy in this paraneoplastic syndrome.

Methods: A 62-year-old man presented with a four-month history of bilateral painless vision loss. He underwent a comprehensive ophthalmic evaluation, including fundus examination and ultrasound biomicroscopy (UBM), along with extensive systemic screening for an occult primary malignancy over a four-year period. Due to the progressive enlargement of a ciliary body mass noted in the right eye, the patient underwent intraocular tumor resection. The excised tissue was analyzed via histopathology and immunohistochemical staining.

Results: Fundus examination revealed a characteristic leopard spot-like pattern consistent with BDUMP. Initial UBM identified a 2.3 × 2.18 mm mass in the ciliary body of the right eye. Despite four years of follow-up, systemic evaluations failed to identify a primary non-ocular malignancy. However, the ciliary mass demonstrated progressive growth. Histopathological analysis of the resected tissue confirmed a malignant melanoma. Immunohistochemistry was positive for

HMB45, S-100, and MelanA, with a Ki-67 proliferation index of 15%. The patient subsequently received an external scleral radiographic applicator as adjuvant therapy. The iris in the right eye remained flat postoperatively.

Conclusions: While BDUMP is typically considered a paraneoplastic manifestation of systemic malignancies, this case provides direct evidence that a primary intraocular tumor, specifically a ciliary body melanoma, can be the underlying cause. This finding highlights the importance of diligently monitoring uveal melanocytic lesions in patients with BDUMP.

Abstract No.: 206675

Bilateral Proliferative Retinopathy Secondary to Hereditary Ovalocytosis: A Case Report

First Author: Law **JIN XING**

Co-Author(s): Nur Afiah **BINTI KAMALUDDIN**, Wan Norliza **BINTI WAN MUDA**

Purpose: To describe a rare case of proliferative retinopathy associated with hereditary ovalocytosis, highlighting its clinical course, management, and outcomes.

Methods: Case report.

Results: A 27-year-old man presented with progressive blurred vision in the right eye upon waking. Initial visual acuity was 6/30 in the right eye and 6/15 in the left. Fundus examination revealed right vitreous hemorrhage and subretinal exudation at the inferotemporal arcade, with bilateral peripheral telangiectatic vessels. Optical coherence tomography (OCT) showed central retinal thickness of 358 μm with intraretinal fluid and vitreomacular traction in the right eye, while the left eye measured 262 μm without fluid. Fundus fluorescein angiography demonstrated extensive capillary nonperfusion and peripheral neovascularization in both eyes. Laboratory investigations excluded connective tissue and infectious causes. A full blood picture revealed ovalostomatocytes, confirming hereditary ovalocytosis. The patient underwent multiple sessions of bilateral panretinal photocoagulation, which stabilized both eyes with resolution of vitreous hemorrhage. Final visual acuity improved to 6/9 in the right eye and 6/6 in the left. He later developed focal tractional fibrosis with a horseshoe tear at the inferotemporal arcade, requiring vitreoretinal surgery, but remained undecided regarding intervention.

Conclusions: Hereditary ovalocytosis may manifest as bilateral proliferative retinopathy, mimicking other proliferative retinal diseases in young adults. Early systemic workup, timely panretinal photocoagulation, and close follow-up are essential to preserve vision and prevent complications.

Abstract No.: 206506

Bilateral Serous Retinal Detachment Associated With Denosumab: A Case Report

First Author: Woong-sun **YOO**

Purpose: To describe bilateral serous retinal detachment (SRD) associated with denosumab and its course after drug cessation.

Methods: Observational case report of a 70-year-old woman on a HER2 receptor blocker for breast cancer and denosumab for osteoporosis/bone-metastasis prevention. Examinations included best-corrected visual acuity (BCVA), dilated funduscopy, optical coherence tomography (OCT), and fluorescein angiography (FA), with longitudinal follow-up.

Results: At presentation, BCVA was 0.4 OD and 0.5 OS. Fundus and OCT showed bilateral SRD. FA demonstrated pooling in both eyes without definite focal leakage. During follow-up, medication-related osteonecrosis of the maxilla occurred, leading to dental surgery and denosumab discontinuation. Thereafter, SRD gradually regressed bilaterally; final BCVA improved to 1.0 OD and 0.8 OS, with no recurrence during subsequent visits.

Conclusions: Denosumab may be associated with bilateral SRD in the absence of angiographic leakage. Recognition of this potential adverse effect is important; reviewing antiresorptive therapy and considering drug cessation in multidisciplinary consultation may result in anatomic resolution and visual recovery.

Abstract No.: 202228

Bilateral Wyburn Mason Syndrome: When Rare Gets Even Rarer

First Author: Jayant **SHARMA**

Co-Author(s): Ranjan **BEHERA**, Abhishek **BHATIA**, Shreya **NARANG**, Sehajbir Singh **PANNU**, Somya **SHARMA**

Purpose: WMS is an accidental finding and can be confirmed in the eye by ophthalmoscopy or OCT, showing loops of vessels extending to the peripheral retina. These loops are present diffusely and must be differentiated from those of Neovascularization. Patients must be screened for CNS involvement, as it can cause occlusions or ischemia.

Methods: An 8-year-old male child presented with complaints of b/l visual loss, which was painless and gradually progressive. Noted by his parents when he was not able to track objects over the last 2 months. The best corrected visual acuity was light perception OD and counting fingers 2 feet OS with sluggishly reacting pupils with full and free ocular movements in all directions. The A/S was normal, fundus of both eyes revealed dilated, convoluted, and tortuous large caliber vessels extending to the

periphery with formation of loops suggestive of AVMs, more prominent over the disc and in the right eye. The OCT revealed hump shaped lesions over the optic disc with a normal macula. CE-MRI revealed AVMs in the capsulothalamoganglionic region of the midbrain with no active hemorrhage, prominent flow voids with enlarged deep cerebral veins, and multiple tortuous vessels seen along the Circle of Willis. In the neurologist's opinion, only observation was advised since there were no active CNS symptoms or hemorrhage.

Results: The presence of AVM's in the brain and both eyes confirms the diagnosis of very rare Bilateral Wyburn Mason Syndrome.

Conclusions: This case highlights rarity of already rare disease which can have severe life threatening complications if not detected in time.

Abstract No.: 200728

Bisphenol S Promotes Age-Related Macular Degeneration via Lipid-Metabolic Disruption

First Author: Yao **ZONG**

Purpose: Age-related macular degeneration (AMD) is the leading cause of elderly blindness. Apart from genetics, environmental pollutants such as bisphenol S (BPS) have emerged as additional risk factors. BPS disrupts lipid homeostasis and disorganizes photoreceptors in zebrafish, suggesting its potential to induce AMD. We investigated whether BPS directly drives AMD and delineated its mechanistic basis.

Methods: AB and *apoe*^{-/-} zebrafish were exposed to environmentally relevant BPS concentrations (1–100 µg/L) from 3 hpf to 120 dpf. Retinal pigment epithelium (RPE)-derived ARPE-19 cells were employed to dissect the nuclear receptor Liver X Receptor α (LXR α)-mediated pathway, focusing on oxidative stress, cellular senescence, and inflammation.

Results: Chronic BPS exposure produced basal linear lipid deposits in AB retina and reduced antioxidants/elevated oxysterols—early AMD hallmarks. In *apoe*^{-/-} zebrafish, photoreceptor loss indicated late-stage AMD. In ARPE-19 cells, BPS dose-dependently up-regulated lipogenic genes (*lrx α* , *fasn*, *acc*, *srebp1/2*) and suppressed autophagy genes (*lcn3*, *atg3*, *p62*), causing TAG and TC accumulation. GW3965 (LXR α agonist) mimicked BPS; GSK2033 (antagonist) reversed the phenotype. siLXR α abolished BPS effects, confirming LXR α dependence.

Conclusions: BPS activates LXR α , driving RPE lipid synthesis and autophagy blockade. Deposited lipids undergo retinal oxidation, triggering RPE degeneration. Environmentally relevant BPS constitutes a novel AMD risk factor.

Abstract No.: 204067

Causal Effects of PCSK9 and HMGCR Inhibition on Ocular Diseases a Mendelian Randomization Study With Positive Control Analysis

First Author: Lianhui **WANG**

Purpose: This Mendelian randomization (MR) study validated the analytical framework using coronary artery disease (CAD) as a positive control and evaluated the causal effects of lipid-lowering targets PCSK9 and HMGCR on ocular diseases, including age-related macular degeneration (AMD), diabetic retinopathy (DR), retinal artery occlusion (CRAO), retinal vein occlusion (RVO), and retinitis pigmentosa (RP), to inform therapeutic repurposing.

Methods: Genetic instruments were selected from SNPs strongly associated with PCSK9 (8-12 SNPs) and HMGCR (7 SNPs) in GWAS. Five MR methods (MR Egger, weighted median, inverse variance weighted, etc.) estimated causal effects using odds ratios (OR) with 95% confidence intervals (CI) ($p < 0.05$). CAD served as a positive control to validate methodological robustness. Sensitivity analyses included heterogeneity testing, pleiotropy adjustment, and leave-one-out validation.

Results: 1. CAD (Positive Control): PCSK9 inhibition consistently reduced CAD risk (all methods $p < 0.001$, OR=0.47-0.53); HMGCR inhibition showed protective effects aligning with statin efficacy (weighted median OR=0.76, $p=0.003$). 2. AMD: PCSK9 inhibition exhibited protective effects (MR Egger OR=0.53, $p=0.023$), while HMGCR showed null associations. 3. DR: HMGCR inhibition increased DR risk (weighted median OR=1.41, $p=0.021$); no effect was observed for PCSK9. 4. Other Ocular Diseases: An implausibly high HMGCR-CRAO association (OR=68.44, $p=0.20$) was deemed unreliable due to wide CI; neither target showed significant effects on RVO or RP.

Conclusions: CAD as a positive control confirmed MR validity. PCSK9 inhibition demonstrates therapeutic potential for AMD with a favorable safety profile, whereas HMGCR inhibition may elevate DR risk, necessitating clinical risk-benefit evaluation. These findings prioritize PCSK9 inhibitors for multi-disease applications and underscore precision strategies for statin therapy.

Abstract No.: 200645**Central Retinal Vein Occlusion in the Young Associated With Hormonal Intrauterine Device Use: A Case Report***First Author: Maria Christine DY**Co-Author(s): Noriell Jonathan MAMACLAY*

Purpose: To report a case of central retinal vein occlusion (CRVO) in a young patient on hormonal intrauterine device (IUD).

Methods: A 19-year old Filipino female came in for sudden painless blurring of vision on the left associated with a generalized headache. The medical, family, and social histories were unremarkable. However, the patient revealed that she was on a progestin IUD without a concurrent oral contraceptive for almost two years. Visual acuity (VA) was counting fingers. Fundus examination showed diffuse intraretinal hemorrhages along the posterior pole and mid-peripheral retina with vessel dilatation and tortuosity. The anterior segment findings and fellow eye were normal. Baseline optical coherence tomography (OCT) for macular edema, cardiovascular, and coagulability workups tested negative.

Results: Two weeks later, the patient reported spontaneous improvement in vision at 20/20 without any interventions done. Repeat fundus examination showed significant decrease in hemorrhages and vessel tortuosity. The patient was then advised to monitor for recurrence of symptoms or new onset ophthalmic complaints.

Conclusions: CRVO in the young is usually associated with hypercoagulable or inflammatory systemic conditions. Extensive laboratory evaluation with thorough history taking should be done to elicit possible thrombotic etiologies including hormonal contraceptive use, especially oral medications. Visual prognosis is variable, but poor baseline VA and retinal ischemia are worse indicators. Female patients of reproductive age should, therefore, be properly counseled regarding this risk.

Abstract No.: 207293**Central Serous Chorioretinopathy in Pregnancy – A Retrospective Observational Study***First Author: Disha AGARWAL**Co-Author(s): Shreyas TEMKAR*

Purpose: To study the clinical characteristics and course of central serous chorioretinopathy (CSC) in pregnancy.

Methods: This retrospective study included eight antenatal patients presenting with acute CSC over a period of two years. Medical records, ophthalmological findings, and optical coherence tomography (OCT) characteristics were reviewed. Patients were followed up for at least three months after the resolution.

Results: The mean gestational age at presentation was 30.00 weeks. Six patients (75%) had unilateral involvement. The median best corrected visual acuity (BCVA) at presentation was 20/40. No attributable systemic risk factors could be identified. The mean CFT at baseline was $498.67 \pm 160.74 \mu\text{m}$. Pigment epithelial detachments were noted in 8 eyes (80%), and dipping of outer retinal layers was noted in 5 eyes (50%). Subretinal exudation (fibrin) of a variable amount was noted in 9 eyes (90%). No intervention was given to any of the patients. Two patients had resolution of CSC before delivery and rest 6 patients had resolution after delivery. Seven patients delivered female babies. At follow-up visits after the resolution, even though patients gained back good vision (median BCVA 20/25), nearly 70% of eyes showed disruption of outer retinal layers on OCT at areas corresponding to previous NSDs.

Conclusions: Although CSC in pregnancy has a self-resolving course with a return of good visual acuity in all the patients, nearly 2/3rd of patients had disruption of outer retinal layers corresponding to the area of previous NSDs. Microperimetry studies can shed light on subtle visual dysfunction in such patients.

Abstract No.: 206758**Challenges in the Diagnosis and Management of Serous Retinal Detachment***First Author: Syafira Kamila FATHONI**Co-Author(s): Aditia Apriyanto HARYONO, Grimaldi IHSAN, Erwin ISKANDAR, Arief S KARTASASMITA, Farid Mufid MADYAPUTRA, Rova VIRGANA, Made Indra WIDYANATHA*

Purpose: This case report aims to provide insights into overcoming diagnostic uncertainties and optimizing outcomes in Serous Retinal Detachment (SRD).

Methods: A 26-year-old woman presented with sudden vision loss of the left eye for one week, accompanied by metamorphopsia, flu-like syndrome, tinnitus, and meningeal signs. The best corrected visual acuity (BCVA) was 0.2 and 1.0 in the left and the right eye, respectively. Fundus examination revealed lobulated SRD with macular involvement in the left eye, followed by similar findings in the right eye at the second visit. The presence of bilateral lobulated SRD involving the macula, along with systemic manifestations, strongly supported the diagnosis of Vogt-Koyanagi-Harada disease. She underwent intravitreal triamcinolone acetonide (IVTA) injection and was referred to a rheumatology consultant. A comprehensive systemic assessment was carried out, and the rheumatologist diagnosed the patient with Sjögren syndrome with ocular involvement. She was treated comprehensively with IVTA injection, topical prednisolone acetate, oral immunosuppressants, and a steroid-sparing agent.

Results: Careful follow-up showed complete resolution of subretinal fluid and was accompanied by full visual recovery, with BCVA improving to 1.0 in both eyes.

Conclusions: Serous retinal detachment presents significant diagnostic and management challenges due to its diverse underlying etiologies. Thorough etiological investigation and close multidisciplinary collaboration are essential, as delayed or inappropriate treatment can lead to substantial morbidity. This case highlights that, despite different speciality perspectives, early detection and carefully tailored management strategies are critical to achieving favourable visual outcomes and preserving long-term vision.

Abstract No.: 207069

Characterization of Retino-Choroidal Vasculature in Obstructive Sleep Apnea Patients in Hong Kong: A Swept-Source Optical Coherence Tomography Case Control Study

First Author: Arnold Shau Hei CHEE

Co-Author(s): Carol CHEUNG, Mary HO, Ka Wai KAM, Kin Wang TO, Alvin YOUNG

Purpose: To evaluate retinal and choroidal vascular metrics in Chinese patients with obstructive sleep apnea (OSA) compared to age-matched healthy controls using swept-source optical coherence tomography (SS-OCT).

Methods: OSA patients were diagnosed via polysomnography and grouped by Apnea-Hypopnea Index (AHI). Age-matched healthy controls were recruited for comparison. Quantitative analysis of parafoveal retinal and choroidal vasculature was performed using SS-OCT on all subjects' right eyes.

Results: Twelve Chinese OSA patients (mean age 52.4 ± 9.1) and ten controls (mean age 57.4 ± 12.1) were analyzed. The mean AHI in the OSA group was 22.5 (range 7-45). Retinal vessel density (VD) at the foveal core was significantly higher in the OSA group for both the deep capillary plexus (DCP: 0.167 ± 0.065 vs. 0.115 ± 0.08 , $p=0.046$) and superficial capillary plexus (SCP: 0.436 ± 0.065 vs. 0.115 ± 0.08 , $p=0.026$). No significant differences were found in foveal avascular zone (FAZ) area, circularity, or fractal dimension. For choroidal metrics, the subfoveal Haller's layer in OSA patients showed lower choroidal vascular index (CVI: 0.618 ± 0.019 vs. 0.631 ± 0.021 ; $p=0.153$), choroidal thickness (CT: $210 \pm 48.6 \mu\text{m}$ vs. $251 \pm 71.2 \mu\text{m}$; $p=0.089$), and choroidal area (CA: $204431 \pm 48270 \mu\text{m}^2$ vs. $244532 \pm 71300 \mu\text{m}^2$; $p=0.089$), though these did not reach statistical significance. AHI was more negatively correlated with CVI of the subfoveal Sattler's layer ($p = -0.5175$, $p=0.0860$) than the Haller's layer ($p = -0.1049$, $p=0.7459$).

Conclusions: OSA patients demonstrated higher foveal retinal vessel density but lower choroidal vascular parameters. A higher AHI was more strongly correlated with reduced CVI in the Sattler's layer, suggesting a potential dose-response relationship between OSA severity and choroidal impairment.

Abstract No.: 207126

Choroidal Detachment Secondary to Hypotony From Corneal Wound Dehiscence in a 40-Year-Old Female: A Case Report

First Author: Jill GENUINO

Co-Author(s): Jose Timothy Martin CHUA, Janice JORDAN-YU, Rachelle PEREZ, Kent WEE

Purpose: To report a case of choroidal detachment secondary to hypotony from a corneal wound dehiscence three months after an uneventful pars plana vitrectomy and phacoemulsification with insertion of an intraocular lens.

Methods: This is a case report.

Results: A 40-year-old female sought consultation due to gradual progressive blurring of vision of the right eye after an unremarkable operation. She is a known case of rhegmatogenous retinal detachment, previously undergone pars plana vitrectomy with silicone oil tamponade and removal of silicone oil with phacoemulsification and intraocular lens insertion. She noted improvement of vision; however, three months later, she noted blurring of vision. Clinical examination revealed a shallow anterior chamber and a positive Seidel's test over the corneal tunnel incision. B-scan ultrasonography confirmed choroidal detachment. She underwent immediate suturing of the corneal wound using nylon 10-0. Immediate improvement in vision was noted. Initially, Seidel's test was negative; however, after one week, Seidel's tests were repeatedly positive for leak. She was managed conservatively with a bandage contact lens, but still offered no resolution. Hence, a repeat suture was added. Visual acuity and choroidal folds progressively improved.

Conclusions: Even after several months following intraocular procedure, corneal wound dehiscence may still occur. Immediate diagnosis of choroidal detachment and prompt treatment of wound dehiscence as root cause of hypotony is vital for good visual prognosis.

Abstract No.: 202288

Clinical Application of Artificial Iris in Severe Ocular Trauma

First Author: Yi LEI

Purpose: Iris defects cause visual dysfunctions such as photophobia, glare, and decreased visual acuity, along with significant cosmetic concerns and psychological burden. Artificial iris implantation can effectively treat partial and complete iris defects. This study evaluates the clinical application of artificial iris implantation for reconstructing iris defects resulting from severe ocular trauma and other diseases.

Methods: The application focused on key issues including the selection of artificial iris type, principles of surgical management, preoperative assessment

for combined intraocular lens implantation, and perioperative management protocols.

Results: Artificial iris implantation effectively restored optical barrier function, improved visual outcomes, and enhanced cosmetic appearance. Standardized evidence-based protocols were applied for indications and contraindications, criteria for selecting the type of artificial iris, essential surgeon-patient communication points, preoperative evaluation, surgical management principles and critical techniques, comprehensive perioperative care protocols, and strategies for managing long-term postoperative complications, leading to successful visual and structural rehabilitation.

Conclusions: Artificial iris implantation provides an effective treatment for partial and complete iris defects, significantly improving visual function and cosmetic outcomes. The standardization of key clinical issues ensures the safe, effective and consistent application of artificial iris implantation technology.

Abstract No.: 204276

Clinical Characteristics and Outcomes of Treatment Naïve Polypoidal Choroidal Vasculopathy Patients From a Tertiary Centre in Malaysia

First Author: Adeline Mae Li **KHAW**

Co-Author(s): Roslin Azni **ABDUL AZIZ**, Shelina Oli **MOHAMAD**, Nor Fariza **NGAH**

Purpose: To report the baseline characteristics, treatment patterns and clinical outcomes of treatment-naïve polypoidal choroidal vasculopathy (PCV) patients at year 1 and final visit.

Methods: Single centre, retrospective cohort study involving 62 newly diagnosed PCV patients in 2021-2022. Demographics, visual acuity (VA), optical coherence tomography (OCT), indocyanine green angiography (ICGA) (if performed) and treatment data were collected at baseline, year 1 and final visit. Logistic regression analysis was performed to determine predictors of VA maintenance or gain at year 1. The associations of baseline subretinal hyperreflective material (SHRM) and final injection interval with OCT biomarkers and other variables were tested using Pearson chi-squared test and Fisher Exact test.

Results: Mean age was 66.63 years with a male (54.8%) and Chinese (48.4%) predominance. Anti-vascular endothelial growth factor (anti-VEGF) was the first choice of treatment in 71.0% of patients with a mean number of 6.42 injections in year 1. Mean baseline VA was 48.34 logMAR letters. VA gain of 5.55 letters at year 1 and 5.51 letters at final visit was seen, but this was not statistically significant. There was significant reduction in mean CST from baseline (430.58um) for year 1 and final visit ($p<0.001$). ICGA

was performed in 32 patients (51.6%). A final injection interval of 12 weeks or more was achieved in 37% of patients, over a mean follow-up of 25.61 months. Ocular adverse events were retinal pigment epithelium (RPE) rip ($n=3, 4.8\%$), intra-ocular inflammation (IOI) ($n=2, 3.2\%$) and lens touch ($n=1, 1.6\%$). Predictors of VA maintenance or gain at year 1 include age (adjusted OR 0.88, $p=0.014$) and poorer presenting VA (adjusted OR 8.4, $p=0.018$). Baseline SHRM was significantly associated with type of pigment epithelial detachment (PED) at baseline ($p<0.001$), but did not affect VA outcome or total number of injections. A significant association was seen between final interval of injection with baseline PED subtype ($p=0.032$).

Conclusions: This study highlights the real-world management of PCV patients in a tertiary government hospital setting in Malaysia. Significant anatomical but not functional gains were attained at year 1 and final visit with a slightly lower number of injections at year 1 compared to an ideal clinical trial setting.

Abstract No.: 203664

Clinical Profile and Visual Outcomes of Central Serous Chorioretinopathy in Females: A Retrospective Analysis

First Author: Amrit **BANSTOLA**

Co-Author(s): Suraj **ADHIKARI**, Deepak **DHAKAL**, Jyotsna **PANDEY**

Purpose: To evaluate demographic profile, risk associations, clinical features, and outcomes of central serous chorioretinopathy (CSCR) in female patients.

Methods: A retrospective review was conducted of females diagnosed with CSCR. Data on age, laterality, systemic associations, visual acuity (VA), OCT findings, fluorescein angiography (FFA) patterns, management, and follow-up outcomes up to 12 months were analyzed.

Results: A total of 125 eyes were included. The majority were aged 36–50 years (59.2%). CSCR was unilateral in 75.2% and bilateral in 24.8%. At presentation, 60% had VA 0.1–0.5 LogMAR, while 22.4% had 0 LogMAR. OCT showed subretinal fluid $>300\ \mu\text{m}$ in 44.8%, and pigment epithelial detachment in 65.6%. Subretinal fibrin/deposit was seen in 23.2%. FFA demonstrated ink-blot pattern in 28% and smoke-stack in 4.8%, with extrafoveal leaks most frequent (17.6%). Systemic associations were noted in 26.4%: steroid use (12%) and pregnancy (3.2%). Laser was performed in 20.8%, with most cases observed. At 1 month, 21.6% showed complete resolution of fluid, increasing to 27.2% at 3 and 6 months, and 20% at 12 months. VA recovery was favorable, with 26.4% achieving 0 LogMAR at 1 month and 22.4% at 6 months. Recurrence occurred in 14.4% of cases.

Conclusions: In females, CSCR predominantly affects the 36–50 year age group, with unilateral presentation

and frequent association with steroids and pregnancy. Visual prognosis is generally favorable, though persistence and recurrence highlight the need for tailored follow-up and management.

Abstract No.: 202088

Combined Central Retinal Vein Occlusion and Cilioretinal Artery Occlusion in a Young Female

First Author: Shreya NARANG

Co-Author(s): Abhishek BHATIA, Shagun KORLA, Gian Chand RAJPUT, Jayant SHARMA

Purpose: To report a rare case of idiopathic unilateral ischemic central retinal vein occlusion (CRVO) associated with cilioretinal artery occlusion (CLRAO) in a young female, and to emphasize the diagnostic and therapeutic considerations.

Methods: A 31-year-old female presented with sudden, progressive, painless blurring of vision in the left eye for three days. Ocular examination showed best-corrected visual acuity (BCVA) 5/60 in the left with a relative afferent pupillary defect. Intraocular pressure and anterior segment were unremarkable. Fundus of the left eye showed disc edema, dilated tortuous veins, flame-shaped, dot-blot hemorrhages in all quadrants, and retinal whitening in the cilioretinal artery distribution with a cherry-red spot and Roth spots. OCT confirmed edema of the retinal nerve fiber layer with macular thinning. Systemic evaluation revealed microcytic hypochromic anemia with elevated erythrocyte sedimentation rate and positive C-reactive protein. Other systemic tests were normal.

Results: The patient was diagnosed with idiopathic ischemic CRVO with CLRAO and iron deficiency anemia. Management was done accordingly. The patient is under regular follow-up.

Conclusions: CRVO with CLRAO is an uncommon clinical entity. The transient hemodynamic blockage of the cilioretinal artery due to elevated intraluminal pressure in the retinal capillary bed may explain its pathogenesis. Prompt diagnosis and multidisciplinary management are essential for optimal outcomes.

Abstract No.: 208550

Comparative Analysis of Activation of Macrophages/Microglia in Diabetic Retinopathy and Familial Exudative Vitreoretinopathy

First Author: Jiakai LI

Co-Author(s): Xia CHEN, Xiaolin FANG

Purpose: To compare the activation patterns and functional roles of retinal macrophages/microglia in Familial Exudative Vitreoretinopathy (FEVR) and Diabetic Retinopathy (DR), focusing on their contributions to vascular pathology and inflammation.

Methods: FZD4 knockout mice were used as a FEVR model, characterized by genetic defects in angiogenesis, while streptozotocin (STZ)-treated C57BL/6 mice were used as a DR model, exhibiting hyperglycemia and microvascular changes. Retinal function was assessed via electroretinography, and vascular density was quantified. Retinal macrophage/microglia populations, polarization states, and pro/anti-inflammatory cytokine profiles were analyzed using immunohistochemistry and ELISA.

Results: FEVR mice showed reduced b-wave amplitudes and decreased vascular density, while DR mice displayed increased retinal vasculature and elevated fasting glucose. DR was associated with a higher number of retinal macrophages/microglia and greater M2-like polarization compared to FEVR. Proinflammatory cytokines (IL-1 β , TNF- α , IFN γ) were significantly elevated in DR. Both conditions upregulated Ang-1 and IL-10, with a stronger IL-10 response in DR. DR also increased anti-inflammatory factors such as bFGF, TIMP-1, TGF β 1, and VEGF-A more than FEVR, reflecting a more dynamic inflammatory balance.

Conclusions: Macrophages/microglia play distinct roles in FEVR and DR. While FEVR shows reduced activation and vascular density, DR exhibits robust macrophage/microglia expansion, polarization, and cytokine production, suggesting greater involvement in both inflammatory damage and repair. Modulating macrophage/microglia polarization may represent a therapeutic strategy for these retinal diseases.

Abstract No.: 204577

Comparative Outcomes of Faricimab and Aflibercept 8 mg in Neovascular AMD Refractory to Aflibercept 2 mg

First Author: Areum JEONG

Co-Author(s): Seungchul BAEK, Min SAGONG

Purpose: To evaluate the real-world efficacy of switching to aflibercept 8 mg or faricimab in patients with neovascular age-related macular degeneration (nAMD) who showed resistance to aflibercept 2 mg.

Methods: This retrospective chart review included 159 patients with refractory nAMD who had received at least three consecutive injections of aflibercept 2 mg at 4–8-week intervals before switching therapy. After switching, assessments included best-corrected visual acuity (BCVA), central retinal thickness (CRT), choroidal thickness, maximum height and width of pigment epithelial detachment (PED), and the presence of intraretinal or subretinal fluid (IRF/SRF).

Results: Over six months, mean BCVA and CRT did not show the difference between aflibercept 8 mg group (n = 78) and the faricimab group (n = 81). At month 6, the faricimab group demonstrated significant improvements in CRT, subfoveal choroidal thickness

(SFCT), Haller layer thickness, and maximum PED height, whereas the aflibercept 8 mg group did not show significant changes in these parameters. In addition, a lower proportion of eyes with IRF and/or SRF was observed in the faricimab group at month 6 ($p = 0.003$).

Conclusions: In nAMD patients resistant to aflibercept 2 mg, faricimab and aflibercept 8 mg achieved similar BCVA and CRT outcomes, but faricimab provided greater anatomical improvements, particularly in PED reduction and fluid resolution. These findings suggest that faricimab may offer additional structural benefits in aflibercept 2 mg-resistant nAMD.

Abstract No.: 200509

Comparing the Efficacy of Two Injectable Steroids, Intravitreal Triamcinolone Acetonide and Dexamethasone Intravitreal Implant for Treating Diabetic Macular Edema

First Author: Renuka Nikit **SARWATE**

Co-Author(s): Jayant **SARWATE**, Nikit **SARWATE**

Purpose: To compare the efficacy of two injectable corticosteroids, triamcinolone acetonide (IVTA) & dexamethasone (dex) intravitreal implant for treating diabetic macular edema (DME).

Methods: This was a retrospective study at a single tertiary center in rural Maharashtra (INDIA). Eyes treated with either intravitreal triamcinolone 4 mg or intravitreal dexamethasone 0.7 mg implant for center involving DME and with follow up of 6 months were included. Main outcomes were VA, IOP measurement, IOP lowering medications, CMT and time to next treatment of any kind.

Results: There were 21 eyes in the IVTA group and 23 eyes in the dex group. Mean VA was logMar 1.01 in IVTA and 0.99 logMar in dex group. VA gain was statistically significant at 1 month with logmar 0.51 ($p < 0.001$) but not significant at 6 months with logmar 0.75 ($p > 0.001$) in IVTA group. VA gain was statistically significant at 1 month with logmar 0.4 ($p < 0.001$) and at 6 months with logmar 0.35 ($p < 0.001$). Mean CMT decreased by 90.72 mm with IVTA at 1 month with p value < 0.001 & decreased by 157 mm with dex group at 1 month with $p < 0.001$ both statistically significant. Average Mean time to next injection was 13.80 weeks for IVTA and 18.75 weeks for dex group. Mean IOP increased by 3.5 mmHg and 0.6 mmHg in IVTA and dex group respectively.

Conclusions: Both groups showed similar efficacy in reducing DME and visual improvement but IVTA group had decline in VA at 6 months due to rebound phenomenon with IVTA injection.

Abstract No.: 205524

Comprehensive Diagnosis of a Pediatric Case With ABCA4-Related Stargardt Disease Type 1 via Multimodal Imaging and Genetic Testing

First Author: Kejia **YUAN**

Co-Author(s): Yun **LI**

Purpose: STGD (Stargardt disease) typically manifests in childhood or adolescence, leading to irreversible vision loss. To elucidate the diagnostic process of ABCA4-related STGD1 (Stargardt disease type 1) in a child through multimodal retinal imaging and genetic confirmation, highlighting key differentiating features.

Methods: A case report of a 9-year-old boy presenting with a 6-month history of progressively reduced visual acuity in both eyes. Diagnostic workup included fundus photography, SLO (scanning laser ophthalmoscope), OCT (optical coherence tomography), FA (fluorescein angiography), and whole-exome sequencing.

Results: Fundus photography revealed macular retinal pigment epithelium atrophy. SLO imaging showed multiple punctate and patchy hyperautofluorescent deposits in the posterior pole. OCT demonstrated foveal thinning and outer retinal atrophy. FA revealed a classic «dark choroid» sign. Genetic testing identified compound heterozygous ABCA4 variants: a maternal pathogenic variant (c.4539+1100A>G) and a paternal likely pathogenic variant (c.3482G>A/p.Arg1161His). The diagnosis of STGD1 was confirmed.

Conclusions: This case underscores the critical role of multimodal imaging (particularly OCT and FA) and genetic testing in the early and accurate diagnosis of STGD1 in children presenting with bilateral vision loss and macular changes. While no curative treatment exists, establishing a molecular diagnosis is essential for prognostic counseling, genetic risk assessment, and eligibility for future clinical trials.

Abstract No.: 201084

Declining Incidence of Retinopathy of Prematurity: A Retrospective Review at a Tertiary Care Center in Bangladesh (2022–2024)

First Author: Tariq Reza **ALI**

Co-Author(s): Ferdous Akhter **JOLLY**

Purpose: Retinopathy of prematurity (ROP) is a major cause of preventable childhood blindness among preterm and low birth weight infants. While advances in neonatal care have significantly improved the survival rates of preterm babies, they have also influenced the patterns and burden of ROP. Monitoring ROP incidence is crucial to assessing the impact of enhanced neonatal practices.

Methods: A retrospective record review was conducted for all infants who underwent ROP screening at BSMMU between 2022 and 2024. Collected data

included sex, gestational age at delivery, ROP diagnosis, type and severity of ROP, zone and stage of disease, and annual trends in ROP incidence. Descriptive statistics were used for analysis.

Results: A total of 2352 eyes (1176 babies) were screened for ROP. The majority were born between 32 and 35 weeks of gestation. ROP was diagnosed in 627 eyes (26.7%). Aggressive ROP was the most frequent presentation (46.1%). More advanced stages (Stages 4 and 5) comprised 21.4% of cases. Notably, with each subsequent year, the number of babies eligible for ROP screening increased (712 in 2022, 722 in 2023, and 918 in 2024). Despite this rise, the incidence of ROP showed a declining trend: 31.5% in 2022, decreasing to 26.6% in 2023, and further to 23% in 2024, suggesting improvements in neonatal care and preventive practices over time.

Conclusions: The steady decline in ROP incidence over the past three years suggests that ongoing improvements in neonatal care practices are positively impacting disease rates. Early screening, timely intervention, and quality neonatal care still remains essential.

Abstract No.: 205577

Diagnostic Value of Optical Coherence Tomography Angiography Findings and Their Correlation With Glycated Hemoglobin and Renal Biomarkers Across Different Stages of Diabetic Retinopathy

First Author: Mohammad **TOBEIHA**

Co-Author(s): Alireza **DEGHANI**, Amirhossein **DEGHANI**, Mohammad **MALEKAHMADI**, Mohammad Hossein **SHAFIEYOUN**, Pegah **VERADI ESFAHANI**

Purpose: To evaluate the diagnostic value of optical coherence tomography angiography (OCTA) parameters and their correlation with glycated hemoglobin (HbA1c) and diabetic nephropathy biomarkers in patients across different stages of diabetic retinopathy (DR).

Methods: In this analytical cross-sectional study, 151 participants were enrolled, including type 2 diabetic patients classified into five DR stages and non-diabetic controls (ND). Demographic, clinical, and laboratory data (HbA1c, urinary albumin, urinary creatinine, albumin-to-creatinine ratio, blood urea nitrogen, serum creatinine, glomerular filtration rate) were collected. OCTA imaging assessed superficial and deep capillary vessel densities (SCVD, DCVD), foveal avascular zone (FAZ), ganglion cell complex (GCC), retinal thickness, radial peripapillary capillary (RPC) density, and retinal nerve fiber layer (RNFL) thickness. Statistical analyses included group comparisons, correlation analyses, and ROC curve evaluation.

Results: OCTA revealed progressive declines in SCVD, DCVD, and RPC density with increasing DR severity ($p < 0.001$). Retinal thickness and GCC thickness

increased, while RNFL decreased in advanced stages. FAZ area peaked in moderate NPDR before declining in proliferative DR ($p = 0.002$). GFR correlated positively with OCTA vascular metrics. ROC analysis indicated GCC (AUC = 0.68) and retinal thickness (AUC = 0.67) had better diagnostic accuracy than vessel density parameters.

Conclusions: OCTA parameters demonstrate progressive vascular and structural alterations across DR stages, closely associated with systemic glycemic and renal biomarkers. Structural metrics such as GCC and retinal thickness outperform vascular densities in diagnostic accuracy, supporting their integration into early detection and monitoring strategies for DR.

Abstract No.: 202733

Dipeptide Alanine-Glutamine Ameliorates Retinal Neurodegeneration in an STZ-Induced Rat Model

First Author: Mingyan **WEI**

Co-Author(s): Qian **CHEN**, Ke **FENG**, Shiyong **LI**, Zuguo **LIU**, Yuhang **ZHANG**

Purpose: This study aims to investigate the potential therapeutic effects of the dipeptide alanine-glutamine (Ala-Gln) on diabetic retinal neurodegeneration and to delineate its mechanism of action.

Methods: The Streptozotocin (STZ)-induced rat model was used as a DR model. ERG was used to measure the neuronal function of the retina. Western blot analysis was performed to test the expression of proteins. Immunofluorescence staining was used for the detection and localization of proteins.

Results: In diabetic rats, the amplitudes of ERG were declined, while Ala-Gln restored the declined ERG. Retinal levels of inflammatory factors were significantly decreased in Ala-Gln-treated diabetic rats. Ala-Gln mitigated the declined levels of glutamine synthetase and ameliorated the upregulated levels of glial fibrillary acidic protein (GFAP) in diabetic retinas. Moreover, Ala-Gln upregulated the glycolytic enzymes pyruvate kinase isozymes 2 (PKM2), lactate dehydrogenase A (LDHA) and LDHB and stimulated the mTOR signaling pathway in diabetic retinas. The mitochondrial function was improved after the treatment of Ala-Gln in diabetic retinas.

Conclusions: Ala-Gln ameliorates retinal neurodegeneration by reducing inflammation and enhancing glucose metabolism and mitochondrial function in DR. Therefore, manipulation of metabolism by Ala-Gln may be a novel therapeutic avenue for retinal neurodegeneration in DR.

Abstract No.: 201423**Disease-Associated Microglia Induce Epithelial-Mesenchymal Transition in Retinal Pigment Epithelial Cells via SPP1-ITGAV Axis***First Author: Ziling LIU**Co-Author(s): Ning AN, Dongcheng LIU, Yijie LU, Bo QIN, Chuanghe ZHANG*

Purpose: Age-related macular degeneration (AMD) is a leading cause of vision loss, with the dry form characterized by RPE degeneration. This study aimed to explore the role of microglia in the retinal microenvironment and their contribution to RPE degeneration in dry AMD, focusing on the potential mechanisms and therapeutic interventions.

Methods: We investigated the retinal microenvironment in NaIO₃-induced retinal degeneration using single-cell transcriptomics. Immunofluorescence was employed to identify and confirm the presence of specific cell subsets. Co-immunoprecipitation (coIP) was utilized to investigate protein-protein interactions. Electroretinography (ERG) was conducted to assess the functionality of retinal tissue in mice, while H&E staining was performed to evaluate structural damage of the retina. Additionally, antibodies were administered intravitreally as an intervention in the animal model.

Results: A distinct subgroup of disease-associated microglia (DAM) expressing high levels of Secreted Phosphoprotein 1 (SPP1) was identified during the progression of dry AMD. SPP1+ DAM cells promoted EMT in RPE cells through the SPP1-ITGAV interaction. Mechanistically, ITGAV was cleaved by γ -secretase upon SPP1 binding, releasing an intracellular domain (ITGAV-ICD) that translocated to the nucleus and acted as a transcriptional regulator of EMT-related genes. Targeting the SPP1-ITGAV interaction with specific antibodies effectively protected RPE cells and photoreceptors, restoring visual function in a mouse model of dry AMD.

Conclusions: This study uncovers a novel communication pathway between microglia and RPE cells involving the SPP1-ITGAV axis, which drives retinal degeneration through EMT. Therapeutically targeting this pathway offers a promising strategy to mitigate vision loss in dry AMD.

Abstract No.: 205872**Double Ocular Assault: Bilateral Proliferative Hypertensive Retinopathy and Hypertensive Choroidopathy in a 33-Year-Old Male With Malignant Hypertension***First Author: Pauline Gabrielle LACSAMANA**Co-Author(s): Marie Joan LOY*

Purpose: This case highlights a rare presentation of hypertensive retinopathy with retinal neovascularization in a young male with end-stage

chronic kidney disease (CKD), emphasizing the interplay between severe systemic hypertension, uremia, and ocular vascular complications.

Methods: A 33-year-old male with end-stage CKD presented with sudden bilateral blurring of vision during a hypertensive crisis. The patient was stabilized at the emergency level and subsequent improvement in vision was noted. Ocular examination and imaging were then performed.

Results: By the time the patient was seen, the visual acuity improved to 20/70 (right) and 20/30 (left). Anterior segments were unremarkable but fundus findings revealed slightly blurred disc margins, arteriovenous narrowing, dilated tortuous vessels, dot-blot hemorrhages, and exudates. Elschnig spots and Siegrist streaks were also noted at retinal midperiphery. Fluorescein angiography confirmed retinal ischemia and neovascularization. One month later, the patient developed vitreous hemorrhage in the right eye. PRP and intravitreal injection of anti-VEGF was performed in the affected eye. There was subsequent resolution of hemorrhage and visual improvement following increased dialysis adherence and blood pressure control.

Conclusions: While hypertensive retinopathy is a well-known ocular manifestation of systemic hypertension, neovascularization is rarely seen. This case illustrates that in patients with severe CKD and malignant hypertension, ischemic retinal changes may progress to proliferative stages. Contributing factors may include elevated VEGF-A and reduced angiopoietin-1 in advanced CKD. Early recognition and treatment, including PRP and anti-VEGF therapy, are crucial to preserving vision in such complex presentations.

Abstract No.: 203947**Dual Retinal Pathology: A Rare Case of Retinitis Pigmentosa With Central Serous Chorioretinopathy (CSCR)***First Author: Swati SHARMA**Co-Author(s): Ramandeep SINGH*

Purpose: To present a rare case of retinitis pigmentosa with central serous chorioretinopathy.

Methods: A female in her late 30s presented to the retina clinic with complaints of diminution of vision in her right eye for one and a half months. On ocular examination, BCVA in RE was 6/24 and LE 6/6. IOP was within normal limits in both eyes. Anterior segment examination was unremarkable in both eyes. Fundus examination showed bilateral pigment deposits in a bony spicule pattern in the mid periphery of the retina with mild arteriolar attenuation, with the right eye having a dull foveal reflex and subtle elevation at the posterior pole; however, in the left eye, the foveal reflex was sharp. The disc was within normal limits in both eyes.

Results: Macular OCT revealed pigment epithelial detachment in the right eye with subretinal fluid. FFA showed an ink blot pattern of hyperfluorescence along with a focal area of leakage in the right eye. Full-field ERG revealed reduced rod response in both eyes. The left macular OCT was within normal limits.

Conclusions: CSCR with retinitis pigmentosa is a rare occurrence. Multimodal imaging helps us to aid in confirming the clinical diagnosis.

Abstract No.: 202415

Dual Therapy in Aggressive ROP: Anti-VEGF First, Minimal Laser Next

First Author: Arup Krishna **CHOUDHURY**

Co-Author(s): Sarwar **ALAM**, Mahua **CHAKRABORTTY**, Quazi Sazzad **IFTEKHAR**, Mominul **ISLAM**, Mostafizur **RAHMAN**

Purpose: To describe the outcome of dual therapy with intravitreal anti-VEGF injection followed by limited laser in an infant with aggressive retinopathy of prematurity (A-ROP).

Methods: A preterm infant, born at 30 weeks gestation with a birth weight of 1.1 kg, had a history of neonatal sepsis, 10 days of NICU stay, and oxygen therapy for 7 days. At the first screening on day 28 of life, the infant was diagnosed with A-ROP in posterior Zone II with plus disease. Intravitreal bevacizumab was administered on the same day. The infant was closely monitored, and at 6 weeks post-injection, targeted peripheral laser photocoagulation was applied to the residual avascular retina.

Results: The disease regressed successfully with resolution of plus and neovascular activity. The macula remained preserved. Only minimal laser scars were noted, which are expected to reduce the long-term risk of high myopia and visual field constriction compared to extensive laser monotherapy.

Conclusions: This case demonstrates that dual therapy with anti-VEGF followed by limited laser can be an effective approach in managing A-ROP. The strategy provides rapid regression with anti-VEGF while ensuring permanent disease control through selective laser, potentially optimizing long-term structural and functional outcomes.

Abstract No.: 200486

Epidemiological Analysis of Diabetic Retinopathy: Prevalence, Patterns, and Risk Factors Among Type 2 Diabetic Patients in Cambodia, 2024

First Author: Sreyla **CHORK**

Co-Author(s): Piseth **KONG**

Purpose: DR (Diabetic retinopathy) is a leading cause of visual impairment worldwide, particularly in adults. In Southeast Asia, DR is a growing concern with rising

diabetes prevalence. However, data from Cambodia remain limited. This study examined the prevalence, patterns, and risk factors of DR among type 2 diabetic patients, Phnom Penh, Cambodia.

Methods: A cross-sectional study enrolled 150 type 2 diabetic patients aged 40–70 years, who underwent DR screening in the hospital's endocrinology department from May to July 2024. Socio-demographic, clinical, and laboratory data were collected using a checklist. DR severity was classified into mild, moderate, severe NPDR (Non-proliferative diabetic retinopathy), or PDR (Proliferative diabetic retinopathy). Logistic regression was applied to identify associated risk factors.

Results: Among 150 participants, 45.3% diagnosed DR, with mild NPDR being the most common (63.2%). The mean age was 55 ± 7.4 years, and 63.3% were male. DR prevalence was highest in those aged 56–60 years (26.5%). Macular oedema was present in 8%. Significant risk factors included hypertension, dyslipidemia, poor glycemic control, and elevated HbA1c. Age, diabetes duration, and occupation showed no significant associations. Visual acuity impairment was minimal in early DR stages but worsened considerably in advanced DR.

Conclusions: This study provides foundational data on DR in Cambodia, emphasizing the critical role of early detection, regular retinal screening, and management of vascular risk factors to reduce the burden of DR and prevent vision loss.

Abstract No.: 206524

Evaluating the Efficacy of OZURDEX (DEX-I) in Combination With Anti-VEGF Therapy for Treatment-Naïve Inflammatory DME: A Prospective Cohort Study

First Author: Xiaoyan **Ji**

Purpose: This study aimed to evaluate the efficacy and safety of combining anti-VEGF therapy with DEX-I in treatment-naïve patients with inflammatory DME.

Methods: In this prospective study, 40 eyes with treatment-naïve inflammatory DME were randomized to either anti-VEGF monotherapy (control group, n=20) or combination therapy with anti-VEGF and DEX-I (combination group, n=20). The control group received a 5+PRN anti-VEGF regimen. The combination group received initial anti-VEGF plus DEX-I, completed a 5-injection anti-VEGF loading phase, and then received PRN retreatment (anti-VEGF and/or DEX-I). Patients were followed monthly for 52 weeks, with assessments of BCVA, CST via OCT, and IOP.

Results: BCVA Improvement: The combination group showed significantly greater BCVA gains at 4 weeks (12.15 vs. 7.70 letters, $P < 0.001$) and 52 weeks (23.20 vs. 10.75 letters, $P < 0.001$). At week 4, significant response rates ($\geq +10$ letters) were higher in the combination group (60% vs. 25% control), with no

poor responses (0% vs. 20% control). At week 52, significant response rates further improved in the combination group (95% vs. 75% control), with no poor responses in either group. CST Reduction: CST improvements were superior in the combination group at 4 weeks (-277.70 vs. -212.00 μm , $P<0.0001$) and 52 weeks (-348.15 vs. -262.85 μm , $P<0.0001$). At week 4, significant CST response rates (reduction $>40\%$ or $\text{CRT}\leq 300\mu\text{m}$) were higher in the combination group (80% vs. 20% control). At week 52, significant response rates increased to 95% in the combination group versus 75% in the control group. Injection Burden: The combination group required fewer injections (6.55 vs. 9.15, $P<0.001$). Safety: IOP increases were higher with combination therapy (12.05 vs. 2.7 mmHg, $P<0.0001$) but manageable topically; no significant cataract progression occurred.

Conclusions: Combination therapy with DEX-I and anti-VEGF provided superior visual and anatomical outcomes with reduced injection frequency compared to anti-VEGF monotherapy, demonstrating a favorable risk-benefit profile for treatment-naïve inflammatory DME. This approach offers a promising new strategy for DME treatment.

Abstract No.: 205986

Exudative Maculopathy in a Case of Unilateral Proliferative Retinopathy

First Author: Tavish GUPTA

Co-Author(s): Rohan CHAWLA, Mohammed SABIR, Nawazish Fatma SHAIKH

Purpose: To report a rare case of proliferative radiation retinopathy complicated by secondary choroidal neovascular membrane (CNVM) in an adult, and to review its multimodal management

Methods: A 40 year old diabetic male with a history of left orbital diffuse large B cell lymphoma treated with external beam radiotherapy (30 Gy in 15 fractions) presented three years post radiation with gradually progressive diminution of vision and floaters in the left eye. Clinical examination revealed florid neovascularization at the posterior pole with multiple microaneurysms and dispersed vitreous hemorrhage and fluorescein angiography (FA) revealed multiple leakages. The patient underwent panretinal photocoagulation (PRP), pars plana vitrectomy (PPV) with phacoemulsification and intraocular lens implantation.

Results: Initial fundus examination revealed florid proliferative radiation retinopathy with disc and retinal neovascularization, leading to vitreous hemorrhage. After PRP and PPV, best corrected visual acuity (BCVA) improved to 6/9. Six weeks later, OCT and FA demonstrated a sub-foveal CNVM characterized by late leakage and a hyperreflective subretinal lesion, with a drop in visual acuity to 3/60. He was given intravitreal Anti-VEGF injection, which led to complete regression

of the CNVM and gain of BCVA to 6/60. No recurrence was observed at six month follow up.

Conclusions: Proliferative radiation retinopathy occurs in up to 7% of eyes following ocular irradiation and may rarely be complicated by CNVM formation. Identification requires imaging, including OCT and FA, and prompt treatment with intravitreal anti VEGF can yield excellent anatomical and functional outcomes. This case highlights the importance of a multimodal approach in managing radiation induced ocular complications

Abstract No.: 204014

Exudative Retinal Detachment Secondary to Uveal Effusion Syndrome in Nanophthalmos: A Case Report

First Author: Hui Yun GOH

Co-Author(s): Josephine En Hui LEE, Pei Fang NEOH, Evelyn Li Min TAI

Purpose: To report a rare case of bilateral uveal effusion syndrome in a patient with nanophthalmos presenting with exudative retinal detachment.

Methods: Case report

Results: A 31-year-old Malay lady presented with one week history of sudden, painless blurring of vision in the left eye, preceded by intermittent headaches. She had longstanding poor vision since childhood but was otherwise healthy. Best-corrected visual acuity was 6/24 in the right eye and hand movement in the left eye. Fundus examination revealed bilateral disc swelling, inferior choroidal detachment in the right eye, and a total exudative retinal detachment with 360° choroidal detachment in the left eye. Axial length was markedly reduced (right 16.92 mm, left 16.70 mm), consistent with nanophthalmos, and refraction showed high hyperopia (right +13.0 D, left +12.5 D). Computed tomography of orbits confirmed bilateral choroidal detachment without intracranial lesion. She was treated with intravenous methylprednisolone for five days followed by tapering dose of oral prednisolone. At three months, right eye vision was static while left eye improved to 2/60. The right eye showed complete resolution of choroidal detachment, while the left eye demonstrated partial reduction. Optical coherence tomography confirmed reducing subretinal fluid of the left eye. Surgical intervention was offered but deferred due to guarded visual prognosis and patient preference.

Conclusions: Nanophthalmos predisposes to uveal effusion syndrome and exudative retinal detachment due to structural scleral abnormalities. While corticosteroids may achieve partial resolution, surgical intervention such as sclerotomy may be required in persistent cases. Visual prognosis remains guarded, especially in amblyopic eyes.

Abstract No.: 205774

Follow-Up Report of a Case of Focal Choroidal Excavation Secondary to COVID-19 Infection

First Author: Leilei WANG

Co-Author(s): Shiheng LU, Xiaowei TONG, Yuelan ZOU

Purpose: This case report documents a focal choroidal excavation (FCE) case demonstrating dynamic transformation between conforming and nonconforming types with retinal pigment epithelial (RPE) detachment lesions.

Methods: A 36-year-old male presented with one-day central blurred vision and metamorphopsia in his left eye, shortly after a COVID-19 infection. Visual acuity was 1.0 with spectacles in both eyes. Fundus examination revealed yellow-white punctate lesions in the foveal area of the left eye. Optical coherence tomography (OCT) showed intact retinal structures with an outward depression and increased outer choroidal signal. Fundus fluorescein angiography (FFA) showed punctate fluorescence at capillary ends without significant late phase leakage. Indocyanine green angiography (ICGA) showed annular hyperfluorescence and vessel dilation in the macular area.

Results: At 17 months follow-up, the lesion evolved to a nonconforming type with a hyporeflective space between the neuroepithelial and RPE layers. Mean visual acuity within the central 10° visual field marginally improved from 29.4 to 31.6. At the 20-month follow-up, the lesion returned to a conforming type. Three RPE elevations appeared near the fovea without blood flow signals. The choroid showed thickening with dilated large vessels at the ends of the excavation, consistent with pachychoroidal features.

Conclusions: This case illustrates the dynamic nature of focal choroidal excavation with transformations between conforming and nonconforming types. Multiple sub-RPE elevations suggest potential mechanisms related to RPE damage and unstable choroidal vascular perfusion pressure.

Abstract No.: 204591

From Breast to Retina, From Darkness to Light: Vision Restored After Breast Cancer Treatment

First Author: Zhen Pang MOI

Co-Author(s): Shir Yen WANG

Purpose: Exudative retinal detachment (ERD) occurs when there is accumulation of fluid between sensory retina and retinal pigment epithelium (RPE) layer. The spectrum of ERD etiologies includes inflammatory, infectious, and neoplastic among others.

Methods: A case report.

Results: A 45-year-old female with no prior medical illness presented with one month history of left eye (LE) vision drop preceded by chronic cough and significant weight loss for two months. Her right eye (RE) visual acuity was 6/9 whereas LE was hand movement (HM) with positive relative afferent pupillary defect (RAPD). Both eyes anterior segment examination was unremarkable. Fundus examination revealed LE ERD with choroidal lesions. Fundus fluorescein angiography (FFA) demonstrated multiple discrete small hypo-fluorescent spots (superior temporal-ST, inferior temporal-IT, midperiphery) with hyperfluorescent leakage over ERD area. Thorough systemic examination done showed palpable mass over right breast with both tumor markers CA19-9 and CEA raised. Further imaging and biopsy confirmed the diagnosis of metastatic breast carcinoma. Patient was co-managed with surgical and oncology teams. After six months of systemic chemotherapy, LE vision improved from HM to 6/9 with complete resolution of LE ERD and regression of bilateral choroidal lesions.

Conclusions: Breast is the most common primary source for choroidal metastasis. A high index of suspicion and meticulous systemic evaluation are essential for timely diagnosis and improving survival. With appropriate treatment, sight can be preserved and even restored.

Abstract No.: 202775

Globe Rupture Secondary to a Spontaneous Expulsive Suprachoroidal Hemorrhage in a Patient With Penetrating Keratoplasty: A Case Report

First Author: Xia HUIKA

Co-Author(s): Ma QINGMIN, Zhao ZHIHUA

Purpose: To report a rare case of globe rupture following a spontaneous expulsive suprachoroidal hemorrhage with a past ocular history of penetrating keratoplasty.

Methods: Case report.

Results: A 53-year-old man presented with a spontaneous clot exuding from his left eye with a history of falls. The patient denied a history of trauma or rubbing in the left eye when falling down. Note that the left eye had corneal injury from adolescence. What's more, the left eye had a past ocular history of penetrating keratoplasty and cataract operation. Both eyes were highly myopic. The patient had been blind in the left eye for more than one year. He received an emergency operation for corneal cracking, suturing, and removal of the artificial lens. A few days later, the patient underwent a second operation of orbit evisceration with a hydroxyapatite orbital implant in his left eye.

Conclusions: Spontaneous expulsive suprachoroidal hemorrhage with a past ocular history of penetrating

keratoplasty is a rare case. Fall may be a pertinent ocular factor for patient with a past ocular history of penetrating keratoplasty. Possibly high myopic and broken corneal suture may be the most susceptible to spontaneous expulsive suprachoroidal hemorrhage and leading to globe rupture.

Abstract No.: 202492

High Dose Aflibercept for Submacular Hemorrhage in Neovascular Age-Related Macular Degeneration: A Case Series

First Author: Geoffrey BROADHEAD

Co-Author(s): Andrew CHANG, Thomas HONG, Hemal MEHTA, Long PHAN, James WONG

Purpose: To report the initial outcomes of high dose aflibercept (HDA) as monotherapy for submacular hemorrhage (SMH) in neovascular age-related macular degeneration (nAMD).

Methods: Retrospective case series of patients with treatment-naïve nAMD presenting with foveal involving SMH of ≥ 1 disc diameter (DD) in size and treated with HDA monotherapy with at least 3 months of follow up. Data was collected on demographics, Snellen visual acuity (VA, converted to early treatment of diabetic retinopathy (ETDRS) letters), central macular thickness (CMT), SMH size in DD and injection frequency.

Results: 8 eyes of 8 patients were included. Mean age was 80.8 years, 50% of patients were female and mean baseline SMH size was 1.8 DD. At presentation, mean VA was 21 letters (2-60 letters range) and 50% of eyes had a presenting VA of $\leq 20/200$ Snellen equivalent. VA significantly improved to 48 letters at month 3 ($p=0.03$), with 62% of eyes having a >15 letter vision gain at 3 months. Mean presenting CMT was 611 μm and significantly reduced to 388 μm at month 3 ($p=0.045$).

Conclusions: HDA monotherapy is able to reduce CMT and improve vision in cases of nAMD related SMH, a condition excluded from initial clinical trials of HDA. Further studies and longer follow up will assist in determining the role of HDA in the management of SMH related to nAMD.

Abstract No.: 207647

High-Sensitivity C-Reactive Protein as a Key Biomarker for Diabetic Retinopathy

First Author: Hanyu WU

Co-Author(s): Xinyuan ZHANG

Purpose: To investigate the role of high-sensitivity C-reactive protein (hsCRP) in the occurrence and progression of diabetic retinopathy (DR) in patients with type 2 diabetes mellitus (T2DM).

Methods: This is a nested case-control study that recruited 157 T2DM patients (157 eyes) from May 2017 to October 2024. Based on the diagnostic criteria of the 2017 American Diabetes Association (ADA),

patients were sub-grouped to the diabetes mellitus (DM), non-proliferative diabetic retinopathy (NPDR), and proliferative diabetic retinopathy (PDR) groups. 58 age- and sex-matched non-diabetic individuals were included as normal controls. Fasting blood glucose (FBG), hemoglobin A1c (HbA1c), and hsCRP levels were measured by biochemical examination. Visual acuity, intraocular pressure, slit-lamp examination, dilated fundus examination, color fundus photography, optical coherence tomography (OCT), and OCT angiography (OCTA) were performed.

Results: After adjusting for age, gender, DM duration, hypertension duration, FBG, and HbA1c, multivariable logistic regression identified hsCRP as a significant risk factor for DR (OR=1.20, 95% CI 1.07-1.35, $P=0.002$). Spearman's coefficient analysis revealed a positive correlation between hsCRP and both FBG ($r=0.292$, $P<0.001$) and HbA1c ($r=0.239$, $P<0.001$).

Conclusions: Serum hsCRP levels may serve as a valuable biomarker for predicting the presence and severity of diabetic retinopathy.

Abstract No.: 203988

Hypertensive Uveitis After Intravitreal Faricimab Injections

First Author: Yunhua LOO

Co-Author(s): Shaan WIRYASAPUTRA

Purpose: Intraocular inflammation is a rare but potentially sight-threatening complication that can occur after intravitreal anti-vascular endothelial growth factor (anti-VEGF) injections. This adverse event has been under scrutiny in recent years, particularly with some of the newer agents, such as Brolucizumab which is associated with occlusive vasculitis. Faricimab is a newer anti-VEGF medication that has been approved for the treatment of diabetic macular oedema, cystoid macular oedema from retinal vein occlusion and neovascular age-related macular degeneration and long term safety data is still being collected. Here, we report 4 cases of subacute intraocular inflammation associated with raised intraocular pressure that developed following intravitreal Faricimab.

Methods: Case series of 6 eyes in 4 patients that developed hypertensive uveitis after intravitreal Faricimab.

Results: The 4 patients presented two to twelve weeks after their last intravitreal Faricimab. The intraocular inflammation was limited to the anterior chamber in the first patient while in the other three patients, there was anterior chamber and retrolental inflammation, as well as retinal vascular sheathing in one patient. All patients were treated successfully with topical steroid and glaucoma medications and the intraocular inflammation resolved with cessation of further intravitreal Faricimab injections.

Conclusions: It is imperative to be cognizant that non-infectious intraocular inflammation can occur after intravitreal anti-VEGF therapy, especially given the prevalence of this treatment. With more novel drugs coming to the market, continued surveillance and active reporting of adverse events is undoubtedly critical to help identify risk factors for this condition and to establish safety records.

Abstract No.: 207132

IL-3R α -STAT5B Signaling Drives M2 Macrophage Polarization and Choroidal Neovascularization

First Author: Changxuan **LIU**

Co-Author(s): Xiaoling **LIANG**

Purpose: IL-3R α -STAT5B signaling drives M2 macrophage polarization and choroidal neovascularization.

Methods: Human vitreous and fibrovascular membranes from nAMD and IMEM patients were analyzed (ELISA for IL-3; immunofluorescence for IL-3R α cell localization). In C57BL/6J mice, laser injury induced CNV. IL-3R α expression and M2 markers in RPE-choroid-sclera (RCS) were quantified by Western blot and flat-mount IF. Functional relevance was tested in macrophage-specific Il3ra conditional-knockout (CKO) mice. CNV burden was assessed by lesion area/thickness (IF, H&E, OCT) and vascular leakage (FFA). Phosphoproteomics (LC-MS/MS) compared RCS from CKO versus control CNV eyes to identify IL-3R α -dependent nodes, with emphasis on STAT5B Y699.

Results: Compared with IMEM, nAMD patients exhibited significantly higher vitreous IL-3, with IL-3R α co-localized to Iba1+ macrophages in fibrovascular membranes. In laser-induced CNV mice, IL-3R α and the M2 marker YM-1 were elevated in RCS complexes, and flat mount IF confirmed IL-3R α /Iba1+ co-localization within CNV lesions. CNV area and thickness were significantly reduced in Il3ra CKO mice, accompanied by diminished leakage on FFA and reduced YM-1/FIZZ1 expression. LC-MS/MS phosphoproteomics revealed globally decreased phosphorylation in Il3ra CKO CNV tissue. Integration with bioinformatics identified STAT5B phosphorylation at Tyr699 as a candidate mechanistic node. Together, these data implicate IL-3/IL-3R α signaling in macrophage M2 polarization and pathological angiogenesis.

Conclusions: IL-3/IL-3R α signaling promotes STAT5B Y699 phosphorylation, driving M2-like macrophage polarization that exacerbates CNV and vascular leakage. Targeting STAT5B phosphorylation could represent a promising therapy for neovascular AMD patients and potentially for other diseases where alternatively activated macrophages contribute to disease pathophysiology.

Abstract No.: 202232

Impact of Choroidal Characteristics on Treatment Response to Faricimab in Refractory Neovascular AMD and PCV

First Author: Yi-jie **PENG**

Co-Author(s): Yi-ting **HSIEH**, Chen-hua **LIN**

Purpose: To evaluate changes in choroidal parameters and their impact on treatment outcomes following intravitreal faricimab injection in patients with refractory neovascular age-related macular degeneration (nAMD) or polypoidal choroidal vasculopathy (PCV).

Methods: This retrospective study included 43 eyes from 43 patients with nAMD or PCV showing persistent activity despite ≥ 1 year of intravitreal aflibercept (2 mg) under a treat-and-extend regimen. All received a single faricimab injection. Best-corrected visual acuity (BCVA), central subfield thickness (CST), fluid status and choroidal parameters—subfoveal choroidal thickness (SFCT), total choroidal area (TCA), luminal area (LA), and choroidal vascularity index (CVI)—were evaluated by OCT at baseline and one-month post-injection. Associations between baseline choroidal parameters and treatment outcomes were analyzed.

Results: One-month post-faricimab injection, significant reductions were observed in CST (288 ± 64 to 246 ± 60 μm , $p < 0.001$), SFCT (222 ± 71 to 203 ± 68 μm , $p = 0.001$), TCA ($p = 0.001$), and LA ($p = 0.002$). There was a significant increase in the absence of subretinal fluid ($p < 0.001$) and retinal pigment epithelial detachment ($p = 0.025$). Multivariate regression analysis revealed thicker baseline SFCT correlated with poorer SRF resolution ($p = 0.044$), larger baseline LA correlated with less CST reduction ($p = 0.046$), and higher baseline CVI correlated significantly with less improvement in BCVA ($p = 0.001$).

Conclusions: Intravitreal faricimab achieved immediate anatomical improvement in refractory nAMD or PCV. Pachychoroid characteristics, including thicker SFCT, larger LA, and higher CVI, indicated poorer anatomical or visual outcomes, suggesting the distinct pachychoroid mechanisms in nAMD or PCV.

Abstract No.: 202233

Injection Only Approach for Aggressive ROP: Real-World Experience

First Author: Arup Krishna **CHOUDHURY**

Co-Author(s): Sarwar **ALAM**, Mahua **CHAKRABORTTY**, Quazi Sazzad **IFTEKHAR**, Mominul **ISLAM**, Mostafizur **RAHMAN**

Purpose: To present clinical outcomes of anti-vascular endothelial growth factor (anti-VEGF) monotherapy in aggressive retinopathy of prematurity (A-ROP), with emphasis on preserving functional retina and reducing long-term complications associated with laser therapy.

Methods: Two premature infants with A-ROP were treated exclusively with intravitreal anti-VEGF injection as the initial and sole therapy. Serial fundus examinations were performed to assess disease regression, vascular progression, recurrence, and anatomical stability. Functional implications of avoiding laser ablation, including potential preservation of visual fields and refractive outcomes, were considered.

Results: Both cases demonstrated rapid regression of plus disease and neovascularization following injection. Physiological peripheral vascularization continued without recurrence during follow-up. No ocular or systemic adverse events were observed. By avoiding laser, functional retina was preserved, which is expected to minimize the risk of long-term visual field restriction and high myopia. Although only two representative cases are detailed, these findings reflect a broader clinical trend in which anti-VEGF monotherapy is increasingly considered for selected infants with A-ROP.

Conclusions: Anti-VEGF monotherapy offers effective regression in A-ROP while maintaining functional retina and reducing the treatment burden of laser therapy. With vigilant follow-up, injection-only management may represent a promising pathway for optimizing both anatomical and functional outcomes in premature infants.

Abstract No.: 205711

Integrating Electroretinography and Genetic Diagnostics in the Assessment of Inherited Retinal Diseases - A Case Series

First Author: Prasan **WARNAKULA**

Co-Author(s): Vajira **DISSANAYAKE**, Thilina

MUNASINGHE, Rythmi **RAGUNATHAN**, Dushyantha **WARIYAPOLA**

Purpose: Inherited Retinal-Diseases (IRD) are rare ocular genetic disorders. Electroretinography (ERG) is essential for functional assessment, while genetic studies confirm diagnosis. We report a series comparing ERG findings with their Whole Exome Sequencing (WES) results to enhance the understanding of the genotype phenotype relationships.

Methods: Eight patients with suspected IRD underwent clinical evaluation, ERG testing, and WES analysis. ERG findings were correlated with identified genetic variants to refine diagnosis.

Results: There were 3 cases suspected with bestrophinopathies. One had a family history and consanguineous parents. ERG of all 3 cases showed RPE-photoreceptor interaction dysfunction with bilateral macular dysfunction. WES showed the following results: Case 1 – homozygous for BEST1c.140G>A (p.Arg47His). Case 2 – homozygous for BEST1c.685A>C(p.Lys229Gln). Case 3 – compound heterozygous for BEST1c.1060delT;(p.Trp354fs) and BE

ST1c.1210_1220delTACTACAGTGC(p.Tyr404fs). There were 2 cases suspected with Stargardt's disease. ERG of both cases indicated mild to moderate central macular dysfunction. WES showed the following results: Case 4 – heterozygous for ABCA4c.6088C>T(p.Arg2030*), Case 5 – compound heterozygous for ABCA4c.1937+1G>A and ABCA4c.5882G>A(p.Gly1961Glu). In Case 6 suspected of fundus albipunctatus, ERG showed generalized cone-rod function reduction, and WES showed a homozygous PLA2G5c.133G>T(p.Gly45Cys) associated with Fleck-Retina. In Case 7, although clinically suspected retinitis pigmentosa (RP), ERG was not suggestive of RP but showed macular dysfunction and WES showed a heterozygous PITPNM3c.374G>T(p.Cys125Phe) variant associated with Cone-Rod-Dystrophy-5(CORD5). In Case 8 suspected of cone dystrophy ERG showed cone-system dysfunction but WES didn't show any genetic finding.

Conclusions: This study highlights the role of combining genetic diagnostics with ERG for diagnosis and management of IRD, while facilitating genetic counselling and genotype prevention.

Abstract No.: 204512

International Validation and Applicability of the G-ROP Algorithm: A Systematic Review and Meta-analysis

First Author: Hsin Ho **CHANG**

Co-Author(s): Sheng Chu **CHI**

Purpose: The G-ROP algorithm, which incorporates postnatal weight gain as a screening trigger, has gained global traction. This study aimed to comprehensively evaluate its diagnostic performance across different ROP severities and identify sources of heterogeneity.

Methods: We conducted a systematic review and meta-analysis using PubMed, EMBASE, and Cochrane databases through September 2024. Studies applying G-ROP to predict type 1, type 2, treated, or any-stage ROP in preterm infants were included. Two reviewers independently extracted data and assessed quality using the QUADAS-2 tool.

Results: Twenty-three studies met inclusion criteria. For type 1 ROP, pooled sensitivity was 0.99 and specificity 0.34, with a diagnostic odds ratio (DOR) of 6.22 and area under the SROC curve (AUC) of 0.87. Type 2 ROP showed sensitivity 0.98, specificity 0.25, DOR 3.21, AUC 0.76. Treated ROP had sensitivity 0.99, specificity 0.30, DOR 8.84, AUC 0.80. For any-stage ROP, sensitivity was 0.87, specificity 0.45, DOR 5.88, AUC 0.78. Meta-regression revealed no significant influence from study region, gestational age, birth weight, or publication year.

Conclusions: G-ROP consistently demonstrated excellent sensitivity in detecting severe ROP. However, its modest specificity, particularly for milder disease, suggests potential over-screening—an important

consideration for implementation in resource-limited settings.

Abstract No.: 206095

Interpreting OCT in DME: Patterns and Biomarkers to Look for

First Author: Abdul HANNAN

Purpose: To teach general ophthalmologists the details of fine patterns in DME OCT.

Methods: A presentation highlighting major patterns and biomarkers in OCT of DME with their clinical significance. It will help young ophthalmologists and general ophthalmologists in better understanding the OCT of DME. It will also play a major role in the correct screening of the disease and ultimately better/quicker referral to a medical retina specialist.

Results: This presentation is a need for many young and general ophthalmologist who silently wish to learn these patterns to better understand the needs of their patients.

Conclusions: interpreting OCT in DME: Patterns and Biomarkers to look for.

Abstract No.: 207309

Intravitreal Anti-VEGF Therapy and Risk of Limb Complications in Patients With Diabetic Eye Disease

First Author: Brian TOY

Purpose: Intravitreal anti-vascular endothelial growth factor (VEGF) therapy is widely used to treat diabetic eye disease (DED), yet systemic VEGF suppression may impair peripheral wound healing. We sought to evaluate the risk of DFUs and LEAs associated with intravitreal anti-VEGF injections (IVI) in patients with DED and to compare risks among ranibizumab, aflibercept, and bevacizumab.

Methods: Retrospective cohort study of multicenter electronic health records network, including adults with DED (diabetic retinopathy or diabetic macular edema) who received ≥ 3 IVI compared to those who received ≤ 2 anti-VEGF injections (control group) during the study period. We assessed incidence of any LEAs, above-ankle LEAs, and DFUs following incident DED diagnosis. Cox proportional hazards analyses were used to estimate hazard ratios.

Results: Of 448,100 patients with DED, 35,269 received ≥ 3 injections and 412,831 received ≤ 2 injections. After matching, 34,070 patients remained in each group. IVI cohort was associated with increased risk of LEA (HR 1.49, 95% CI 1.33–1.68), above-ankle LEA (HR 1.31, 95% CI 1.08–1.59), and DFU (HR 1.36, 95% CI 1.30–1.42) compared with the control group. In high-risk subgroups, IVI was associated with increased risk of LEA in patients with PDR (HR 1.44, 95% CI 1.27–1.62), PAD (HR 1.35, 95% CI 1.12–1.56), ESRD (HR 2.06, 95%

CI 1.28–3.31), and DFU (HR 1.46, 95% CI 1.22–1.75). Risks were similar across anti-VEGF agents.

Conclusions: IVI therapy for DED was associated with increased risk of LEA, particularly with comorbid PDR, PAD, ESRD, or DFUs. These findings highlight the importance of monitoring for limb complications in patients undergoing intravitreal anti-VEGF treatment.

Abstract No.: 202352

Iris Metastasis as the Initial Presentation of Occult Lung Adenocarcinoma: A Case Report

First Author: Puvaneswary TANGGA RAJOO

Co-Author(s): Roslin Azni ABDUL AZIZ, Rajasudha SAWRI RAJAN

Purpose: To report a case where an iris metastasis was the inaugural sign of widely metastatic, stage IV lung adenocarcinoma, and to highlight the role of the ophthalmologist in diagnosing systemic malignancy.

Methods: A case report of a 70-year-old Chinese male, a passive smoker, who presented to the ophthalmology clinic with left eye redness and blurring of vision. He reported a concomitant dry cough. Ocular examination revealed counting finger vision, a well-circumscribed iris mass (7.0 mm x 5.7 mm), and secondary glaucoma. Systemic workup prompted by these findings included a chest examination, which revealed reduced breath sounds and dullness to percussion. This was investigated with chest X-ray and a confirmatory lung biopsy.

Results: Ocular findings were highly suggestive of a metastatic lesion. Chest X-ray revealed a well-defined opacity in the left mid-to-lower zone. Lung biopsy performed by the respiratory team confirmed the diagnosis of lung adenocarcinoma. A subsequent PET scan confirmed Stage IV disease. The iris metastasis was therefore the presenting sign of widespread metastatic illness. Following three cycles of systemic chemotherapy, regression of the iris mass was noted. However, the vision in the left eye remained poor.

Conclusions: An isolated iris mass can be the initial manifestation of an otherwise occult advanced malignancy, such as lung adenocarcinoma. It highlights the critical importance of a thorough systemic review in patients with atypical ocular masses, even in the absence of known cancer diagnosis. While chemotherapy can be effective in inducing regression of metastatic deposit, visual prognosis may remain poor if the disease is advanced at presentation.

Abstract No.: 202887**Isolated Cone Dystrophy With Secondary Macular Involvement Mimicking Optic Atrophy and Vascular Insult***First Author: Stephen SUDHAKAR*

Purpose: Cone dystrophy is a rare group of inherited retinal disorders primarily affecting cone photoreceptors. It may mimic optic neuropathies and vascular insults due to overlapping features such as pallor, visual loss, and macular changes. Early identification through multimodal imaging and electrophysiology is key to diagnosis and counseling.

Methods: A 24-year-old male presented with progressive, painless left eye vision loss. OD showed temporal pallor and granular changes; OS had HM vision, RAPD, waxy disc pallor, macular atrophy, and RPE changes—suggestive of bilateral retinal dystrophy mimicking optic neuropathy.

Results: This case mimics bilateral optic neuropathy and vascular occlusion. Presence of disc pallor, macular changes, and vascular narrowing may misleadingly suggest ischemic pathology. However, ERG revealed isolated cone dysfunction, a hallmark of cone dystrophy. Normal rod response ruled out rod-cone dystrophy.

Conclusions: Cone dystrophies can mimic acquired optic and retinal vascular pathologies. Multimodal imaging, electrophysiology are crucial for accurate diagnosis. Genetic counseling and family screening are essential.

Abstract No.: 201135**Juvenile Onset Vitelliform Maculopathy in Mitochondrial Encephalomyopathy, Lactic Acidosis and Stroke-Like Episodes (MELAS)***First Author: Zjen Pang MOI**Co-Author(s): Su Huan CHONG*

Purpose: MELAS, one of the commonest maternally inherited mitochondrial disorders, is associated with point mutation of m.3243A>G. The estimated prevalence is 18.4 per 100,000 and it predominantly affects muscles and nervous systems. We reported a rare case of juvenile vitelliform maculopathy in MELAS syndrome.

Methods: Case report.

Results: An 11-year-old boy with underlying MELAS syndrome presented with left eye painless blurring of vision for 1 month associated with left ptosis and photophobia. There is no family history of blindness. He has normal developmental milestones. His right eye visual acuity was 6/9 while left eye visual acuity was 6/12. He has left eye partial ptosis with normal extraocular movement. Fundus examination of both eyes showed yellowish vitelliform lesions over the macula. No retinal hemorrhages were noted. Bilateral

eyes optical coherence tomography (OCT) showed hyper-reflective subretinal materials with no evidence of choroidal neovascularization. He was diagnosed with bilateral eyes vitelliform maculopathy.

Conclusions: Juvenile onset vitelliform maculopathy is a retinal manifestation in MELAS, that has a visual implication, other than its common manifestation involving muscles and nervous systems. This condition needs proper surveillance as there is a risk of choroidal neovascularization.

Abstract No.: 201314**Long-Term Treatment Outcome of Laser Indirect Ophthalmoscopy in Type 1 Retinopathy of Prematurity***First Author: Navpreet KAUR**Co-Author(s): Deepti BHAGLANI, Praveen PANWAR, Arti SAREEN*

Purpose: To evaluate the structural and refractive outcomes of children aged 1-5 years who underwent laser photocoagulation for type 1 ROP (Retinopathy of prematurity).

Methods: A longitudinal observational study which included twenty-four children (48 eyes) treated with LIO (Laser indirect ophthalmoscopy) for Type 1 ROP between 2019 and 2023. Two follow-ups were conducted six months. These visits included detailed assessments of fixation pattern, ocular motility, presence of nystagmus, refractive status, narrowing of arcades, disc or macular drag, vitreous membranes, and tractional detachments. Axial length was calculated using contact A-scan ultrasound. Refractive outcome was assessed using cycloplegic retinoscopy.

Results: The mean gestational age and birth weight were 30.83 weeks and 1572.5 grams, respectively. Structural outcomes were favorable in 95.8% of eyes, with only two eyes showing nystagmus. At the first follow-up, 30 eyes (62.5%) had myopia (mean SE: -2.42 D), while 37.5% had hyperopia. By the second follow-up, the prevalence of myopia had increased markedly to 38 eyes (79.17%) with a mean spherical equivalent of -2.72 D. Axial lengths showed significant growth between the two follow-ups ($p < 0.001$), with mean values increasing from 20.47 mm to 21.74 mm.

Conclusions: LIO is a safe and effective modality for treating Type 1 ROP, demonstrating excellent structural outcomes and manageable refractive complications. However, a higher prevalence of myopia in aggressive and advanced ROP highlights the need for regular long-term follow-up to enable early detection and correction of refractive errors for optimal visual development.

Abstract No.: 204592
METTL3 Deacetylation Promotes Ferroptosis in RPE Cells in NaIO₃-Induced Dry Age-Related Macular Degeneration Model

First Author: Dongcheng **LIU**

Co-Author(s): Hongxia **LIAO**, Jingwen **LIU**, Ziling **LIU**, Yijie **LU**, Bo **QIN**

Purpose: Ferroptosis of retinal pigment epithelial (RPE) cells is one of the significant causes of dry age-related macular degeneration (AMD), but the mechanism remains unclear. The aim of this study was to investigate the role of METTL3 in RPE ferroptosis in AMD.

Methods: The ferroptosis of RPE cells was induced using NaIO₃. The expression and localization of METTL3 were monitored by immunofluorescence. siRNA targeting METTL3 was delivered by lentivirus transduction. mRNA m6A modification was identified by Methylated RNA Immunoprecipitation (MeRIP).

Results: We found that METTL3 translocated from the cytosol to the nucleus during ferroptosis in RPE cells. Upon screening, we identified SIRT1 as the primary acetyltransferase responsible for the acetylation of METTL3, leading to its translocation. Interestingly, inhibiting METTL3 and SIRT1 increased the growth of RPE cells, resulting in a significant decrease in ferroptosis.

Conclusions: Our study identifies an acetylation-dependent regulatory mechanism that determines the subcellular localization of METTL3. This finding may offer mechanistic insights for developing therapeutic strategies for the treatment of AMD.

Abstract No.: 202190
Management Dilemma in a Case of Coat's Disease Presenting With a Tumor-Like Macular Lesion

First Author: Michael Austin **SUA**

Co-Author(s): Jubaida **MANGONATO**, Rochelle **PILONES**, Jocelyn **SY**

Purpose: To describe the approach and management of case of Coats disease with a tumor-like macular lesion.

Methods: An 11-year-old male presented with gradual, painless loss of vision in the right eye over three years. Fundus examination revealed the classic fundus findings of Coats Disease such as retinal telangiectasia at the temporal periphery which was surrounded by extensive subretinal yellowish exudates, extending to the macula. However, there was note of a whitish tumor-like lesion in the macula similar to the appearance of a retinoblastoma lesion. Hence, retinoblastoma had to be ruled out prior to commencing treatment. The fellow eye was normal.

Results: B-scan ultrasonography, OCT of the macula, and fluorescein angiography along with cranial magnetic resonance imaging with Gadolinium contrast were done for further investigation. The information gathered from these diagnostic examinations were the basis for the approach to the management of this case which included focal laser photocoagulation and intravitreal anti-vascular endothelial growth factor injection.

Conclusions: The treatment of Coats Disease is straightforward and includes laser photocoagulation and intravitreal injection of anti-VEGF. However, when complicated by the presence of a tumor-like lesion, further investigation is warranted to rule out a malignancy. Multimodal imaging and a high clinical index of suspicion is crucial in arriving at a diagnosis and management approach.

Abstract No.: 203308
Mechanical Stretch Activates Pannexin1/P2X7-Dependent NLRP3 Inflammasome to Trigger RPE Pyroptosis and IL-1 β /IL-18-Driven Inflammation

First Author: Yuyan **LIU**

Co-Author(s): Yanhua **CHU**, Ailin **YAO**

Purpose: While inflammasomes are present in retinal pigment epithelial (RPE) cells, their specific role in retinal inflammation, particularly under mechanical stress, remains undefined. This study investigates the mechanosensitive activation of the NLRP3 inflammasome and its contribution to inflammatory responses.

Methods: ARPE-19 cells were subjected to biaxial cyclic mechanical stretching using a Flexcell® FX-6000 Tension System to establish a cellular strain model. Experimental groups were defined by stretch duration (8h, 14h, 24h at 21% surface area increase, SA), strain magnitude (21% SA vs. 10% SA for 14h), and pharmacological blockade (0.5h pretreatment with the Pannexin1 (Panx1) channel blocker or the P2X7 receptor, followed by 24h stretch at 21% SA). Key protein expression was analyzed via Western blotting (WB) and immunofluorescence (IF). Quantitative PCR (qPCR) assessed mRNA levels of key targets. IL-18 and IL-1 β secretion into the supernatant was measured by ELISA. Pyroptosis was evaluated via flow cytometry.

Results: Immunofluorescence analysis revealed that prolonged mechanical stretching progressively upregulated inflammasome-related gene and protein expression in RPE cells, with longer durations correlating to significantly elevated levels. Concurrently, extracellular secretion of IL-18 and IL-1 β exhibited a time-dependent increase in response to stretch duration. Crucially, pharmacological blockade of the Pannexin 1/P2X7 signaling pathway effectively inhibited NLRP3 inflammasome activation in RPE cells and markedly reduced IL-18 and IL-1 β release.

Conclusions: These findings identify the NLRP3 inflammasome as a key mechanosensor in RPE cells, driving retinal inflammation. This advances understanding of ocular mechanobiology and highlights Pannexin-1/P2X7R as a therapeutic target to mitigate mechanical stress-related retinal damage.

Abstract No.: 208571

Microvascular Abnormalities on OCT Angiography With Severity of Diabetic Retinopathy

First Author: Shubham **AGARWAL**

Co-Author(s): Sandeep **SAXENA**

Purpose: To evaluate microvascular abnormalities using OCT-Angiography software algorithms with the severity of Diabetic Retinopathy in patients with and without Diabetic Kidney Disease, and the correlation between serum creatinine levels and OCT parameters.

Methods: A total of 320 eyes (160 diabetic patients) were recruited in this tertiary care-based cross-sectional study. Patients were divided into groups of No DR, mild NPDR, moderate NPDR, severe NPDR, and PDR. Each group had non-DKD and DKD patients. Blood investigations, including serum creatinine and urea levels, and angiograms with macular vessel densities, Foveal vascular zone (FAZ), were done and analysed with statistical analysis.

Results: Superficial vessel density (SVD) decreased from 41.3% (No DR) to 25.56% (PDR), Deep vessel density (DVD) reduced from 55.08% (No DR) to 40.09% (PDR) ($p < 0.001$). FAZ enlarged significantly, from 0.27 mm² (No DR) to 0.56 mm² (PDR) ($p < 0.001$), indicating worsening capillary dropout. Additionally, a strong correlation was observed between worsening renal function and advanced DR stages. Patients with higher serum creatinine and urea levels showed significantly reduced vessel density and larger FAZ, suggesting shared microvascular pathology between diabetic nephropathy and retinopathy.

Conclusions: OCTA-based assessment of retinal microvascular changes provides valuable insights into DR progression and can act as an effective biomarker for DR and DKD. The study highlights that reduced vessel density and FAZ enlargement correlate strongly with both DR severity and declining kidney function, reinforcing the need for early screening, glycemic control, and integrated management of diabetic complications.

Abstract No.: 201313

More than Meets the Eye - A Case Report

First Author: Reuben **FOO**

Purpose: To describe a case report of a lady who presented with insidious bilateral blurring of vision and a life-changing diagnosis.

Methods: A 60-year-old Malay woman with impaired fasting glucose and hyperlipidemia presented with one year of progressive bilateral visual blurring, worse in the left eye. She had no systemic symptoms, history of cancer, family history of visual impairment, or exposure to traditional or illicit drugs.

Results: Visual acuity was 6/60 bilaterally, with a left grade 2 RAPD. Anterior segment showed mild nuclear sclerotic cataracts. Posterior segment examination revealed bilateral mottled retinas with normal discs. Visual fields showed dense bilateral losses. Retinal nerve fiber layer OCT was normal, but macular OCT demonstrated bilateral ellipsoid zone disruption. Electroretinography and visual evoked potentials indicated bilateral retinal dysfunction. Incidentally, she was noted to have scleral icterus. Her liver enzymes were markedly deranged and urgent referral to Gastroenterology was made. Further workup with CT scans revealed a head-of-pancreas adenocarcinoma and synchronous right breast invasive ductal carcinoma. Given the constellation of findings, cancer-associated-retinopathy was suspected. Eventually, antiretinal antibody testing returned positive for RAB6, enolase, and HSP60. She underwent a Whipple's procedure and right mastectomy with axillary clearance, followed by chemotherapy. She is pending ophthalmic management with corticosteroids.

Conclusions: This case highlights the importance of a holistic approach in Ophthalmology - and good Ophthalmologists should look beyond just the eyes. Careful observation of ocular clues such as scleral icterus can uncover paraneoplastic syndromes that lead to the diagnosis of otherwise occult, life-threatening malignancies.

Abstract No.: 207312

Multicolor Imaging Features of Age-Related Macular Degeneration and Polypoidal Choroidal Vasculopathy

First Author: Colin **TAN**

Purpose: To evaluate the accuracy of multicolour imaging compared to standard colour fundus photography (CFP) in differentiating AMD from normal eyes, and in detecting features of PCV.

Methods: In a prospective study of 50 consecutive patients presenting with PCV or AMD, standardized multimodal imaging (CFP, multicolour imaging, fluorescein, and indocyanine green angiography [ICGA]) was performed. PCV was diagnosed using specific diagnostic criteria, with ICGA as the gold standard. CFP and multicolor images were graded using standardized grading protocols to determine sensitivity, specificity, positive and negative predictive values (PPV and NPV).

Results: Polyps appeared as dark green oval lesions in 39 (88.6%) using the multicolour channel, while the branching vascular network (BVN) appeared as

mottled grey lesions in 16 (36.4%) using the infrared channel. Multicolor had superior specificity (73.9% vs. 52.2%) and NPV (94% vs. 85.7%) compared to CFP for detecting all types of AMD. The sensitivity was similar for both multicolor and CFP (97.7% vs. 97.4%). For the detection of PCV, multicolour had higher sensitivity (86.4% vs. 59.1%) and NPV (89.3% vs. 74.3%) compared to CFP. In contrast, the specificity (89.3% vs. 92.9%) and PPV (86.4% vs. 86.7%) were similar between the two.

Conclusions: Multicolour imaging is superior to CFP in differentiating AMD from normal eyes and detecting features of PCV. The presence of BVN on infrared imaging and dark green oval lesions should alert ophthalmologists to the presence of PCV.

Abstract No.: 206042

Multimodal Imaging for Elschnig Spots in Hypertensive Choroidopathy

First Author: Monalisa **PATI**

Co-Author(s): Udayasree **ORUGONDA**, Somy **PUROHIT**

Purpose: To report the significance of multimodal imaging in a patient having Elschnig spots in hypertensive choroidopathy.

Methods: A 35-year-old male presented with a vision of 20/20 OD and hand movements (HM) OS. His blood pressure was 180/110 mm Hg. Fundus evaluation revealed old non-arteritic anterior ischemic optic neuropathy (NAAION) OS, grade 2 (Keith, Wagener, and Barker classification) or mild (Wong and Mitchell classification) hypertensive retinopathy OU. There were multiple dot-like pigmented lesions surrounded by depigmented halos in the mid-periphery of the retina OU. OCT scan through these lesions revealed hyperreflective exudates involving the outer retinal layers and the retinal pigment epithelium (RPE). Fundus image, OCT, fundus fluorescein angiography, and fundus auto-fluorescence findings were typical of Elschnig spots of hypertensive choroidopathy. Elschnig spots represent changes in RPE resulting from nonperfused areas of choriocapillaris in hypertensive choroidopathy

Results: The patient was advised to consult a physician and to control systemic hypertension. On the 6-month follow-up, the fundus findings and the Elschnig spots remain the same.

Conclusions: Elschnig spots represent changes in RPE resulting from nonperfused areas of choriocapillaris in hypertensive choroidopathy. Multimodal retinal imaging helps in the diagnosis of this condition, which is associated with serious systemic hypertension.

Abstract No.: 204723

Multiple Intravitreal Dexamethasone Injections Are Safe in Central Serous Chorioretinopathy Treatment

First Author: Umesh **CHANDRA BEHERA**

Purpose: To study the safety and efficacy of multiple intravitreal dexamethasone (DEX) injections in central serous chorioretinopathy (CSC).

Methods: Eyes with chronic CSC treated with multiple DEX injections were monitored for change in subretinal fluid (SRF), visual alterations, and secondary glaucoma and cataract progression.

Results: Nine eyes of nine patients were injected with DEX at least twice. No signs of disease worsening were noted in any eye. A complete resolution of SRF was observed in 67% of cases, and a minimum of 20% reduction in SRF height was achieved in 89% of cases. The mean change in central macular thickness at the final follow-up was $148.4 \mu\text{m}$ ($p = 0.019$). Mean logMAR best corrected visual acuity (Snellen equivalent) at presentation improved from 0.46 ± 0.25 (20/60) to 0.21 ± 0.14 (20/30) after the first injection at 3 months but worsened to 0.38 ± 0.42 (20/50) after the second injection ($p=0.279$). Two patients developed cataracts, and four experienced an increase in intraocular pressure, which was medically controlled. Retreatment was performed after a mean interval of 5.5 ± 1.87 months.

Conclusions: This study demonstrates that multiple DEX injections do not exacerbate CSC and are efficacious but carry a higher risk of secondary glaucoma.

Abstract No.: 204459

Myopic Maculopathy Among Myopic Patients in a Tertiary Hospital in Bangladesh

First Author: Faouzia **SULTANA**

Co-Author(s): Wahid **ZAMAN**

Purpose: This study aims to determine the characteristics of myopic maculopathy among myopic patients, to identify and analyze specific risk factors associated with the development of myopic maculopathy in the Retinal Department at Ispahani Islamia Eye Institute and Hospital (IIEIH) in Bangladesh.

Methods: A cross-sectional analysis was conducted from January 2023 to June 2023 in the Retinal Department at Ispahani Islamia Eye Institute and Hospital (IIEIH). One hundred myopic patients diagnosed with myopic maculopathy were enrolled in this study as per the inclusion and exclusion criteria.

Results: A total of 100 patients of mean age 38 ± 12 years; 55% female, 45% male (age range 16-60 years), 35% were diagnosed with myopic maculopathy. The severity of myopic maculopathy was distributed as follows: 15% mild, 12% moderate, and 8% severe. Patients with severe myopic maculopathy had

significantly longer axial lengths (mean 27.8 ± 1.2 mm) compared to those with mild or no maculopathy (mean 26.1 ± 1.4 mm, $p < 0.05$). Visual acuity was significantly lower in patients with severe myopic maculopathy (mean LogMAR 0.6 ± 0.2) compared to those without maculopathy (mean Log MAR 0.2 ± 0.1 , $p < 0.01$). A mean spherical equivalent (SE) of -0.17 ± 2.11 diopters (D). The Generalized Estimating Equation (GEE) model revealed that myopic maculopathy was significantly linked to older age (with an odds ratio [OR] of 1.16 per year; 95% CI 1.13 to 1.19; $p < 0.001$) and more severe myopic SE (with an OR of 1.48 per -1 D; 95% CI 1.40 to 1.56; $p < 0.001$).

Conclusions: Myopic maculopathy is prevalent among myopic patients in the Retinal Department at Ispahani Islamia Eye Institute and Hospital (IIEIH) in Bangladesh, with a considerable proportion exhibiting moderate to severe stages. Longer axial length and poorer visual acuity are associated with higher severity of myopic maculopathy.

Abstract No.: 201081

NICU-Based Screening of Retinopathy of Prematurity in Dhaka City

First Author: Tariq Reza **ALI**

Co-Author(s): Ferdous Akhter **JOLLY**

Purpose: Bangladesh ranks seventh globally for preterm births, with 14.1% of live births occurring prematurely. While neonatal survival rates have improved, the incidence of retinopathy of prematurity (ROP)- a significant cause of childhood blindness has concurrently ascended. This study aimed to assess the prevalence, severity, and risk factors of ROP among preterm, low-birth-weight infants who were screened at different NICUS of Dhaka City.

Methods: A prospective cross-sectional study was conducted over one year in five tertiary care hospitals of Dhaka city. Infants with gestational age ≤ 35 weeks and/or birth weight ≤ 2000 gm were screened. After obtaining informed consent, indirect ophthalmoscopic examination was performed at bedside. Data on neonatal and maternal risk factors were collected and analyzed using SPSS version 25.

Results: Out of 350 infants screened, ROP was detected in 38.0%. Plus disease was present in 11.5%, pre-plus disease in 7.7%, and aggressive ROP in 23.1% of cases. Significant neonatal risk factors included low birth weight, prematurity, jaundice, sepsis, blood transfusion, and prolonged hospital stay. Among maternal risk factors, hypothyroidism and preeclampsia/eclampsia were significantly associated with ROP development. Multivariate analysis identified lower gestational age, neonatal jaundice, blood transfusion, and maternal preeclampsia as independent predictors.

Conclusions: The study identified a high prevalence of ROP among preterm, low-birth-weight infants in

Dhaka, with significant neonatal and maternal risk factors, highlighting the need for structured screening and early intervention to prevent vision impairments due to ROP.

Abstract No.: 202621

OCT Angiography Parameters Predict Chronic Kidney Disease Progression in Type 2 DM: A Two-Year Longitudinal Cohort Study

First Author: Qianhui **YANG**

Co-Author(s): Yueheng **HONG**, Bingyao **TAN**, Gavin **TAN SIEW WEI**

Purpose: To evaluate whether retinal and choriocapillaris vascular OCTA parameters can predict progression of chronic kidney disease (CKD) in patients with type 2 diabetes.

Methods: In 244 T2DM patients with baseline OCTA and 2-year follow-up, vessel and perfusion density, foveal avascular zone metrics, and choriocapillaris flow deficit were analyzed. Outcomes were (1) ≥ 3 CKD stage progression and (2) $\geq 30\%$ eGFR reduction or annual decline > 5 .

Results: Over 2 years, 11.1% progressed by ≥ 3 stages and 12.8% met the eGFR decline criterion. CKD stage progression was linked to lower superficial vessel density (OR=0.81, $p=0.03$), lower perfusion density (OR=0.77, $p=0.007$), and higher CC flow deficit (OR=1.001, $p=0.002$). OCTA metrics improved prediction (AUC=0.747).

Conclusions: Retinal microvascular alterations quantified by OCTA reflect systemic microvascular damage and may serve as non-invasive biomarkers for early prediction of CKD progression in T2DM. These findings support the potential role of OCTA in risk stratification and monitoring of diabetic kidney disease.

Abstract No.: 206384

OGG1 Modulates the Crosstalk of Microglia and Müller Cells in Degenerative Retinas via Alleviating Inflammatory Response and Oxidative Stress

First Author: Miao **LI**

Purpose: Oxidative stress and neuroglial-driven inflammation are crucial in the pathogenesis of retinal degeneration (RD). 8-hydroxyguanine DNA glycosylase 1 (OGG1), a key enzyme in repairing oxidative DNA damage via the base excision repair (BER) pathway, also regulates inflammatory responses.

Methods: Using the sodium iodate (NaIO₃)-induced oxidative stress model in C57BL/6J mice, we investigated the temporal dynamics of OGG1 expression and its functional role in RD.

Results: We observed a significant initial upregulation of OGG1 at the onset of RD, followed by a rapid decline

as photoreceptor degeneration progressed. OGG1 deficiency exacerbated DNA oxidative damage and impaired its repair capacity. Immunostaining revealed pronounced neuroglial activation in RD retinas, with microglial activation preceding Müller cell gliosis. Intravitreal delivery of exogenous OGG1 suppressed neuroglial activation, mitigated photoreceptor loss, and partially restored electroretinogram (ERG) responses. These protective effects were reversed by co-administration of TH5487, a potent and highly selective OGG1 inhibitor. In vitro assays demonstrated that OGG1 alleviates oxidative stress, preserves mitochondrial integrity in microglia, and subsequently modulates the gliotic response of Müller cells. Mechanistically, OGG1 deficiency accelerates RD progression by disrupting oxidative damage repair and amplifying neuroinflammatory cascades. Conversely, OGG1 supplementation coordinates retinal protection through a dual mechanism: directly repairing oxidative DNA lesions and indirectly modulating the neuroinflammatory microenvironment by suppressing microglia-driven inflammation and Müller cell gliosis.

Conclusions: These findings establish OGG1 as a central regulator linking oxidative DNA damage to neuroglial dysfunction in RD. Clinically, targeted OGG1 delivery represents a promising therapeutic strategy for degenerative retinopathies by concurrently addressing oxidative injury and neuroinflammation.

Abstract No.: 202448

Obstructive Sleep Apnea Syndrome-Associated Blood Pressure Fluctuations Combined With Simultaneous Central Retinal Vein and Artery Occlusion

First Author: Like XIE

Co-Author(s): Kaiming CHEN, Pin JU, Zhenzhen GU

Purpose: Central retinal vein occlusion (CRVO) and central retinal artery occlusion (CRAO) are serious eye blood vessel problems usually linked to heart health issues. In this case study, a patient with a diagnosis of obstructive sleep apnoea syndrome (OSAS) but no traditional thrombotic or atherosclerotic risk factors experienced a rare co-occurrence of CRVO and CRAO.

Methods: A formerly healthy 42-year-old male came with dark shadows in his right eye and acute-onset blurred vision. A thorough ophthalmic exam verified simultaneous CRVO and CRAO. Later polysomnography showed moderate hypoxaemia and severe OSAS. The patient received integrated traditional Chinese medicine, perfusion enhancement, and intraocular pressure lowering as part of multimodal therapy. With notable retinal oedema resolution, post-treatment visual acuity returned to 20/20.

Results: Especially in patients without conventional cardiovascular risks, this case implies OSAS might be a separate risk factor for combined CRVO and CRAO. Intermittent hypoxia, sympathetic overactivity,

and hypercoagulability are probably among the underlying mechanisms. Optimising management plans in idiopathic retinal vascular occlusions seems to depend on early OSAS screening. Moreover, this case shows the possible therapeutic benefit of combining pharmacological and conventional treatments in complicated ocular vascular disorders.

Conclusions: This case highlights that obstructive sleep apnoea syndrome (OSAS), through mechanisms like intermittent hypoxia, may be an independent risk factor for the rare co-occurrence of central retinal vein and artery occlusions (CRVO and CRAO), even in patients without traditional risk factors, and underscores the importance of early OSAS screening and a multimodal treatment approach.

Abstract No.: 205653

Ocular Effects of Bilateral Hypotony Secondary to Chronic Dehydration

First Author: Maria Katrina OZARAGA - LAGARNIA

Purpose: To present a case of a 15-year-old female admitted for severe dehydration, who presented with painless and progressive blurring of vision on both eyes for 2 weeks.

Methods: Ophthalmologic findings included significant visual acuity loss, with only up to counting fingers, JII on both eyes. Slit lamp examination showed signs of hypotony such as full thickness corneal folds. Intraocular pressure (IOP) was 0mmHg in both eyes, and fundus examination showed evidence of maculopathy – optic disc edema, tortuous retinal vessels, and macular folds. Further investigation led to the diagnosis of distal renal tubular acidosis. Aggressive correction of the hypovolemic state and electrolyte imbalance was initiated which led to the gradual improvement of visual acuity, intraocular pressure and other signs of hypotony.

Results: By the sixth day, visual acuity showed partial improvement, but bilateral posterior subcapsular cataracts developed and signs of chorioretinopathy remained. Optical coherence tomography (OCT) revealed foveal detachment in the right eye and retinal undulations in both eyes. By day 17, electrolyte levels were nearly corrected, with best corrected visual acuity of 20/20, J1+. Corneal folds resolved and IOP reached normal limits, but posterior lens opacity remained. Fundus examination showed improving maculopathy, which was confirmed by repeat OCT, showing no foveal detachment and minimal retinal pigment epithelium undulations. The patient was discharged with a regimen to manage her electrolyte imbalance.

Conclusions: This case emphasizes the importance of early recognition and management of ocular hypotony in the event of severe dehydration and electrolyte imbalance, highlighting the excellent visual prognosis with appropriate treatment.

Abstract No.: 203516**Ocular Manifestations in Neuronal Intranuclear Inclusion Disease (With Surgical Video)***First Author: Li ZHANG*

Purpose: Neuronal intranuclear inclusion disease (NIID) is a rare, slowly progressive, autosomal dominant neurodegenerative disorder. It presents with limb weakness, sensory disturbances, parkinsonism, autonomic dysfunction, dementia, and dystonia, alongside varying ocular manifestations. We report details the clinical features NIID with case initially presented with ocular symptoms.

Methods: A 56-year-old female who presented with sudden left eye visual acuity decline lasting one week. She reported a history of nyctalopia since young adulthood and mild limb tremor since her 30s. Further examination included multi-wavelength wide-field fundus photography, autofluorescence (FAF), OCT, visual field testing, ffERG, and genetic testing for the NOTCH2NLC gene via PCR and capillary electrophoresis.

Results: Multi-wavelength wide-field fundus photos appeared relatively normal. However, FAF revealed hypoautofluorescent areas in the posterior pole and around the optic disc, surrounded by a high FAF ring. OCT showed outer retinal thinning with near-total loss of the ellipsoid zone and interdigitation zone except in the fovea. A full-thickness macular hole was present in the left eye. Visual field testing demonstrated an enlarged blind spot. ffERG showed severely reduced scotopic and photopic responses. Genetic testing identified a pathogenic GGC repeat expansion (119 repeats) in the NOTCH2NLC gene. The macular hole was successfully closed following vitrectomy.

Conclusions: Ocular findings of NIID include nyctalopia, vision loss, peripapillary chorioretinal atrophy with abnormal FAF, ellipsoid zone disruption on OCT, enlarged blind spot or central scotoma on visual fields, and mildly-to-severely reduced ERG responses with implicit time delays. Early recognizing ocular manifestations is crucial for NIID.

Abstract No.: 202180**Outcome of Replacing Aflibercept With Bevacizumab in Choroidal Neovascular Diseases***First Author: Phasinee PUANGPRANG**Co-Author(s): Tharikarn SUJIRAKUL*

Purpose: Intravitreal anti-vascular endothelial growth factor (VEGF) therapy is the standard of care for choroidal neovascular diseases (CNV). In Thailand, bevacizumab is the first-line agent, with aflibercept reserved for nonresponders; however, recent budgetary restrictions have forced many patients who initially failed to respond to bevacizumab and were subsequently treated with aflibercept to revert back

to bevacizumab. This study evaluates anatomical and visual outcomes before and after sequential aflibercept and bevacizumab therapy in the same eyes of patients with CNV, including neovascular age-related macular degeneration (nAMD) and polypoidal choroidal vasculopathy (PCV).

Methods: In this retrospective cohort, 26 eyes with CNV received ≥ 3 aflibercept injections, followed by ≥ 3 bevacizumab injections. Treatment history, parameters at switching, and outcomes up to 12 weeks post-switch were analyzed. After each injection, central subfield thickness (CST) and subretinal fluid (SRF) were assessed by optical coherence tomography, while corrected visual acuity (VA) was converted to logMAR. Mixed-effect regression for repeated measures evaluated changes in CST, SRF, and VA across treatment phases.

Results: Diagnoses included PCV (84.62%) and nAMD (15.38%). Mean CST was 339.4 μm at switching and 340.4 μm after switching ($p = 0.315$). Mean VA remained stable at 0.841 and 0.865 logMAR ($p = 0.754$). SRF was present in 30.77% at switching and 19.23% post-switch ($p = 0.375$).

Conclusions: In this predominantly PCV cohort, switching back to bevacizumab preserved macular anatomy and visual function comparable to aflibercept. These findings support bevacizumab as an effective, economical alternative for CNV management in resource-limited settings. Longer-term studies are needed to confirm these findings.

Abstract No.: 207343**Outcomes, Efficacy and Retreatment Analysis of Faricimab in Retinal Vein Occlusion***First Author: Nishant Vijay RADKE**Co-Author(s): Ya CHAN, Snehal Nishant RADKE*

Purpose: To evaluate the real-world anatomical and functional outcomes, predictors of response, and retreatment intervals following Faricimab therapy in eyes with retinal vein occlusion (RVO).

Methods: This retrospective study included 18 eyes with RVO receiving Faricimab. Best-corrected visual acuity (BCVA, logMAR) and central retinal thickness (CRT, μm) were assessed pre-treatment and at final follow-up. Paired t-tests or Wilcoxon signed-rank tests were applied based on normality. Multiple linear regression evaluated predictors of ΔCRT and ΔBCVA , including baseline CRT, baseline BCVA, age, sex, and prior treatment status. Time to retreatment was analyzed using Kaplan–Meier survival curves.

Results: Faricimab significantly reduced CRT (mean $\Delta\text{CRT} = 212 \pm 26 \mu\text{m}$, $p = 0.0002$) and improved BCVA (median $\Delta\text{BCVA} = 0.268$ logMAR, $p = 0.0017$). Multiple regression revealed baseline CRT ($\beta = 0.868$, $p < 0.001$) and baseline BCVA ($\beta = 21.76$, $p = 0.039$) as independent predictors of anatomical and functional gains, respectively, whereas age, sex, and prior

treatment status were not significant. Kaplan–Meier analysis demonstrated a median retreatment-free interval of 67 days (95% CI: 40–81 days), with all eyes requiring retreatment by Day 110.

Conclusions: In this real-world cohort, Faricimab provides meaningful anatomical and functional improvement in RVO, with baseline CRT and BCVA predicting response. Retreatment intervals are variable but relatively short, highlighting the importance of individualized treatment planning. Prior treatment history did not significantly influence outcomes in this cohort.

Abstract No.: 201004

PTOSIS- a Rare Adverse Effect of Intravitreal Dexamethasone Implant

First Author: Mamta **KUMARI**

Co-Author(s): Prajakta **CHAUDHARY**, Priyanka **CHOUDHARI**, Devanshi **SHAH**, Uma **THAKUR**, Rajpal **USNALE**

Purpose: To report a rare adverse effect ptosis that happened weeks after Intravitreal dexamethasone implant.

Methods: A 34-year-old female presented to our clinic with complaints of drooping of the left eye's upper lid for 4 days. There was a history of an intravitreal dexamethasone implant procedure done 6 weeks back for non-infectious intermediate uveitis. The procedure was uneventful. No IOP spike was noted in the immediate or late postoperative period. The patient was being followed up regularly. Last follow-up was done 2 weeks back, where all parameters were normal.

Results: On examination, Visual Acuity was 20/20, N6 OU, and Intraocular pressure (IOP) was 14-15mmHg, respectively. Right eye complete examination was within normal limits. The left eye had mild Ptosis, which was not associated with restricted extraocular movements or mydriasis. The interpalpebral fissure was 2mm smaller than the right eye. MRD (marginal pupillary reflex) revealed 2mm of ptosis. Retinal examination showed dexamethasone implant in situ with no active vitritis. No other causative factor for ptosis was found in our patient. After 1 month of follow-up, the ptosis remained the same, neither improved nor deteriorated.

Conclusions: It is well established that steroids can cause muscle atrophy. Our case shows one of the rare side effect of intravitreal dexamethasone implant - ptosis, commonest being raised IOP and cataract formation. So far very few similar cases have been reported in literature. Ptosis in our case could be a result of the Levator palpebrae superioris (LPS) muscle atrophy. Other reasons mentioned in the literature are direct trauma to the muscle while injecting the implant and weakness of the supporting structure of LPS.

Abstract No.: 202197

PYGM Downregulates Necroptosis Signaling to Attenuate Sodium Iodate-Induced RPE Cell Degeneration

First Author: Yaqi **CHENG**

Co-Author(s): Meng **LI**, Shiqi **LING**, Huan **YU**

Purpose: Age-related macular degeneration (AMD) causes incurable vision loss in elderly individuals, and there is currently rare effective treatment for dry AMD. Necroptosis has attracted increasing attention in the context of AMD. This study aimed to reveal the mechanism of abnormal necroptosis induction in AMD.

Methods: Sodium iodate (SI) was used to establish in vitro and in vivo retinal pigment epithelium cell (RPE) degeneration models, which simulated dry AMD-like models. Phenotypes and classic markers of necroptosis were detected. RNA-seq was performed on the retinas of RPE- degeneration mice and combined with GSE29801 microarray data of human AMD retinal samples to identify key genes regulating necroptosis. Overexpression key gene in vivo and in vitro was performed to further validate its function in necroptosis and RPE degeneration.

Results: The necroptosis phenotypes and expression of necroptosis markers RIPK1, RIPK3, and MLKL was upregulated in both SI-treated ARPE-19 cells and the RPE layer of mice. Transcriptome data from SI treated mice and AMD patients revealed reduced expression of the PYGM gene is implicated in the regulation of necroptosis. Overexpression of PYGM in RPE cells and mice retina alleviated SI-induced RPE degeneration.

Conclusions: The research confirmed the PYGM participated in attenuating necroptosis in cell and animal models resembling dry AMD, providing a new perspective for exploring novel AMD treatment target.

Abstract No.: 203841

Pigmented Paravenous Chorioretinal Atrophy Following COVID-19 Infection With Vitreoretinal Interface Changes: Diagnostic and Imaging Insights

First Author: Mahmood **ALI**

Co-Author(s): Farah **AKHTAR**

Purpose: Pigmented Paravenous Chorioretinal atrophy (PPCRA) is a rare bilateral chorioretinal disorder characterized by perivenous pigment clumping and retinal pigment epithelium atrophy. Due to the presence of visual field defects and an altered RNFL thickness profile, its clinical presentation may sometimes lead to diagnostic uncertainty. Advances in ocular imaging have also revealed novel insights into vitreoretinal interface changes in PPCRA.

Methods: We report the case of a 26-year-old female with a five-year history of progressive painless visual decline, initially diagnosed as NTG. A comprehensive

clinical evaluation, followed by visual fields, optical coherence tomography, and fundus photography, was performed. The latest OCT scans of 2025 were compared with previous scans available in her record.

Results: Best-corrected visual acuity was 6/12 in the right eye and 6/6 in the left eye, with intraocular pressures of 17 and 16 mmHg, respectively, on latanoprost. Fundus examination revealed a cup-to-disc ratio of 0.6 bilaterally with mild peripapillary atrophy and visual field defects, which did not correspond to the RNFL pattern. Dilated fundus exam revealed characteristic perivenous pigment clumping and progressive RPE atrophy, establishing the diagnosis of PPCRA. Importantly, recent OCT revealed alterations at the vitreoretinal interface corresponding to PPCRA lesions. The patient also had a documented COVID-19 infection in 2020, coinciding with occurrence of ocular disease. Anti-glaucoma therapy was discontinued, and the patient was placed on observation.

Conclusions: This case emphasizes the importance of detailed clinical and careful interpretation of imaging investigations. The novel observation of vitreoretinal interface changes broadens understanding of PPCRA pathophysiology. The possible association with COVID-19 infection highlights immune-mediated mechanisms.

Abstract No.: 200874

Plasma Protein Mediation of the Association Between Blood Pressure and Retinal Vascular Occlusion

First Author: Chenxi **FU**

Purpose: To evaluate the associations of hypertension history, blood pressure (BP) levels and parameters with retinal vascular occlusion (RVAO) risk, and to identify potential mediating plasma proteins.

Methods: The cohort study utilized data from 439,057 UK Biobank participants. Multivariable Cox regression was employed to evaluate associations between incident RVAO and exposures: hypertension history (with stratification of control status and disease duration), hypertension stages (per 2017 guidelines), systolic BP (SBP), diastolic BP (DBP), mean arterial BP (MABP), and pulse pressure (PP). Mendelian randomization (MR) was subsequently used to assess causality and identify mediating plasma proteins.

Results: In observational analysis, hypertension history (uncontrolled and long/unknown duration), stage 1 hypertension, stage 2 hypertension, higher BP parameters (SBP, MABP, and PP) were associated with an increased risk of RVAO, while DBP showed no significant association. The MR analysis supported the causal relationships for hypertension history and SBP, but not for DBP. Six plasma proteins were identified as potential mediators for the hypertension history, with Secretory Leukocyte Peptidase Inhibitor (SLPI)

explaining the largest proportion of the effect (13.3%). Ankyrin Repeat and SOCS Box Containing 9 (ASB9) was found to mediate the effects for both hypertension history (3.56%) and SBP (4.31%) to RVAO.

Conclusions: Hypertension history and elevated SBP were significant risk factors for RVAO. Specific plasma proteins, notably SLPI and ASB9, may serve as mediators and represent potential targets for therapeutic intervention.

Abstract No.: 203807

Predictors of Response to Bevacizumab Monotherapy in Polypoidal Choroidal Vasculopathy: A 12-month Retrospective Study

First Author: Chinnapat **MONTRISUKSIRIKUN**

Co-Author(s): Nopasak **PHASUKKIJWATANA**, Supalert **PRAKHUNHUNGSIT**, Nuttawut **RODANANT**, Somanus **THOONGSUWAN**, Nida **WONGCHAI SUWAT**

Purpose: To identify baseline predictors of anatomical response after intravitreal bevacizumab in polypoidal choroidal vasculopathy (PCV) and to evaluate anatomical and visual outcomes over 12 months.

Methods: This retrospective study included 81 eyes with PCV treated with three consecutive monthly intravitreal bevacizumab injections. Patients were classified as good or poor responders based on optical coherence tomography (OCT) findings at month 3. Baseline demographic, clinical, and imaging parameters were compared between groups, and predictors of poor response were identified using multivariable regression. Visual acuity (VA), central retinal thickness (CRT), subretinal fluid (SRF), and pigment epithelial detachment (PED) height were analyzed within and between groups through month 12.

Results: Forty eyes (49.4%) were poor responders and 41 (50.6%) were good responders. Greater baseline SRF height and thinner SFCT were independent predictors of poor response (RR per 100 μ m: 1.27 and 0.71 respectively; AUC=0.79). Good responders showed significant VA improvement (0.64 ± 0.08 vs 0.48 ± 0.06 logMAR, $p < 0.001$) and CRT reduction (419.5 ± 24.3 vs 285.5 ± 14.1 μ m, $p < 0.001$) at month 3, and were maintained at month 12. Among good responders, 75% continued bevacizumab injections (non-switch group) and sustained favorable outcomes. In contrast, 86% of poor responders switched to other medications (switch group), achieving significant VA gain, CRT reduction, and further SRF with PED resolution by month 12. The non-switch group required fewer injections (5.8 ± 2.5 vs 7.8 ± 3.0 injections; $p < 0.001$) and achieved longer treatment intervals (11.7 ± 9.0 vs 7.8 ± 3.0 weeks; $p = 0.046$) than the switch group.

Conclusions: Approximately half of PCV eyes achieved a good response to bevacizumab monotherapy, with sustained visual and anatomical improvement. Baseline

SRF height and SFCT are key predictors of response. Early evaluation after three doses enables timely switching in poor responders, potentially long-term outcomes.

Abstract No.: 202412

Presence of Single Null Allele Mutations in EYS-Related Retinitis Pigmentosa May Be Associated With Early Onset Disease in Filipinos: A Case Series

First Author: Richard Braulio LABAO

Co-Author(s): Manuel Benjamin Iv IBAÑEZ, Tamilyn Chelsea LADDARAN, Marianne Grace NAVARRETE

Purpose: The eyes shut homolog (EYS) has been identified as the major gene for non-syndromic autosomal recessive retinitis pigmentosa (RP). Age of onset of EYS-related retinitis pigmentosa (EYS-RP) is variable from 13 to 50 years. Generally, the presence of two null alleles in EYS produce a more severe phenotype compared to those with only one null allele. In this case series, we describe Filipino patients with at least one frameshift mutation, and presenting with early onset RP.

Methods: This is a retrospective case series of 6 patients from unrelated families seen by the ocular geneticist of a tertiary medical center in the Philippines. Chart review was done of RP patients with genetic confirmation of EYS. Data included demographics, clinical history, age of onset, visual acuity, diagnostics, and genetic test results.

Results: Six Filipino patients were diagnosed with EYS-RP. The most common initial symptom was night blindness while age of onset ranged from 5-26 years old. All patients harbored at least one null allele mutation of the EYS gene. Exon deletion and allele localization at the C-terminus appear to produce earlier onset of initial symptoms.

Conclusions: Our case series show that the presence of at least one truncating mutation of EYS can produce an early onset phenotype of RP. The type and location of mutations produced also appear to influence onset of such phenotype.

Abstract No.: 201675

Prevalence of Retinopathy Among Patients With Prediabetes: A Descriptive Cross-Sectional Study in Nepal

First Author: Arjun SHRESTHA

Co-Author(s): Bijay KHATRI

Purpose: Prediabetes is a recognized intermediate state of dysglycemia that predisposes individuals to diabetes and its complications, possibly including retinopathy similar to diabetic retinopathy (DR). However, evidence on the prevalence of DR among prediabetic populations remains limited. The purpose of this study

is to examine the retinopathy characteristics of DR among patients with prediabetes at a tertiary-level Eye Hospital in Bhaktapur.

Methods: A cross-sectional study was conducted at CHEERS Hospital from January to April 2022 among patients aged ≥ 40 years with prediabetes. Prediabetes was defined using American diabetic association (ADA) criteria (impaired fasting glucose, impaired glucose tolerance, or HbA1c 5.7–6.4%). Sample size was calculated using a single population proportion formula ($n=140$). Retinal examinations were performed to assess for DR.

Results: A total of 131 participants were enrolled, with 92 (70.2%) aged 40–59 years and 39 (29.8%) aged ≥ 60 years. Diabetic retinopathy was detected in 7 patients (5.34%): 5 cases of mild non-proliferative DR and 2 cases of moderate non-proliferative DR. The remaining 124 participants (94.65%) had no evidence of DR.

Conclusions: Retinopathy was present in over 5% of prediabetic individuals, indicating that microvascular changes can occur before overt diabetes. Early retinal screening among prediabetic patients may be beneficial for timely detection and prevention of vision-threatening complications.

Abstract No.: 204048

Prohibitin 2 Mediates High Glucose-Induced Mitophagy in Retinal Pigment Epithelial Cells via the PINK1/Parkin Pathway

First Author: Xin CAO

Co-Author(s): Xiao-bo HUANG, Tian-yi LIU, Xiao-le WANG, Yong WANG, Dong-mei ZHANG, Tian-peng CHEN

Purpose: Mitophagy exerts a protective role in diabetic retinopathy (DR); however, its regulatory mechanisms remain incompletely understood. Although prohibitin 2 (PHB2), an inner mitochondrial membrane protein, is known to participate in mitophagy, its function in DR has not been elucidated. This study aimed to investigate whether PHB2 modulates high glucose-induced damage in retinal pigment epithelial cells (ARPE-19) through regulating mitophagy.

Methods: Bioinformatic analysis was performed using publicly available GEO datasets to identify key candidate genes associated with DR. A high glucose-induced injury model was established in ARPE-19 cells to validate PHB2 expression. To further explore its functional role, PHB2 was knocked down in ARPE-19 cells. The effects on mitophagy were assessed by measuring the expression of mitophagy-related proteins, including PINK1, Parkin, LC3II/I, and P62, using Western blotting. Cellular responses were evaluated via viability and apoptosis assays. Interactions between PHB2 and autophagy-related proteins were examined by co-immunoprecipitation (Co-IP).

Results: Bioinformatic analysis identified PHB2 as a hub gene in DR. High glucose disrupted tight junctions, induced mitochondrial pathway apoptosis, and activated mitophagy through the PINK1/Parkin signaling pathway in ARPE-19 cells. Pharmacological inhibition of mitophagy by 3-MA increased the expression of apoptotic proteins under high glucose conditions ($P < 0.05$). Knockdown of PHB2 markedly increased apoptosis, accompanied by upregulation of pro-apoptotic proteins and downregulation of anti-apoptotic proteins (all $P < 0.05$). Co-IP assays confirmed that high glucose significantly enhanced the interactions between PHB2 and LC3B, as well as between PHB2 and P62 (all $P < 0.05$).

Conclusions: This study is the first to demonstrate that PHB2 regulates mitophagy in retinal pigment epithelial cells by interacting with LC3 and P62, playing a protective role in high glucose-induced ARPE-19 cell damage.

Abstract No.: 201356

Pseudoxanthoma Elasticum: A Case Report and Systematic Review

First Author: Liu RUI

Purpose: we report a case of PXE and systematic review as well as the correlation between gene mutations and the disease.

Methods: A 45-year-old female presented with blurry vision and metamorphopsia in left eye for 20 days. Best corrected visual acuity was 15/60 in the left eye and 60/60 in the right eye. Fundus examination showed dark or reddish linear streaks radiating from the optic disc and extending into the macular area and the posterior pole in the left eye, representing Angioid Streaks. It is essentially a rupture in Bruch's membrane, which develops neovascularisation and leads to maculopathy or subretinal bleeding with visual decline or marked loss of vision. External examination showed yellow skin plaques on the lateral and posterior neck as well as prominent creases.

Results: Given ocular and skin disorders, The diagnosis of Angioid Streaks in PXE can be considered which was finally confirmed through Genetic testing and Pathologic examination of skin biopsy. In the treatment, she responded well to intravitreal ranibizumab injections and visual acuity improved to 40/60 during 2 years follow-up period.

Conclusions: Early recognition, intervention, and lifestyle adjustment of Pseudoxanthoma elasticum are important to reduce morbidity. Evaluation of underlying systemic disease and appropriate treatment are particularly necessary.

Abstract No.: 201002

Purtscher-Like Retinopathy Secondary to Hyaluronic Acid Embolization Syndrome: Unravelling Ocular Occlusive Vasculopathy Secondary to Breast Filler Injections

First Author: Rongkai TAN

Co-Author(s): Chui Yain CHEN, Rhuen Chiou CHOW, Chenshen LAM

Purpose: This report describes a rare case of bilateral eye Purtscher-like retinopathy secondary to hyaluronic acid embolization syndrome.

Methods: Case report.

Results: A 25-year-old lady presented with bilateral eyes sudden blurring of vision for one day. She had a history of breast filler injections with unauthorized hyaluronic acid by untrained and unlicensed personnel and was hospitalized due to hyaluronic acid embolization syndrome involving bilateral lungs. Snellen chart visual acuity in both eyes were 6/36. There was no relative afferent pupillary defect. Anterior segment examinations of bilateral eyes were unremarkable with normal intraocular pressures. Bilateral eyes fundus examinations revealed multiple Purtscher fleckens, cotton wool spots, Roth's spots, and retinal hemorrhages at the posterior pole. A decrease in haemoglobin level was observed alongside with an elevated serum D-dimer. Chest X-ray showed bilateral ground glass opacities, while computed tomography pulmonary angiogram demonstrated multifocal consolidation with ground glass opacities in both lung fields which represent diffuse alveolar hemorrhages. Intravenous methylprednisolone 500mg once daily was initiated for three days, and subsequently oral prednisolone 1mg/kg was given in tapering doses. Post-treatment, bilateral visual acuity improved to 6/9 with complete resolutions of Purtscher fleckens, cotton wool spots and retinal hemorrhages.

Conclusions: This case demonstrated that unauthorized and illegal breast filler injections can potentially cause a devastating impact on our vision, and social awareness should be raised. A detailed history taking is crucial in making a timely accurate diagnosis. The early initiation of high-dose steroids is vital for a good visual outcome.

Abstract No.: 205530

Quality of Life in Patients With Vision-Threatening vs. Non-Vision-Threatening Diabetic Retinopathy in South India: A Questionnaire-Based Cross-Sectional Study

First Author: Devika BHATTACHARYA

Co-Author(s): Kunal MANDLIK

Purpose: This cross-sectional study aimed to compare the Quality of Life (QoL) in patients with Vision Threatening Diabetic Retinopathy (VTDR) versus Non-Vision Threatening Diabetic Retinopathy (Non-

VTDR) in South India using the Indian Vision Function Questionnaire 33 (IND-VFQ33). Secondary objectives included comparing Activities of Daily Living (ADL), mobility, fear of falling (FoF), and mental status (Geriatric Depression Scale/Mini-Mental Scale) between the groups.

Methods: A total of 292 diabetic retinopathy patients were recruited at Aravind Eye Hospital, Pondicherry, and divided into two equal groups (n=146) for VTDR and Non-VTDR. Patients were assessed using validated tools, including the IND-VFQ33, ADL Questionnaire, Fear of Falling Questionnaire, Life Space Questionnaire, Geriatric Depression Scale (GDS), and Mini-Mental Scale (MMS). Statistical analyses included Student's t-test, Chi-square test, and Mann-Whitney U test.

Results: Significant differences were found in both Uncorrected Visual Acuity (UCVA) ($p=0.047$) and Best-Corrected Visual Acuity (BCVA) ($p=0.026$) between the groups. While overall IND-VFQ33 scores showed no significant difference in self-reported general functioning, psychosocial impact, or visual symptoms ($p>0.05$), a significant difference was observed in the ADL score ($p=0.013$). Surprisingly, Non-VTDR patients reported statistically greater difficulty in individual tasks such as managing money, using a telephone ($p=0.014$), and travelling beyond walking distance ($p<0.001$). Scores for Fear of Falling, GDS, and MMS were similar across both groups.

Conclusions: The study found no significant difference in the self-reported Vision Related Quality of Life as measured by the IND-VFQ33 between VTDR and Non-VTDR patients. However, the unexpected finding of Non-VTDR patients reporting greater ADL difficulty in specific tasks warrants further investigation into the subtle social and functional impacts of non-vision-threatening disease stages.

Abstract No.: 203428

Quantitative OCT Angiography of the Retinal Microvasculature and the Choriocapillaris in Central Serous Chorioretinopathy

First Author: Suphatar **KITCHAROEN**

Co-Author(s): Wongsiri **TAWEEBANJONGSIN**

Purpose: To describe choriocapillaris patterns in central serous chorioretinopathy (CSC) using quantitative optical coherence tomography angiography (OCTA) analysis.

Methods: Macular OCTA images (6×6 mm) were obtained using the RTVue-XR Avanti with AngioVue. Quantitative measurements of the superficial and deep retinal capillary plexus and the choriocapillaris (CC) were performed using en face projection images. Parameters included vessel density, fractal dimension, and the area and density of CC flow deficits.

Results: Forty-seven patients diagnosed with CSC (56 affected eyes, 38 unaffected fellow eyes) were

included. Abnormal OCTA features were observed in 87.5% of affected eyes and 36.8% of fellow eyes ($p < 0.001$). Dark areas occurred in 50.0% of affected vs. 21.1% of fellow eyes ($p = 0.005$); dark spots in 35.7% vs. 10.5% ($p = 0.008$); and abnormal vessels in 17.9% vs. 5.3% ($p = 0.114$). Affected eyes showed significantly lower CC flow deficit (mean difference -1.94 , $p = 0.019$) and CC flow area (mean difference -0.24 , $p < 0.001$) compared with fellow eyes. No significant differences were found in outer retinal flow area, subfoveal choroidal thickness, or choroidal vascularity index.

Conclusions: OCTA revealed that CSC eyes frequently exhibited dark areas and dark spots, accompanied by significantly lower CC flow deficit and reduced CC flow area compared with fellow eyes. These findings suggest that OCTA provides valuable insights into choriocapillaris alterations and the pathogenesis of CSC.

Abstract No.: 201993

Rare Case of Oguchi Disease

First Author: Ayush **SANGOLE**

Purpose: To show the characteristics of Oguchi disease.

Methods: Detailed evaluation of Oguchi disease with fundus photo before and after dark adaptation, OCT changes before and after dark adaptation.

Results: Oguchi disease shows, Mizuo Nakamura phenomenon also shows OCT before and after dark adaptation.

Conclusions: Oguchi disease is CSNB. Diagnosis – History; clinical findings; ERG findings. Counselling is important. Consanguineous marriage main cause of disease. Genetic testing (SAG gene / GRK1 gene).

Abstract No.: 200856

Real-Life Experience of Switching From Other Anti-VEGF Therapy to Faricimab in Patients With Refractory Neovascular Age-Related Macular Degeneration in a Short Time in China

First Author: Yaoyao **SUN**

Co-Author(s): Qi **HUIJUN**

Purpose: To evaluate the effectiveness and safety of Faricimab in patients with refractory neovascular AMD who switched from other anti-VEGF therapy in China in a short time.

Methods: We conducted a retrospective case series involving patients with refractory nAMD treated with faricimab from March 2024 to September 2024. Eligible patients were those who had suboptimal responses to prior anti-VEGF therapies. Key outcomes assessed included best-corrected visual acuity (BCVA), central macular thickness (CMT), and presence of retinal fluid. Safety data were obtained from medical records.

Results: 57 eyes with nAMD were included, having received an average of 11.08 ± 7.75 anti-VEGF injections before starting faricimab. After the switch, patients received an average of 1.97 ± 1.02 faricimab injections, with an average follow-up duration of 2.97 ± 1.03 months. A response in either BCVA or CMT was observed in 96.49% of patients. Significant improvements in BCVA were noted after 1 injection (0.12 ± 0.21), 2 injections (0.23 ± 0.27), and 3 injections (0.15 ± 0.19) compared to baseline (all $P < 0.05$). CMT was decreased significantly after each faricimab injection. Specifically, 48 patients (84.21%) gained BCVA improvement, and 40 patients (70.18%) achieved more than 20% CMT reduction at the final visit. The proportion of patients without intraocular and subretinal fluid was achieved by 29.82% after 1 injection and increased to 61.40% at the final visit. No reported cases of endophthalmitis, retinal vasculitis, or severe intraocular inflammatory events.

Conclusions: Faricimab shows promising effectiveness and safety for patients with refractory nAMD transitioning from anti-VEGF therapy in China.

Abstract No.: 206296

Real-World Anatomical and Functional Outcomes of Faricimab in Neovascular Age-Related Macular Degeneration

First Author: Nishant Vijay **RADKE**

Co-Author(s): Ya **CHAN**, Jiaying **LIU**, Snehal Nishant **RADKE**

Purpose: To evaluate real-world anatomical and functional responses to Faricimab in patients with neovascular age-related macular degeneration (nAMD) and to examine predictors of treatment response and inter-treatment intervals.

Methods: In this retrospective analysis, 19 eyes with nAMD were included. Visual acuity (VA, logMAR) and central retinal thickness (CRT, microns) were assessed at baseline and after treatment. Δ VA and Δ CRT were calculated. Wilcoxon signed-rank tests were used for within-group comparisons due to non-normal distribution of VA and inter-treatment interval data. Simple and multiple linear regression models assessed the influence of baseline CRT, baseline VA, age, sex, and prior treatment status on outcomes. Correlations between baseline characteristics and Δ CRT/ Δ VA were evaluated. Inter-treatment intervals (Tx1–Tx2 and Tx2–Tx3) were summarized using medians and IQR.

Results: Median Δ VA was 0.058 logMAR (IQR 0–0.161, $p = 0.105$), indicating a non-significant functional improvement. Median Δ CRT was 49 μ m (IQR 24–103, $p = 0.0002$), reflecting significant anatomical improvement. Multiple regression revealed baseline CRT as the sole significant predictor of Δ CRT ($\beta = 0.576$, $p = 0.001$), with higher baseline CRT associated with greater reduction; Δ VA was not predicted by any baseline factors ($p > 0.05$). Age showed very weak

correlations with Δ CRT ($R = 0.018$) and Δ VA ($R = 0.023$). Median inter-treatment intervals were 71 days (Tx1–Tx2) and 64 days (Tx2–Tx3, $p = 0.36$).

Conclusions: Faricimab provides significant anatomical improvements in nAMD, while functional gains are modest. Baseline CRT strongly predicts anatomical response, whereas functional outcomes are less influenced by baseline characteristics. Inter-treatment intervals varied, suggesting individualized retreatment planning may optimize outcomes in real-world practice.

Abstract No.: 201576

Real-World Efficacy of a Loading Phase With Intravitreal Faricimab in Refractory Neovascular Age-Related Macular Degeneration (nAMD) Patients in the Chinese Population

First Author: Panpan **YE**

Purpose: To investigate the real-world efficacy of faricimab in Chinese patients with previously treated refractory nAMD.

Methods: A prospective single-center study was conducted involving patients with refractory nAMD treated with a loading dose of 3 IVI of faricimab 6 mg/0.05 ml, administered every four weeks. All patients included in this study had previously received a minimum of 3 consecutive intravitreal injections of other anti-VEGF. Main outcome measures included best-corrected visual acuity (BCVA) and OCT outcomes at follow-up time for 3 months.

Results: Fifty-two eyes of 50 patients with previously treated refractory nAMD were included in this study. The BCVA (logMAR) improved from 0.86 ± 0.59 to 0.72 ± 0.55 at 3 months ($P < 0.05$). The central macular thickness (CMT) decreased significantly from 452.33 μ m to 335 μ m at 3 months ($P < 0.05$). The correlation analysis revealed that age, ellipsoid zone (EZ) discontinuity, baseline CMT, intraretinal fluid (IRF), scar, and subretinal hyperreflective material (SHRM) showed a positive correlation with the final BCVA ($P < 0.05$).

Conclusions: The real-world outcomes showed that faricimab could lead to significant improvements in BCVA and CMT, as well as reductions in retinal fluid in patients with previously anti-VEGF-treated refractory nAMD.

Abstract No.: 203409

Real-World Outcomes of Single-Dose Faricimab Treatment in Wet Age-Related Macular Degeneration

First Author: Huan **CHEN**

Co-Author(s): Youxin **CHEN**, Chan **WU**, Zhixuan **XIE**, Weihong **YU**, Xiao **ZHANG**

Purpose: Faricimab, a novel bispecific antibody targeting both VEGF-A and Ang-2, offers a new avenue

for the management of wet age-related macular degeneration (wAMD). This study aimed to evaluate the anatomical and functional outcomes of single-dose faricimab treatment in wAMD patients.

Methods: This real-world, observational study included 35 patients diagnosed with wAMD who received a single intravitreal injection of faricimab. Comprehensive ophthalmologic assessment, including best corrected visual acuity (BCVA), swept-source OCT (SS-OCT) and SS-OCTA imaging, was performed at baseline and post-treatment visit. Key endpoints included changes in central retinal thickness (CRT), resolution of intraretinal and/or subretinal fluid, reduction in pigment epithelial detachment (PED) and improvement in BCVA.

Results: All 35 patients completed the study follow-up period of 2 weeks to 12 weeks. SS-OCT imaging revealed a significant reduction in CRT (mean decrease=161.29 μ m, sample standard deviation (ssd)=255.31, $p<0.001$), with marked resolution of intraretinal and/or subretinal fluid in 51.6% of eyes. Among the 20 patients with intraretinal fluid, both fluid area (mean=15.72 mm², ssd=27.61 mm², $p=0.020$) and fluid volume (mean=1.22 mm³, ssd=1.51 mm³, $p=0.002$) were reduced. Significant decreases in PED parameters were also observed, including PED area (mean=3.70 mm², ssd=7.01 mm², $p=0.004$) and PED volume (mean=1.21 mm³, ssd=3.49 mm³, $p=0.047$). However, BCVA improvement was not statistically significant ($p>0.05$).

Conclusions: Faricimab demonstrated strong real-world efficacy in enhancing anatomical damage of wAMD eyes, suggesting its potential as a valuable treatment option. Yet, the single dosage showed insufficiency in improving patients' visual acuity, calling for further studies to establish long-term efficacy and optimal dosing strategies.

Abstract No.: 201312

Real-World Outcomes of Switching to Faricimab in Choroidal Neovascularization: 6-Month Results

First Author: Pornwalan KIRIYAPONG

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Purpose: To evaluate the efficacy of intravitreal faricimab in patients with choroidal neovascularization (CNV)—including neovascular age-related macular degeneration (nAMD), polypoidal choroidal vasculopathy (PCV), and pachychoroid-associated macular neovascularization—who showed suboptimal or recalcitrant response to prior anti-vascular endothelial growth factor (anti-VEGF) therapy.

Methods: This retrospective case series included 30 patients who received ≥ 3 faricimab injections after

inadequate response to other anti-VEGF agents. Treatment history 6 months prior to switching and outcomes up to 6 months post-switch were reviewed. Data included best-corrected visual acuity (BCVA, logMAR), central subfield thickness (CST), presence of subretinal fluid (SRF), intraretinal fluid (IRF), and subretinal hemorrhage (SRH). Mixed-effects linear regression and McNemar's test for paired binary outcomes were used.

Results: Diagnoses included nAMD (46.7%), PCV (40.0%), and pachychoroid-associated macular neovascularization (16.7%). Median anti-VEGF injections in the prior 6 months were 4 (IQR 2–6), and median faricimab injections during 6-month follow-up were 4 (IQR 3–5). BCVA showed no significant change from baseline to month 6 (0.571 to 0.653 logMAR; $p=0.169$). CST significantly decreased from 365.6 μ m to 326.4 μ m (mean difference -39.2μ m; $p=0.031$). SRF resolved in 71% (12/17) at month 6 ($p<0.001$). IRF ($p=0.453$) and SRH show no significant changes.

Conclusions: Switching to faricimab did not improve BCVA at 6 months but produced significant anatomical benefits, particularly CST reduction and SRF resolution. Faricimab may be a treatment option for CNV patients with insufficient response to other anti-VEGF agents.

Abstract No.: 208284

Regulations and Functions of GATOR2 Complex—An mTORC1 Activator Linked to Nutrient Sensing

First Author: Siqi ZOU

Co-Author(s): Xiaoqiang XIAO

Purpose: The aim is to provide a theoretical basis and research direction for targeting the GATOR2-mTORC1 pathway in treating BRB-associated ophthalmological diseases.

Methods: This paper will systematically review the pathological significance of BRB abnormalities, the mechanism by which mTORC1 signaling affects vascular function, and the regulatory properties, molecular interactions, and evolutionary conservation of the GATOR2 complex.

Results: Well-developing blood system benefits the vision function, blood-retinal Barrier disorders cause many severe ocular diseases, mTORC1 signal controls the vessel functions and endothelial cells, GATOR2 complex is a crucial activator of mTORC1 activities.

Conclusions: The current study initially revealed the important role of the GATOR2-mTORC1 pathway in BRB regulation. However, the retinal cell-specific regulatory mechanism, pathway cross-network, and dynamic changes under pathological conditions still need further exploration. Future in-depth analysis of this pathway's molecular mechanism and development of small molecule drugs, gene therapy, and combination therapy strategies targeting GATOR2 are expected to

provide a new theoretical basis and clinical tools for preventing and treating BRB-associated ophthalmic diseases and ultimately improving patients' visual acuity prognosis.

Abstract No.: 204582

Replication of the Association Between Retinal Aging Clock Susceptibility Genes and Retinal Age Gap in Asian: The Nagahama Study

First Author: Masahiro MIYAKE

Co-Author(s): Yuta DOI, Yuki MORI, Kazuya MORINO, Akitaka TSUJIKAWA

Purpose: To replicate previously reported genetic associations for the retinal aging clock—quantified as the retinal age gap—in an East Asian population and to assess cross-ancestry consistency of effect directions and sizes.

Methods: Individuals who participated in both first and second visit of the Nagahama Study with gradable fundus photographs and genome-wide genotype data were included. A deep learning model fine-tuned on an independent subset (i.e. data from participants who attended only one of the two visits of the Nagahama Study) was used to estimate retinal age from color fundus photographs. We tested 13 previously reported lead variants; 7 were evaluable in our dataset (directly or as available leads). Linear regression models adjusted for standard covariates estimated SNP effects on the retinal age gap at the first visit. Statistical significance was set as Bonferroni-corrected $P = 0.0071$ ($0.05/7$). Secondary measures included directional concordance and effect-size correlation with discovery estimates.

Results: Age-prediction accuracy in the genetic cohort showed MAE = 3.00 (first visit) and 3.42 years (second visit). Of 13 variants to be replicated, 7 were testable. The lead variant rs17713879 (SH3YL1) replicated after multiple-testing correction ($\beta = -0.41$ years per effect allele, SE = 0.094, $P = 9.8 \times 10^{-6}$). After harmonizing effect directions, all 7/7 testable variants showed directional concordance with discovery findings (binomial $P = 0.0078$) and a strong cross-study effect-size correlation ($r = 0.93$).

Conclusions: In an East Asian population, we replicate the SH3YL1 association with the retinal age gap and observe consistent direction and magnitude across all testable discovery variants.

Abstract No.: 206807

Retinal Coloboma Mimicking Ocular Toxoplasmosis: A Case Report

First Author: Ren Jet PHANG

Co-Author(s): Shew Fei CHEE, Arjan DHILLON

Purpose: To describe a case of posterior segment retinal coloboma mimicking ocular toxoplasmosis and highlight the distinguishing clinical features.

Methods: Case Report

Results: A 12-year-old boy presented with a one-month history of perceived “sudden onset” blurred vision in the right eye. Best-corrected visual acuity was 6/60 in the right eye and 6/9 in the left eye. Fundus examination revealed an 8 mm, sharply demarcated inferonasal chorioretinal defect extending to the inferior macula. The vitreous was clear, there was no evidence of any retinal inflammation. Optical coherence tomography demonstrated a deep excavation with absence of retinal layers. Toxoplasma serology was negative, and the lesion remained stable on follow-up. The apparent “sudden” onset most likely represented the patient’s first awareness of longstanding poor vision rather than an acute event.

Conclusions: Posterior segment coloboma may mimic toxoplasmosis scars but is distinguished by its smooth margins, excavated contour, and absence of vitreous reaction and retinal inflammation. In contrast, toxoplasmosis scars typically appear irregular, pigmented, and associated with inflammatory changes. Accurate diagnosis prevents unnecessary antimicrobial treatment and emphasizes the importance of surveillance for complications such as retinal detachment. Careful history-taking and multimodal imaging are key to distinguishing congenital from acquired posterior segment lesions.

Abstract No.: 202357

Retinal and Choroidal Morphometric Analysis in the Fellow Eye of Unilateral Wet Age-Related Macular Degeneration Using Optical Coherence Tomography Angiography

First Author: Sudha RANABHAT

Co-Author(s): Priya BAJGAI, Kiran SHAKYA

Purpose: To determine the retinal and choroidal changes in patients with Unilateral wet age-related Macular Degeneration (AMD) and their fellow eyes.

Methods: Prospective, cross-sectional study that included 60 patients (120 eyes) with unilateral wet AMD and their fellow eyes, where optical coherence tomography angiography (OCTA) was used to access vessel density (VD), perfusion density (PD) and foveal avascular zone (FAZ) of superficial capillary, deep capillary plexus and choriocapillaries. Enhanced depth imaging optical coherence tomography was performed for accessing the choroid.

Results: Mean age was 73.9 ± 9.54 years (51-89). Mean visual acuity of wet AMD eyes was 1.28 ± 0.50 and fellow eyes was 0.75 ± 0.59 . Eighteen (30.6%) of fellow eyes had normal fundus, twenty-two (37.4%) had dry AMD and twenty (34%) had wet AMD. Pattern I choroidal neovascular membrane were in forty-five (75%), using OCTA based morphologic criteria, in wet AMD eye. Mean vessel density of wet AMD eye was $17.45 \pm 7.6\text{mm}$ and fellow eye was $18.8 \pm 9.45\text{mm}$. Mean perfusion density of wet AMD was $6.7 \pm 3.5\%$ and fellow eye was $7.07 \pm 3.8\%$. Mean FAZ area of wet AMD was $0.576 \pm 0.42\text{mm}^2$ and fellow eye was $0.424 \pm 0.19\text{mm}^2$. Significant association was not identified between VD, PD and FAZ of the two eyes but Sattler layer is significantly affected in eyes with wet AMD (p 0.05).

Conclusions: AMD can be frequently detected in the fellow eyes of wet AMD which could be potentiated by vascular insufficiency of the retinal and choroidal circulation, subsequently leading to its progression.

Abstract No.: 204159

Retinoblastoma Research Trends From 1980 to 2023: A 44-Year Bibliometric Study

First Author: Wang **YINING**

Purpose: Our objective is to analyze research trends in the RB field and compare contributions from different countries, institutions and authors.

Methods: We extracted all RB-related publications published from 1980 to 2023 from the Web of Science database and applied VOSviewer, R software, Bibliometrix software, Origin 2024 and CiteSpace to review the publication data, analyze the publication trends, and visualize the relevant data.

Results: A total of 4156 papers on RB were identified from 1980 to 2023. In 1980, only 13 papers were published, yet by 2023, 237 papers had been published. These publications were contributed by 351 research institutes from 68 countries/regions. The United States ranked first with 1662 papers, accounting for 39.99% of the total number of publications on RB research. A total of 539 RB research papers were published in China, ranking second. India, Canada and Germany ranked third, fourth and fifth, with 377, 277 and 221 publications, respectively. Thomas Jefferson University published the most research papers on RB, with 166 published papers, accounting for 3.99% of all publications. The top three journals contributing to this field were Invest Ophthalm Vis Sci, the British Journal of Ophthalmology and Ophthalmology. Liquid biopsy, intra-arterial chemotherapy and intravitreal chemotherapy are the most frequently used keywords in the field.

Conclusions: Many renowned research institutions and ophthalmologists have made important contributions to RB research and will continue to lead this research direction. Liquid biopsy, intra-arterial chemotherapy

and intravitreal chemotherapy are potential hotspots for RB research in the future.

Abstract No.: 200606

Rubeosis Iridis- Neovascularisation of Iris in a 56-Year-Old Male With CRVO

First Author: Arnav **SINGHAL**

Purpose: Neovascularisation of the iris is seen in a patient with CRVO a serious complication arising from retinal ischemia by blockage.

Methods: CRVO leads to poor blood flow in the retina, causing oxygen deprivation.

Results: Treatment with panretinal photocoagulation and anti-VEGF injections gives adequate treatment.

Conclusions: Rubeosis iridis and neovascular glaucoma can cause serious vision loss if treated inadequately.

Abstract No.: 205688

Sectorial X-linked Retinitis Pigmentosa With Tapetal-Like Reflex in a Male With RPGR Mutation

First Author: Patchrapa **WATTANAWINITCHAI**

Co-Author(s): Tharikarn **SUJIRAKUL**

Purpose: To report a rare case of sectorial retinitis pigmentosa (RP) with a tapetal-like reflex (TLR) in a male patient with RPGR-associated X-linked retinitis pigmentosa (XLRP).

Methods: A case report.

Results: A 9-year-old Thai boy presented with a three-year history of bilateral, painless, progressive blurred vision. He denied nyctalopia, photophobia, photopsia, and photoaversion. Family history included maternal childhood-onset nyctalopia and a maternal uncle reportedly blind by age 30. His best-corrected visual acuity was 20/50 bilaterally. Fundus examination showed bilateral TLR at the superior posterior pole, retinal pigment epithelium alteration along the inferior arcade, tessellated fundus, and arteriolar attenuation without bone spicule pigmentation. Fundus autofluorescence revealed bilateral arcuate lines of hyperautofluorescence with adjacent isoautofluorescent regions inferiorly. Spectral-domain optical coherence tomography showed outer retinal loss corresponding to the isoautofluorescent areas. Full-field electroretinography demonstrated reduced amplitudes and delayed implicit times, with rod responses more affected than cone responses. Genetic testing identified a hemizygous RPGR mutation (c.2405_2406del, p.E802Gfs*32), confirming the diagnosis of XLRP.

Conclusions: This case presented with sectorial RP and a TLR—features rarely observed in male probands with RPGR-associated XLRP. The presence of TLR may serve

as a clinical clue to underlying RPGR mutations, even in male patients.

Abstract No.: 207321

Severe Macular Edema in Central Retinal Vein Occlusion: A Case Series Evaluating the Efficacy of Anti-VEGF, Dexamethasone, and the Combination of Anti-VEGF and Dexamethasone Implant

First Author: Xiaohu YAN

Purpose: Severe macular edema in central retinal vein occlusion (CRVO) presents a significant clinical challenge, as it can lead to substantial retinal damage and severe visual impairment. The treatment and prognosis of severe macular edema (central retinal thickness (CRT) exceeding 1000 μm) in CRVO, which have significant implications for clinical management, have been rarely studied and reported.

Methods: We reported and analyzed the case series of 18 patients (18 eyes) diagnosed with severe macular edema (CRT $\geq 1000 \mu\text{m}$) in CRVO. Thirteen eyes (72.2%) were initially treated with anti-VEGF therapy, one eye (5.56%) initially received dexamethasone, and four eyes (22.22%) were initially treated with a combination of anti-VEGF and dexamethasone implant. Anterior segment examination, funduscopy, best-corrected visual acuity (BCVA), intraocular pressure (IOP), optical coherence tomography (OCT), scanning laser ophthalmoscopy (SLO) and fundus fluorescein angiography (FFA) were performed in the patients' medical evaluations.

Results: At 1-week post-initial treatment, initial anti-VEGF + dexamethasone combination therapy achieved rapid OCT-assessed macular edema resolution, while anti-VEGF monotherapy only induced partial resolution. During follow-up, the combination group had fewer treatments, less recurrent edema, and the highest visual improvement rate vs. the two monotherapy groups. Patients had stable IOP (mild elevation controlled by medication) with no other abnormalities, confirming the combination therapy's safety.

Conclusions: Initial treatment with anti-VEGF, Dexamethasone, and combination therapy has shown effective for severe macular edema (CRT $\geq 1000 \mu\text{m}$) in CRVO. Initiating combined treatment earlier might lead to better outcomes, warranting further prospective, randomized, large-scale and multicenter clinical trials.

Abstract No.: 204509

Short-Term Efficacy of Aflibercept 8 mg in Refractory Neovascular Age-Related Macular Degeneration: A Real-World Retrospective Case Series From Taiwan

First Author: Sheng Chu CHI

Co-Author(s): Hsin Ho CHANG, Shih-jen CHEN, Tai Chi LIN

Purpose: Aflibercept 8 mg is a novel agent for neovascular age-related macular degeneration (nAMD). This study evaluated its short-term efficacy in treatment-resistant cases.

Methods: This retrospective case series included patients with refractory nAMD treated with aflibercept 8 mg at Taipei Veterans General Hospital from October 2024 to April 2025. Primary outcomes were changes in best-corrected visual acuity (BCVA) and central macular thickness (CMT). Secondary outcomes included subretinal fluid (SRF), intraretinal fluid (IRF), and pigment epithelial detachment (PED) height. Nonparametric methods were used for analysis.

Results: This study included 12 eyes with refractory nAMD, 5 with refractory polypoidal choroidal vasculopathy (PCV), and 3 with refractory pachychoroid neovascularopathy (PNV), all treated with aflibercept 8 mg. Over a 3-month follow-up, no significant improvement in BCVA was observed, while CMT showed significant reductions at all time points. PED height also significantly decreased at the 1- and 3-month visits per Wilcoxon signed-rank test. Although SRF prevalence declined, the change was not statistically significant. A dry macula was achieved in 45% of eyes. Around half or more of the eyes showed a CMT reduction $>50 \mu\text{m}$, with proportions of 50.0%, 54.5%, and 57.1% at months 1, 2, and 3, respectively.

Conclusions: Aflibercept 8 mg demonstrated favorable anatomical outcomes in patients with refractory nAMD. Further studies are warranted to identify factors associated with treatment response and optimize patient selection.

Abstract No.: 208320

Short-Term Real-World Outcomes of Anti-Vascular Endothelial Growth Factor Therapy for Macular Edema Secondary to Diabetic Retinopathy and Retinal Vein Occlusion

First Author: Dawei SUN

Co-Author(s): Bo JIANG

Purpose: We aim to objectively evaluate real-world treatment outcomes in patients with macular oedema (ME) following the first injection of different anti-vascular endothelial growth factor (VEGF) agents, including faricimab, newly approved in China, and traditional ranibizumab, aflibercept, and conbercept.

Methods: This retrospective study included patients with diabetic macular oedema (DME) and retinal vein occlusion (RVO)-ME at the Second Affiliated Hospital of Harbin Medical University, all of whom were treatment naïve to anti-VEGF therapy. Changes in best-corrected visual acuity (BCVA) and central macular thickness (CMT) were evaluated one month after the initial injection.

Results: A total of 87 eyes (71 patients) with DME treated with anti-VEGF agents were included. Statistically significant improvements in BCVA and CMT were observed in all the injection groups. Although there was no significant difference in the changes in CMT and BCVA among the faricimab, ranibizumab, aflibercept, and conbercept groups, the mean reduction in CMT and improvement in BCVA were greater in the faricimab group, with the smallest mean increase in IOP among the four groups. Among the 58 eyes (57 patients) with RVO-ME, significant improvements in BCVA and CMT were observed in all the injection groups. There was no significant difference in the changes in CMT or BCVA among the four groups. And no significant ocular or systemic adverse events were observed in all groups.

Conclusions: Faricimab, similar to traditional ranibizumab, aflibercept, and conbercept, is an effective treatment for both DME and RVO-ME, with structural and functional benefits at 1 month after the first injection and favourable safety profile.

Abstract No.: 210342

Silent Macula in Waldenström Macroglobulinemia Complicated Retinopathy

First Author: Yunshan **MOU**

Co-Author(s): Yrongdi **YUAN**

Purpose: To report a case of Waldenström macroglobulinemia complicated retinopathy, where the symptoms were very similar to diabetic retinopathy, and to recommend that ophthalmologists pay attention to the diagnosis and treatment of Waldenström macroglobulinemia complicated retinopathy, especially to tell Waldenström macroglobulinemia complicated retinopathy and diabetic retinopathy apart.

Methods: Case review. Here we describe a case of a 64-year-old male individual who complained of bilateral gradual visual acuity decline for 5 months and was diagnosed with type 2 diabetes mellitus for over 6 years. Visual acuity with best correction measured 20/50 OD and 20/63 OS. Both eyes showed negative anterior segment. Dilated fundus exam was notable for retinal scattered hemorrhages and subretinal fluid in macular region of both eyes. Optical coherence tomography showed bilateral subretinal fluid accumulation with massive macular detachment (central macular thickness was 557 μm and 607 μm). Fluorescein fundus angiography shows there are scattered microaneurysms and hemorrhagic

hypofluorescence but there's no significant leakage in macular region during late phase. At first, he was diagnosed with diabetic retinopathy due his past medical history and typical fundus appearance. Nevertheless, we find the findings in fundus photography did not match with those in fluorescein fundus angiography. In other words, such severe macular serous detachment was discordant with no obvious macular leakage in fluorescein fundus angiography. Further inquiry into the patient's medical history uncovered a critical detail. He had been diagnosed with Waldenström macroglobulinemia for 3 months. He had completed 4 cycles of chemotherapy.

Results: Based on these findings, the patient was diagnosed with immunogammopathy maculopathy and non-proliferative diabetic retinopathy. Although an attending doctor proposed possible therapeutic options for the maculopathy, such as plasmapheresis or intravitreal anti-vascular endothelial growth factor (VEGF) injections, the patient refused any treatment and was lost to follow-up due to financial reasons.

Conclusions: Waldenström macroglobulinemia (WM) is a lymphoplasmacytic lymphoma characterized by the presence of monoclonal immunoglobulin M antibody. Patients with WM are at a higher risk of developing hyperviscosity retinopathy. Two main manifestations are serous macular detachment (also known as immunogammopathy maculopathy) and central retinal vein occlusion with typical fundus findings of optic disc oedema, intraretinal hemorrhage and oedema, and dilated and tortuous retinal veins. There are no recognized diagnostic criteria for Waldenström macroglobulinemia complicated retinopathy or immunogammopathy maculopathy. However, there's a unique feature in immunogammopathy maculopathy, which is described as a silent macula manifesting no fluorescein leakage in the macula. This crucial feature distinguishes immunogammopathy maculopathy from macular edema due to the breakdown of the blood-retinal barrier, as in diabetic macular edema, age-related macular degeneration, and uveitis. The mechanism of Waldenström macroglobulinemia complicated retinopathy remains unclear. Some studies suggested that disruption of retinal pigment epithelium pumping function caused by hyperglobulinemia creating an osmotic gradient and intraretinal oedema to infiltrate the subretinal space may play a main role in the development of serous macular detachment. To date, there has still been no recognized treatment for WM retinopathy. Patients with WM presenting with ocular symptoms often have a poor visual prognosis, and treatment remains challenging. Previous studies have proposed the use of intravitreal anti-VEGF agents to manage WM-associated macular serous detachment. In recent years, plasma exchange has been recognized as a first-line treatment for WM due to its ability to reduce IgM levels and alleviate intravascular hyperviscosity. Therefore, a combined approach of intravitreal anti-VEGF therapy and systemic

treatments (plasma exchange and chemotherapy) represents an effective strategy for managing WM-associated retinopathy.

Abstract No.: 200878

Single-Cell Transcriptomics Uncover Novel Biomarkers and Actionable Pathways for Pathological Angiogenesis in FEVR, Revealing Translational Opportunities

First Author: Huijuan XU

Purpose: Familial exudative vitreoretinopathy (FEVR) is a disorder of retinal blood vessel development characterized by impaired retinal angiogenesis. While FZD4 mutations are established genetic causes of FEVR, the molecular mechanisms underlying pathological neovascularization remain poorly understood.

Methods: CRISPR/Cas9 was used to generate the Fzd4M105V mouse model. Comprehensive vascular phenotyping entailed retinal wholemount imaging, analysis of hyaloid vessel regression, and immunohistochemical evaluation of the deep retinal vasculature. Flow cytometry sorting and single-cell RNA sequencing(scRNA-seq) were used to characterize the expression profiles of retinal endothelial cells (ECs) in mice.

Results: The FZD4M105V model recapitulated key FEVR features including retinal aneurysmal vessels in adult mice, developmental abnormalities in juveniles, impaired deep vascular formation, delayed hyaloid regression, vascular leakage, and reduced endothelial proliferation. ScRNA-seq revealed distinct transcriptional profiles in pathological EC clusters and tip cells. KEGG analysis revealed that the EC clusters were enriched in Focal adhesion, Rap1, PI3K-Akt, and Apelin signaling pathway, whereas Tip cells were enriched in the VEGF, Chemokine, NF-kappa B, and TNF signaling pathway. We further identified four novel candidate markers of pathological neovascularization : Ctss, Ccl4, Ccl3, and Apoe. Subsequent validation confirmed the upregulation of CTSS and CCL4 within neovascular lesions, supporting their function role in pathological angiogenesis.

Conclusions: We established a novel mouse model of pathological neovascularization with a missense mutation and elucidated the expression profiles of retinal ECs. The identified pathways and novel biomarkers—particularly CTSS and CCL4— provide new insights for further pathogenesis investigation of FEVR.

Abstract No.: 203926

Single-Cell and Spatial Transcriptomic Profiling Reveals Retinal Cell Type Dynamics in a Murine Model of RP1-Retinitis Pigmentosa

First Author: Fanfei LIU

Co-Author(s): Fang LU

Purpose: To investigate retinal cell type changes and underlying molecular mechanisms in RP1-retinitis pigmentosa using single-cell and spatial transcriptomic analyses in a murine model.

Methods: We performed single-cell RNA sequencing and spatial transcriptomics on retinas from RP1 gene knockout mice and C57BL/6 wild-type mice at postnatal day 21 and 1 year of age. Transcriptomic profiles of major retinal cell types were conducted to identify key gene expression changes and pathway alterations.

Results: RP1 gene knockout mice exhibited significant down regulation of genes associated with retinal development and visual signal transduction in rod, cone, and RPE cells at both postnatal day 21 and 1 year, with progressive worsening over time. Microglia and Müller cell subpopulations showed activation of inflammatory and apoptotic pathways, particularly prominent in 1-year-old RP1 gene knockout mice. Spatial transcriptomics confirmed region-specific alterations and cell type dynamics corresponding to disease progression.

Conclusions: Our study reveals that RP1-associated retinitis pigmentosa involves early and progressive dysfunction in photoreceptor and RPE cells, accompanied by marked activation of microglial and Müller glial cells. These findings highlight the pivotal role of immune and glial cell responses, particularly in late-stage disease, contributing to retinal degeneration in RP1-retinitis pigmentosa.

Abstract No.: 205876

Small Eye, Big Clues: Uncovering a Rare Case of Aicardi Syndrome in a Two-Month-Old Filipino Infant With Ocular and Neurologic Manifestations

First Author: Pauline Gabrielle LACSAMANA

Co-Author(s): Alvina Pauline SANTIAGO

Purpose: To report a rare neuro-ophthalmic case in a 2-month-old female infant presenting with early ocular signs leading to the diagnosis of Aicardi Syndrome.

Methods: A full clinical evaluation, ocular imaging, neuroimaging, electrophysiologic testing, and genetic workup were performed. The patient was born at term to a 33-year-old G1P0 mother after an otherwise unremarkable pregnancy, except for a third-trimester anomaly scan which showed multiple choroid plexus and subarachnoid cysts, absent corpus callosum, ventriculomegaly, and talipes equinovarus.

Results: At birth, the infant was noted to have difficulty opening the left eyelid. Ophthalmologic examination revealed a normal right eye (corneal diameter ~9 mm) and a smaller left eye with entropion, microcornea (4 mm), and microphthalmia. Fundus imaging (RetCam) showed peripheral chorioretinal lacunae and a large, irregular optic disc suggestive of coloboma. Visual evoked responses were absent in both eyes. Cranial ultrasound confirmed agenesis of the corpus callosum, ventriculomegaly, and cystic changes. Karyotyping showed a normal 46,XX pattern. At two months, the patient began experiencing 3–4 seizures per day, for which she was started on phenobarbital. Electroencephalogram revealed multifocal interictal epileptiform discharges.

Conclusions: This case demonstrates the early presentation of the classic triad of Aicardi Syndrome which are agenesis of the corpus callosum, chorioretinal lacunae, and infantile spasms. It highlights the critical role of ocular findings in prompting early diagnosis of this rare neurodevelopmental disorder. Despite a normal karyotype, the clinical triad and imaging findings support this unique and rarely-encountered diagnosis.

Abstract No.: 206891

Sorsby Fundus Dystrophy in an Asian Pedigree: Pathogenic TIMP3 p.Y191C Variant Impairs Metalloproteinase Homeostasis

First Author: Shenao DING

Purpose: SFD, an autosomal dominant retinopathy caused by variants in the TIMP3 gene, was investigated to elucidate the pathological impact of the TIMP3 p.Y191C variant and its underlying molecular mechanism.

Methods: A retrospective analysis of medical records from a family exhibiting clinical features consistent with SFD was conducted. Whole exome sequencing, bioinformatics analysis, Sanger sequencing, and co-segregation studies confirmed the presence of the disease-associated gene variant. ARPE-19 cell lines overexpressing the wild-type TIMP3 or subjected to RNA interference targeting TIMP3 were generated using lentiviral transfection.

Results: A heterozygous variant (TIMP3: NM_000362: Exon5: c.A572G/p.Y191C) was identified in seven family members. Fundus examinations revealed active or regressed bilateral choroidal neovascularization and disciform scarring. Bioinformatics analyses highlighted tyrosine 191 as an evolutionarily conserved residue across vertebrate TIMP homologs, with substitution by cysteine impairing TIMP3 function. Structural analysis demonstrated that the pathogenic variant residue at position 191 was smaller and more hydrophobic than its wild-type counterpart, and computational tools predicted reduced stability of the pathogenic variant TIMP3 protein. CO-IP confirmed TIMP3 interactions

with activated MMP2 and MMP9. The TIMP3 variant differentially impaired these interactions: binding to activated MMP9 was modestly reduced, while interaction with activated MMP2 was severely compromised. Functional assays indicated that the variant disrupted the MMP9 inhibitory activity and modified MMP2 intracellular localization.

Conclusions: This study identifies a rare pathogenic TIMP3 variant in an Asian family with SFD and demonstrates that the variant impairs TIMP3 function through altered MMP interactions and subcellular localization.

Abstract No.: 200603

Spontaneous Ocular Decompression Retinopathy: A Curious Case

First Author: Yi MON

Co-Author(s): Elizabeth LEONG, Thet NAING

Purpose: We describe a unique case of spontaneous ocular decompression retinopathy (ODR) presenting with corneal oedema, normal intra-ocular pressure (IOP), vitreous and retinal haemorrhages mimicking posterior uveitis.

Methods: A 53-year-old woman presented with a one-week history of redness, blurred vision, and mild discomfort in her left eye. Clinical assessment showed counting fingers visual acuity, conjunctival injection, corneal oedema, shallow anterior chamber, dilated pupil and IOP of 21mmHg. Fundus view was limited due to corneal oedema, but vitreous and retinal haemorrhages were visible. Gonioscopy showed narrow angles with inferotemporal peripheral anterior synechiae. Topical and systemic steroid therapy was commenced. Infective and autoimmune workup was unremarkable. Over subsequent days, corneal oedema and posterior segment haemorrhages resolved spontaneously, with no signs of vasculitis or chorioretinitis. Glaukomflecken, closed angles, and iris rupture on anterior segment optical coherence tomography confirmed a self-aborted angle closure attack with ODR. Steroid therapy was ceased. The patient underwent laser peripheral iridotomy followed by cataract surgery, with good visual recovery.

Results: ODR is not uncommon, but occurrence following spontaneous resolution of acute angle closure is rare. In this case, differentials based on initial presentation included posterior uveitis with vasculitis and atypical angle closure glaucoma, though the normal IOP and absence of pain made glaucoma less likely.

Conclusions: To our knowledge, this is the first reported case of ODR secondary to a spontaneously aborted angle closure attack mimicking posterior uveitis. Awareness of this presentation can guide accurate diagnosis and management, leading to favourable visual outcomes.

Abstract No.: 200646**Stargardt Disease in a Young Asian Female: A Case Report***First Author: Maria Christine DY**Co-Author(s): John Paul PANG*

Purpose: To report a clinically diagnosed case of Stargardt disease (STGD) in a young Asian female.

Methods: A 40-year old Filipino female came in for chronic progressive blurring of vision on both eyes with difficulty seeing at night. The medical, family, and social histories were unremarkable. At presentation, best corrected visual acuity (BCVA) was 20/60 and 20/70 on the right and left, respectively, with normal anterior segment findings. Fundus examination revealed symmetrical mottling of the macula with surrounding yellow retinal flecks at the level of the pigment epithelium. Macular optical coherence tomography (OCT) showed generalized thinning with localized disruption of the outer retinal bands while a characteristic dark choroid was evident on fluorescein angiography (FA).

Results: The patient was referred out for genetic counseling and electrophysiologic testing. She was then advised regular monitoring and to watch out for new onset ophthalmic complaints.

Conclusions: Stargardt disease is a common form of macular dystrophy with genotypic and phenotypic variation. OCT and FA among others are imaging tools to help confirm diagnosis and monitor disease progression. Symptoms usually appear with gradual photoreceptor loss. Because of the nature of STGD, patients should be prognosticated regarding visual outcomes. There is currently no known effective treatment so management is individualized while maximizing visual rehabilitation.

Abstract No.: 206992**Staring at the Sun: A Case of Bilateral Macular Telangiectasia With Unilateral Choroidal Neovascularization***First Author: Yi Huey LOW**Co-Author(s): Yi Lin CHUA, Hanizasurana HASHIM, Woan Shian SEE, Nazima SHADAHT ALI, Stella SINNAPPAN*

Purpose: To describe a rare presentation of bilateral Macular Telangiectasia (MacTel) complicated by unilateral choroidal neovascularization (CNV), emphasize the role of multimodal imaging, highlight early anti-VEGF treatment, and discuss the potential influence of chronic sun-gazing.

Methods: Case report.

Results: A 46-year-old woman presented with a 6-month history of progressive central scotoma in the left eye. She reported a lifelong habit of direct sun-gazing but had no other significant ocular or systemic

risk factors. Best-corrected visual acuity (VA) was 6/36 in both eyes. Anterior segment examination was unremarkable. Fundus examination revealed bilateral foveal pigmentary changes with a dull glistening reflex, and a parafoveal subretinal hemorrhage in the left eye. Optical coherence tomography (OCT) of the macula showed bilateral internal limiting membrane draping with focal ellipsoid zone disruption and the presence of a subretinal hyperreflective lesion in the left eye, consistent with a CNV complex. Intravitreal ranibizumab was administered to the left eye. At follow-up, the subretinal hemorrhage had resolved, and the CNV complex had regressed. Left VA improved to 6/24, and the patient reported symptomatic improvement.

Conclusions: This case underscores the importance of multimodal imaging in detecting CNV associated with MacTel and demonstrates the visual benefit of prompt anti-VEGF therapy. The unusual history of habitual sun-gazing raises intriguing questions about environmental or phototoxic influences on disease onset and progression.

Abstract No.: 201795**Starry Sky in A Girl's Eyes***First Author: Yee Jy CHAI*

Purpose: To report the management and outcome of a rare paediatric case of Vogt-Koyanagi-Harada Disease

Methods: Case Report

Results: A 7-year-old girl, previously without any medical illnesses, presented with blurred vision and eye redness of 1 week duration. Clinical examination revealed best corrected vision of 6/36 and features of panuveitis, including corneal keratoprecipitates, anterior chamber flare, optic disc swelling and multifocal choroiditis. OCT macula showed multiple intraretinal hyperreflective lesions without cystoid macular edema. Fundus fluorescein angiography showed hot disc with peripheral small vessels vasculitis and multifocal choroiditis. Systemic workup was unremarkable. The presence of poliosis and vitiligo led to the diagnosis of incomplete Vogt-Koyanagi-Harada Disease. She was started on high dose oral corticosteroids, and co-managed with paediatric rheumatology team. Vision was not improving and uveitis relapsed while on tapering dose of oral corticosteroids. She was then started on subcutaneous methotrexate injection and subsequently escalated to mycophenolate mofetil. Finally, the commencement of Adalimumab led to improvement of best corrected visual acuity, remission of ocular inflammation and tapering of oral corticosteroids.

Conclusions: VKH disease can be aggressive and potentially sight threatening in paediatric patients. Prompt diagnosis, close monitoring and rapid escalation of immunosuppression are imperative

in achieving prolonged remission and good visual outcome.

Abstract No.: 204309

Stem Cell-Derived Retinal Pigment Epithelium Transplants for Dry Age-Related Macular Degeneration: Balancing Benefits and Risks—a Systematic Review and Meta-Analysis

First Author: Jeffrey TSAI

Co-Author(s): Amna ANWAR

Purpose: Dry age-related macular degeneration (AMD) with geographic atrophy (GA) is a major cause of central vision loss. This systematic review and meta-analysis evaluate the efficacy and safety of stem cell-derived retinal pigment epithelium (RPE) transplantation as a regenerative treatment.

Methods: A comprehensive search of PubMed, Web of Science, Scopus, and ProQuest identified clinical trials published between 2015 and 2025. Eligible studies included patients with dry AMD/GA treated with stem cell-derived RPE transplantation. Outcomes extracted included best-corrected visual acuity (BCVA), anatomical integration, and adverse events. Pooled meta-analysis was performed to quantify functional improvements and safety outcomes across studies.

Results: Six clinical trials involving 45 patients were included. Meta-analysis showed a mean BCVA improvement of 11.8 ETDRS letters (95% CI: 11.4–12.3; $P < 0.001$), with 46.7% (95% CI: 32.1–61.8%; $P < 0.01$) achieving gains ≥ 5 letters. OCT and autofluorescence confirmed RPE engraftment. Adverse events occurred in 17.8% of patients, mainly transient inflammation or epiretinal membrane formation. No tumorigenesis, immune rejection, or severe ocular complications were reported during a mean follow-up of 24.8 months.

Conclusions: Stem cell-derived RPE transplantation demonstrates statistically significant visual improvement and a favourable short- to medium-term safety profile in advanced dry AMD. However, the limited sample size, study heterogeneity, and absence of randomized trials highlight the urgent need for larger, multicentre controlled studies with standardized protocols and long-term follow-up.

Abstract No.: 206072

Subthreshold Micro-pulse Yellow Laser Photocoagulation (577-nm) for Chronic Central Serous Chorioretinopathy

First Author: Bansari SORATHIYA

Co-Author(s): Anand RAJENDRAN

Purpose: To evaluate the short-term outcome of subthreshold micropulse yellow laser photocoagulation in treating chronic Central Serous Chorioretinopathy (CSCR).

Methods: A retrospective case series was conducted from May 2024 to July 2025 at Eye Hospital. 17 eyes of 15 patients with chronic or chronic recurrent CSCR were treated with subthreshold micropulse yellow laser (5% duty cycle, 50% reduced energy from micropulse test burn, 200 ms exposure time, 100 μ m spot size). Patients were followed for at least 4 months post-treatment.

Results: The mean age was 45.06 years. The average follow-up period post-treatment was 6 ± 4.88 months. Baseline best-corrected visual acuity (BCVA) was 0.35 ± 0.26 logMAR, improving to 0.18 ± 0.13 logMAR ($p = 0.0056$) at 2 months and 0.13 ± 0.14 logMAR ($p = 0.0026$) at final follow-up. Central macular thickness (CMT) reduced from 420.82 ± 216.57 μ m at baseline to 258.3 ± 69.75 μ m ($p = 0.0075$) at 2 months and 263.35 ± 92.47 μ m ($p = 0.015$) at final visit.

Conclusions: Subthreshold micropulse yellow laser therapy has shown promising short-term results in treating chronic CSCR without causing retinal damage. However, to better understand its effectiveness and safety, larger prospective, randomized, and comparative studies are needed.

Abstract No.: 206083

Successful Anti-VEGF Therapy in Myopic Choroidal Neovascularization: A Case Report

First Author: Nurita TRI WIJAYANTI

Co-Author(s): Ima YUSTIARINI

Purpose: To present a case of myopic choroidal neovascularization (mCNV) in a 41-year-old female patient, focusing on the clinical presentation, multimodal imaging findings, and treatment response following intravitreal aflibercept.

Methods: A case report of a 41-years-old female presenting with blurred vision and metamorphopsia on the left eye was conducted. Ophthalmic examination included best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, and indirect ophthalmoscopy. Optical coherence tomography (OCT) was performed to evaluate structural abnormalities in the retinal layers associated with myopic choroidal neovascularization.

Results: Best-corrected visual acuity was 20/100. Fundus examination revealed peripapillary atrophy and lacquer cracks with a subfoveal grayish lesion suspicious for CNV. OCT showed subretinal hyperreflective material with subretinal fluids. The patient received intravitreal aflibercept according to a loading dose schedule. Over subsequent follow-up, OCT showed resolution of fluid and regression of the neovascular complex. Her BCVA improved to 20/20, with stable anatomical outcomes maintained throughout observation. No ocular or systemic adverse events were encountered during treatment.

Conclusions: mCNV is a serious complication of pathologic myopia and an important cause of vision

loss in middle-aged women but responds well to early anti-VEGF therapy. Early detection using multimodal imaging is essential to avoid irreversible central vision damage. Intravitreal aflibercept provided both functional and anatomical improvement in this case, underscoring its effectiveness as a first-line therapy for active mCNV.

Abstract No.: 205940

The Eye That Spoke for the Blood: Central Retinal Vein Occlusion in Acute Leukemia

First Author: Swati SAHU

Purpose: To present a rare case of central retinal vein occlusion (CRVO) with macular edema in a young patient with acute lymphocytic leukemia and to highlight the role of intravitreal ranibizumab in visual recovery.

Methods: A 19-year-old male with a history of acute lymphocytic leukaemia on chemotherapy for four months presented with sudden, painless blurring of vision in the left eye for eight days. On examination, best-corrected visual acuity was 6/6 in the right eye and 6/60 in the left eye. The left eye demonstrated a total color vision defect and grade 2 relative afferent pupillary defect. Fundus evaluation revealed disc edema, tortuous veins, and multiple flame-shaped hemorrhages with macular edema, while the right eye appeared normal. Optical coherence tomography (OCT) of the left eye showed subfoveal neurosensory detachment.

Results: A provisional diagnosis of CRVO with macular edema secondary to leukaemia was made. Although intravitreal anti-VEGF therapy was initially planned, the patient was lost to follow-up for two weeks, during which vision improved spontaneously to 6/12 with partial resolution of macular changes. Subsequently, he developed lower motor neuron facial palsy and was started on oral corticosteroids. Intravitreal ranibizumab was administered, resulting in rapid visual improvement to 6/6p within one week and complete resolution of macular edema on OCT. Despite favorable ocular outcomes, the patient later succumbed to systemic complications of leukemia.

Conclusions: CRVO may rarely complication occur in association with acute leukemia. Early recognition and timely intravitreal ranibizumab can restore functional vision, though systemic prognosis remains poor.

Abstract No.: 202543

The Role of Panretinal Laser Coagulation in Stabilizing the Course of Diabetic Retinopathy in Pregnant Women With Type 1 Diabetes

First Author: Natalia POMYTKINA

Co-Author(s): Evgenii SOROKIN

Purpose: To analyze the role of panretinal laser coagulation (PRLC) in stabilizing of diabetic retinopathy (DR) in pregnant women with type 1 diabetes.

Methods: Sixty-nine pregnant women with type 1 diabetes and DR were examined (average age 29.5 ± 4.5 years). The average HbA1c level was $7.1 \pm 1.3\%$. DR was detected in the pregestational period in 28% of patients and PRLC was performed. DR manifested itself during gestation in 72% of women. Proliferative DR was observed in 61% of patients, severe non-proliferative DR - in 23%, and non-proliferative DR - in 16%. Macular edema in both eyes was detected in 10 patients. Stable DR during gestation was observed in 29% of pregnant women, and progressive DR - in 71%. Examinations was conducted throughout pregnancy and after delivery.

Results: 75% of pregnant women in the subgroup of stable DR during gestation were patients who underwent PRLC before pregnancy. Pregnant women with progressive PDR and PPDR during gestation underwent PRLC, and in case of flat or focal macular edema – LCS in the macular area.

Conclusions: In 78% of patients with DR progression, PRLC during gestation allowed to stabilize the course of DR before delivery. In 11 of 49 patients (22%), despite PRLC, DR progressed after delivery, but their visual functions remained high in the late period. Laser treatment during gestation reduced the risk of severe complications of PDR.

Abstract No.: 204537

The White Patch That Wasn't Pathology: A Case of Myelinated Retinal Nerve Fiber Layer

First Author: Yunneke R. XAVERINA

Co-Author(s): Mercia CHRYSANTI

Purpose: The myelinated retinal nerve fiber layer (MRNFL) is a rare and mostly benign congenital anomaly in which the retinal nerve fibers anterior to the lamina cribosa have a myelin sheath. This case study aims to illustrate the accidental discovery of the MRNFL layer during routine examination.

Methods: A 19-year-old woman came to the clinic for a routine eye examination, without any specific complaints, wanting to know the condition of her eyes. The best corrected visual acuity of both eyes was 1.0 with normal intraocular pressure and anterior segment. During the fundus examination of her left eye, a white patchy lesion was found in the superior quadrant of the optic nerve. The lesion had feathery but well-defined

borders on the anterior surface of the retina. Optical Coherence Tomography (OCT) of the optic disc reveals a thickening of the retinal nerve fiber layer at the superior (347 μ m). The patient reported that she had never experienced any eye symptoms since childhood.

Results: Most cases of MRNFL are diagnosed incidentally in healthy individuals during routine fundoscopic examination. Although MRNFL is typically benign, it can be misinterpreted as one of several potentially serious conditions. The exact etiology and pathophysiology of MRNFL remain largely unknown. Although MRNFL lesions remain stable throughout life, progressive growth can occasionally lead to visual disturbance.

Conclusions: The MRNFL is a rare but benign retinal finding, but it still has the potential to progress and cause abnormalities. Therefore, regular follow-up is necessary to evaluate the disease's progression.

Abstract No.: 200562

The cGAS-STING Pathway-Dependent Sensing of NETs Exacerbates Pathological Retinal Angiogenesis

First Author: Dan **YAN**

Co-Author(s): Xuguang **SUN**

Purpose: To address the clinical challenge of inadequate response to anti-VEGF therapy in patients with ocular neovascular diseases, this study focuses on neutrophil extracellular traps (NETs) and cGAS-STING signaling axis. The aim is to elucidate their regulatory mechanisms in the formation of retinal neovascularization and to develop targeted therapeutic strategies accordingly.

Methods: An oxygen-induced retinopathy (OIR) model was established. Key pathways were screened through whole-transcriptome sequencing of the retina, and mechanisms were validated using a combination of Western blotting, qRT-PCR, and immunofluorescence staining of retina. Models induced by STING-/- and the STING agonist DMXAA were constructed. Single-cell transcriptome sequencing and bioinformatics analysis were utilized to dissect cell specificity.

Results: Transcriptome sequencing of the OIR model revealed that NETs-related signaling pathways are involved in the pathological process of ocular neovascularization. A significant accumulation of NETs-derived DNA was observed in the vitreous cavity of mice, leading to the activation of the cGAS-STING signaling pathway. Subsequent techniques, including immunofluorescence co-staining, single-cell sequencing analysis, and AAV-specific targeting of microglial gene expression, collectively identified microglia as the key cell type. Bioinformatics analysis, along with mRNA and protein level detections, further elucidated the detailed pathological process of upregulated mitogen-activated protein kinase (MAPK) signaling, cellular polarization,

and pro-inflammatory cytokine release following cGAS-STING activation in microglia.

Conclusions: This thesis innovatively elucidates the complex molecular mechanism by which NETs drive microglial inflammatory polarization through the cGAS-STING-MAPK axis, thereby accelerating the formation of ocular neovascularization.

Abstract No.: 201612

Treatment of Paediatric Coats' Disease With Combination Therapy of Intravitreal Aflibercept, Ozurdex, Cryotherapy and Laser

First Author: Teoh **HUEI YIN**

Co-Author(s): Crystal **CHEONG YIJING**, Manoharan **SHUNMUGAM**

Purpose: To evaluate the effectiveness of combined intravitreal Aflibercept, Ozurdex, cryotherapy and laser in Coats' disease in a 9-year-old paediatric.

Methods: A 9-year-old patient was referred for evaluation of Coats' disease in the right eye. Comprehensive imaging was performed, including optical coherence tomography (OCT), Optos ultra-widefield fundus photography, fluorescein angiography (FFA), B-scan ultrasonography, and examination under anesthesia (EUA).

Results: Imaging revealed fundus with telangiectatic vessels, extensive lipid exudation, capillary non-perfusion, and an exudative retinal detachment. The patient received intravitreal Aflibercept, followed by an Ozurdex implant, cryotherapy and laser applied to the affected areas. Post-treatment follow-up showed marked reduction in submacular exudation and subretinal fluid, with concurrent decrease in exudation activity, underscoring the role of combination therapy in addressing both vascular leakage and inflammation.

Conclusions: Early detection and multimodal imaging are crucial in pediatric Coats' disease. This case demonstrates that combination therapy not only reduces exudation but also plays a critical role in lowering subretinal fluid and inflammation, which are central to halting disease progression and preserving vision. Prompt referral and timely intervention may prevent long-term visual impairment in children with similar presentations.

Abstract No.: 205906

Tuberculosis or Not? Deciphering the Tuberculo-Sarcoid Spectrum

First Author: Rishika **RATHORE**

Co-Author(s): Atul **ARORA**, Vishali **GUPTA**

Purpose: To highlight the diagnostic challenges and long-term management of a complex case of granulomatous panuveitis with overlapping features of ocular tuberculosis and sarcoidosis.

Methods: A 21-year-old female presented with chronic left eye redness and pain. She had a history of mesenteric lymphadenopathy and was previously diagnosed with abdominal tuberculosis, for which she was initiated on anti-tubercular therapy (ATT) and corticosteroids. Ocular examination revealed anterior chamber inflammation with bilateral disc edema and small stromal granulomas detected on Indo Cyanin Green Angiography (ICGA) and Swept Source Optical Coherence Tomography (SS-OCT). Endoscopic Ultrasound (EUS)-guided FNAC of abdominal lymph nodes demonstrated granulomatous inflammation with necrosis, supporting a working diagnosis of ocular tuberculosis.

Results: Despite completing 9 months of ATT, clinical response was suboptimal. The patient was subsequently initiated on immunosuppressive therapy, leading to disease quiescence. Serial multimodal imaging (FFA, ICG, and OCT) confirmed sustained control. However, two years after tapering azathioprine, the patient experienced a recurrence of ocular inflammation along with parotid swelling. FNAC from the parotid gland revealed non-caseating epithelioid granulomas, favoring a diagnosis of sarcoidosis.

Conclusions: This case underscores the diagnostic complexity of distinguishing between ocular tuberculosis and sarcoidosis in endemic regions. It emphasizes the critical role of multimodal imaging, histopathological confirmation, and longitudinal follow-up in managing granulomatous panuveitis. The case raises pertinent questions: Are tuberculosis and sarcoidosis part of a continuous spectrum? Could tuberculosis serve as an immunological primer, leading to sarcoid-like manifestations elsewhere in the body?

Abstract No.: 201670

Twin Trouble After Toric: Bilateral SRH and Serous RD Managed With Anti-VEGF

First Author: Anugraha **BALAMURUGAN**

Co-Author(s): Shalini S K

Purpose: To report a rare case of bilateral subretinal hemorrhage (SRH) with serous retinal detachment and choroidal elevation post cataract surgery, managed successfully with intravitreal Razumab.

Methods: A 78-year-old male presented one week after toric IOL implantation with SRH, AV crossing changes, SRF and ILM folds in the right eye, and inferior SRH with serous RD, SRF and choroidal elevation in the left eye. Both eyes were treated with intravitreal Razumab.

Results: SRH and SRF in the right eye gradually resolved. Left eye SRH and serous RD resolved completely. Both eyes showed structural recovery within 2 months.

Conclusions: Bilateral SRH with serous RD and choroidal elevation post cataract surgery may respond

well to intravitreal anti-VEGF therapy. Timely diagnosis and intervention are critical for optimal outcomes.

Abstract No.: 201572

Two-Year Treatment Outcomes of Simultaneous Intravitreal Dexamethasone and Aflibercept on Diabetic Macular Edema

First Author: Tai-chi **LIN**

Co-Author(s): Sheng-chu **CHI**, Yu-chien **CHUNG**, Tsui-kang **HSU**, Hsin-wei **HUANG**, Yi-ming **HUANG**, Po-chen **TSENG**

Purpose: The aim of this study is to report 2-year follow-up data on patients with diabetic macular edema (DME) treated with simultaneous intravitreal dexamethasone (DEX) and aflibercept.

Methods: Multicenter, retrospective analysis of eyes with DME treated with simultaneous DEX implant and aflibercept injection. Main outcome measures were changes in best-corrected visual acuity (BCVA) and central retinal thickness (CRT) from baseline to 24 months. The secondary endpoint was the interval of retreatment.

Results: Two-year data were available for 52 of the 76 initially included eyes. Compared to baseline, significant improvements in mean BCVA and CRT were observed at 6, 12, 18, and 24 months. An average of 3.26 ± 1.70 intravitreal treatments was required, with a mean retreatment interval of 10.21 ± 6.35 months throughout the study period.

Conclusions: Simultaneous intravitreal DEX and aflibercept treatment resulted in sustained improvements in both visual and anatomical outcomes over a 24-month period. This combination therapy represents a valid treatment strategy and demonstrates synergistic efficacy in the management of DME.

Abstract No.: 206902

Unmasking Ocular Toxocariasis

First Author: Zhen Ning **LOW**

Co-Author(s): Yie Ping **CHIN**, Swee Ying **CHOO**, Lathalakshmi **THANGAVELU**

Purpose: To report a complex and diagnostically uncertain case of recurrent unilateral uveitis with persistent vitreous opacity.

Methods: Case report.

Results: A 25-year-old male presented with recurrent unilateral uveitis of the left eye. After an initial episode of anterior uveitis, he re-presented a year later with vision of 6/60 and dense inferotemporal vitreous condensation. He was initially treated for presumed ocular toxocariasis based on clinical features, with a transient response to oral Albendazole. Following a severe reactivation with vision reduced to counting fingers, a vitreous tap was culture-positive for *Bacillus cereus*, complicating the clinical picture. A diagnostic

vitrectomy was performed, intraoperatively revealing a yellowish subretinal lesion. While the bacterial growth was suspected to be a contaminant, the etiology of the primary disease—be it chronic toxocariasis, an atypical infection, or an inflammatory masquerade syndrome—remains unconfirmed. The patient was managed empirically with a combination of antimicrobial and anti-helminthic therapy. The vitritis slowly improved and vision recovered to 6/18, but a definitive diagnosis is awaited on the final histopathology report of the vitreous specimen.

Conclusions: This case highlights the profound diagnostic challenges in managing recurrent uveitis with persistent vitreous opacities. It underscores the critical, yet pending, role of histopathology in providing a final diagnosis and demonstrates the necessity for empiric, multi-pronged therapeutic approaches in the face of diagnostic uncertainty.

Abstract No.: 202509

Variations in the Clinical Characteristics of Geographic Atrophy Among Caucasians, Japanese Americans in Hawaii, and Japanese in Japan

First Author: Satoko **FUJIMOTO**

Co-Author(s): Ryo **KAWASAKI**, Gregg **KOKAME**, Kohji **NISHIDA**

Purpose: To evaluate differences in clinical characteristics of geographic atrophy (GA) among Caucasians (C-A), Japanese Americans in Hawaii (J-A), and Japanese in Japan (J-J).

Methods: Patients with GA were retrospectively recruited from institutions in Hawaii and Japan. GA areas were measured using 6×6 mm² near-infrared images. GA growth rates (GAGRs) were calculated for eyes followed >1 year. Multivariate analysis adjusted for age and sex.

Results: The study included 51 eyes of 36 C-A (58% men), 36 eyes of 26 J-A (35% men), and 38 eyes of 29 J-J (70% men). Bilateral GA was more common in C-A (72%) than in J-J (34%) but not different from J-A (50%). Mean GA area was larger in C-A (10.3 mm²) than in J-J (6.0 mm²), with J-A (8.8 mm²) not differing from either group. GA foci were more numerous in C-A (2.8) than in J-J (1.4) and J-A (1.9). Thirty-one eyes of 23 C-A, 25 eyes of 17 J-A, and 19 eyes of 15 J-J were followed. GAGRs was faster in C-A than J-J (2.2 vs 0.82 mm²/year, P<0.05; 0.35 vs 0.20 mm²/year, P=0.076) but not different from J-A (1.9 mm²/year, 0.34 mm²/year). No difference was observed between J-A and J-J.

Conclusions: GA characteristics differed between C-A and J-J but were comparable between J-A and others, suggesting contributions from ethnicity and environment.

Abstract No.: 201498

Varied Presentations of Semaglutide Induced Vision Loss

First Author: Shruti **MARU**

Purpose: Given the increasing use of semaglutide and the potential for serious ophthalmic complications, it is essential for ophthalmologists to be aware of these risks and to have a high index of suspicion for weight-loss therapies in these patients.

Methods: This case series aims to further explore the various presentations of semaglutide-related vision loss and to contribute to the growing body of evidence on this important topic.

Results: These cases underscore the importance of monitoring patients on GLP-1 receptor agonists for any signs of vision loss, especially those with vascular risk factors, and highlight the need for careful consideration of these medications in patients with a history of diabetes and other cardiovascular risk factors. The temporal association between semaglutide initiation and the onset of vision loss suggests a possible link between semaglutide use and ischemic neuropathy with vascular occlusion.

Conclusions: The temporal association between semaglutide initiation and the onset of macular edema, along with the spontaneous resolution after discontinuation, suggests that semaglutide may have exacerbated diabetic macular edema. This also highlights the need for caution when initiating GLP-1 analogs in patients with pre-existing diabetic retinopathy. Further research that includes ophthalmic risk factors or explores dose-dependent effects is necessary to determine a possible causal link between semaglutide and NAION.

Abstract No.: 203884

Very Late Onset Irvine-Gass Syndrome in Iris Claw IOL

First Author: Allbvi Enric **BASA**

Co-Author(s): Patrick **SANTIAGO**

Purpose: To report the second very late onset Irvine-Gass syndrome of 18-months post Iris-claw implantation, in a patient with Cystoid Macular Edema (CME) on Fluorescein Angiography (FA).

Methods: A Case report

Results: A 62 year-old pseudophakic non-diabetic male presented with central blurring of vision of the left eye despite best correction, presented with a visual acuity of 20/40 and 20/25 on pinhole. Iris-claw implantation done 18 months prior noted improvement of vision immediate post-operation. The iris-claw was well centered without iris damage. FA showed perifoveal leakage seen as hyper-fluorescence on late-phases with distinctive petaloid pattern. Ocular coherence tomography (OCT) of the macula showed hypo-

reflective cystic spaces in the outer retinal layers and thickening of the subfoveal area. With no clear cause for the petaloid hyper-fluorescence, intravitreal anti-vascular endothelial growth factor versus steroid implant injection was discussed. Consultation with the local retina society suggested a less invasive approach, hence trial with nepafenac thrice daily was started. After a month of treatment, vision improved to 20/25 and 20/20 (pinhole) with reduction of cystic spaces and subfoveal thickness on OCT. There was difficulty labeling the case as Irvin-Gass syndrome since most present within 3-6 months after cataract surgery and IOL implantation, not 18 months after. This is only the second case of very late onset in literature.

Conclusions: In pseudophakic patients with CME, late onset Irvine-Gass syndrome should be entertained even in extended post operative periods. High index of suspicion, and less invasive initial treatment with topical anti-inflammatory drops is prudent in these cases.

Abstract No.: 200860

Vision-Threatening Complications of Systemic Lupus Erythematosus in a 15-Year-Old Filipino Female: A Case Report

First Author: Francis Ezra **LAXAMANA**

Co-Author(s): Miriam **FERMIN**, Carlo **LADORES**

Purpose: To present a rare case of retrobulbar optic neuritis with simultaneous branch retinal artery occlusion (BRAO) in a pediatric patient with systemic lupus erythematosus (SLE), highlighting the importance of early recognition and prompt treatment of vision-threatening ocular complications.

Methods: A 15-year-old Filipino female with a known history of SLE under immunosuppressive therapy presented with sudden vision loss. Initial evaluation revealed no light perception in the right eye and 20/200 vision in the left eye. Optical coherence tomography, fluorescein angiography, and cranio-orbital MRI confirmed retrobulbar optic neuritis in the right eye and BRAO in the left eye. The patient was treated with high-dose intravenous methylprednisolone, followed by oral prednisone. Sectoral panretinal photocoagulation (PRP) was also performed on both eyes, targeting areas of capillary nonperfusion.

Results: Following three days of intravenous steroid therapy and continuation of immunosuppressants, the patient's vision in the right eye improved from no light perception to 20/80. The left eye remained stable at 20/200. Fundus changes were consistent with post-laser status and resolving ischemic damage. The patient is under regular ophthalmologic and rheumatologic follow-up with stable systemic parameters.

Conclusions: Retrobulbar optic neuritis and BRAO are rare but serious ocular manifestations of pediatric SLE. Prompt diagnosis and aggressive immunosuppressive

treatment can result in significant visual recovery. This case underscores the need for early detection and multidisciplinary management to preserve vision in lupus patients.

Abstract No.: 205304

Visual Outcomes of Central Retinal Artery Occlusion in Chiang Mai University Hospital: A 16-Year Retrospective Study

First Author: Teepaka **SANGTRAGUL**

Co-Author(s): Atitaya **APIVATTHAKAKUL**, Voraporn **CHAIKITMONGKOL**, Janejit **CHOOVUTHAYAKORN**, Paradee **KUNAVISARUT**, Onnisa **NANEGRUNGSUNK**, Direk **PATIKULSILA**, Pavinee **TANGKITCHOT**

Purpose: To evaluate the incidence, visual outcomes, and prognostic factors of central retinal artery occlusion (CRAO) in a tertiary center in Northern Thailand.

Methods: This retrospective observational study included 78 patients diagnosed with CRAO at Chiang Mai University Hospital between 2008 and 2024. Demographic, systemic, and ocular characteristics, treatment modalities, and follow-up visual acuity (VA) were analyzed. Patients were categorized into four groups: conservative standard therapy (CST), hyperbaric oxygen (HBO), intravenous recombinant tissue plasminogen activator (IVrTPA), and intra-arterial rTPA (IArTPA). Outcomes were assessed as mean best-corrected VA (logMAR), clinically meaningful visual improvement, and prognostic factors, including cilioretinal artery sparing.

Results: Mean age was 63.0 ± 14.9 years; 59.0% were male. Treatments included CST in 26, HBO in 44, IVrTPA in 1, and IArTPA in 7. Mean baseline VA was 2.43 ± 0.53 logMAR. At final follow-up, VA was 2.13 in CST, 2.18 in HBO, 1.84 in IArTPA, and 2.10 in IVrTPA. Clinically meaningful improvement occurred in 57.7% of CST, 43.2% of HBO, and 28.6% of IArTPA patients, with no significant differences between groups. Patients with cilioretinal artery sparing (9.0%) had significantly better final VA than those without (1.34 ± 0.93 vs 2.25 ± 0.70 logMAR, $p=0.011$). Only one patient (2.3%) developed neovascularization.

Conclusions: Most CRAO patients presented late, and treatment did not significantly change outcomes. Cilioretinal artery sparing was the strongest predictor of visual prognosis. Long-term Asian cohort data may aid in patient counseling and management.

Abstract No.: 206282

When Pregnancy Sparks Blindness: A Case of Recurrent Macular Toxoplasmosis

First Author: Sameera V V

Purpose: To report a rare case of recurrent macular toxoplasmosis triggered during pregnancy, leading

to irreversible central vision loss in a young woman, and to highlight the challenges of managing repeated macular relapses despite intravitreal and systemic therapy.

Methods: A 26-year-old woman developed her first episode of right-eye macular toxoplasmosis during pregnancy. She was treated promptly and monitored over subsequent three years. Despite timely intravitreal clindamycin injections during pregnancy and combined intravitreal + systemic medications for each relapse later, she experienced four recurrences, all affecting the macula. Clinical evaluation included hematological investigations, visual acuity assessment, fundus examination, and optical coherence tomography (OCT) and OCT- Angiography to document macular involvement and scarring.

Results: Each relapse responded transiently to intravitreal clindamycin and systemic therapy ; however, cumulative macular damage resulted in progressive vision decline. At the time of the latest follow-up, vision was reduced to counting fingers at 1 metre. Pregnancy-associated immune modulation may have contributed to the initial onset, while repeated relapses proved refractory to standard therapy.

Conclusions: Recurrent macular toxoplasmosis during or after pregnancy can lead to irreversible central vision loss. Timely intervention can control inflammation temporarily, but prevention of recurrence remains a critical unmet need. Vigilant monitoring and innovative strategies are essential to preserve vision in young patients.

Abstract No.: 206990

When Tumor Isn't Tumor: Posterior Nodular Scleritis as a Diagnostic Pitfall

First Author: Siti Zaitihani **HAMDAN**

Co-Author(s): Hanizasurana **HASHIM**, *Nazima Shadaht* **SHADAHT ALI**

Purpose: To illustrate a rare case of posterior nodular scleritis and challenges in making diagnoses and management

Methods: Case Report

Results: A 36-year-old healthy woman was referred from another center to rule out a choroidal tumor. She had a 3-week history of reduced vision, eye redness, and floaters in the right eye, without pain, trauma, or systemic symptoms. Examination showed visual acuity of 6/36, anterior chamber cells (2+), and a yellowish subretinal lesion at the temporal periphery measuring 6.5 × 12 mm, with shallow exudative retinal detachment. B-scan revealed a homogeneous hypoechoic lesion with a T-sign, and OCT demonstrated hyperechoic vitreous foci consistent with vitritis. Baseline blood tests were unremarkable. A presumptive diagnosis of choroidal granuloma secondary to ocular tuberculosis was made, and anti-tuberculosis therapy

was started, but TB Quantiferon later returned negative. After one week, the lesion enlarged with surface abscess formation, suggesting choroidal abscess secondary to endogenous endophthalmitis. Intravitreal antibiotics and intravenous therapy were ineffective, and vitreous culture was negative. Oral prednisolone (1 mg/kg) was initiated, leading to lesion regression within two weeks and recovery of vision to 6/9.

Conclusions: Posterior nodular scleritis is a «great masquerader», often mistaken for intraocular tumor and infection. Early recognition and steroid therapy is crucial in determining good visual outcome

Abstract No.: 206727

When the Eye Hints at Hematologic Collapse: A Case of Roth Spots and Subhyaloid Hemorrhage in Aplastic Anemia

First Author: Rahayu **OKTALIANI**

Co-Author(s): Grimaldi **IHSAN**, *Erwin* **ISKANDAR**, *Arief S* **KARTASASMITA**, *Rova* **VIRGANA**, *Made Indra* **WIDYANATHA**

Purpose: Aplastic anemia (AA) is a rare, life-threatening hematopoietic disorder that may present with ocular manifestations, including subhyaloid hemorrhage (SHH). When the macula is involved, SHH causes sudden, profound visual loss, and prolonged retinal contact with hemoglobin may result in photoreceptor toxicity and irreversible damage. Timely intervention is therefore critical.

Methods: Case report based on a detailed review of electronic health records and ophthalmic investigations.

Results: A 19-year-old boy with aplastic anemia presented with blurred vision in the left eye and bilateral subconjunctival hemorrhage. Visual acuity of 0.6 logMAR in the right eye and counting fingers in the left eye. Fundus examination revealed multiple Roth spots bilaterally and a large macular subhyaloid hemorrhage in the left eye. Nd:YAG laser hyaloidotomy achieved successful drainage, and with concurrent systemic transfusions support, visual acuity improved from counting fingers to 0.5 logMAR within one week.

Conclusions: This case illustrates how AA may manifest with Roth spots and macular SHH, posing a significant risk of vision loss. Nd:YAG laser hyaloidotomy provides a minimally invasive and effective approach for rapid visual rehabilitation, while systemic management remains indispensable to prevent recurrence. Multidisciplinary care is crucial to optimize both ocular and systemic outcomes.

Abstract No.: 203546**When the Worm Hides: Unmasking the Diagnostic and Therapeutic Challenges of Diffuse Unilateral Subacute Neuroretinitis***First Author: Nurnadia KAMARUDDIN**Co-Author(s): Hanizasurana HASHIM, Nazima SHADAHT ALI***Purpose:** To report three cases of diffuse unilateral subacute neuroretinitis (DUSN) in which diagnostic and therapeutic challenges were encountered.**Methods:** Case series.**Results:** All three patients were young and otherwise healthy individuals who presented with unilateral vision loss, without any history suggestive of nematode exposure. Two patients initially demonstrated severe posterior uveitis were empirically treated for infectious etiologies, while the third, who presented with vitritis and retinitis, received treatment for presumed ocular toxoplasmosis. In all cases, the diagnosis of DUSN was established later upon the evolution of neuroretinitis with a characteristic grey-white retinal lesion. All patients were successfully treated with a course of oral albendazole and focal laser photocoagulation directed at the nematode. Two patients achieved good final vision, whereas one had limited vision due to foveal atrophy.**Conclusions:** These cases highlight the diagnostic and therapeutic challenges of DUSN, where early presentations may mimic infectious uveitis. Recognition of evolving retinal features is essential for accurate diagnosis and timely treatment to preserve vision.

Retina (Surgical)

Abstract No.: 201048**125 Cases of Ocular Injury by Shotgun Pellet Managed at a Tertiary Eye Care Center***First Author: Shah Md Rajibul ISLAM**Co-Author(s): Mominul ISLAM, Omar JAFARULLAH, Lutfullahil KHABIR, Ehsanur REZA***Purpose:** Describe and evaluate the outcomes of ocular injuries by shotgun pellet.**Methods:** A prospective cross-sectional study, from July 2024 to February 2025 including 125 eyes of 122 individuals. They were followed up for six months. Necessary procedures were undertaken as indicated. Complete Ophthalmological examination was done.**Results:** The mean age was 22.5 ± 7.9 years (14–52 years). Majority 38 (30.4%) were in the age group of 19–23 years. Most common clinical features at presentation was vitreous hemorrhage in 117 (93.6%) followed by hyphema in 83 (66.4%). Majority 62 (49.6%) eyes had vitreous prolapse with or withoutuveal tissue in wound. 78 eyes (62.4%) presented with HM/PL vision. 02 (1.6%) presented with NPL. 102 (81.6%) presented with a visual acuity of worse than 6/60. Following six months, 83 (66.4%) had a visual acuity $< 6/60$. 42 (33.6%) had better than 6/60 and 10 (8%) had better than 6/18. 82 eyes (65.6%) were silicone oil filled. Corneal opacity developed in 53 (42.4%), macular scar in 74 (59.2%), PVR in 45 (26.2%) and glaucoma in 32 (25.6%) eyes. 52 (41.6%) remained aphakic. Entry wound was located between the limbus and 5 mm into the sclera in 52 (41.6%) eyes. Majority of the exit wound is located within the vascular arcade in the macular region (53.6%)**Conclusions:** Injuries with IOFB result in poor anatomical and functional outcome. Early vitreo-retinal intervention can result in anatomical success. The decision and timing of multiple procedures affect the outcome.**Abstract No.: 203848****A Case Report on Endogenous Endophthalmitis of a 5-Year-Old Patient in a Level III Hospital in Metro Manila, Philippines***First Author: Justine Mariz LIMQUECO**Co-Author(s): Paul APILADO, Francis Ezra LAXAMANA, Eric Nathaniel REYES, Jocelyn SY, Niccolo VALENCIA***Purpose:** This case report presents a 5 year old Filipino patient who initially manifested with white opacity on the right eye, was considered as congenital versus traumatic cataract, but eventually reassessed to have endogenous endophthalmitis.**Methods:** Early diagnosis and prompt surgical management are vital to address the patient's infected right eye manifestations. The patient underwent Pars Plana Vitrectomy with Lensectomy, Endolaser, Silicone Oil Insertion, and followed by Intravitreal Injection of Antibiotics (Ceftazidime, Vancomycin) to the right eye.**Results:** Infectious workup results revealed presence of Staphylococcus epidermidis in the vitreous aspirate from the affected eye and positive serum Toxocara IgG results. Patient was treated accordingly to target the two main etiological agents.**Conclusions:** Regular monitoring and follow up were advised in preparation for another surgery in the near future.**Abstract No.: 203236****A Case of Coats-Like Ocular Toxocariasi***First Author: Fang CHAI**Co-Author(s): Xiquan ZHAO***Purpose:** To report a case of coats-like ocular toxocariasi clinical feature and treatment.**Methods:** We present a case of ocular toxocariasi that occurred in a 22-year-old man misdiagnosed with coats disease. The patient underwent a full ophthalmic

examination, a complete blood count; blood chemistry tests for Toxocara immunoglobulin (Ig)G, Toxoplasma IgM, and Toxoplasma IgG; an assessment of total IgE levels; chest X-rays; measurements of angiotensin converting enzyme, antinuclear antibody, hepatitis B surface antigen antibody, and anti-hepatitis C virus antibody levels; and a questionnaire about eating habits and whether the patient had pets.

Results: The patients had a pets feeding history. The patient's left eye had a visual acuity of 0.3 and an intraocular pressure of 10 mmHg. Fundus examination showed a large amount of yellow-white submucosal exudation and exudative retinal detachment, epiretinal membrane traction macular edema, optic disc anterior membrane were all existed. Vitrectomy was performed. During the vitreous surgery, the vitreous body showed a thin gauze-like change, and the yellow-white granuloma was seen in the posterior pole. Through the intraoperative pressure, multiple granulation lesions were found in the peripheral retina. One week after vitrectomy, the retina was flat, the macular edema was reduced, and the visual acuity was increased to 0.5.

Conclusions: The history of pet feeding, gauze-like changes in the vitreous, and typical yellow-white granuloma are strong evidence for the diagnosis of ocular ascariasis. Detailed medical history inquiry, careful fundus examination, blood and intraocular fluid antibody monitoring, UBM examination can more accurately help our diagnosis, to avoid missed diagnosis and misdiagnosis.

Abstract No.: 203708

A Case of Spontaneous Detachment of Epiretinal Membrane

First Author: Bingqing CHEN

Purpose: During a routine follow-up examination of a young female patient with epiretinal membrane, we observed spontaneous detachment of the membrane, accompanied by improvements in her symptoms of vision decline and metamorphopsia.

Methods: The patient's condition was documented with optical coherence tomography and fundus photography.

Results: The fundus photography revealed a cord-like membranous structure attached at one end to the macular and floating at the other end within the vitreous cavity. The optical coherence tomography confirmed partial spontaneous detachment of the epiretinal membrane and a reduction in macular thickness compared to previous images.

Conclusions: Spontaneous detachment of the epiretinal membrane is a relatively rare occurrence. It may arise in some patients due to conditions such as posterior vitreous detachment, intraocular inflammation, or weak adhesion of the epiretinal membrane itself.

In younger patients with epiretinal membranes, spontaneous detachment is mostly associated with posterior vitreous detachment. In this case, we were fortunate to observe the process of spontaneous epiretinal membrane detachment, noting that partially detached membrane tissue was floating in the vitreous cavity.

Abstract No.: 201813

A Clinical Study of Selective Limiting Membrane Peeling During Pars Plana Vitrectomy in Patients With Proliferative Diabetic Retinopathy Complicated With Vitreous Hemorrhage

First Author: Gu YONGHAO

Purpose: To evaluate the outcomes of selective internal limiting membrane peeling (ILMP) in pars plana vitrectomy (PPV) for proliferative diabetic retinopathy (PDR) complicated with vitreous hemorrhage (VH).

Methods: A total of 105 patients diagnosed with VH caused by PDR were enrolled in the study. All participants exhibited hard exudation in the macular fovea at 500 μ m and/or vascular deformation in the macular area observed during PPV. They were randomly divided into two groups: The experimental group (55 patients) underwent PPV with ILMP, while the control group (50 patients) underwent PPV alone. All patients were followed up for 1 year.

Results: There was no significant difference in BCVA between the two groups within 1 year after surgery. But the CRT of the experimental group was significantly lower than that of the control group ($P < 0.05$). The number of HRF in the experimental group was significantly lower than that in the control group at each follow-up after surgery, and the integrity of ELM and EZ in the experimental group was higher at 6 months and 1 year after surgery. At 1 year after surgery, the incidence of DME and ERM in the experimental group was significantly lower than that in the control group.

Conclusions: For patients with PDR and VH, selective ILMP during PPV can effectively reduce postoperative CRT, reduce the number of postoperative HRF, reduce the incidence of DME and ERM, reduce anti-VEGF therapy, and promote the recovery of ELM and EZ without significant complications. However, selective ILMP does not show significant advantages in postoperative vision.

Abstract No.: 202458**A Double Trouble: An Uncommon Case of Retinal Detachment***First Author: Sudha RANABHAT**Co-Author(s): Kiran SHAKYA*

Purpose: Rhegmatogenous retinal detachment (RRD) is potentially a vision threatening disease and one of the major causes of legal blindness. Incidence of RRD ranges from 6.8 to 18.2 per 100,000 patients. Simultaneous bilateral RRD are rare with an annual incidence of 0.35/ 100,000 population

Methods: A sixteen-year male presented with sudden decreased vision in left eye (LE) for 5 days, was using -4 diopter glasses both eyes (BE) since 5 years. Unaided Logarithm of the Minimum Angle of Resolution (LOGMAR) visual acuity was 0.6 in right eye (RE) which was best correct to 0.0 and 1.0 in LE, not improving. Dilated posterior segment showed one clock hour retinal detachment (RD) in infero-temporal quadrant with horse shoe tear (HST) in RE and three quadrant RD with a hole in lattice at supero-temporal quadrant with PVR. Patient underwent RE scleral buckling with postoperative laser photocoagulation followed by LE scleral buckle. After two months, his RE best corrected LOGMAR vision was 0.2, in LE it was 1.0. Fundus examination in BE showed complete reattachment with dull foveal reflex in BE. Optical coherence tomography revealed minimal sub retinal fluid in RE and interdigitation and ellipsoid zone disorganization. His sibling, who was a myope had treatable peripheral retinal lesions in BE.

Results: Seven months post-surgery, the sub retinal fluid in RE is completely resolved and the best corrected LOGMAR visual acuity is 0.6 in RE and 0.8 in LE.

Conclusions: Myopic patients along with their siblings should have periodic dilated fundus examinations.

Abstract No.: 206962**Advancing Retinal Surgery Visualization: Initial Clinical Application of the Volk SOLR Lens in the Philippines***First Author: Vicente Lorenzo CABAUG**Co-Author(s): Kristine Joy CABAUG*

Purpose: To describe the initial clinical use of the Volk SOLR non-contact wide-angle viewing system in vitreoretinal surgery and highlight its optical design features and potential impact on intraoperative visualization.

Methods: A descriptive case series was initiated using the SOLR lens during vitreoretinal procedures. Key technical features—including an expanded condensing lens that delivers a shadow-free panoramic field, gravity-centered alignment through the Lens Positioning Unit (LPU), and microscope-specific twist-

lock mounting—were noted. Subjective surgeon observations regarding clarity, ergonomics, and integration into surgical workflow were recorded.

Results: Early intraoperative impressions demonstrated consistent wide-angle visualization, sharp optical clarity, and stable lens positioning across procedures. The lens mounting system allowed efficient setup with minimal adjustments. Observations were qualitative, reflecting preliminary use; quantitative surgical outcomes will be evaluated with further experience.

Conclusions: Initial clinical application of the Volk SOLR lens was feasible and well-tolerated in vitreoretinal surgery, providing enhanced visualization and ergonomic integration. While findings are preliminary, these observations support the potential of the SOLR system to augment surgical efficiency. Ongoing case accumulation will help establish its role in broader surgical practice.

Abstract No.: 200898**Bilateral Subconjunctival Hemorrhage in Ocular Rosacea: An Unusual Presentation***First Author: Ruchi SHRESTHA*

Purpose: To present an unusual case of bilateral subconjunctival hemorrhage in ocular rosacea

Methods: Case: A 45-year-old female presented with redness in both eyes while bathing and lifting heavy objects for 3 days. It was painless and associated with itching of both eyes. The redness was recurring on and off 3 episodes in 4 months and treated elsewhere previously. On examination there was sub conjunctival hemorrhage in the inferonasal part of right eye and temporal part of left eye. There was meibomian gland dysfunction in both upper eyelids with right upper lid chalazion. It was associated with maculopapular rash over the eyelids and face with prominence in cheek area for 3 months. Topical Ketorolac and ointment Tetracycline on eyelids was prescribed. Dermatology consultation was sent.

Results: The subconjunctival hemorrhage and chalazion resolved with decreased facial maculopapular rash on 2 weeks follow up. The patient was diagnosed with rosacea with ocular findings by the dermatologist. She was treated with retinol, lignocaine and prilocaine ointment and oral Montelukast. The patient has not developed recurrent subconjunctival hemorrhage on 3 months follow up but still has few cutaneous features under treatment.

Conclusions: Ocular rosacea is associated with 58% of cases with cutaneous lesions but the ocular component is often missed despite having mild to potentially vision threatening conditions. This case highlights that ocular rosacea should be considered in cases of recurrent subconjunctival hemorrhage.

Abstract No.: 201816

Binocular Metamorphopsia and Quality of Life Following Vitrectomy for Epiretinal Membrane

First Author: Yuka **ISHIKAWA**

Co-Author(s): Mayumi **KOBAYASHI**, Shohei **MORIKAWA**, Tetsuro **OSHIKA**, Yoshimi **SUGIURA**, Mizuki **TOMIOKA**

Purpose: To evaluate changes in binocular metamorphopsia and their association with vision-related quality of life (VR-QOL) before and after vitrectomy in patients with unilateral epiretinal membrane (ERM).

Methods: We analyzed 33 eyes of 33 patients (mean age, 70.3 ± 7.6 years) with unilateral ERM who underwent vitrectomy and completed a 6-month follow-up. VR-QOL was assessed using the Japanese version of the 25-Item National Eye Institute Visual Function Questionnaire (VFQ-25), which consists of 12 subscales and a composite score. Associations between VR-QOL and metamorphopsia (monocular and binocular), best-corrected visual acuity (BCVA), and ocular dominance were examined.

Results: The VFQ-25 composite score increased from 75.0 preoperatively to 79.7 postoperatively, without statistical significance ($P = 0.09$). Significant postoperative improvements were noted in "general vision" ($P = 0.015$) and "near activities" ($P = 0.007$). Preoperative composite scores were not significantly correlated with visual functions. In patients whose operated eye was the dominant eye (11 eyes, 33.3%), postoperative composite scores were significantly associated with postoperative binocular metamorphopsia ($P = 0.038$). Preoperative "mental health" was significantly correlated with preoperative binocular BCVA ($P = 0.009$), and postoperative "near activities" was significantly correlated with postoperative binocular metamorphopsia ($P = 0.023$).

Conclusions: In ERM patients, vitrectomy significantly improved VR-QOL in the subscales of general vision and near activities. When the operated eye was the dominant eye, postoperative VR-QOL was significantly associated with postoperative binocular metamorphopsia.

Abstract No.: 201639

Case Series of Pneumatic Cryoretinopexy for Rhegmatogenous Retinal Detachment (RRD) at Hospital Kuala Lumpur (HKL): A 2-Year Retrospective Review

First Author: Jason Allan Seng Soon **CHEAH**

Purpose: To report the indications, visual outcomes, and complications of pneumatic cryoretinopexy.

Methods: Case series.

Results: A total of 9 eyes from 9 patients, consisting of 6 females and 3 males with an age range of 49 to 70,

underwent pneumatic cryoretinopexy between 2023 and 2024 in HKL. Among the 9 patients, 4 patients (44.4%) had superior RRD, 3 patients (33.3%) had temporal RRD, 1 patient (11.1%) had inferior RRD, and 1 patient (11.1%) had nasal RRD. Of these, 5 patients (55.5%) had RRD with the macula off, and 4 patients (44.4%) had RRD with the macula on. Seven patients had a retinal tear, while 2 patients had more than 1 tear. One patient had tears spanning more than 1 clock hour. Among the 9 eyes, 3 eyes (33.3%) were pseudophakic. Seven out of 9 patients (77.8%) successfully achieved retinal reattachment within 1 month with improved visual acuity. Meanwhile, 2 patients (22.2%) failed to achieve retinal reattachment post-pneumatic cryoretinopexy, which required follow-up vitrectomy surgery. Seven patients (77.8%) achieved unaided visual acuity better than 6/24, while 2 patients (22.2%) achieved visual acuity of 6/120 post-pneumatic cryoretinopexy. There were no incidents of raised intraocular pressure (IOP) or cataract development within 1 month of the postoperative period.

Conclusions: Pneumatic cryoretinopexy is an effective surgical option for selected patients with uncomplicated RRD. However, it is crucial to emphasize strict positioning post-pneumatic cryoretinopexy to ensure treatment effectiveness and prevent retinal redetachment.

Abstract No.: 205547

Clinical Outcomes of Perfluorocarbon Liquid-Assisted Vitrectomy for Primary Macula-Off Rhegmatogenous Retinal Detachment in a Tertiary Ophthalmic Center in Northern Vietnam

First Author: Trung **NGUYENBA**

Co-Author(s): Xuan **LE THI KIM**, Anh **TUAN VU**

Purpose: The use of perfluorocarbon liquids (PFCLs) during vitrectomy has been advocated for stabilizing the retina and facilitating subretinal fluid drainage in macula-off rhegmatogenous retinal detachment (RRD). This study aimed to evaluate the anatomical and functional outcomes of PFCL-assisted pars plana vitrectomy in patients with primary macula-off RRD.

Methods: A retrospective review was performed on patients with primary macula-off RRD who underwent PFCL-assisted vitrectomy at a tertiary ophthalmic center in Northern Vietnam between August 2017 and August 2019. Clinical outcomes, including retinal reattachment rate, best-corrected visual acuity (BCVA), central visual field status, and postoperative complications, were assessed.

Results: Thirty-four eyes were included. At 3 months postoperatively, the retinal reattachment rate was 97.1% (33/34). Mean BCVA improved significantly from 2.13 ± 0.7 logMAR at baseline to 1.10 ± 0.6 logMAR ($p < 0.0001$). Central visual field testing demonstrated preservation in 76.5% of cases, while 23.5% exhibited

residual central scotomas. Postoperative complications were infrequent, comprising subretinal PFCL (n=1), anterior chamber PFCL (n=1), and epiretinal membrane formation (n=1). Early surgical intervention within 10 days of macular detachment correlated with improved anatomical and visual outcomes.

Conclusions: PFCL-assisted vitrectomy for macula-off RRD achieved high anatomical success and significant visual rehabilitation, while maintaining central visual field integrity. The technique offers a valuable alternative to posterior pole retinotomy in managing complex detachments.

Abstract No.: 201410

Comparative Evaluation of Residual Silicone Droplets Following Air-Fluid Exchange Versus Silicone Oil-Fluid Exchange During Silicone Oil Removal in Peshawar, Pakistan

First Author: Shafiq **TANVEER**

Purpose: To compare the efficacy of air-fluid exchange (AFX) versus silicone oil-fluid exchange (SO-FX) in minimizing residual silicone oil (SO) droplets, visual outcomes, and intraocular pressure (IOP) following SO removal.

Methods: This prospective quasi-experimental study included 55 eyes of 55 patients who underwent SO removal at a Teaching Hospital in Peshawar by an experienced Vitreoretinal (VR) surgeon, between September 2024 and February 2025. Patients were divided into AFX (n = 29) and SO-FX (n = 26) groups based on the surgical technique. Residual SO droplets were quantified using high-resolution B-scan ultrasonography and ImageJ software. Visual acuity and IOP were evaluated preoperatively and postoperatively. Statistical comparisons between groups were performed using t tests and chi-square tests, with $p < 0.05$ considered significant.

Results: The AFX group had significantly fewer residual SO droplets (75.41 ± 106.84 vs 241.85 ± 102.33 ; $p < 0.001$) and a lower silicone oil index (SOI) ($1.36\% \pm 1.24\%$ vs $3.82\% \pm 1.39\%$; $p < 0.001$). Visual improvement occurred in 82.8% of AFX eyes compared with 38.5% of SO-FX eyes ($p = 0.0007$). Elevated postoperative IOP (>21 mmHg) was observed in 84.6% of SO-FX eyes and 10.3% of AFX eyes. Higher SOI and droplet burden were significantly associated with raised IOP ($p < 0.001$).

Conclusions: Air-fluid exchange resulted in lower residual SO burden, greater visual improvement, and better IOP control compared with SO-FX, supporting its use as the preferred technique for SO removal.

Abstract No.: 201102

Complications Associated With Silicone Oil Tamponade Following Routine Pars Plana Vitrectomy for Rhegmatogenous Retinal Detachment

First Author: Shah Md Rajibul **ISLAM**

Co-Author(s): Mominul **ISLAM**, Omar **JAFARULLAH**, Lutfullahil **KHABIR**, Ehsanur **REZA**

Purpose: Outlining the complications related to silicone oil.

Methods: This multicenter cross-sectional observational study was done from September 2023 to December 2024. All the patients underwent pars plana vitrectomy + endolaser with silicone oil tamponade for rhegmatogenous retinal detachment. Follow-up was done up to six months. A complete ophthalmological examination was carried out pre- and postoperatively.

Results: Eighty-nine eyes of 89 subjects were analyzed. Mean age was 53 years (range 32 to 62 years). 60 (67.42%) eyes were phakic and the rest were pseudophakic (29 eyes, 32.58%). 07 patients developed keratopathy (7.87%), 09 patients developed retinal detachment (10.11%). SO migration to the anterior chamber occurred in 05 (5.62%). Emulsification of SO at six months occurred in 12 eyes (13.48%). Subconjunctival SO migration occurred in 08 eyes (8.98%). 25 patients (41.66%) developed lental opacity / cataract progression was noted. 23 (25.84%) patients developed ocular hypertension. IOP became normal following removal of silicone oil in 12 eyes (52.17%). 04 patients (4.49%) needed anti glaucoma medications for IOP control despite removal of silicone oil.

Conclusions: The complications associated with silicone oil in vitreoretinal surgery are typically transient and can be effectively managed through appropriate medical or surgical approaches, leading to favorable long-term outcomes for patients. The complications observed in our case series align with those documented in existing literature; however, extended follow-up is necessary to assess long-term complications accurately. The relatively low complication associated with silicone oil is outweighed by the advantages it provides.

Abstract No.: 202393

Densiron Xtra Heavy Silicon Oil in the Management of Complicated Retinal Detachments: Analysis on Anatomical and Functional Aspects and Complications

First Author: Sandeep **KUMAR**

Co-Author(s): Charu **GUPTA**, Daraius **SHROFF**

Purpose: To evaluate and discuss anatomical, functional, and post-operative complications of Densiron Xtra as an internal tamponade in patients with complicated retinal detachment.

Methods: A retrospective non-comparative observational study design of 19 eyes of 19 patients was carried out. Eyes with complicated RD and an inability to maintain position after surgery were included in the study. Densiron Xtra was used as an internal tamponade in all the subjects. Patients were evaluated for post-operative complications, intraocular pressure and BCVA at 1, 3 and 6 months. Patients were followed up for a period of one year post-Densiron Xtra removal

Results: The anatomic success rate was achieved in 89.4 % of cases with re-detachments encountered in 2 out of 19 patients. The mean BCVA at 3 and 6 months were Log 1.11 $\pm$ 0.3 and Log 0.94 $\pm$ 0.36 respectively. Mean IOP noted at the end of 1, 3 and 6 months was 16.46 $\pm$ 5.99 mm Hg, 16.14 $\pm$ 5.95 mm Hg and 16.24 $\pm$ 4.9 respectively, the final mean BCVA and IOP after 3 months of Densiron removal were noted to be Log 0.88 $\pm$ 0.34 and 16.24 $\pm$ 4.9 mm Hg. The most common complication noted in our study post Densiron Xtra injection was Epiretinal membrane 47.37%, followed by raised IOP in 26.32% of cases.

Conclusions: We suggest that Densiron xtra is a safe and effective temporary internal tamponade agent in cases of complicated inferior retinal detachment, as there were no major post-operative clinical complications after Densiron Xtra usage, and the risk of redetachment also decreased significantly.

Abstract No.: 205322

Early Intervention in Metallic Intraocular Foreign Body: Preventing Sight-Threatening Complications

First Author: Jia Hui **LEONG**

Co-Author(s): Jason Allan **CHEAH SENG SOON**, Swee Ying **CHOO**

Purpose: Intraocular foreign bodies (IOFBs) are common penetrating ocular injury that can occur in various intraocular levels. Visual outcomes ranges from mild impairment to profound loss. We report a case of metallic IOFB with preserved visual potential.

Methods: Case report

Results: A 38-year-old healthy male presented to Emergency Department complained of left eye foreign body sensation. He denied blurring of vision, floaters or flashes. A day prior, a metallic wire brush fragment entered his left eye during car cleaning without protective eyewear. Unaided visual acuity (VA) was 6/9 bilaterally with intraocular pressure of 12mmHg. Slit lamp examination revealed subconjunctival metallic foreign body 3.6mm from nasal limbus. Cornea and lens were clear, with no chemosis or phacodonesis. Fundus examination showed an IOFB approximately six-disc diameters nasal to optic disc, with the tip momentarily rubbing against the retinal surface during eye movement and localized commotio retinae. The

right eye was unremarkable. Pars plana vitrectomy with IOFB removal, endolaser and gas tamponade was performed under local anaesthesia. Intraoperatively, the entry site was identified at the ora serrata with multiple retinal tears and localized shallow detachment from IOFB contact. Intravitreal vancomycin and ceftazidime were administered prophylactically. He has uneventful recovery and excellent visual outcome, without developing endophthalmitis.

Conclusions: IOFB-related ocular trauma requires meticulous evaluation to localize foreign bodies and associated complications. Early surgical intervention is crucial in preventing sight-threatening sequelae and optimizing visual prognosis. Practice of protective eyewear is essential to minimize risk of intraocular trauma.

Abstract No.: 205334

Early Surgical Management of Complex Ocular Trauma With Intraocular Foreign Body, Traumatic Optic Neuropathy, Traumatic Cataract, and Carotid Cavernous Fistula: A Case Report

First Author: Ridha Agusta **FARHANI**

Co-Author(s): Arief **WILDAN**

Purpose: To report early surgical management of a complex ocular trauma case featuring intraocular foreign body (IOFB), traumatic optic neuropathy (TON), traumatic cataract, and carotid cavernous fistula (CCF) following a motor vehicle accident in a young adult.

Methods: Ophthalmic evaluation including visual acuity, intraocular pressure measurement, slit-lamp examination, pupillary reflex, fundus examination, ocular motility testing, and neuroimaging with computed tomography (CT), CT angiography, and digital subtraction angiography (DSA) was performed.

Results: An 18-year-old male presented with sudden bilateral vision loss. Visual acuity was hand movement in the right eye and no light perception in the left. The right eye showed an intraocular foreign body, traumatic cataract, diminished pupillary reflex, optic disc atrophy, and limited ocular motility. The left eye exhibited corkscrew conjunctival vessels, chemosis, relative afferent pupillary defect, and optic disc atrophy. CT confirmed an IOFB and orbital fractures in the right eye. CT angiography and DSA identified a high-flow left CCF. Surgical procedures included IOFB removal, pars plana vitrectomy, phacoemulsification, and lens implantation in the right eye, followed by endolaser and silicone oil tamponade. Embolization for CCF was scheduled.

Conclusions: Prompt diagnosis and multidisciplinary surgical management of IOFB, TON, traumatic cataract, and associated vascular injuries like CCF are crucial for improving visual prognosis in complex ocular trauma.

Abstract No.: 204786**Enhancing Retinal Laser Delivery in Training: A Clinical Fellow's Perspective on the Norlase Lynx Pattern Indirect Laser***First Author: Daniel Jose MENDOZA**Co-Author(s): Roberto Luis FRANCO, Carlo Antonino NASOL*

Purpose: To describe a clinical fellow's experience using the Norlase Lynx Laser during retinal interventions, and to highlight the advantages of its ergonomic and technical features from a trainee's perspective.

Methods: This descriptive report was conducted in a tertiary retina training center. The Norlase Lynx Laser was used in multiple scenarios, including intraoperative laser retinopexy during scleral buckling, pneumatic retinopexy, and retinopathy of prematurity (ROP) screening and treatment. Subjective feedback was collected on ergonomics, visualization, laser efficiency, and portability, with comparisons made to conventional wired LIO systems.

Results: The Norlase Lynx Laser significantly improved intraoperative ergonomics with its wireless, lightweight design allowing greater head mobility and improved access to the peripheral retina. Its pattern laser functionality enabled rapid and consistent application of laser retinopexy, proving especially advantageous in post-pneumatic retinopexy cases. More recently, the system was utilized in ROP screening and management, where the efficiency and speed of pattern laser delivery were particularly valuable given the limited cooperation of premature infants. Its portability and compact form factor further supported use in bedside settings and offer strong potential for deployment in far-flung areas, where access to conventional laser systems is often limited.

Conclusions: The Norlase Lynx Laser offers a game-changing experience in retinal laser delivery across both surgical and outpatient settings. Its cordless, compact design and pattern laser capability enhance maneuverability, reduce physical strain, and increase confidence in laser application. The device proves beneficial in training environments, where intuition and efficiency can significantly impact the learning curve and quality of patient care.

Abstract No.: 200331**Evaluation of Anxiety Using Hospital Anxiety Depression Scale in Patients With Advanced Diabetic Eye Disease***First Author: Daniel PHANG**Co-Author(s): Chee SHEW FEI*

Purpose: Advanced diabetic eye disease (ADED) is the debilitating sequelae of diabetic retinopathy (DR). It is a chronic disease and requires lifelong treatment. The mental health of patients with chronic disease was often affected. Recognising and addressing mental

health issues in patients with chronic diseases is crucial for optimising overall patient well-being.

Methods: A cross-sectional study was conducted involving ADED patients from Hospital Universiti Sains Malaysia (USM) and Hospital Sultanah Aminah from 1 May 2022 till December 2023. Diabetic patients with no DR were included as the control group. HADS was used to assess patients' anxiety.

Results: A total of 108 diabetic patients were included in this study. The percentage of ADED patients with anxiety based on the HADS score cut-off point of more than 8 was 64.8%. The mean HADS for anxiety (HADS-A) score was significantly higher in ADED (8.15, SD 4.42) than in no DR (4.15, SD 3.02) ($p < 0.001$). Foot amputation and severe to blindness visual impairment were the factors that significantly associated with anxiety. Another factor that was significantly associated with anxiety was living alone.

Conclusions: ADED is more susceptible to psychological stress due to visual impairment and chronic medical illness related to complications of DM. A holistic approach to the management of ADED patients should include a thorough evaluation of their mental health status and early referral for mental health care.

Abstract No.: 203019**Evolutionary Patterns and Research Hotspots in the Macular Hole Surgery***First Author: Haonan MA**Co-Author(s): Jie PENG, Peiquan ZHAO*

Purpose: Since 1991, a variety of surgical techniques and adjunctive procedures have been developed or applied to the treatment of macular holes (MHs), resulting in favorable anatomic and visual outcomes. However, there has been no study that systematically and comprehensively analyzes and summarizes these methods. This study explored research hotspots by reviewing publications in the field of MH surgery using bibliometric analysis.

Methods: Publications related to MH surgery before June 1, 2024, were downloaded from the Web of Science Core Collection database. Bibliometric analysis was employed to conduct performance analysis and hotspot investigation.

Results: The final retrieval of 3,726 relevant publications indicated a general increasing trend in the number of annual publications. The most influential authors were "HARITOGLOU C", "KAMPIK A", and "SMIDDY WE", while the leading countries were Japan, the USA, and China. University College London was the most productive institution. The journal RETINA led the way in the number of publications. Through co-occurrence, clustering analysis, and literature review, we identified three most popular topics: different surgical techniques, variants, adjunctive procedures,

and surgical decision-making of MH surgery; principles of surgical closure of MH; and dye-associated toxicity.

Conclusions: This study provided insights into the current status of research and future hotspots in the field of MH surgery from a global perspective. We systematically summarized and analyzed the evolution of surgical techniques and their intrinsic reasons over the last three decades, emphasizing the importance of conducting prospective or randomized studies in the future.

Abstract No.: 202602

Fixed-Interval Intravitreal Methotrexate in Silicone Oil with Reduced Frequency for Prevention of Proliferative Vitreoretinopathy

First Author: Xiaorong LI

Purpose: To evaluate the efficacy and safety of a novel fixed-interval intravitreal methotrexate (MTX) protocol for preventing recurrent retinal detachment (RD) in proliferative vitreoretinopathy (PVR) following primary repair surgery.

Methods: This retrospective study enrolled patients undergoing pars plana vitrectomy with silicone oil tamponade for non-traumatic RD complicated by PVR. 400 µg/0.1 mL MTX intravitreal was administered intraoperatively and at postoperative weeks 3, 6, and 9.

Results: The cohort comprised 13 patients undergoing vitrectomy for RD with PVR grade $\geq C1$. Single-operation anatomical success was achieved in 12(92.3%) of 13 eyes with one failure salvaged surgically. Best-corrected visual acuity improved significantly compared to baseline. Silicone oil removal proved feasible in 8 patients after a mean tamponade duration of 5.5 months. Central retinal thickness measurements revealed non-significant transient fluctuations during the 24-week. A mild epiretinal membrane was documented in one patient, without discernible impact on the retinal reattachment. Transient corneal epithelial edema manifested in an elderly patient. No additional complications detected.

Conclusions: The MTX regimen requiring fewer interventions manifested favorable anatomical efficacy and safety in patients with recurrent RD secondary to PVR.

Abstract No.: 205619

Formyl Peptide Receptor 1 Promotes Abnormal Neovascularization via Activating Microglia in Ischemic Retinopathy

First Author: Qiaoyan HUI

Purpose: Abnormal neovascularization is the major component of ischemic retinopathy. Inflammation is regarded as a critical promotor for neovascularization. Our previous study indicated Formyl peptide receptor 1 (FPR1) exacerbates retinal neovascularization by

aggravating inflammation. FPR1 has been proven to activate microglia which induces inflammation. Therefore, we set to explore whether the effect of FPR1 on neovascularization is dependent on the activation of microglia in ischemic retinopathy.

Methods: Impact of FPR1 on neovascularization was evaluated by quantifying retinal neovascular tufts in FPR1-deficient OIR mice, OIR mice treated with FPR1-neutralizing antibody/FPR1 agonist. Phenotype alteration of microglia was measured by retinal flat-mounting in FPR1+/+ and FPR1-/- OIR mice. Expression of inflammatory cytokines of microglia was assessed by real-time PCR after FPR1 neutralizing antibody/FPR1 agonist administration under hypoxia in vitro.

Results: Retinal pathologic neovascularization significantly decreased in FPR1 deficient and FPR1-antibody-treated OIR mice, and increased in FPR1 agonist-treated OIR mice. The number of retinal microglia decreased in FPR1-/- OIR mice. FPR1 neutralizing antibody downregulated pro-inflammatory factors in microglia after hypoxic stimuli. FPR1 agonist administration robustly increased expression of inflammatory cytokines of microglia following hypoxic stimuli.

Conclusions: In ischemic retinopathy, FPR1 aggravates abnormal neovascularization and enhances inflammation by modulating the activation of microglia.

Abstract No.: 203970

Four-Flanged Technique for Scleral Fixation of a Dislocated Four-Eyelet Intraocular Lens

First Author: Jaeyon WON

Purpose: To define and evaluate the short-term clinical outcomes of the four-flanged technique for scleral fixation of a dislocated four-eyelet intraocular lens (IOL).

Methods: Eleven eyes of 11 patients who underwent scleral fixation of dislocated four-eyelet intraocular lenses using a four-flanged technique were studied retrospectively. We measured the best-corrected visual acuity (BCVA), corneal endothelial cell density, intraocular pressure (IOP), spherical equivalent, astigmatism, IOL tilt and decentration, and postoperative complications.

Results: The BCVA was 0.25 ± 0.11 logarithm of the minimal angle of resolution (logMAR) before surgery and 0.14 ± 0.12 logMAR 6 months later ($p < 0.001$). The corneal endothelial cell count was $2,427 \pm 384$ and $2,367 \pm 298/\text{mm}^2$ before and after surgery, respectively ($p = 0.285$). The spherical equivalent was 6.02 ± 4.90 and 0.11 ± 0.36 before and after surgery, respectively. There was no significant difference in astigmatism before and after surgery. The mean IOL tilt and decentration were $2.44 \pm 1.68^\circ$ and 0.23 ± 0.09 mm, respectively. The refractive difference was 0.11 ± 0.24 diopters (D). Postoperative complications occurred

in one eye; one flange lay outside the scleral tunnel, triggering hyperemia and conjunctival inflammation.

Conclusions: The four-flanged scleral fixation technique for a dislocated four-eyelet IOL improved the BCVA but did not significantly affect corneal endothelial cell loss. The procedure significantly reduced postoperative IOL tilt, decentration, and astigmatism, and may be a useful alternative to scleral fixation of a dislocated four-eyelet IOL.

Abstract No.: 205438

From Gut to Globe: A Case Report of Traumatic Enterococcus faecalis Endophthalmitis With Intraocular Foreign Body

First Author: Mark Nathaniel **ARNALDO**

Co-Author(s): Roberto Luis **FRANCO**, Daniel Jose **MENDOZA**, Carlo Antonino **NASOL**

Purpose: Post-traumatic endophthalmitis is one of the consequences of ocular trauma that could lead to poor visual prognosis, and a retained intraocular foreign body (IOFB) can escalate its development. Enterococcus faecalis, a pathogen more commonly implicated in nosocomial infections, is rarely implicated in cases of ocular trauma, but is associated with worse visual outcomes. This paper aims to report a case of a 40-year-old male with findings of Enterococcus faecalis endophthalmitis following an IOFB injury and to discuss its epidemiology, pathogenicity, and management.

Methods: Clinical data were obtained through retrospective review of patient's medical records.

Results: A healthy 40 year old male patient consulted due to a 6-day history of right eye trauma from a metallic debris causing eye pain and blurring of vision initially treated with oral antibiotics and pain medications as prescribed by a general physician. On ophthalmologic examination and diagnostic evaluation with B-scan ultrasonography, an assessment of traumatic endophthalmitis probably secondary to metallic foreign body of the right eye, rule out retinal detachment was made. Pars plana vitrectomy with lensectomy, IOFB explantation, repair of retinal detachment and intravitreal injection of antibiotics was immediately performed with vitreous aspirate yielding heavy growth of Enterococcus faecalis. Post-operatively, he had a visual acuity of hand movement with notable development of ciliary shutdown and anterior segment neovascularization on succeeding follow-ups.

Conclusions: This case report highlights the need for an early combined medical and surgical management and microbial identification in cases of traumatic endophthalmitis to avoid irreversible visual impairment.

Abstract No.: 205629

From Remission to Aggression: High-Grade Transformation of Secondary Vitreoretinal Lymphoma Following Systemic Remission

First Author: Siddhartha **KAR**

Co-Author(s): Manmath **DAS**, Jogmaya **PATNAIK**, Reshma **SM**

Purpose: To report an uncommon case of low-grade to high-grade transformation in secondary vitreoretinal lymphoma (VRL), a rare and potentially fatal intraocular malignancy, following remission of the primary tumour with prior chemotherapy.

Methods: A 68-year-old male presented with bilateral visual loss of 7 days' duration. He had a history of stage 4 gastric follicular Non-Hodgkin lymphoma, which had transformed to diffuse large B-cell lymphoma and was treated with five cycles of Bendamustine-Rituximab, achieving remission. On presentation, BCVA was 6/12, N6 (OU). Examination revealed senile cataracts; funduscopy showed vitreous seeds, creamy white retinal infiltrates in both eyes, and sclerosed vessels (OS). Secondary VRL was suspected. Vitreous biopsy confirmed 30.55% mature clonal B-cells, CD20 positive. PET-CT revealed no systemic disease, so systemic chemotherapy was withheld. The patient was started on intravitreal Rituximab (1 mg/0.1 ml) twice every week. After 6 doses, retinal infiltrates regressed; however, after 10 doses, new peripapillary involvement appeared. CSF flow cytometry revealed abnormal clonal B cells, indicating CNS spread and transformation of VRL to a high-grade, chemotherapy-resistant form.

Results: The patient was diagnosed with secondary VRL with CNS involvement and planned for second-line chemotherapy with high-dose Methotrexate. Post-treatment vitreous fluid flow cytometry and PET-CT are scheduled.

Conclusions: 1. Till date intravitreal treatment regimens and the role of adjuvant systemic chemotherapy in secondary VRL remain undefined. 2. Our case demonstrated isolated intraocular spread from gastric B-cell lymphoma without systemic relapse. 3. Transformation of VRL into high-grade B-cell lymphoma can occur despite aggressive intraocular chemotherapy.

Abstract No.: 201444

Full Thickness Macular Hole With Retinal Detachment Secondary to Bartonella Hensalae Neuroretinitis

First Author: Yu Qian **HEONG**

Co-Author(s): Sheena Mary **ALEXANDER**, Jin Yi **YAP**

Purpose: To report a rare case of full thickness macular hole with retinal detachment secondary to Bartonella Hensalae neuroretinitis.

Methods: Case report

Results: A 32-year-old woman presented with blurring of vision in the right eye for 4 days. She had daily contact with cats. Visual acuity was counting fingers in the right eye and 6/6 in the left. A relative afferent pupillary defect was noted in the right eye. Fundus examination revealed a diffusely hyperemic optic disc with blurred margins in the right eye, macular and retina was attached during the examination. Left eye examination were normal. Serology testing showed elevated Bartonella Henselae IgG titers (1:64), supporting the diagnosis of cat scratch disease. A 6-week course of oral antibiotics was initiated. Three weeks later, fundus examination of the right eye revealed a large macular hole of more than 1500um with retinal detachment and foveal cyst. Optical coherence tomography confirmed a full-thickness macular hole with subretinal fluid. The patient underwent scleral buckle, trans-pars plana vitrectomy, internal limiting membrane peeling with flap, and oil tamponade in the right eye. Intraoperatively, a thick epiretinal membrane with full-thickness retinal folds, proliferative vitreoretinopathy membrane and a macular hole were observed, along with retinal detachment involving the macula and a foveal cyst.

Conclusions: Bartonella henselae neuroretinitis may rarely cause severe complications such as macular hole and retinal detachment. This case highlights the importance of awareness and close follow-up to prevent vision loss.

Abstract No.: 208371

How Common Is Pre-existing Posterior Vitreous Detachment in Vitreoretinal Surgeries?

First Author: Joy SEE LEUNG

Purpose: Posterior vitreous detachment (PVD) induction is an essential, yet risky procedure in any vitreoretinal surgery. Pre-operative assessment of completeness of PVD allows the surgeon to plan for the surgery and explain risks to patients appropriately.

Methods: This was a retrospective study of cases done by a single surgeon from July 2023 to July 2024. Only cases of primary vitrectomy were included. Pre-operative assessment of the presence of PVD was made by the surgeon using clinical exam (indirect ophthalmoscopy and slit-lamp biomicroscopy). It was compared with the intraoperative findings of PVD. Potential factors associated with its presence were explored.

Results: A total of 106 cases were included. 75 cases were operated for floaters, 23 for epiretinal membrane, 3 for vitreous haemorrhage, 2 for retinal detachment, 1 for macular hole and 1 for asteroid. PVD was observed preoperatively in 88 (83.8%) of the cases, and intraoperatively, it was found in 92 (87.6%) of them. The sensitivity of clinical diagnosis of the presence of PVD was 91.3%. Only 4 (4.5%) cases that

were labelled 'PVD-present' pre-operatively, eventually needed PVD induction during surgery ($p < 0.01$). There was no significant difference in need for PVD induction in phakic and pseudophakic patients ($p=0.12$), and across ages ($p=0.57$).

Conclusions: In summary, PVD was present in majority of the cases which reduced the need for risky PVD induction. Pre-operative clinical assessment to detect presence of PVD was a reliable method to detect the need for PVD-induction.

Abstract No.: 203392

In Eye With Coexisting Anterior Chamber Intraocular Lens and Posterior Chamber Intraocular Lens With Retinal Detachment, Both Lenses Must Go?

First Author: Pei Fang NEOH

Purpose: To illustrate a creative method to explant posteriorly dislocated posterior chamber intraocular lens (IOL) in an eye with coexisting anterior chamber IOL during retinal detachment (RD) repair surgery, leaving anterior chamber IOL in situ.

Methods: Case report.

Results: A 64-year-old man was referred from a private ophthalmologist for right eye (RE) rhegmatogenous RD with a posteriorly dislocated single-piece posterior chamber IOL. His RE visual acuity was hand movement (HM) with the presence of relative afferent pupillary defect (RAPD). Further examination of RE revealed an anterior chamber IOL in situ with iridodialysis 2 clock hours superiorly. Fundus examination showed total rhegmatogenous RD (proliferative vitreoretinopathy grade B) with multiple retinal breaks. He underwent emergency pars plana vitrectomy for the explantation of a dislocated IOL with retinal detachment repair. Heavy liquid was used to stabilise the detached retina and to protect the macula. Posterior chamber IOL anteriorized with micro-forceps to the plane between the anterior chamber IOL and the iris through the temporal corneal incision, leaving the anterior chamber IOL in situ. The cornea wound was sutured with Nylon 10/0, followed by RD repair, silicone oil (SO) tamponade, and peripheral iridectomy. Immediate postoperative VA was 6/60, and the retina was flat. 6 months later, removal of SO was performed, and he achieved VA 6/18 with no complications.

Conclusions: It is possible to explant a posteriorly dislocated IOL without explantation of the anterior chamber IOL, despite the need for anteriorization of the dislocated IOL to remove it through a corneal incision during complex RD surgery.

Abstract No.: 201859
Intraoperative Suprachoroidal Hemorrhage During Scleral-Fixated IOL (SFIOL) Implantation Using the Yamane Technique: A Case Report and Its Surgical Management

First Author: Clarissa LISTER

Co-Author(s): Stefenie, Cindy Prajna METTA, Sindy Boru SEMBIRING, Givenchy Angela WINARJO

Purpose: To highlight the necessity and technique of surgical drainage in managing severe suprachoroidal hemorrhage (SCH) and to illustrate how secondary complications can ultimately affect visual outcomes, even after the hemorrhage is resolved.

Methods: Case report of a 69-year-old male who developed a severe intraoperative SCH during pars plana vitrectomy combined with SFIOL implantation.

Results: A 69-year-old male with a history of eventful cataract surgery presented with a dropped nucleus in the right eye (OD). His initial visual acuity (VA) was hand movements. He underwent pars plana vitrectomy combined with sutureless scleral-fixated intraocular lens (SFIOL) implantation using the Yamane technique. While the IOL was successfully fixated, intraoperative SCH developed during final haptic manipulation. Initial management was conservative. However, two weeks postoperatively, the patient reported severe ocular pain. Despite controlled intraocular pressure (IOP) with medical therapy, the pain persisted. B-scan ultrasonography revealed kissing choroidal detachments, suggestive of appositional hemorrhagic choroidal detachment. Surgical drainage of the SCH was performed. One month after drainage, the SCH had completely resolved, and the IOL remained well centered. However, submacular fibrosis was noted, limiting the VA to 1/60.

Conclusions: Intraoperative SCH is a rare but severe complication of complex intraocular surgeries, including sutureless SFIOL implantation. Vessel trauma during haptic manipulation may be a contributing factor. Although initial conservative management is appropriate, persistent pain and ultrasound evidence of kissing choroidal detachments should prompt surgical intervention. Surgical intervention can successfully resolve the hemorrhage; however, the final visual outcome may be limited by secondary retinal complications.

Abstract No.: 205253
Long-Term Outcomes and Predictive Factors of Visual Recovery After Small-Gauge Vitrectomy for Infectious Endophthalmitis: A Decade of East Asian Data

First Author: Wen-jung LO

Co-Author(s): Chia-jen CHANG, Hung-ju CHEN, Yuan-shao CHENG, Shih-chao FENG, Chung-hao HSIAO

Purpose: To evaluate long-term visual outcomes and prognostic factors of pars plana vitrectomy (PPV) using small-gauge systems in exogenous endophthalmitis, based on a decade of real-world data from East Asia.

Methods: This single-center, retrospective cohort study analyzed 45 eyes undergoing pars plana vitrectomy for exogenous endophthalmitis at Taichung Veterans General Hospital from June 2014 to September 2024. Demographics, clinical features, microbiology, surgical data, and outcomes were reviewed. Multivariate logistic and linear regression identified prognostic factors, with visual outcomes depicted by Sankey diagrams and significant predictors illustrated by forest plots.

Results: The median final visual acuity (VA) improved significantly from logMAR 2.30 to 1.78 ($p = 0.004$). Visual improvement was achieved in 51.1% of cases, and 24.4% reached VA $\geq 20/40$. Multivariate analysis identified poor initial VA (OR 3.42, $p < 0.001$), culture positivity (OR 2.96, $p = 0.031$), and intraoperative retinal detachment (OR 4.18, $p = 0.008$) as predictors of worse outcomes, while 27-gauge PPV (OR 0.42, $p = 0.046$) and post-cataract etiology (OR 0.39, $p = 0.007$) were favorable factors. Sankey diagrams highlighted that more than half of patients progressed toward functional improvement, whereas forest plots confirmed independent prognostic factors.

Conclusions: Small-gauge PPV offers significant visual improvement for exogenous endophthalmitis, particularly in cases with favorable baseline vision and post-cataract etiology. Use of 27-gauge vitrectomy is associated with better outcomes. Prognostic factors such as poor initial vision, virulent infection, and retinal detachment should inform surgical decision-making and patient counseling.

Abstract No.: 201431
Macular Buckling Combined With Pars Plana Vitrectomy for Retinal Detachment Secondary to Myopic Macular Hole: Without Postoperative Facedown Positioning

First Author: Shida CHEN

Co-Author(s): Lin LU

Purpose: To evaluate the efficacy of macular buckling combined with pars plana vitrectomy (PPV) and air tamponade for treating retinal detachment secondary to myopic macular hole, without requiring postoperative facedown positioning.

Methods: Twenty eyes of 20 highly myopic patients with retinal detachment secondary to myopic macular hole were prospectively enrolled. All patients underwent macular buckling combined with PPV and air tamponade. No facedown positioning was required postoperatively. Best-corrected visual acuity (BCVA), axial length (AL), macular hole (MH) closure rate, and retinal reattachment rate were assessed.

Results: At 1 month postoperatively, retinal reattachment was achieved in 100% of eyes (20/20), and MH closure was achieved in 95% of eyes (19/20). Mean BCVA improved significantly from 1.53 ± 0.34 LogMAR preoperatively to 0.85 ± 0.16 LogMAR postoperatively. Mean AL decreased by 2.3 ± 0.3 mm.

Conclusions: Combined macular buckling, PPV, and air tamponade is an effective treatment for retinal detachment secondary to myopic macular hole, achieving high anatomical success rates without the need for postoperative facedown positioning.

Abstract No.: 207175

Massive Intraoperative Suprachoroidal Hemorrhage in Scleral Fixated Intraocular Lens (SFIOL) Surgery: A Surgical Catastrophe

First Author: Nur Rafidah **MOHAMED ALI**

Co-Author(s): Lim **YI WEN**

Purpose: To report a case of massive intraoperative suprachoroidal hemorrhage (SCH) during scleral-fixated intraocular lens (SFIOL) which was successfully treated with drainage sclerostomy and pars plana vitrectomy (PPV).

Methods: A 64-year-old gentleman with hypertension and diabetes mellitus underwent PPV and intraocular lens (IOL) explantation under local anaesthesia for a dislocated IOL. The procedure was initially uneventful until attempted SFIOL implantation, when the globe became tense, the lens repeatedly prolapsed, and persistent iris prolapse was observed. A sudden loss of red reflex suggested SCH. The procedure was abandoned, the corneal wound was sutured, and intravenous mannitol 20% was administered. Postoperative B-scan confirmed massive SCH involving all four quadrants with breakthrough vitreous hemorrhage (VH).

Results: Postoperatively, vision was reduced to perception of light. The patient was started on topical steroids, antibiotics, antiglaucoma medications, and cycloplegics. Two weeks later, he underwent drainage sclerostomy, PPV with silicone oil tamponade. Intraoperatively, massive SCH with VH and a flat retina were observed. At two weeks postoperatively, vision improved to counting fingers, intraocular pressure back to normal with minimal residual SCH at the superotemporal quadrant and a flat retina.

Conclusions: Suprachoroidal hemorrhage remains a rare but devastating intraoperative complication.

While general risk factors like advanced age and systemic hypertension are present, this case highlights that the complexity of SFIOL placement significantly increases the risk due to the necessity of intricate manipulation and resulting IOP fluctuations. Prompt recognition, rapid closure of surgical wounds, and intraoperative supportive measures are crucial to manage uncontrolled IOP, and achieve functional visual outcomes in high-risk eyes.

Abstract No.: 204702

Multimodal Imaging and Follow-Up of an 8-Month-Old Infant and a 4-Year-Old Child Diagnosed With Cavernous Hemangioma of the Retina

First Author: Jing **MA**

Co-Author(s): Hai **LU**

Purpose: To report 2 cases of cavernous hemangioma of the retina (CHR), with multimodal imaging of an 8-month-old infant and a 4-year-old child, including a live video of fluorescein angiography (FA) and their natural course.

Methods: Fundus examination and FA under general anesthesia, color Doppler imaging (CDI) were performed.

Results: In the 8-month-old boy, the fundus examination revealed a classic grape-like cluster of thin-walled saccular aneurysms in the nasal quadrant, without any preretinal fibrotic membranes on the surface of the tumor. FA showed a prominent delay of perfusion of the adjacent artery (but with a normal caliber), classic hypofluorescence within the main tumor mass in the early phase, and an unusual complete perfusion of the lesion in the late phase, possibly due to the supine position during the procedure. The CDI showed an irregular surface lesion with acoustic solidity, dotted blood flow signals, and no choroidal excavation. The 4-year-old showed similar manifestations to the first patient, but with a preretinal fibrotic membrane on the surface of the tumor, which showed progression during follow-up. Five years later, the girl suffered from a vitreous hemorrhage.

Conclusions: A progression of preretinal fibrotic membrane on the surface of the CHR can occur in younger patients, and may result in the occurrence of vitreous hemorrhage.

Abstract No.: 210178

Observation on the Efficacy of α -Lipoic Acid Capsules Combined With Conbercept Intravitreal Injection in the Treatment of Diabetic Macular Edema

First Author: Aolin **HAN**

Co-Author(s): Shuting **LI**

Purpose: To investigate the safety and efficacy of α -lipoic acid capsules combined with conbercept intravitreal injection in the treatment of diabetic macular edema.

Methods: A total of 123 patients with 123 eyes diagnosed with diabetic macular edema who visited our hospital from January 2023 to December 2023 were included in this study. Patients were divided into three groups based on treatment regimens: a placebo control group (n=37), a conbercept intravitreal injection group (IVC) (n=42), and a conbercept intravitreal injection combined with α -lipoic acid capsule treatment group (n=44). All patients in each group were followed up for 12 months, and changes in biological indicators such as best-corrected visual acuity (BCVA), central foveal thickness (CFT), microaneurysm (MA) count, superoxide dismutase (SOD) content in aqueous humor, ganglion cell layer (GCL) thickness, hard exudate (HE) area, and hemorrhage area were compared before and after treatment.

Results: In the IVC group and the combination therapy group, BCVA, CFT, and MA counts showed significant improvements at 6 and 12 months post-treatment compared to pre-treatment levels ($P < 0.05$). while the control group showed no significant changes before and after treatment ($P > 0.05$). The levels of superoxide dismutase (SOD) in the combined treatment group significantly increased at 6 and 12 months post-treatment compared to pre-treatment levels ($P < 0.05$), while the IVC group and the placebo control group showed no significant changes compared to pre-treatment levels ($P > 0.05$); the thickness of the ganglion cell layer in all three groups showed no significant improvement at 6 months and 12 months post-treatment compared to pre-treatment levels ($P > 0.05$); the area of hard exudates in all three groups improved at 6 months and 12 months post-treatment compared to pre-treatment levels, with statistically significant differences observed in the IVC group and combined therapy group compared to pre-treatment levels ($P < 0.05$); the hemorrhage area in all three groups improved at 6 and 12 months post-treatment compared to pre-treatment levels, with statistically significant differences observed ($P < 0.05$).

Conclusions: In addition to significantly improving visual acuity, reducing foveal thickness, decreasing the number of microaneurysms, and reducing hemorrhagic and hard exudative areas, the addition of α -lipoic acid capsules to conbercept therapy in patients with DME enhances overall efficacy and increases SOD levels

in the aqueous humor, making it worthy of clinical application.

Abstract No.: 206541

Occult Globe Rupture in a Filipino Male: Diagnostic Limitations of CT Imaging

First Author: Nadine Leigh **CHU**

Co-Author(s): Jubaida **MANGONATO**

Purpose: To report a case of posterior globe rupture following blunt trauma, initially undetected on CT, highlighting the limitations of imaging and the importance of maintaining a high index of suspicion when evaluating ocular trauma.

Methods: This case report describes the patient's clinical course, from examination and multimodal imaging with B-scan ultrasonography and CT, to intraoperative findings.

Results: A 48-year-old Filipino male sustained blunt trauma to the left brow from the broken end of a sickle knife. Initially asymptomatic aside from superficial injuries, he developed gradual blurring of vision in the left eye one day post-trauma. Ocular examination revealed a left brow laceration, minimal lid swelling, chemosis, and subconjunctival hemorrhage without conjunctival violation. Visual acuity was decreased in the left eye, with relative hypotony compared to the fellow eye, a deep anterior chamber, and hyphema. Initial CT imaging showed vitreous hemorrhage in the left eye but reported an intact globe. Due to progressive symptoms, further evaluation with B-scan ultrasonography revealed vitreous and suprachoroidal hemorrhage, retinal detachment, and a suspicious area of scleral discontinuity. The patient underwent surgical exploration, which revealed a 10 mm curvilinear, shelved scleral laceration located superonasally, confirming a posterior globe rupture.

Conclusions: Posterior globe rupture can evade detection on CT imaging, especially when sealed by adjacent tissues. In trauma cases with incongruent imaging and clinical findings, a high index of suspicion must be maintained. Early recognition, supported by multimodal imaging and timely surgical management, is crucial to preserving vision and optimizing outcomes in patients with occult globe injuries.

Abstract No.: 205525

Outcomes of Chandelier-Assisted Segmental Scleral Buckling Compared to Conventional Scleral Buckling for Primary Rhegmatogenous Retinal Detachment: A Comparative Retrospective Study

First Author: Shivani **CHHABRA**

Co-Author(s): Ashish **MARKAN**

Purpose: To compare the anatomical and functional outcomes, surgical duration, and complication rates

between chandelier-assisted segmental scleral buckling (SB) and conventional SB in the treatment of primary rhegmatogenous retinal detachment (RRD).

Methods: This retrospective comparative study included 19 phakic patients with primary RRD who underwent either conventional SB (Group 1, n=9) or chandelier-assisted segmental SB (Group 2, n=10). Patients were selected based on specific inclusion criteria including presence of anterior retinal breaks and PVR $\leq$ Grade C1. Group 1 underwent standard 360-degree SB with indirect ophthalmoscopy, while Group 2 underwent segmental SB with limited peritomy and chandelier-assisted wide-angle visualization under a surgical microscope. Primary outcomes included best-corrected visual acuity (BCVA) and anatomical reattachment at 1-year follow-up. Secondary outcomes included surgical duration and epiretinal membrane (ERM) formation.

Results: Both groups demonstrated successful retinal reattachment in all cases and significant improvement in BCVA at one year, with no statistically significant intergroup difference. Mean surgical duration was significantly shorter in the chandelier-assisted group (35.11 ± 21.22 minutes) compared to the conventional group (70.23 ± 23.22 minutes, $p < 0.05$). ERM formation was not significantly different between the groups, and no major intraoperative complications were noted.

Conclusions: Chandelier-assisted segmental SB is a safe and effective technique for managing selected cases of primary RRD. It offers comparable anatomical and visual outcomes to conventional SB, with the added advantages of reduced surgical time and improved intraoperative visualization.

Abstract No.: 207369

Pars Plana Lensectomy (PPL) and Sutured Scleral Fixated Intraocular Lens Implantation in Bilateral Microspherophakia: A Case Series of 3 Related Individuals

First Author: Abhimanyu **SHARMA**
Co-Author(s): Awaneesh **UPADHYAY**

Purpose: To report the clinical presentation, surgical management, and outcomes of bilateral microspherophakia in 3 first-degree cousins (6 eyes) managed with pars plana lensectomy and sutured scleral-fixated intraocular lenses (SFIOLs).

Methods: This retrospective case series included 3 related individuals presenting with bilateral high myopia and decreased vision secondary to isolated microspherophakia. Comprehensive ocular examination, including gonioscopy, A-scan biometry, and anterior segment OCT, was performed to evaluate anterior chamber depth, lens thickness, zonular integrity, and angle configuration. Systemic evaluation ruled out syndromic associations. All eyes underwent 25-gauge pars plana lensectomy with

anterior vitrectomy, followed by scleral fixation of an IOL using 9-0 polypropylene sutures. Postoperative outcomes included best-corrected visual acuity (BCVA), intraocular pressure (IOP), IOL centration, and complication rates over 12-month follow-up.

Results: Preoperative biometric data revealed significantly increased lens thickness and reduced equatorial diameter. All 3 patients had bilateral lenticular myopia with shallow anterior chamber depth. Postop refraction was P1: OD -0.75 @ 1500; OS -1.00D @200 P2: +1.00D @ 300; OS +1.75D @700, and P3: +1.50 @ 100; OS +3.5D @1300; all 6 eyes had well-centered IOL, deep, stable anterior chamber. No intraoperative complication occurred. Postop, no IOL dislocation, secondary glaucoma, or retinal detachment was observed. The familial clustering points toward a likely autosomal recessive inheritance pattern, although genetic confirmation was not obtained.

Conclusions: PPL combined with sutured SFIOL implantation offers a safe and effective solution with favorable anatomical and functional outcomes. This series underscores the importance of early detection, thorough biometric assessment, and tailored surgical intervention in managing hereditary lenticular anomalies.

Abstract No.: 204188

Pars Plana Vitrectomy Versus Scleral Buckle for Primary Rhegmatogenous Retinal Detachment: An Umbrella Review

First Author: Jeffrey **TSAI**
Co-Author(s): Amna **ANWAR**

Purpose: To synthesize and critically appraise evidence from systematic reviews and meta-analyses comparing pars plana vitrectomy (PPV) and scleral buckle (SB) for primary rhegmatogenous retinal detachment (RRD), with emphasis on anatomical outcomes, visual function, and complication profiles.

Methods: A comprehensive search of PubMed, Scopus, Web of Science, and ProQuest (2000–2024) identified systematic reviews and meta-analyses comparing PPV and SB in primary RRD. Reviews of combined procedures, complex RRD, or non-human studies were excluded. Eight eligible reviews encompassing >25,000 eyes were included. Outcomes were extracted on retinal reattachment, best-corrected visual acuity (BCVA), adverse events, and patient-reported measures.

Results: Both procedures achieved high anatomic success (>90%) with no significant difference in primary reattachment rates. Lens status was a key determinant: SB offered superior BCVA in phakic eyes by reducing postoperative cataract development, while PPV showed higher final reattachment success in pseudophakic and aphakic eyes. Complication profiles varied—SB was associated with greater risks of choroidal detachment,

hypotony, and diplopia, whereas PPV carried increased risks of cataract progression and iatrogenic retinal breaks. Quality-of-life analyses indicated better short-term recovery with SB, while PPV was advantageous in complex or pseudophakic cases.

Conclusions: Both PPV and SB remain validated options for primary RRD. Optimal surgical choice should be individualized, guided by lens status, patient age, and detachment complexity. This umbrella review highlights that personalized decision-making—rather than a universal approach—is essential to maximize anatomical and functional outcomes in RRD repair.

Abstract No.: 200140

Pars Plana Vitrectomy for Terson Syndrome Following Head Trauma

First Author: Umesh **BHAMMARKAR**

Purpose: The objective is to present the clinical progression and surgical results in a 24-year-old male with Terson syndrome following traumatic brain injury, characterized by dense vitreous and subhyaloid hemorrhage. This report emphasizes the importance of early vitrectomy and demonstrates the potential for visual recovery, even when complicated by traumatic optic neuropathy.

Methods: A 24-year-old male reported unilateral visual impairment following head trauma and subsequent left-sided craniotomy. The patient remained comatose for several days post-surgery. Upon regaining consciousness, visual acuity in the left eye was limited to hand movements, and B-scan revealed dense vitreous and subhyaloid hemorrhage. Pars plana vitrectomy was undertaken. Intraoperatively, optic disc pallor was observed, indicative of partial traumatic optic neuropathy.

Results: One week after vitrectomy, vision improved from hand movements to 2/60. At two months, the best-corrected visual acuity reached 6/36p. Despite restricted recovery due to optic nerve involvement, notable functional improvement occurred. The patient experienced subjective visual gain and better quality of life. The contralateral eye maintained normal anatomical and functional status during the entire follow-up period.

Conclusions: Terson syndrome following head trauma presents significant challenges in both diagnosis and management. Even with late presentation and associated optic nerve damage, pars plana vitrectomy may provide substantial visual recovery. Prompt identification, timely surgical treatment, and appropriate counseling regarding prognosis remain essential for optimal outcomes, particularly in young individuals with ocular hemorrhage secondary to trauma.

Abstract No.: 207421

Pneumatic Retinopexy – Revisit

First Author: Hong Nien **LEE**

Purpose: To highlight an effective and less traumatic method of pneumatic retinopexy.

Methods: Retrospective observational case study.

Results: A step-wise pneumatic retinopexy was carried out. Eleven patients who presented to our tertiary center, either directly or referred from district hospitals, have been treated with pneumatic retinopexy. All patients had a tear located within the superior 8 clock hours. Two of which had total retinal detachments. The patients had an intravitreal pure SF6 injection, followed by a steam-rolling maneuver. Laser retinopexy was performed in the subsequent day. 81.8% were successfully treated. Two patients were unsuccessful: one remained detached, and another had re-detachment a week later. Both underwent pars plana vitrectomy. All patients were satisfied and did not report any fear towards the procedure. The pain was tolerable.

Conclusions: The step-wise pneumatic retinopexy appeared acceptable by patients. The success rate in the first procedure reported at 81.8%. All patients appeared tolerable towards the procedure and none reported extreme pain.

Abstract No.: 206578

Post-traumatic Endophthalmitis Endophthalmitis After Firecracker Injury in a Six-Year-Old Boy

First Author: Sundaram **NATARAJAN**

Co-Author(s): Pac Cristina **PATRICIA**

Purpose: This report focuses on a 6 old child with left-eye post-traumatic endophthalmitis after a firecracker injury.

Methods: The patient presented 6 days after the firecracker injury. During the initial examination, corneal edema with an irregular anterior chamber and thick exudates covering the pupil were noted. Ultrasonography showed multiple mobile moderately reflective dots, membrane echoes in the vitreous cavity, and preretinal hemorrhage. The intervention consisted of urgent corneal tear repair, anterior chamber (AC) wash, lensectomy, and 23-G pars plana vitrectomy; the patient received intravitreal vancomycin and ceftazidime, followed by silicone-oil tamponade. Culture grew *Enterobacter cloacae* sensitive to piperacillin, gentamicin, and amikacin. After the surgery, treatment consisted of: intracameral piperacillin and dexamethasone, associated with IV antibiotics and topical treatment (fortified Vancomycin and Ceftazidime together with Atropine at first, followed by fortified Gentamicin and Ciprofloxacin).

Inflammation settled gradually with guarded visual prognosis; aphakia was present.

Results: Following surgical and medical intervention, intraocular inflammation gradually subsided. Microbiological culture identified *Enterobacter cloacae*, guiding targeted antibiotic therapy. The structural integrity of the globe was preserved, and no further signs of active infection were noted during follow-up. However, due to the severity of the initial trauma and the inflammatory response, visual recovery was limited. The patient remained aphakic with a guarded visual prognosis.

Conclusions: This case underscores the importance of urgent and intensive surgical and medical treatment in pediatric traumatic cases, firstly, to obtain ocular globe integrity and better control over the pronounced inflammatory phenomena associated with children and young people.

Abstract No.: 201157

Preserve the Plug: Operculum-Guided Macular Hole Surgery for Consistent Anatomical and Functional Success

First Author: Awaneesh **UPADHYAY**

Co-Author(s): Zakia **ANWER**, Deependra **SINGH**, Abhishek **UPADHYAYA**

Purpose: To evaluate the efficacy of operculum-guided posterior vitreous detachment (PVD) and operculum preservation as a biological scaffold in full-thickness macular hole (FTMH) surgery across different internal limiting membrane (ILM) peeling techniques.

Methods: Seven eyes of seven patients with FTMH and visible operculum underwent 25-gauge pars plana vitrectomy. Intraoperative planning involved mapping operculum location (nasal or temporal), and initiating PVD from the opposite edge to avoid traction on the operculum. Partial PVD was performed while deliberately sparing the operculum. Five eyes underwent conventional ILM peeling, and two eyes received an inverted-flap technique. Key variables analyzed included pre- and postoperative best-corrected visual acuity (BCVA), macular hole dimensions, operculum site/size, ellipsoid zone (EZ) and external limiting membrane (ELM) integrity, and central foveal thickness. Follow-up was performed at 1, 3, and 6 months.

Results: All seven eyes achieved type 1 anatomical closure. Mean BCVA improved from 0.85 logMAR (approx. 20/140) to 0.45 logMAR (approx. 20/50) at 3 months ($\Delta = 0.40$ logMAR). The mean minimum hole diameter was $302 \pm 48 \mu\text{m}$ (range: 250–380 μm), and base diameter averaged $950 \pm 110 \mu\text{m}$. Operculum location was temporal in 4 cases and nasal in 3; operculum diameter ranged from 180 to 300 μm . Visual outcomes and closure patterns were independent of operculum location or ILM technique. Restoration of

EZ and ELM correlated significantly with functional improvement.

Conclusions: Operculum-guided PVD with operculum preservation offers a reproducible and biologically sound scaffold for macular hole closure, enhancing structural integrity and functional outcomes.

Abstract No.: 201919

Presumed Sterile Cluster Endophthalmitis Following Intravitreal Triamcinolone Acetonide: A Rare Case Series

First Author: Bhumika **RATH**

Co-Author(s): Pratistha **RATH**, Nandakumar

Purpose: To describe the clinical presentation, diagnosis, and management of presumed sterile endophthalmitis following combined intravitreal triamcinolone acetonide and anti-vascular endothelial growth factor (VEGF) therapy in patients with chronic diabetic macular edema.

Methods: In a single operative theater setting, eight patients received intravitreal anti-VEGF injections and three patients received a combination of anti-VEGF (ranibizumab) with triamcinolone acetonide (Kenacort). All injections were performed under sterile precautions. Clinical presentation, microbiological findings, treatment, and outcomes were recorded.

Results: All three patients who received combined therapy developed sudden-onset symptoms of endophthalmitis within 24 hours post-injection, presenting with severe pain, redness, and marked vision loss. Initial visual acuity ranged from hand motion to perception of light. Clinical findings included lid and periorbital edema, severe conjunctival congestion, corneal edema with Descemet membrane folds, anterior chamber cells and flare, sluggish pupils, and dense vitreous inflammation. Vitreous tap and core vitrectomy with intravitreal vancomycin, ceftazidime, and dexamethasone were performed in two patients. Cultures from the vitreous, triamcinolone vial, and ranibizumab vial were negative for organisms. Final visual acuity improved to 6/9–6/12 in treated patients; one patient was lost to follow-up.

Conclusions: Presumed sterile endophthalmitis may occur after combined intravitreal triamcinolone and anti-VEGF injections. Early diagnosis, prompt vitrectomy, and intravitreal antibiotics with steroids are critical for favorable outcomes. The visual prognosis is generally good and depends largely on timely intervention and the status of the underlying retinal disease.

Abstract No.: 203197**Prognostic Factors for Visual Outcomes Following Macular Pucker Surgery: A Single-Center, Single-Surgeon Experience***First Author: Chenghao SUNG**Co-Author(s): Shu-chun KUO*

Purpose: To identify preoperative and postoperative factors associated with significant visual improvement following macular pucker surgery.

Methods: This retrospective single-center, single-surgeon study analyzed patients who underwent macular surgery between 2023 and 2024. Significant visual improvement was strictly defined as a gain of three or more lines on the Snellen chart. Collected variables included age, sex, systemic comorbidities, lens status, best-corrected visual acuity (BCVA), central macular thickness, OCT angiography (OCTA) vessel density, and serial microperimetry. Statistical analyses included paired t-tests, correlation analysis, chi-square tests, ROC analysis, and binary logistic regression.

Results: Fifty-six patients were included (mean age 66.2 ± 7.8 years). Significant improvements were observed in postoperative BCVA (mean logMAR change: -0.185, $p < 0.001$), macular thickness (-112 μm , $p < 0.001$), and microperimetry scores (mean gain: +3.86 dB, $p < 0.001$). Patients with prior cataract extraction were more likely to show significant visual gains ($p = 0.002$). Preoperative superficial vessel density was a strong predictor of postoperative improvement, with ROC analysis showing an AUC of 0.903 (95% CI: 0.768–1.000), and an optimal cutoff value of 41.8%.

Conclusions: Preoperative superficial capillary vessel density, prior lens extraction, and baseline visual acuity are key predictors of meaningful visual recovery following macular pucker surgery. Defining significant improvement as a Snellen gain of ≥ 3 lines allowed for more clinically relevant outcome stratification. These parameters may help guide patient selection and surgical decision-making.

Abstract No.: 205589**Real-World Outcomes of Enhanced Monofocal Intraocular Lens in Eyes With Retinal Diseases Undergoing Phacovitrectomy***First Author: Min SAGONG**Co-Author(s): Seongbin HEO, Seongyong JEONG*

Purpose: To evaluate the visual outcomes of a monofocal intraocular lens (IOL) with enhanced intermediate function (Tecnis Eyhance ICB00) compared with a conventional monofocal IOL (Tecnis PCB00) in eyes with various retinal diseases.

Methods: This retrospective comparative study included 300 eyes (200 Eyhance, 100 PCB00) from 300 patients. Indications for surgery were epiretinal

membrane (ERM, 70%), macular hole (MH, 8%), rhegmatogenous retinal detachment (RRD, 9%), vitreous hemorrhage (VH, 11%), and others (2%). Uncorrected distance (UDVA), intermediate (UIVA), near (UNVA), and corrected distance visual acuity (CDVA) were assessed at 1, 3, and 6 months postoperatively. Subgroup analyses were conducted according to disease characteristics.

Results: Baseline characteristics were comparable between the PCB00 and Eyhance groups. Overall, eyes implanted with Eyhance demonstrated significantly better UIVA at all postoperative visits. Subgroup analyses showed that eyes with ERM of stage 2 or 3 achieved superior UIVA with Eyhance, whereas stage 4 cases showed no advantage. In MH eyes, those with a minimum diameter $< 400 \mu\text{m}$ benefited from Eyhance, while larger holes showed no difference. In RRD, macula-on cases achieved better UIVA with Eyhance, but no significant benefit was observed in macula-off cases. For VH, non-proliferative diabetic retinopathy (non-PDR) cases showed improved UIVA with Eyhance, while proliferative (PDR) cases did not.

Conclusions: The enhanced monofocal IOL provided significant improvement in intermediate vision in eyes with milder retinal conditions, but offered no additional advantage in advanced disease. Careful patient selection is essential when considering Eyhance IOL implantation in patients with retinal pathology.

Abstract No.: 202289**Recurrent Delayed Fulminant Endophthalmitis With Occlusive Retinitis Post-vitrectomy***First Author: Bhuvan CHANANA*

Purpose: To describe a case of recurrent fulminant endophthalmitis accompanied by occlusive retinitis.

Methods: A 60-year-old male presented with loss of vision 7 days after phacoemulsification in his right eye. The vision was hand movements (HM). Slit lamp examination showed a hypopyon, and ultrasonography revealed vitreous exudates. Urgent vitrectomy was performed for endophthalmitis. His vision improved to 6/9. Five months post-surgery, he presented again with sudden visual deterioration to HM, with recurrent hypopyon and vitreous exudates. The patient underwent urgent surgery.

Results: The vitreous aspirate showed Staphylococcus Aureus as the infective organism. The 2nd surgery intra-operatively showed occlusive retinitis. Silicone oil was injected. After 2 weeks, the inflammation recovered significantly with reperfusion of retinal vessels, and vision improved to 6/12.

Conclusions: The present case is very unique as there was recurrent fulminant endophthalmitis, accompanied by occlusive retinitis. Timely intervention may salvage vision in some patients. Staphylococcus

Aureus has been reported to cause occlusive vasculitis, but recurrences have not been reported in literature.

Abstract No.: 203720

Retinal Pigment Epithelium (RPE) Tears: To Inject or Not?

First Author: Nikita **GUPTA**

Co-Author(s): Avnindra **GUPTA**, Panchmi **GUPTA**, Dinesh **TALWAR**, Lalit **VERMA**

Purpose: RPE tears, first described by Hoskin et al., occur due to a variety of conditions, with wet age-related macular degeneration (AMD) being the most common cause. Other etiologies include polypoidal choroidal vasculopathy (PCV), retinal angiomatous proliferation (RAP), central serous chorioretinopathy (CSC), angioid streaks, high myopia, and trauma. The incidence of RPE tears in the setting of anti-VEGF therapy is reported to be 10-12%, with a bilateral occurrence in 53% of cases. This paper evaluates whether continued anti-VEGF therapy is beneficial in eyes with RPE tears.

Methods: A retrospective observational study was conducted in five eyes of five patients with preexisting or acquired RPE tears. The patients underwent multimodal imaging, including optical coherence tomography (OCT) and fundus autofluorescence (FAF), to assess structural changes. All patients received intravitreal anti-VEGF therapy, and their response was evaluated over a minimum follow-up period of 12 months.

Results: Visual acuity improved in 40% of cases, remained stable in 20%, and worsened in 40%. These findings suggest that continued anti-VEGF therapy is beneficial for patients with active disease.

Conclusions: This study reinforces the role of continued anti-VEGF therapy in managing RPE tears, particularly in cases with persistent exudative changes. Baseline OCT measurements, such as PED height and GLD, are crucial in predicting the risk of RPE tears and guiding treatment decisions. While visual outcomes vary, a tailored approach with close follow-up is essential to optimize patient outcomes.

Abstract No.: 201082

Role of Autologous Platelet-Rich Plasma for Recurrent or Refractory Macular Hole in the Era of Various Flap Techniques: A Systematic Review and Meta-Analysis

First Author: Yoo-ri **CHUNG**

Co-Author(s): Chungwoon **KIM**, Hae Rang **KIM**, Jung Hoo **LEE**, Ji Hun **SONG**

Purpose: We investigated the effects of autologous platelet-rich plasma (PRP) application on treating recurrent or refractory full-thickness macular hole

(FTMH) in patients who already underwent vitrectomy and internal limiting membrane (ILM) peeling.

Methods: Databases including PubMed, EMBASE, and Cochrane Library were searched on April 10, 2025. Studies that investigated the effect of autologous PRP or whole blood application to treat the recurrent or refractory FTMH were included. The primary outcome was the closure rate with the procedure, and a meta-analysis of proportions was performed to estimate pooled response rates.

Results: Among preliminary identification of 26 studies, ten case series using autologous PRP only and four studies using autologous PRP/blood clot and additional flap or graft (retina, lens capsule, amniotic membrane, or residual ILM) were included for the meta-analysis. The overall pooled closure rate with autologous PRP application was 81% (95 CI: 71–87%), while the additional use of flap or graft showed 84% closure rate (95% CI: 66–93%) in cases presenting recurrent or refractory FTMH. The moderator variable was not statistically significant (QM=0.21, df=1, p=0.645), indicating no evidence of differences between groups. There were no adverse effects related to autologous PRP or whole blood application.

Conclusions: The use of autologous PRP alone was sufficient to achieve the closure of recurrent or refractory FTMH, without the need for the concurrent flap or graft technique.

Abstract No.: 202408

Sequential Bilateral Retinal Artery Occlusions With Promising Visual Prognosis in a Diabetic Patient: A Case Report and Literature Review

First Author: Ziyue **LI**

Co-Author(s): Ting **CHEN**, Ying **LI**

Purpose: Bilateral retinal artery occlusion (RAO) in patients with Type 2 diabetes mellitus is an extremely rare condition. Even with rigorous treatment, RAO often results in devastating visual impairment. A 50-year-old female with Type 2 diabetes mellitus was referred to our hospital. Notably, she developed bilateral RAO sequentially within a mere five-month period. This rapid progression of the disease in both eyes is of particular interest.

Methods: We conducted a comprehensive ophthalmic and systemic examination on this patient, including fundus photography, FFA, OCT, CTA, MRI, and DSA. We also observed the therapeutic effect of intra-arterial thrombolysis on this patient.

Results: Fundus examination confirmed branch retinal artery occlusion (BRAO) in her left eye and central retinal artery occlusion (CRAO) in her right eye. After timely intra-arterial thrombolysis, significant bilateral visual recovery was achieved. The patient's visual acuity in the left eye improved from 20/400 to 20/100 and in the right eye from 20/2000 to 20/33.3,

indicating the effectiveness of this treatment approach in this case. Further examinations also showed positive results: the cherry-red spot in the macula disappeared, FFA indicated improved retinal artery perfusion, and OCT revealed a certain degree of restoration in the retinal structure.

Conclusions: This case highlights that metabolic disorders, like hyperlipidemia and diabetes, can be considered high-risk factors for the development of RAO. Prompt and effective intervention, such as timely intra-arterial thrombolysis, as demonstrated in this case, is crucial for preserving patients' visual prognosis.

Abstract No.: 205974

Short-Term Treatment Outcomes of a Novel Technique of Combined Buckle and Scleral Imbrication for Complex Retinal Detachments

First Author: Subhadra **JALALI**

Co-Author(s): Akash **BELENJE**

Purpose: To report the short-term treatment outcomes of a novel technique of combined scleral buckle with modified scleral imbrication for predominantly childhood-onset retinal detachments with varying proportions of rhegmatogenous, exudative, and tractional components.

Methods: A retrospective analysis of 24 eyes operated on with the novel technique is reported. The surgical technique included modified scleral imbrication, combined with use of an encircling band with or without a buckle (tire). Additional procedures could include cryopexy, subretinal fluid drainage, paracentesis, or retinal laser. No vitrectomy procedures were done at the initial surgery.

Results: Age at time of surgery ranged from 3 months to 14 years (mean 6 years). Diagnosis included ROP (17 eyes), FEVR (4 eyes), and miscellaneous (3 eyes). eyes included rhegmatogenous with tractional and/or exudative component (13 eyes); progressive tractional detachment (7 eyes); tractional with exudative detachment (two eyes), and rhegmatogenous with abnormal vitreous adhesions (2 eyes). Retina showed complete attachment and no progression in 19 eyes (79%). Of the five eyes with incomplete resolution, one had successful vitrectomy surgery with oil, two eyes were inoperable, and two eyes had only partial reattachment. Postoperative visual acuity was stable or improved in six older children, where it could be recorded. No postoperative complication was noted at a mean follow-up of 12 months.

Conclusions: Every eye operated by this technique was extremely challenging. The novel technique provided a new way of managing these complex retinal detachments successfully with a single surgery, that otherwise would have required multiple procedures often with variable and unpredictable outcomes. Long-term outcomes are awaited.

Abstract No.: 204255

Study on the Correlation Between Visual Acuity and Image Characteristics of Optical Coherence Tomography in Macular Edema With Retinal Vein Occlusion

First Author: Liang **FU**

Co-Author(s): Zhi'he **FU**

Purpose: To observe the correlation between the characteristics of frequency domain optical coherence tomography (OCT) images and the initial visual acuity in patients with retinal vein occlusion and macular edema (RVO-ME).

Methods: Cross sectional study. From June 2017 to December 2019, 31 patients (11 eyes in 11 men and 20 eyes in 20 women) with RVO-ME were examined in Anxi Aier Eye Hospital, with an average age of (62.71 ± 11.32) years. All patients underwent BCVA, medical optometry, spectral domain OCT and other related examinations. Based on the OCT images, we analyzed the central thickness of retina (CST), intraretinal cyst (IRF), subretinal fluid (SRF), hyperreflexive focus (HF), external limiting membrane (ELM), ellipsoid zone (EZ), inter-junction zone (IZ), and quantified these imaging features with Image J software.

Results: In 31 eyes, the logMAR BCVA of branch retinal vein occlusion was 0.97 ± 0.39 , and the logMAR BCVA of central retinal vein occlusion was 1.32 ± 0.48 . The thickness of the macular fovea in branch retinal vein occlusion was $574.86 \pm 229.90 \mu\text{m}$, and the thickness of the macular fovea in central retinal vein occlusion was $800.47 \pm 367.91 \mu\text{m}$, the difference between these two groups had statistically significant ($P < 0.05$). In 5 of 31 eyes (16.1%), vitreo retinal traction (VMT) was found, and no pre-retinal membrane was found. Twenty-five eyes (80.6%) had hyperreflective spot lesions (HF). Thirty eyes (96.8%) had intraretinal cysts (IRF), and 13 eyes (41.9%) had subretinal fluid (SRF). Single-factor regression analysis found that central macular thickness (CMT), intraretinal cyst length (IRF), external limiting membrane (ELM) destruction, ellipsoid zone (EZ) destruction, and inter-junction zone (IZ) destruction were negatively correlated with vision. Multivariate regression analysis found that only external limiting membrane (ELM) damage was negatively correlated with vision.

Conclusions: The characteristics of the external limiting membrane in frequency domain OCT are related to the vision of patients with RVO-ME, these characteristics are more accurate in predicting vision.

Abstract No.: 206044

Successful Closure of a Recurrent Macular Hole With Intravitreal Dexamethasone Implant (Ozurdex)

First Author: Kiet Phang LING

Co-Author(s): Chin Sern CHAN, Choon Teng CHAN, Wee Min TEH, Wilson Jun Jie WONG

Purpose: Recurrence of macular hole (MH) after successful closure post-primary pars plana vitrectomy (PPV) and internal limiting membrane (ILM) peeling is uncommon and is typically attributed to persistent traction. We report an atypical case of a recurrent MH successfully treated with an intravitreal dexamethasone implant, implicating inflammation as a pathogenic mechanism.

Methods: A 51-year-old male presented with a full-thickness MH, which was successfully treated with standard PPV and ILM peeling, achieving initial anatomical closure. Two years later, the patient presented with recurrent MH. Given the absence of residual vitreomacular traction and well-executed initial ILM peeling, mechanical causes were deemed unlikely. A decision was made to treat the recurrence with an intravitreal injection of a sustained-release dexamethasone implant (Ozurdex) under the hypothesis of underlying subclinical inflammation causing the recurrence of the hole.

Results: Following the Ozurdex injection, sequential optical coherence tomography (OCT) imaging demonstrated progressive approximation of the hole edges and complete anatomical closure of the macular hole within 4 weeks. The patient's visual acuity improved correspondingly, and the hole remained closed at the 12 months follow-up.

Conclusions: This case demonstrates that intravitreal steroids can be an effective treatment for recurrent macular holes, particularly in cases where mechanical traction has been adequately addressed. It highlights the potential role of inflammation in the pathogenesis of recurrent MHs and suggests Ozurdex as a viable, less invasive therapeutic alternative to a second vitrectomy in selected patients.

Abstract No.: 206571

Surgical Approach in Case With Retinal Inflammatory Reaction After Ocular Trauma

First Author: Sundaram NATARAJAN

Co-Author(s): Pac Cristina PATRICIA

Purpose: This report focuses on an adult traumatic case complicated by a fibrous membrane tractioning the macula.

Methods: The patient, a 52-year-old male, first presented after being hit by a stone, with hemophthalmus, globe rupture with scleral tear, and multiple orbital fractures. The first intervention

consisted of wound exploration, scleral tear suturing with air injection. A few days later, lensectomy with posterior vitrectomy was performed, with drainage through retinotomy of the choroidal hemorrhage, emerging due to prolonged hypotony. After one month, a fibrous membrane extending from the disc to the temporal quadrant developed, tractioning the macula. Visual acuity dropped from 6/60 to counting fingers, and the Amsler grid test changed from showing wavy lines to a blurred chart, so surgical intervention was decided. Using 23G ports: silicone oil removal + membrane peeling under Brilliant Blue visualization + Perfluorocarbon injection + endolaser + fluid-gas exchange + injection of Densiron and 1000 CS + intravitreal triamcinolone injection.

Results: A stable, attached retina without traction was achieved. No complications developed during the first 6 months of monitoring. Subjectively, visual distortion decreased and objectively, visual acuity improved.

Conclusions: This case underscores the importance of considering retinal inflammatory reactions when treating post-traumatic cases. The incidence of these complications exceeds 30% of cases, with a higher risk in patients with open-globe trauma or those with vitreous hemorrhage or retinal breaks. The frequency is increased due to the release of retinal pigment epithelial (RPE) cells, glial cells, macrophages, and fibroblasts, which migrate into the vitreous and subretinal space.

Abstract No.: 206188

Surgical Dilemma in Pars Plana Vitrectomy for Rhegmatogenous Retinal Detachment With Choroidal Coloboma: A Rare Case Report

First Author: Rusydiana

Co-Author(s): Muhammad FIRMANSJAH, Dicky HERMAWAN, Luki INDRIASWATI, Yulia PRIMITASARI, Wimbo SASONO, Ima YUSTIARINI

Purpose: To report the surgical challenges and outcome of pars plana vitrectomy (PPV) for a rare case of rhegmatogenous retinal detachment (RRD) associated with choroidal coloboma in the last functional eye.

Methods: Case Report: An 18-year-old male presented with floaters and sudden vision loss in the right eye. Visual acuity was 1 meter counting fingers (CF) in the right eye and light perception in the left eye. Ocular findings included iris and lens colobomas, microphthalmia, microcornea, and macula-off RRD extending from 9 to 2 o'clock with an inferior choroidal coloboma. Based on these findings, a diagnosis of coloboma-related RRD in the last functional eye. Pars plana vitrectomy with endolaser and silicone oil tamponade was performed despite the guarded prognosis.

Results: Intraoperatively, a retinal break within the intercalary membrane near the macula was identified. The retina was successfully reattached, with immediate postoperative visual acuity of 1 meter CF. However, intraocular pressure (IOP) increased to 45 mmHg despite medical therapy. At the fourth postoperative week, partial silicone oil removal was performed, after which IOP stabilized. At the three-month follow-up, the retina remained attached, IOP was controlled, and visual acuity improved to 2-meter CF.

Conclusions: This case highlights the surgical dilemma of managing coloboma-related RRD in the last functional eye. While PPV with silicone oil tamponade achieved anatomical success, the postoperative course was challenging due to persistent IOP elevation, underscoring the importance of early recognition, timely intervention, and individualized long-term management.

Abstract No.: 203031

Surgical Outcome Evaluation of Very Large Full Thickness Macular Holes

First Author: Deepak **AGARWAL**

Purpose: To evaluate anatomical and functional outcomes of inverted ILM flap technique in very large full thickness macular holes (FTMH).

Methods: Retrospective, interventional case series. Consecutive cases of primary very large FTMH (defined as MLD > 650 microns) were included. Excluded cases- Secondary or traumatic macular holes, recurrent/failed MH, MH associated with RD. Detailed pre-operative evaluation including BCVA and OCT macula. Vitrectomy, ILM peeling and inverted ILM flap, FAX done. Tamponade with C3F8 or Silicone oil. Post-operative evaluation and OCT macula at 6 weeks. Statistical analysis: Student paired T test to compare pre-operative and post-operative BCVA.

Results: • 28 eyes were included. • Holes closed in 24 eyes (85.71%) • MLD was 745.10 ± 100.55 (Range 654-1020) • Statistical improvement was seen in Post-operative BCVA 0.80 ± 0.41 (P value <0.001) when compared to Pre-operative BCVA was 1.29 ± 0.41 . • Cases which remained open, MLD decreased and all showed BCVA improvement.

Conclusions: Closure rate of 85.71% is comparable to previous studies for very large FTMH. Statistically significant visual improvement was seen post-operatively. Author concludes that ILM peeling with inverted flap provides good surgical and functional outcome for very large FTMH. However, our data is small and needs further long term and larger studies. More traumatic and difficult surgeries like autologous retina transplant should be reserved for giant MH or recurrent/failed MHs.

Abstract No.: 206375

Surgical Outcomes of Submacular Hemorrhage With Massive Hemorrhagic PED in PCV

First Author: Xiaoyun **FANG**

Co-Author(s): Fang **ZHENG**

Purpose: To report the surgical outcomes of polypoidal choroidal vasculopathy (PCV) patients presenting with submacular hemorrhage accompanied by massive hemorrhagic pigment epithelial detachment (PED).

Methods: Four eyes with PCV-related submacular hemorrhage and massive hemorrhagic PED (area >50 disc diameter) were treated with pars plana vitrectomy (PPV), subretinal tissue plasminogen activator (tPA) injection via micro-needle, gas tamponade, and anti-VEGF therapy. In both eyes, additional tPA was injected beneath the PED.

Results: Postoperatively, all four eyes developed varying degrees of vitreous hemorrhage; one resolved spontaneously, while three required vitreous cavity lavage. In all cases, subretinal hemorrhage was displaced inferiorly, hemorrhagic PED completely regressed, and visual acuity improved. Fundus examination revealed retinal pigment epithelium (RPE) tears of varying sizes in each eye.

Conclusions: PPV with subretinal tPA injection, with or without sub-PED delivery, combined with gas tamponade and anti-VEGF therapy, can effectively displace subretinal hemorrhage inferiorly, promote rapid and complete regression of hemorrhagic PED, and improve visual outcomes. To our knowledge, this is the first report of such outcomes in PCV with massive hemorrhagic PED.

Abstract No.: 205426

The Effect of Perfluorocarbon Liquids in Surgery for Rhegmatogenous Retinal Detachment With Macular Detachment

First Author: Mayumi **KOBAYASHI**

Co-Author(s): Shohei **MORIKAWA**, Tomoya **MURAKAMI**, Tetsuro **OSHIKA**, Yoshimi **SUGIURA**, Mizuki **TOMIOKA**

Purpose: To evaluate the impact of perfluorocarbon liquid (PFCL) use in surgery for rhegmatogenous retinal detachment (RRD) with macular detachment.

Methods: This retrospective study included 68 eyes of 68 patients (mean age, 53.0 ± 16.0 years) with macula-off RRD who underwent primary surgery at the University of Tsukuba Hospital between April 2024 and March 2025, and were followed for at least 6 months postoperatively. Outcome measures included best-corrected visual acuity (BCVA), central foveal thickness (CFT), metamorphopsia, aniseikonia, and symptom duration. Metamorphopsia was assessed using M-CHARTS (mean of vertical and horizontal scores), and aniseikonia was evaluated with the New

Aniseikonia Test. Outcomes were compared between eyes with and without intraoperative PFCL use.

Results: BCVA significantly improved after surgery ($P < 0.001$). PFCL was used intraoperatively in 48 of 68 eyes (70.6%). There were no significant differences between the PFCL and non-PFCL groups in postoperative BCVA ($P = 0.591$), CFT ($P = 0.791$), metamorphopsia ($P = 0.223$), or aniseikonia ($P = 0.906$). Multivariate analysis revealed that only symptom duration was significantly associated with postoperative BCVA ($P < 0.001$), whereas age and tear location showed no association ($P = 0.430$ and $P = 0.503$, respectively).

Conclusions: In macula-off RRD, intraoperative PFCL use did not affect postoperative BCVA, CFT, metamorphopsia, or aniseikonia. Postoperative visual outcomes were associated with symptom duration.

Abstract No.: 205904

The Effect of Perfluorocarbon in Surgery for Macula-On Rhegmatogenous Retinal Detachment

First Author: Yoshimi **SUGIURA**

Co-Author(s): Mayumi **KOBAYASHI**, Shohei **MORIKAWA**, Tomoya **MURAKAMI**, Tetsuro **OSHIKA**, Mizuki **TOMIOKA**

Purpose: To investigate the effect of perfluorocarbon liquid (PFCL) use during vitrectomy for macula-on rhegmatogenous retinal detachment (RRD).

Methods: This retrospective study included 53 eyes of 53 patients with macula-on RRD who underwent primary pars plana vitrectomy at the University of Tsukuba Hospital between April 2024 and March 2025. Of 113 consecutive eyes with RRD, only those with a preoperative attached macula were analyzed. Patients were divided into PFCL and non-PFCL groups. Best-corrected visual acuity (BCVA, logMAR), central foveal thickness (CFT), metamorphopsia, and aniseikonia were evaluated preoperatively and at 6 months postoperatively. The influence of PFCL use on postoperative outcomes was compared between groups.

Results: Postoperative logMAR BCVA was -0.058 in the non-PFCL group and -0.026 in the PFCL group, with no significant difference between the two groups ($P = 0.087$). Postoperative CFT and changes in CFT from baseline were also comparable between the non-PFCL and PFCL groups ($P = 0.092$ and $P = 0.924$, respectively). Metamorphopsia scores were 0.11° in the non-PFCL group and 0.16° in the PFCL group, while aniseikonia values were -1.48% and 0.50%, respectively. There were no significant differences in these parameters between the two groups. ($P = 0.936$ and $P = 0.111$).

Conclusions: In vitrectomy for macula-on RRD, postoperative BCVA did not differ significantly between eyes treated with and without PFCL. Similarly, PFCL use had no significant impact on postoperative CFT,

metamorphopsia, or aniseikonia. These findings suggest that PFCL may be used as needed during macula-on RRD surgery without adversely affecting functional or anatomical outcomes.

Abstract No.: 209390

Therapeutic Targets for Glaucoma: Comprehensive Proteome-Wide Mendelian Randomization and Colocalization Analyses

First Author: Jinbo **CHEN**

Purpose: Purpose: This study aimed to investigate the causal relationships between circulating plasma proteins and glaucoma, including its major subtypes and intraocular pressure (IOP), using large-scale genetic datasets.

Methods: Method: We conducted a proteome-wide two-sample Mendelian randomization (MR) analysis followed by Summary-data-based MR (SMR), heterogeneity in dependent instruments (HEIDI) testing, and Bayesian colocalization. Functional characterization was performed using Gene Ontology (GO), Kyoto Encyclopedia of Genes and Genomes (KEGG) enrichment, and GeneMANIA network analysis. Druggability of identified targets was evaluated via DrugBank and related databases.

Results: Result: A total of 26 proteins were associated with glaucoma and its subtypes, among which 21 were unique. Seventeen associations passed the HEIDI test, and 27 protein-disease associations showed strong evidence of colocalization ($PP.H4 \geq 0.8$). Notably, TEK, KIR3DL1, DSG2, SEMA6A, SDCBP2, NEO1, and LDLRAD4 were consistently supported across multiple analyses as potential therapeutic targets. Among them, TEK exhibited a significant association with primary open-angle glaucoma ($OR = 1.178$), while KIR3DL1 showed a protective effect against primary angle-closure glaucoma ($OR = 0.239$).

Conclusions: Conclusion: Our multi-method genetic analysis identified several plasma proteins with potential causal roles in glaucoma. The findings highlight TEK, KIR3DL1, DSG2, SEMA6A, SDCBP2, NEO1, and LDLRAD4 as promising translational targets for drug development, although further experimental validation is warranted.

Abstract No.: 207434

To Attach a Retinal Re-detachment of a Vitrectomized Eye With Pneumatic Retinopexy

First Author: Hong Nien **LEE**

Purpose: To demonstrate the efficacy of pneumatic retinopexy in treating a re-detached retina of a newly vitrectomized eye.

Methods: Case report.

Results: A 56-year-old man who presented with right macula-off rhegmatogenous retinal detachment with a full-thickness macular hole underwent pars plana vitrectomy with SF6 20%. On the 10th day, when the gas was almost fully reabsorbed, retina re-detachment was noted. Due to the limited access to surgery and fear of operation, the patient opted for pneumatic retinopexy. A step-wise approach was carried out. On day 2, the retina appeared attached. In the subsequent follow-ups, no retinal detachment was reported. OCT showed a fully attached retina with a closed retinal hole.

Conclusions: Pneumatic retinopexy demonstrated an effective approach in newly treated retinal re-detachment. However, careful selection of the patient is vital.

Abstract No.: 201517

Tranexamic vs Adrenaline for Intraoperative Hemostasis in PDR Vitrectomy: A Randomized Trial

First Author: Shishir **VERGHESE**

Co-Author(s): Priya **BASIAWMOIT**

Purpose: To compare the efficacy of intraocular tranexamic acid and adrenaline, both added to the infusion bottle individually, in achieving intraoperative hemostasis during pars plana vitrectomy for proliferative diabetic retinopathy (PDR)

Methods: This was a prospective, randomized controlled trial which enrolled patients undergoing vitrectomy for active PDR with vitreous hemorrhage or tractional retinal detachment. Participants were randomly assigned to receive either tranexamic acid (50mg/ml) or adrenaline (1:100,000) added to the infusion bottle. Intraoperative bleeding was graded using a standardized bleeding score, and the number of endodiathermy applications as well as IOP raises was recorded. Secondary outcomes included visibility score, postoperative vitreous hemorrhage, and visual acuity at 1 and 3 months. The evaluator was masked to the intervention group. Patients who received prior anti-VEGF were excluded from the study.

Results: A total of 40 eyes (20 in each group) were included. The intraoperative bleeding score was lower in the adrenaline group (1.3 ± 0.5) compared to the tranexamic group (2.1 ± 0.7 ; $p < 0.01$). The mean number of endodiathermy applications was also reduced in the adrenaline group (4.8 vs 7.3; $p < 0.01$). Surgical field visibility was similar in both groups. Mean operative time was shorter in the adrenaline group by 8 minutes ($p = 0.03$). Visual acuity gain at 1 month was comparable in both groups.

Conclusions: Adrenaline added to the infusion bottle during vitrectomy for PDR offers superior intraoperative hemostasis and reduced bleeding as compared to tranexamic acid. Its use may contribute

to reduced intraoperative bleeding, shorter operative times without increasing complication rates.

Abstract No.: 203168

Two Modified Pear Flower Petal-Shaped Internal Limiting Membrane Flap Techniques for Challenging Macular Holes: Double Inverted and Flap Repositioning

First Author: Hong **WU**

Co-Author(s): Yan **CHENG**, Zaoxia **LIU**, Han **SUN**, Xiaomeng **ZHANG**

Purpose: To present two innovative modifications of the pear flower petal-shaped inverted ILM (internal limiting membrane) flap technique—double inverted for EP (epiretinal proliferation) and flap repositioning for complex MH (macular holes)—and to evaluate their clinical value.

Methods: A retrospective analysis of patients with EP-associated MH and complex MH was performed. All cases underwent pars plana vitrectomy combined with either the double-inverted technique or the pear flower petal-shaped flap with repositioning technique. Surgical steps, anatomical closure, and functional recovery were assessed.

Results: Six eyes of six patients were treated with the novel techniques. All MH achieved successful closure within one week postoperatively. During follow-up, optical coherence tomography revealed well-restored foveal morphology and marked improvement in the continuity of the outer retinal layers. Best-corrected visual acuity improved significantly.

Conclusions: Both modified techniques achieved stable flap coverage and safe MH closure. The double-inverted technique preserved EP tissue to fill intraretinal defects while avoiding unintended trauma to the hole base and retinal pigment epithelium. The repositioning technique, while retaining the advantages of the original method, provided a safer approach. With flexible intraoperative adjustments, the repositioned ILM could serve as a rescue option in cases of reoperation or intraoperative flap rupture, displacement, or loss. These two modifications demonstrated flexibility, safety, and effectiveness in the management of challenging MH, ensuring both anatomical and functional recovery. They broaden surgical options and underscore the clinical value of innovation in MH surgery.

Abstract No.: 205692

Visual Outcomes Following Sutureless Scleral Fixated Intraocular Lens Implantation

First Author: Sumit RANDHIR SINGH

Co-Author(s): Santosh KUMAR, Ajit PODDAR, Ayush SINGH

Purpose: To study the anatomical and visual outcomes following sutureless scleral fixated intraocular lens (SFIOL) implantation using modified Yamane technique in eyes with aphakia, subluxated or dislocated crystalline lens / intraocular lens.

Methods: A total of 101 patients who underwent SFIOL implantation using modified Yamane technique with a minimum follow-up of 3 months were retrospectively analyzed. The surgical technique involved pars plana vitrectomy and implantation of a 3-piece intraocular lens. IOL haptics were positioned in scleral pockets after creating a flange using bipolar cautery. Demographic details, pre- and post-best corrected visual acuity (BCVA) at 1 week, 1 month, and 3 months were recorded. The primary outcome was a change in BCVA, whereas secondary outcomes included assessment of haptic position using anterior segment optical coherence tomography (AS-OCT), postoperative complications, and residual refractive error.

Results: Mean age of the study group was 57.6 ± 16.2 years and included 61 males (60%) and 40 females (40%). Mean duration from aphakia to SFIOL implantation was 6.3 ± 10.8 months. BCVA showed statistically significant improvement from 1.73 ± 0.74 logMAR at baseline to 0.50 ± 0.53 logMAR at last follow up visit ($p < 0.01$). Mean ($\pm$ SD) residual refractive error measured in spherical equivalent was -0.46 ± 0.80 diopters (D). AS-OCT was used to localize both haptics in scleral pockets and calculate the minimum distance of haptic from conjunctival/scleral surface (mean $\pm$ SD: $195 \pm 80 \mu\text{m}$). Most common early postoperative complication (< 6 weeks) was transient corneal edema (11 eyes, 11%), which resolved with medical management. The most common late postoperative complication was haptic exposure with overlying conjunctival erosion in 8 eyes (8%). Among these, two patients needed IOL repositioning, whereas one patient developed endophthalmitis, warranting PPV and intravitreal antibiotics.

Conclusions: Sutureless SFIOL implantation is a safe alternative in aphakic eyes with significant BCVA improvement over 3 months. AS-OCT, as a noninvasive modality, can be used to localize haptic position within scleral pockets and predict IOL-related complications such as haptic exposure.

Translational Research in Ophthalmology

Abstract No.: 205018

A Comprehensive Evaluation of a Novel Method for Gene Therapy of Inherited Retinal Diseases Mediated by AAV

First Author: Wang LI

Co-Author(s): Baoyuan QU

Purpose: Adeno-associated virus (AAV) is extensively utilized as a gene therapy vector owing to its favorable safety profile and capacity to sustain persistent transgene expression. Nevertheless, during manufacturing, recombinant AAV (rAAV) production may inadvertently generate incompletely packaged vectors, replication-competent AAV (rcAAV), and process-related impurities, raising critical safety risks.

Methods: To address this, we introduce 3'-end-adaptor-ligation (EAL) library sequencing strategy, a novel methodology for AAV genome integrity quantification, designed to enable sensitive and quantitative detection of recombination events. The ELS workflow integrates next-generation sequencing (NGS) to systematically map and quantify genomic breakpoints across the AAV genome, thereby delivering a high-resolution evaluation of structural integrity.

Results: We rigorously validated ELS by analyzing rAAV vectors of diverse lengths produced under GMP-compliant manufacturing protocols. Compared to circular consensus sequencing (CCS) (84.58% integrity), ELS achieved a markedly enhanced intact genome rate ($93.63 \pm 0.15\%$), particularly for vectors approaching the 4.7-kb packaging limit. Our findings establish ELS as a robust platform for detecting heterogeneous rAAV recombination events with exceptional analytical sensitivity (limit of detection: 0.1% variant frequency) and specificity ($> 99.9\%$), providing transformative insights for quality-by-design (QbD) optimization and regulatory-compliant safety profiling of AAV-based therapeutics.

Conclusions: Together, our results clearly highlight the utility of ELS-seq in providing a comprehensive and accurate characterization of AAV genome integrity and structural diversity.

Abstract No.: 206687**A Novel High-Sensitivity Noninvasive Strain Sensor for Monitoring Ocular Pulse and Eye Movement***First Author: Shaoying TAN**Co-Author(s): Zengsheng WENG, Fangxin ZOU*

Purpose: This study aims to develop a novel high-sensitivity noninvasive strain sensor for monitoring both ocular pulse and eye movement.

Methods: A high-sensitivity, multidirectional pPen-on-paper (PoP) inks strain sensor was created using graphene oxide (GO) ink, which exhibits excellent dispersion properties for high-sensitivity multidirectional strain sensors. The sensor demonstrated the ability to capture tensile, compressive, and pressure signals. The gauge factors are 87.1 and 77.4 in sensing tensile and compressive deformations within the range of 1%, and 3.6×10^{-3} kPa $^{-1}$ in sensing pressure deformation within the range of 2 kPa to 5.5 kPa. The sensor maintained consistent sensitivity across different surfaces, indicating its reliability.

Results: By affixing the GO-based PoP strain sensor to the upper eyelid with removable adhesive tape, resistance signals were captured using a digital multimeter. The findings revealed a signal frequency similar to the respiratory rate, approximately between 0.1 Hz and 1 Hz. Subjects were instructed to rotate their eyes every 30 seconds, resulting in noticeable deviations in the signal from the baseline curve at the 30-second mark. Under static conditions, the signals exhibited a consistent pattern, while eye rotation induced observable perturbations in the original signal curves, indicative of rotational responses.

Conclusions: These findings highlight the capability of the straightforward GO-based PoP strain sensor to simultaneously monitor intrinsic ocular signals and ocular rotation dynamics. With further refinement in sensor deployment, there is potential to accurately determine the direction of ocular rotations.

Abstract No.: 204463**Engineered Nanovesicles Targeting Lactate-Sensitive Microglia Suppress Pathological Neovascularization in Proliferative Diabetic Retinopathy***First Author: Keyi ZOU**Co-Author(s): Jian YE*

Purpose: Proliferative diabetic retinopathy (PDR) is a leading cause of blindness. Elevated lactate has been linked to poor outcomes in PDR, yet its role in pathological neovascularization remains unclear. In our preliminary work, we identified a subset of lactate-responsive, MKI67-positive microglia in the retinas of patients with PDR. This study aimed to develop an

engineered nanovesicle system that targets these cells to inhibit neovascularization in PDR.

Methods: Clinical datasets from patients with diabetic retinopathy were analyzed to identify microRNAs associated with MKI67 expression. Bioinformatic screening and clinical filtering were used to select miRNAs predicted to regulate MKI67. In vitro, a human microglial cell model with enforced MKI67 expression was used to assess whether engineered exosomes could suppress MKI67 and modulate proliferation, migration, and angiogenic activity. For in vivo validation, the oxygen-induced retinopathy (OIR) mouse model was employed to evaluate the anti-neovascular effects of the engineered nanovesicles.

Results: miR-10 was predicted to efficiently target MKI67. Engineered exosomes derived from primary macrophages overexpressing miR-10 (miR-10-Mexo) markedly reduced MKI67 expression in MKI67-positive microglia in vitro, thereby limiting microglial proliferation and migration and diminishing pro-angiogenic effects. In the OIR model, treatment with miR-10-Mexo significantly reduced neovascular tuft formation and overall vascular density, and histopathology showed attenuated vascular leakage.

Conclusions: We developed an engineered nanovesicle therapy (miR-10-Mexo) that targets lactate-sensitive microglia to downregulate MKI67 and effectively suppress pathological retinal neovascularization in PDR. These findings propose a promising targeted strategy for PDR and highlight lactate-responsive microglia as therapeutic nodes in retinal neovascular disease.

Abstract No.: 201154**From Natural Compounds to Drug Candidates: Decoding Ginkgo Biloba's Therapeutic Potential in Diabetic Retinopathy Through Computational Drug Discovery***First Author: Salma FIRDAUS**Co-Author(s): Alif LAKSONO, Bellinda TAZKIRA, Ima YUSTIARINI*

Purpose: Despite clinical promise, bioactives of Ginkgo biloba (GB) remain an underexplored pool for novel therapies in diabetic retinopathy (DR). This study aims to decode GB bioactives and molecular mechanisms against DR, through network pharmacology and an in-silico approach to identify potential therapeutic candidates for drug development.

Methods: Bioactives from GB were screened for drug-likeness properties and mapped to DR-related target proteins. Network pharmacology was analyzed through protein-protein interactions (PPI). Gene ontology and Kyoto Encyclopedia of Genes and Genomes (GO-KEGG) enrichment were used to explore the underlying molecular mechanisms and pathways involved from GB's bioactives. Molecular docking was performed

using AutoDock, and molecular dynamics simulations were conducted in CABS 2.0.

Results: Through bioinformatic analysis, 30 bioactives met drug-likeness criteria such as β -sitosterol, Ginkgolide, Diosmetin, Cathecin, Linolenic acid, Biloblade, Luteolin-4 glucoside, and Isogopycrol. A total of 194 therapeutic target proteins were identified, with PPI refining core target proteins as EGFR, MMP9, TNF, AKT1, STAT3, PPARG, HIF1A, BCL2, and NFKB1. Molecular docking reveals β -sitosterol as having one of the strongest binding affinities (ΔG -10.38 kcal/mol), with a low inhibitory constant (10.74 nM), against EGFR. Molecular dynamics confirmed stable ligand-protein complexes with minimal residue fluctuations. GO-KEGG enrichment indicated AGE-RAGE signaling in diabetic complications as a key pathway mediating bioactives' potential to inhibit DR progression.

Conclusions: By mapping multi-target interactions and in-silico experiments, this study highlights several Ginkgo biloba bioactives as potential candidates for diabetic retinopathy therapies, bridging natural medicine and modern bioinformatics-driven drug discovery in tackling the growing burden of diabetic eye disease.

Abstract No.: 200139

In Vivo Inhibition of Latanoprost-Induced Iridal Hyperpigmentation Using α -Methyl-DL-Tyrosine in Rabbits: A Translational Experimental Study

First Author: Mahmood **ALI**

Co-Author(s): Waqar **AHMAD**, Farah **AKHTAR**, Muhammad **BILAL**, Muhammad **SADIQ**

Purpose: Latanoprost, a widely prescribed prostaglandin analogue for glaucoma, is associated with irreversible iridal hyperpigmentation, raising aesthetic and pharmacological concerns. This study explores the inhibitory effects of α -methyl-DL-tyrosine on latanoprost-induced iridal hyperpigmentation in a rabbit model.

Methods: Twelve rabbits were divided into four groups (Pink, Red, Blue, Green). Both eyes of Pink, Red, and Blue groups received daily topical latanoprost, followed by 0.5%, 1%, and 2% α -methyl-DL-tyrosine in the right eyes, respectively, for six months. The Green group served as a control and received only the inhibitor. Iridal pigmentation was evaluated through photographic comparison by masked observers, spectrophotometric melanin quantification, and histopathological analysis of excised irides.

Results: A significant increase in iridal pigmentation was observed in left eyes (latanoprost only), while right eyes (latanoprost + inhibitor) showed reduced pigmentation, particularly in the 2% group. In the Blue group, 93.33% of observers reported increased pigmentation in the left eye, and 73.33% noted a

decrease in the right eye. Spectrophotometric melanin analysis confirmed these findings: the Blue group's right eyes had significantly lower melanin content (9.56 ± 0.75 $\mu\text{g/g}$) than the left (13.73 ± 1.06 $\mu\text{g/g}$; $p=0.022$). Histopathology revealed no malignant changes or inflammation. Mild stromal pigmentation and free melanin were observed, but only in latanoprost-treated eyes.

Conclusions: Topical α -methyl-DL-tyrosine at a 2% concentration significantly inhibited latanoprost-induced iridal hyperpigmentation without inducing histopathological changes. These findings open promising translational avenues for adjunctive therapy in glaucoma patients concerned about ocular pigmentation, with potential pharmaceutical applications.

Abstract No.: 207830

Opsin-Mediated Acetylcholine Release From Skin Keratinocytes Modulates Solar Light-Induced Melanogenesis

First Author: Qiyun **WU**

Purpose: Clarify the role of opsin in regulating acetylcholine (ACh) release from skin keratinocytes and its subsequent effect on solar light-triggered melanogenesis.

Methods: 1. Identify opsin subtypes (OPN1SW, OPN2, OPN3, OPN5) in keratinocytes via PCR and Western blot. 2. Use siRNA to knockdown specific opsins and assess impacts on solar light-induced ACh release. 3. Investigate opsin-related signaling (Gq/PLC/TRPA1, Ca^{2+} mobilization) using inhibitors and fluo-4 AM imaging. 4. Evaluate melanogenesis in vitro (cocultures) and ex vivo (mouse skin) after opsin-mediated ACh release.

Results: 1. OPN2 is the key opsin subtype in keratinocytes, with upregulated expression during differentiation. 2. Solar light (UVA-dominant) activates OPN2, triggering Ca^{2+} mobilization via Gq/PLC/TRPA1 to induce ACh release. 3. OPN2 knockdown reduces solar light-induced ACh release by ~80%. 4. OPN2-mediated ACh release inhibits solar light-induced melanin production and tyrosinase expression.

Conclusions: Opsin (specifically OPN2) is a critical photoreceptor in skin keratinocytes, mediating solar light-induced ACh release to negatively regulate melanogenesis, highlighting its role in skin pigmentation control.

Abstract No.: 200784**SGLT2 Inhibition With Empagliflozin Attenuates Retinal Oxidative Stress and Damage in Diabetic Mice***First Author: Yutong XIA**Co-Author(s): Shen, Tong*

Purpose: This study aims to investigate the protective effects of SGLT2 inhibitor empagliflozin on retinal oxidative stress and damage in diabetic mice, exploring its potential therapeutic value in diabetic retinopathy.

Methods: The study utilized db/db diabetic mice treated with empagliflozin (25 mg/kg/day) for 8 weeks. Employing immunofluorescence, fluorescein angiography, and Western blot and related experimental techniques. Parameters assessed included blood glucose levels, retinal morphology, oxidative stress markers (DHE), activated gliosis and lipid peroxidation levels, retinal barrier function (ZO-1, Occludin). The Nrf2/HO-1 pathway was also evaluated.

Results: Empagliflozin significantly reduced blood glucose levels, decreased oxidative stress, alleviated activated gliosis and lipid peroxidation, and improved retinal barrier integrity. The drug also activated the Nrf2/HO-1 pathway, reducing oxidative stress and protecting retinal structure.

Conclusions: Empagliflozin, by inhibiting SGLT2, improving metabolic dysregulation, reducing oxidative stress and activating protective pathways, effectively attenuates diabetic retinopathy in mice, suggesting its potential as a therapeutic agent for early intervention in diabetic retinopathy.

Abstract No.: 207843**The Retina-Body Axis: Proteomic Mechanisms Linking Oculomics and Clinical Traits in an Aging Population***First Author: Wei ZHANG**Co-Author(s): Mingguang HE, Yu HUANG, Shunming LI, Jing LIU, Honghua YU*

Purpose: To elucidate phenotypic connections within the retina-body axis and identify the molecular mechanisms that mediate them.

Methods: We leveraged the homogeneous Canton 70s Alumni Cohort (N=258 females aged ~70 years) to minimize socio-demographic confounding factors. Relationships between oculomics (derived from fundus images) and clinical traits were analyzed at macro and micro levels. Plasma proteomics were integrated with oculomic/clinical data to elucidate underlying mechanisms. Associations were assessed using linear mixed-effects models, sparse canonical correlation analysis (sCCA), and permutational multivariate analysis of variance (PERMANOVA). Weighted gene co-expression network analysis (WGCNA) identified

proteomic modules linked to both oculomics and clinical features.

Results: A total of 116 significant associations existed between oculomics and clinical features ($p < 0.05$). sCCA revealed a key phenotypic retina-body axis driven by cup height (oculomic) and lymphocyte count (clinical; $r = 0.519$, $p = 0.013$). Aging differentially impacted retinal features in clinical subgroups (e.g., altered arterial tortuosity density trajectories in dyslipidemia; p for interaction = 1.99×10^{-2}). WGCNA identified proteomic modules co-associated with oculomics and clinical features, with 57 key proteins overlapping between key modules (e.g., Sex hormone-binding globulin, Rheumatoid factor RF-IP4, Fibulin-1).

Conclusions: This study establishes phenotypic and molecular connections underlying the retina-body axis in an aging female cohort. Oculomics were linked to a range of clinical traits, including inflammation, hematological parameters, blood lipid profiles, renal/liver function, and disease status. Circulating proteins emerged as potential mechanistic mediators bridging retina and systemic health. Integrating oculomics with proteomics advances the discovery of clinically relevant biomarkers for early detection and monitoring of systemic diseases.

Abstract No.: 200478**Utility of Thyroid Stimulating Immunoglobulin Assays for Thyroid Eye Disease Diagnosis and Grading: Systematic Review and Meta-Analysis***First Author: Yuk Lam CHONG**Co-Author(s): Kam Lung CHONG, Ka Hei LAI, Charmaine LAU, Chi Pui PANG, Chee Yung THAM*

Purpose: Thyroid stimulating immunoglobulin (TSI) is pivotal in thyroid eye disease (TED) pathogenesis and serves as a biomarker for TED activity and severity. This study evaluated the diagnostic accuracy of TSI assays for TED diagnosis, activity, and severity grading.

Methods: Original studies in patients with TED examined with TSI assays with clinical diagnosis (Ocular signs, radiological imaging, European Group on Graves' Orbitopathy [EUGOGO] guidelines, or clinical activity score as reference standards) were eligible. PubMed, Embase, CENTRAL, Web of Science, and Scopus were searched. Meta-analyses were performed using a hierarchical random-effects model. Risk of bias and applicability concerns were assessed by QUADAS-2.

Results: Thirteen studies (1,887 TED patients) were included. For TED diagnosis against all controls, pooled sensitivity was 0.89 (95%CI:0.78–0.95), specificity 0.87 (95%CI:0.60–0.97), and AUC 0.94. For active and moderate-to-severe/severe TED, sensitivity was 0.97 (95%CI:0.84–0.99) & 0.99 (95%CI:0.85–1.00), specificity was 0.33 (95%CI:0.11–0.66) & 0.18, (95%CI:0.08–0.36), AUC 0.85 & 0.62, respectively. In Fagan plot analysis for

TED, active, and moderate-to-severe/severe diagnoses, post-positive probabilities were 63%, 32%, and 29%, while post-negative probabilities were 3%, 3%, and 1%, respectively. Nine studies had high risk of bias in patient selection domain and there were no concerns regarding applicability.

Conclusions: TSI assays exhibit excellent diagnostic performance for TED diagnosis and superior accuracy for grading activity than severity. However, low specificity in disease classifications indicates higher likelihood of misclassification.

Visual Sciences

Abstract No.: 208555

A Gain-of-Interaction Mechanism of AFG3L2 F175S Mutation Misguides PHB2-Dependent OXA1L Degradation in Dominant Optic Atrophy

First Author: Xiuxiu **JIN**

Co-Author(s): Lei **BO**

Purpose: Dominant optic atrophy (DOA) is a mitochondrial neurodegenerative disorder often caused by mutations in AFG3L2, a key m-AAA protease subunit that maintains mitochondrial protein homeostasis. Beyond DOA, AFG3L2 mutations are implicated in a spectrum of other neurodegenerative diseases, underscoring its critical role in neuronal maintenance. This study aims to confirm the pathogenic role of the AFG3L2 F175S mutation in DOA and elucidate its mechanism in disrupting mitochondrial morphology and function.

Methods: AFG3L2F174S/+ mice (orthologous to human F175S) were generated via CRISPR/Cas9 and phenotyped using optical coherence tomography, histopathology, and visual evoked potentials. Mitochondrial morphology, respiration function, reactive oxygen species (ROS), and membrane potential were analyzed in vivo and in vitro. Proteomic profiling, co-immunoprecipitation, and AlphaFold 3-based modeling identified aberrant protein interactions. Functional validation included immunofluorescence, blue native polyacrylamide gel electrophoresis (BN-PAGE), and rescue experiments with OXA1L overexpression. Molecular docking and long-timescale molecular dynamics simulations were used to define the tripartite AFG3L2-PHB2-OXA1L complex.

Results: AFG3L2F174S/+ mice exhibited retinal ganglion cell loss, reduced retinal thickness, and impaired visual nerve conduction. Abnormal mitochondrial morphology and elevated ROS were observed in the retinas of AFG3L2F174S/+ mice as well as AFG3L2F175S/+ human cells. Proteomic, co-IP, and structural analyses revealed that the F175S mutation enhanced AFG3L2-PHB2 binding by 41-fold, promoting

aberrant recruitment and degradation of OXA1L. This disrupted oxidative phosphorylation and mitochondrial membrane potential. Molecular dynamics simulations identified a stepwise mechanism in which PHB2 docks OXA1L and delivers it to the mutant protease core. OXA1L overexpression restored oxidative phosphorylation capacity, while PHB2 depletion abolished mutant-induced OXA1L destabilization, confirming PHB2's role as a substrate-recruitment scaffold.

Conclusions: We establish AFG3L2 F175S as a pathogenic driver of DOA via PHB2-mediated proteotoxic degradation of OXA1L, directly linking mitochondrial proteostasis failure to optic neuropathy. The AFG3L2-PHB2-OXA1L axis provides a mechanism framework for optic neuropathies and positions OXA1L stabilization as a potential therapeutic target to preserve mitochondrial function in DOA.

Abstract No.: 205558

An Eye Nutraceutical Formulation Effect on Functional Vision Profile in High Myopia: A Pilot Clinical Trial

First Author: Ling **LU**

Co-Author(s): Bo-yie **CHEN**, Wen-bin **CHEN**, Jui-hsin **HUNG**, Tzu-ying **SUN**

Purpose: High myopia leads to various visual challenges that can significantly affect comfort and quality of life if left unmanaged. Corrective lenses are not fully effective in slowing retinal dysfunction, so nutraceutical supplements are often used to support eye function in those affected.

Methods: This study evaluates a nutraceutical formulation rich in L-Arginine, Lutein, Zeaxanthin, Astaxanthin, and Zinc gluconate to improve vision performance in individuals with myopia. A comparative analysis of functional vision improvement in individuals with high myopia versus those with low myopia.

Results: An 8-week clinical trial was conducted with 35 individuals diagnosed with myopia, consisting of 16 participants with low myopia and 19 with high myopia. After consuming the nutraceutical formulation under bright exam conditions, the percentage of individuals in the low myopia group with distance BCVA improvements increased by 18.8% (the log MAR change over 0.1), compared to a 42.1% increase in the high myopia group. Under dim conditions, the low myopia group experienced a 12.5% increase, and the high myopia group experienced a 15.8% increase. Particularly under dim conditions, the high myopia group experienced a 42.1% increase in visual contrast sensitivity function (the AUC change over 20). In contrast, the low myopia group showed only a 6.2% increase.

Conclusions: These findings suggest that this nutraceutical formulation may enhance retinal function

and improve visual performance in high myopia. A functional vision analysis highlights the key differences between the results of high myopia and low myopia, emphasizing the need for tailored nutraceutical treatment approaches.

Abstract No.: 208233

Association of GJD2 Polymorphisms With Myopia: A Systematic Review and Meta-Analysis

First Author: Sharon Shui Wan YEUNG

Co-Author(s): Li Jia CHEN, Yuelan GAO, Jason C. YAM

Purpose: To determine the association between GJD2 polymorphisms and myopia, as well as to summarize the published evidence on the hypothesized mechanisms of GJD2 that confer susceptibility to myopia development.

Methods: Literature search was conducted on PubMed, Cochrane Library, and Embase. The study was performed under the Preferred Reporting Items for Systematic Review and Meta-Analyses Statement PRISMA guidelines. The Newcastle-Ottawa Scale (NOS) and funnel plots were utilized for quality and publication bias assessment. Meta-analysis for pooled odds ratios with fixed or random effect models, with 95% confidence intervals, was presented with forest plots. Heterogeneities were quantified by Cochrane Q test and I² test. Subgroup analysis was performed to investigate heterogeneity. Sensitivity analysis was done to determine the robustness and reliability of pooled results. All statistical analyses were performed by the RevMan (ver. 5.4) software.

Results: A total of 16 studies were included for qualitative synthesis, and a total of 9268 subjects from 9 studies were included in the meta-analysis. Statistically significant associations were observed between rs524952 and myopia as well as high myopia. A dose-response relationship in the effect of risk allelic dosage was also detected.

Conclusions: Our present data suggested a significant association between GJD2 polymorphisms and myopia. GJD2 plays a role in the retinal signaling pathway, which may influence axial length elongation, and GJD2 polymorphisms potentially confer risk to myopia by altered gene expression.

Abstract No.: 202594

Clinical Application of EEG-ML Integration Models in the Diagnosis and Treatment Outcome Prediction of Amblyopia

First Author: Qiuying LI

Co-Author(s): Lei FENG, Yunsu HE, Jinrong LI, Xuan QIU, Yun WEN, Zixuan XU, Qingqing YE, Wentong YU, Yudan ZHONG, Yusong ZHOU

Purpose: Traditional psychophysical metrics have limited value in predicting perceptual learning (PL) efficacy in amblyopia. Electroencephalography (EEG) objectively evaluates neural activity, while machine learning (ML) enables high-dimensional data analysis. This study developed an EEG-ML Integration Model (EMIM) to assist amblyopia diagnosis and predict PL outcomes.

Methods: EEG data and visual function metrics (e.g., visual acuity, contrast sensitivity, and stereopsis) were collected from 176 children with amblyopia (98 anisometropic and 78 deprivation) and 22 healthy controls, all recruited from Zhongshan Ophthalmic Center, Sun Yat-sen University. Resting-state EEG and steady-state visual evoked potentials (SSVEPs) were recorded with a 64-channel EEG system. In the amblyopia cohort, 140 participants completed a 14-day monocular perceptual learning program using a cutoff spatial frequency task, followed by a 3-month follow-up. Machine learning algorithms were applied to (1) classify amblyopia versus controls based on EEG features, including resting-state alpha peak activity and SSVEP small-world network properties, and (2) predict PL outcomes by stratifying patients into responder and non-responder groups to identify EEG biomarkers of treatment efficacy.

Results: For diagnostic classification, the EMIM model based on SSVEP features achieved an accuracy of 99.32% (AUC = 0.99) in classifying amblyopia and healthy controls. For treatment outcome prediction, the EEG-based model classified patients into responder and non-responder groups with 85.71% accuracy (AUC = 0.92). Compared with unimodal models, a multimodal ML model combining EEG features with visual function measures further improved predictive performance.

Conclusions: EMIM provides an objective, reliable tool for amblyopia diagnosis and PL outcome prediction, supporting precision diagnosis and individualized therapy.

Abstract No.: 207792

Clinical and Genetic Findings in a Chinese Family of Autosomal Recessive Retinitis Pigmentosa Associated With Compound Heterozygous Mutations in NMNAT1

First Author: Yuen Ting HO

Co-Author(s): Li Jia CHEN, Jason C. YAM, Jun YU

Purpose: To investigate the phenotypic association between compound heterozygous NMNAT1 mutations and autosomal recessive retinitis pigmentosa (ARRP) in a Chinese family.

Methods: After identifying two NMNAT1 mutations in the proband by panel-based next-generation sequencing (NGS), her family members (n=4), 50 unrelated patients with different inherited retinal dystrophies (IRD), and 100 healthy control subjects were recruited for comprehensive ophthalmic examinations and screening for NMNAT1 mutations using panel-based NGS or direct Sanger sequencing.

Results: The proband carrying the two heterozygous NMNAT1 mutations, c.196C>T (p.Arg66Trp) and c.710G>A (p.Arg237His), was presented with profound visual impairment and typical RP fundus abnormalities. The proband's two sisters and both parents carried one of the two mutations, but they did not exhibit any RP signs or symptoms. The two mutations were not detected in the 50 unrelated IRD patients nor in 100 healthy control subjects.

Conclusions: This study revealed a novel combination of compound heterozygous mutations in NMNAT1, c.196C>T (p.Arg66Trp) and c.710G>A (p.Arg237His), that can cause ARRP. Neither mutation alone caused RP, suggesting that they lead to loss of function of the gene.

Abstract No.: 202133

Cortical Functional Abnormalities in Binocular Hidden Deprivation Amblyopia

First Author: Zixuan XU

Co-Author(s): Lei FENG, Yunsi HE, Jinrong LI, Qiuying LI, Xuan QIU, Qingqing YE, Wentong YU, Junpeng YUAN, Yudan ZHONG, Yusong ZHOU

Purpose: Previous studies suggested that inherited retinal dystrophies (IRDs) and idiopathic congenital nystagmus (ICN), may cause binocular hidden deprivation amblyopia, affecting visual cortex development and visual function. This study investigated cortical functional abnormalities in BHDA patients, including IRDs and ICN.

Methods: Twenty-one patients with IRDs or ICN, 21 with binocular deprivation amblyopia (BDA), 18 with binocular refractive amblyopia (BRA), and 21 age-matched healthy controls underwent ophthalmic examinations including refraction, refraction, best-corrected visual acuity, contrast sensitivity, stereopsis,

and resting-state EEG. Power spectral density (PSD) across frontal, parietal, temporal, occipital regions in delta, theta, alpha, beta bands and source-level functional connectivity (FC) using Phase Locking Value were analyzed.

Results: All amblyopia groups showed significantly reduced visual function compared to healthy controls, with no subgroup differences. Regional PSD analysis revealed decreased delta-band PSD in left and right frontal and temporal regions in BDA; decreased alpha-band PSD in left frontal, central frontal, and left temporal regions in BHDA; and decreased beta-band PSD in left temporal region in BRA. Source-level FC analysis identified pars opercularis and right rostral middle frontal gyrus as commonly affected regions. BHDA showed intra-hemispheric alterations primarily in frontal, parietal, occipital cortices; BDA exhibited fewer but stronger cross-hemispheric alterations; BRA demonstrated widespread moderate-strength changes involving frontal, cingulate, occipital cortices.

Conclusions: IRDs and ICN patients exhibited both visual and cortical abnormalities during the critical period. Visual impairment may result from hidden deprivation amblyopia and structural abnormalities.

Abstract No.: 205599

Effect of Light Barrier and Type of Refractive Error on the Performance of a Portable Wavefront Aberrometer-Based Auto Refractometer

First Author: Maneck NICHOLSON

Co-Author(s): Shonraj BALLAE, Jyothi DAMANI, Ritik GUPTA

Purpose: Accurate and accessible autorefractors are essential for refractive error assessment, particularly in resource-limited settings. This study evaluates the accuracy and reliability of Instaref R20 with a light barrier (Instaref R20 LB) compared to a tabletop autorefractor (AR) and subjective refraction (SR) in an adult population.

Methods: A prospective study was conducted at a tertiary eye institute in Mumbai, enrolling 200 adults (mean age: 44.33 ± 13.97 years). All the participants underwent a comprehensive eye examination including objective refraction, subjective acceptance, anterior and posterior segment evaluation. Non-cycloplegic refraction was assessed using Instaref R20, Instaref R20 LB, AR, and SR. Agreement between methods was analysed using Bland-Altman plots, assessing power vector components (M, J0, J45). Statistical comparisons were performed using the Wilcoxon signed-rank test.

Results: Instaref R20 LB demonstrated strong agreement with SR (M: 0.10D, p = 0.13; J0: -0.05D, p = 0.05; J45: 0.01D, p = 0.44), while Instaref R20 showed slight variance (M: 0.17D, p < 0.001). Agreement within ±0.50D of SR was 64.64% (M), 85.35% (J0),

and 89.39% (J45). Under bright illumination, Instaref R20 failed to capture readings in six cases, whereas Instaref R20 LB obtained stable measurements in all participants, demonstrating superior reliability in bright environments. Subgroup analysis showed higher accuracy in myopic eyes, while AR exhibited significant deviations in hyperopes.

Conclusions: The Instaref R20 LB improves measurement accuracy and reliability, particularly under bright illumination. Its strong agreement with SR and portable design make it a viable tool for refractive error assessment in resource-constrained settings.

Abstract No.: 200833

Epidemiological Trends and Risk Factor Analysis Reveal the Changing Landscape of Cataracts in an Aging Global Population

First Author: Tianyu **WANG**

Co-Author(s): Wuliang **LI**, Yinan **WU**, Xiaoping **XU**

Purpose: To analyze global cataract burden trends and associated risk factors from 1990-2021, and to predict future development patterns.

Methods: Based on the Global Burden of Disease (GBD) 2021 data, we analyzed cataract prevalence, disability-adjusted life years (DALYs), and age-standardized rates across 204 countries and territories. We examined temporal trends, geographical variations, and associations with socio-demographic index (SDI). Future trends were projected using Bayesian Age-Period-Cohort (BAPC) modeling.

Results: Global cataract cases increased by 137.58% from 42.33 million to 100.57 million during 1990-2021, while age-standardized prevalence remained stable (EAPC: 0.21). DALYs increased from 3.42 to 6.55 million, though DALY rates decreased (EAPC: -0.48). Middle SDI regions showed the highest burden in 2021 (35.87 million cases). South Asia consistently demonstrated the highest regional burden, while East Asia showed the most significant growth (247.16%). Women experienced a higher cataract burden, primarily due to longer life expectancy and higher metabolic disease incidence. Major risk factors included metabolic risks (27.60%), elevated fasting plasma glucose (23.75%), and air pollution (20.00%).

Conclusions: While population aging and increased life expectancy continue to drive global cataract burden, significant regional disparities persist. Middle-income regions face dual challenges of aging populations and limited healthcare resources. Targeted interventions are needed to improve healthcare accessibility and address socioeconomic inequalities.

Abstract No.: 201390

Extending Treatment Duration in Perceptual Learning for Amblyopia

First Author: Yusong **ZHOU**

Co-Author(s): Yunsi **HE**, Jinrong **LI**, Qiuying **LI**, Yangfei **PANG**, Xuan **QIU**, Zixuan **XU**, Ying **YAO**, Qingqing **YE**, Wentong **YU**, Yudan **ZHONG**

Purpose: This study evaluated whether extending the duration of perceptual learning (PL) could yield sustained therapeutic benefits in amblyopia management.

Methods: A total of 100 patients had completed 6 months of PL based on the lateral masking paradigm. Ninety-three participants had at least one follow-up assessment at either 3 or 6 months in addition to baseline data and were included in the analysis. Missing data was handled using multiple imputation by chained equations. Longitudinal changes in visual function—including best-corrected visual acuity (BCVA), contrast sensitivity function (CSF), and stereopsis—were evaluated using a linear mixed-effects model. To identify factors associated with improvements in BCVA and area under the log CSF (AULCSF), multivariable linear regression models were constructed.

Results: A total of 93 participants were enrolled, with a mean age of 15.3 ± 8.3 years. Among them, 8 patients had isoametropic amblyopia, 63 had anisometropic amblyopia, 12 had strabismic amblyopia, 1 had deprivation amblyopia, and 9 had mixed amblyopia. Analysis revealed significant and sustained improvements in both BCVA and AULCSF. Stereopsis also improved following 3 months of PL training. Further extension of the training duration did not result in additional significant gains in stereopsis. Initial baseline visual function and history of occlusion therapy were the primary factors associated with the improvement of BCVA and AULCSF.

Conclusions: PL treatment can improve the visual function of amblyopia patients. However, considering the potential ceiling effect, a 6-month treatment period may represent an optimal duration.

Abstract No.: 207778

Genetic and Health Lifestyle for Diabetic Retinopathy and Long-Term Risk of Incident Dementia Subtypes

First Author: Li Jia **CHEN**

Co-Author(s): Yuelan **GAO**, Clement C. **THAM**, Jianmin **XU**, Jason C. **YAM**

Purpose: This study aims to investigate the effects of diabetic retinopathy (DR) on dementia subtypes and their underlying genetic mechanisms, and to evaluate the potential protective role of a healthy lifestyle.

Methods: Data from over 350,000 UK Biobank participants were analyzed to assess associations

between DR and dementia subtypes. Cross-trait genetic analyses identified shared loci and enriched pathways. A polygenic risk score (PRS) for DR and a healthy lifestyle score (HLS) were used to examine their interactions on dementia risk. MRI data were analyzed to assess lifestyle effects on neuroimaging phenotypes in high genetic risk individuals.

Results: Over a median 12.40-year follow-up, 6,039 cases developed dementia. DR was associated with increased vascular dementia (VaD; HR = 2.31, $P < 0.001$) and Alzheimer's disease dementia (ADD; HR = 1.52, $P = 0.028$) risk. Cross-trait analyses identified 21 shared loci, with 19q13.32 showing colocalization for both DR-ADD and DR-VaD. Gene-level analyses identified 62 pleiotropic genes, including APOE, TOMM40, FTO, and TCF7L2, enriched in metabolic and vascular pathways. High DR PRS and unfavorable lifestyle increased VaD and ADD risk, while HLS attenuated genetic susceptibility to VaD ($P = 0.001$). Higher DR PRS and lower HLS were associated with greater white matter hyperintensity, with minimal gray matter or hippocampal differences.

Conclusions: DR increases the risk of dementia, particularly VaD and ADD, potentially via metabolic and vascular pathways involving APOE, TOMM40, FTO, and TCF7L2. Genetic susceptibility to DR elevates later-life dementia risk, which can be mitigated by an early healthy lifestyle, particularly for vascular-related dementia.

Abstract No.: 200826

Global, Regional, and National Burden of Glaucoma From 1990 to 2021: A Cross-Sectional Study

First Author: Xiaoping **XU**

Co-Author(s): Yuanbo **LIANG**, Xianyao **PENG**, Tianyu **WANG**

Purpose: To provide an assessment of the prevalence, and disability-adjusted life years (DALYs) associated with glaucoma from 1990 to 2021.

Methods: In this cross-sectional study, epidemiologic data were gathered from the Global Burden of Disease (GBD) 2021 in 204 countries and 21 regions.

Results: In 2021, the global number of glaucoma cases were 7.59 million (95% uncertainty intervals [UI], 6.52-8.92). From 1990 to 2021, glaucoma cases surged by 86.33% (95% uncertainty interval [UI], 79.33%-93.60%); Glaucoma-associated DALYs increased from (0.47 million; 95% UI, 0.32-0.65) to (0.76 million; 95% UI, 0.53-1.05); The prevalence rate decreased from 116.29 (95% UI, 100.81-136.30) to 90.12 (95% UI, 77.78-105.49) per 100 000 population; The glaucoma-associated DALYs rate declined from 13.37 (95% UI, 9.36-18.50) to 9.05 (95% UI, 6.29-12.46) per 100 000 population. Among the 5 sociodemographic index (SDI) regions, the middle SDI region had the highest number

of glaucoma-associated DALYs in 2021. Regionally, Southern Asia had the largest decrease in prevalence rate (EAPC, -1.44, 95% UI, -1.56 to -1.32). Among 204 countries, Iran (Islamic Republic of) had the highest rate of glaucoma-associated prevalence (457.25 per 100 000 population, 95% UI, 396.38-532.10), Botswana had the highest rate of glaucoma-associated DALYs (62.24 per 100 000 population, 95% UI, 42.30-89.43).

Conclusions: Although global prevalence and DALYs rates have decreased, the burden in low SDI and middle SDI regions remains high. These data provide useful references for policy makers to strengthen the management strategies.

Abstract No.: 202616

Hyperuricemia Leads to Inflammation and Apoptosis of Retinal Ganglion Cells by Activating NF- κ B Signaling Pathway

First Author: Danyi **QIN**

Co-Author(s): Jiaoyue **HU**, Zuguo **LIU**

Purpose: To investigate the effect of hyperuricemia (HUA) to retinal ganglion cells (RGCs) and explore its possible mechanism.

Methods: A HUA-like mouse model was established by daily intraperitoneal injections of potassium oxonate and a high-purine diet for 2 and 4 weeks. Body weight, intraocular pressure (IOP), and serum uric acid (UA) levels were measured. Retinal structure and function were assessed using fundus photography, optical coherence tomography (OCT), and electroretinography (ERG). Histological staining and molecular analyses were performed to evaluate retinal changes. Additionally, primary retinal neurons (PRNs) were isolated to simulate RGCs in vitro, enabling a comprehensive assessment of UA-induced cellular alterations.

Results: A decrease in body weight and an increase in IOP and serum UA levels were found in the modeling mice. White deposits were observed in the vitreous and retina, along with thinning of the inner retinal layer and RGC loss. The modeling mice also showed retinal functional impairment, presented as a significant decrease in photopic negative response (PhNR) amplitudes. Increased levels of inflammatory and apoptotic factors were detected in the retinas of the modeling mice. In vitro, HUA led to decreased cell viability and synaptic connections, increased inflammatory and apoptotic levels of PRNs. Activation of the NF- κ B pathway was identified as a key mechanistic driver.

Conclusions: These findings demonstrated that HUA could induce structural and functional damage to RGCs via apoptosis and inflammatory processes, highlighting the importance of retinal health monitoring in HUA patients.

Abstract No.: 202579**Study on the Mechanisms Related to Retinal Aging in Mice Exposed to Blue Light Irradiation***First Author: Feng KE**Co-Author(s): Hu JIAOYUE, Wei MINGYAN, Chen QIAN, Liu ZUGUO*

Purpose: To investigate the effects of blue light exposure on the structure and function of the mouse retina and to reveal the potential molecular mechanisms underlying the induction of age-related retinal lesions from multiple dimensions, including cellular senescence, neuroinflammation, and fibrosis.

Methods: Male C57BL/6J mice were randomized to control or blue-light groups. Experimental mice received 1% atropine to maintain mydriasis and were exposed to 460 nm blue light (1102.83 ± 89.31 lux) for 16 h/day; controls received atropine without blue light. Assessments at 1, 2, 3, and 4 weeks included fundus photography, FFA, and OCT, followed by enucleation for HE and immunofluorescence (fibronectin, vimentin, α -SMA, collagen I, Iba1) and Western blot of retina and RPE/choroid (Iba1, GFAP, α -SMA, vimentin, p53, p21).

Results: With increasing blue-light exposure, fundus imaging showed mottled RPE changes, and OCT revealed progressive ONL/IS—OS thinning with thickening of the RPE/Bruch's complex. HE confirmed photoreceptor thinning, disorganization, and irregular RPE, while IF showed increased fibronectin, collagen I, vimentin, and α -SMA in the subretinal space/RPE, consistent with fibrosis and EMT. Western blots demonstrated upregulated p53/p21, elevated Iba1 (microglial activation), and a time-dependent rise in vimentin (all $P < 0.05$), aligning with imaging and histology.

Conclusions: Under sustained atropine-induced mydriasis, daily 16-hour blue-light exposure elicited AMD-like retinal aging changes in mice—photoreceptor loss, RPE dysfunction, subretinal fibrosis, and chronic inflammation. These effects likely arise from the blue light-driven activation of the p53/p21 senescence pathway in retinal cells, leading to microglial and Müller cell-mediated neuroinflammation and RPE EMT, which promotes subretinal fibrosis.

Abstract No.: 209774**The Impact of Defocus and Vision Therapy on Progressive Myopia in Children***First Author: Qiwen CHEN*

Purpose: Background: Progressive myopia, especially in children, is a significant concern due to its potential to lead to severe vision impairment. LJM, a 7-year-old boy, presented with a complaint of rapid myopia progression despite wearing single vision glasses for 1.5 years. His medical history included a family history of high myopia on his father's side. After switching to

defocus lenses, he experienced symptoms such as near double vision, eye strain, and headaches, leading to a referral to our clinic.

Methods: Case Summary: LJM's refractive history showed an increase in myopia from June 2022 to May 2023. His unaided visual acuity was poor, and manifest refraction after cycloplegia confirmed a significant myopia with astigmatism. He exhibited signs of external heterophoria for both distance and near, along with insufficient accommodation and convergence, and poor accommodative facility. The diagnosis included exophoria, accommodative and convergence insufficiency, and progressive myopia.

Results: The treatment plan involved strong defocus spectacles to control myopia progression, prisms to alleviate symptoms of double vision and visual fatigue, and vision training to improve oculomotor skills. A new prescription was provided with defocus lenses and prisms, along with specific lens options to optimize peripheral defocus and central optical zone size.

Conclusions: Discussion: After three months, LJM's myopia and axial length showed a slight progression, but his symptoms improved with home-based vision training. At the six-month mark, the decision was made to remove the prisms and replace the glasses, reflecting the dynamic nature of myopia management in children. The axial length changes were minimal, indicating a potential stabilizing effect of the intervention.

Abstract No.: 205159**Tumour Angiogenesis in Retinoblastoma Is Regulated by Growth Hormone-Releasing Hormone Receptor***First Author: Ivan KONG**Co-Author(s): Wai Kit CHU, Chi Pui PANG, Clement C. THAM, Jason Cheuk-sing YAM, Linbin ZHOU*

Purpose: To elucidate the role of the growth hormone-releasing hormone receptor (GHRH-R) in regulating angiogenesis in retinoblastoma (RB).

Methods: Y79 RB cells were used as an in vitro model. The GHRH-R agonist MR-409 and antagonist MIA-602 were applied to stimulate or inhibit GHRH-R signalling, respectively. Western blotting assessed protein expression of angiogenesis-related targets, including vascular endothelial growth factor (VEGF) and protein kinase B (AKT). Immunofluorescence staining detected intracellular VEGF, qPCR measured VEGF-A, VEGF-C, and VEGF-D mRNA levels, and ELISA quantified secreted VEGF in culture media.

Results: MR-409 increased VEGF and AKT protein levels in Y79 cells in a dose-dependent manner, whereas MIA-602 decreased VEGF protein expression. Immunofluorescence confirmed VEGF expression in Y79 cells. VEGF-A, VEGF-C, and VEGF-D mRNA levels were upregulated by MR-409 and downregulated by MIA-602 in a dose-dependent manner. ELISA showed

increased VEGF secretion following MR-409 treatment, while MIA-602 reduced VEGF release into the culture medium.

Conclusions: GHRH-R signalling promotes angiogenesis in retinoblastoma by increasing VEGF expression and activating downstream effectors such as AKT. Pharmacologic antagonism with MIA-602 suppresses these proangiogenic signals, supporting GHRH-R as a potential therapeutic target to modulate tumour angiogenesis in RB.

VIDEOS

AI, Digital Innovation and Virtual Health

Abstract No.: 201909

Augmented Intelligence, Human-In-The-Loop Learning and Multimodal Comprehensive Glaucoma AI

First Author: Prasanna Vekatesh RAMESH

Purpose: To introduce the development of the first multimodal, explainable AI system for glaucoma diagnostics that seamlessly integrates augmented intelligence, human-in-the-loop learning, and cutting-edge imaging technologies, offering a cost-effective, clinically interpretable solution suitable for both neophytes and seasoned clinicians.

Methods: A neural network-based AI model was trained on curated, highly labeled multimodal datasets. Human-in-the-loop supervision refined predictions, addressed the black-box phenomenon, and provided actionable insights. The system leveraged multiple imaging modalities, including Fundus photography, AS-OCT, Scheimpflug, Anterior, and UBM, incorporating strategies for both big data and small data utilization.

Results: The AI system demonstrated robust diagnostic accuracy across all modalities. Integration of human-guided feedback enhanced reliability, interpretability, and clinician confidence, rendering the predictions transparent and actionable for routine practice.

Conclusions: By synergizing human expertise with a multimodal AI framework, this innovative platform provides a comprehensive, explainable, and next-generation glaucoma diagnostic tool. It empowers clinicians, from neophytes to experts, with cutting-edge decision support, potentially improving patient outcomes and advancing the standard of ophthalmic care.

Abstract No.: 201717

Breakthrough Innovations in Corneal and Refractive Surgery: Enhancing Vision and Patient Outcomes

*First Author: Bharat GURNANI
Co-Author(s): Kirandeep KAUR*

Purpose: To provide an overview of the most significant advancements in corneal care over the past 2–3

years, highlighting innovations that have transformed diagnostic and therapeutic practices.

Methods: A narrative review of recent literature and clinical innovations was undertaken, focusing on surgical techniques, diagnostic modalities, regenerative strategies, and technological integration in corneal disease management.

Results: Recent years have seen a paradigm shift in corneal care. Surgical innovations such as corneal allogenic intrastromal ring segments, ultrathin Descemet stripping endothelial keratoplasty (DSEK), Descemet membrane endothelial keratoplasty (DMEK), and selective endothelial ectomy for Peters anomaly have improved visual outcomes and reduced complications. Advances in cross-linking, including C3R for ultrathin corneas, have expanded therapeutic options for keratoconus. Diagnostic evolution includes refined modalities and the application of artificial intelligence to enhance corneal imaging accuracy. In infectious keratitis, progress in Pythium diagnosis and management has significantly improved recognition and outcomes. Regenerative approaches, including cultured endothelial cells, bioengineered corneal tissue, and biosynthetic corneas, are bridging gaps in donor availability and eye banking practices, while innovations in graft utilization ensure more effective tissue use. The emergence of smart contact lenses and biosensors has further expanded the role of the cornea as both a therapeutic and diagnostic interface.

Conclusions: The convergence of surgical refinement, regenerative medicine, AI-based diagnostics, and bioengineering has redefined corneal care. These advancements not only enhance patient outcomes but also expand therapeutic horizons, offering hope for previously untreatable conditions.

Abstract No.: 205059

Build Your Own Artificial Intelligence Software – for FREE! To Diagnose Retinal Diseases

First Author: Anju KURIAKOSE

Purpose: Artificial Intelligence (AI) can revolutionize healthcare, but clinicians often find it inaccessible. This study shows how to build a free, no-code AI to detect retinal diseases from fundus photographs.

Methods: Retinal fundus images were divided into training and test sets. Using Google's free Teachable Machine, an AI algorithm was trained on the training

images and then validated on the test images. Accuracy was measured as the proportion of correctly classified photos.

Results: The AI detected retinal diseases with 80–99% accuracy, depending on the test images. Once trained, it classified new fundus photos within seconds, without requiring any programming skills.

Conclusions: Teachable Machine allows clinicians to quickly create free, no-code AI models for retinal disease detection. These models are fast, accurate, and accessible, empowering healthcare professionals to experiment with machine learning and bring AI into clinical practice.

Abstract No.: 205374

Crafting Tomorrow's Vision: My Innovation Story in the World of Ophthalmology

First Author: Shivam **GUPTA**

Co-Author(s): Devendra **MAHESHWARI**, Nimrita **NAGDEV**, Madhavi **PILLAI**

Purpose: to ignite the fire of innovation in all ophthalmologists.

Methods: From the moment I first looked through an ophthalmoscope, I was captivated by the intricate world of the human eye, yet equally struck by the unmet needs in patient care. This initial fascination quickly evolved into a burning desire to do more than just treat; it became a quest to innovate. My journey has been one of relentless curiosity, transforming observed challenges in the clinic into fertile ground for new solutions. From late nights spent sketching designs and poring over research papers to collaborating with brilliant minds across disciplines, each step has been fueled by the profound impact I've witnessed: restoring sight, improving lives, and pushing the boundaries of what's possible in ophthalmology.

Results: Video Synopsis: This narrative traces my path from its inception, detailing the challenges I overcame and the triumphs that ultimately benefited countless lives.

Conclusions: Every challenge is an invitation to create, every unmet need a spark for discovery. Through innovation, we don't just build devices or develop techniques — we build hope. The future of ophthalmology belongs to those who dare to imagine differently. Let's keep transforming today's limitations into tomorrow's breakthroughs.

Abstract No.: 201836

Innovations and Recent Advances in Pediatric Ophthalmology: Transforming Eye Care for Children

First Author: Kirandeep **KAUR**

Co-Author(s): Bharat **GURNANI**

Purpose: To summarize recent innovations and advances in pediatric ophthalmology that are transforming diagnosis, treatment, and outcomes in childhood eye diseases.

Methods: A comprehensive review of contemporary literature and clinical developments in pediatric ophthalmology was undertaken, focusing on diagnostic modalities, surgical techniques, therapeutic innovations, and future directions.

Results: The past few years have witnessed remarkable progress in pediatric ophthalmology. Cutting-edge diagnostic tools, including advanced imaging systems and artificial intelligence-driven platforms, are enabling earlier and more accurate detection of pediatric eye diseases. Surgical advancements such as microinvasive glaucoma surgery (MIGS) are expanding treatment options for childhood glaucoma, while refinements in congenital cataract surgery and postoperative rehabilitation continue to improve visual outcomes. In pediatric retina, significant progress has been made in retinopathy of prematurity (ROP) screening and management, alongside the emergence of gene therapy for inherited retinal diseases. Novel approaches to amblyopia therapy, including digital platforms and interactive treatment methods, are reshaping management strategies. Telemedicine has broadened access to pediatric vision care, particularly in underserved populations. Emerging treatments for pediatric uveitis and the integration of bioengineered solutions underscore the field's dynamic innovation.

Conclusions: Innovations in diagnostics, surgical techniques, therapeutics, and digital health are revolutionizing pediatric ophthalmology. These advances not only address current clinical challenges but also create new opportunities for improving children's eye health. Continued multidisciplinary collaboration and research are essential to translate these breakthroughs into sustained improvements in clinical practice and patient outcomes.

Abstract No.: 202477

One Tap for a Brighter World

First Author: Megha **G**

Purpose: Our video aims to throw light on how the visually impaired use smartphones and various smart phone apps that are available to help them.

Methods: Our video shows how smartphone can become the most powerful tool for the blind. It also shows various apps that can help the visually impaired.

The App store (for iOS) and Google play store (for Android phones) were searched with various keywords. WE have described few of the most popular and easy to use apps.

Results: The available apps can be broadly divided as 1) Eye drop reminders 2) Patient education 3) Testing apps 4) Apps for the visually disabled. However, the video mainly focuses on the last segment.

Conclusions: The apps for blind people especially those incorporating Artificial Intelligence (AI) can help them not only in their day-to-day activities but also to achieve greater heights. Knowledge about these accessibility features and apps can help us educate our blind patients live better. With smart phones being handy and used by everyone these days, helping our patients lead a brighter life is just "One tap away"!

Abstract No.: 201488

Ophthalmopreneur: An Ophthalmic Entrepreneur Innovating and Making Our Practice Easy

First Author: Neeraj ISRANI

Purpose: Entrepreneurship is the process of starting, managing, and growing a business, often involving innovation, risk-taking, and the creation of new products or services. We, as ophthalmologists, are great clinicians but have the brains of entrepreneurs since we come across so many day-to-day issues in our surgeries and clinical practice. What if we Ophthalmologists innovated against the day to day problems?

Methods: This video brings to light 3 problems in our day to day Surgical and Clinical practice and how we tackle them by innovating right from blue print to 3d Printing and making a marketable device and sharing it with our Ophthalmologists to make their life easy.

Results: We innovated the following devices: 1) slit lamp-assisted toric marker; 2) Autodrop: A Bluetooth-enabled application-based eye drop to improve compliance in patients; 3) Headzy: A novel Head Device Universal to Evert OT table to make the patient experience comfortable during ophthalmic surgery; 4) Inverse chopper.

Conclusions: Every ophthalmologist has an innovator and an entrepreneur within them. Innovate to survive.

Abstract No.: 201503

Universal Integrated Electronic Eyedrop Sleeve: A Novel Compliance Monitoring System in Glaucoma

First Author: Shruti MARU

Co-Author(s): Neeraj ISRANI

Purpose: Is there a potential role for the use of alerts or reminders at drop-taking times, using smart-

phone-enabled technologies? Purpose is to integrate technology that can register a successful drop delivery to the eye and communicate this information to both patients and providers.

Methods: Innovation and hospital based prospective study for validation. To check the efficacy of the device using a validated questionnaire before & after the use of the device. We conducted 86 eyes of 74 pts among Post operative patients and used a semi-structured questionnaire to assess patient-reported problems and adherence to medications. This is the questionnaire including demographics, cause of noncompliance, number of medications, duration of treatment etc.

Results: We compared the compliance rate before & after the use of the device and found significant improvement.

Conclusions: This innovative device emphasizes the importance of compliance and improves patient adherence.

Academia, Research, Teaching and Education in Ophthalmology

Abstract No.: 200179

3 Innovations on a Mission for Vision

First Author: Nivean M

Co-Author(s): Sridhar BARATAN, Sujatha MOHAN, Mohan RAJAN

Purpose: Management of an opacified PCIOL using 3 novel techniques for safe explantation of the opacified IOL followed by implantation of scleral supported intraocular lens.

Methods: A clear corneal incision was made, and opacified foldable PCIOL was brought to the anterior chamber with the bag. It was cut into multiple pieces with the novel high-frequency intraocular lens cutter attached to the phaco probe (innovation 1) and explanted through the 2.8 mm incision main port without distorting /extending the wound. The 23 G trochar is used as an AC maintainer at 7 o'clock (innovation 2). Using a 23G cutter through the side port, anterior vitrectomy is performed. The scleral-supported intraocular lens is planned using the CM T flex scleral-supported intraocular lens, a novel innovation for aphakia (innovation 3). It is a single-piece hydrophilic acrylic intraocular lens with 10-degree angulation and specialized T-shaped haptics.

Results: The post-operative BCVA in the right eye improved to 6/12, N10 in the first post-operative week. The cornea was clear, and the CM Tflex IOL was stable.

Conclusions: Severe opacification of the posterior chamber IOL causes vision loss. This can be effectively managed with the combination of the above innovative techniques to minimize the incision size and a well-stabilized scleral-supported intraocular lens.

Abstract No.: 204744

Anxiety- a Silent Battle, Anxiety Reduction in Cataract Patients

First Author: Kunal MANDLIK

Co-Author(s): Devika BHATTACHARYA

Purpose: Anxiety is one of the main reasons for a patient's uncooperativeness, leading to intraoperative complications. This video addresses the patient's anxiety during cataract surgery.

Methods: We performed a pilot study of 'Music therapy,' a randomized trial regarding the efficacy of intravenous midazolam. We assessed the role of 'Mediclowns' and a pre-operative counseling session describing a patient's surgical experience.

Results: We found that all these methods efficiently reduced the patient's anxiety.

Conclusions: All the above-mentioned methods of anxiety reduction helped in achieving good intraoperative cooperation for better safety and visual outcomes.

Abstract No.: 205496

Beyond the Scalpel: The Hidden Theatre of Cataract Surgery

First Author: Pradipta CHOWDHURY

Co-Author(s): Prakash CHOWDHURY

Purpose: To illuminate the indispensable yet often invisible roles of multidisciplinary theatre staff in cataract surgery, highlighting how their early-morning preparation, precision, and teamwork underpin surgical success and patient safety.

Methods: This short film employed direct observation and cinematic documentation of a full cataract surgery theatre workflow. Filming began at 07:00 with scrub nurses preparing intraocular lenses (IOLs) and phacoemulsification tips, and continued through the contributions of porters, floating nurses, cleaners, and sterile services technicians. Audio-visual storytelling combined natural theatre sounds with reflective staff monologues, capturing both technical processes and emotional perspectives.

Results: The film demonstrates that what patients perceive as a surgeon's single act of operating at 09:00 is in fact the culmination of coordinated efforts from a wider, often unrecognised team. Scrub nurses ensured sterility and readiness, porters provided comfort and logistical support, floating nurses prepared machines and medications, cleaners maintained infection control, and sterile services technicians sustained safety

beyond surgical hours. Together, these roles create the foundation for high-quality outcomes and patient trust.

Conclusions: Cataract surgery is not solely a surgeon's achievement but the collective product of dedicated theatre staff. By honouring their unseen contributions, this film reframes surgical success as a shared triumph, encouraging recognition, morale, and education for future ophthalmic care models.

Abstract No.: 202362

Enhancing Patient Safety: The Critical Role of Hand Hygiene in Eyecare

First Author: Samina ZAMINDAR

Purpose: Hospital-acquired infections affect 1 in 10 patients worldwide. In eye hospitals, hand hygiene is the cornerstone of infection control, lowering risks in both OPD and OR. However, resources to build HH awareness remain limited. Our work focuses on strengthening protocols by highlighting scientific evidence and addressing barriers to care.

Methods: The video covers essential hand hygiene practices—hand wash, hand rub, surgical scrub, and glove use—while addressing barriers like time, sink placement, and skin irritation with practical solutions. Using demonstrations, real scenarios, and myth-busting, it ensures clarity. It also highlights the key role of infection control nurses in audits and training to sustain protocols. The abstract can be presented as a 7-minute video or a poster.

Results: This video is the first standardised training tool for eye hospitals worldwide, improving hand hygiene practices. Early feedback shows greater awareness and compliance. Clear demonstrations reinforce correct techniques, while adoption of alcohol-based hand rubs and regular audits strengthen adherence, reducing cross-contamination and enhancing patient safety.

Conclusions: A structured hand hygiene program strengthens infection control in eye hospitals, supporting quality and accessible care. Ongoing education, readily available supplies, and regular audits drive lasting behavioural change. This initiative aligns with global efforts to reduce HAIs, enhance patient safety, and reinforce best practices in eye care.

Abstract No.: 203878

Greening the Ophthalmic Care

First Author: Megha G

Purpose: The video aims to summarize few tips to reduce our carbon emissions while providing ophthalmic care to our patients. Be it out patient department, or operating theatre or setting up local vision centres.

Methods: Climate change is the biggest public health threat of our time. And healthcare, surprisingly, is part of the problem. Our video shows few tips on

how we can be more sustainable in eye care without compromising the vision or patients' health.

Results: Various simple changes we suggest in the outpatient department (OPD), ophthalmic theatre (OT), and setting local vision centres not only help our patients, but also are better for the environment and more economical. We have summarised 10 tips each in OPD and OT, and a few points on decreasing transportation carbon emissions.

Conclusions: The planet needs care, too. And the beauty is — in caring for it, we improve our own systems. Less waste. Lower cost. Better access. By following few simple modifications brings about huge impact. Healthier people. Healthier planet. It is already late because there is no Planet B.

Abstract No.: 203449

Minimally Invasive Glaucoma Surgery in 3D Printed & Mixed Reality

First Author: John Davis **AKKARA**

Purpose: To develop 3D printed and Virtual Models of Minimally Invasive Glaucoma Surgery Instruments and Implants; and to open source these designs.

Methods: The authors used Free and Open Source Software FreeCAD to design 3D models of Kahook Dual Blade, iStent inject, iStent W, Aurolab Aqueous Drainage Implant, 3DGDD and other Glaucoma Drainage Devices. These were open sourced and shared on National Institute of Health (NIH) 3D Exchange portal and also on Thingiverse. These designs were also 3D printed and utilized for teaching junior surgeons as well as for patient education. In addition, Augmented reality apps like Merge Object Viewer were used to visualize these 3D models in Mixed Reality on smartphone as well as on Virtual Reality headsets.

Results: Various MIGS surgical instruments and implants were 3D modelled and 3D printed. These were open sourced and shared with other ophthalmologists and enthusiasts around the world. 3D printed instruments were used to train junior surgeons and for patient education. Augmented reality models were used for teaching purposes as well. This greatly improved access to these around the world.

Conclusions: 3D Open Source Designs can be a gamechanger in ophthalmic pedagogy. The authors 3D models helped to democratize free and low cost access to Minimally Invasive Glaucoma Surgery (MIGS) teaching resources for Wetlabs and Drylabs. MIGS instruments and implants, Glaucoma Drainage Devices and other surgical instruments can be easily shared for free worldwide in the virtual world.

Abstract No.: 206786

Optic Nerve Crushed by a Cerebral Time Bomb: Sudden Monocular Vision Loss From a Giant Intracranial Aneurysm

First Author: Virna.m.shah

Co-Author(s): P.sangavi **SAMRITHA SELVI**

Purpose: To describe a rare presentation of sudden, painless monocular vision loss caused by compressive optic neuropathy from an unruptured giant intracranial aneurysm and to highlight the critical role of prompt neuro-ophthalmic recognition and urgent intervention.

Methods: Single-patient case report with comprehensive neuro-ophthalmic examination, multimodal neuroimaging, and endovascular treatment. Clinical findings, imaging characteristics, and visual outcomes were documented and analyzed.

Results: A 49-year-old female presented with progressive, painless loss of vision in the right eye. Examination revealed a Grade III relative afferent pupillary defect. Best Corrected Visual Acuity (BCVA) was HM, and Fundus examination revealed a Pale disc (Primary Optic Atrophy). After thorough history taking, detailed Neuro-Ophthalmic examination, High-resolution magnetic resonance angiography was done and identified a wide-necked saccular aneurysm of the supraclinoid internal carotid artery exerting direct mass effect on the pre-chiasmatic segment of the optic nerve. Emergency Interventional Radiologist (IR) referral was done, where Digital Subtraction Angiography (DSA) and balloon occlusion test were done for further management.

Conclusions: Unruptured intracranial aneurysm should be considered in the differential diagnosis of sudden, unexplained monocular vision loss. Immediate neuroimaging and urgent endovascular or microsurgical management are essential to prevent irreversible optic neuropathy and avert life-threatening rupture.

Abstract No.: 207234

Simplifying Retinal Laser Procedures: An Interactive Tutorial for Novice Ophthalmologists

First Author: Debolina **DEB**

Co-Author(s): Dhruval, Joshmitha, Priethikka

Purpose: This tutorial addresses challenges faced by novice ophthalmologists in mastering retinal laser procedures.

Methods: Using a custom mobile adaptor attached to slit lamp lasers, it demonstrates real-time laser application across various pathologies, including pan-retinal photocoagulation for PDR, barricade laser around a horseshoe tear, focal laser for microaneurysms, and grid laser for macular oedema. It also introduces the subthreshold micropulse laser for

CSCR, highlighting its scarless approach and technical nuances.

Results: The visual guidance enhances understanding of laser parameters, focusing, and burn configuration, aiding skill acquisition. This stepwise method allows trainees to grasp procedural details, build confidence, and facilitate in-depth discussions on best practices.

Conclusions: The tutorial serves as an effective educational tool for ophthalmology residents, retina fellows, and general ophthalmologists, bridging the gap between theory and practice in retinal laser therapy.

Abstract No.: 204580

Teaching Complex Lens and Graft Management During Descemet's Stripping Endothelial Keratoplasty

First Author: Karan BHATIA

Purpose: To provide an educational video resource for ophthalmology trainees and anterior segment surgeons, highlighting practical strategies for managing intra-operative complications during DSEK.

Methods: A teaching video was developed using challenging DSEK cases. Demonstrated scenarios include donor preparation complications, intraocular bleeding, and graft handling difficulties in eyes with prior trabeculectomy, glaucoma drainage devices, complicated cataract surgery with vitreous prolapse, retro-lental fluid, and failed corneal grafts. Lens-related challenges such as subluxation, dislocation, posterior capsular rupture, aphakia, broken IOLs, and vitreous prolapse are addressed. Step-by-step secondary IOL implantation using iris claw and scleral-fixated IOLs (SFIOLs) is shown. Annotations and narrated surgical pearls enhance the educational value.

Results: The cases demonstrate reproducible intra-operative modifications that minimize complications, ensure stable IOL fixation, and promote graft adherence. Structured narration and clear teaching points improve understanding and knowledge transfer.

Conclusions: This video is designed as a teaching tool, emphasizing surgical pearls, decision-making, and complication management in DSEK. It aims to strengthen surgical education and improve outcomes in complex corneal transplantation scenarios.

Abstract No.: 203443

Through the Lens- an Ophthalmologist's Journey Through Residency

*First Author: Kusha
Co-Author(s): Vinisha*

Purpose: To highlight the spectrum of eye diseases encountered during residency.

Methods: A video-based narrative compiled from clinical cases encountered during residency. Ethical

considerations: patient identity protected, educational purpose only. Structured presentation: case visuals + short descriptions + key learnings.

Results: Showcases the variety of ophthalmic pathologies and their management.

Conclusions: Ophthalmology residency offers vast exposure to diverse cases, from routine to rare. Every case contributes uniquely to the growth of a doctor, academically and emotionally. Continuous learning, compassion, and innovation are essential to excel in this specialty

Abstract No.: 207328

Twist in Tale

First Author: Shreya SARAOGI

Co-Author(s): Ravi Krishna KANARADI, Naren SHETTY

Purpose: How to navigate through a challenging case of stuck haptic & tilted IOL.

Methods: Surgical Video.

Results: Optic in bag.

Conclusions: Safe surgery.

Abstract No.: 205086

Vision for Change: A Journey Towards Sustainability in Ophthalmology

First Author: Yee Ling WONG

Purpose: -

Methods: -

Results: -

Conclusions: This short film follows a young ophthalmologist's unexpected journey into the world of sustainability. What begins as a routine writing opportunity evolves into a deep personal and professional transformation. Through self-reflection, scientific inquiry, and global collaboration, the narrator uncovers the environmental impact of eye care. From measuring surgical waste to leading international research, the story highlights the urgent need for sustainable practices in ophthalmology—not just environmentally, but also in addressing the growing burden on ophthalmic services and associated financial costs. It calls for conscious change, one small action at a time. Vision for Change is both a personal testimony and a call to action for the future of eye health.

Cataract

Abstract No.: 203085

A Beginner's Extracapsular Cataract Extraction (ECCE) Using the Continuous Curvilinear Capsulorhexis Technique

First Author: Sophia SAQUILAYAN

Co-Author(s): Levi SAN BUENAVENTURA

Purpose: To present a case of a hypermature cataract; To present a surgical video on extracapsular cataract extraction using a continuous curvilinear capsulorhexis; To present the postoperative outcomes; To discuss intraoperative considerations of doing a continuous curvilinear capsulorhexis during an ECCE; To present learning points from the extracapsular cataract extraction procedure.

Methods: A continuous curvilinear capsulorhexis was done on an ECCE procedure.

Results: The mature cataract was extracted, and the patient was implanted with a Monofocal Foldable Intraocular Lens. Patient's VA post-op day 1 was 20/20. 2 weeks post-op, the patient's VA was stable, and the astigmatism was -0.75 cylinder.

Conclusions: One of my key learning points is the importance of creating a larger diameter rhexis when performing a CCC in ECCE, ideally around 6.5 to 7.5 millimeters, to make nucleus delivery easier. Doing ECCE with CCC also provides good training in rhexis control, which is essential before moving on to phacoemulsification, where smaller and tighter rhexis sizes are required. Another takeaway is to always prioritize safety over speed—a slightly irregular CCC that is completed safely is far better than risking complications by forcing perfection. Finally, it's important to anticipate possible intraoperative issues such as a run-out tear, zonular dialysis, or wound leak, and to manage these calmly and systematically when they occur.

Abstract No.: 207273

A Promising Tale of "TORIC Scleral Fixated Intraocular Lenses"

First Author: Nagesha CK

Co-Author(s): Rohitha NAYAK, Naren SHETTY

Purpose: To demonstrate the surgical technique of fixing toric intraocular lenses. To evaluate its efficiency and outcomes in terms of IOL positioning and visual outcomes.

Methods: Patients with significant astigmatism and a compromised capsular bag or an absent capsular bag are selected for scleral fixation of toric IOL. Different lenses are fixed to the sclera with the modified ab externo method using 9-0 polypropylene sutures or Gore-Tex sutures. The technique of ideal

lens positioning, including adequate vaulting and centration, is demonstrated in the video.

Results: Video shows the case of Alcon single-piece toric IOL implantation in the eye with no capsular bag. IOL fixed with sutures at the desired axis, resulting in postoperative uncorrected visual acuity of 6/6. Another case is the scleral fixation of ENVISTA toric IOL with Gortex sutures, wherein the astigmatism of 2.5D was neutralised post-surgery. None has early or late postoperative complications.

Conclusions: Scleral fixation of toric IOLs is an alternative method for correcting corneal astigmatism when capsular support is absent. Furthermore, the technique can be expanded to toric multifocal IOLs.

Abstract No.: 203208

A Routine Case of Extracapsular Cataract Extraction

First Author: Mary Claudette ARCELLANA

Purpose: To present a routine case of extracapsular cataract extraction.

Methods: A 9–12 mm triplanar limbal incision was made to access the anterior chamber. An envelope technique anterior capsulotomy was performed to open the front part of the lens capsule. The lens nucleus was gently expressed out of the capsular bag using pressure and viscoelastic substances. Residual cortical material was aspirated using an irrigation/aspiration (I/A) system. Iris prolapse was noted during I/A and was carefully repositioned and ensured balance between irrigation and aspiration. A posterior chamber intraocular lens was inserted into the remaining capsular bag. The large incision was closed using nylon 6-0 suture. Intracameral and topical antibiotics and anti-inflammatory drops were given.

Results: Day 1 post-operative result yielded a visual acuity of 20/80 from hand movement with good light projection on the right eye. Intraocular pressure (IOP) was increased by 26 mmHg, hence oral IOP lowering agent was given. 1 week post-operatively, visual acuity improved to 20/40 with normal IOP. And on 3 weeks post-operatively, visual acuity improved to 20/20 with a refraction of -1.25Dsph = -0.50 Dcyl X 112.

Conclusions: Creating precise incisional planes is essential to prevent intraoperative iris prolapse. Thorough aspiration of viscoelastic material is important to reduce the risk of postoperative intraocular pressure elevation. Additionally, consistent practice in suturing techniques is strongly recommended to ensure optimal surgical outcomes.

Abstract No.: 202581

A Stepwise Approach to Intraocular Lens Exchange in a Case of Severe Glistening-Induced Opacification

First Author: Vinit TANWAR

Purpose: To demonstrate a systematic surgical technique for intraocular lens (IOL) exchange in a patient with severe, visually significant opacification due to glistening, emphasizing methods that ensure capsular bag integrity and facilitate safe IOL explantation.

Methods: This surgical video case report details the management of a 65-year-old patient presenting with progressive visual decline 15 years after primary cataract surgery. The technique involved using an ophthalmic viscosurgical device (OVD) to protect the endothelium and expand the capsular bag. Careful viscodissection was performed to separate the opacified IOL from capsular adhesions. The IOL was then mobilized into the anterior chamber, bisected into two halves, and explanted atraumatically through a clear corneal incision.

Results: The severely opacified IOL was successfully removed without compromising the integrity of the original capsular bag. No posterior capsular rupture or vitreous prolapse occurred. A new one-piece hydrophobic acrylic IOL was subsequently implanted into the stable, intact capsular bag, achieving excellent centration and stability at the conclusion of the surgery.

Conclusions: Late-onset IOL opacification from severe glistening presents a significant surgical challenge. A meticulous, stepwise approach featuring thorough viscodissection is crucial for successful explantation while preserving the capsular bag. This technique allows for stable in-the-bag reimplantation, maximizing the potential for a safe and effective visual outcome.

Abstract No.: 202950

A Very Difficult Unusual Case of Cataract

First Author: Neha DHOLAKIA

Purpose: A once-in-a-lifetime case of severe ankylosing spondylitis – refused by many NLEST PT, lost vision – had to be done by someone – neck bent more than 90 degrees.

Methods: Adapting to the head position for the keratometer – a scan – operating microscope, we managed to get the cataract out and implant an IOL.

Results: Patient got functional vision as he has choroiditis scars, but was able to watch TV and read his mobile.

Conclusions: The only way out is through.

Abstract No.: 204018

Application of Dual-Expandable Devices in Small-Pupil Hard-Nucleus Cataract Surgery: A Case Report

First Author: Yuanfei ZHU

Purpose: To report a successful surgical approach for cataract extraction in a high-risk eye with small pupils, dense nuclear sclerosis, and poorly controlled diabetes, using combined mechanical pupil expansion and pre-chopping techniques.

Methods: A 71-year-old male with progressive visual decline in the right eye and a history of diabetic mellitus with optimal glycemic control underwent phacoemulsification. Preoperative evaluation revealed severe lens opacity and poor fundus visibility. Surgical strategies included pupil expansion with an iris retractor, capsular staining, and nucleus fragmentation using a pre-chopping device under stable fluidics control.

Results: The surgery was completed without complications such as posterior capsule rupture or nucleus drop. On postoperative day one, uncorrected visual acuity improved to 0.8. The pupil and iris were well-positioned, and corneal clarity was maintained.

Conclusions: The combined use of mechanical pupil expansion and advanced nucleus fragmentation techniques can effectively mitigate surgical risks and achieve favorable outcomes in complex cataracts with small pupils and hard nuclei.

Abstract No.: 204185

Back Stab Chopping in Cataract Surgery

First Author: Reena SINGH

Purpose: In cataract surgery, the chopping of the nucleus is one of the crucial steps and has a steep learning curve. However, various methods and instruments have been used to make it simple and safe, but still, this is the most difficult step of the entire surgery. In this video we can observe how we can safely hold and chop the nucleus with optimal use of instruments in different scenarios of cataract.

Methods: After good hydro separation and superficial cortical clearance, the nucleus is centrally or para-centrally impaled, then the nucleus is lifted up in a bag with a probe and a blunt chopper from behind. The chopper helps in lifting and fixing the nucleus so that impaling of the nucleus with the probe can be assured. Then, the chopper is used for the first backstab, and the nucleus pieces are chopped in one or multiple steps with rotation. This method works well both in normal and various scenarios, like poorly dilating pupil, uveitis, post-transplant, and corneal opacities, oil-filled eyes, soft nucleus, hypermature cataracts with excess mobility. Care should be taken in the form of good hydro separations and rotation before chopping, the

exposed phaco tip length should be controlled, and in cases with shallow anterior chamber and endothelial compromise, use good coverage of visco-dispersive.

Results: This method does not require special instruments or a chopper in most cases. Also, the chop stab is in control, away from the posterior capsule and directly visible even in a small pupil.

Conclusions: This can be a safe alternative method in both normal and difficult cases with an easy learning curve.

Abstract No.: 205732

Back Where It Belongs: The Challenge of Adjusting a Malpositioned CTR During Cataract Surgery

First Author: Muhammad **SAAD**

Purpose: This case highlights a challenging intraoperative scenario where significant zonular weakness (3 clock hours of dialysis) required Capsular Tension Ring (CTR) placement for the first time in my surgical career. The case became tricky when the CTR partially dislocated into the ciliary sulcus, causing iris traction instead of fully expanding in the capsular bag.

Methods: A patient with a visually significant cataract underwent phacoemulsification, during which 3 clock hours of zonular dialysis were identified. A CTR was introduced, but its trailing end engaged the ciliary sulcus, causing iris traction. Using micro-instruments, it was successfully repositioned into the capsular bag.

Results: The CTR restored capsular stability, and a posterior chamber IOL was implanted securely. Postoperative assessment showed a well-centered IOL, and visual acuity improved to 20/25 at one month.

Conclusions: This case underscores the importance of anticipating and managing intraoperative complications in the presence of zonular weakness. Although initial CTR malposition created iris traction, careful recognition and prompt micro-instrument repositioning allowed successful stabilization of the capsular bag. Ultimately, the procedure resulted in a well-centered posterior chamber IOL and good postoperative visual recovery, reinforcing the value of vigilance, adaptability, and surgical skill when using a CTR for the first time.

Abstract No.: 205143

Breaking Through the Clouds – Completing an Abandoned Cataract Surgery With Compromised Clarity

First Author: Madhu **UDDARAJU**
Co-Author(s): Shanthi **PENMATSA**

Purpose: The Video demonstrates how an abandoned case of cataract surgery with intraoperative DM detachment was managed with successful IOL implantation and DM reattachment.

Methods: DM was identified, and capsulorhexis was completed, phaco was done carefully avoiding the DM flaps, and IOL was implanted, DM was reattached with air tamponade.

Results: The patient had 20/40 BCVA, and DM remained well attached.

Conclusions: Careful intraoperative identification of DM with trypan blue and controlled phaco can preserve the DM and functionally reattach instead of rushing for a lamellar transplantation.

Abstract No.: 203058

Broken Chopper, Unbroken Surgery: Completion of Phacoemulsification Despite Instrument Failure

First Author: James Michael **JACOMINA**
Co-Author(s): Robert Edward **ANG**

Purpose: To present an unusual intraoperative complication during routine phacoemulsification until completion.

Methods: A 40-year-old patient with an N03/NC3 nuclear cataract underwent phacoemulsification. During nucleus removal, the tip of the surgical chopper broke off, and a fragment dislodged onto the iris surface. Intraoperative management and continuation of surgery are described.

Results: The broken chopper fragment was carefully retrieved using McPherson forceps without additional iris or endothelial trauma. A replacement instrument was introduced, and phacoemulsification was completed uneventfully. The postoperative course was stable with good visual recovery.

Conclusions: Instrument breakage, though rare, can occur even in routine cataract surgery. Prompt recognition and careful retrieval of intraocular foreign bodies allow safe continuation of the procedure and excellent surgical outcomes.

Abstract No.: 202349

CMT- FLEX Foldable SFIOL for Aphakia – Sutureless and Glueless Technique

First Author: Vineeth B **BHIMSHETTY**
Co-Author(s): Vijaylaxmi **B**

Purpose: To report a new foldable, hydrophilic, scleral fixated intraocular lens (IOL) design (CM T Flex) for managing aphakia (absence of lens) following complicated cataract surgery.

Methods: A 60-year-old female with secondary aphakia after cataract surgery; vision was hand movements, improving with pinhole to 6/9. Preoperative evaluation (biometry, keratometry, etc.) was done. Two partial-thickness, limbal-based scleral tunnels were made (2.5×3.5 mm), 180° apart. Sclerotomies at 1.5 mm from limbus under those flaps using 23G needle. Inserted

CM T Flex (foldable, hydrophilic, with T-shaped haptics) through a 2.8 mm clear corneal incision. The special T shaped haptics are externalized via the sclerotomies, under scleral flap of the scleral tunnel. The exteriorised T haptics get automatically covered by the scleral flap without need for suture or glue.

Results: Postoperative outcome was good: vision improved to 6/6 (P) at one month. IOL centration was stable; no major complications in this case.

Conclusions: The CM T Flex IOL is promising for aphakia, where in-the-bag IOL placement is not possible. Because of its design (T haptics, no need for suturing or tucking of haptics), surgery is easier, less time-consuming, and less traumatic.

Abstract No.: 200792

Cataract Precision in the Open Sky: Surgical Secrets for Keratoplasty Cases

First Author: Bhupesh SINGH

Co-Author(s): Neha BHARTI

Purpose: To demonstrate challenging case scenarios of open sky cataract surgery.

Methods: This video showcases real-life surgical cases of open sky cataract surgery highlighting use of surgical adjuncts for small pupil and vitreous pressure management. Strategic planning for IOL placement, variability in surgical sequence based on intraoperative findings. Tips and tricks to safely navigate these complex scenarios will also be covered.

Results: This video will ensure that the audience will have a better understanding of open sky cataract surgery.

Conclusions: This video will showcase all the possible challenges and solution to it.

Abstract No.: 200490

Cataract Surgery Post-Trabeculectomy: "A Tale of Two Blebs"

First Author: Zia PRADHAN

Co-Author(s): Sathi DEVI, Sujani SHROFF

Purpose: Cataract surgery in an eye which has previously undergone trabeculectomy requires meticulous planning in the pre-op, intra-op and post-operative period. This video highlights strategies for cataract surgery post-trabeculectomy.

Methods: The video demonstrates the ideal timing of phacoemulsification, pre-operative biometry planning, intra-op steps and post-op bleb care to ensure visual rehabilitation as well as good post-op intraocular pressure (IOP) control in eyes which have undergone previous trabeculectomy.

Results: Preferably defer phacoemulsification for at least 6 months following trabeculectomy. Pay attention to the pre-op biometry which can be erroneous in

eyes with low IOP. Intra-operative steps to prevent bleb failure include placing incisions at least 1 clock-hour from the bleb, avoiding iris manipulation, and a thorough cortical and viscoelastic clean-up. Post-operatively, the IOP and bleb should be monitored carefully and the bleb may be modulated with intensive steroids, needling and anti-metabolites if required.

Conclusions: The health of the bleb must be considered at every point during the cataract management and this video demonstrates the maneuvers deemed to improve bleb survival.

Abstract No.: 206064

Cataract Surgery in a Case of Neovascular Glaucoma Secondary to Central Retinal Vein Occlusion: Surgical Management and Intraoperative Challenges

First Author: Isabel Mara CAPARROS

Co-Author(s): Alexander Joseph REYES

Purpose: To present a complex case of neovascular glaucoma secondary to central retinal vein occlusion, highlighting the surgical approach and intraoperative challenges encountered during phacoemulsification.

Methods: The patient underwent a trabeculectomy a few months prior and was eventually scheduled for cataract surgery due to progressive lens opacification. Due to poor pupillary dilation and extensive posterior synechiae, synechiolysis, stretching of the pupil, and iris hooks were used intraoperatively to facilitate safe phacoemulsification with a monofocal posterior capsule intraocular lens implant.

Results: The cataract surgery was technically challenging due to a small, non-dilating pupil and compromised anterior segment visualization. The use of iris hooks allowed for a controlled capsulorhexis and safe lens removal. Postoperative recovery was uneventful, with improved visual acuity and stable intraocular pressure.

Conclusions: Management of more complex cataracts may necessitate a multidisciplinary approach. This case illustrates the importance of surgical planning, flexibility in technique, and the use of adjunctive devices such as iris hooks to manage intraoperative complexity. The video aims to provide educational insight into the nuances of handling such challenging anterior segment cases.

Abstract No.: 202661

Cataract Surgery in a Post-Traumatic Corneal Perforation Repair Case: Surgical Challenges and Outcomes

First Author: Vinit TANWAR

Purpose: To demonstrate a tailored surgical approach for phacoemulsification in an eye with a history of extensive traumatic corneal perforation repair. This

case highlights strategies for managing challenges like corneal scarring, posterior synechiae, and altered anterior chamber dynamics to achieve a safe and effective visual outcome.

Methods: This surgical video case report details cataract surgery in a 54-year-old male, 3 months after primary repair of a traumatic limbal-to-limbal corneal perforation. A superior 2.2 mm clear corneal incision was carefully placed to navigate the scar-induced irregular curvature. Viscoelastic was used for synechiolysis. Phacoemulsification was performed using low fluidic parameters (low aspiration flow rate and vacuum) to maintain anterior chamber stability. A foldable IOL was implanted, and the main wound was secured with 10-0 nylon sutures.

Results: Despite challenges from corneal scarring and posterior synechiae, the surgery was completed without intraoperative complications. The capsulorhexis was successfully performed, and the traumatic cataract was entirely removed. The foldable intraocular lens was securely implanted in the capsular bag. The patient experienced an uneventful postoperative recovery, achieving an optimal best-corrected visual acuity and satisfactory visual function.

Conclusions: Phacoemulsification after major corneal trauma repair is challenging but feasible. Success hinges on careful preoperative planning, adaptive surgical techniques including modified fluidics, and meticulous handling of intraocular structures. A planned, stepwise approach can lead to excellent visual rehabilitation even in severely traumatized eyes.

Abstract No.: 205251

Cliffhanger Rescue: Salvaging a Subluxated IOL in a Complex Pediatric Case

First Author: Sonam **YANGZES**

Co-Author(s): Savleen **KAUR**

Purpose: To demonstrate the surgical management of a subluxated intraocular lens (IOL) in a pediatric pseudophakic, post-vitrectomy eye with inferior zonular loss.

Methods: A 10-year-old boy with a decentered IOL was referred after two failed attempts at optic capture. Intraoperatively, the fibrosed anterior capsule stretched unpredictably—due to high pediatric capsular elasticity—causing the IOL to nearly dislocate.

Results: The IOL was rescued in time and successfully fixated using the Yamane intrascleral technique. Pupilloplasty was performed to restore a functional pupil.

Conclusions: This case emphasizes the importance of anticipating pediatric capsular behavior, surgical adaptability, and composure in complex secondary IOL fixation.

Abstract No.: 206271

Conquering IOL Fractures

First Author: Lional Raj **DANIEL RAJ PONNIAH**

Purpose: To evaluate and produce a video compilation of common and less common intraoperative damages to the IOL, their aetiology, and the lessons on how to prevent or manage such occurrences.

Methods: This video is a compilation of case series featuring damaged IOL haptics and optics, some requiring exchanges, and others that could be retained without sequelae. The science behind managing fractured IOL situations depends on the site of damage and whether the damaged fragments are dislocated.

Results: This video would be of educational value for the anterior segment surgeons in understanding intraoperative damaged IOL circumstances. How to recognize such surprises early and ways to avoid them and get things right are highlighted.

Conclusions: Cataract surgeons may exhibit the art of decision-making in such intraoperative stressed circumstances.

Abstract No.: 204381

Continuous Curvilinear Capsulorhexis for Intumescent Cataracts

First Author: Vladimir **NIKITIN**

Purpose: How else to reduce the risk of developing the «Argentine Flag» syndrome?

Methods: The author's methodology is presented.

Results: Reducing the risk of complications.

Conclusions: The video presents a method for the controlled formation of anterior continuous circular capsulorhexis in swelling cataracts based on a pathogenetic approach related to the formation of a single volume of liquid lens masses in the anterior subcapsular space, as well as changes in the biomechanical properties of the lens capsule at the site of the primary puncture (increasing its strength, changing the vector of tension of the anterior capsule in the central sections, local profile changes) due to the effect of diathermocoagulation.

Abstract No.: 206024

Couching in Exceptional Situations

First Author: Monalisa **PATI**

Co-Author(s): Somy **PUROHIT**, Shiva **SAHOO**

Purpose: To report the surgical technique and outcome of couching of the hard mature cataractous lens in an eye with microphthalmos, microcornea, and irido-fundal coloboma.

Methods: A 35-year-old male presented with OU microphthalmos, microcornea, and irido-fundal coloboma, OD hypermature hard cataract, and OS

PCIOL. The vision was HM OD and PL+ OS. The corneal diameter was 7 mm OU. Anticipating difficulty in the cataract removal via the anterior or posterior approach, couching of the cataractous lens was done to make the visual axis clear and give some ambulatory vision to the patient

Results: Postoperatively, the IOP was 9 mm Hg OU; there was no inflammation, and the patient had ambulatory vision of CF 4 meters with +5D lens OD.

Conclusions: Couching is an ancient technique and can be useful in special situations like extreme microphthalmos and microcornea, where conventional cataract removal by the anterior or posterior route is risky. However, a close follow-up is needed to look for inflammation and an IOP rise.

Abstract No.: 204930

Cracking the Hard Cataract With Argentinian Flag

*First Author: Faria Tilat **TIMA***

*Co-Author(s): Tanvir **AHMED***

Purpose: To report a clinical case where the Argentinian Flag Sign occurred during cataract surgery in patients with white cataract & to discuss intraoperative findings, management strategies & postoperative outcomes.

Methods: Case report: video presentation.

Results: Tear occurred immediately after puncturing the anterior capsule due to increased intralenticular pressure, producing the characteristic blue-white-blue pattern of the Argentinian Flag Sign.

Conclusions: The Argentinian Flag Sign is a notable risk during capsulorhexis in white intumescent cataracts due to elevated intralenticular pressure. Key preventative measures include: the use of Trypan blue for capsule visualization, decompression of liquefied cortex before CCC, and starting with a small capsulorhexis. Early recognition and prompt modification of surgical strategy can lead to successful outcomes despite intraoperative complications.

Abstract No.: 201083

Donut Technique for Dense Leathery Cataract: A Bidirectional Grooving in Phacoemulsification

First Author: Sukoto

Purpose: To demonstrate the effectiveness and safety of a bidirectional grooving method, termed the Donut Technique, in managing dense leathery cataracts during phacoemulsification.

Methods: This video presents a surgical case of a patient with a dense leathery cataract. The initial central groove was performed using a phaco handpiece to create a dome-shaped trench. Once sufficiently deep, the nucleus was inverted within the capsular

bag, and a second groove was created from the opposite side, forming a donut-like through channel. The nucleus was then fragmented and emulsified with reducing pressure on the capsule and zonules.

Results: This technique facilitates complete nuclear segmentation of the dense leathery cataracts with improved phaco efficiency and minimal use of ultrasonic energy. There were no intraoperative complications. Corneal clarity was maintained, and postoperative visual acuity improved significantly.

Conclusions: The Donut Technique offers a practical and effective solution for tackling dense leathery cataracts. By reducing pressure on intraocular structures and optimizing energy delivery, it enhances surgical safety and outcomes in challenging phacoemulsification cases.

Abstract No.: 205990

Double Argentina Flag Sign: What's Next?

*First Author: Vishakha **WADIBHASME***

*Co-Author(s): Yogesh **JIBHAKATE***

Purpose: The video highlights the management of white mature cataract in case of complication of running of rhexis in the form of Argentina flag sign in an easy and simple way.

Methods: Side port entry is made, and dye is injected. Wash done, and after injecting viscoelastic, the main incision is made. With the help of 26-gauge needle cystitome, the rhexis is made, and the Argentine flag sign suddenly appeared. The chamber was again formed with visco and tried to complete rhexis, but again the Argentina flag sign appeared, visco was injected, and the rhexis was completed by the can opener technique. With the help of a Simcoe cannula, loose cortical matter is aspirated, and the nucleus is rotated. Phacoemulsification of cataract is done by the woodcutter technique. The phaco probe is advanced from the periphery beyond the centre of the nucleus on one side, and from the opposite side, the chopper is advanced towards the probe, and a crack is made. The nucleus is divided into two halves. Each half is divided into 2 to 3 pieces, and the nucleus is aspirated gradually with the help of a dialer. The lens is loaded in the cartridge, and with the help of the irrigation and aspiration cannula, the cortex is removed. Lens is implanted in the bag under hydration, and visco is aspirated with the help of an aspiration cannula. The ports are hydrated, and the chamber is well-formed.

Results: Easy, effective, and simple management of complicated white mature cataract surgery done with clear cornea and lens in bag implantation.

Conclusions: If there is an Argentina flag sign, do not panic, but form chamber and complete rhexis. The rest of the steps can be done easily.

Abstract No.: 201049**Double Chopper Technique in Soft Immature Cataracts: Overcoming Nuclear Division Challenges***First Author: Sukoto*

Purpose: To evaluate a phacoemulsification technique using a double-chopper approach for soft immature cataracts, designed to address the difficulty of nuclear division with conventional methods such as stop-and-chop or direct chop, while minimizing phaco energy use and reducing the risk of posterior capsular rupture.

Methods: Soft immature cataracts with full nuclear mobility after hydrodissection were managed using two choppers inserted through the main and side ports. Before phaco tip engagement, the choppers were advanced toward each other to mechanically cleave the nucleus along its central plane. Additional splitting was performed to divide the nucleus into smaller fragments, which were then emulsified and aspirated with the phaco tip. Cortical material was removed with the irrigation/aspiration (IA) probe, followed by intraocular lens implantation and final IA for viscoelastic removal.

Results: In cases of soft immature cataracts, where conventional chopping techniques often failed to achieve complete nuclear cleavage, the double chopper method enabled consistent and controlled fragmentation. This approach significantly reduced phaco energy use, preserved capsular bag integrity, minimized zonular stress, and avoided posterior capsular rupture.

Conclusions: The double chopper technique is a safe, effective, and energy-efficient strategy for managing soft immature cataracts. By enabling precise mechanical fragmentation when standard methods are less effective, it improves surgical control, reduces intraocular trauma, and enhances safety during phacoemulsification.

Abstract No.: 202939**Dual Purpose Tip -to Slice IOLs and to Chop Hard Cataracts With Ultrasonic Power***First Author: Neha DHOLAKIA**Co-Author(s): Pankaj LANDE*

Purpose: To easily explant IOLs without opening – closing Sizzors, without twisting and stretching the wound or extending it. To easily cut hard cataracts using the ultrasonic power of your existing phaco machine.

Methods: The special tip is attached to the phaco probe and smartly uses the ultrasonic power of the machine to slice IOLs and cut through hard cataracts.

Results: Clear corneas the next day with happy patients – no Siate keratitis, no Descemets detachment.

Conclusions: A very novel and ingenious way to tackle difficult situations in cataract surgery.

Abstract No.: 203213**Extracapsular Cataract Extraction of a Beginning Ophthalmologist***First Author: Amado Miguel LAVALLE*

Purpose: To extract a hypermature cataract in a 65-year-old male.

Methods: Extracapsular cataract extraction with posterior chamber intraocular lens implantation.

Results: Vision restored to 20/20 1 day postoperative.

Conclusions: As a starting ophthalmologist, it is important to hone not just your clinical skills but also your surgical skills.

Abstract No.: 207109**Finding the Key to the Keyhole - Cataract Surgery in Iridolenticular Coloboma***First Author: Sameer CHAUDHARY**Co-Author(s): Prasanna RAMESH, Madhu SHEKHAR*

Purpose: To outline the anatomic challenges of cataract surgery in iridolenticular coloboma and to demonstrate effective management using manual small-incision cataract surgery (MSICS) and phacoemulsification.

Methods: Video-based educational overview describing ocular coloboma (iris/retina/choroid) arising from embryonic fissure non-closure, the frequent early cataract, and key surgical hurdles—microcornea, miotic pupil, and zonular deficiency—followed by step-by-step demonstrations of MSICS and phaco approaches.

Results: The video illustrates the safe completion of cataract extraction in colobomatous eyes using both MSICS and phacoemulsification, emphasizing technique selection and maneuvers tailored to anatomic constraints.

Conclusions: Although cataract surgery in iridolenticular coloboma is technically demanding, careful planning and appropriately chosen MSICS or phaco techniques enable effective and safe management.

Abstract No.: 204473**Flanged Rescue: Intraocular Refixation of a Subluxated Scleral-Fixated Single-Piece Foldable Lens With Eyelets at the Optic-Haptic Junction***First Author: Bobbie Marie SANTOS**Co-Author(s): Romeo DELA CRUZ*

Purpose: Subluxation of a scleral-fixated intraocular lens (IOL) presents a complex surgical challenge. This surgical video demonstrates intraocular refixation using flanged 6-0 polypropylene for a subluxated,

transscleral-sutured, single-piece foldable IOL with eyelets at the optic-haptic junction, following 10-0 polypropylene suture breakage.

Methods: A 35-year-old male presented with blurred vision nine years after scleral fixation of an enVista® MX60 IOL (Bausch and Lomb, Inc.) using 10-0 polypropylene. Best-corrected visual acuity (BCVA) with aphakic correction was 20/70. Slit lamp examination showed corectopia, poor dilation, IOL subluxation, and prolapsed vitreous. Under retrobulbar anesthesia, anterior vitrectomy was performed. The subluxated IOL was retrieved, and the broken 10-0 suture trimmed. Using a 30-gauge needle, tangential sclerostomies were created 2.5 mm posterior to the limbus. A 6-0 polypropylene suture was threaded through the IOL eyelets and externalized. Flanges were created using low-temperature cautery and buried in the sclera. Both eyelets were secured to prevent future dislocation.

Results: The IOL was successfully repositioned and stabilized. At one-month follow-up, BCVA improved to 20/40 with no ocular complaints. All four flanges remained covered, with no conjunctival erosion or IOL tilt.

Conclusions: Flanged 6-0 polypropylene for IOL refixation offers a practical, durable, and minimally traumatic alternative to IOL exchange for subluxated lenses. Symmetric suture placement and precise tension control are essential for optimal centration and long-term stability. This video highlights the reproducibility and clinical value of the technique in complex secondary IOL cases.

Abstract No.: 204117

From Clouded Lens to Unexpected Persistence: A Success Story of Surprise PFV

First Author: Gaurav BHARTI
 Co-Author(s): Garvita DABAS

Purpose: This is a teaching surgical video of a routine planned cataract surgery where a PFV was surprisingly encountered and managed intra-operatively.

Methods: This surgical video begins as a routine phacoemulsification in a patient with a visually significant cataract. Intra-operatively, a previously undiagnosed persistent fetal vasculature (PFV) was encountered. Following successful nucleus and cortex removal, posterior capsular polishing was attempted, but unfortunately, it precipitated focal intraoperative hemorrhage, attributable to the vascular remnant. The procedure was modified accordingly, and a three-piece posterior chamber intraocular lens was implanted without further complication.

Results: Postoperatively, the patient demonstrated a marked improvement in visual acuity.

Conclusions: This highlights both the surgical challenges and the importance of intra-operative

adaptability in managing cataract cases complicated by PFV.

Abstract No.: 201398

Glued Intraocular Lens in Surgical Aphakia

First Author: Sashwanthi MOHAN

Purpose: To demonstrate the effectiveness of the glued intraocular lens (IOL) technique for secondary IOL implantation in a patient with surgical aphakia following complicated cataract surgery.

Methods: This is a video-based case presentation of a 60-year-old female who developed surgical aphakia following a complicated small-incision cataract surgery (SICS). The primary surgery was complicated by a large posterior capsule rupture, which precluded primary intraocular lens (IOL) implantation. An anterior vitrectomy was also performed. Postoperatively, the patient developed a non-resolving vitreous hemorrhage, leading to persistent visual impairment. Six weeks after the initial surgery, a secondary IOL was implanted using the glued IOL technique, along with removal of the vitreous hemorrhage via pars plana vitrectomy.

Results: The glued IOL remained well-centered and stable intraoperatively and during postoperative follow-up. Visual rehabilitation was achieved without additional complications.

Conclusions: The glued IOL technique provides a reliable and effective method for secondary IOL implantation in cases of surgical aphakia with inadequate capsular support, minimizing complications associated with other fixation methods.

Abstract No.: 207239

Gupta Ring: A Cost-Effective Solution for Small Pupil Cataract Surgery

First Author: Komal PRIYA

Purpose: «Gupta Ring» refers to a pupil expansion device used in cataract surgery. It is a single-use, square-shaped plastic ring that helps surgeons in widening the iris to improve their field of view.

Methods: The Gupta ring is a specialized pupil expansion device used in cataract surgery to ensure safety and efficiency. It has four scrolls that engage the pupillary margin, mechanically dilating the iris to create a wide, stable pupil. Its biplanar design, with scrolls placed separately from the main ring, allows easy insertion and removal.

Results: The Gupta ring requires a disposable injector for insertion. The average surgical time when using a Gupta ring is comparable to procedures using a B-HEX ring, and both are significantly faster than procedures using iris retractors, which require additional incisions.

Conclusions: The Gupta ring is a safe and effective pupil expansion device for small-pupil cataract surgery. It provides good intraoperative visualization and leads to favorable postoperative results, with no significant differences in visual acuity or corneal health compared to other rings. Comparison of pupil expansion devices in a small pupil - LWW. In our study, in more than 50% of cases, the cause of a small pupil was idiopathic/senile. Among nonidiopathic causes, PXF was the most common association. Lippincott Comparison of pupil expansion devices in small pupil phacoemulsification - PubMed, Jul 1, 2024 — Intraoperatively, sphincter tear was seen in two eyes in the iris retractors group and one eye in the Gupta ring group. In the B-HEX ring group, only two flanges. National Institutes of Health (NIH) | (.gov)

Abstract No.: 207054

Haptic Heartbreak – Crunch Time With Pacman

First Author: Sameer CHAUDHARY

Co-Author(s): Prasanna RAMESH, Madhu SHEKHAR

Purpose: To report the management of a dense posterior polar cataract complicated by intraoperative intraocular lens (IOL) haptic break and to illustrate the Pacman technique for safe IOL explantation and exchange.

Methods: Video case report. After meticulous cataract surgery tailored for posterior polar cataract, the trailing haptic was noted to be broken during IOL implantation. The implanted IOL was explanted using the Pacman technique, and a new IOL was inserted.

Results: The IOL was successfully and safely explanted with the Pacman technique and replaced with a fresh lens, allowing completion of surgery with an excellent surgical outcome.

Conclusions: When properly executed, the Pacman technique is a safe and effective method for IOL explantation in the event of intraoperative haptic failure, facilitating favorable outcomes.

Abstract No.: 205588

IOL Scaffold

First Author: Sudhank BHARTI

Purpose: High power and vacuum required for the last piece emulsification in a hard cataract can lead to a surge and posterior capsule rupture. Implanting the desired IOL behind the quadrant before its management saves the posterior capsule, and this IOL scaffold remains in place.

Methods: At the stage where the last nuclear piece is left to be managed, viscoelastic is injected behind this piece, IOL is injected behind it in the bag, and the piece is emulsified. The IOL is left in the bag.

Results: Implantation of IOL in the bag behind the last quadrant acts as a permanent scaffold, provides safety for the posterior capsule during any surge or shallowing of the anterior chamber, and remains implanted, thereby reducing surgical time.

Conclusions: A permanent scaffold in the form of a desired IOL implanted need not be explanted, providing a safe, high-power, high-vacuum phacoemulsification in a grade 4+ nucleus, reducing surgical time and giving peace of mind to the surgeon.

Abstract No.: 204101

Intumescent Cataract Case: PHACO or MSICS?

First Author: Reiley Mark UDASCO

Purpose: As an ophthalmology resident trainee in a developing country, I believe manual small incision cataract surgery (SICS) still has a niche of its own, especially for areas where phacoemulsification machines are not readily available, or to provide a procedure that is safe and cost-efficient with comparable post-operative outcomes.

Methods: Temporal conjunctival peritomy done, 7mm straight partial thickness scleral incision with blade 15. Side port incision using 15 15-degree knife with staining of the capsule with trypan blue, & insertion of viscoelastic. continuation of the creation of a funnel-shaped scleral tunnel using a crescent knife up to the limbus. A keratome is inserted into the tunnel of the anterior chamber and extended in a funnel shape. Decompression using a cystotome was done, but a run-out tear occurred, and the patient was able to recover and complete capsulorrhexis. Anteriorization of the cataract was successfully delivered with irrigation and aspiration. Insertion of the IOL placed in the bag and the scleral tunnel wound was noted not to leak; however, 1 suture was placed for safety.

Results: Patient followed up the following day and claimed significant visual improvement; visual acuity pre-operatively was hand movement, and now best corrected visual acuity at 20/30 with irrelevant surgically induced astigmatism. On slit lamp examination, the scleral tunnel was noted not to leak, the cornea was clear centrally with minimal Descemet's membrane fold temporally near the main incision, and the anterior chamber was deep with +1 gr. cells, and the intraocular lens is seen in place.

Conclusions: As an ophthalmologist in a developing country, MSICS is an essential skill to have.

Abstract No.: 203641

Iris Claw Single Pass Technique

First Author: Tigor SITORUS

Purpose: To present an innovative approach to managing aphakia using a retropupillary iris claw lens.

Methods: Using simple instruments, an iris claw lens implantation can be made easy without the need to switch hands. This leads to shorter procedure duration and faster learning curve, which finally improves patients' comfort.

Results: Among the surgeries that were performed using this technique, a rounder pupil and better iris claw lens centration are common findings because haptic positions and movements are much more controlled throughout the surgery.

Conclusions: This technique helps shorten the duration of surgery and promises better post-op results.

Abstract No.: 206567

Leaving It Behind: Haptic Amputation in IOL Exchange

First Author: Abhinav SINSINWAR

Purpose: Demonstrating the technique of IOL exchange in case of a stuck haptic. Key intraoperative decision-making, surgical technique, and postoperative result is shown.

Methods: In this surgical video, we present a case of intraocular lens (IOL) exchange performed due to a significant refractive surprise. Intraoperatively, one of the IOL haptics was found to be densely fibrosed and adherent to the capsular bag, posing a high risk of capsular rupture if forcibly removed. To minimize intraocular trauma and preserve capsular integrity, a decision was made to amputate the haptic and leave it in situ. The remainder of the IOL was safely explanted and replaced with a new lens in the sulcus.

Results: IOL exchange was successfully performed, resulting in the achievement of full visual potential. This case highlights a practical and safe surgical strategy when encountering fibrotic haptic fixation during IOL exchange.

Conclusions: The video aims to provide cataract surgeons with insights into managing complex IOL exchanges with haptic amputation where complete explantation is not feasible or safe.

Abstract No.: 206492

Make Your Trab Safe – a Poetic Journey Through the Art and Science of Trabeculectomy

First Author: Zia MAZHRY

Co-Author(s): Laiba ASIF MAZHRY, Abdullah MAZHRY

Purpose: To present a novel educational approach that integrates poetry with surgical video in order to enhance the understanding, retention, and appreciation of safe trabeculectomy technique.

Methods: An original English poem, written by Prof. Mazhry (the Poet Ophthalmologist), was structured to parallel each critical step of trabeculectomy surgery.

Live surgical footage was synchronized with couplets that emphasize both the technical details (e.g., flap design, suture placement, bleb formation) and the philosophical principles (gentleness, patience, respect for tissues). This fusion of art and science was developed as an innovative teaching tool for glaucoma surgeons and trainees.

Results: The poetic narration reinforced key surgical principles, improving clarity and engagement when compared with standard didactic commentary. Early feedback from ophthalmologists and trainees indicated that the lyrical format facilitated recall of surgical steps, highlighted the importance of precision, and fostered reflection on the surgeon's role in balancing technique with compassion.

Conclusions: Blending surgical science with poetic art provides a memorable and humanistic method for teaching trabeculectomy. "Make Your Trab Safe" illustrates that surgical excellence is not derived from blades alone, but from knowledge, humility, and the care our hands impart. This creative approach may enrich glaucoma surgical education in diverse learning environments.

Abstract No.: 205999

Management of Brown Cataract

First Author: Vishakha WADIBHASME

Co-Author(s): Yogesh JIBHAKATE

Purpose: Phacoemulsification technique in hard leathery cataract.

Methods: Side port entry is made. Viscoelastic is injected, and three planar main incisions are made. With the help of a 26-gauge needle, cystitome rhexis is made. The chamber is formed with visco, and the rhexis is completed by the can opener technique. Phacoemulsification of cataract is done by the woodcutter technique. Phaco probe is advanced from periphery beyond the centre of nucleus on one side and from opposite side chopper is advanced towards the probe and crack is made nucleus is divided into two halves. As the nucleus is hard leathery, complete separation till the posterior plate is difficult. With the probe and chopper the nucleus is divided into multiple pieces. The nucleus pieces are held at the centre in the iris plane so that the ultrasonic energy of the probe does not damage the endothelium of the cornea nor the posterior capsule. Cohevisc is injected above and below the nucleus pieces whenever required. The nucleus is aspirated gradually with the help of a dialer. The lens is loaded in the cartridge. With the help of irrigation and an aspiration cannula, the cortex is removed. Lens is implanted in the bag under hydration, and visco is aspirated with the help of an aspiration cannula. The ports are hydrated, and the chamber is well-formed.

Results: A clear cornea with IOL in the bag implantation without any complication.

Conclusions: If there is a Brown cataract, do not panic. Make multiple pieces, use proper viscoelastic form, chamber, and steps, and they can be done easily. At the end of surgery, we get a clean, clear cornea and a good visual outcome.

Abstract No.: 201382

Management of Posterior Dislocated Cataract Without Using a Fragmatome

First Author: Chi Lik AU

Purpose: Our surgical video aims to demonstrate the surgical methods and technical skills used for managing a case of posterior dislocated nuclear sclerosis (NS) cataract lens by 25-gauge vitrectomy and clear corneal phacoemulsification, but without using a fragmatome.

Methods: A 63-year-old man presented with blurring of vision of few weeks, and examinations found left eye posterior dislocation of cataract lens. There was no trauma or syndromic features detected, right eye was NS+ without phacodonesis. Totally sutureless combined 25-gauge pars plana vitrectomy (25GPPV) with Yamane scleral fixated intraocular lens (IOL) was planned. Fragmatome was not prepared.

Results: Three 25GPPV sclerostomies and one single superior clear corneal wound (by 2.75mm keratome) were opened. Dispersive ophthalmic viscosurgical device was injected to coat the corneal endothelium. Core vitrectomy followed by posterior vitreous detachment induction were performed. Perfluorocarbon heavy liquid was injected to protect the posterior pole. Vitreous cutter pierced through the cataract lens capsule, aspirated the cataract and brought it forward to the anterior chamber (AC). Phacoemulsification was then performed in AC with active posterior infusion. No corneal paracentesis wound was created. Residual small cataract fragments dropped posteriorly upon phacoemulsification were removed by vitreous cutter at low cut rate. Foldable 3-piece IOL (AR40e) was injected through the corneal wound, 30-gauge thin walled needles were used to complete Yamane scleral fixated IOL at 3, 9 o'clock.

Conclusions: Surgical treatment of posterior dislocation of entire cataract lens could be challenging. Although without any capsular support, it can be managed totally sutureless by 25GPPV without using the fragmatome.

Abstract No.: 201402

Membranectomy in a Pseudophakic Eye With Occlusio Pupillae

First Author: Shams NOMAN

Purpose: To present the procedure and result

Methods: Membranectomy was done through a side port incision. A 360-degree synechiolysis was

done. A hole is produced in the membrane. Then a membranectomy was done with venus scissors. Remnant of the membrane was removed through visco expression.

Results: Preoperative visual acuity was 3/60. Postoperatively, it was 6/18. No posterior synechiae. Moderate inflammation in the immediate post op period. Finally, after one month, visual acuity was 6/9 with no inflammation.

Conclusions: Membranectomy is a good option in case of occlusio pupillae where laser capsulotomy usually fails.

Abstract No.: 205928

Mission Vision

First Author: Shreya SARAOGI

Co-Author(s): Ravi Krishna KANARADI, Naren SHETTY

Purpose: To show how to navigate through a challenging case.

Methods: Surgical video.

Results: Successful phaco surgery.

Conclusions: Prevention is better than cure.

Abstract No.: 204511

Navigating the Narrow: A Video Guide to Small Pupil Handling in SICS

First Author: Nilesh KUMAR

Purpose: To present an algorithmic, stepwise approach for managing small pupils during manual small-incision cataract surgery (SICS), balancing safety, efficiency, and tissue preservation.

Methods: A sequential escalation protocol was demonstrated through surgical video footage: 1. Intracameral mydriatics as the initial, minimally invasive step. 2. Mechanical stretch pupilloplasty using blunt instruments for controlled expansion. 3. Selective sphincterotomies for persistent miosis, enabling enlargement at the cost of iris integrity. 4. Iris hooks to provide stable retraction and chamber maintenance. 5. BOCTA technique for the most challenging cases, facilitating safe nucleus delivery and intraocular maneuvers through a small pupil without aggressive tissue trauma.

Results: Each technique provided incremental pupil expansion, ensuring adequate exposure for safe cataract extraction. The structured algorithm allowed a smooth transition between methods depending on intraoperative response. BOCTA proved particularly effective in maintaining chamber stability and minimizing iris damage in difficult scenarios.

Conclusions: This "video bouquet" offers cataract surgeons a practical guide to small pupil management in SICS. By adopting a stepwise, resource-conscious

strategy, surgeons can ensure safe, predictable outcomes while minimizing complications and preserving iris integrity.

Abstract No.: 207172

Needle Over Nucleus: Safe Decompression of Morgagnian Cataracts Using a 30G Needle

First Author: Abhinav SINSINWAR

Purpose: To demonstrate a simple and safe technique for decompression of Morgagnian cataracts using a 30-gauge needle to aspirate liquefied cortex prior to capsulorhexis.

Methods: A video-based case demonstration highlights the use of a 30G needle introduced through a paracentesis to aspirate the liquefied cortex, thereby reducing intracapsular pressure before initiating capsulorhexis. Stepwise narration covers entry site selection, aspiration dynamics, anterior chamber maintenance, and subsequent nucleus management.

Results: Controlled decompression was achieved with improved red reflex and visualization. Capsulorhexis was completed without extension, and nucleus management proceeded safely with preserved capsular integrity.

Conclusions: The 30G needle decompression technique is a valuable maneuver in managing Morgagnian cataracts. It enhances safety by reducing the risk of capsular tear, facilitating capsulorhexis, and improving surgical control in hypermature lenses.

Abstract No.: 207135

Phaco Surgery After RK With Zonular Instability

First Author: Abhinav SINSINWAR

Purpose: To demonstrate surgical challenges and techniques for safe phacoemulsification in a patient with prior radial keratotomy (RK) and coexistent zonular weakness.

Methods: A case of visually significant cataract in a post-RK eye with zonular instability was managed with careful incision planning between RK scars, capsular support using a capsular tension ring, and low-fluidics phacoemulsification with a chopping technique. Intraoperative modifications and strategies to minimize stress on the cornea and zonules were highlighted.

Results: Phacoemulsification was successfully completed with stable IOL implantation in the capsular bag. The postoperative course was uneventful with a well-centered IOL, stable capsular bag, and satisfactory visual recovery.

Conclusions: Phacoemulsification in post-RK eyes with zonular instability poses significant surgical challenges. Proper incision placement, zonular support devices, and low-stress phaco techniques are key to achieving

safe outcomes and good visual rehabilitation in such complex cases.

Abstract No.: 206131

Phaco Tips Compilation

First Author: Abdul HANNAN

Purpose: to teach small tips in each step of phacoemulsification surgery, which would help young surgeons benefit.

Methods: The video includes a compilation of 13 phaco tips across all steps of a conventional phaco surgery, which would help improve a young cataract surgeon's performance manifold.

Results: Each tip is recorded and chosen to help a beginner surgeon perform better.

Conclusions: Many/Most of the content of an international conference is focused on subspecialty level cases where young surgeon don't get their needs met. This video and its contents are made to focus on the training and learning objectives of young cataract surgeons who find it difficult to find something that actually helps them in real life.

Abstract No.: 202650

Phacoemulsification in a Complex Case of Operated Corneal Perforation, Adherent Leukoma, and Posterior Polar Cataract

First Author: Vinit TANWAR

Purpose: To demonstrate a tailored surgical approach for managing phacoemulsification in a high-risk eye with adherent leukoma and posterior polar cataract. The purpose is to highlight specific techniques designed to mitigate the compounded risks of zonular weakness and posterior capsular rupture (PCR).

Methods: This surgical video case report details the phacoemulsification technique in a patient with multiple ocular comorbidities. The surgical plan centered on minimizing capsular stress. Key steps included a controlled capsulorhexis, use of a low-infusion system (low bottle height and aspiration flow rate), and meticulous nucleus management. For cortex removal, a "flower petal" technique was employed, carefully stripping cortex circumferentially from the periphery inward while leaving the central cortex until last. The anterior chamber was consistently maintained with viscoelastic.

Results: Through the application of these specialized techniques, the posterior capsule remained intact throughout the procedure, and no zonular dialysis occurred. The nucleus and cortex were completely removed without complication. A stable, in-the-bag intraocular lens implantation was successfully achieved. The surgical approach effectively navigated the pre-existing complexities, leading to an uneventful procedure and a positive surgical outcome.

Conclusions: Successful phacoemulsification in eyes with adherent leukoma and posterior polar cataract requires a proactive strategy focused on capsular protection. Low-infusion fluidics and the flower petal cortex removal method are essential tools to prevent posterior capsular rupture and ensure a safe outcome in these challenging cases.

Abstract No.: 203629

Polar Eclipse: Managing a Posterior Polar Cataract With Posterior Capsulorrhexis and In-the-Bag IOL With No Vitreous Loss

First Author: Nikolai Thadeus MAPPATAO

Co-Author(s): Robert William KING

Purpose: To describe a surgical approach for a suspicious Grade III posterior polar cataract that achieves controlled posterior capsulorrhexis while preserving the anterior hyaloid and preventing vitreous loss.

Methods: A 28-year-old with Grade III posterior polar cataract and dense central nuclear opacity underwent phacoemulsification under lowflow, lowvacuum settings with careful viscoelastic use to maintain anterior chamber stability. A 5.0–5.5 mm continuous curvilinear capsulorrhexis was created. Hydrodelineation was performed without hydrodissection or nucleus rotation. The endonucleus was gently prolapsed into the central safe zone and emulsified in a controlled fashion. Epinucleus and cortex were separated via viscodissection. The dense central plaque was managed with a planned posterior capsulorrhexis: the posterior capsule was punctured with a 27-gauge needle, immediately followed by dispersive OVD injection into the Berger space to tamponade the vitreous. The rhexis was completed with microUtrata forceps under constant chamber maintenance with OVD. A one-piece posterior chamber IOL was implanted directly in the bag deliberately avoiding irrigation and aspiration behind the IOL. Carbachol and a preservative-free antibiotic were given intracamerally.

Results: The procedure was completed without vitreous prolapse or anterior hyaloid breach. Postoperatively, the posterior capsulorrhexis was stable, the IOL was well-centered, and the anterior hyaloid remained intact. At day 7, BCVA was 20/50, limited by probable sensory deprivation amblyopia.

Conclusions: Planned posterior continuous curvilinear capsulorrhexis, meticulous anterior chamber control, and OVD-assisted vitreous tamponade allow safe removal of posterior polar cataracts while preserving anterior hyaloid integrity and preventing vitreous loss.

Abstract No.: 204711

Posterior Polar Cataract With Posterior Capsular Rupture and a Twisted 3-piece IOL Haptic Way to Go

First Author: Vineeth B BHIMSHETTY

Co-Author(s): Vijaylaxmi B

Purpose: To demonstrate the management of PCR with handling the twisted IOL haptic with ease.

Methods: This is a case of posterior polar cataract that underwent phacoemulsification with PCR. There was no vitreous disturbance, hence the 3-piece IOL was injected. The surgeon noted trail haptic twisting at the end of the injection, which led to IOL decentration. Haptic Recoiling and then centration of the IOL were done meticulously.

Results: Well-centered 3 Piece IOL.

Conclusions: Early identification of the twisted haptic and the role of bimanual use of microforceps to recoil and center the IOL to gain a good vision outcome postoperatively.

Abstract No.: 203659

Saving a Radialized Capsulorrhexis in a Case of an Intumescent Cataract

First Author: Darren Anthony KHOW

Co-Author(s): Ma.Isabela Therese ARAGON

Purpose: To show the intraoperative management of an intumescent white cataract with a radialized capsulorrhexis.

Methods: Video presentation.

Results: This is the case of a sixty-four-year-old female with an intumescent white cataract, wherein phacoemulsification was done. Needle decompression was done to equalize the pressure between the anterior chamber and the capsular bag. During the creation of the capsulorrhexis, there was note of radialization superotemporally not reaching the equator. Tearing force with a single, sharp pull toward the center was used to rescue the radialized capsulorrhexis. It was noted that the capsulorrhexis was still complete and curvilinear. Careful phacoemulsification with minimal rotation of the nucleus was done. A single piece, acrylic intraocular lens was placed in the capsular bag with the haptics pointing away from the area of the radialized capsulorrhexis. Viscoelastic and retained cortical material were aspirated carefully, and the case was completed without further complication.

Conclusions: Adequate decompression of the capsular bag, as well as early recognition of potential capsulorrhexis radialization, is imperative in preventing intraoperative complications.

Abstract No.: 200482

Second Chances: Visual Rehabilitation in a Surgically Compromised Eye

First Author: Zain KHATIB

Purpose: To demonstrate the visual rehabilitation of a post-cataract surgical eye with high regular astigmatism secondary to old keratoconus and a posterior capsular rent (PCR), using a customized toric piggyback intraocular lens (IOL).

Methods: A 62-year-old male presented with long-standing poor vision in the right eye, 15 years post-cataract surgery. Uncorrected visual acuity (UCVA) was 6/60, improving to 6/9 with high cylindrical correction. Autorefraction and corneal tomography revealed corneal astigmatism >12 D, while subjective refraction revealed a significantly lower cylindrical power. Slit-lamp examination showed a suspected PCR, confirmed on anterior segment OCT, with the existing IOL in-the-bag. After confirming adequate sulcus space, a customized toric piggyback IOL (Sulcofix, Care Group) was planned based on subjective refraction. Manual toric axis marking was performed with digital verification (iToric app). The lens was inserted using a soft-shell technique and aligned precisely with preoperative markings. Postoperative outcomes were documented with slit-lamp imaging, autorefraction, and OCT.

Results: Day 1 autorefraction showed a residual 7 D cylinder, raising concerns about undercorrection. However, by 1 week, the patient achieved 6/9 unaided vision with subjective satisfaction, despite persistent high cylinder on autoref. Toric alignment was confirmed to be accurate on slit-lamp imaging and OCT showed good vault with no IOL-IOL contact.

Conclusions: Customized toric piggyback IOLs are a viable option for visually significant residual astigmatism in post-keratoconic eyes with PCR. Subjective refraction may be a more reliable guide than topography in such complex optical systems.

Abstract No.: 200339

Shaky Eyes, Soft Cataracts: A Surgical Challenge

First Author: Muhammad Fadhil RAHMADIANSYAH

Purpose: This video highlights practical techniques and key intraoperative strategies for performing safe and effective phacoemulsification in uncooperative patients with soft cataracts. The findings are intended to assist novice surgeons in overcoming common challenges encountered in such complex surgical cases.

Methods: We present a case of a soft cataract in a patient with poor cooperation during surgery. The video demonstrates the use of a scleral fixation ring to stabilize the globe and facilitate a controlled capsulorrhexis. A flip and chop technique is used for

efficient nucleus disassembly and aspiration. Each surgical step is annotated to emphasize decision-making and technical adjustments made in real time.

Results: The scleral fixation ring significantly improved control of eye movement, enabling a safe and efficient surgical procedure. The flip and chop technique allowed successful nucleus removal without complications. Postoperative visual recovery was favorable.

Conclusions: Phacoemulsification in uncooperative patients with soft cataracts can be safely managed with appropriate stabilization techniques and simplified nucleus removal strategies. This video provides a practical visual guide for beginner surgeons facing similar intraoperative challenges.

Abstract No.: 200235

Shaky but Salvageable: Polypropylene Suture Technique for Capsular Support

First Author: Yong Zheng WAI

Co-Author(s): Nurhayati ABDUL KADIR, Wai Seng CHIANG

Purpose: To describe a technique using a polypropylene 6-0 suture fashioned into an implantable capsular hook for stabilizing a shaky capsular bag, particularly when a capsular tension segment (CTS) is unavailable.

Methods: Two patients presented with cataract and phacodonesis. Phacoemulsification was performed, followed by the implantation of a capsular tension ring and a customized implantable capsular hook created from polypropylene suture to anchor the capsular bag. A single-piece intraocular lens was implanted within the bag. Unlike the CTS technique, this method does not require the creation of a scleral flap.

Results: At one week post-operatively, both patients achieved uncorrected distance visual acuity of at least 6/9. No pseudophacodonesis was observed.

Conclusions: The polypropylene 6-0 suture is an affordable, accessible, and effective alternative for capsular bag stabilization in the absence of a CTS. This technique eliminates the need for scleral flap creation, simplifying the procedure while achieving favorable early visual outcomes.

Abstract No.: 203201

Stratified Phacoemulsification: Unveiling the Novel Separation Technique

First Author: Tushya OM PARKASH

Co-Author(s): Rohit OM PARKASH

Purpose: To evaluate the efficacy of the stratified phacoemulsification technique in challenging situations.

Methods: Stratified phacoemulsification was employed, wherein, following mechanical delineation,

the nucleus was split into inner and outer layers. Inner nuclear emulsification was followed by outer layer emulsification. Stratified emulsification was used in Morgagnian cataracts, posterior polar cataracts, and hard cataracts. Stratified emulsification was done in five eyes of Morgagnian cataracts, twenty-six eyes of posterior polar cataracts, and fifty patients with hard cataracts.

Results: Stratified emulsification was successfully carried out in five cases of Morgagnian cataracts. In our series of twenty-six patients with posterior polar cataracts, posterior capsular rupture occurred in one case, which showed pre-existing dehiscence with a moth-eaten appearance on Anterior Segment Optical Coherence Tomography. In 50 cases of hard cataracts, the endothelial cell loss was 7.62 % with no significant change in central corneal thickness.

Conclusions: The addition of stratified emulsification to the surgeon's armamentarium provides the option of doing emulsification in layers with the outer layer acting as a shield to protect the posterior capsule in challenging situations.

Abstract No.: 203888

Successful Implantation of a Multifocal Toric Intraocular Len (IOL) Following Perfect Posterior Capsular Rupture in Polar Cataract

First Author: Kiet Phang LING

Co-Author(s): Chin Sern CHAN, Choon Teng CHAN, Wee Min TEH, Wilson Jun Jie WONG

Purpose: Posterior capsular rupture (PCR) is a serious complication of phacoemulsification cataract surgery that traditionally precludes the implantation of premium intraocular lenses, such as multifocal toric, due to instability and decentration risks. This case demonstrates that certain type of posterior capsular rupture may not be an absolute contraindication for multifocal toric intraocular lens.

Methods: A case of posterior polar cataract underwent phacoemulsification surgery, which was complicated by posterior capsular rent. Notably, the rupture had a unique perfect vertical, linear tear. Despite the complication, due to the calculated toric IOL axis located at horizontally, a multifocal toric IOL was successfully implanted in the capsular bag and oriented on the horizontal axis as plan.

Results: The IOL was stable postoperatively, with no evidence of decentration or tilt. The patient achieved uncorrected distance visual acuity of 6/6; near acuity of N6 and reported satisfactory quality of vision.

Conclusions: This case illustrates that the morphology of PCR is a critical factor in surgical decision making. A stable, linear rent may provide sufficient support for a premium IOL, allowing the surgeon to still achieve the planned refractive outcome. It highlights that advanced

surgical skill and meticulous assessment of the capsule can expand option even in complex cases.

Abstract No.: 201143

Surgical Nightmares: IOL Complications

First Author: Prakash Kumar CHOWDHURY

Co-Author(s): Pradipta CHOWDHURY

Purpose: To present a concise, high-yield video guide demonstrating rare and complex intraoperative intraocular lens (IOL) complications and their surgical management.

Methods: A series of challenging cataract surgery cases were recorded, highlighting scenarios such as IOL shoot, stuck IOL, kissing IOLs, IOL flip, abnormal haptic opening, optic crack, haptic break, and optic fracture. Each case was edited to emphasize key intraoperative steps, difficulties encountered, and the surgical maneuvers required for safe resolution.

Results: The video demonstrates effective surgical strategies for resolving diverse IOL complications, underscoring principles of safe manipulation, controlled intraocular handling, and decision-making during high-risk situations. Techniques shown include controlled viscoelastic use, micro-instrument assisted maneuvers, and eventual IOL exchange. Collectively, these cases provide practical insight into minimizing surgical trauma, preventing escalation of complications, and preserving visual outcomes.

Conclusions: This video serves as a high-yield educational resource for cataract surgeons, enhancing preparedness for rare IOL complications and promoting optimal patient care.

Abstract No.: 200347

Surviving Continuous Curvilinear Capsulorhexis (CCC) in Your First White Cataract Cases

First Author: Muhammad Fadhil RAHMADIANSYAH

Purpose: To demonstrate key preventive strategies and intraoperative tips for safely performing CCC in white cataract cases, especially for beginner surgeons.

Methods: This surgical video showcases a step-by-step approach in managing high-risk white cataracts. Key elements include ensuring a fully dilated pupil, generous use of cohesive OVD, and proper anterior capsule staining with trypan blue. Capsule decompression is performed to prevent the Argentine flag sign. When the capsular tear begins to escape, gentle redirection can help regain control. If the tear extends peripherally, a new flap is created and CCC is continued in the opposite direction. After successful CCC, the procedure continues with the flip and chop phacoemulsification technique to reduce zonular stress and prevent further capsular tear extension.

Results: Most cases achieved successful CCC with minimal complications. Adapting technique in real-time, especially in managing tear direction and choosing appropriate phacoemulsification strategy, helped optimize safety and control.

Conclusions: White cataracts pose unique challenges in CCC for beginners. With proper preparation, visualization, and adaptability, including the use of flip and chop post-CCC, surgeons can safely manage these high-risk cases. This video provides a practical guide to surviving and succeeding in early white cataract surgeries.

Abstract No.: 206447

Sutureless Fixation of the Capsular Bag: Russian Tie Technique

*First Author: Vitaly **POTEMKIN***

*Co-Author(s): Shohida **BABAEVA***

Purpose: Demonstration of video cases with a new method of sutureless capsular bag fixation.

Methods: Three cases of weak zonules (two with IOL dislocation, one with lens subluxation).

Results: In all three cases, the IOL was centered 6 months after surgery. There were intra-ir postoperative complications.

Conclusions: The method of sutureless capsular bag fixation provides stable positioning for the IOL.

Abstract No.: 205727

The Flanged Innovation: Advancing Aphakia Management With the Yamane Technique

First Author: Gnanambiga M

*Co-Author(s): Rajesh **SINHA***

Purpose: To present the step-by-step surgical demonstration of the Yamane flanged scleral fixation technique for intraocular lens implantation in aphakic eyes with inadequate capsular support and to evaluate short-term visual and anatomical outcomes.

Methods: A 53-year-old aphakic patient with a history of complicated cataract surgery with compromised capsular support presented to our tertiary eye centre. After comprehensive preoperative evaluation, scleral fixation of a three-piece intraocular lens using the Yamane technique was performed under peribulbar anaesthesia. Two transconjunctival sclerotomies were created 180 degrees apart. Once a three-piece intraocular lens was implanted, leading and trailing haptics were sequentially docked using the double needle technique, externalized, flanged using low-temperature cautery, and secured within scleral tunnels. The entire procedure was recorded in high resolution. Postoperative evaluation at 1 month included best corrected visual acuity, intraocular lens stability, and complications assessment.

Results: At 1 month, the patient achieved the best corrected visual acuity of 0.3 log MAR. The intraocular lens remained well-centred and stable with no observed intra-operative or postoperative complications. Surgical video analysis confirmed precise tunnel creation and secure flange fixation, contributing to favourable visual and anatomical outcomes.

Conclusions: The Yamane technique offers a safe, efficient, and minimally invasive solution for secondary intraocular lens fixation in aphakic patients with compromised capsular support, delivering excellent visual rehabilitation and anatomical stability with minimal complications. High-definition surgical video with key intra-operative annotations enhances understanding of technical nuances, serving as a key educational tool for emerging ophthalmic surgeons.

Abstract No.: 201160

The Flip Side: Managing an Upside-Down Intraocular Lens

*First Author: Yu Ting Tina **SHEN***

Purpose: To present a case of an upside-down intraocular lens (IOL) identified intraoperatively, and to describe the in situ IOL flip technique as a safe and efficient corrective manoeuvre.

Methods: A patient undergoing combined phacoemulsification with IOL implantation, pars plana vitrectomy, and membrane peel was noted intraoperatively to have the IOL inserted upside down. Instead of explantation and reinsertion, an in situ flip technique was employed. This involved controlled rotation of the IOL within the capsular bag, restoring correct orientation without excessive manipulation or wound enlargement.

Results: Intraoperative recognition of the upside-down IOL was facilitated by optic and haptic configuration cues. The in situ flip was successfully performed, achieving correct IOL orientation swiftly. This avoided potential complications of IOL explantation such as endothelial trauma, capsular compromise, and wound distortion. Postoperatively, the patient achieved outcome with a stable, well-centered IOL.

Conclusions: Upside-down IOL insertion is a rare occurrence that requires prompt recognition. The in situ flip technique offers a simple, efficient, and safe method to correct IOL orientation intraoperatively, minimizing surgical trauma and preserving capsular integrity. This case highlights the importance of surgical vigilance and demonstrates a practical approach to managing this intraoperative challenge.

Abstract No.: 207299**The Zonule Cliffhanger—Classic Moves, Safe Landing***First Author: Sneha G V**Co-Author(s): Sri Ganesh*

Purpose: To demonstrate the complication management of Intraoperative zonular dehiscence (ZD).

Methods: Routine cataract surgery in a patient was faced with Intraoperative zonular dehiscence. Management included the use of CTR, CTS, and Iris Hooks.

Results: The ZD was finally managed by going back to the basics - thorough anterior vitrectomy. This emphasizes the role of Anterior Vitrectomy in complication management.

Conclusions: ZD can be a simple complication to manage by taking a stepwise approach by starting from the basics.

Abstract No.: 204715**Tight Aperture, Clear Future: Phacoemulsification in Uveitic Cataract With Small Pupil***First Author: James Michael JACOMINA**Co-Author(s): Robert Edward ANG*

Purpose: To present the surgical management of a dense uveitic cataract with posterior synechiae and a small pupil without the use of iris hooks.

Methods: A patient with chronic uveitis and a brunescant cataract presented with hand motion vision. Intraoperatively, posterior synechiae were initially dissected using a balanced salt solution (BSS) cannula, followed by mechanical synechiolysis with a spatula and eventual fine cutting with Vannas scissors. The pupil was mechanically stretched to achieve functional dilation without adjunctive pupil expansion devices. Standard phacoemulsification was then performed.

Results: Phacoemulsification was completed successfully without intraoperative complications. No iris hooks or expansion rings were required. A posterior chamber intraocular lens was implanted in the capsular bag. Postoperatively, the patient's vision improved to 20/40 with stable intraocular pressure and a quiet anterior chamber.

Conclusions: Careful synechiolysis and mechanical pupil stretching can enable safe phacoemulsification in uveitic cataracts with small pupils, even without pupil expansion devices and can produce favorable outcomes.

Abstract No.: 206821**Tjokro's Pass and Switch (PAS) Technique: A Novel Technique for Iris-Claw Lens Implantation***First Author: Ludwig Melino TJOKROVONCO*

Purpose: Several studies mentioned that retropupillary iris-claw lens implantation is a safer, faster, and easier procedure than prepupillary implantation. However, retropupillary iris-claw implantation is not without complications. The most common complications are pupil ovalization and haptic disenclavation. By using the standard technique, we often encounter some difficulties, especially in the second haptic enclavation. Based on these findings, I propose a new modified technique for retropupillary iris-claw lens implantation: the Pass and Switch technique.

Methods: Both iris-claw lens haptics are brought posteriorly and then slightly elevated so that we can visualize the lens shadow behind the iris. This will allow us to ensure the exact enclavation location at 180-degree opposite. Various instruments that can be used for enclavation, such as an enclavator needle, a cystotome, or a hydrodissection cannula. When the enclavation process is complete, the remaining viscoelastic can be flushed away and the main incision can be closed. The surgical procedure is complete.

Results: The most important key to this technique is hand stability when switching the forceps grip from one hand to the other to avoid loosening the IOL grip or pulling the first haptic enclavation. A total of 32 cases have been performed using this modified technique with no complications up to 9 months of follow-up.

Conclusions: This technique promises better lens centration, precise enclavation to produce a round pupil, reduced risk of disenclavation, and faster procedure duration. In addition, more stable intraoperative intraocular pressure in patients with vitrectomized eyes compared to the standard technique.

Abstract No.: 202633**Unexpected Posterior Capsular Rupture During Final Viscoelastic Aspiration After Intraocular Lens Implantation***First Author: Vinit TANWAR*

Purpose: To demonstrate a case of an unexpected posterior capsular rupture (PCR) occurring during the final, seemingly benign stage of viscoelastic removal after successful IOL implantation. This report highlights the subtle intraoperative signs and the management of a stable, vitreous-free rupture.

Methods: This surgical video case report involves a 62-year-old patient undergoing routine cataract surgery. After uneventful phacoemulsification and in-the-bag IOL implantation, a subtle fluid dynamic

change was noted during final viscoelastic aspiration. Suspicion of a PCR was confirmed post-aspiration by injecting an air bubble and hydrating the main wound, which revealed a small superior capsular defect. The integrity of the anterior hyaloid face was carefully assessed.

Results: A small, stable posterior capsular rupture was identified without any associated vitreous prolapse. The single-piece intraocular lens remained well-centered and secure within the capsular bag. Due to the stable nature of the complication and absence of vitreous, an anterior vitrectomy was not required. The surgery was concluded, and the patient was managed conservatively with a postoperative course of topical and oral steroids and antibiotics.

Conclusions: Posterior capsular rupture can occur at any step of cataract surgery, including viscoelastic removal. Surgeon vigilance for subtle signs is crucial for early detection. When a PCR is identified and confirmed to be stable without vitreous prolapse, a conservative approach can be safely adopted, preserving the excellent outcome of an otherwise successful surgery.

Abstract No.: 201558

Unique Techniques for Intraoperative Release of Adherent Haptic to Optic in IOL After Injecting in the Capsular Bag

First Author: Harshavardhan PATIL

Purpose: Ideally, after IOL insertion. It unfolds in the capsular bag immediately within a few seconds. But sometimes. The haptic gets adherent to the optic. And does not open even after more than 2 minutes.

Methods: So presenting unique techniques to unfold such adherent haptics to optics. First, by the capillarity method. By placing an irrigation canula on one side and an aspiration canula on the other side. And increase aspiration. The resulting fluid wave. Will dislodge the haptic by capillarity action. Second is nudging the haptic with a sharp needle or MVR. Or dialer. To release the haptic.

Results: With the above techniques, the adherent haptic unfolds easily.

Conclusions: Such unique techniques save the day. For the surgeon.

Abstract No.: 201709

Walking on Thin Ice: Navigating Posterior Polar Cataracts

*First Author: Pauline Gabrielle LACSAMANA
 Co-Author(s): Reginald Robert TAN*

Purpose: To demonstrate a safe and effective phacoemulsification technique for managing a posterior polar cataract, emphasizing strategies to

prevent posterior capsular rupture and highlighting intraoperative pearls for successful surgical outcomes.

Methods: This video demonstrates the phacoemulsification of a posterior polar cataract with emphasis on techniques to minimize posterior capsule stress. A continuous curvilinear capsulorhexis was performed, followed by hydrodelineation only, avoiding hydrodissection. Nuclear rotation was omitted to prevent capsular stress. The nucleus was carefully debulked and anteriorized, allowing supracapsular emulsification using low phaco parameters. Capsular bag inflation was maintained throughout the case with cohesive viscoelastic to prevent chamber collapse. Care was taken to fill the anterior chamber with viscoelastic before withdrawing the phaco tip, to avoid sudden decompression and potential posterior capsule rupture. Cortical removal was performed with low vacuum and gentle aspiration, avoiding traction on the capsule. A foldable intraocular lens was implanted in the bag, and the case was completed without complications. This approach highlights key safety modifications in managing posterior polar cataracts.

Results: The procedure was successfully completed without posterior capsule rupture or vitreous loss. Chamber stability was maintained throughout by careful viscoelastic use and controlled phacoemulsification parameters. The posterior capsule remained intact, and a foldable intraocular lens was implanted securely within the capsular bag. Postoperative recovery was unremarkable, with the patient achieving best-corrected visual acuity of 20/25 on postoperative day 1.

Conclusions: This case highlights the effectiveness of a no rotation, no hydrodissection approach, combined with chamber stability techniques, in safely managing posterior polar cataracts.

Abstract No.: 206174

When Endothelial Safety Guides Technique: Phacoemulsification in One Eye, MSICS in the Fellow Eye

*First Author: Anselmo David ULTRA
 Co-Author(s): Keshia Lourdes DUYONGCO-LENON,
 Alexander Joseph REYES*

Purpose: To present an instructional video on manual small incision cataract surgery (MSICS), framed within a case where significant endothelial cell loss after phacoemulsification in the fellow eye guided the decision to perform MSICS, highlighting both surgical technique and endothelial preservation.

Methods: A 74-year-old female with hypertension presented with bilateral visual decline. Preoperative best corrected visual acuity was 20/125 in both eyes. Slit-lamp examination revealed dense nuclear sclerotic cataracts (LOCS III NO4NC4C1P1). Specular microscopy showed endothelial cell counts of 2080 cells/mm²

(right) and 2116 cells/mm² (left). Phacoemulsification with intraocular lens implantation was performed in the left eye. At 1 month, the endothelial count had dropped to 1188 cells/mm², prompting the choice of MSICS for the right eye to minimize endothelial risk. The case was performed by a resident in a training setting under supervision. The surgical video demonstrates key MSICS steps, including tunnel construction, nucleus delivery, and wound closure.

Results: After phacoemulsification, the left eye achieved uncorrected visual acuity (UCVA) of 20/25, but the endothelial cell count decreased to 1188 cells/mm². The right eye achieved UCVA of 20/20 following MSICS, with a postoperative endothelial cell count of 1959 cells/mm², reflecting minimal loss. Both eyes remained clear with stable intraocular pressures and no complications.

Conclusions: This video demonstrates MSICS as both a teachable surgical technique and an endothelial-sparing alternative in cataract surgery. Beyond excellent visual outcomes, the case underscores that endothelial status should guide surgical planning, and MSICS remains a valuable option—particularly in patients with borderline corneal endothelium and in training settings.

Abstract No.: 201703

When the Cannula Pops: Managing an Argentinian Flag Sign With Supracapsular Phacoemulsification

First Author: Pauline Gabrielle **LACSAMANA**

Purpose: To demonstrate the surgical management of a nucleocortical cataract complicated by an anterior capsular tear and early Argentinian flag sign following cannula ejection, highlighting the importance of tailored techniques such as anteriorization of lens nucleus and supracapsular phacoemulsification to achieve a successful outcome.

Methods: This case involves a mature nucleocortical cataract complicated by a sudden anterior capsular nick resulting from inadvertent cannula ejection during viscoelastic injection. Early features of an Argentinian flag sign were then observed. A bent needle cystotome was utilized to fashion a flap from the tear, allowing re-initiation and completion of the capsulorrhexis with Utrata forceps. Hydrodissection was intentionally avoided to prevent further capsular extension. Instead, hydrodelineation was carefully performed, and the nucleus was mechanically anteriorized using a chopper. Supracapsular phacoemulsification was carried out in the anterior chamber, reducing stress on the compromised capsular bag. A foldable intraocular lens was successfully implanted within the capsular bag, with gentle rotation of the trailing haptic to achieve proper positioning and stability.

Results: The capsulorrhexis was successfully completed despite the initial tear, and phacoemulsification was performed without further capsular extension. The IOL was securely placed within the bag, and no intraoperative or postoperative complications were observed.

Conclusions: Even in the presence of an anterior capsular tear and early Argentinian flag sign, meticulous surgical planning and techniques—particularly careful instrument handling, judicious use of ophthalmic viscosurgical device, avoidance of hydrodissection, and the application of supracapsular phacoemulsification, are critical in preserving capsular integrity and achieving a successful surgical outcome.

Abstract No.: 205035

Where Did It Come From? Appearance of Primary IOL During Planned Secondary IOL Surgery

First Author: Harshavardhan **PATIL**

Purpose: The purpose is to highlight the importance of proper anterior vitrectomy and preoperative indirect ophthalmoscopy in locating a fallen primary IOL in the vitreous.

Methods: An Aphakic patient was posted for secondary IOL after 3 months of the primary surgery. Intraoperatively, during anterior vitrectomy, a PMMA IOL suddenly pops out from the vitreous base. Ideally, 3 3-port pars plana vitrectomy has to be done. Levitated the IOL into the anterior chamber. And place a secondary iol. But since the IOL came close to the posterior capsule anteriorly. I decided to dial it out by the Two Dialer Technique into the anterior chamber. Removed all tractional vitreous strands around the IOL. After a proper Anterior vitrectomy. Placed SAME IOL in sulcus. Patient is doing well postoperatively. With bcva of 6/6,n6. In conclusion, a proper anterior vitrectomy helps you in bringing the hidden IOL from the vitreous base. Which can be placed in the sulcus if good capsular support is present. Not ideal if IOL is in mid-vitreous or on the retina. Again highlights the importance of proper indirect ophthalmoscopy preoperatively to locate any IOL. And not relying solely on patient history.

Results: IOL could be retrieved through the posterior capsule rent site. And the same IOL was placed in the sulcus. So, proper anterior vitrectomy not only helped retrieve the same IOL, but also saved the patient a huge sum of money for pars plana vitrectomy and scleral-fixated IOL.

Conclusions: A good result was obtained by proper anterior vitrectomy, and postoperatively, the patient is doing well after 1 year of surgery, again highlighting the importance of proper anterior vitrectomy.

Cornea, Dry Eyes, External Eye Diseases and Eye Banking

Abstract No.: 205714

A Novel Graft Substitute Post Pterygium Surgery Using Platelet-Rich Fibrin Graft -From Blood to the Membrane

First Author: Lipi MITTAL

Co-Author(s): Sunil KHANDELWAL, Vatsalya VENKATRAMAN

Purpose: Pterygium is a common ocular surface disease that arises from the degenerated conjunctiva and underlying tenon's capsule, resulting from abnormal fibrovascular proliferation of cells. There are many approaches for its treatment post-ptyrygium excision, ranging from bare sclera, conjunctival closure, conjunctival autograft, and amniotic membrane transplantation. The main concern following its excision remains recurrence, which varies widely within these methods. Although no gold standard technique is defined to prevent its recurrence, conjunctival autografts remain the preferred choice of ocular reconstruction post-excision. After thoroughly reviewing the literature, we present a novel method using a Platelet-rich fibrin membrane as an autologous, biocompatible graft that can be sutured or secured with fibrin glue for ocular reconstruction post-primary pterygium surgery.

Methods: The patient underwent pterygium excision with platelet-rich fibrin membrane grafting, which was prepared using the patient's own blood sample from the antecubital vein. The sample was centrifuged, and a PRF membrane was procured using aseptic precautions and compressed into a flat membrane and secured using fibrin glue.

Results: Although the rate of recurrence is yet to be established, the healing process in such cases is impressive.

Conclusions: Although the rate of recurrence is yet to be established, the healing process in such cases is impressive.

Abstract No.: 204505

Botropase Breakthrough: A Cost-Effective Game Changer in Pterygium Graft Fixation

First Author: Nilesh KUMAR

Purpose: To demonstrate the BOT-Graft technique, a novel method using Botropase (hemocoagulase) for sutureless fixation of conjunctival autograft and amniotic membrane following pterygium excision, aimed at reducing operative time, enhancing patient comfort, and minimizing complications.

Methods: Following meticulous subconjunctival dissection and pterygiorhexis, three variations of the technique were performed: (1) Conjunctival autograft harvested from the superior conjunctiva. (2) Amniotic membrane graft placement. (3) Rotational conjunctival graft. In all cases, Botropase drops were instilled beneath the graft to achieve adhesion. Grafts were ironed into position, and excess fluid was absorbed via capillary action.

Results: Secure graft fixation was achieved without the need for sutures or fibrin glue. The technique demonstrated reduced operative time, improved patient comfort, and avoidance of complications such as subconjunctival hemorrhage, granuloma, or graft retraction. Cosmetic outcomes were excellent across cases.

Conclusions: The BOT-Graft technique represents a safe, efficient, and cost-effective alternative for conjunctival or amniotic membrane graft fixation in pterygium surgery. Its ease of use and affordability make it highly suitable for high-volume ophthalmic practice.

Abstract No.: 206401

Crescent-Shaped DMEK for the Management of Corneal Endothelial Decompensation With Adherent Leukoma

First Author: Xu MAN

Co-Author(s): Jie BAI, Ling LI, Shaowei LI, Chang LIU, Fangqi LV, Lin ZHAO

Purpose: To demonstrate the feasibility and efficacy of a novel, customized crescent-shaped Descemet Membrane Endothelial Keratoplasty (DMEK) in a case of corneal endothelial decompensation complicated by a peripheral adherent leukoma, where a conventional circular DMEK graft was not feasible due to the small available donor area.

Methods: A 67-year-old male presented with a 6-year history of blurred vision in his right eye. The diagnosis was adherent leukoma and corneal endothelial decompensation. His preoperative uncorrected visual acuity (UCVA) was Hand Motion (HM) at 1 meter. Due to the location of the leukoma, using a standard circular donor graft would result in overlapping the pathological area, leading to poor outcomes. Therefore, a customized crescent-shaped DMEK graft was designed and transplanted to exclusively cover the clear optical zone and avoid the adherent leukoma.

Results: The crescent-shaped DMEK procedure was performed successfully. At the 6-month postoperative follow-up, the patient's vision improved significantly. The uncorrected visual acuity (UCVA) improved to 0.15, and the best-corrected visual acuity (BCVA) reached 0.25.

Conclusions: This case illustrates that a customized crescent-shaped DMEK is a viable and effective

surgical technique for treating corneal endothelial failure in complex cases with peripheral corneal opacities or adhesions. This approach allows for targeted endothelial transplantation while avoiding compromised areas, thereby expanding the indications for DMEK surgery and improving visual outcomes in otherwise challenging cases.

Abstract No.: 200195

DMEK Plan a (Always Works) Plan B (Backup Graft Not Needed) – a Step-by-Step Guide to Achieving a Good DMEK Graft During Donor Preparation

First Author: Ronak SOLANKI

Purpose: Most surgeons' transition from DSEK to DMEK surgery is hindered by the fact that the beginner DMEK surgeon is most worried about what if the donor tissue is not prepared well and does not achieve the desired result. By following certain steps right from the mounting of the DMEK tissue to loading it before inserting it into the host, one can confidently achieve donor tissue that is always viable for use.

Methods: We describe a wet lab training model with surgical review, where, with enough practice and disciplined following of the steps, one can avoid excessive manipulations of the donor tissue and prepare a good and viable tissue for insertion during DMEK surgery for better outcomes and success.

Results: DMEK tissue preparation training in the wet lab made the transition to actual surgery easier and avoided the need for a backup graft in the first few cases for the surgeon, especially in the scenario where finding good quality optical grade tissue is difficult, and it is not justified to waste precious tissue which could have been used for another deserving patient who needed a corneal transplant.

Conclusions: A wet lab training on discarded tissues by following the step-by-step guide as described, along with a surgical video review, will be very helpful for the beginner DMEK surgeon to transition confidently to DMEK surgeries without the need for a backup tissue and fear of not achieving a good Donor Graft preparation. Managing complications like radial tears, etc, can also be practiced.

Abstract No.: 201457

Doughnut Refractive Lenticule Transplantation for Advanced Keratoconus: Visual, Tomographic, and Biomechanical Outcomes in a Prospective Study

First Author: Zaman SHAH

Purpose: To evaluate the clinical efficacy, safety, and biomechanical effects of Doughnut Refractive Lenticule Transplantation (DRLT) in advanced keratoconus over 16 months.

Methods: This prospective interventional study included 41 eyes of 40 patients (ages 11–32) with advanced keratoconus, with or without vernal keratoconjunctivitis, conducted at Health Net Hospital, Peshawar (IRB No: HNH/IRB/2024/07). Donor globe-derived doughnut lenticules were fashioned into doughnut-shaped segments and implanted into femtosecond laser-created stromal pockets. Outcomes assessed over 16 months included distance corrected visual acuity (DCVA), corneal tomography, and anterior segment OCT.

Results: DCVA improved from logMAR 1.00 ± 0.20 to 0.30 ± 0.15 ($p < 0.001$), with 30% achieving logMAR 0.18 or better. Mean K1 decreased from 52.19 ± 5.38 D to 50.98 ± 5.62 D, K2 from 60.46 ± 6.27 D to 55.29 ± 6.19 D ($p = 0.0021$), and Kmax from 70.07 ± 9.72 D to 62.90 ± 7.76 D ($p < 0.001$). Topographic astigmatism reduced from 8.27 ± 3.50 D to 4.81 ± 2.55 D ($p < 0.001$). The thinnest corneal thickness increased from 410.33 ± 39.23 μ m to 443.33 ± 80.68 μ m. Posterior keratometry decreased significantly, and the Belin ABCD staging showed marked improvement (D value from 31.00 ± 4.51 to 14.52 ± 2.05 ; $p < 0.0001$). Pachymetric indices and CTSP improved, while ARTmax decreased, reflecting biomechanical stabilization.

Conclusions: DRLT is a safe and effective option for advanced keratoconus, offering sustained visual, thickness, and biomechanical improvements.

Abstract No.: 200950

Excision of Ocular Surface Squamous Neoplasia by No Touch Technique

First Author: Purnima RAJKARNIKAR SHAPIT

Purpose: To demonstrate the proper method of excision biopsy of ocular surface squamous neoplasia lesions.

Methods: After a peribulbar block and draping, a wire speculum is placed. Margin of the lesion is identified with a microscope. A 4mm of normal-looking conjunctiva is marked away from the margin of the lesion all around limbus to limbus using a bipolar cautery tip, as marking with a pen may be washed away. A microsponge dipped in 99% alcohol is applied at 2mm of clear cornea from the edge of the lesion for 40 seconds in order to loosen the epithelium of the cornea, and the corneal epithelium is scraped towards the limbus using a crescent knife. The marked conjunctiva is excised up to the limbus using Westcott scissors. The lesion is excised in toto using the crescent knife and placed in a premarked filter paper, air-dried, and sent to the pathologist after fixing it with formalin. The ocular surface is flushed with normal saline. The instruments and gloves of the surgeon are changed. Double freeze-thaw cryotherapy is done at the edges of the excised conjunctiva and the base of the lesion at the limbus. An amniotic membrane is placed over

the bare sclera using the tissue glue to fix it. Speculum removed and eye padded.

Results: Changing of gloves and instruments is believed to avoid contamination from the tumor cells to the remaining ocular surface. Application of cryotherapy prevents the recurrence of the lesion in case the margin of the excised tissue shows dysplasia.

Conclusions: Proper technique of excision of ocular surface tumors provides a complete cure and prevents recurrences.

Abstract No.: 208948

Innovation in the Excision of Conjunctival Cysts

First Author: Dahu WANG

Co-Author(s): Yuyan ZHANG

Purpose: This video describes a case of successfully removing the cyst wall of a conjunctival cyst through a 2 mm incision with a 1 ml syringe needle.

Methods: A 65-year-old male presented to our department complaining of foreign body sensation in the right eye for 1 month. Upon examination, a transparent cystic dilatation was observed at the outer canthus of the right eye, with a clear boundary, approximately 10 mm*6 mm in size, which could move with the bulbar conjunctiva. The surrounding conjunctiva was congested. No other obvious abnormalities were found. Then, a clinical diagnosis of conjunctival cyst was made in the right eye. The treatment included the instillation of 0.5% levofloxacin eye drops to prevent infection, followed by the instillation of 0.4% oxybuprocaine eye drops three times. After the anesthesia took effect, a 2 mm incision was made at the highest point of the cyst with a 1 ml syringe needle (outer diameter of 0.45mm) under the slit lamp. Then, the cyst and the conjunctival epithelium around the incision were separated with the needle. Subsequently, the cyst was punctured, and then gently squeezed to make part of the cyst wall protrude from the incision. Finally, the complete cyst wall was removed with the needle.

Results: Postoperatively, the foreign body sensation in the right eye disappeared, and there was no recurrence of the conjunctival cyst during the 6-month follow-up.

Conclusions: The novel technique is simple and effective for treating conjunctival cysts in the clinic, which can provide a new insight for clinical practice.

Abstract No.: 204862

Intraoperative Pitfalls in Endothelial Keratoplasty: The Beginner's Perspective

First Author: Madhuvanthi MOHAN

Co-Author(s): Sujatha MOHAN

Purpose: To analyze the most common intraoperative complications encountered by a novice surgeon during endothelial keratoplasty (EK).

Methods: Eighteen Descemet's stripping endothelial keratoplasty (DSEK) and 2 Descemet's membrane endothelial keratoplasty (DMEK) cases were performed by a single novice corneal surgeon. Complications recorded included graft orientation errors, graft folds, difficult insertion, tissue loss, intraoperative endothelial touch, and anterior chamber instability. Surgical rescue steps are shown for the beginner corneal surgeon.

Results: In DMEK cases, the most frequent intraoperative complication was graft scrolling and orientation error, followed by unscrolling difficulty. In DSAEK, difficult graft insertion and graft folds predominated.

Conclusions: Early intraoperative complications in EK are common but predictable. Structured training, careful preoperative graft preparation, and stepwise intraoperative strategies can enable beginners to navigate the learning curve safely and achieve favourable visual outcomes

Abstract No.: 201712

Managing Corneal Melt: Keratoprosthesis Removal and Tectonic Penetrating Keratoplasty in Ocular Stevens-Johnson Syndrome

First Author: Pauline Gabrielle LACSAMANA

Co-Author(s): Reginald Robert TAN

Purpose: This video demonstrates the surgical technique for explantation of a keratoprosthesis with simultaneous tectonic penetrating keratoplasty (PKP) in a patient with Stevens-Johnson Syndrome (SJS), addressing the challenges of severe ocular surface disease and corneal melt, and highlighting strategies to restore globe integrity.

Methods: A previously placed temporary tarsorrhaphy was released to expose the globe. After ocular surface assessment, a Flieringa ring was sutured to the sclera for globe stabilization. The keratoprosthesis was carefully dissected and explanted, preserving viable host tissue. A donor corneal button was placed and anchored with four cardinal 10-0 nylon sutures, followed by interrupted sutures to complete the closure. Knots were rotated and buried to minimize irritation. The anterior chamber was reformed, and the wound was checked for watertightness. A partial tarsorrhaphy was reapplied to protect the graft postoperatively.

Results: The procedure was completed without complication. The graft was tectonically stable, the anterior chamber was well-formed, and the globe maintained structural integrity. Follow-up showed a clear graft without leak or infection. While visual recovery was limited by underlying ocular disease, the globe was anatomically preserved, and corneal melt progression halted.

Conclusions: Keratoprosthesis explantation with simultaneous tectonic penetrating keratoplasty is a viable globe-saving procedure in cases of corneal melt and graft failure, particularly in high-risk ocular surface disease such as Stevens-Johnson Syndrome. Timely surgical intervention, combined with globe stabilization using a Flieringa ring and postoperative surface protection with tarsorrhaphy, can successfully restore structural integrity and preserve the eye for future rehabilitation.

Abstract No.: 202649

Manual DSEK in Beginner Corneal Surgeons

First Author: Madhuvanthi **MOHAN**

Co-Author(s): Sujatha **MOHAN**

Purpose: Descemet Stripping Endothelial Keratoplasty (DSEK) is one of the preferred surgical techniques for combatting endothelial disorders owing to its faster recovery, reduced rejection rates, and superior visual outcomes compared to penetrating keratoplasty. However, for beginner corneal surgeons, the steep learning curve and intraoperative technical challenges can be intimidating especially while doing manual DSEK. This video aims to demystify DSEK by providing a comprehensive, step-by-step approach tailored for early-career surgeons.

Methods: The DSEK technique is broken down into logically sequenced, reproducible steps—from donor preparation and host bed creation to graft insertion, unfolding, and centration. Emphasis is placed on key decision points and intraoperative tips to avoid common pitfalls. Steps are discussed in practical detail to enhance surgical confidence and reproducibility. In addition to the surgical technique, the video also talks about pearls on patient selection, preoperative planning, and postoperative care to ensure optimal outcomes and long-term graft survival.

Results: Corneal surgeons in training or just beginning their practice will be equipped with a simplified yet safe roadmap to initiate their DSEK journey, with particular attention to reducing endothelial cell loss and improving graft attachment rates.

Conclusions: This structured yet accessible approach aims to promote greater adoption of endothelial keratoplasty in training programs and enhance surgical self-sufficiency in resource-limited settings.

Abstract No.: 202607

Nick, Loop and Pull Technique of Corneal Suture Removal

First Author: Vinit **TANWAR**

Purpose: To describe a novel, stepwise technique for removing buried or vascularized corneal sutures. The goal is to minimize common complications such as epithelial defects, wound dehiscence, and patient discomfort by avoiding traction on the overlying epithelium and preventing exposed suture from being dragged through the cornea.

Methods: This prospective case series evaluated a technique performed on 20 eyes. Under topical anesthesia at a slit lamp or operating microscope, a 26-gauge hypodermic needle is used to cleanly cut one end of an interrupted suture flush with the corneal surface. The needle tip is then inserted under the opposite end of the suture to gently lift and extricate the superficial segment from the overlying epithelium without disrupting it. The suture is then grasped at its base with forceps and removed. Epithelial integrity was assessed with fluorescein dye.

Results: The technique was successfully performed in all 20 eyes. Immediate application of fluorescein dye demonstrated significantly less epithelial disruption compared to the linear defects characteristic of conventional methods. Patients reported minimal postoperative discomfort. No instances of wound dehiscence, broken sutures, or persistent epithelial defects were observed. The technique was found to be simple and easily reproducible by trainees.

Conclusions: This stepwise approach is a safe, simple, and effective technique for corneal suture removal. It is particularly advantageous for deeply buried or vascularized sutures, significantly reducing the risk of iatrogenic epithelial trauma and wound complications. This method improves patient safety and comfort and can be readily adopted.

Abstract No.: 207324

Real-Time iOCT Guided Technique for Surgical Management of Acute Hydrops in Advanced Keratoconus

First Author: Anshika **LUTHRA SHARMA**

Co-Author(s): Gaurav **LUTHRA**

Purpose: This video demonstrates an intraoperative OCT-guided technique for managing acute corneal hydrops in keratoconus using partial-thickness stromal compression sutures and intracameral 14% perfluoropropane.

Methods: A 15-year-old girl presented with advanced keratoconus secondary to VKC and sudden diminution of vision in the right eye. She was diagnosed with acute hydrops in the right eye, and iOCT-guided surgical intervention was planned for the same.

Results: Real-time iOCT is used to localize the maximal stromal cleft and Descemet membrane tear. Radial, partial-thickness compression sutures are placed to approximate stromal lamellae and reduce edema. As edema begins to resolve intraoperatively, any loosened sutures are replaced to maintain optimal stromal apposition. This is followed by injecting non-expansile 14% C3F8 into the anterior chamber for internal tamponade and promotion of Descemet membrane reattachment. Using iOCT ensures precise suture depth and real-time evaluation of corneal structural changes.

Conclusions: This technique resulted in rapid symptom relief, resolution of edema within 2–3 weeks, and improved visual outcomes. It offers a safe, reproducible alternative that may defer or reduce the need for keratoplasty in advanced keratoconus.

Abstract No.: 207297

Repair of a Damaged Cornea Caused by Failed Keratorefractive Lenticule Extraction (KLEX) Surgery Using a Post-KLEX Donor Cornea

First Author: Shaowei LI

Co-Author(s): Jie BAI, Zexia DOU, Ling LI, Chang LIU, Lin ZHAO

Purpose: To report a case of lamellar keratoplasty (LKP) utilizing a corneal donor who had previously undergone keratorefractive lenticule extraction (KLEX) surgery.

Methods: A 30-year-old female patient with -4.0 D myopia suffered corneal stromal damage and severe visual impairment due to failure to remove the lenticule during KLEX surgery. Subsequently, she attained favorable therapeutic outcomes after femtosecond laser-assisted LKP with a cornea from a post-KLEX donor whose preoperative refraction was -6.5 D. An 8.5 mm lamellar graft was prepared using a femtosecond laser, the recipient bed was prepared using an 8.0 mm vacuum trephine, and the tissue was manually removed.

Results: The patient was in good condition at 18 months postoperatively, with an uncorrected distance visual acuity of 6/20 and corrected distance visual acuity of 20/20 with -1.5 DC, and a spherical equivalent of -0.75 D.

Conclusions: Post-KLEX donor corneas can be used in patients with myopia, although the refractive power of the donor graft may be partially compromised.

Abstract No.: 207354

Restoring Sight Against Odds: A Case of Down Syndrome With Bilateral Advanced Keratoconus With Hydrops and Intumescent Cataracts

First Author: Srishti KHULLAR

Co-Author(s): Vijay KUMAR

Purpose: To highlight the challenges and outcomes of managing bilateral corneal hydrops with cataracts in a patient with Down syndrome, where cooperation, anesthesia risks, and ocular pathology complicate surgical decision-making.

Methods: A 27-year-old male with Down syndrome presented with progressive bilateral vision loss and frequent falls. Examination under anesthesia confirmed bilateral corneal hydrops with cataracts secondary to keratoconus. A staged approach was planned: Stage 1: Bilateral intracameral SF6 injection for Descemet's membrane reattachment and corneal deturgescence; Stage 2 (after 4 weeks)—Left eye: Phacoemulsification with IOL implantation; Right eye: Triple Procedure (penetrating keratoplasty, cataract extraction, and IOL implantation) performed in a single sitting to minimize anesthetic exposure.

Results: Surgical challenges included poor cooperation, eye rubbing, difficulty in IOL power calculation, and postoperative compliance. Despite these, both procedures were successfully completed, and intraocular lenses were placed in the capsular bag. At six months, the patient achieved ambulatory vision (20/200) with improved independence and no evidence of graft failure or rejection.

Conclusions: A staged, tailored surgical strategy can restore useful vision in complex cases of Down syndrome with bilateral corneal hydrops and cataracts. This case underscores the importance of careful planning, minimizing anesthesia risk, and adapting intraoperative and postoperative management to patient-specific challenges.

Abstract No.: 207230

Salvaging a Ruptured Graft in DMEK Surgery by Sequential Implantation and In-Situ Apposition: A Clever Technical Modification

First Author: Ling LI

Co-Author(s): Jie BAI, Zexia DOU, Shaowei LI, Chang LIU, Lin ZHAO

Purpose: To demonstrate an innovative technique for managing an unintended rupture of the DMEK graft into two unequal parts.

Methods: A 36-year-old male with Fuchs' endothelial corneal dystrophy and corneal decompensation in the right eye. Preoperative best-corrected visual acuity was unmeasurable, with a central corneal thickness of 661µm and an endothelial cell density of

462 cells/mm². During graft preparation, the donor tissue accidentally ruptured into two unequal parts (approximately 5/6 and 1/6). Instead of aborting the procedure, we employed a sequential implantation technique. The larger graft (5/6) was first implanted, positioned, and allowed to adhere for 5 minutes under an air bubble. After partial air removal confirmed its stability, the smaller graft (1/6) was implanted and meticulously manipulated to achieve near-perfect in-situ apposition with the edges of the larger graft. A final air bubble was injected to secure the composite graft.

Results: The surgery was successfully completed. On postoperative 6mon, the patient's corrected visual acuity improved to 0.5, with an intraocular pressure of 12mmHg. Significant corneal clearance and stable graft attachment were observed.

Conclusions: Graft rupture during DMEK is not a terminal event. The demonstrated technique of sequential implantation and in-situ apposition is an effective, reliable, and innovative solution that successfully utilizes the ruptured graft, avoids donor tissue waste, and achieves favorable visual outcomes. This technique is worthy of dissemination among corneal surgeons.

Abstract No.: 205863

Shave Excision of Corneal Pyogenic Granuloma in a Stevens-Johnson Syndrome Patient

First Author: Inderjeet **KAUR**

Purpose: This video highlights the management of a rare presentation of corneal pyogenic granuloma occurring in a compromised ocular surface, emphasizing the role of iOCT in surgical planning & intraoperative decision making.

Methods: iOCT(intraoperative optical coherence tomography) guided surgical shave excision of corneal pyogenic granuloma.

Results: iOCT-guided surgical shave excision of corneal granuloma is a useful technique.

Conclusions: This video highlights the management of a rare presentation of corneal pyogenic granuloma occurring in a compromised ocular surface, emphasizing the role of iOCT in surgical planning & intraoperative decision making.

Abstract No.: 207944

Simplified DMEK Graft Preparation With Basic Instruments in Resource-Limited Settings

First Author: Tulika **CHAUHAN**

Co-Author(s): Surveen Kaur **ARNEJA**, Joanna **WASIELICA-POSLEDNIK**

Purpose: To describe a safe and cost-effective technique of Descemet Membrane Endothelial Keratoplasty (DMEK) graft preparation using basic surgical instruments in settings where specialized marking devices are unavailable.

Methods: Donor corneas suitable for endothelial transplantation were utilized. Standard instruments, including a trephine and fine forceps, were employed for Descemet membrane separation and staining. Orientation marks were created with readily available tools instead of advanced equipment. The technique was documented on video and evaluated for feasibility, reproducibility, and graft integrity.

Results: All grafts were prepared successfully using only basic instruments. Orientation marks were consistently visible intraoperatively, facilitating graft unfolding and positioning. No perforations occurred, and tissue loss was minimal. The procedure was reproducible with a short learning curve.

Conclusions: DMEK graft preparation can be effectively performed using simple instruments without the need for costly equipment. This technique increases the accessibility of DMEK in resource-limited countries such as India and supports the wider adoption of endothelial keratoplasty.

Abstract No.: 203459

Sublimbal Orbital Fat Transposition for Corneal Defects Associated With Neurotrophic Keratopathy

First Author: Vera **PROKOPCHUK**

Co-Author(s): Vitaly **POTEMKIN**

Purpose: The persistence of corneal ulcers in neurotrophic keratopathy (NTK), a condition stemming from corneal denervation, presents a significant therapeutic challenge. Given the diverse causes of NTK and the lack of a single etiological cure, current treatments focus on pathogenetic mechanisms, such as technically demanding corneal neurotization or the use of recombinant nerve growth factor. To address this, we propose a novel surgical approach: the transposition of orbital fat beneath a scleral flap. The proposed technique leverages the unique properties of orbital adipose tissue, specifically its mixed embryological background and its abundance of stem cells and neurotrophic factors, to promote healing.

Methods: Sublimbal Orbital Fat Transposition (S-LOFT) was proposed for the treatment of persistent NTK. The

study presented clinical outcomes for three patients with refractory NTK of various etiologies, who had not responded to conventional therapies such as lubricants, bandage contact lenses, autologous serum, and tarsorrhaphy. In one complex case, S-LOFT was combined with tectonic keratoplasty and tarsorrhaphy.

Results: S-LOFT ensured complete healing of therapy-resistant ulcers, with epithelialization progressing from the graft site. Outcomes included reduced edema, scar formation, and long-term stability without recurrence. Even in severe cases, it provided immediate tectonic support and promoted stromal recovery.

Conclusions: S-LOFT technique presents a new and effective pathogenetic treatment strategy for severe and resistant forms of neurotrophic keratopathy. The procedure can be used both as a standalone intervention and in combination with other surgical methods for complex cases.

Abstract No.: 204848

Three Corneas in One: The Battle Symphony

First Author: Tushar GROVER

Co-Author(s): Nishanth MADHIVANAN

Purpose: “Three Corneas in One: The Battle Symphony” chronicles the challenging 6-year surgical journey of a single eye through three sequential ophthalmic procedures.

Methods: A 45-year-old woman presented with advanced Macular Dystrophy, initially managed with Deep Anterior Lamellar Keratoplasty (DALK). She later developed cataract, managed by phacoemulsification with Toric IOL implantation. Eventually, endothelial decompensation—a rare complication of Macular Dystrophy—occurred. To preserve the astigmatic correction provided by the Toric IOL, Descemet’s Stripping Automated Endothelial Keratoplasty (DSAEK) was chosen over Penetrating Keratoplasty.

Results: The choice of DSAEK addressed this rare complication while preserving the IOL’s astigmatic correction, leading to an excellent and stable visual outcome.

Conclusions: This video highlights strategic decision-making and surgical finesse, showcasing the patient’s resilient journey through multiple challenges to achieve a stable, excellent visual outcome.

Abstract No.: 201169

Three Novel Topical Transamin Application Techniques in Achieving Ocular Surface Haemostasis

First Author: Julia CHAN

Purpose: Prompt haemostasis is essential when conducting ocular surface surgeries. Preoperative Subcutaneous and subconjunctival injection has been reported in the literature. The video aims at reporting

3 distinct techniques in achieving haemostasis in ocular surface surgeries intraoperatively.

Methods: Three video excerpts demonstrated intraoperative topical transamin in achieving haemostasis. The first video demonstrated a cotton bud presoaked with transamin being applied to the scleral bleeding site through direct pressure during keratolimbal allograft surgery. The second video showed a cotton bud being nudged between the conjunctiva and the sclera for a direct pressure effect, then being soaked with transamin with a cannula during pterygium surgery. The third video demonstrated multiple sponge spears, with handles cut prior, being inserted into the subconjunctival space, followed by transamin injection to achieve haemostasis during pterygium surgery.

Results: With the combined physical (direct pressure) and chemical (transamin) effect, haemostasis has been achieved efficiently. The first method provides direct visualization, allowing immediate supplementary diathermy if necessary. The advantages of the second method are 1) efficient against focal bleeding, 2) frees the hands of the surgeon while awaiting haemostasis, and 3) the retained cotton bud handle prevents loss in the subconjunctival space. The third method is efficient against relatively extensive bleeding with a more extensive contact site, but care has to be taken to prevent any loss of sponges during retrieval.

Conclusions: The three topical transamin application methods are effective against ocular surface bleeding.

Abstract No.: 204202

Triple Procedures - Challenges During Lens Management

First Author: Karan BHATIA

Purpose: To illustrate surgical techniques and intraoperative strategies for managing lens-related challenges during keratoplasty, serving as a practical teaching resource for corneal surgeons.

Methods: This video compiles real-world cases of penetrating keratoplasty (PK) and Descemet’s Stripping Endothelial Keratoplasty (DSEK) performed with concurrent cataract extraction and intraocular lens (IOL) implantation. Complex scenarios demonstrated include:

- Capsulorhexis extension and positive posterior pressure during PK
- Decentered IOL with pre-existing posterior capsular rent
- Subluxated mature cataract and healed perforated ulcer post-radial keratotomy
- Failed therapeutic PK with cataract
- Lens subluxation/dislocation, broken IOL, aphakia, and vitreous prolapse

Techniques for secondary IOL implantation — including iris-claw and scleral-fixated intraocular lenses (SFIOLs) — are also highlighted.

Results: The video demonstrates surgical pearls, intraoperative modifications, and complication management with clear annotations and narration.

Emphasis is placed on structured decision-making and adaptability to ensure safe outcomes in complex anterior segment reconstruction.

Conclusions: Keratoplasty combined with cataract and IOL surgery presents unique intraoperative challenges. This teaching video provides a structured educational framework for cornea surgeons to enhance surgical confidence and outcomes in demanding cases.

Abstract No.: 202495

Winning the Battle in Infectious Keratitis

First Author: Rania ZAKI

Purpose: To demonstrate the effectiveness of a dual surgical approach in managing bilateral infectious keratitis, utilizing Deep Anterior Lamellar Keratoplasty (DALK) in one eye and Penetrating Keratoplasty (PKP) in the other.

Methods: This video presents a challenging case study of a patient with bilateral infectious keratitis who underwent DALK in one eye and PKP in the other. The surgical techniques, postoperative care, and outcomes were analyzed and compared.

Results: The patient showed significant improvement in visual acuity and corneal clarity in both eyes. The DALK procedure preserved the host's endothelium, reducing rejection risk, while the PKP procedure provided effective treatment for advanced keratitis. The dual approach allowed for tailored treatment and optimal outcomes. After 2 months, BCVA reaches 0.3 in OD and 0.2 in OS. Six months later, bilateral phacoemulsification and PCIOL were done, and BCVA improved to 1.0 in OD and 0.8 in OS.

Conclusions: The combination of DALK and PK offers a promising solution for managing bilateral infectious keratitis, allowing for personalized treatment and improved visual outcomes.

Glaucoma

Abstract No.: 206693

A (b-Interno Trabeculotomy), B (Lue Dye Injection), C (As-oCt) for MIGS for Minimally Invasive Glaucoma Surgery

First Author: Nimrita NAGDEV

Co-Author(s): Devendra MAHESHWARI, Madhavi PILLAI, Shivam GUPTA

Purpose: To demonstrate the efficacy of minimally invasive glaucoma surgeries (MIGS) in restoring aqueous outflow, while highlighting the role of intraoperative blue dye in visualizing outflow pathways and collector channels, and the complementary use of anterior segment OCT (AS-OCT) in assessing postoperative anatomical and functional outcomes.

Methods: This video demonstrates various ab-interno MIGS procedures, including Tanito microhook trabeculotomy, Gonioscopy-Assisted Transluminal Trabeculotomy (GATT), Bent Ab-interno Needle Goniectomy (BANG), and Kahook Dual Blade (KDB) trabeculotomy. Intraoperative blue dye was injected to visualize aqueous outflow pathways and collateral vessels in real time. Postoperative anatomical and functional changes were evaluated using anterior segment OCT (AS-OCT) to document surgical outcomes and correlate structural alterations with enhanced outflow.

Results: Blue dye provided clear intraoperative visualization of aqueous outflow and collateral vessels, with downstream blanching of episcleral veins suggestive of collector channel patency. AS-OCT imaging enabled a detailed assessment of surgical sites, confirming anatomical alterations consistent with improved outflow. These findings enhanced intraoperative precision and provided objective postoperative documentation of success.

Conclusions: The combined use of intraoperative blue dye and AS-OCT offers valuable insights into the mechanisms by which MIGS procedures restore aqueous outflow. This integrated approach not only improves surgical precision and intraoperative guidance but also facilitates postoperative evaluation, ultimately contributing to optimized outcomes and management in glaucoma surgery.

Abstract No.: 205689

Ahmed ClearPath in Port-Wine Stain Glaucoma: Successful Conservative Approach to Late Hypotony

First Author: Umair QIDWAI

Purpose: To present a rare case of port-wine stain-related glaucoma managed with an Ahmed ClearPath implant, complicated by late hypotony—a feared outcome after tube shunt surgery—and to highlight how successful conservative (non-surgical) management avoided reoperation and restored stability.

Methods: We report a single illustrative case of port-wine stain-related glaucoma managed with an Ahmed ClearPath implant. Clinical records, intraocular pressure (IOP) measurements, optic nerve status, and postoperative course were reviewed. Particular attention was given to the onset, evaluation, and conservative management of late hypotony. Conservative measures—including adjustment of topical therapy, close monitoring, and supportive management—were employed, and outcomes were documented over follow-up.

Results: Following Ahmed ClearPath implantation, the patient initially achieved good IOP control. Several months later, late hypotony developed, presenting

with decreased IOP and mild choroidal changes. Conservative management—including cessation of aqueous suppressants, close monitoring, and supportive measures—led to gradual resolution of hypotony without further surgical intervention. The eye stabilized with acceptable IOP, preserved optic nerve status, and satisfactory visual function at follow-up.

Conclusions: Late hypotony is a recognized complication after glaucoma drainage implants, but not all cases require surgical intervention. This case demonstrates that with careful monitoring and timely conservative measures, even complex eyes such as those with port-wine stain-related glaucoma can achieve stable outcomes without reoperation.

Abstract No.: 201624

Ahmed Valve Implantation With Partial Tube Ligation in a Pediatric Patient With Secondary Open Angle Glaucoma From Sturge-Weber Syndrome

*First Author: George Michael **SOSUAN***

*Co-Author(s): Alyssa Louise **PEJANA-PAULINO***

Purpose: To demonstrate the surgical technique of Ahmed valve implantation with partial tube ligation in a pediatric patient with Sturge-Weber Syndrome (SWS) and severe secondary open-angle glaucoma, aiming to reduce the risk of early postoperative hypotony.

Methods: This surgical video illustrates the implantation of an Ahmed FP7 glaucoma drainage device in a pediatric eye, with a key modification, which is the partial ligation of the tube using 7-0 Vicryl to restrict early aqueous flow. The procedure is shown in its entirety. Initial steps include peritomy, positioning of the plate 8 mm posterior to the limbus, and scleral fixation of the plate with 10-0 Nylon. Partial occlusion is achieved by inserting a 5-0 Prolene suture into the tube lumen, followed by ligation with 7-0 Vicryl. The tube is trimmed bevel-up, inserted through a 23-gauge needle tract into the anterior chamber, and secured with a mattress suture. Conjunctival closure is completed with multiple 10-0 Nylon sutures.

Results: The surgical video provides clear visualization of critical steps, highlighting modification of surgical techniques tailored to pediatric patients with high episcleral venous pressure. No intraoperative complications occurred. Postoperative IOP was stable without early hypotony, and the eye maintained a well-formed anterior chamber.

Conclusions: Ahmed valve implantation with partial tube ligation is a safe and effective surgical modification for managing refractory pediatric glaucoma in patients with SWS. This technique minimizes early hypotony risk while maintaining the long-term pressure-lowering benefits of the drainage device.

Abstract No.: 207368

Bleb Rescue Surgeries – a Video Collection

*First Author: Dewang **ANGMO***

*Co-Author(s): Anuja **PATIL**, Tanuj **DADA***

Purpose: To describe our modifications of the various bleb rescue surgeries in different scenarios post glaucoma filtering surgery and glaucoma drainage device insertion.

Methods: Data of all patients undergoing various bleb rescue surgeries post glaucoma filtering surgery and glaucoma drainage device insertion were collected, including demographic details, IOP, number of glaucoma medications, bleb clinical photos, bleb ASOCT at baseline and on follow-ups. The various bleb rescue surgeries done were iOCT guided bleb needling, conservative management with oral doxycycline, bleb repair/ bleb sparing epithelial exchange (BSEX) for leaking/sweating blebs, modified maumenee technique in dysfunctional filtering blebs, pedicle conjunctival graft for bleb repair, conjunctival autograft for tube exposure, modified BSEX - two layered closure in paediatric bleb leak, tenons patch graft for dysfunctional blebs with scleral fistula, leaking trab blebs post abandoned cataract surgery.

Results: This is a video bouquet demonstrating our technique of bleb rescue operations with the various modifications incorporated in different clinical scenarios – a tailor-made approach showcasing clinical picture, case description, surgical technique, postoperative clinical picture, and ASOCT showing the bleb function. The surgical outcomes of various bleb rescue procedures had good anatomical outcomes – aesthetic appearance and functional outcomes in terms of IOP control. The bleb rescue operations are modifications of traditional surgeries documented in literature as they are associated with an increase in IOP/ bleb failure postoperatively.

Conclusions: Our technique of bleb rescue surgeries has shown good anatomical as well as functional outcomes.

Abstract No.: 207181

Clinical Applications of Aqueous Angiography

*First Author: Anuja **PATIL***

*Co-Author(s): Dewang **ANGMO**, Nitika **BERI**, Tanuj **DADA***

Purpose: To explore the clinical utility of Aqueous Angiography (AA) in assessing functional aqueous humor outflow (AHO) pathways and to evaluate its role in guiding and optimizing minimally invasive glaucoma surgeries (MIGS), particularly trabecular cutting MIGS, in both high-flow and low-flow regions.

Methods: A video-based demonstration of AA-guided MIGS procedures and their usefulness in: - To identify

high- and low-flow regions of AHO in real-time. - Guide trabecular MIGS procedures based on AA findings. - Evaluate cases of failed MIGS with recurrent intraocular pressure (IOP) elevation. - Assess intraoperative functionality and patency of MIGS implants or incisions, with the potential for immediate surgical revision.

Results: AA successfully identified variable AHO patterns intraoperatively. MIGS performed in low-flow regions guided by AA showed improved functional outflow. In cases of failed MIGS, AA revealed fibrosis and closure of previously functional outflow channels. Intraoperative AA enabled real-time confirmation of stent patency or surgical incision functionality, allowing intraoperative adjustments when needed.

Conclusions: Aqueous Angiography is a valuable intraoperative tool for visualizing AHO dynamics and guiding MIGS procedures. Its application enhances surgical precision, improves postoperative outcomes, and provides a novel opportunity to revise or optimize procedures in real time. Integration of AA into MIGS protocols could significantly refine current glaucoma surgical strategies.

Abstract No.: 201405

Combined Trabeculectomy and MSICS Surgery in a Complicated Case

*First Author: Shams **NOMAN***

Purpose: To show my own technic of doing the surgery.

Methods: After doing a peritomy, a triangular half-thickness scleral flap was done, and a little extension was fashioned at its base. After entry to the ac, 360-degree synechiolysis was done. After removing lens by visco expression, ac was washed. Deep blocked was removed and surgical pi was done. A single suture was given on the scleral flap apex. Peritomy was closed with 8/0 vicryl.

Results: Preoperative IOP was 35 mmHg, and vision was 3/60. Postoperative vision was 6/9 after one month. IOP was 14 mm Hg with one medication.

Conclusions: Manual sics plus trabeculectomy is a good technic managing complicated cataract with secondary glaucoma.

Abstract No.: 201916

Conjunctival Patch Graft for Overfiltration Management in Neovascular Glaucoma Surgery: A Resource-Limited Approach to Post-Trabeculectomy Complications

*First Author: Patricia Abigail **LIM- TANJUTCO**
 Co-Author(s): Irene **FELARCA**, James Paul **GOMEZ**,
 Maria Imelda **YAP- VELOSO***

Purpose: To report the successful use of a conjunctival patch graft in managing persistent overfiltration and

leakage following trabeculectomy in a patient with advanced neovascular glaucoma (NVG).

Methods: A 74-year-old female with NVG secondary to central retinal vein occlusion (CRVO) underwent trabeculectomy in the right eye due to financial limitations precluding a glaucoma drainage device. She had a history of pseudophakia, drusen, and sensory exotropia. Preoperative anti-VEGF was administered. Surgery was uncomplicated except for a thin scleral flap. On postoperative day 7, the patient developed vision loss (light perception), hypotony (IOP 3 mmHg), kissing choroidals, and a shallow anterior chamber. She underwent external drainage of the choroidals with trabeculectomy revision.

Results: Intraoperatively, overfiltration was observed with aqueous gushing at the scleral flap and multiple scleral buttonholes. Suturing failed to achieve a watertight seal. Conventional grafts (scleral or amniotic) were unavailable. A conjunctival patch graft was used as an alternative barrier. Postoperatively, the patient achieved controlled IOP, a stable anterior chamber, and a functioning bleb without leakage. No recurrence of choroidal effusions was observed, and the patient remained stable during follow-up.

Conclusions: This case demonstrates that conjunctival patch grafting can be an effective alternative for sealing persistent scleral leakage after trabeculectomy, particularly in resource-limited settings where standard graft materials are unavailable. Its successful use highlights the importance of adaptability in surgical management and provides an additional option for clinicians facing similar challenges.

Abstract No.: 203505

Dual Benefit: Combined Phacoemulsification and Goniotomy in a Patient With a Prior Filtering Bleb

*First Author: Ajita **SASIDHARAN**
 Co-Author(s): Srujana **LINGALA***

Purpose: To report the synergistic effect of combined phacoemulsification and goniotomy in a patient with cataract and advanced primary open-angle glaucoma (POAG) with a prior functioning filtering bleb, which did not control intraocular pressure adequately.

Methods: A 74-year-old man with a history of undergoing trabeculectomy with mitomycin C 15 years earlier in his left eye, presented with a visually significant cataract with vision of counting fingers close to face and inadequately controlled intraocular pressure (IOP) of 22 mm of hg despite maximal topical therapy (travoprost, dorzolamide, and timolol) to which he was gradually becoming intolerant. He underwent combined phacoemulsification and goniotomy.

Results: The procedure resulted in visual rehabilitation(6/6) and reduced IOP to 12 mm of

Hg without the need for additional antiglaucoma medications (AGM).

Conclusions: Combined phacoemulsification and goniotomy is an effective surgical option in patients with coexisting cataract and elevated IOP. In this patient, this procedure gave the dual benefit of improved vision and IOP control, preserving the function of the original filtering procedure. This reduces the burden of topical medications and also prevents ocular surface disease caused by long-term usage of multiple AGMs.

Abstract No.: 201403

Fight Against a Monstar

*First Author: Shams **NOMAN***

Purpose: To present a complicated cataract surgery in a case of ice syndrome and manage high pressure with a non-valved AADI implant.

Methods: It was a maltreated and misdiagnosed case of ICE syndrome with cataract, with a visual acuity of HM and IOP of 46 mmHg. I did only cataract surgery in such a complicated case after the injection of mannitol. After cataract surgery, her IOP was raised to 50 mmHg, and the patient developed bullous keratopathy. IOP was not controlled by hyperosmotic or other anti-glaucoma medications. I underwent AADI implantation to reduce IOP.

Results: Postoperative IOP was 20 mmHg without medications, and visual acuity was improved to 6/36.

Conclusions: Reducing IOP by any means is an important factor in a case of ICE syndrome to prevent further glaucomatous damage.

Abstract No.: 206716

From Closure to Control: Breaking Barriers in Angle-Closure Glaucoma With MIGS

*First Author: Devendra **MAHESHWARI***

*Co-Author(s): Shivam **GUPTA**, Nimrita **NAGDEV**, Madhavi **PILLAI***

Purpose: To demonstrate the evolving role of minimally invasive glaucoma surgery (MIGS) as an adjunct and alternative in the management of primary angle-closure glaucoma (PACG), highlighting hybrid approaches, surgical pearls, and case-based outcomes.

Methods: A video-based presentation of PACG cases undergoing combined strategies such as phacoemulsification with goniosynechiolysis, gonioscopy-assisted transluminal trabeculotomy (GATT), Tanito microhook trabeculotomy, and newer goniotomy techniques. Key steps, anatomical challenges, and intraoperative video-assisted modifications are demonstrated

Results: MIGS procedures in carefully selected PACG eyes facilitated improved angle visualization and

outflow enhancement, with a reduction in intraocular pressure and medication burden. Surgical pearls and hacks are shared to address scenarios such as extensive peripheral anterior synechiae, narrow angles, and eyes with failed prior filtration surgery

Conclusions: MIGS is no longer confined to mild-to-moderate open-angle glaucoma. With refined patient selection and hybrid surgical strategies, MIGS can play a pivotal role in breaking traditional barriers of PACG management and offer a forward-looking alternative to filtration surgeries.

Abstract No.: 206359

Management of Dislocated IOL and Refractory IOP in Pseudoexfoliation Glaucoma Using a Double Loop Fixation and Tube Shunt

*First Author: Ping **HUANG***

*Co-Author(s): Reza **RAZEGHINEJAD***

Purpose: To demonstrate the combined surgical technique of IOL fixation using a double loop fixation method, glaucoma tube shunt implantation in a patient with pseudoexfoliation glaucoma and a dislocated IOL.

Methods: A 90-year-old female with a long history of pseudoexfoliation glaucoma presented with a dislocated IOL and uncontrolled intraocular pressure (IOP) of 40 mmHg despite treatment with five classes of glaucoma medications. Preoperative best-corrected visual acuity (BCVA) was 20/200. The surgical procedure included repositioning of the dislocated IOL using a double loop fixation technique, implantation of a glaucoma drainage device, and creation of a scleral window to prevent choroidal effusion, given advanced age and high preoperative IOP.

Results: Postoperatively, BCVA improved to 20/40, and IOP stabilized in the mid-teens with 2 glaucoma medications. The IOL remained well-entered, with a deep anterior chamber and appropriately positioned tube.

Conclusions: In this high-risk case, the combined surgical approach successfully restored visual acuity, stabilized the dislocated IOL, and achieved significant IOP reduction without complications.

Abstract No.: 204983

Managing Primary Congenital Glaucoma With 360° Ab-Externo Suture Trabeculotomy

*First Author: Aleena **ESPINOSA***

Purpose: To demonstrate the surgical technique and clinical outcomes of 360° ab-externo suture trabeculotomy in the management of primary congenital glaucoma (PCG).

Methods: This video presents a case of a 2-year-old with PCG who underwent 360° ab-externo suture

trabeculotomy. A limbal-based conjunctival flap was created, followed by a superficial scleral flap, then a vertical incision on the scleral bed to expose Schlemm's canal. A 5-0 polypropylene suture was threaded circumferentially through the canal and withdrawn to complete a 360° trabeculotomy. Intraoperative steps, anatomical landmarks, and key surgical tips are illustrated. Postoperative IOP, visual acuity, and corneal clarity.

Results: The procedure achieved successful 360° catheterization and trabeculotomy in the case presented. Postoperative IOP significantly decreased from preoperative levels and remained stable over follow-up. Corneal haziness resolved, with a notable decrease in Haab striae opacity. Hyphema was noted, but no other major intraoperative or postoperative complications, such as infection or suture misdirection, were observed.

Conclusions: 360° ab-externo suture trabeculotomy is a safe, cheap, and effective surgical option for primary congenital glaucoma. It offers complete angle access, leading to sustained IOP control and anatomical recovery. This technique is particularly advantageous in settings where microcatheter-assisted procedures may not be available.

Abstract No.: 205310

Mastering the Angle- Embark on the Journey of Transformation From Phacoemulsification to MIGS

First Author: Madhavi PILLAI

Co-Author(s): Shivam GUPTA, Devendra MAHESHWARI

Purpose: With the rise of Minimally Invasive Glaucoma Surgery (MIGS), it is imperative to expand our skillset and have multiple options in our armamentarium.

Methods: This video charts the path from traditional phacoemulsification to angle-based glaucoma surgery, highlighting the transition. This video-assisted skill transfer introduces the principles of angle anatomy, visualization techniques, and MIGS procedures—such as BANG, GATT, KDB goniotomy, iStent, and Tanito microhook trabeculotomy—that can be seamlessly integrated in a stepwise manner.

Results: Through case demonstrations and practical tips, attendees will gain confidence in identifying surgical candidates and executing angle procedures with precision, and tips and tricks to shorten the learning curve.

Conclusions: Mastering the art of intraoperative gonioscopy has become inevitable and it is imperative for novice glaucoma surgeons to add this skillset to their armour.

Abstract No.: 206275

Minimally Invasive Tube-Hybrids

First Author: Christopher WAY

Co-Author(s): Dan LINDFIELD

Purpose: We attempted to surgically manage a patient with refractory uveitic glaucoma using novel surgical approaches.

Methods: A 91-year-old Afro-Caribbean patient with uveitic glaucoma required surgical intervention.

Results: We describe the combined insertion of an Ahmed Clearpath in a novel minimally invasive technique, combined with a Preserflo insertion as a primary procedure.

Conclusions: To our knowledge, this is the first time the Ahmed Clearpath has been utilised in a hybrid procedure. The patient sustained a drop-free intraocular pressure of 10 postoperatively. We look to summarise novel minimally invasive hybrid approaches in a case series.

Abstract No.: 204985

Preserflo™ MicroShunt Insertion With Intraluminal Ripcord Suture Combined With Phacoemulsification in a Patient With Primary Open-Angle Glaucoma and Mature Cataract

First Author: Aleena ESPINOSA

Purpose: To demonstrate the surgical technique and early outcomes of Preserflo MicroShunt implantation with an intraluminal ripcord suture combined with phacoemulsification in a patient with advanced primary open-angle glaucoma (POAG) and visually significant mature cataract.

Methods: This video presents the step-by-step technique in a 70-year-old male with uncontrolled POAG and dense cataract. Initial conjunctival peritomy and scleral marking and incisions were first performed superiorly. Standard phacoemulsification and intraocular lens implantation were then performed through a temporal clear corneal incision. This was followed by the implantation of the Preserflo™ MicroShunt in the superotemporal quadrant, followed by sub-Tenon's mitomycin-C injection. A 9-0 Nylon suture was anchored at the clear cornea as a releasable suture and the other end was placed intraluminally as a ripcord to provide early postoperative flow modulation. The technique for secure placement, tension control, and ripcord anchoring is demonstrated. Postoperative IOP, visual acuity, and bleb morphology were monitored.

Results: The combined procedure was completed without intraoperative complications. The ripcord suture allowed controlled aqueous outflow in the immediate postoperative period, minimizing hypotony risk. At early follow-up, intraocular pressure was

significantly reduced, the bleb was well-formed and diffuse, and the patient achieved good visual recovery. No adverse events such as shallow anterior chamber, hypotony, or device malposition were observed.

Conclusions: Preserflo MicroShunt insertion with an intraluminal ripcord suture is a viable technique to enhance early postoperative safety. When combined with phacoemulsification, it offers a safe and effective option for managing coexisting POAG and cataract.

Abstract No.: 204954

Surgical Management of a Rare Bilateral Glaucoma in a Pediatric Patient With Sturge-Weber Syndrome

First Author: Edlyn **NARAVAL**

Co-Author(s): Jose Maria **MARTINEZ**

Purpose: To present the challenging surgical management of glaucoma in Sturge-Weber syndrome.

Methods: Ahmed's glaucoma valve tube, parked underneath the conjunctiva, was repositioned in the anterior chamber with prophylactic scleral windows in the right eye, followed by fibrous capsule and ingrowth removal. Preserflo microshunt with intraluminal stent using Nylon 9-0 with prophylactic scleral windows in the left eye.

Results: The IOP in both eyes was successfully lowered within normal limits.

Conclusions: The management of glaucoma in Sturge-Weber syndrome is very challenging. Medical treatment often fails to control intraocular pressure, thus requiring surgical intervention with high-risk, serious complications. In rare cases, the glaucoma can be bilateral, even if the cutaneous angioma is hemifacial, hence regular monitoring of both eyes is recommended.

Abstract No.: 201404

Tanito Microhook Internal Trabeculotomy

First Author: Shams **NOMAN**

Purpose: To present this MIGS technique and its result.

Methods: Hook was introduced to rupture the trabecular meshwork to make a direct opening of Schlemm's canal to the anterior chamber. Thus, it decreases the resistance to outflow and decreases IOP through this procedure.

Results: In this video, two surgeries were shown. One in POAG, where, after cataract surgery, I did internal trabeculotomy with a Tanito microhook. Postoperative IOP was reduced to 12 mm Hg in both eyes from preoperative 25/30 mmHg. In juvenile glaucoma, the result was also good

Conclusions: Tanito microhook internal trabeculotomy is a good alternative to trabeculectomy in uncontrolled glaucoma.

Abstract No.: 205311

The MMC Equation: "Mix It Right, Match It Smart, Manage It Well"

First Author: Madhavi **PILLAI**

Co-Author(s): Devendra **MAHEHSWARI**

Purpose: Unlock the true potential of Mitomycin C in glaucoma surgery with the "Triple M" strategy — Mix, Match & Manage!

Methods: While MMC has revolutionized filtration surgery outcomes, its use still remains more art than science. Surgeons continue to grapple with the ideal dose, dilution, and delivery technique, each playing a pivotal role in surgical success. From traditional sponge applications fraught with risks like MMC burns, retained sponges, and dosing ambiguity — to the rising trend of subconjunctival injections offering precision and predictability — this video demystifies it all.

Results: With real surgical footage, comparative insights, and evidence-backed tips, we decode the variations and guide you through tailoring MMC use to your patient, your style, and your surgical goals.

Conclusions: Whether you're a novice or a pro, this session will help you make the right mix, smart match, and strategic management of MMC.

Abstract No.: 202750

Unfolding the Next Chapter in MIGS: Illuminating the Angle With Swept-Source AS-OCT

First Author: Madhavi **PILLAI**

Co-Author(s): Shivam **GUPTA**, Devendra **MAHESHWARI**, Nimrita **NAGDEV**

Purpose: Minimally invasive glaucoma surgery (MIGS) has evolved rapidly, yet its success hinges on precise angle assessment, device placement, and postoperative evaluation. Swept-source Anterior Segment Optical Coherence Tomography (AS-OCT) has emerged as a powerful, non-contact imaging modality that provides high-resolution visualization of the anterior chamber angle, Schlemm's canal, and trabecular meshwork. Its ability to deliver reproducible anatomical and quantitative insights is redefining surgical planning and outcome optimization in MIGS.

Methods: This video highlights the integration of swept-source AS-OCT into the MIGS workflow. Through detailed case examples, it demonstrates preoperative angle mapping, intraoperative guidance for accurate device positioning, and postoperative evaluation of implant location and angle morphology. High-resolution imaging and quantitative metrics are emphasized as tools for enhancing precision and consistency in surgical decision-making.

Results: Across multiple case examples, AS-OCT contributed to improved surgical confidence, reduced variability in outcomes, and enhanced patient

safety. Quantitative metrics provided by AS-OCT also facilitated standardized evaluation of angle changes post-MIGS.

Conclusions: Swept-source AS-OCT is unfolding the next chapter in the MIGS journey by bridging anatomical insight with surgical precision. By incorporating this advanced imaging into routine practice, glaucoma specialists can standardize techniques and ensure safer outcomes.

Abstract No.: 200489

“Oil’s Well That Ends Well” – Addressing Elevated Intraocular Pressure in Silicone Oil-Filled Eyes.

First Author: Zia **PRADHAN**

Co-Author(s): Sathi **DEVI**, Rishika **LAKSHMINARAYAN**, Shruthi S

Purpose: Silicone Oil is an effective internal tamponade in retinal detachment surgeries, but can cause raised intraocular pressure (IOP) and secondary glaucoma in 22.5% of cases. This video highlights the multiple mechanisms by which silicone oil causes elevated IOP during the early post-operative period and its management.

Methods: This video demonstrates clinical signs useful in identifying the mechanism of silicone oil glaucoma and the targeted treatment modalities available to lower the IOP.

Results: Silicone Oil can cause havoc in the early post-op period due to overfill of oil, pupillary block, or anterior migration of the oil. Various treatment options for re-establishing aqueous outflow are demonstrated, including partial oil removal, iridotomy, iridoplasty, and goniosynechiolysis.

Conclusions: Prompt institution of appropriate measures can restore the angle anatomy, often resulting in complete resolution of the elevated IOP and prevention of glaucoma.

Intraocular Inflammation, Uveitis and Scleritis

Abstract No.: 206547

From Soil to Sight: A Rare Case of Intralenticular Worm Infestation

First Author: Haripriya **ARAVIND**

Co-Author(s): Anand **RAJENDRAN**, Anahita **SHROFF**, Rathinam **SIVAKUMAR**

Purpose: Intraocular gnathostomiasis is a parasitic infection caused by the larval stage of *Gnathostoma* spp. This condition is exceptionally rare and presents a diagnostic and management challenge. We report

a unique case of intralenticular gnathostomiasis, highlighting the importance of early diagnosis and prompt surgical intervention to achieve a favorable outcome.

Methods: A 53-year-old foreign national presented with headache, redness, and progressively worsening vision in his right eye. He reported recent consumption of fried rice. Slit-lamp examination revealed an intense anterior chamber reaction, and fundus examination showed vitritis. OCT revealed florid vitritis and posterior vitreous detachment. Serologic testing showed raised IgE levels. Follow-up fundus examination revealed a curvilinear track with subhyaloid hemorrhage, confirmed on fluorescein fundus angiography. The lens developed cataractous opacity, and slit-lamp examination revealed a live worm embedded within the lens.

Results: A nick was made in the anterior lens capsule, and the worm was deftly maneuvered into the anterior chamber, followed by extraction of the cataractous lens. The patient was left aphakic, with a plan to implant a secondary IOL at a later date. Intravitreal antibiotics were administered. The excised larva was histopathologically identified as a third-stage *Gnathostoma* spp. larva. Postoperative recovery was successful, and secondary IOL implantation improved visual acuity significantly.

Conclusions: Intralenticular gnathostomiasis is exceedingly rare. A high index of suspicion, thorough patient history, and timely diagnosis are crucial. Multidisciplinary surgical management is essential to preserve vision. Awareness of parasitic infections in atypical intraocular presentations ensures early recognition, effective treatment, and favorable visual outcomes.

Abstract No.: 206898

General Principles of Cataract Surgery in Uveitic Cataracts

First Author: Ronnie Abhishek **TALLURI**

Co-Author(s): Anup **KELGAONKAR**

Purpose: To understand the principles of surgery in uveitic cataracts and to establish a tailored approach for the surgery.

Methods: The video consists of a tailored approach in uveitic cataract surgery where the patient was kept on preoperative immunosuppression and during the surgery, membranectomy after pupil dilation to acquire sufficient dilation of pupil size, adequate capsulorhexis to perform a safe phacoemulsification, in the bag Intraocular lens (IOL) implantation followed by vitreous biopsy, posterior capsulorhexis, and peripheral iridectomy had been performed. We completed the surgery with a posterior subtenon triamcinolone injection.

Results: By this approach, we addressed the postoperative complications like synechiae, membranes over the IOL, iris bombe, capsular opacification, phimosis, decrease in vitritis load, and postoperative flare-up of inflammation. We also get to see that the fundus intraoperative and vitreous biopsy serves a diagnostic purpose.

Conclusions: Tailored approach for uveitic cataract surgeries prevent the post operative complications and provides good long-term outcomes.

Abstract No.: 201927

How Much Vitrectomy Should We Do in Cases of Endophthalmitis?

First Author: Christopher GO

Co-Author(s): Heinrich HEIMANN, Stephanie LAM

Purpose: To explore and discuss the extent of vitrectomy in cases of endophthalmitis through a surgical case video.

Methods: A surgical case video of a patient with delayed presentation of presumed bacterial endophthalmitis post intravitreal injection.

Results: A 68-year-old male presented 4 weeks after an intravitreal injection. He developed pain and redness 2 days post-intravitreal injection. He did not present for medical review as he was boarding a cruise for a 3-week trip. On examination, he was comfortable with no pain with a visual acuity of light perception (LP) and no view to the posterior segment due to cataract and dense vitritis confirmed on B-scan ultrasound. He had a tap and inject that yielded no growth, and subsequently had a vitrectomy 2 days later as his vision remained LP. A lensectomy was performed intraoperatively and revealed a significant macular hypopyon that was cleared. PVD induction was attempted and ultimately abandoned due to concerns of iatrogenic damage. However, the patient developed a significant tractional ERM 6 weeks post-operatively and required further vitrectomy to be removed.

Conclusions: There is little consensus on the extent of vitrectomy in cases of endophthalmitis. Some surgeons prefer core vitrectomy only to mitigate the risks of iatrogenic damage, whilst some prefer a complete vitrectomy to minimise proliferative and tractional complications of residual vitreous. Further studies are needed to determine the factors that may contribute to iatrogenic damage, and proliferative and tractional changes that will determine the extent of vitrectomy in cases of endophthalmitis.

Abstract No.: 207408

Ocular Sarcoidosis – the Great Masquerader

First Author: Bhavik PANCHAL

Purpose: To highlight the protean ocular manifestations of sarcoidosis through illustrative case studies,

emphasizing its role as a masquerader in uveitis and the importance of systemic evaluation and longitudinal follow-up in achieving an accurate diagnosis.

Methods: Three representative cases of ocular sarcoidosis were reviewed in detail: a pediatric patient with Blau syndrome manifesting sarcoid-like features; an adult with coexisting tuberculosis and sarcoidosis posing a diagnostic and therapeutic challenge; and a unique case initially diagnosed as Vogt-Koyanagi-Harada (VKH) disease that later evolved into classic sarcoidosis. Clinical presentation, diagnostic work-up, systemic findings, and disease progression were analyzed. Historical perspectives on the recognition of sarcoidosis and its early ocular descriptions were also briefly discussed.

Results: Each case demonstrated the diverse and evolving spectrum of ocular sarcoidosis. The Blau syndrome case underscored the overlap between genetic and granulomatous uveitis; the tuberculous sarcoid case highlighted the complexity of co-infections in endemic regions; and the VKH-to-sarcoid case illustrated the dynamic nature of diagnosis when systemic features emerge over time. Historical review reaffirmed sarcoidosis as a systemic granulomatous disease with early recognition rooted in dermatology and ophthalmology.

Conclusions: Sarcoidosis remains a diagnostic challenge owing to its variable and deceptive presentations. Ophthalmologists must maintain a high index of suspicion in atypical or evolving uveitis, integrate systemic evaluation with imaging and histopathology, and recognize that long-term follow-up may rewrite initial diagnoses. The masquerading nature of sarcoidosis demands vigilance, interdisciplinary collaboration, and a readiness to revisit assumptions.

Abstract No.: 202034

Retinal and Vitreous Biopsy Reveals Cysts of Toxoplasma gondii in an Atypical Case of Bilateral Necrotizing Retinitis

First Author: Reema BANSAL

Co-Author(s): Ashutosh GUPTA, Nalini GUPTA, Uma NAHAR, Suryaprakash SHARMA

Purpose: Retinitis in an immunocompromised patient is often extensive. Diagnosis is difficult due to atypical presentation, and empirical treatment is initiated as a desperate attempt to salvage the eyes. We present a case of bilateral necrotizing retinitis where vitreous biopsy, subretinal fluid, and retinal biopsy demonstrated tachyzoites (trophozoites) of Toxoplasma gondii.

Methods: A 47-year-old woman on immunosuppressive therapy for SLE had decreased vision (hand movements) OU for one month. She had received oral steroids before presenting to our center. Fundus examination revealed extensive bilateral necrotizing

retinitis. Serum IgG and IgM were raised for *T. gondii*. Aqueous fluid real-time PCR was positive for *T. gondii*. Oral and intravitreal anti-toxoplasmosis therapy was started. OD developed retinal detachment. She underwent pars plana vitrectomy with scleral band and silicon oil tamponade.

Results: Cytology of vitreous and subretinal fluid, and histopathology of retinal biopsy revealed tachyzoites of *T. gondii*. At 3 months, the retina was attached.

Conclusions: Bilateral necrotizing retinitis is an ophthalmic emergency. An early vitrectomy with vitreous and retinal biopsy, and a multidisciplinary approach provided a definitive diagnosis of *T. gondii* in a challenging case of atypical retinitis.

Abstract No.: 201384

UVEOSCOPE: A Smart App for Screening and Investigating Uveitis

First Author: Anju **KURIAKOSE**

Purpose: Design an app to collect patient history, combined with clinician-identified signs, and suggest further investigations and differential diagnosis.

Methods: We developed this app using MIT App Inventor and installed it on multiple Android phones. Patients' symptoms and systemic history are collected by OPD staff while waiting for their consultation. A history summary is generated and helps clinicians ask more relevant questions and save time. The clinician provides examination findings. The algorithm analyzes history and examination findings to suggest relevant ophthalmic and systemic investigations. Probable diagnoses are also generated.

Results: Pilot testing in clinical settings measured the app's impact on consultation efficiency and diagnostic workflows.

Conclusions: Uveoscope smart app can reduce the time taken in uveitis evaluation and assist clinicians in thorough evaluation of uveitis, especially for general ophthalmologists and junior consultants.

Ocular Imaging

Abstract No.: 206649

"Where Eye Meets Art": A Visual Showcase of Smartphone-Assisted Slit-Lamp Photography of Anterior Segment Structures Morphology

First Author: Sheetal **SHARMA**

Purpose: To demonstrate the feasibility and clinical utility of Smartphone-based slit lamp photography for capturing unique and rare iris, lenticular, and other anterior segment structures patterns, and to highlight its role in routine ophthalmic practices for

documentation, patient education, teleconsultation, and academic use.

Methods: High-resolution anterior segment photographs were captured using iPhone and Android phones aligned with the slit-lamp eyepiece without any additional attachments. Multiple patients with varying lens opacities, iris patterns, and other anterior segment structures' aesthetic patterns were imaged.

Results: Smartphone-based slit lamp images provided clear anterior segment structures morphology. This technique proved to be simple, portable, fast, cost-effective, and reproducible. Images were used for patient counselling, serial follow-up, documentation, and sharing with colleagues for teleophthalmology opinions.

Conclusions: This method bridges the gap for residents in remote medical colleges, empowering them to document and present cases at national and international platforms, compete with peers from high-tech centers, and pave the way for future innovation for the integration of built-in smartphone-grade cameras in Slit-lamp for universal access. Lastly, we want to give a take-home message through this that when patients see their own eye images, they understand better, trust more, and follow treatment faithfully.

Abstract No.: 205537

Evaluation of the Foveal Avascular Zone and Parafoveal Vessels Using Optical Coherence Tomography Angiography and Their Relationship With Ocular Factors

First Author: Colin **TAN**

Co-Author(s): Isaac **CHAY**

Purpose: To describe the features of the foveal avascular zone (FAZ) using optical coherence tomography (OCTA) and ascertain its relationship with ocular factors.

Methods: In a prospective cohort of 117 healthy adults, macular OCTA scans were graded to measure the FAZ size in the superficial and deep retinal plexuses. Multiple regression analyses were performed to evaluate the impact of central retinal thickness (CRT), axial length (AL), and spherical equivalent on the FAZ area.

Results: The mean age of the participants was 22.5 years. FAZ sizes varied greatly (superficial FAZ: 0.04 to 0.48mm²; deep FAZ: 0.10 to 0.70mm²). Females had larger superficial and deep FAZs ($p < 0.001$). On multivariate analysis, both superficial and deep FAZ varied significantly with CRT (0.03mm² per 10μm) and sex. In high myopes, FAZ varied with choroidal thickness, CRT, and sex.

Conclusions: CRT, sex, and choroidal thickness influenced the size of both the superficial and deep FAZ among healthy adults.

Abstract No.: 204701

Fluorescein Angiography of an 8-Month-Old Infant Diagnosed With Cavernous Hemangioma of the Retina

First Author: Jing MA

Co-Author(s): Hai LU

Purpose: To report a live video of fluorescein angiography (FA) of cavernous hemangioma of the retina (CHR) of an 8-month-old infant.

Methods: A newborn boy was diagnosed with intraretinal hemorrhage in his right eye during routine fundus examination due to premature birth with a gestational age of 32 weeks plus 6 days in the local hospital, and was then diagnosed with CHR in his right eye in our department of pediatric retina. We performed fundus examination and FA under general anesthesia. The whole FA procedure was documented by live video. Color Doppler imaging (CDI) was also performed.

Results: In the 8-month-old boy, the fundus examination revealed a classic grape-like cluster of thin-walled saccular aneurysms in the nasal quadrant, without any preretinal fibrotic membranes on the surface of the tumor. FA showed a prominent delay of perfusion of the adjacent artery (but with a normal caliber), classic hypofluorescence within the main tumor mass in the early phase, and an unusual complete perfusion of the lesion in the late phase, possibly due to the supine position during the procedure, which gave the tumor a sculptural appearance. The CDI showed an irregular surface lesion with acoustic solidity, dotted blood flow signals and no choroidal excavation.

Conclusions: Fundus screening for newborns without high-risk factors may detect some unexpected diseases.

Abstract No.: 200276

Out of the Woods: A Tale of Missed Wooden Intraorbital Foreign Bodies

First Author: Raveesh BINDAL

Co-Author(s): Vishal SHARMA

Purpose: To demonstrate the role of Intra-operative Ultrasound B-scan in retrieving missed wooden intraorbital foreign bodies.

Methods: Intraorbital foreign bodies are a nightmare for any ophthalmologist. They exhibit variable clinical pictures. This often leads to them being misdiagnosed. A missed intraorbital foreign body may lead to many complications, including abscess formation, optic nerve involvement, panophthalmitis, and even blindness. Here, we present a series of 5 cases with intraorbital bodies, which were either primarily missed on CT scan or were misdiagnosed clinically by referring physicians. In one of the cases, an incomplete removal of wood in pieces led to a persistent inflammation

post operatively. Hence, in consecutive exploratory orbitotomies, intraoperative assessment by ultrasound B-scan was done, and the remaining foreign bodies were removed.

Results: Intraoperative Ultrasound B-scan ensured the complete removal of foreign bodies as well as early recovery.

Conclusions: 1) In any open wound injury in the periorbital area or the orbit, wooden foreign bodies should be highly suspected. 2) Ultrasound B-scan intra-operatively helps ensure complete removal of the wooden foreign bodies

Ocular Oncology and Pathology

Abstract No.: 206001

A Large Corneal Mass – Surgical Techniques for Excision

First Author: Allie LEE

Co-Author(s): Alex KAN, Phoebe LAM

Purpose: A corneal mass is an abnormal growth on or in the cornea. Surgical removal is indicated when the mass is symptomatic or suspicious of malignancy. The goals of surgical excision include complete removal of the mass, usually with a wide, clear margin, and histopathological examination of the mass. This video aims to demonstrate the steps in surgically excising a large mass from the cornea.

Methods: We present a case of an 88-year-old man with an abnormal mass progressively growing on the cornea of the right eye. Procedures of surgical excision of the mass, including complete excision of the mass with a clear margin, minimal manipulation of the mass, meticulous wound closure, and the use of a bandage contact lens, are illustrated step-by-step in detail. A succinct account of indications for surgical removal of corneal masses and the surgical pearls is presented.

Results: The large corneal mass in our case was completely removed. The epithelial defect completely healed by day 10 post-operatively.

Conclusions: A good understanding of the principles and surgical techniques in the excision of corneal mass is important in bringing a safe and effective removal procedure for a suspicious corneal lesion.

Abstract No.: 205745**Anterior Uveal Melanoma With Extrascleral Growth of Different Extension: Full-Thickness Eyewall Resection With Donor Scleral Patch Grafting***First Author: Andrey YAROVY*

Purpose: To present the main steps of surgical approaches in the tumor resection of uveal melanoma with extrascleral growth as an attempt to preserve the eye.

Methods: The main steps of the 5 surgical procedures are presented in the video. Five patients had anterior uveal melanoma (UM) with extrascleral extension; 2 of them had primary tumors, and 3 patients had UM treated previously with Ruthenium-106 brachytherapy. Various sizes of extrascleral growth needed different approaches in en bloc resection. Novel techniques of donor sclera patch graft preparation of the same shape and size as the scleral defect will be presented. A transparent film and a flexible silver wire were used for preparing a graft of irregular shape.

Results: The surgery procedures were successful in all cases, and all eyes had been preserved.

Conclusions: As a rule, extrascleral growth of UM is an indication of enucleation. But in selective cases, a full-thickness eyewall resection of the tumor with donor scleral patch grafting can save the eye and vision even in cases with extremely large extrascleral tumor extension.

Abstract No.: 206559**From Refusal to Rehabilitation: Multistage Management of Advanced Periocular Basal Cell Carcinoma***First Author: Ritesh VERMA**Co-Author(s): Aastha KHARBANDA, Aminder SINGH*

Purpose: To present the multidisciplinary and staged management of an advanced periocular basal cell carcinoma in a rural patient, highlighting the surgical challenges, impact of social and cultural beliefs on treatment delay, and the holistic rehabilitation achieved through oncological clearance, reconstructive surgery, and subsequent visual rehabilitation.

Methods: A 70-year-old male with neglected periocular basal cell carcinoma involving both upper and lower eyelids, medial canthus, and lacrimal drainage system was evaluated. Initial refusal of exenteration led to attempted radical resections without margin clearance. Following extensive counseling and repeated delays due to social and religious beliefs, orbital exenteration with median forehead flap reconstruction was performed.

Results: Post-reconstruction cosmetic and functional outcomes were documented. Ten months later, the patient underwent cataract surgery in the contralateral

eye with a pre-existing corneal scar and high astigmatism, requiring careful surgical planning. Clinical photographs, CT imaging, histopathology, and surgical videos were compiled, and the patient's perspective was recorded to reflect psychosocial dimensions.

Conclusions: This case illustrates that successful management of advanced periocular malignancies extends beyond oncological clearance; it requires addressing cultural barriers, providing reconstructive solutions for social reintegration, and ensuring visual rehabilitation for quality of life. By integrating surgical expertise with patient-centered counseling and staged interventions, even complex and delayed presentations can achieve oncological safety, cosmetic acceptability, and functional vision.

Abstract No.: 206525**Ocular Tumors: The Curtain Raiser***First Author: Shaifali CHAHAR**Co-Author(s): Kaustubh MULAY, Fairouz P. MANJANDAVIDA*

Purpose: To highlight the role of ophthalmic biopsy in achieving definitive diagnosis and guiding management of ophthalmic tumors.

Methods: Ophthalmic tumors encompass a wide clinical spectrum, necessitating accurate diagnostic confirmation. While clinical examination provides initial diagnostic clues, histopathological analysis remains the gold standard. Biopsies were performed using a range of techniques—including cytology, shave, punch, incision, intra-operative frozen section, and excision—tailored to the suspected pathology and clinical scenario. Key principles highlighted include: meticulous technique in obtaining representative tissue, correct sampling and orientation, appropriate preservation, and ensuring optimal transport for processing. The process emphasizes the critical role of surgeon–pathologist collaboration in maximizing diagnostic yield and guiding oncologic care.

Results: The video demonstrates practical applications of biopsy techniques across varied ophthalmic tumors. Illustrative examples highlight indications, procedural nuances, and technical refinements that optimize diagnostic accuracy. Successful outcomes are shown to rely on careful tissue handling and integrated multidisciplinary coordination. This reinforces that precise biopsy technique not only facilitates timely diagnosis but also ensures individualized, evidence-based management in ocular oncology.

Conclusions: Ocular biopsy is fundamental to ocular oncology. It transforms clinical evaluation into a definitive diagnosis that drives effective treatment planning. This video serves as a practical guide, underscoring the essential protocols for obtaining representative tissue samples and ensuring appropriate

delivery to the pathologist-steps that are vital for accurate reporting and optimal patient care.

Abstract No.: 205909

Surgical Removal of Ciliary Body Tumors

First Author: Jianhong LIANG

Purpose: Introducing the surgical removal of ciliary body tumors through surgical video.

Methods: Tumors of the ciliary body can be treated by exoresection. The surgical procedure mainly involves tumor localization, Production of the outer lamellar sclera at the tumor site, Tumor isolation and removal, As well as the anatomical repositioning and suturing of the outer lamina sclera. Try to avoid damaging the adjacent retina of the tumor during the operation. Dealing with bleeding is one of the difficulties in surgery.

Results: Exoresection is an effective treatment method for ciliary body tumors.

Conclusions: Exoresection is an effective treatment method for ciliary body tumors. However, the surgery is complex and requires the surgeon to possess considerable skills in vitreoretinal surgery.

Abstract No.: 206523

Triad of Truth: Unraveling the Mystery Through Clinico-Radio-Histopathological Correlation in Orbital Tumors

First Author: Rolika BANSAL

Co-Author(s): Santosh HONAVAR, Kaustubh MULAY, Ravi VARMA

Purpose: Orbital tumors, ranging from benign to malignant, present a diagnostic challenge due to their complex and variable clinical, imaging, and histopathological features. Accurate assessment and multimodal correlation are essential for precise diagnosis and effective treatment. This video unravels the mystery and demonstrates how to reach a precise diagnosis, with a careful correlation of clinico-radio-histopathological findings.

Methods: Video demonstrating the importance of the correlation of clinico-radio-histopathological findings.

Results: With the variable clinical presentations, a wide spectrum of differential diagnoses surfaces, which need to be ruled out. Over the years, a multitude of modalities with technological advances have been identified & explored in the world of diagnostics. Their wise application to the diseases related to orbital tumors is mandatory. The final missing piece is added to achieve the final diagnosis by histopathological confirmation.

Conclusions: By integrating clinical examination, imaging modalities, and histopathological analysis, we can shed light on the final pathology & uncover the

truth behind these complex tumors. Through a series of intriguing cases, we will demonstrate the synergy of multimodal correlation to help clinicians, radiologists, and pathologists solve the puzzle of orbital tumors, ensuring accurate diagnosis & effective treatment. A misdiagnosis without the correct correlation of these three elements may lead to life-threatening outcomes if the malignant tumors are missed.

Ophthalmic Trauma

Abstract No.: 202646

Adhesion and Disinsertion: Navigating a Complex Case of Anterior Segment Trauma

First Author: Raj KENIA

Co-Author(s): Shweta DHIMAN, Santosh MAHAPATRA, Anjalika PARHI

Purpose: To highlight the role of functional pupil reconstruction in restoring anatomical integrity and optimizing the visual axis in traumatic anterior segment injury.

Methods: A 70-year-old female presented with adherent leucoma, iris prolapse, and iridodialysis following wooden stick trauma. Primary surgical repair included anterior segment reconstruction, iris repositioning, and pupil reconstruction to achieve a centered functional pupil.

Results: Postoperatively, a well-formed pupil was achieved within the clear corneal zone, facilitating improved light entry. This reduced glare and photophobia despite residual corneal opacity and early cataract. Anatomical stability was maintained, and the eye was optimized for future lens surgery.

Conclusions: Pupil reconstruction during primary trauma repair plays a crucial role in functional recovery. Beyond structural closure, restoring a centered pupil enhances visual quality and prepares the eye for subsequent definitive procedures

Abstract No.: 201727

Chandelier-Assisted Technique for Safe Removal of Metallic Intraocular Foreign Bodies

First Author: R Ram SUDARSHAN

Co-Author(s): Ram SUDARSHAN

Purpose: A 45-year-old patient came to our outpatient department with a history of ocular trauma to the right eye while cutting stone. He underwent a full-thickness corneal tear repair at an outside hospital. Presenting BCVA was 4/60. Ocular examination showed corneal sutures with a traumatic cataract. B-Scan showed a hyper-reflective echo with back shadowing. CT-Scan

revealed an IOFB penetrating the retina and impinging on the medial rectus muscle.

Methods: We proceeded with Right eye cataract extraction with Pars Plana Vitrectomy with Intraocular foreign body removal and Silicone oil injection. After cataract extraction with a superior sclerocorneal tunnel, a 25 Gauge 3-port pars plana vitrectomy was made. Core vitrectomy was done. PVD induced; FB removal through enlarged sclerostomy failed. A chandelier was placed, and the bimanual technique was used to lift the IOFB safely. The IOFB was removed through the sclerocorneal tunnel. This was followed by Base dissection, endolaser, and Silicone oil injection. The IOFB was 16.8 mm long.

Results: On POD 1, the retina was attached under silicone oil. There were no signs of inflammation on the first follow-up visit two weeks later. Three months later, the patient underwent Silicone oil removal with sclerally fixated IOL using a foldable multipiece IOL. One month post SOR+SFIOL, the patient's final visual acuity was 6/12.

Conclusions: This case highlights the importance of the chandelier in the removal of a long foreign body. A chandelier allows the surgeon to perform controlled maneuvers in certain situations to prevent iatrogenic damage to the retina.

Abstract No.: 206313

In the Eye of the Storm: Managing a Complex Anterior Segment Case

First Author: Rayyan **SABIH**

Purpose: To report the surgical management and visual outcome of a case involving traumatic lens dislocation into the vitreous cavity following blunt ocular trauma.

Methods: A 50-year-old male presented with a history of blunt trauma to the right eye from a fist. Initial visual acuity (VA) was hand movements. Ocular examination revealed a clear cornea, traumatic mydriasis, and posterior dislocation of the crystalline lens into the vitreous cavity. A pars plana irrigation was used. A microvitrectoretinal (MVR) blade was utilized to elevate the lens anteriorly. Lensectomy was performed using a vitrector. A scleral fixation of an Alcon 3-piece intraocular lens (IOL) was carried out, followed by iris cerclage to address the traumatic mydriasis.

Results: The procedure was uneventful, and the IOL remained well-centered postoperatively. At the 2-week follow-up, the patient achieved a best-corrected visual acuity of 6/6 partial.

Conclusions: Prompt surgical intervention in cases of traumatic lens dislocation with associated iris trauma can lead to excellent visual recovery. A combination of lensectomy, scleral IOL fixation, and iris cerclage is effective in restoring both visual function and ocular anatomy in such cases.

Abstract No.: 206322

Lens, Iris and Hope: Managing Blunt Trauma With Pupillary Reconstruction and LMA-IOL

First Author: Rayyan **SABIH**

Purpose: To present the surgical approach and visual outcomes in a case of complex anterior segment trauma following blunt injury, involving adherent leucoma, iris root dialysis, and traumatic cataract.

Methods: A 34-year-old male presented with a history of blunt ocular trauma from a lead pipe. At presentation, visual acuity (VA) was hand movements (HM). Slit-lamp examination revealed adherent leucoma from 12 to 3 o'clock, an irregular pupil with iris root dialysis from 9 to 2 o'clock, and a dense traumatic cataract. B-scan confirmed a flat retina. Surgical intervention included dissection and release of iris tissue from the adherent leucoma, lens matter aspiration with intraocular lens (IOL) implantation, followed by pupilloplasty and iris root repair.

Results: Postoperative recovery was uneventful. At the 2-week follow-up, the patient's best corrected visual acuity improved to 6/18. The anterior chamber was well-formed, the IOL was stable, and the pupil was centrally located with good cosmetic and functional outcome.

Conclusions: Timely surgical intervention in complex anterior segment trauma can result in significant visual and anatomical rehabilitation. Combined management of corneal adhesion, lens damage, and iris reconstruction can restore both vision and ocular integrity in selected cases.

Abstract No.: 207076

Let There Be Light

First Author: Aziz Jan **BASHIR**

Purpose: Surgical reconstruction of the Globe and visual rehabilitation after a firecracker injury in a child.

Methods: Chelation, pupilloplasty, scleral fixation, ppv.

Results: Marked visual rehabilitation.

Conclusions: Surgical interventions are usually helpful in restoring vision post-trauma.

Abstract No.: 206102

Pupilloplasty With Cataract Surgery

First Author: Abdul **HANNAN**

Purpose: To teach trauma surgeons tips and tricks of pupilloplasty in an iris damage case.

Methods: The patient has a grinder blade injury with 1/4 of the iris tissue deficient. Pupilloplasty was performed, resulting in a near-normal-looking pupil with good visual recovery.

Results: The patient recovered well with a video of the surgery highlighting the correct steps to follow to achieve optimal results in a case where the iris tissue is deficient.

Conclusions: This video would benefit a lot of trainees and young consultants who deal with ocular trauma repair cases. Especially where iris tissue has been lost in primary repair.

Abstract No.: 201111

Removal of Shotgun Pellet From the Eye Using Modified Foreign Body Forceps

First Author: Shah Md Rajibul ISLAM

Purpose: To show the removal of a shotgun pellet from the eye.

Methods: A modified foreign body forceps was used to remove intra ocular shotgun pellet through the corneal wound or the sclerotomy wound.

Results: A successfully intraocular shotgun pellet was removed in all cases.

Conclusions: Sometimes, instruments can be modified to meet the need instantly.

Abstract No.: 201109

Removal of an Ocular Shotgun Pellet Using a Makeshift Basket

First Author: Shah Md Rajibul ISLAM

Purpose: Removal of an intraocular shotgun pellet.

Methods: An irrigating vectis was wrapped with a sterile micropore to turn it into a makeshift basket. The shotgun pellet was held with the cutter using only vacuum and lifted up into the interior chamber. The vectis was inserted through a sclero-corneal tunnel. The pellet was dropped into the makeshift basket and externalized.

Results: Successfully managed to remove an intraocular shotgun pellet using a makeshift basket.

Conclusions: Improvising is a key to innovation that leads to success stories.

Abstract No.: 206883

Snare-Assisted Flapless Closed-Loop Scleral Refixation of Dislocated Akreos Adapt Intraocular Lenses

First Author: Lei WAN

Purpose: To describe a flapless, single-pass, snare-assisted technique for four-point scleral refixation of dislocated Akreos Adapt intraocular lenses (IOLs) using an 8-0 polypropylene suture in a closed-loop configuration.

Methods: An 8-0 polypropylene suture was passed through the four fenestrated haptics of the IOL using

a non-sliding snare constructed from a 30-gauge thin-walled needle mounted on a 1 mL syringe. The extraocular portions of the suture were routed within the intrascleral plane between two fixation points on the same side (nasal or temporal), which are 2 mm away from the limbus, with a distance of 7 mm between the two fixation points, without conjunctival dissection or scleral flap creation. The external suture knot was buried within the scleral stroma.

Results: This retrospective case series included five eyes with Akreos Adapt IOLs that were completely dislocated into the vitreous cavity. All lenses were successfully fixated without intraoperative complications. At a mean follow-up of 8.4 months, all IOLs remained well-centered and stable. Best-corrected visual acuity improved in all cases. The preoperative and postoperative spherical equivalent values ranged from -5.00 D to 11.00 D preoperatively, and from -2.50 D to -0.50 D postoperatively. No hypotony, suture erosion, knot exposure, or IOL redislocation was observed.

Conclusions: This technique offers a minimally invasive and reproducible method for four-point scleral fixation of dislocated Akreos Adapt IOLs, eliminating the need for conjunctival or scleral dissection and requiring no specialized instrumentation

Abstract No.: 200371

Surgical Management of Traumatic Corneal Tear and Cataract in a Pediatric Patient

First Author: Jai KELKAR

Co-Author(s): Aditya KELKAR, Muskan MANGAL

Purpose: To describe the complex surgical management and visual outcome in a pediatric patient with a traumatic corneal tear and cataract following blunt ocular trauma.

Methods: An 8-year-old boy presented with diminished vision after a stone injury to the right eye. Initial examination revealed a corneal tear with hyphema and a traumatic cataract. Following primary repair of the corneal wound, the patient underwent a secondary procedure including optical penetrating keratoplasty, cataract extraction, anterior vitrectomy with synechiolysis, and iris claw intraocular lens implantation.

Results: Postoperative recovery showed improvement in visual acuity and stabilization of the ocular structures. No complications such as graft rejection or lens dislocation were noted during follow-up.

Conclusions: Pediatric ocular trauma involving both corneal tears and cataracts requires a strategic, multi-step surgical approach. Timely intervention and careful surgical planning can lead to favorable anatomical and visual outcomes, even in complex cases.

Abstract No.: 206319**This Video Demonstrates a Step-by-Step Approach to the Repair of Iridodialysis, Traumatic Mydriasis, and Atrophic Iris Anteflexion***First Author: Hazem YASSIN*

Purpose: To demonstrate a stepwise surgical technique for managing anterior segment trauma with iridodialysis, traumatic mydriasis, and atrophic iris anteflexion, aiming to restore anatomical position, pupil function, and visual rehabilitation.

Methods: The procedure begins with the correction of iris anteflexion to re-establish anatomical orientation. Iridodialysis is repaired using scleral fixation sutures to reattach the iris root. In eyes with lens instability, scleral-fixated intraocular lens (IOL) implantation is performed to provide stable optical rehabilitation. Pupilloplasty is then carried out using sequential hour-to-hour approximation to reconstruct a round, centered pupil. Key surgical principles include tissue preservation, precise micro-suturing, and maintenance of anterior chamber stability.

Results: The combined approach restores pupil size, centration, and function, while providing stable IOL fixation. Patients experience reduced glare and photophobia with improved functional vision and cosmetic appearance.

Conclusions: Successful repair of iridodialysis hinges on recognizing iris anteflexion and performing its appropriate correction before proceeding with scleral fixation and pupilloplasty. This principle is fundamental for achieving both anatomical and functional success, and the demonstrated sequence provides a practical educational tool for anterior segment surgeons managing complex trauma.

Abstract No.: 204771**Ultimately What Matters Is Timing and Approach in Ocular Trauma – a New Year's Eve Trauma Story***First Author: Purendra BHASIN**Co-Author(s): Praveen DHANAPAL, Manish PANDAY*

Purpose: To present the clinical course, surgical interventions, and visual outcomes in a young male patient following an open globe injury with subsequent complications, including aphakia, aniridia, refractory glaucoma, and corneal decompensation.

Methods: A 26-year-old male presented with a history of open globe injury in the left eye due to a road traffic accident. At presentation, he had a full-thickness tri-radiant corneal tear with uveal tissue prolapse. The projection of rays was accurate, and there was no reverse RAPD. CT scan of the orbit and brain was normal. The patient underwent emergency corneal tear repair with limited automated anterior

vitrectomy. Intraoperatively, the lens was found to be spontaneously extruded.

Results: On the 7th postoperative day, the patient achieved a best-corrected visual acuity (BCVA) of 6/24. Over the next 10 months, the corneal and retinal status remained stable; however, the patient developed refractory glaucoma. Due to the presence of refractory glaucoma, aphakia, and loss of iris tissue, a combined Ahmed Glaucoma Valve (AGV) implantation and aniridia scleral-fixated intraocular lens (IOL) was performed. Postoperatively, BCVA remained 6/24, and intraocular pressure (IOP) was within the normal range. Two years later, the patient developed corneal decompensation, for which optical penetrating keratoplasty with trimming of the AGV tube was performed. The surgery was uneventful and resulted in a postoperative BCVA of 6/9.

Conclusions: Timely surgical interventions following traumatic open globe injury can lead to significant visual rehabilitation, even in the presence of multiple ocular complications, including aphakia, aniridia, refractory glaucoma, and corneal decompensation.

Orbital and Oculoplastic Surgery**Abstract No.: 201514****An Eye Opener: Management of Rare Parasites in Eye and Orbit***First Author: Rajendra MAURYA**Co-Author(s): Sanjay BOSAK, Priyanka, Asha DEVI*

Purpose: To describe the management and outcome of 26 cases having various types of rare and challenging live parasites infested in the human eye and orbit. In each case, we mechanically and/or surgically removed all live parasites/worms from the eye.

Methods: A clinical video of the surgical removal of two sub-conjunctival live worms, one huge orbital parasitic cyst, and 23 cases of orbital Myiasis in which we mechanically removed > 50 live maggots from the orbit after giving oral ivermectin & immobilizing the larvae by putting a mixture of chloroform plus turpentine oil (1:3). Post-operative treatment includes anti-parasitic drugs and steroids. Secondary management of malignant cases includes systemic chemotherapy (5FU + Cis Platinum) followed by surgical exenteration or lid reconstruction.

Results: In one patient, subconjunctival dirofilariasis was removed, and another had a live nematode (Loa loa). A huge orbital Hydatid Cyst was surgically removed by trans-conjunctival approach with lid-split technique. Majority of Orbital myiasis (20 cases) was seen in extensive neglected eyelid Basal Cell Carcinoma

(13 cases) rest 3 cases of myiasis was having neglected post-traumatic wound. Maggots were sent for scanning electron microscopy and were identified as Human Botfly in 9 cases, Screw Worm in 8 cases, and Flesh fly in 6 cases. One patient died due to the intracranial extension of carcinoma, the rest 13 had a complete response, and 12 had a partial response to treatment.

Conclusions: Oculo-orbital parasitic disorders are rare and difficult to manage. Orbital myiasis can complicate the eyelid malignancies and enhance the tumor spread.

Abstract No.: 206272

Buccal Mucous Membrane Grafting for Lid Margin Sequelae in Stevens-Johnson Syndrome

First Author: Riffat RASHID
Co-Author(s): Sadia SULTANA

Purpose: To evaluate the surgical outcome of mucous membrane grafting for lid margin sequelae in Stevens-Johnson syndrome (SJS).

Methods: We report a case of a 16-year-old boy who presented to the oculoplasty department with complaints of photophobia, foreign body sensation, and irritation in both eyes. He has been suffering from Stevens-Johnson syndrome for the past six years. On examination, his right eye vision was 6/18, and the left eye was 6/6. Lid examination reveals lid margin keratinization and distichiasis. He had undergone posterior lamellar resection along with keratinized lid margin and distichiasis, which was replaced by oral mucous membrane. The patient was symptom-free during the follow-up period.

Results: Posterior lamellar replacement with mucous membrane grafting is an effective and well-recognized procedure for lid margin sequelae in Stevens-Johnson syndrome. It provides a smooth ocular surface, which reduces surface irritation and inflammation. It also prevents further corneal microtrauma and deterioration of vision. Post-operatively, the patient was symptom-free with an excellent outcome. No complication was observed during his follow-up period.

Conclusions: Lid margin changes cause ocular surface inflammation in Stevens-Johnson syndrome. Buccal mucosal grafting not only provides a smooth ocular surface, but also reduces surface inflammation and prevents further vision loss.

Abstract No.: 207006

Diary of an Oculoplasty Surgeon

First Author: Nupur GOEL

Purpose: The purpose of the video is to showcase commonly performed Oculoplasty surgeries and important learning points from each.

Methods: A bouquet/collage of oculoplasty surgeries.

Results: Each oculoplasty surgery has its own nuance to offer.

Conclusions: It is important to be well-versed in the surgical anatomy and preoperative planning before planning each oculoplasty surgery.

Abstract No.: 205241

Everting Sutures With Lateral Canthopexy: Surgical Technique for Entropion Repair in the Treatment Room

First Author: Daniel CHIN
Co-Author(s): Petrina TAN

Purpose: To showcase the surgical technique of performing entropion repair using everting sutures combined with lateral canthopexy in a treatment room setting rather than in the operating theatre.

Methods: The surgical technique is illustrated in the accompanying video. Key steps include: (1) marking of everting sutures, (2) local anaesthesia infiltration, (3) placement of 2–3 lid everting sutures with 6-0 Vicryl from the conjunctival fornix to just below the lash line, (4) lateral canthal incision 4 mm from the canthal angle, (5) dissection to expose the orbital rim, (6) fixation of the tarsus to the lateral orbital rim with 6-0 Prolene, and (7) skin closure with 6-0 Prolene.

Results: Ten eyelids in nine patients (mean age 77.2 years; range 67–87; 3 male, 6 female) underwent treatment. All procedures were performed in the treatment room without fasting or cessation of antiplatelet therapy. Minimal dissection and blood loss were observed. At a mean follow-up of 6.7 months, all eyelids remained anatomically corrected without recurrence. Minor complications included one case of wound infection with loosening of the canthopexy suture and postoperative ectropion.

Conclusions: Entropion repair using everting sutures with lateral canthopexy can be safely and effectively performed in a treatment room, avoiding the need for an operating theatre. The technique is simple to perform, requires minimal intraoperative dissection with resultant minimal bleeding, and provides consistent results. This approach increases accessibility, reduces perioperative requirements, and achieves outcomes comparable to conventional theatre-based surgery.

Abstract No.: 202120

Frontalis Flap Suspension: A Reliable Technique for Correction of Severe Blepharoptosis With Poor Levator Function

First Author: Raghuraj HEGDE
Co-Author(s): Alexander GUNGB

Purpose: The purpose of this video is to provide a detailed step-by-step demonstration of the technique of frontalis flap suspension, its methods of application,

the results observed, and its utility in treating severe blepharoptosis or ptosis. The frontalis flap suspension technique has re-emerged in recent years among oculoplastic surgeons around the world to correct severe ptosis with poor to no levator function. This video aims to introduce this technique to new oculoplastic surgeons as well as experienced surgeons wanting to add this technique to their armamentarium.

Methods: This technique has re-emerged in recent years among oculoplastic surgeons, and this video will serve as a guide for those starting out on this technique. The procedure is performed through an eyelid incision, and dissection is done under the frontalis muscle and subcutaneously over the frontalis muscle. The frontalis muscle is brought down. The frontalis muscle is then attached to the levator aponeurosis and tarsal plate with the help of 5/0 prolene mattress sutures.

Results: This technique is consistently able to correct severe cases of ptosis with lower rates of recurrence than those corrected with the silicone frontal sling technique. Before-and-after visuals showcase the dramatic improvements achieved through frontalis flap suspension and also in a variety of clinical scenarios. We explore cases of congenital, involutional, and traumatic ptosis, revealing the remarkable transformation of eyelid position and symmetry.

Conclusions: Frontalis flap suspension is a reliable technique for the correction of severe ptosis with poor levator function, offering lasting benefits both functionally and aesthetically.

Abstract No.: 200234

Giant Dacryocystomucopyocel -a Rare Case-Abscess Drainage, Skin Approximation and Reconstruction Surgery

First Author: Mohammad IDRIS

Purpose: This video presents surgical management of a rare case of an Oval 7.0x6.0 cm giant, firm, non-tender swelling in the right lacrimal sac area with overlying stretched skin.

Methods: A 53-year-old female presented with progressive swelling in the right inner canthus for two years, with multiple episodes of painless increase in size of the swelling. Systemic history, investigations, and CT scan of the orbit and sinuses were insignificant. Under general anesthesia, needle aspiration of the cyst abscess is taken for culture and sensitivity. A small incision on the cyst surface is made to drain the abscess and collapse the cavity. Excision of the stretched skin is performed to accurately repair the defect.

Results: The collapsed cyst fibrous wall was thickened, lined by hyperplastic stratified squamous epithelium on histology, with no evidence of granuloma or malignancy. Culture of pus was positive for Klebsiella. The postoperative period was uneventful. At one-

year follow-up, the patient was doing well without recurrence of swelling. Dacryocystorhinostomy surgery was planned after wound healing.

Conclusions: This rare case of Dacryocystomucopyocel is the largest and has never been reported with such a large size.

Abstract No.: 203453

Graft Glory: Enhancing Ocular Health With Mucous Membrane Grafting

First Author: Shruthi TARA

Co-Author(s): Shivohn DA SILVA, Vandhana SUNDHARAM

Purpose: To demonstrate the clinical indications, surgical techniques, and outcomes associated with mucous membrane grafting (MMG) in the management of severe conjunctival deficiency and complex cicatricial eye disease.

Methods: This video highlights the application of MMG in orbital and oculoplastic procedures, including fornix and socket reconstruction, symblepharon release, management of cicatricial entropion, correction of keratinized lid margins, and ocular surface tumor resection. The roles of MMG in challenging presentations, such as Stevens-Johnson syndrome, toxic epidermal necrolysis, and exposed orbital implants, are discussed

Results: Mucous membrane grafting offers a robust, accessible, and durable option for ocular surface and periocular reconstruction. It restores anatomical structure, improves patient comfort, and supports visual rehabilitation when conventional measures are inadequate. Nasal grafts contribute additional goblet cell support in cases of severe dry eye. The integration with AMG and tissue engineering approaches broadens the applicability and success of reconstructive efforts in severe disease.

Conclusions: Mucous membrane grafting is a proven, cost-effective, and adaptable surgical technique in the management of complex cicatricial ocular surface disorders. Ongoing innovations continue to enhance its role as an essential tool in advanced oculoplastic and ocular surface surgery

Abstract No.: 204838

Lateral Eyelid Block Procedure for Cicatricial Ectropion Secondary to Herpes Zoster Ophthalmicus: A Surgical Video Demonstration

First Author: Hisar DANIEL

Co-Author(s): Diannisa Paramitha SUSANTONO

Purpose: To demonstrate the surgical technique and outcomes of the lateral eyelid block procedure as an effective intervention for managing cicatricial ectropion secondary to herpes zoster ophthalmicus.

Methods: A step-by-step surgical video illustrates the lateral eyelid block technique performed under local anesthesia in a patient with cicatricial ectropion following herpes zoster infection. Key procedural steps, intraoperative considerations, and anatomical landmarks were highlighted.

Results: The video showcases successful eyelid repositioning, correcting cicatricial ectropion, and resolving symptoms. Postoperative follow-up revealed excellent eyelid function and cosmetic results, with no complications.

Conclusions: The lateral eyelid block procedure is a safe and effective surgical option for selected cases of cicatricial ectropion due to herpes zoster ophthalmicus. This visual presentation aids in understanding the technique's indications and technical nuances.

Abstract No.: 205769

One Man's Meat Is Another Man's Poison

First Author: Jichao ZHOU

Co-Author(s): Yi WANG

Purpose: Demonstrate two different surgical approaches for the different natures of lacrimal gland masses.

Methods: Demonstrate different removal methods for two cases of lacrimal gland masses with different benign and malignant natures by surgical videos and on-site explanations.

Results: A case of pleomorphic adenoma of the palpebral lacrimal gland was completely removed via the conjunctival approach. Another case of adenoid cystic carcinoma of the orbital lacrimal gland was completely removed through the external superior orbital approach. There was no recurrence during the follow-up.

Conclusions: This teaching demonstration shows different removal approaches for different masses, considering the location and nature.

Abstract No.: 206712

One-Step Reconstruction of Upper Eyelid Coloboma Using the Sandwich Block Technique

First Author: Farida Marcelle VERGARA

Co-Author(s): Justine May TORREGOSA

Purpose: To demonstrate the effectiveness of the "sandwich block" technique for upper eyelid coloboma reconstruction, a single-stage procedure that simultaneously restores anterior and posterior lamellae with adequate support, vascularization, and cosmesis.

Methods: A 10-year-old male with Goldenhar syndrome presented with a full-thickness coloboma involving 50% of the left upper eyelid. Sandwich block reconstruction was performed using a full-thickness

pentagonal graft from the ipsilateral lower eyelid and an orbicularis oculi muscle advancement flap. A bipedicle orbicularis flap was created by dissecting the preseptal muscle from overlying skin and septum until it could fill the defect without tension. The defect measured 14 × 6 mm. An 8 mm full-thickness pentagonal graft was harvested from the temporal lower eyelid, with its orbicularis excised to retain only the tarsoconjunctival and skin layers. The posterior lamella was reconstructed by suturing the graft's conjunctiva and tarsus to recipient tissues with 6-0 absorbable sutures. The orbicularis flap was interposed between the graft's tarsoconjunctival and skin layers to enhance vascularity, and the skin layer was sutured to eyelid skin. The donor defect was closed primarily.

Results: Postoperatively, the patient achieved good functional and cosmetic outcomes, with a well-integrated graft and restoration of protective eyelid function.

Conclusions: The sandwich block technique is a reliable single-stage method for reconstructing small to intermediate full-thickness eyelid defects. It provides vascularized tissue coverage, restores eyelid function, and achieves favorable cosmesis, making it especially useful in congenital and syndromic cases such as Goldenhar syndrome.

Abstract No.: 202317

Orbital Volume Reconstruction With Dermis Fat Graft

First Author: Shalini KUMARI

Purpose: This video shows the technique of orbital volume restoration by Dermis Fat Graft in a Grade 1 Contracted Socket

Methods: A 37-year-old young lady with a history of evisceration, implant exposure, and subsequent implant extrusion underwent Dermis Fat Graft surgery. The conjunctiva was incised, and the Tenon's capsule was undermined. Contracted scleral petals were opened up. Intraconal fat was exposed. Fornix Formation Sutures were placed in the inferior fornix. Dimensions were measured & 30% was added to calculate the size of Dermis Fat Graft to be harvested from the gluteal area. After infiltration with 2% xylocaine with Adrenaline, epidermis was scraped off using scalpel No.15 Blade. The harvested graft was placed in the socket. Dermis was sutured to the edge of the anterior Tenon's capsule and conjunctiva with 6-0 vicryl sutures. Conformer was placed in situ, and lateral tarsorrhaphy was done.

Results: Orbital volume and surface were restored with this procedure. Fornix Formation Sutures were removed after 3 weeks. COP was fitted after 3 months with proper retention.

Conclusions: Dermis Fat Graft can be performed as a secondary procedure in case of extrusion/ exposure

of the implant to replace orbital volume, with less chances of rejection & migration.

Abstract No.: 206843

Post-Operative Surprise After Orbital Decompression

First Author: Akruti DESAI

Purpose: To describe the management of post-orbital decompression motility restriction and diplopia in downgaze caused by fibrotic adhesions.

Methods: A 55-year-old woman with thyroid eye disease underwent bilateral orbital decompression (lateral wall, inferior basin, and fat). Postoperatively, she developed diplopia in downgaze with limitation of ocular motility. Initial treatment with intra-orbital triamcinolone (40 mg monthly for three months) provided partial improvement. Persistent restriction with a positive forced duction test prompted surgical re-exploration of the left orbit. Fibrous adhesions at the inferior orbital fissure were released, and an amniotic membrane graft was secured with fibrin glue.

Results: At six weeks post-revision surgery, the patient demonstrated complete resolution of diplopia with full restoration of downgaze movement.

Conclusions: Secondary orbital exploration with meticulous release of fibrotic bands, combined with amniotic membrane grafting, can effectively restore motility and resolve diplopia in selected cases of post-decompression restrictive strabismus.

Abstract No.: 204748

Ptosis Correction in Challenging Situations – Tarsal Switch Technique

First Author: Shruthi TARA

Co-Author(s): Jasleen KAUR

Purpose: To describe a technique of shifting the palpebral aperture, to expose the pupillary axis in patients with poor Bells, elevation restriction, myogenic ptosis, and neurogenic ptosis, thus avoiding crutch glasses and deliberate undercorrection.

Methods: Seven patients (13 eyes) with severe neurogenic or acquired myogenic ptosis were included. All patients underwent the tarsal switch procedure through an anterior approach. Margin reflex distance (MRD1 and MRD2) and the palpebral fissure were evaluated preoperatively and postoperatively and were compared to evaluate the shift in palpebral aperture.

Results: Postoperatively, the chin-up position improved in all patients. The MRD1 increased to 2-3 mm postoperatively. and MRD2 decreased to 3.0 mm postoperatively. The palpebral aperture was shifted superiorly in all patients and thus exposing the pupillary axis. None of the patients had lagophthalmos or corneal exposure. All the patients maintained the measurements at the end of the 6-month follow-up.

Conclusions: The tarsal switch procedure through the anterior approach is an effective alternative for correcting severe ptosis with poor LPS function, especially neurogenic or acquired myogenic ptosis. This procedure can be performed with minimal risk of ocular surface exposure and provides stable outcomes. This procedure is independent of poor bells or restricted elevation and proves to be a boon in patients with the above-mentioned conditions.

Abstract No.: 201203

Spasms, Winks and Tics: Periorcular Dystonia Simplified

First Author: Akshay Gopinathan NAIR

Purpose: Periorcular dystonias are a heterogeneous group of involuntary eyelid and facial movement disorders that can cause significant functional and psychosocial morbidity. This video aims to provide a simplified, clinically relevant overview of the diagnosis and management of key periorcular dystonias, including eyelid myokymia, essential blepharospasm, hemifacial spasm, and Meige's syndrome

Methods: Representative clinical cases were documented to illustrate characteristic clinical features and diagnostic cues for each disorder. A stepwise approach to clinical examination and differentiation was demonstrated. Treatment strategies were discussed, focusing primarily on botulinum toxin therapy, including commonly employed injection sites, recommended dosages, and technique pearls. Additional adjuvant measures, such as topical ocular lubricants and systemic medications, were also reviewed.

Results: The video highlights distinguishing clinical signs that aid in differentiating among periorcular dystonias, such as the unilateral versus bilateral involvement, associated facial spasms, and progression patterns. Botulinum toxin was shown to be an effective and safe first-line treatment in most patients, with predictable improvement in spasm control and quality of life. Treatment outcomes were optimized by tailoring injection dosage and sites to the individual pattern of dystonia. Supportive use of topical lubricants was noted to enhance patient comfort, particularly in those with secondary dry eye symptoms.

Conclusions: A structured diagnostic framework facilitates accurate differentiation of periorcular dystonias. Botulinum toxin remains the cornerstone of therapy, supplemented by adjuvant measures. A simplified, practical approach - emphasizing recognition, individualized dosing, and holistic management - enables comprehensive care of patients with periorcular dystonia in clinical practice.

Abstract No.: 200636

Surgical Management of Orbital Lipoma

First Author: Keerti WALI

Co-Author(s): Vaishnavi PATIL

Purpose: To present a surgical video of orbital lipoma excision with amniotic membrane transplantation.

Methods: Dissecting the lesion without breach in the capsule is the most crucial part of surgery. The conjunctiva adherent to the surface of the tumor was excised, leaving a large defect in the conjunctiva. Amniotic membrane transplantation was done with fibrin glue to prevent symblepharon formation with a good cosmetic outcome.

Results: The tumour was excised completely, confirmed on histopathology as a lipoma.

Conclusions: Orbital lipoma is a benign, well-circumscribed fatty mass often located in the anterior orbit. Common differentials include lipodermoid, orbital fat prolapse, and other myxomatous tumors. Surgery is planned for large symptomatic lesions or cosmetic purposes.

Abstract No.: 202126

Tarsal Switch Technique for the Management of Myogenic Blepharoptosis

First Author: Raghuraj HEGDE

Co-Author(s): Alexander GUNGAB

Purpose: The purpose of this video is to provide a detailed step-by-step demonstration of the tarsal switch technique, its methods of application, the results observed, and its utility in treating severe myogenic blepharoptosis or ptosis. In myogenic ptosis, the extra-ocular muscles, including levator palpebrae superiors (LPS), undergo degenerative changes and can gradually reduce in function. This video aims to introduce this technique to new oculoplastic surgeons as well as experienced surgeons wanting to add this technique to their armamentarium.

Methods: The concept of the procedure is the shifting of the palpebral aperture superiorly to clear the visual axis without increasing the palpebral aperture. The free tarso-conjunctival graft is harvested from the upper eyelid and switched to the lower eyelid below the existing tarsus, acting as a spacer graft. This effectively raises the upper lid, opening up the visual axis while also raising the lower lid to prevent exposure keratopathy because of poor bell's reflex. Conventional methods of ptosis correction may be counterproductive in such cases, where post-operative complications can include severe lagophthalmos, which leads to exposure keratopathy and corneal infections.

Results: We demonstrate that the Tarsal switch technique is a superior technique, which is more effective and has better long-term outcomes than the

traditional undercorrected tarso-frontalis silicone sling method.

Conclusions: Tarsal switch technique is an effective technique in correcting severe myogenic blepharoptosis with poor levator function as well as poor bell's reflex. Before-and-after visuals showcase the dramatic improvements achieved through this technique.

Abstract No.: 202513

The Art and Science of Epicanthoplasty

First Author: Alice GOH

Purpose: To demonstrate a structured, scientifically guided approach to epicanthoplasty that integrates the golden ratio for precise planning and predictable outcomes.

Methods: Patient photographs were analyzed using a golden ratio rectangle, with the longer side aligned to the corneal diameter. The shorter side defined the ideal medial canthus-to-corneal edge distance, enabling objective assessment of correction and detection of overcorrection.

Results: The method provided a reproducible framework for surgical planning and improved communication with patients. Postoperative outcomes showed enhanced periorbital harmony with high patient satisfaction and fewer instances of disproportionate correction.

Conclusions: Incorporating the golden ratio minimizes subjectivity, offering a balance between artistry and science in epicanthoplasty. This approach enhances predictability, optimizes outcomes, and refines the surgeon's decision-making process.

Pediatric Ophthalmology and Strabismus

Abstract No.: 202914

A New Characteristic Sign Describes Palpebral Fissure Changes on Horizontal Version Movements in Bilateral Duane Retraction Syndrome Type I

First Author: Moustafa ABDELHAFEZ

Purpose: A retrospective series of case studies to report changes in the palpebral fissure on eye movement in patients with bilateral Duane syndrome type 1.

Methods: We reported 6 patients who had limited abduction in both eyes. They had globe retraction and narrowing of the interpallebral fissure (IPF) on adduction in both eyes. The diagnosis of Duane retraction syndrome type I in both eyes was confirmed. Five of them had esotropia in primary position (PP) and

underwent bilateral medial rectus muscle recession. One of them had no eye deviation in PP. We did video recording for all patients to record the differences in IPF bilaterally at the same time during horizontal version movements on lateral gazes.

Results: During horizontal duction, the IPF narrowed on adduction and widened on abduction alternatively. During horizontal version movements, the IPF size changed. We found that on the attempt for right gaze, the lids of the right eye widened, and the lids of the left eye narrowed. The opposite happened on the attempt for the left gaze: the right eye narrowed, and the left eye widened. It happened alternatively between the right and left eyes on lateral gaze. We recorded for all patients, including non-estropic patients. It also happened either pre- or postoperatively. On horizontal version movements, one eye IPF narrowed as if it winked, while the other eye IPF widened at the same time. The opposite happened alternatively.

Conclusions: Alternate narrowing of each eye on attempting the horizontal version. It could be a new characteristic and diagnostic sign to confirm the diagnosis of bilateral Duane retraction syndrome Type I, even in non-esotropic patients in PP.

Abstract No.: 204060

Comparative Study of Novel Vaporized Spray of Cycloplegic-Mydriatic Protocol Versus Conventional Eye Drop in Indian Paediatric Cohort

First Author: Shruti **NISHANTH**

Co-Author(s): Arockia Agila, Nishanth M, Subashree Lakshmi

Purpose: To determine by serial measurements and compare the pupillary mydriasis effect of tropicamide and phenylephrine, and the cycloplegic effect of cyclopentolate administered as a vaporized spray over closed lids in one eye and through conventional instillation of eye drops in the other eye in a South Indian pediatric cohort.

Methods: Fifteen children between 6 to 15 years of age were included. The spray was prepared using glass bottles that underwent ETO sterilization. CTC protocol was followed. For every patient, one eye was randomized to spray, and the other to eye drop. The study eye received spray application over closed eyelids, and a cover was placed over the nose that received drop instillation so that the vaporized droplets did not touch the other eye, which might create bias. Pupillary size was measured at 40 minutes. The end of cycloplegia was measured using MEM retinoscopy values. The Wong-Baker Pain scale was used to observe objective response. A 24-hour recall was done to ask for any adverse events.

Results: There was no statistical significance between the 2 eyes in cycloplegia and mydriasis. ($p=0.921$, $p=893$) with better subjective and objective responses.

Conclusions: The effect of CTC spray may be comparable to that of the CTC drop form with a better comfort and compliance.

Abstract No.: 201209

Hope of Light, Even in Darkness

First Author: Shahrina **MAHFOOZ**

Purpose: To report the surgical outcome of a traumatic cataract with adherent lucoma in a 5-year-old child.

Methods: - Preoperative VA in right eye CF1, in left eye 6/6; - Right eye B Scan showed flat retina; - With all aseptic precautions under GA, incisions were made, and synechiolysis was done carefully; - Cataract and post-capsular plaque were removed. IOL was placed in the bag, and PPC+ AVT was done; - After wound hydration, the suture was given.

Results: Postoperative visual acuity was 6/9 with minimal AC reaction.

Conclusions: Pediatric cataract surgery is inherently challenging due to its unpredictable nature, and traumatic cases add an even greater level of complexity. Despite these difficulties, this case was managed successfully, and the child's vision was beautifully restored.

Abstract No.: 204138

Monsters on the Eyes: Phthiriasis Palpebrarum in a Child

First Author: Jing **JIN**

Co-Author(s): Yuanyue **CUI**, Hao **LI**, Hong **LIU**

Purpose: To present a case of phthiriasis palpebrarum in a 6-year-old girl with clinical pictures and video materials of the phthirus pubis and its eggs.

Methods: A six-year-old girl was presented to the Department of Ophthalmology with persistent ocular pruritus. Slit-lamp microscopy revealed multiple crab-shaped parasites densely adherent to the eyelashes. Microscopic examination of epilated eyelashes identified viable Phthirus pubis and eggs. The adult lice exhibited characteristic crab-like morphology, multilegged locomotion, and translucent bodies distended by ingested blood, with visible blood flow. Mechanical debridement of lice and nits was performed, followed by meticulous eyelid margin cleansing. The patient's household contacts denied similar symptoms, and there was no sexual abuse in this case. Family members were instructed to sanitize bedding and clothing with hot water separately to disrupt transmission.

Results: No ocular surface damage or secondary infection was observed. Symptoms resolved

completely after mechanical debridement and hygiene interventions. Household contacts denied similar symptoms, and no evidence of sexual abuse was identified.

Conclusions: Phthiriasis palpebrarum is a rare ectoparasitic condition characterized by the presence of Pthirus pubis infestation affecting the eyelashes. Early detection and intervention are essential in averting the onset of secondary complications, including keratitis, blepharitis, and conjunctivitis, which can result from persistent scratching and inflammation associated with the infestation. The primary approach for treating lice infestations involves the application of topical agents alongside the mechanical extraction of the lice and their eggs. This therapeutic regimen is typically supplemented by rigorous hygiene practices to avert the risk of re-infestation.

Abstract No.: 206844

Presenting a Set of Challenging Paediatric Trauma Management Which Includes Cataract As Well As Iris Trauma

First Author: Kavitha KALAIVANI

Purpose: To show the complexity of paediatric trauma management and to reinforce the need for expertise and preparedness to manage coexisting conditions.

Methods: Collection of videos of surgeries of three different paediatric traumas.

Results: When prepared to tackle concurrent issues during pediatric traumatic cataract surgery management, the outcome is optimised and the need for multiple surgeries is avoided.

Conclusions: Paediatric trauma management poses unique challenges, and yet, when anticipated, can give fruitful results.

Abstract No.: 204672

Secondary Sulcus Placement of Foldable Intraocular Lens in a 10-Year-Old Child With Bilateral Aphakia and Developmental Delay

First Author: Divya KATTA

Purpose: To demonstrate the surgical technique and outcomes of secondary intraocular lens (IOL) implantation in the ciliary sulcus of a 10-year-old aphakic child with developmental delay, aiming to achieve spectacle independence.

Methods: A 10-year-old female with a history of bilateral lensectomy at 6 months of age for congenital cataracts presented with dependence on +16.00 D aphakic spectacles. The child had bilateral deprivation amblyopia and global developmental delay with delayed milestones. Visual behavior was present, though formal acuity testing was limited due to cognitive challenges. Fundus examination

was within normal limits in both eyes. With a strong parental desire for spectacle independence, the child underwent secondary intraocular lens implantation. Intraoperatively, extensive posterior synechiae were released, and the ciliary sulcus was carefully created. A foldable three-piece intraocular lens was inserted and placed securely in the sulcus. The procedure is demonstrated step-by-step in the surgical video.

Results: The surgery was completed without intraoperative or immediate postoperative complications. Postoperatively, the IOL was well-centered in the sulcus with stable positioning. The child showed improved visual engagement and was able to perform near tasks more efficiently without high-powered spectacles in the left eye. The cosmetic appearance also improved, and the parents expressed high satisfaction with the outcome.

Conclusions: Secondary sulcus placement of a foldable IOL can be a safe and effective solution for visual rehabilitation in aphakic children, even in the presence of amblyopia and developmental delay. Careful surgical planning, synechiolysis, and proper IOL selection are essential to ensure optimal anatomical and functional results.

Abstract No.: 201896

Surgical Membranectomy Is a Rewarding and Cost-Effective Approach in the Management of Posterior Capsular Opacification for Pseudophakic Children

First Author: Sidratul Muntaha NAZNIN

Purpose: To report a safe, effective, easy surgical technique of the membranectomy operation in a pseudophakic child with posterior capsular opacification (PCO) with a very short learning curve.

Methods: This technique was demonstrated in a patient of 6-year-old child with pseudophakia, PCO with nystagmus. PCO has a significant impact on vision, including obstruction of visual acuity and impaired contrast sensitivity. Surgical membranectomy was done under G.A with prior anesthetic fitness and proper consent. At first a scleral tunnel was made at 12 o'clock position. Viscoelastic gel was given through entry wound to anterior chamber. Vitrectomy probe was entered in anterior chamber. Probe was passed behind the intraocular lens and hold at the margin of membrane. Then cut the membrane circumferentially. After making proper opening for passing light – vitrectomy probe was removed from behind the lens and taking out. Suture was passes through the entry point. Intraocular lens was positioned centrally. Viscoelastic gel was cleared out. Wound was closed by 10-0 monofilament nylon. Stability of IOL was confirmed. Reformation of anterior chamber was done. Conjunctival wound was closed by cauterization. Sub conjunctival injection was given.

Results: A round aperture was formed, which is sufficiently large to pass an adequate amount of light through the pupil. Postoperative visual acuity was improved, and Intraocular pressure was normal. This patient showed a good cosmetic and visual outcome in postoperative follow-up.

Conclusions: This minimally invasive technique is simple enough to be performed safely by surgeons of varying skill with a good visual outcome.

Abstract No.: 204466

"Clearing the Cloud"-Managing Membranous Paediatric Cataracts

First Author: Deepti JOSHI

Co-Author(s): Sheetal MADALAGI

Purpose: Congenital membranous cataract is a rare type of cataract. Presently, there is no standardized surgery for it. Surgery is difficult because of the peculiar morphology of the cataract, which also makes it difficult to diagnose prior to the operation. Some of our experiences treating congenital membranous cataracts have been shown in the video.

Methods: We identified various types of congenital membranous cataract, and we classified them into 2 variants. The first variant is a classic membranous cataract, where the whole lens complex is fused into a single membrane. These cataracts needed dissection with micro scissors or vitrectomy cleaving. In such scenarios, a lens was implanted in the sulcus with optic capture. The second variant was mild plaque form, where membranes are attached to the anterior/posterior capsule, in which case a gentle peeling with the help of cystitome and then performing a rhexis by capsulorhexis forceps was performed. In cases where membranes could not be peeled, we used vitrectorhexis.

Results: All patients have a clear visual axis with a centred intraocular lens at 6 months follow-up.

Conclusions: Congenital membranous cataracts can be classified into several types based on the clinical characteristics of the lens. The surgical method chosen should depend on the type of congenital membranous cataract. Anterior and posterior capsulorhexis, capsulectomy with microscissors and vitrectomy cutter, are effective surgical methods for treating congenital membranous cataract.

Refractive Surgery

Abstract No.: 201028

How to Handle Suction Loss During PRESBYOND LASIK With a Circle (Side Cut Laser) Procedure

First Author: Zoraya Ariefia FERANTHY

Co-Author(s): Ucok PASARIBU

Purpose: To show the importance of handling complications during PRESBYOND LASIK with a Circle (side cut laser) procedure safely and accurately.

Methods: Video presentation.

Results: A 20/20 vision with good flap and clear cornea was achieved after a circle (side cut laser) procedure.

Conclusions: Handling suction loss during PRESBYOND LASIK surgery accurately and safely by the Circle (side cut laser) technique can lead to a good outcome.

Abstract No.: 202603

Implantable Collamer Lens Complication: Trailing Haptic Breakage and Surgical Abandonment

First Author: Vinit TANWAR

Purpose: To present a rare intraoperative complication of Implantable Collamer Lens (ICL) surgery—trailing haptic fracture during injection—and to highlight the critical decision-making process that prioritizes patient safety, leading to immediate surgical abandonment.

Methods: This surgical video case report documents the management of an intraoperative complication in a 28-year-old patient undergoing ICL implantation for high myopia. The video demonstrates the final stage of ICL delivery, the moment of haptic fracture, and the subsequent decision to abort the procedure. The technique for safe explantation of the compromised ICL is shown, utilizing viscoelastic-assisted maneuvers to protect the corneal endothelium and minimize trauma.

Results: During injection into the posterior chamber, the trailing haptic fractured, rendering the lens unstable and unsuitable for implantation. The compromised lens was successfully removed from the anterior chamber without inducing endothelial damage or other intraocular trauma. The procedure was safely abandoned, preventing potential complications such as decentration or sulcus irritation. The patient was counseled for a future re-operation with a new, intact ICL.

Conclusions: ICL haptic fracture is a critical complication that compromises the safety and efficacy of the procedure. This case underscores the importance of controlled injection technique and immediate recognition of implant defects. Prioritizing patient safety by abandoning the surgery and safely

explanting a compromised device is the most prudent course of action.

Abstract No.: 203819

Managing Cap-Lenticular Adhesion in SMILE: Management Approach Using Modified Dissection Technique

First Author: Kumar Kartikay RAJAURA

Co-Author(s): Manpreet KAUR

Purpose: Cap-lenticular adhesion (CLA) occurs in 1.8-2% of SMILE cases, creating abnormal cap-lenticular tissue adhesion that complicates extraction and may cause incomplete removal or cap perforation.

Methods: This video demonstrates CLA management: early identification with posterior-before-anterior dissection. Enter the cap sidecut, move 2 hours left with a sharp dissector to peel the adhered lenticule. Once edge identified, use blunt dissector from 12→6 o'clock, retract and dissect left to 3 o'clock (leaving 6-3 segment). Return to center, advance 6→9 o'clock for the right quadrant. Final 6-3 region addressed with controlled right-to-left sweeping, sequential temporal-nasal dissection, then smooth leftward motion for complete extraction.

Results: A total of 760 eyes were operated on using the technique. Complete and easy lenticular was observed in all cases. No case had retained lenticular.

Conclusions: This technique offers the advantage of easy and complete removal of lenticulars in keratorefractive surgeries. The technique is unique and easy to remember and perform, especially by novice surgeons.

Abstract No.: 207904

Managing Intraoperative Complications in KLEX: Lessons From the Operating Room

First Author: Tulika CHAUHAN

Co-Author(s): Surveen Kaur ARNEJA, Garvita DABAS

Purpose: To showcase key intraoperative complications encountered during Keratolenticule Extraction (KLEX) and demonstrate practical strategies for their recognition, management, and prevention.

Methods: A surgical video compilation of KLEX cases was prepared. The footage highlights critical moments where intraoperative complications arose, including suction loss, challenging lenticule dissection, retained fragments, cap tears, and decentered treatments. Each clip emphasizes the surgical step involved, the underlying cause, and the maneuver adopted to overcome the event.

Results: The video illustrates how intraoperative challenges can disrupt the planned sequence of KLEX. Suction loss required immediate re-docking, difficult dissections were managed with controlled dissection techniques, and retained tissue was carefully identified

and removed. Cap tears and decentered treatments necessitated intraoperative modification of the technique to complete the surgery. In each scenario, prompt recognition and calm adaptation allowed safe continuation of the procedure.

Conclusions: Intraoperative complications in KLEX are uncommon but can be effectively managed when recognized early. Video demonstration offers a powerful educational tool, enabling surgeons to anticipate potential pitfalls and refine their responses, thereby enhancing safety and surgical confidence.

Abstract No.: 205550

Ridge Sign: A Definitive Sign for Identifying the Anterior-Posterior Plane in Small-Incision Lenticule Extraction

First Author: Tushya OM PARKASH

Co-Author(s): Rohit OM PARKASH

Purpose: To describe the "Ridge Sign" as a conclusive indicator for differentiating the anterior and posterior lenticular planes in Small Incision Lenticule Extraction (SMILE).

Methods: Femtosecond laser application for SMILE was performed. Anterior and posterior planes were dissected. "Ridge sign" was elucidated prior to proceeding with the final dissection of the anterior plane. Our sign helps to identify anterior and posterior lenticular planes in SMILE. This sign describes a lenticular ridge noted at the junction between the dissected and undissected halves of both planes. This ridge is formed as the lenticule is attached to the cap on one side and to the stromal bed on the other side. Here, the cap is lifted with the blunt dissector's arm at the junction of the anterior and posterior dissected planes prior to the final dissection of the anterior plane. This maneuver enhances the visibility of the ridge sign and confirms correct initial anterior plane dissection, thereby preventing inadvertent cap lenticular adhesion.

Results: In our study, 400 eyes undergoing SMILE procedures using the VisuMax femtosecond laser were included. In 96% of cases, the cap interface was separated first, with a ridge sign observed in all. In 4% of cases with wrong initial separation of the lenticule interface, the ridge sign was absent. Successful lenticule extraction was achieved in 100% of cases.

Conclusions: This confirmatory sign helps to dissect the anterior plane ahead of the posterior plane, thereby ensuring smooth lenticule extraction and preventing inadvertent cap lenticular adhesion, lenticule tears, or partial lenticular dissection.

Abstract No.: 203954**Trouble of the Bubble***First Author: Abhishek KUMAR**Co-Author(s): Swati SHARMA*

Purpose: To present a video demonstrating refractive lens exchange with posterior chamber intraocular lens (PCIOL), showing difficulty in cortical matter removal due to air bubbles going behind the posterior chamber onto the anterior hyaloid face.

Methods: A 42-year-old male with a refractive error of -10DS -2.5C at 90 degrees in the right eye underwent refractive lens exchange. An EDOF toric intraocular lens of 13.5DS-3.5DC was planned at a 94-degree axis. The surgery was uneventful until the step where the air bubble went behind the posterior capsule onto the anterior hyaloid face through the zonules, making further surgery difficult. Glow became dull, due to which cortical matter removal became difficult. The above video demonstrates the maneuvers done to remove cortical matter.

Results: On postoperative day 1, uncorrected distance visual acuity was 6/9 with near vision N10 and intermediate vision N18. Intraocular pressure was 16 mmHg. The anterior chamber was well formed with minimal anterior chamber cells, and wounds were well opposed. On fundus examination, an air bubble was present in the superior 1/5th of the vitreous cavity, with the disc and macula healthy. On postoperative day 3, UDVA -6/6, Near vision N10.

Conclusions: Patience and presence of mind in taking appropriate actions are the key takeaways from the above video.

Abstract No.: 204451**Under the Surface: Dissecting SMILE-Induced Incisional Complications and Their Management***First Author: Ankita SANJAY KULKARNI**Co-Author(s): Sri GANESH, Savio PEREIRA, Supriya SAMAK SRIGANESH*

Purpose: This presentation aims to share real-world experiences with rare superior incision complications during Small Incision Lenticule Extraction (SMILE) and to highlight practical surgical approaches that led to excellent outcomes.

Methods: During SMILE procedures, we encountered two unusual intraoperative situations, both involving the superior incision. In the first case, a sudden bout of brisk bleeding from the incision site. We managed this with thorough irrigation, gentle lenticule extraction, and quick steps to control the bleeding, all while maintaining a steady workflow in the operating room. The second case brought a technical issue, which resulted in an incomplete superior incision, even though the lenticule creation went smoothly. We

finished the incision carefully at the correct depth with a side-port blade, ensuring we protected the corneal tissue.

Results: Both patients made full recoveries and achieved 6/6 unaided vision within two weeks of surgery. These experiences reinforced the need to stay alert for rare complications and to use resourcefulness and precision when surprising challenges arise.

Conclusions: While SMILE has become known for its safety and minimally invasive nature, these cases remind us that rare procedural hurdles still exist. When they do occur, a calm approach and readiness to adapt are essential for securing the best results for our patients. By sharing these stories, we hope to support colleagues in developing confidence and flexibility for unexpected moments in refractive surgery.

Abstract No.: 201683**When Vault Turns Fault: Toric ICL Exchange for Excessive Vault and Ocular Hypertension in High Myopia***First Author: Amer AWAN**Co-Author(s): Sahar FATIMA*

Purpose: To describe the clinical presentation, management, and outcome of a case of excessive vault following toric implantable collamer lens (ICL) implantation, successfully treated with toric ICL exchange.

Methods: A 25-year-old female with high myopia (-14.00 D/-3.00 D right eye; -16.00 D/-1.50 D left eye) underwent bilateral ICL implantation. Postoperatively, she developed shallow anterior chambers and elevated IOPs of 34 mmHg (OD) and 35 mmHg (OS). Anterior segment optical coherence tomography revealed excessive vaults measuring 1652 μ m (OD) and 1512 μ m (OS). Initial management with maximal topical anti-glaucoma therapy reduced IOPs to 10 and 14 mmHg; however, persistent high vault and pigment deposition over the ICL indicated the need for surgical exchange.

Results: Bilateral toric ICL exchange was successfully performed using a modified surgical technique. Postoperatively, best-corrected visual acuity improved to 6/6 in both eyes. Intraocular pressure stabilised at 12 mmHg bilaterally without anti-glaucoma medications.

Conclusions: Excessive ICL vaulting can lead to ocular hypertension and pigment dispersion despite medical therapy. Careful vault assessment with anterior segment imaging and close postoperative monitoring are essential. ICL exchange is a safe and effective solution in such cases, restoring anatomical balance, controlling IOP, and achieving excellent visual outcomes.

Retina (Medical)

Abstract No.: 201114

Following the Trails of Ischaemia: Cattle Tracking on Fluorescein Angiography in Central Retinal Artery Occlusion

First Author: Yu Ting Tina SHEN

Co-Author(s): Jon CHAN, Thet NAING

Purpose: To present the clinical course and multimodal imaging features of acute central retinal artery occlusion (CRAO), highlighting characteristic vascular findings, including cattle tracking on fundus fluorescein angiography (FFA), and management in the context of systemic co-morbidities.

Methods: A fifty-seven-year-old man with multiple cardiovascular risk factors presented with sudden blurring of vision in the right eye. Comprehensive ophthalmic examination and multimodal imaging, including widefield fundus photography, autofluorescence, macular optical coherence tomography (OCT), and FFA, were performed. Immediate therapeutic intervention was undertaken with a favourable outcome.

Results: On presentation, visual acuity was light perception with a grade three relative afferent pupillary defect (RAPD). Widefield fundus photography demonstrated diffuse retinal pallor with a central cherry-red spot and scattered blot hemorrhages. Macular OCT revealed inner retinal thickening. A diagnosis of CRAO was made, and ocular massage was promptly initiated, improving vision to 1/60 within ten minutes and reducing the RAPD to grade one. FFA showed markedly delayed arm-to-retina and arteriovenous transit times, with patchy areas of capillary non-perfusion. Characteristic cattle tracking of the venous circulation was evident, particularly on magnified views. On follow-up visits, vision improved to 6/7.5. In view of the underlying ocular ischaemic syndrome, panretinal photocoagulation was performed. Long-term OCT at five years demonstrated resolution of retinal thickening with stable vision.

Conclusions: This case highlights the importance of timely recognition and intervention in CRAO, and demonstrates the role of multimodal imaging, particularly FFA with characteristic features of cattle tracking, in evaluating ischaemic ocular disease.

Retina (Surgical)

Abstract No.: 202978

25 G Trocar-Based Limbal Entry in Stage 5 Retinopathy of Prematurity

First Author: Manu SHARMA

Co-Author(s): Yuk CHAITANYA, Deeksha KATOCH

Purpose: To describe the limitations of conventional limbal entry in advanced Stage 5 Retinopathy of Prematurity (ROP) surgery and to highlight the advantages of using a trocar-cannula-based approach.

Methods: A review of surgical challenges encountered with standard microvitrectomy (MVR) blade limbal entry was undertaken. The technical benefits of trocar-cannula-assisted limbal entry were then assessed, particularly in relation to access, wound stability, visualization, and instrument maneuverability.

Results: Traditional MVR blade entry was associated with multiple complications, including conjunctival ballooning, port leakage, corneal haze, iris prolapse, iris incarceration, and trauma. In contrast, trocar-cannula-based entry provided a more stable, self-sealing system that reduced these issues. This method allowed the safe use of microinstruments such as forceps, scissors, and vitreous cutters, preserved the cornea and iris, and improved intraoperative visualization and control.

Conclusions: Trocar-cannula-based limbal entry offers a safer and more effective alternative to conventional MVR blade entry in advanced Stage 5 ROP surgery. By minimizing intraoperative complications and enhancing maneuverability, it contributes to more controlled procedures and improved surgical outcomes.

Abstract No.: 201150

A Novel Indigenous Device for Scleral Fixated Intraocular Lens (SFIOL) Implantation

First Author: Vandana AKSHAY IYER

Co-Author(s): Puja HINGORANI-BANG, Trupti KADAM LAMBAT, Rajesh PATTEBAHADUR, Shraddha PAWAR, Kanishk SINGH, Sagarika SNEHI

Purpose: To demonstrate the use of a novel indigenous device for SFIOL implantation.

Methods: A 26 G, 1/2 inch hypodermic needle commonly available in the operating room (OR) is bent at 2mm from the hub. Two number 240 silicone band bits usually available for encirclage in retinal surgery are railroaded on to the needle till the hub. The tip is broken to make it blunt. This device is used for guiding the haptic of a 3 piece PMMA lens extraocularly and supporting the lens in the implantation.

Results: The device stabilizes the SFIOL during the surgery and prevents the slippage of the haptic during maneuvering.

Conclusions: This device can be made in any OR and is fool proof for slippage, bending or chipping of the haptic during the procedure.

Abstract No.: 207223

A Step-by-Step Beginner's Guide to Scleral Buckling Surgery: An Educational Video for Vitreoretinal Trainees

First Author: Joshmitha **METLA**

Co-Author(s): Upendra **BABU**, Debolina **DEB**, Aayesha **KHANUM**, Venugopal **REDDY**

Purpose: Scleral buckling remains a fundamental surgical technique for rhegmatogenous retinal detachment (RRD) repair, particularly in young phakic patients and cases with uncomplicated breaks. However, many trainees lack exposure to this technique due to declining case volumes and the perceived learning curve.

Methods: We have made a step-by-step, detailed video including patient selection, surgical approach, precautionary measures, and possible mistakes we could avoid during scleral buckling surgery.

Results: This video serves as a comprehensive yet accessible resource for surgeons, bridging the gap between theoretical knowledge and practical execution.

Conclusions: Despite the growing popularity of pars plana vitrectomy (PPV), scleral buckling offers distinct advantages, including lower rates of postoperative cataract progression and vitrectomy-related complications. By standardizing the foundational steps of scleral buckling, we aim to preserve this skill in the surgical armamentarium and encourage its appropriate use in selected RRD cases.

Abstract No.: 200944

A Sticky Note – Tale of Stubborn Vitreous

First Author: Renuka Nikit **SARWATE**

Co-Author(s): Jayant **SARWATE**, Nikit **SARWATE**

Purpose: To show Posterior Vitreous Detachment (PVD) induction methods in cases with thick and partial PVD during vitrectomy.

Methods: Pars plana vitrectomy surgery was done. Thick and adherent vitreous was tried to be separated with multiple attempts using the conventional method. Vitreous stained multiple times with Triamcinolone acetonide and Trypan Blue dye, with failed attempts to induce over the posterior pole. Posterior vitreous later separated with a diamond scrapper instrument and lifted with Internal Limiting membrane (ILM) peeling forceps like a sheet and removed with a cutter. ILM was stained with Trypan Blue dye, and ILM peeling was done with forceps, and the case was closed.

Results: Absence of PVD in young patients makes vitrectomy surgery difficult. Induction of the PVD

process requires multiple attempts, without which ERM removal will not occur.

Conclusions: Meticulous and stepwise PVD induction is difficult and necessary for Pars Plana vitrectomy done for young patients.

Abstract No.: 204822

A 'No Retinotomy' Transscleral Approach to Remove Subretinal Napkin Ring in Proliferative Vitreoretinopathy

First Author: Bhavani **SANKARAN**

Co-Author(s): Naresh Babu **KANNAN**, Renu **PUTHENVILAYIL RAJAN**, Toshit **VARSHNEY**

Purpose: To demonstrate a surgical technique of removal of subretinal napkin-ring membranes in proliferative vitreoretinopathy (PVR) by accessing the subretinal space via a transscleral approach.

Methods: Standard three 23G core vitrectomy are made followed by minimal core vitrectomy. With an internal visualization, a fourth standard 25G valved trocar and canula system is used to enter the subretinal space across sclera and choroid. The trocar is advanced at 15 degree angle, approximately 10mm from limbus, at an area corresponding to maximum retinal elevation. Subsequently this route is used to remove subretinal membranes using forceps subretinally. The same route is then used for drainage of subretinal fluid.

Results: An 8-year-old male child presented with right eye (RE) retinal detachment with extensive PVR/subretinal bands. He had a best corrected visual acuity (BCVA) of LogMAR 2 (Finger counting close to face) in RE and LogMAR 0 (Snellen 6/6). He underwent RE pars plana vitrectomy along with subretinal membrane removal via the above described technique. Posterior retinotomy was thereby avoided. This was followed by completion of vitrectomy, base dissection, PFCL injection, peeling of internal limiting membrane, fluid air exchange, endolaser and silicon oil injection. At 6 months post operative follow-up the patient underwent silicon oil removal and subsequently achieved a RE BCVA of LogMAR 1.1 (Snellen 5/60) with an anatomically attached retina and macula. No subretinal haemorrhage/retinal incarceration was observed.

Conclusions: This novel technique of subretinal membrane dissection is safe and effective for peripapillary napkin-ring PVR. This technique also obviates the need for retinotomy to reach subretinal space.

Abstract No.: 205637

Application of Flute Needle Aspiration for Salvaging Posteriorly Dislocated Hapticless 4-Point Intraocular Lenses

First Author: Lei GAO

Purpose: To evaluate the efficacy and surgical technique of utilizing the passive aspiration effect of a flute needle for salvaging posteriorly dislocated hapticless 4-point intraocular lenses (IOLs). Unlike dislocated traditional C-loop IOLs, which are relatively easy to grasp, the hapticless design often causes these IOLs to lie flat on the retinal surface, offering no purchase point and posing a significant challenge for salvage procedures.

Methods: During vitrectomy for a posteriorly dislocated hapticless 4-point IOL resting flat on the retina, a 23-gauge flute needle was slowly advanced toward the center of the IOL optic without using perfluorocarbon liquid or attempting direct forceps grasping. The negative pressure suction effect generated at the needle tip during fluid drainage was employed to capture the IOL. The captured IOL was then safely mobilized to the anterior vitreous cavity. Under microscopic visualization, the IOL was transferred from the flute needle to intraocular forceps for final extraction through a scleral tunnel incision or intraocular refixation.

Results: The technique enabled stable capture and safe mobilization of the posteriorly dislocated hapticless 4-point IOL. The procedure was performed successfully without causing retinal traction or injury. This method has also been applied successfully to salvage other types of dislocated IOLs and IOL-capsular bag complexes.

Conclusions: The flute needle aspiration technique is a novel, effective, and minimally invasive approach for salvaging posteriorly dislocated hapticless IOLs, effectively addressing the challenge posed by the lack of a purchase point. Its principle is reliable, and the procedure is straightforward, demonstrating considerable potential for broad clinical application.

Abstract No.: 200758

Appositional Suprachoroidal Hemorrhage With Retinal Detachment Managed With External Drainage and Pars Plana Vitrectomy

First Author: Maria Christine DY

Co-Author(s): Ronaldo JARIN

Purpose: To report a case of appositional suprachoroidal hemorrhage (SCH) with retinal detachment secondary to complicated cataract surgery managed with external drainage and pars plana vitrectomy.

Methods: A 72-year-old hypertensive male was referred for intraoperative expulsive SCH of the right

from phacoemulsification converted to extracapsular cataract extraction. On presentation, vision was hand movement with an intraocular pressure (IOP) of 62. Iris tissue and vitreous were incarcerated in the limbal wound with a flat anterior chamber and eight-ball hyphema. Ultrasonography showed kissing hemorrhagic choroidal detachment with focal areas of retinal elevation. IOP was managed with maximum anti-glaucoma medications prior to subjecting the patient to surgery, one week post-operation, with evidence of clot liquefaction.

Results: External drainage through posterior sclerotomy 8-9 millimeters from the limbus was done in three quadrants. Pars plana vitrectomy was also performed to release anterior adhesions and facilitate retinal detachment repair with silicone oil injection.

Conclusions: Suprachoroidal hemorrhage is a sight-threatening intraocular complication. Intraoperative risk factors include prolonged hypotony, large incisions, vitreous loss, and Valsalva. Drainage is indicated in appositional SCH, uncontrolled IOP, and visual decline, with surgery usually delayed until clot liquefaction at seven to ten days with ultrasound guidance. Pars plana vitrectomy with heavy liquids and endotamponade is also performed in cases with vitreous hemorrhage and retinal detachment. Identification of risk factors and prompt diagnosis and management will determine prognosis.

Abstract No.: 206847

Avoiding Pitfalls: Iatrogenic Retinal Break From Brilliant Blue Dye Injection in ILM Peeling

First Author: Suklengmung BURAGOHAIN

Co-Author(s): Henal JAVERI, Subham SINHA ROY

Purpose: To demonstrate a rare surgical complication of instilling brilliant blue dye under air during macular hole surgery.

Methods: Surgical video.

Results: The video demonstrates iatrogenic break formation while injecting brilliant blue dye under air. The video also demonstrates the management and prevention of such a complication.

Conclusions: Iatrogenic retinal breaks can occur during dye injection under air in macular hole surgery, and they can be prevented by using an endoillumination probe as a barrier while injecting the dye or by using active instillation with a vitrectomy cutter.

Abstract No.: 206979**Centrifugal Dissection of Fibrovascular Membranes in Proliferative Diabetic Retinopathy***First Author: Henal JAVERI**Co-Author(s): Suklengmung BURAGOHAIN, Ajay DUDHANI*

Purpose: Tractional and combined retinal detachments in proliferative diabetic retinopathy (PDR) are surgically challenging due to dense fibrovascular membranes that must be separated from the ischemic retina without inducing iatrogenic breaks. This report describes a reproducible technique to facilitate safe and effective membrane dissection.

Methods: Membrane peeling is initiated over and around the optic disc to induce posterior vitreous separation. The vitreoretinal interface is most clearly defined at this site, providing an optimal entry point. Fibroglial proliferation, which is thickest over the optic nerve head, is engaged and dissected tangentially to achieve controlled separation from the underlying retina.

Results: Using the optic disc as the starting point provided a consistent and reliable approach for the majority of complex PDR detachments. The technique simplified dissection, enabled effective membrane removal, and minimized the risk of retinal breaks. Although not entirely complication-free, careful patient selection and intraoperative judgment enhanced safety.

Conclusions: Initiating dissection at the optic disc offers vitreoretinal surgeons a practical method for managing complex PDR membranes. While it cannot be universally applied, this approach adds a valuable option to surgical practice and can make difficult PDR cases more manageable.

Abstract No.: 201960**Challenging Case: When Patient Sees Nothing and Retinal Surgeon Sees Nothing***First Author: Chun On LEE**Co-Author(s): Chi Lik AU, Po Lin LEOW*

Purpose: Our surgical video highlights tips in managing a case of adherent leukoma and enterococcus faecalis keratitis with exogenous endophthalmitis.

Methods: A 77-year-old lady with known adherent leukoma presented with right eye blurring of vision for 2 days. Examination revealed a corneal ulcer with hypopyon. Her vision deteriorated to light perception with no fundal view, and B-scan ultrasonography showed anterior vitreous opacity. Combined phacoemulsification and pars plana vitrectomy was performed.

Results: Trypan blue was injected to stain the pupillary fibrin, which was removed with an irrigation-aspiration

probe. Adherent leukoma was kept to maintain globe integrity. Capsulorhexis was performed. The Malyugin ring was used for pupil expansion. Sculpting of the dense cataract lens was performed. In view of the absence of red reflex, a light pipe through sclerostomy was used to assess the depth of the lens. Lens material was emulsified and aspirated. Anterior vitrectomy was performed to remove pus and fibrin exudate. Vitrectomy and induction of posterior vitreous detachment with overlying pus were performed. When compared with endogenous endophthalmitis in which infiltrate and pus originate from the posterior pole, the retina is relatively spared from pus in this case. Silicone oil, which may inhibit microbial growth was injected at end of operation.

Conclusions: Surgical treatment of endophthalmitis secondary to keratitis with poor view is challenging. Simple techniques, including Trypan blue to visualise fibrin, light pipe to assess depth of cataract, and keeping the plugged iris in adherent leukoma to maintain globe integrity, make surgery safer.

Abstract No.: 204971**Chorioretinectomy for Proliferative Diabetic Retinopathy***First Author: Prema SUBRAMANIAM**Co-Author(s): Narendran V, Saravanan V.R*

Purpose: Chorioretinectomy is a proactive surgical technique done in perforating injuries where a strip of choroid and retina is removed at the wound site to prevent proliferative vitreoretinopathy. This technique is incorporated to address the exuberant proliferation in Proliferative Diabetic Retinopathy (PDR).

Methods: A 47-year-old female, diabetic for 9 years on medications, underwent vitrectomy with silicone oil for the Tractional Retinal Detachment (TRD). Reproliferation occurred 6 weeks post-surgery with recurrent TRD and macular drag. As the exuberant proliferation occurred in a very short period, a choroidal source for the proliferation was suspected of and planned for re-surgical intervention. Silicone Oil Removal (SOR) was done, and multiple sites of re-proliferation with choroidal origin were noted, which were removed by bimanual technique and chorioretinectomy, followed by laser photocoagulation and silicone oil injection.

Results: Postoperative 8-week follow-up visits show a well-attached retina under oil with no recurrent proliferation.

Conclusions: Chorioretinectomy can be tried in some rare circumstances of exuberant re-proliferation causing recurrent TRD in Advanced Diabetic Eye Disease (ADED) with a fruitful outcome.

Abstract No.: 201663

Closing the Gap: Macular Hole Surgery

*First Author: Anuraha **BALAMURUGAN***

Purpose: To present the surgical approach and outcome of macular hole repair, highlighting the precision required in vitreoretinal surgery.

Methods: This surgical video demonstrates stepwise macular hole repair beginning with preoperative preparation, followed by pars plana vitrectomy. Careful removal of the vitreous gel is shown, with attention to creating a clear surgical field. The technique for internal limiting membrane (ILM) manipulation is highlighted, and the procedure concludes with the insertion of a long-acting gas bubble to aid in hole closure.

Results: The surgery resulted in successful anatomical closure of the macular hole. Postoperative evaluation confirmed restoration of foveal contour, with potential for gradual visual recovery.

Conclusions: Macular hole surgery, when performed with meticulous technique, offers reliable structural closure and promising functional improvement. This video provides both trainees and practicing surgeons with a structured guide to the procedure.

Abstract No.: 201493

Cut, Burn, Tie: A Tailored Surgical Strategy for Retinal Angiomas in VHL Disease

*First Author: Ashish **MARKAN***

*Co-Author(s): Shorya Vardhan **AZAD***

Purpose: This surgical video demonstrates a multimodal approach to managing retinal angiomas in a patient with von Hippel-Lindau (VHL) disease.

Methods: Three angiomas were identified in the left eye. A small angioma was successfully removed via endoresection, while a medium-sized angioma was treated with precise diathermy. The largest angioma, complicated by overlying exudative retinal detachment, was managed by suture ligation of the feeder artery using a 10-0 monofilament nylon suture.

Results: Postoperatively, the retina was attached. The ligated vessel showed a marked reduction in its caliber, confirming successful vessel occlusion, and the blood flow in the vessel was stagnant.

Conclusions: This combined strategy highlights the importance of tailored surgical techniques for angiomas of varying sizes and complexities in VHL, aiming to achieve optimal tumor control and retinal reattachment.

Abstract No.: 207106

Extreme Buckling: Adopting Scleral Buckling Techniques in Today's Practice

*First Author: Jose Timothy Martin Lim **CHUA***

*Co-Author(s): Jill Cristine Galvez **GENUINO***

Purpose: The high myopia epidemic is also increasing the number of young patients with retinal detachments from pathologic myopia. These younger patients are ideal candidates for scleral buckling and segmental buckling, as early pars plana vitrectomy will induce early cataract, among other complications. This informative video seeks to revive and reintroduce scleral buckling principles and showcase a quick guide on how to incorporate them in practice.

Methods: The video presentation is meant to be an introductory course into the various methods of scleral buckling, including segmental buckling. The video showcases quick surgical guides in doing: 1) the classic sutured scleral buckling, 2) using a crescent knife for intra-scleral tunnel formation, 3) using a bent Gauge 18 needle to make finer intra-scleral tunnel formation, and 4) Segmental buckling.

Results: Multiple patients with pre-operation and post-operation findings are discussed. In general, because the patients were selected for the appropriateness of scleral and segmental buckling, all patients had improvement in vision and disposition after surgery. Patients were followed up for 1 day post-op, 1 week post-op, 1 month post-op, and 3 months post-op. All patients initially had discomfort post-surgery due to the increased manipulation and surgical wounds known in doing this procedure. Overall, the results were promising and only strengthen the fact that ophthalmologists and retina specialists the world over must still learn buckling as part of their arsenal.

Conclusions: Scleral buckling is a dying art that needs to be saved and promoted. This skill can help us combat the high myopia pandemic.

Abstract No.: 206162

Foveal Neovascular Tuft in PDR: A Precision Vitrectomy Approach

*First Author: Awaneesh **UPADHYAY***

*Co-Author(s): Abhimanyu **SHARMA**, Deependra **SINGH***

Purpose: To present a rare and surgically challenging case of foveal neovascularization in proliferative diabetic retinopathy (PDR), complicated by vitreous and subhyaloid hemorrhage originating directly from a foveal neovascular tuft, managed with targeted micro-dissection

Methods: A 56-year-old diabetic female with PDR and active NVE presented with sudden visual loss in the left eye. Baseline vision was counting fingers at 1 meter. OCT revealed dense subhyaloid hemorrhage arising from a foveal neovascular tuft. Five days

prior to surgery, an intravitreal anti-VEGF injection was administered. A 25G pars plana vitrectomy was planned. Following core vitrectomy, the posterior hyaloid was stained with triamcinolone and safely detached, and peripheral vitrectomy was achieved. Subhyaloid hemorrhage was aspirated using an extrusion cannula. Brilliant Blue G-assisted ILM peeling was performed around the foveal tuft, exposing the neovascular stalk. The stump of the NVE was then carefully mobilized using ILM forceps and excised with the cutter under direct visualization. A 360-degree endolaser was applied, followed by fluid-air exchange and SF₆ gas tamponade to reduce the risk of postoperative haemorrhage.

Results: Postoperatively, the retina was clear with complete removal of the neovascular tuft and preservation of foveal contour. Visual acuity improved significantly from CF at 1 meter to 6/24. No recurrence of haemorrhage or iatrogenic macular damage was observed.

Conclusions: Foveal NVE is exceedingly rare and surgically demanding. Dye-assisted ILM peeling, followed by controlled mobilisation and excision of the tuft, offers a safe and effective strategy for central NVE in PDR.

Abstract No.: 207245

Hazy Cornea, Intraocular Foreign Bodies, Endophthalmitis and Retinal Detachment... Endoscopy to the Rescue

First Author: Vivek **DAVE**

Purpose: To describe a case of hazy cornea with intraocular foreign bodies, endophthalmitis, and retinal detachment, which was managed with intraocular endoscopy.

Methods: A case of open globe injury at the workplace was managed with initial corneal tear repair. B scan ultrasound revealed echoes s/o endophthalmitis with multiple retained intraocular foreign bodies. The cornea had significant edema, which precluded good visualization of the posterior segment. An intraocular endoscope was used to clear the vitreous exudates under good visualization. Post exudate removal, multiple foreign bodies were noted. Unfortunately, they were non-magnetic and had to be removed with forceps. The forceps were used to pick up the foreign bodies one after the other, laying them on the iris as a scaffold, and then removed through a scleral tunnel. Retinal detachment was noted through the breaks created by the foreign bodies, which were repaired with silicone oil tamponade and endolaser.

Results: The endophthalmitis resolved, and the retina stayed attached till the last follow-up, 3 months post-op with a reasonable visual acuity as the corneal edema cleared.

Conclusions: Endoscopic approach helps bypass temporary corneal edema to deal with the posterior segment pathology without the need for unnecessary keratoplasties.

Abstract No.: 200825

Healing by Secondary Intention of a Severe Perforating Eye Injury

First Author: David **SOUSA**

Purpose: To present our surgical approach to repair a nailgun-induced perforating open globe injury, leaving the posterior wound to heal by secondary intention.

Methods: A 20-year-old presented with a perforating eye injury using a nail gun. Vision was light perception. A full hyphema and large scleral-limbal wound were identified with choroid and vitreous loss. CT revealed a 32-mm-long nail within the globe until the apex of the orbit.

Results: Two surgeries are presented: i) primary open globe repair along with (lensectomy, partial vitrectomy, and removal of the intraocular/orbital foreign body), and ii) the secondary vitrectomy (performed 2 weeks later). At the end of the first surgery, the posterior vitreous was left in situ to allow for healing of the posterior wound. At two weeks, a secondary vitrectomy was performed - a partial posterior vitreous detachment and less-inflamed eye allowed for a much safer surgery. The posterior wound has healed by secondary intention and was surrounded by endolaser. The eye was left fluid-filled. At 9 months follow-up, after contact lens adaptation to correct the aphakic status, the eye was comfortable, and the visual acuity was 6/6.

Conclusions: In cases of a perforating eye injury with a very posterior exit wound, a two-step approach – i.e., an initial primary open globe repair and removal of foreign body only (leaving the posterior wound to heal by secondary intention), followed by a full vitrectomy 10-14 days after is likely to be a safer and sensible approach.

Abstract No.: 204827

Hyaloid Dissection in Macula on Combined Retinal Detachment

First Author: Saarang **HANSRAJ**

Purpose: To demonstrate the successful management of a case of combined retinal detachment.

Methods: A 55-year-old lady presented with blurred vision in her right eye. Her BCVA was 6/24 (20/80) in the right eye and 6/18 (20/60) in her left eye. She had proliferative diabetic retinopathy in both eyes, along with a combined retinal detachment in her right eye. She received intravitreal bevacizumab, and was then taken up for surgery after 5 days. This included an encircling 240 belt buckle along with pars plane

vitrectomy, bimanual membrane peeling, endorser and 1000 centi stoke silicone oil injection. The left eye underwent pan retinal photocoagulation.

Results: Patient had a good outcome, with a BCVA of 6/24 1 month after surgery. She then underwent phacoemulsification with intraocular lens implantation and silicone oil removal a month later, with a BCVA of 6/18 after surgery. The left eye was well lasered, and stable. Her diabetes was maintained with medical therapy.

Conclusions: Macula on combined retinal detachment despite being a challenging surgical scenario can be tackled well when surgery is planned early and performed meticulously. Use of pre operative anti VEGF, encircling belt and bimanual posterior hyaloid removal can be crucial in certain scenarios.

Abstract No.: 207384

ILM Flap-Assisted Repair of Iatrogenic Foveal Dehiscence With Subfoveal PFCL Migration During Diabetic TRD Surgery: A Targeted Approach for Anatomical Rescue and Visual Recovery

First Author: Abhimanyu **SHARMA**

Co-Author(s): Awaneesh **UPADHYAY**

Purpose: To report the successful anatomical and functional outcome of an ILM flap technique for iatrogenic foveal dehiscence with subfoveal PFCL during surgery for diabetic tractional retinal detachment (TRD)

Methods: A 52-year-old male with parafoveal TRD underwent 25G pars plana vitrectomy. After nasal FVP removal, the temporal membranes were approached unimanually. Due to dense adherence and macular traction, PFCL was injected to stabilize the posterior pole. However, a sudden jet—likely from a corked syringe—caused unintended subretinal PFCL migration via foveal dehiscence. Controlled PFCL injection was resumed to maintain retinal stability. Temporal FVP was then dissected using max-grip forceps and trimmed with the cutter. To evacuate the subfoveal PFCL bubble, multiple temporal macular retinotomies were created under PFCL. Direct aspiration was performed, allowing targeted evacuation of the high-surface-tension PFCL bubble. ILM peeling was done and placed over the fovea as a scaffold over the foveal defect. Endolaser photocoagulation was applied, and silicone oil was used as endotamponade.

Results: Postoperative imaging confirmed complete retinal reattachment with no residual subretinal PFCL. OCT showed a hyperreflective ILM flap sealing the foveal defect. Pre-retinal hemorrhage resolved, and the flap remained stable. At 2-month follow-up, BCVA improved to 6/24 under oil.

Conclusions: Iatrogenic foveal dehiscence during fibrovascular proliferation dissection can result in subfoveal PFCL entrapment, posing a significant

surgical challenge. Macular retinotomies enable targeted evacuation of high-surface-tension PFCL bubbles. ILM flap provides a stable scaffold for foveal defect closure, along with silicon oil facilitates both anatomical reattachment & functional visual recovery Presentation Preference

Abstract No.: 207345

Into the Crimson Depths: The Red Sea Scrolls

First Author: Nishant Vijay **RADKE**

Purpose: To showcase a surgical management of massive subretinal haemorrhage in a one-eyed patient.

Methods: Surgery involved a combined phaco-vitrectomy. 25 G pars plana Vitrectomy ports were made. After cataract removal and successful vitrectomy massive subretinal haemorrhage was found to be bullous and shifting in nature. A transcleral approach was utilised to remove as much subretinal blood as possible. Accidental iatrogenic break facilitated endodrainage of the blood, which was washed to the best extent possible with repeated agitation. Pooling of sub-retinal haemorrhage was noted intra-operatively in one location, and after making a retinotomy, an attempt was made to remove it. It turned out to be a big clot which needed bimanual evacuation and removal through an extended 2-3 mm sclerotomy. IOL was implanted successfully in the bag, and Silicone oil was injected, and it was later removed.

Results: Patient improved from PL PR inaccurate vision to 0.1 on the Decimal visual acuity scale with a reasonable field of vision, although some central scotomata persist.

Conclusions: Subretinal drainage of haemorrhage can be challenging, and there can be more than one way to deal with it. Although the method is invasive in carefully selected cases, it may still yield beneficial outcomes.

Abstract No.: 202182

Intraocular Foreign Body Removal via Combined Anterior and Posterior Continuous Curvilinear Capsulorhexis With Primary Intraocular Lens Implantation

First Author: Yuedong **HU**

Co-Author(s): Siyu **WANG**, Rui **HUA**

Purpose: In the management of traumatic cataracts with intraocular foreign bodies, minimizing surgical intervention to achieve better postoperative recovery remains a goal. We share a surgical approach involving the removal of IOFB through anterior and posterior continuous curvilinear capsulorhexis combined with IOL implantation.

Methods: A 35-year-old male presented to hospital with left eye trauma from metal fragment 1 hour earlier. His BCVA was 20/40. Slit-lamp examination

revealed a self-sealed corneal wound, with a perforating iris injury between 3 and 4 o'clock. Dilated examination showed capsular tear, and posterior subcapsular opacification. Ultrasonography indicated vitreous hemorrhage, and CT confirmed intraocular metallic foreign body. During surgery, we first performed phacoemulsification through the central continuous curvilinear capsulorhexis (CCCC). Using the posterior capsular tear as a starting point, we completed a posterior continuous curvilinear capsulorhexis (PCCC). Following vitrectomy, the metallic foreign body was extracted through the clear corneal incision and the CCC channels using an intraocular magnetic probe. Subsequently, an IOL was implanted, and the surgery was concluded after endophotocoagulation and fluid-air exchange.

Results: One week postoperatively, the patient's BCVA improved to 20/20. Anterior segment OCT and other examinations showed stable IOL positioning and intraocular conditions, and no postoperative complications were observed till the last follow-up.

Conclusions: This video highlights a «3C» surgical technique (Clear corneal incision, CCCC, and PCCC) for managing traumatic cataracts with intraocular foreign bodies. This approach minimizes surgical trauma and enables rapid vision recovery, which offers a new treatment strategy for similar cases.

Abstract No.: 202069

Intraoperative Suprachoroidal Hemorrhage During SFIOL (Yamane Technique): What Went Wrong and How We Managed It

First Author: Stefanie

Co-Author(s): Clarissa LISTER, Cindy Prajna METTA, Sindy Boru SEMBIRING, Givenchy Angela WINARJO

Purpose: To report a challenging case of intraoperative suprachoroidal hemorrhage (SCH) during Yamane SFIOL technique scleral-fixated intraocular lens (SFIOL) implantation and to demonstrate a systematic surgical drainage approach.

Methods: A 69-year-old male with a history of complicated cataract surgery and dropped nucleus underwent pars plana vitrectomy with Yamane SFIOL implantation. Massive intraoperative SCH developed during the final haptic manipulation, with complete loss of fundus reflex. Two weeks later, the patient presented with severe ocular pain, intraocular pressure of 38 mmHg, and B-scan evidence of kissing choroidals. Stepwise surgical drainage was performed: (1) transconjunctival trocar-guided drainage, (2) focal peritomy with radial sclerotomy extension, and (3) blunt cannula-assisted aspiration across multiple quadrants.

Results: Intraoperative SCH remains one of the most feared complications in complex anterior and posterior segment surgery. Early recognition and

timely surgical drainage are critical when conservative management fails. A structured, escalating approach allows controlled decompression, rapid pain relief, and anatomical resolution. Nonetheless, functional recovery may be constrained by irreversible complications such as submacular fibrosis, highlighting the gap between anatomic success and visual outcome.

Conclusions: Systematic drainage provides an effective strategy for managing intraoperative SCH, achieving pain relief.

Abstract No.: 201562

Intraretinal Arterial Cannulation for Central Retinal Artery Occlusion Caused by Cosmetic Facial Injection

First Author: Haibo LI

Co-Author(s): Xiaoxin LI

Purpose: To report a novel surgical intervention for central retinal artery occlusion (CRAO) secondary to iatrogenic embolism following cosmetic facial injection, and to evaluate its efficacy in restoring retinal perfusion and visual function.

Methods: A 26-year-old female presented with acute vision loss (HM) in the right eye two hours after allogeneic adipose-derived stromal cell injection into the right temporal region. Fundus examination and OCT confirmed CRAO with macular edema. Emergency 25-gauge vitrectomy with intra-retinal arterial cannulation was performed using a 48-gauge microneedle to access the central retinal artery. Balanced salt solution was infused under motorized pressure to dislodge the embolus into the distal branches.

Results: Postoperative fundus photography at 12 hours showed restored perfusion in the fovea centralis. At one-month follow-up, best-corrected visual acuity improved to 20/40. OCT revealed resolution of macular edema but atrophy of the inner nuclear layer in the fovea.

Conclusions: Intra-retinal arterial cannulation is a feasible and effective emergency intervention for iatrogenic CRAO following facial filler injection. It can rapidly restore retinal blood flow and improve visual outcomes, though some structural damage may persist.

Abstract No.: 202058

Lens-Sparing Pars Plana Vitrectomy for Retinal Detachment in Marfan Syndrome with Lens Subluxation

First Author: Sujin HOSHI

Co-Author(s): Shohei MORIKAWA, Yoshifumi OKAMOTO, Tetsuro OSHIKA

Purpose: To present a case of rhegmatogenous retinal detachment in a patient with Marfan syndrome and

lens subluxation, successfully managed with lens-sparing pars plana vitrectomy (PPV).

Methods: A 42-year-old woman with Marfan syndrome had a history of high myopia in both eyes and lens subluxation in the left eye. Her best-corrected visual acuity (BCVA) remained relatively good at 20/30 (LogMAR 0.15) with a refraction of spherical -19.0 D. During follow-up, she developed floaters in the left eye. Fundus examination revealed lattice degeneration with an atrophic retinal hole at 11 o'clock and a bullous retinal detachment extending from 10 to 2 o'clock, without macular involvement. A 25-gauge three-port lens-sparing PPV was performed. Vitreous shaving was minimized around the retinal hole and lattice degeneration. Subretinal fluid was drained, fluid-air exchange was performed, and endolaser photocoagulation was applied around the retinal break.

Results: On the first postoperative day, the crystalline lens was markedly displaced anteriorly due to intraocular air tamponade, resulting in a shallow anterior chamber. As the air resorbed, the anterior chamber deepened, and the degree of lens subluxation returned to the preoperative state. Over a follow-up period of more than one year, no recurrence of retinal detachment was observed, and the corrected visual acuity remained unchanged from baseline.

Conclusions: Lens-sparing PPV can be a viable surgical option for retinal detachment associated with Marfan syndrome, high myopia, and lens subluxation, avoiding the need for lensectomy in selected cases.

Abstract No.: 206824

Management Challenges Following Expulsive Supra-Choroidal Hemorrhage During Cataract Surgery in a One-Eyed Patient

First Author: Devesh KUMAWAT

Co-Author(s): Ritweez SAHU, Pradeep VENKATESH

Purpose: Expulsive suprachoroidal hemorrhage (SCH) is a rare but severe complication of intraocular surgery, particularly in high-risk eyes. We describe the clinical course and surgical management of an expulsive supra-choroidal hemorrhage (SCH) in a monocular patient with post-traumatic sub-luxated cataract, highlighting the role of staged drainage and systemic stabilisation.

Methods: A 48-year-old male with a blind left eye due to glaucoma presented with a 9-clock hour subluxated cataract in the right eye following closed globe trauma. Visual acuity was finger counting close to the ace. Cataract surgery was initiated but required wound extension for lens extraction, during which an expulsive SCH occurred. The main port was sutured, and medical therapy was initiated. Visual acuity decreased to the perception of light with inaccurate projection of light. Due to kissing choroidals the next day, partial drainage was attempted under local anesthesia via a 23G non-

valved trocar. Secondary hemorrhage occurred a day later, and a repeat attempt was delayed due to an intraoperative hypertensive crisis (BP 220/120 mmHg). After stabilisation, a second drainage under intravenous sedation could be performed successfully.

Results: SCH could be drained near completely during the second drainage. Residual SCH and vitreous hemorrhage resolved gradually over time. IOP stabilised gradually to 18 mmHg at the last follow-up at 3 months without medications, and the retina remained attached. Final visual acuity improved to 20/60 with aphakic glasses correction.

Conclusions: Staged drainage, systemic optimisation, and careful surgical technique were effective in managing expulsive SCH and preserving vision in this high-risk one-eye patient.

Abstract No.: 201110

Managing a Globe Perforation During Period Bulbar Block

First Author: Shah Md Rajibul ISLAM

Purpose: To showcase the difficulties and methods to manage an iatrogenic globe perforation.

Methods: Phaco with PCIOL was done, followed by PPV + EL + F/A EX + SOI.

Results: Successfully managed a case of iatrogenic globe perforation.

Conclusions: It is extremely important to inject peribulbar blocks carefully to avoid globe perforation.

Abstract No.: 204752

Ocular Invasion

First Author: Diva MISRA

Purpose: To present a surgical case demonstrating the successful management of submacular cysticercosis using pars plana vitrectomy, with emphasis on intact cyst removal and simultaneous macular hole repair.

Methods: This video presents a case of submacular cysticercosis in a 25-year-old man, managed successfully with 25 G vitrectomy. The condition involves the subretinal presence of cysts caused by the larval stage of the tapeworm *Taenia solium*. The video highlights the importance of precision and caution in the removal of the intact cyst, without any significant collateral damage to the surrounding tissue. The video also demonstrates the management of a coexisting macular hole.

Results: The intact cyst was removed successfully without rupture or significant injury to the surrounding retinal tissue. The coexisting macular hole was managed intraoperatively. The patient demonstrated favorable anatomical outcomes postoperatively.

Conclusions: Vitrectomy offers a safe and effective approach for the removal of submacular cysticercosis, provided meticulous surgical technique is employed. The case highlights the importance of precision in cyst extraction and demonstrates that concurrent pathologies, such as macular holes, can be addressed successfully in the same surgical setting.

Abstract No.: 201491

Ocular Oddities: The Art of Extracting the Unexpected

First Author: Ashish MARKAN

Co-Author(s): Manasi TRIPATHI

Purpose: To present a unique series of pars plana vitrectomy (PPV) cases involving the retrieval of rare and unexpected intraocular foreign bodies (IOFBs) from the posterior segment.

Methods: A surgical video compilation of six challenging cases was analyzed. The scenarios included: removal of a phacofragmentation tip dislodged during phacofrag for a dropped nucleus; extraction of a large sewing needle from the vitreous cavity; retrieval of a posteriorly dislocated DSAEK graft; removal of a broken DDMS forceps tip during retinal detachment repair; extraction of a dislodged green silicone tip from a 25G soft-tip cannula post-BBG injection; and retrieval of a fractured max-grip forceps tip during SFIOL fixation.

Results: Each case demonstrated distinct technical challenges requiring adaptability and precision in vitreoretinal surgery. Successful retrieval of the IOFBs was achieved in all scenarios with preservation of intraocular integrity. The cases highlight the importance of individualized surgical strategies and the use of appropriate instrumentation.

Conclusions: Unexpected IOFBs during vitreoretinal surgery present unique challenges that demand surgical expertise, careful intraoperative decision-making, and tailored use of instrumentation. This video underscores the complexity of such cases and emphasizes the critical role of adaptability in ensuring safe and effective outcomes.

Abstract No.: 203205

One-Piece Amniotic Membrane Epiretinal Patch for Recurrent Retinal Detachment With Proliferative Vitreoretinopathy and Large Posterior Retinectomy

First Author: Chun-ju LIN

Purpose: Amniotic membrane (AM) is a popular treatment for external ocular diseases. One case of intravitreal epiretinal human AM transplantation as an adjunct treatment for complicated retinal detachment (RD) and proliferative vitreoretinopathy (PVR) was reviewed.

Methods: A 33-year-old male was a case of traumatic retinal dialysis with RD. Microincisional vitrectomy surgery (MIVS), macular ILM peeling, and silicon oil tamponade were performed. However, recurrent RD with inferior PVR was noted. MIVS, an inferior 160-degree retinectomy, encircling the Gore-Tex buckle, and silicon oil tamponade were done. Unfortunately, recurrent RD with an inferior fixed-fold PVR complicated retinal detachment developed. An implanted one-piece epiretinal AM during MIVS was presented.

Results: Despite the severity of RD and PVR, retinal reattachment and a stable clinical outcome were obtained in this case.

Conclusions: Epiretinal AM was a viable adjuvant with potential benefits for treatment of complicated RD and PVR. No sign of rejection reactions or toxicity was detected. Further studies are needed to evaluate this potential.

Abstract No.: 204796

PFCL Assisted PVD Induction in Bullous Retinal Detachment With GRT

First Author: Rama Kumar G V N

Purpose: To demonstrate the method of inducing PVD with the help of PFCL during a surgery done for rhegmatogenous retinal detachment associated with giant retinal tear (GRT).

Methods: In eyes with retinal detachment associated with giant retinal tear, PVD is usually present. There are certain cases of pathological myopia in which GRT occurs without preexisting PVD. When VR surgery is done in those eyes, it is very difficult to induce PVD with the bullous detachment and highly mobile retina, and the retina keeps coming into the cutter or any other instrument used for PVD induction. In GRT cases, PFCL is used to flatten the retina if there is pre-existing PVD or after PVD induction. In this video, PFCL was used as an additional instrument to stabilize the posterior pole, and PVD could be successfully induced with the cutter in aspiration mode, starting carefully at the edge of the PFCL bubble and moving posteriorly towards the disc. The PFCL bubble helped in preventing the mobile retina from entering the cutter port.

Results: PVD could be induced without much collateral damage with the help of PFCL. After successful PVD induction, the remaining surgery could be completed uneventfully.

Conclusions: This video gives a previously undescribed new method of successfully inducing PVD in a case of RD with GRT with the help of PFCL.

Abstract No.: 202638

PFCL-Assisted ILM Peeling in a Traumatic Large Macular Hole

First Author: Chitaranjan MISHRA

Co-Author(s): Monalisa PATI, Somy PUROHIT, Shiva Prasad SAHOO

Purpose: To report the surgical outcomes of a large traumatic macular hole that was successfully managed with PFCL-assisted, BBG-stained, inverted ILM peeling and grafting.

Methods: A 13-year-old male with a history of cricket ball injury OD 6 months ago presented with a large MH (diameter 1020 microns) with traumatic retinal degeneration of the posterior pole. The vision was 6/36 OD. He was advised and underwent PPV+PVD induction, PFCL-assisted BBG staining, and inverse peeling of the ILM and grafting of the ILM in the MH. Postoperatively, the ILM graft was in situ, the MH closed, and the vision improved to 6/24 at 1 week and 6/18 at 3 months.

Results: Postoperatively, the ILM graft was in situ, the MH closed, and the vision improved to 6/24 at 1 week and 6/18 at 3 months. OCT documentation of the closure of the MH was done.

Conclusions: PFCL-assisted inverted ILM peeling and grafting is a useful surgical treatment modality in the management of a traumatic large MH. PFCL acts as the surgeon's third hand and prevents the dislodgement of the ILM graft. ILM graft acts as a scaffold and hence helps in the regeneration of the retinal layers, thus anatomical hole closure and visual improvement.

Abstract No.: 202290

PFCL-Assisted Membrane Dissection in Diabetic Vitrectomy

First Author: Bhuvan CHANANA

Purpose: To describe the use of perfluorocarbon liquids (PFCL) in different situations during diabetic vitrectomy.

Methods: Video clips demonstrating the role of PFCL in difficult situations during diabetic vitrectomy will be shown. The videos will highlight when to use PFCL to have a successful surgical outcome.

Results: PFCL was shown to be extremely helpful in certain situations. PFCL acts as a third hand, tamponading and pushing the retina behind. PFCL, if injected in the proper plane, can even help to perform membrane dissection and en bloc removal of taut adherent membranes. Lastly, PFCL also pressure tamponades the bleeders and provides a clear media for further surgery and pan-retinal photocoagulation.

Conclusions: PFCL works as magic in certain tricky situations, like pressure tamponade of uncontrolled bleeders and en bloc removal of membranes. If used

judiciously, PFCL can be an extremely helpful tool in diabetic vitrectomy.

Abstract No.: 203520

Pars Plana Vitrectomy With Scleral Buckling in Closed-Funnel Rhegmatogenous Retinal Detachment

First Author: Maria Christine DY

Co-Author(s): Ronaldo JARIN

Purpose: To report a case of closed-funnel rhegmatogenous retinal detachment (RRD) managed with combined pars plana vitrectomy (PPV) and scleral buckling (SB).

Methods: A 65-year-old Filipino male came in for blurred vision on the right. He was diagnosed by a private ophthalmologist with pseudophakic RRD with a full-thickness macular hole (MH), but the patient only sought consultation at our center five months later due to financial constraints. Vision was hand movement with normal intraocular pressure. A single-piece posterior chamber intraocular lens was noted while the fellow eye was relatively normal. The posterior view was limited, but ultrasonography revealed a closed-funnel RD.

Results: With careful preoperative planning, the patient underwent combined PPV with SB. Silicone band 42 was utilized with standard three-port gauge 23 trocar insertion. Methotrexate (MTX) 400ug/0.1mL was also infused during PPV. Extensive membrane peeling was performed using retinal forceps, and complete peripheral vitrectomy was done with perfluorocarbon assistance. The retina gradually flattened with repeated peeling and interval fluid aspiration over the primary retinal break. 360 endolaser cerclage was done with 5000 centistokes of silicone oil injected. One month post-operation, vision was stable at 20/200 with a single dose of intravitreal MTX augmentation injected at week two.

Conclusions: Complex RRD cases constitute multiple surgical challenges, including PVR, MH, and redetachment. An individualized stepladder approach should ideally be followed with adequate planning and patient chair time. MTX has also proven to be a safe and effective adjunct in preventing PVR recurrence and retinal redetachment with favorable anatomical and functional outcomes.

Abstract No.: 206870

Pars Plana Vitrectomy and Scleral Fixation of a Dropped Intraocular Lens via Yamane Technique

First Author: Anna Victoria SAN PEDRO

Co-Author(s): Edmin SANTOS

Purpose: This video demonstrates a combined approach using pars plana vitrectomy and the Yamane

technique to retrieve and reposition a dropped three-piece intraocular lens (IOL). It highlights that in selected cases, the original IOL can be anteriorized and reused, eliminating the need for lens exchange.

Methods: A 74-year-old male with a history of cataract surgery 40 years prior presented with a dislocated IOL in the vitreous cavity. A three-port 23-gauge pars plana vitrectomy was performed, followed by core and peripheral vitrectomy. Perfluorocarbon liquid was injected to protect the macula. The haptics were sequentially anteriorized after releasing the incarcerated haptic from the pars plana. The Yamane technique was then performed after successful anteriorization of the lens.

Results: Post-operatively, the IOL was well-centered with no tilt. Visual acuity improved to 20/55 after the resolution of corneal edema. No intraoperative or postoperative complications were noted.

Conclusions: The Yamane technique, when combined with pars plana vitrectomy, offers a reliable method for repositioning dropped IOLs. An existing three-piece IOL can be safely reused and fixated without the need for lens exchange, achieving stable anatomical and visual outcomes.

Abstract No.: 202016

Plucking the Black Mushroom by Its Roots: Endoresection of a Choroidal Melanoma

First Author: Mohit **DOGRA**

Purpose: Choroidal melanoma (CM) is the commonest primary intraocular malignancy in adults. Management includes plaque brachytherapy (Ru-106, I-125), proton beam therapy (PBT), transpupillary thermotherapy, and enucleation. Rarely, transscleral resection (for broad-based anterior tumors) and vitrectomy with endoresection (for high posterior tumors) are indicated.

Methods: Non-availability of PBT and I-125 plaques in our country makes management of posterior CMs with height >8mm extremely challenging. We show 2 cases of CM with height >8mm who were successfully managed with 3-port 25G pars plana vitrectomy, posterior hyaloid removal, endoresection of the tumor, followed by endolaser/cryotherapy and silicone oil tamponade.

Results: Preoperative planning, anaesthesia, and crucial intraoperative steps of the procedure are highlighted in this video.

Conclusions: Primary endoresection may be an option for select patients with high posterior choroidal melanomas.

Abstract No.: 207351

Pneumatic Retinopexy – the Less Traumatic Journey

First Author: Hong Nien **LEE**

Purpose: To demonstrate a less traumatic method of performing pneumatic retinopexy.

Methods: Intravitreal gas is performed on a patient with a single tear within 8-4 clock hours. After gas is injected, the patient is advised to perform the steam-rolling maneuver in a face-down position for at least 3-4 hours. Subsequently, he is advised to come to our clinic on the following day, or get admitted if logistically not possible. Laser retinopexy is performed and re-examined in the next one or two days. A top-up laser is performed if the laser mark is inadequate.

Results: The method appears more acceptable than the conventional technique performed with cryotherapy.

Conclusions: A step-wise pneumatic retinopexy appears to be easily accepted by patients, yet effective.

Abstract No.: 203707

Posterior Pole Remodeling in MTM: A Combined Approach Using Scleral Imbrication and PPV

First Author: Priyanka **PATEL**

Co-Author(s): Prabhu **SHANKAR**

Purpose: To evaluate the anatomical and functional outcomes of combining scleral imbrication (SI) with pars plana vitrectomy (PPV) and gas tamponade as a primary surgical approach for myopic traction maculopathy (MTM).

Methods: This video presents a patient with MTM associated with high myopia who underwent primary surgery combining scleral imbrication, PPV, and intraocular gas tamponade. The surgical technique involves the removal of the vitreous with posterior hyaloid detachment, followed by the placement of posteriorly located scleral imbrication sutures to reduce axial length and modify the posterior curvature. SF6 gas was used as a tamponade. Pre- and postoperative outcomes, including best-corrected visual acuity (BCVA) and spectral-domain OCT imaging, were analyzed over a 6-month follow-up period.

Results: The operated eye demonstrated resolution of macular detachment on OCT. Mean axial length was reduced postoperatively. BCVA improved, with no major intraoperative or postoperative complications. The posterior pole showed reconfiguration with improved foveal contour.

Conclusions: Scleral imbrication combined with PPV and gas tamponade appears to be a safe and effective primary surgical strategy for MTM in highly myopic eyes. This approach addresses both vitreoretinal

traction and posterior staphyloma, facilitating anatomical restoration and functional recovery.

Abstract No.: 206910

RRR: Reduce, Reuse, Refix! Minimally Invasive Scleral Fixation of a Dislocated IOL

First Author: Manoharan SHUNMUGAM

Purpose: To describe a novel approach for scleral fixation of a dislocated intraocular lens (IOL) that emphasises minimal intervention by reusing the original lens and tips for overcoming difficulties.

Methods: A patient with a posteriorly dislocated IOL underwent pars plana vitrectomy followed by scleral fixation. Instead of exchanging the lens, the existing IOL was stabilised using a transconjunctival double-needle technique. Only two paracenteses were performed in addition to standard vitrectomy ports. This reduced the need for larger corneal incisions and excessive intraocular manoeuvres. Surgical video documentation was captured to illustrate each step

Results: The IOL was successfully fixated with excellent centration and stability. The minimally invasive strategy shortened surgical time, preserved corneal integrity, and minimised postoperative astigmatism. No perioperative complications occurred. At early postoperative review, the patient demonstrated improved visual acuity with a well-centred IOL and quiet anterior chamber.

Conclusions: This case highlights the advantages of a "Reduce, Reuse, Refix" approach for managing dislocated IOLs. By reducing unnecessary incisions, reusing the patient's own lens, and applying an appropriate fixation technique, patients can achieve visual rehabilitation with less surgical manipulation. This method represents a safe, efficient, and sustainable alternative to traditional IOL exchange in selected cases.

Abstract No.: 206120

Rescue Strategy for Macular Hole in Diabetic TRD: A Combined ILM Scaffold and Amniotic Membrane Plug Approach

First Author: Awaneesh UPADHYAY

Co-Author(s): Deependra SINGH, Zakia ANWER, Tejasvini CHANDRA

Purpose: To demonstrate a surgical rescue technique for full-thickness macular holes (FTMH) encountered during pars plana vitrectomy (PPV) for tractional retinal detachment (TRD) secondary to proliferative diabetic retinopathy (PDR), using a combination of internal limiting membrane (ILM) scaffold and amniotic membrane graft (AMG).

Methods: A 58-year-old male with PDR presented with TRD involving the macula and a coexisting FTMH with vision of counting fingers @1metre. Standard

25G PPV with meticulous membrane dissection was performed along with subretinal fluid aspiration through the macular hole. An ILM flap was fashioned and positioned over the hole as a scaffold under perfluorocarbon liquid (PFCL). However, during fluid-air exchange, the ILM scaffold was inadvertently aspirated. Pan-retinal photocoagulation (PRP) and silicone oil tamponade were done. As a salvage strategy, a trimmed AMG was gently inserted over the disc and manoeuvred over the macular hole under silicon oil.

Results: Postoperative OCT at 1 week confirmed type 1 closure of the macular hole with good anatomical contour and complete retinal reattachment. The AMG remained stable without signs of displacement or inflammation. Visual acuity improved to 6/60. No intra-operative or postoperative complications were noted

Conclusions: Macular holes in the setting of diabetic tractional retinal detachment are uncommon and pose significant surgical challenges. While the use of an internal limiting membrane (ILM) flap under perfluorocarbon liquid (PFCL) offers a stable scaffold for hole closure, intraoperative loss of the flap can compromise outcomes. In such situations, an amniotic membrane graft (AMG) serves as an effective rescue strategy, providing predictable outcomes.

Abstract No.: 206433

Retinal Mavericks: Stories of Intraocular Gymnastics

First Author: Srinivas JOSHI

Co-Author(s): Apoorva AYACHIT, Guruprasad AYACHIT, Giriraj VIBHUTE

Purpose: To demonstrate a few challenging cases of closed globe internal refixation of dislocated/ subluxated IOLs & Intraocular foreign bodies.

Methods: We present the unique minimally techniques for refixation of dangling/dislocated intraocular lenses without need for explantation. One case represents successful tackling of a challenging scenario involving large corneal tear, large irregularly shaped IOFB and retinal detachment.

Results: The various techniques described achieved refixation of dislocated/ subluxated IOLs. In case with IOFB, inspite of corneal sutures, the IOFB was removed, retina could be reattached and even ILM peeling was possible.

Conclusions: The techniques of closed globe internal refixation provide minimally invasive, safe and effective solution for selected cases of dislocated/ subluxated IOLs. And with modern technology and techniques even cases which were earlier thought to be inoperable, can be given a try.

Abstract No.: 200764**Salvaging Vision in a Monocular Ultra-High Myopic Elderly: Modified Yamane Scleral Fixation Using 1ml Syringe Needle Under 4mm Pupil Constraint***First Author: Huang YUJUAN*

Purpose: To rescue the only functional vision in a monocular, ultra-highly myopic elderly patient by safely repositioning a dislocated intraocular lens (IOL) from the vitreous cavity and achieving stable refractive rehabilitation under extreme surgical constraints (pupil dilation $\leq 4\text{mm}$).

Methods: (1) Minimally invasive vitrectomy via standard 3-port pars plana approach to access and extract the dropped IOL. (2) Iris retractors to overcome a 4mm pupillary constraint during IOL retrieval from the vitreous, avoiding retinal disturbance. (3) Modified Yamane technique: Created scleral tunnels using 30G 1ml syringe needles (nasal/temporal). Guided IOL haptics through tunnels via intraocular forceps with syringe-needle assistance for precision. Achieved intrascleral haptic fixation with posterior chamber IOL stabilization. 4. Confirmed IOL centration, haptic burial, and retinal integrity before closure.

Results: Pre-op: Light perception only (IOL drop + poor dilation). Post-op: Day 1: UCVA 0.5/1 & 6 months: UCVA stabilized at 0.8, IOL well-centered with buried haptics (AS-OCT confirmed). Zero complications: No endophthalmitis, retinal detachment, IOL redislocation, or abnormal IOP over 6-month follow-up.

Conclusions: This modified Yamane technique using 1ml syringe needles successfully addresses complex IOL dislocation in high-risk scenarios (monocular, ultra-high myopia, poor dilation). It enables micro-incision, precise haptic externalization, and stable scleral fixation without costly tools. The approach is a safe, resource-efficient paradigm for vitreoretinal surgeons managing critical cases.

Abstract No.: 207112**Saving the EYE- Combined Vitrectomy and Choroidal Drainage in Traumatic Retinal Detachment and Choroidal Detachment***First Author: Nehha Bs PANDEY (DR NEHA BAJPAYEE)*

Purpose: To present the case of 58 a 58-year-old gentleman who had a history of trauma 3 months back, post which the patient developed Retinal detachment and subsequently choroidal detachment, and his IOP at the time of presentation was 5 mmHg. Such cases require meticulous planning and draining CD before starting vitrectomy through 23 G ports, followed by vitrectomy and Silicone oil tamponade, which saved the patient's eye.

Methods: In cases of trauma with hypotony, it is very important to inspect the sclera for any perforation,

after a 360-degree peritomy and scleral inspection AC maintainer was used to see if the globe is forming, and then Choroidal detachment and serous fluid were drained through 23 G port, and vitrectomy was continued, and silicone oil tamponade was used at the end.

Results: Post op day 1, the patient had vision of CF at 2 m with 12mm of Hg IOP, settled RD and CD. Post op 1 month, vision improved to 6/60 (Snellen) under oil.

Conclusions: In eyes with combined RD and CD with hypotony, it is very important to inspect scleral perforation, and meticulous planning with drainage of choroidal fluid helps to settle CD and helps the surgeon to go ahead with vitrectomy confidently. Drainage of choroidal fluid becomes challenging in a hypotonous eye, forming globe before drainage is very important.

Abstract No.: 206884**Scleral Buckling and External Drainage With Chandelier-Assisted Visualization for Rhegmatogenous Retinal Detachment***First Author: Anna Victoria SAN PEDRO**Co-Author(s): Junn PAJARILLO*

Purpose: To demonstrate a detailed surgical approach to scleral buckling with external drainage using chandelier-assisted visualization in the management of rhegmatogenous retinal detachment (RRD) in a young adult patient.

Methods: This video presents a case of a 21-year-old male with rhegmatogenous retinal detachment. A standard scleral buckling procedure was performed using a 240 encircling band and a 277 segmental buckle. Buckle elements were adjusted and secured with partial-thickness scleral bites using 5-0 braided polyester sutures. Chandelier-assisted wide-angle visualization was employed intraoperatively to localize retinal breaks and assess the extent of retinal detachment. After securing the buckle components, a radial scleral cutdown was performed in the inferotemporal quadrant. Following light cauterization, the choroid was punctured with a needle to allow controlled external drainage of subretinal fluid. Balanced salt solution was injected intravitreally to maintain intraocular pressure and restore globe tension. Final inspection confirmed that the retinal breaks were adequately supported by the segmental indentation and encircling band.

Results: The retinal breaks were well-supported by the buckle and segmental indentation. Drainage was successfully achieved without complications such as retinal incarceration or hypotony. The retina remained attached postoperatively after completion of laser treatment.

Conclusions: Scleral buckling with external drainage remains an effective treatment for RRD. Chandelier-assisted visualization provides better visualization and

eliminates the need to repeatedly don the indirect ophthalmoscope, streamlining workflow. Effective anatomical reattachment can be achieved with proper buckle placement and external drainage.

Abstract No.: 207205

Scleral Fixation in the Shadow: Salvaging a Dropped IOL in the Presence of Choroidal Detachment

First Author: Abhimanyu SHARMA
Co-Author(s): Awaneesh UPADHYAY

Purpose: To demonstrate the management of a case of IOL drop with a co-existing choroidal detachment employing critical decision making and intra-operative adaptability.

Methods: A 58-year-old male presented post-complicated cataract surgery with a dropped 3-piece IOL following an attempted sulcus placement. A 25G pars plana vitrectomy was undertaken. Intra-operatively, the IOL was embedded within dense viscoelastic and triamcinolone at the posterior pole. Careful core vitrectomy and clearance revealed the IOL and a nasal-to-disc choroidal detachment.

Results: Given the altered posterior segment contour, scleral fixation was strategically performed at 6 and 12 o'clock positions to minimise the risk of exacerbating the detachment. The IOL was fixated, followed by peripheral vitrectomy, anterior chamber reformation, and secure closure of scleral pockets and conjunctiva.

Conclusions: This case demonstrates intraoperative adaptability and highlights critical decision-making required during secondary IOL fixation in eyes with coexisting choroidal pathology and limited posterior segment stability

Abstract No.: 201942

Secondary IOL Implantation in a Silicone Oil-Filled Aphakic Eye

First Author: Shah Md Rajibul ISLAM

Purpose: To observe the safety of secondary IOL implantation in a silicone oil-filled aphakic eye.

Methods: The infusion port was placed in the infero-temporal quadrant, 3.5 mm from the limbus. Infusion was not connected. Secondary IOL was implanted by the Yamane technique. 2 Superior ports were made 3.5 mm from the limbus at the supero-nasal & supero-temporal quadrants. SOR done, fluid air exchange done. Wound closed.

Results: The procedure was completed safely.

Conclusions: Secondary IOL implantation is safe and easier in an SO-filled globe. SOR can be done following IOL implantation.

Abstract No.: 206426

Seeing is Believing: Exploring New Possibilities in Vitreoretinal Surgery

First Author: Srinivas JOSHI
Co-Author(s): Apoorva AYACHIT, Guruprasad AYACHIT, Giriraj VIBHUTE

Purpose: To demonstrate the clinical utility of intraoperative fluorescein, digital image filters, and advanced vitrectomy cutters in enhancing surgical visualization and management of complex vitreoretinal conditions.

Methods: A descriptive demonstration of recent innovations in vitreoretinal surgery, focusing on the integration of intraoperative fluorescein dye and angiography, the adoption of digital filters for real-time image enhancement, and the use of next-generation vitreous cutters capable of precise tissue plane access.

Results: The application of intraoperative fluorescein and angiography improved intraoperative understanding of the underlying conditions. Digital filters provided enhanced contrast and virtual "third-eye" perspectives, facilitating meticulous dissection during challenging steps. Advanced cutters allowed for closer, safer tissue segmentation. Combined, these technologies were associated with more efficient surgeries and potential improvements in anatomical and functional outcomes.

Conclusions: Intraoperative use of fluorescein, digital imaging filters, and advanced vitreous cutters collectively improves visualization and precision in vitreoretinal surgery, supporting their adoption to optimize outcomes in complex retinal procedures.

Abstract No.: 202838

Small Pupil, Big Challenges: Managing RRD With Small Pupil

First Author: Arjun AURORA
Co-Author(s): Manisha AGARWAL, Akash CHAUDHARY

Purpose: Small pupil with retinal detachment is a challenging situation. Our video demonstrates two situations of small pupil-a dropped nucleus with a chronic rhegmatogenous retinal detachment (RRD), and second case of a chronic RRD in a young male.

Methods: Although there are a variety of pupil expansion devices available, iris hooks are most reliable in our hands.

Results: First case was a 70-year-old male who suffered blunt trauma a year ago, and presented to us with a non-dilating pupil, dislocated white cataract, and a total RRD on B scan with visual acuity of light perception (PL). We first performed a near total vitrectomy with base shaving, and used phaco-fragmentation for nucleus removal. Retina settled after Fluid air exchange (FAX). 360 endolaser (EL) was done and 1000 Cst silicone oil was injected. Patient improved to Best corrected VA

(BCVA) of 6/60. Our second case is a 30-year-old male, who, after suffering blunt trauma by a ball 2 years ago, presented to us with a chronic RRD after undergoing complicated cataract surgery elsewhere. He had a non-dilating pupil with an ACIOL in-situ. Iris hooks were implanted, and a meticulous vitrectomy was done. Following FAX, break was lasered and 360 EL was done. Patient improved to BCVA of 6/18.

Conclusions: Managing small pupil with RRD, although challenging, gives gratifying results with the right planning and pupil expansion devices. Iris hooks are our device of choice, since they are cheap, easily available, and give good pupil expansion.

Abstract No.: 206588

Surgical Challenges in a Case With Multiple Lesions After Trauma With Pulling Band

First Author: Sundaram **NATARAJAN**
Co-Author(s): Pac Cristina **PATRICIA**

Purpose: This report focuses on a 44-year-old male with total retinal detachment associated with dense subretinal haemorrhage, PVR changes, and scleral tear after trauma with pulling the band while doing exercise.

Methods: After urgent full-thickness scleral tear repair, the integrity of the ocular globe has been obtained by performing a 23 gauge pars plana vitrectomy, lens extraction, membrane peeling, relaxing retinectomy, perfluorocarbon liquid use, endolaser, and silicone oil injection. Challenges faced during the surgery were regarding bleeding control, blood clots stuck to the retina, PVR identification and management, protecting the retinal tissue from further damage, and unfolding the retina with the best macular aspect possible. Postoperative care was focused on the retinal aspect, controlling the inflammation and the intraocular pressure, and maintaining a good corneal transparency.

Results: Retinal reattachment was achieved with preserved macular structure. Intraoperative bleeding and PVR membranes were effectively managed. Postoperative recovery was stable, with clear cornea and controlled intraocular pressure. Visual improvement was limited due to trauma severity, but globe integrity was restored. The patient reported functional vision gain and remains under follow-up for possible silicone oil removal.

Conclusions: This case underlines the complexity of post-traumatic cases that undergo multiple surgeries for a slight improvement of visual acuity and the fact that every little more, little better" really counts. Every step well thought out and guided by precision and firmness uplifts chances for a better reconstruction of the ocular globe and, therefore, more chances for a better vision for the patient.

Abstract No.: 205157

Surgical Management of Large Subretinal Silicone Oil Globule

First Author: Lawrence **IU**

Purpose: Silicone oil is a common tamponade agent used in a vitrectomy operation for the treatment of retinal detachment. Inadvertent retention of silicone oil in the subretinal space after a retinal detachment operation is uncommon. This video presents a case of a large subretinal silicone oil globule occupying the inferior one-half of the retina, which was removed successfully by retinectomy and direct removal.

Methods: The surgical technique to remove subretinal silicone oil involves retinectomy to create access to the subretinal space, direct removal of subretinal silicone oil, followed by heavy liquid (PFCL) injection to flatten the retina, endolaser retinopexy and direct PFCL-silicone oil exchange to maintain retinal attachment.

Results: A 68-year-old male patient had a large subretinal silicone oil globule involving the inferior one-half of the retina after a vitrectomy operation for chronic total rhegmatogenous retinal detachment. The described technique successfully removed the large subretinal silicone oil globule. The retina remained attached all along after the operation.

Conclusions: Subretinal silicone oil is an uncommon complication after a vitrectomy operation. High clinical suspicion is necessary. It can be safely and effectively removed by retinectomy and direct removal.

Abstract No.: 207094

Taking On the XLs

First Author: Aziz Jan **BASHIR**

Purpose: Surgical techniques for successful closure of XL macular holes.

Methods: Technique one: Retinal Autograft; Technique two: Multilayered ILM flaps over the Hole.

Results: Successful closure of the holes with both techniques.

Conclusions: Retinal Autograft and Multilayered ILM flaps are useful techniques for successful anatomical closure of XL Full-thickness Macular Holes.

Abstract No.: 204489

The Missing Link – Management of Missing Retinal Tear in Rhegmatogenous Retinal Detachment

First Author: Nurul Ain **RAHIM**
Co-Author(s): Mae-lynn catherine **BASTION**, Jemaima **CHE HAMZAH**, Teck Chee **CHENG**

Purpose: To showcase the drainage retinotomy technique for retinal reattachment when no retinal break is detected.

Methods: Retrospective review of 1 case.

Results: A 65-year-old woman underwent complicated cataract surgery in her right eye. One week later, she developed a superior retinal tear, treated with barricade laser. Three months later, her vision dropped to 6/60 due to an inferior rhegmatogenous retinal detachment. No causative tear was identified pre-operatively. Optical Coherence Tomography (OCT) showed Subretinal Fluid (SRF). She underwent Pars Plana Vitrectomy (PPV) and tamponade. Intraoperatively, no retinal tear was identified. Heavy liquid (HL) was injected to displace subretinal fluid and reveal a tear but failed. It was able to flatten the retina after drainage retinotomy was performed at the inferotemporal retina to drain the subretinal fluid. A 360-degree laser was delivered. Heavy liquid–air exchange was then performed. C3F8 16% was used as a tamponade. Post-op vision improved to 6/18 after 4 months of follow-up with attached retina.

Conclusions: Occult or missed retinal tear in rhegmatogenous retinal detachment is rare and requires a modification of the surgical technique. In this case, a combination of drainage retinotomy, HL usage, and 360-degree laser barricade during PPV led to successful retinal reattachment.

Abstract No.: 206065

The Oil Misplacement Odyssey

First Author: Vidhi BAJPAI

Co-Author(s): Mudit TYAGI

Purpose: To report a rare intraoperative complication of suprachoroidal silicone oil injection and describe its recognition and management.

Methods: A 72-year-old female with acute postoperative endophthalmitis following cataract surgery was planned for pars plana vitrectomy with intravitreal antibiotics. Intraoperatively, a rhegmatogenous retinal detachment was noted. During perfluorocarbon–silicone oil exchange, silicone oil was inadvertently injected into the suprachoroidal space. This video illustrates the sequence of events, recognition of the complication, and the surgical strategy adopted for controlled drainage.

Results: Suprachoroidal oil was drained using 23 gauge non-valved cannula successfully. Initially, the globe was closed under perfluorocarbon, which was replaced with silicone oil one week later. The retina was successfully reattached, and no additional postoperative complications occurred.

Conclusions: Suprachoroidal injection of silicone oil is a rare complication, and this video demonstrates a practical method for its management.

Abstract No.: 201746

Tiny Eye, Timely Intervention: Pars Plana Vitrectomy in Pediatric Endogenous Endophthalmitis

First Author: Francis Ezra LAXAMANA

Co-Author(s): Niccolo VALENCIA

Purpose: To present the surgical management and visual outcome of a rare case of endogenous endophthalmitis in a pediatric patient, highlighting the role of pars plana vitrectomy combined with intravitreal antibiotics and silicone oil tamponade.

Methods: A 5-year-old male presented with redness and foreign body sensation in the right eye. On slit-lamp examination, a central whitish corneal opacity was noted with dense whitish pupillary membranes. Ocular ultrasonography revealed dense vitreous opacities suggestive of vitritis. A diagnosis of endogenous endophthalmitis was made. The patient underwent 23-gauge pars plana vitrectomy and lensectomy with intravitreal injection of vancomycin and ceftazidime, followed by silicone oil tamponade due to intraoperative concerns of retinal ischemia, retinal tears, and persistent inflammation. Multiple techniques were utilized to debulk the inflammation and restore the anatomy of the child's eye.

Results: Postoperative recovery was uneventful. Ocular inflammation subsided, as well as the patient's comfort. The eye remained stable with the silicone oil in situ. Removal of silicone oil and secondary implantation of an intraocular lens is being planned in the future.

Conclusions: Endogenous endophthalmitis in the pediatric population is rare and may present subtly. Early surgical intervention with vitrectomy and appropriate intravitreal antibiotic therapy, combined with silicone oil tamponade in select cases, can lead to favorable anatomical and functional outcomes.

Abstract No.: 206918

Unconventional Laser Application for Subfoveal CNV via a Macular Hole in High Myopia

First Author: Vicente Lorenzo CABAUG

Co-Author(s): Quan HOANG

Purpose: To present a unique case of pathologic myopia with chronic full-thickness macular hole (FTMH) complicated by subfoveal choroidal neovascularization (CNV) and subsequent macular hole retinal detachment (MHRD), managed with vitrectomy and unconventional subfoveal laser through the macular hole.

Methods: A 71-year-old female with high myopia and prior macular hole surgery developed new floaters and flashes. Evaluation revealed chronic FTMH with CNV and MHRD. The patient underwent TPPV with membrane peeling, C3F8 tamponade, and targeted

focal laser applied through the macular hole to address the subfoveal CNV.

Results: The retina was successfully reattached with closure of the macular hole. The CNV showed regression following laser application. Vision stabilized at pre-detachment levels (6/60).

Conclusions: This case demonstrates the feasibility of applying a laser directly through a macular hole to treat subfoveal CNV in the setting of high myopia. Although unconventional, this approach provided effective CNV control while addressing MHRD, underscoring innovative surgical decision-making in complex myopic maculopathy.

Abstract No.: 201419

Unraveling an Unusual Retinal Detachment

First Author: Shishir **VERGHESE**

Co-Author(s): Prithvi **CHANDRAKANTH**

Purpose: To report an unusual case of combined retinal detachment.

Methods: A 75-year-old male presented with hand movements and vision in the right eye. Examination revealed an immature cataract and subtotal retinal detachment with a greyish-white lesion at the inferotemporal arcade. Multimodal imaging and uveitis workup were performed. He underwent pars plana vitrectomy with silicone oil and intraoperative retinectomy; the excised lesion showed chronic inflammation. Postoperatively, a new retinitis lesion developed near the retinotomy site. A diagnosis of retinal detachment secondary to Toxoplasma retinochoroiditis was made, and appropriate therapy was initiated.

Results: Three months later, cataract surgery with silicone oil removal was performed, and vision improved to 6/36.

Conclusions: This video highlights an unusual retinal detachment presenting as a rare complication of toxoplasma retinochoroiditis and its appropriate management. Early detection is the key to good outcomes in these cases

Abstract No.: 205894

Visco-Expression of Hyphema in a Silicone-Oil Filled Aphakic Eye – A Novel Technique

First Author: Rishika **RATHORE**

Co-Author(s): Atul **ARORA**, Yvk **CHAITANYA**, Vishali **GUPTA**, Shilpa **SABU**

Purpose: Hyphema is a vision-threatening complication commonly associated with ocular trauma, intraocular surgery, or neovascularization of the iris (NVI). Classical management includes anterior chamber washout or needle aspiration via limbal paracentesis to restore aqueous outflow. Organized or non-resolving hyphema may require irrigation-aspiration with a Simcoe's

cannula or automated anterior vitrectomy. However, in aphakic silicone oil-filled eyes, surgical intervention is challenging as silicone oil rises into the anterior chamber during maneuvers. We describe a novel, safe, and effective technique of hyphema drainage using viscoelastic in such eyes.

Methods: A 48-year-old Asian Indian male, with a history of pars plana lensectomy and vitrectomy with silicone oil tamponade for combined retinal detachment, developed postoperative hyphema in his only seeing eye (fellow eye lost to neovascular glaucoma). A clear corneal incision was made at 10 o'clock using an MVR blade. Dispersive viscoelastic was used to mechanically separate blood clots from underlying structures. The organized hyphema was then expressed through a second corneal incision at 12 o'clock.

Results: Complete hyphema clearance was achieved, with restoration of a clear visual axis with media grade 1. No intraoperative complications or silicone oil migration were observed.

Conclusions: Visco-expression of hyphema is a safe and effective option for organized hyphema removal in aphakic, silicone oil-filled eyes. It provides a mechanical barrier preventing silicone oil migration and allows controlled clot dissection, minimizing intraoperative risk and preserving visual potential.

Abstract No.: 201220

Vitreous Lavage in Upright Position- an Innovative Topical Air Fluid Exchange (AFE) for Recurrent Vitreous Hemorrhage (VH) Post-Vitrectomy

First Author: Harshal **SAHARE**

Purpose: This novel technique addresses some of the key challenges associated with conventional approaches to managing recurrent VH post-vitrectomy by performing VL in an innovative way.

Methods: The technique involved injecting air with a 30G needle in a 5ml syringe at the 6 O'clock position under topical anaesthesia in the upright position without making any ports. Gradually, air is injected inside the globe and allows the vitreous fluid to come outside simultaneously on the same syringe. Globe pressure is checked throughout the procedure.

Results: Postoperative data show fast resolution of dispersed VH with rapid recovery and best corrected visual acuity of 20/20 within a week without undergoing revision vitrectomy.

Conclusions: This is a brilliant workaround by injecting air in the upright position under topical anaesthesia and simultaneously aspirating dissolved VH fluid from the cavity with rapid post-operative visual recovery without going for revision vitrectomy.

Abstract No.: 207252

Well Begun Is Half Done: Pre-Op tPA/Gas as a Bridge to Vitrectomy in Massive Submacular Hemorrhage

First Author: Sandeep KUMAR

Co-Author(s): Charu GUPTA

Purpose: To describe a novel staged approach for the management of massive submacular hemorrhage, wherein pre-operative intravitreal tissue plasminogen activator (tPA) combined with expansile gas is employed to displace the clot and facilitate clot lysis, followed by pars plana vitrectomy for definitive management. This strategy aims to optimise clot clearance, minimize surgical trauma, and enhance visual outcomes in eyes with an otherwise poor prognosis.

Methods: A staged approach was employed for a case of massive submacular hemorrhage. Pre-operative intravitreal tissue plasminogen activator (tPA) combined with expansile gas was administered to achieve clot displacement and liquefaction. This was followed by pars plana vitrectomy as a planned second step. The rationale was to minimize macular photoreceptor toxicity from prolonged blood contact and to simplify subsequent intraocular surgery.

Results: The initial intravitreal injection led to significant displacement and liquefaction of the submacular clot, thereby facilitating its clearance during vitrectomy. In most cases, spontaneous egress of blood into the vitreous cavity was noted, further shortening surgical time. Where blood remained localized, liquefied subretinal blood could be easily evacuated with minimal manipulation. This sequential strategy improved visualization, reduced intraoperative complexity, and enhanced the likelihood of anatomical and functional recovery.

Conclusions: Pre-operative tPA and gas injection prior to vitrectomy represents a practical and effective method for managing massive submacular hemorrhage.

专题发言

眼底外科

摘要编号: 210014

折叠式球囊 (Foldable Capsular Buckle, FCB) 巩膜外垫压术治疗孔源性视网膜脱离的疗效分析

首席导师: Xiao TAN

目的: 探讨折叠式球囊 (Foldable Capsular Buckle, FCB) 巩膜外垫压术治疗孔源性视网膜脱离 (Rhegmatogenous Retinal Detachment, RRD) 的疗效及优势, 尤其在多发或巨大视网膜裂孔所致复杂性 RRD 中的应用价值。

课程简介: 回顾分析 2024 年 6 月至 2025 年 10 月于深圳爱尔眼科医院接受 FCB 巩膜外加压术治疗的 21 例 (21 只眼) RRD 患者的临床资料。术后随访 1 ~ 12 个月, 观察视网膜复位情况、最佳矫正视力 (BCVA)、眼压变化及并发症。所有患者均接受 SLO、OCT、B 超、视盘直径、人工晶体测量及角膜内皮细胞计数检查。

课程大纲: 21 例患者 (21 只眼), 单个视网膜裂孔 10 例 (其中 4 例裂孔 ≥ 4 PD), 多个视网膜裂孔 11 例 (裂孔 ≥ 2 个、相距 ≥ 1 象限)。所有患者手术顺利完成, 其中 4 例伴上方巨大裂孔或多发裂孔者辅助玻璃体腔注气, 复位率 100%。4 例因特殊情况转行玻璃体切除术 (巩膜囊肿、黄斑孔合并脱离、高端晶体致周边视网膜裂孔判断困难、上方变性区筛孔渗漏)。术后并发症包括眼压升高 3 例 (停激素后恢复)、复视 4 例 (取出 FCB 后恢复)。13 例视网膜脱离未累及黄斑患者术后 BCVA 约 1.0; 8 例术前视网膜脱离累及黄斑者 (术前 BCVA 0.2-0.3) 术后 BCVA 提高至 0.5 ± 0.2 , OCT 显示黄斑结构恢复。随访期间全部病例视网膜复位良好, 无再脱离发生。

论文发言

人工智能、数位创新与虚拟健康

摘要编号：210092

人工智能在儿童近视防控中的应用与展望

第一作者：Rouan CHEN

目的：近视在全球儿童与青少年中呈现高发与低龄化趋势，对公共卫生构成严峻挑战。传统预测方法因精度有限与个体化评估不足，难以满足精准防控需求。本研究旨在系统总结人工智能（Artificial Intelligence, AI）在该领域的主要建模思路与应用进展，探讨其技术潜力与临床价值。

方法：研究通过文献梳理与比较分析，构建了基于数据类型的 AI 方法选择框架：传统机器学习擅长处理屈光度、眼轴长度等结构化数值数据，在风险分层中兼具效能与良好可解释性；深度学习在解析眼底图像、光学相干断层扫描（Optical Coherence Tomography, OCT）等非结构化影像方面展现出卓越的特征提取能力，能自动识别与近视相关的微观结构标志；多模态融合模型则通过整合数值与影像信息，实现了预测结果的稳健性与泛化性显著提升。

结果：应用层面，AI 已贯穿于近视管理的全链条：在测量层面，AI 能利用眼底照片等易得数据替代复杂检测，自动精准量化关键参数；在预测上，基于数值数据、影像特征乃至二者融合信息，构建了从早期筛查、风险分层到基于时间序列的个体化进展动态预测模型；在防控干预上，展现出在个性化关键参数预测与药物疗效评估（如角膜塑形镜验配、阿托品疗效预测）中的辅助决策潜力。

结论：综上所述，人工智能正成为儿童近视预测与防控体系的核心技术支撑。尽管前景广阔，当前研究仍面临模型泛化能力不足、多维度信息整合不充分以及“黑箱”决策可解释性有限等挑战。未来应致力于构建多中心、大样本的标准化数据库，深化多模态数据融合，并加强可解释性 AI 研究，以推动人工智能从技术工具向能够支撑精准公共卫生策略与个体化临床管理的核心能力转变。

摘要编号：201865

人工智能在眼底病创新诊疗中的四维突破

第一作者：Xianwei LI

目的：破解眼底病诊疗困境：眼底病是全球致盲的主要原因，糖尿病视网膜病变（DR）患者超 1.4 亿，而基层眼科医生缺口达 70%。传统诊疗依赖人工阅片，三甲医院单张 OCT 影像分析需 8-12 分钟，误诊率高达 23%。本研究旨在通过人工智能（AI）技术实现三大目标：提升诊断效率：缩短影像分析时间至秒级，缓解医疗资源不均问题；突破诊断瓶颈：构建多模态数据融合模型，提升黄斑变性等复杂病变识别精度；推动个性化治疗：通过 AI 预测 DR 进展风险，指导精准干预。

方法：多维度技术融合路径 1. 数据采集与处理 多模态数据库：整合 1 万例 OCT、眼底彩照及患者电子病历，涵盖 DR、青光眼等 5 类疾病；数据增强：采用生成对抗网络（GAN）扩增罕见病变样本，解决数据不平衡问题。2. AI 算法构建 深度学习架构：搭建 3D-ResNet-50 网络，提取 OCT 分层特征（如视网膜神经纤维层厚度）；多任务学习：同步完成病灶定位（误差 ± 0.11 mm）、分级（准确率 96.7%）及预后预测。3. 临床验证设计 前瞻性试验：在 8 省市 32 家医院开展对比试验，AI 组与专家组双盲阅片；性能指标：采用 ROC 曲线、Kappa 值评估模型一致性，F1-score 衡量分类性能。

结果：临床效能显著提升 诊断效率突破 AI 系统单张 OCT 分析时间降至 3.2 秒，基层医生工作量下降 68%；DR 筛查敏感度达 98.2%，特异性 91.5%，超越中级职称医生水平。复杂病变识别 黄斑裂孔自动分割 Dice 系数 0.89，较传统 U-Net 提升 12%；脉络膜新生血管检出率提高至 94.3%，漏诊率从 17% 降至 4.2%。治疗决策支持 DR 5 年失明风险预测模型 AUC 值 0.93，指导抗 VEGF 治疗时机选择；AI 辅助治疗方案使患者年就诊次数减少 3.2 次，医疗费用下降 41%。

结论：AI 重塑眼底病诊疗范式 技术价值验证 AI 显著提升眼底病诊疗标准化水平，使基层医院 DR 筛查准确率从 67% 跃升至 89%。多中心试验证实，AI 系统可减少 38% 的过度治疗和 26% 的治疗不足。临床应用挑战 数据异质性：不同设备影像特征差异导致模型泛化性下降（如 Topcon 与

Heidelberg OCT 数据)；伦理风险：7.3% 患者对 AI 诊断存疑，需建立人机协同决策机制。本研究证实，AI 不仅是一把“数字手术刀”，更是打破医疗资源壁垒的核心引擎。随着《医疗 AI 临床应用指南》的出台，人工智能有望在 5 年内覆盖 80% 眼底病诊疗场景，让“光明守护”突破时空界限。

摘要编号：210337

儿童近视神经网络中鲁棒的可解释的单元级因果推理

第一作者：Zihui JIN

共同作者：Shi-ming LI

目的：理解深度学习中的因果机制对于临床应用至关重要，其中可解释性和可靠性是关键所在。目前大多数人工智能系统如同黑箱，限制了医学领域的透明度。我们提出了一个集成于神经网络中的因果推断框架，用于评估个体特征对预测的影响。

方法：通过对一个 3000 多名儿童纵向随访的前瞻性儿童眼科队列的研究，通过干预估计直接和间接因果效应。采用多重证伪策略进行的反驳实验验证因果效应的稳健性和可靠性。

结果：我们的方法通过干预估计了直接和间接因果效应。将该方法应用于儿童近视进展的研究中，不仅取得了良好的性能，还识别出了临床上合理的因果路径。因果效应的稳健性和可靠性也得到了证实。该方法不受模型影响，适用于需要可解释性的数字健康干预。

结论：通过将单元级因果推理融入深度学习，这项工作推动了与精准医学和公平医疗目标相一致的透明、可靠人工智能系统的发展。

摘要编号：209271

因果注意力网络用于糖尿病黄斑水肿疗效预测

第一作者：Yan LIU

共同作者：Yao FU, Ao SHEN, Xuefei SONG, Xieyang XU

目的：探讨基于光学相干断层扫描 (OCT) 影像的糖尿病黄斑水肿抗 VEGF 疗效预测新方法，评估玻璃体 - 黄斑界面病变在疗效预测中的价值，构建具备解释性和泛化能力的多任务深度学习模型。

方法：研究收集 600 张 OCT 采集的图像建立模型。由一名经验丰富的眼科医生初步标注图像中黄斑前膜区域，并由另一名医生复检验证。引入因果注意力学习模块，构建多模态输入通道，在内部数据集上完成训练与验证，并与多种算法进行性能对比。

结果：基于因果注意力学习的多任务 OCT 深度模型 (ERM-CAL-Net) 在疗效预测与结构分割双任务中均取得优于现有 SOTA 模型的表现。课程学习策略有效改善了模型的收敛效率与稳定性；多模态输入的引入进一步增强了预测的准确度与可解释性。该模型刻画糖尿病黄斑水肿中黄斑前膜及相关微结构异常的特征。

结论：本研究提出的 ERM-CAL-Net 在 OCT 图像的多任务分析中实现了方法学创新，兼具预测准确性与临床可解释性。未来可进一步扩展至其他眼科疾病（如黄斑裂孔、视网膜脱离），并结合 OCTA、眼底照相及功能学检查，构建具备跨模态与跨病种泛化能力的智能诊疗系统。

摘要编号：209301

基于 AI- 医师协同定量分析眼底 ISI 与房水中细胞因子的相关性研究

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目的：AI- 医师协同定量分析糖尿病视网膜病变 (DR) 患者超广角荧光素眼底血管造影不同区域缺血指数 (ISI)，并探讨其与房水细胞因子的相关性。

方法：本研究为横断面研究。收集接受抗血管内皮生长因子 (VEGF) 药物治疗的 DR 患者 40 例 40 只眼。根据临床诊断标准将受检者分为非增生型 DR (NPDR) 组 18 例和增生型 DR (PDR) 组 22 例。采用 Luminex 液相芯片技术检测房水中 VEGF、胎盘生长因子 (PLGF)、血管生成素样蛋白 4 (ANGPTL4)、白细胞介素 -6 (IL-6)、IL-8、IL-1 β 、单核细胞趋化蛋白 -1 (MCP-1)、细胞间黏附分子 -1 (ICAM-1) 和肿瘤坏死因子 - α (TNF- α) 9 种细胞因子的浓度。所有患者均行 UWFA。使用 “AI-Doctor” 协同模型对获取的图像进行处理，自动分割视网膜区域（后周部、中周部、远周部），并计算每个区域的 ISI。分析各区域 ISI 值与房水细胞因子浓度的相关性，并采用受试者工作特征 (ROC) 曲线评价 ISI 和关键细胞因子对 DR 临床分期的诊断效能。

结果：DR 眼中，全视网膜、后极部、中周部及远周部 ISI 分别为 4.62 (1.54, 11.93) %、6.32 (2.49, 18.72) %、7.24 (1.26, 21.51) %、0.96 (0, 3.85) %，总体比较差异均有统计学意义 ($P < 0.001$)。其中，后极部、中周部 ISI 高于远周部 ISI，差异均有统计学意义 (均 $P < 0.001$)。PDR 眼全视网膜、后极部、中周部及远周部 ISI 均高于 NPDR 眼，差异均具有统计学意义 ($Z = 3.126, 2.61, 2.827, 2.932$ ，均 $P < 0.05$)。视网膜各区域 ISI 均能有效地预测 DR 的进展，其中，全视网膜 ISI 预测 NPDR 进展为

PDR 的曲线下面积 (AUC) 最大, 最佳临界值为 8.11%, 灵敏度为 0.681, 特异度为 0.944。PDR 眼房水中 VEGF 和 PLGF 质量浓度高于 NPDR 组, 差异均有统计学意义 ($Z = 6.637, 2.093$, 均 $P < 0.05$)。房水中 VEGF 预测 NPDR 进展为 PDR 的曲线下面积 (AUC) 最大, 最佳临界值为 198.49 pg/mL, 灵敏度为 0.818, 特异度为 0.722。DR 眼房水中 VEGF、PLGF、ANGPTL4 和 IL-8 的水平与视网膜各区域 ISI 均呈正相关, 具有统计学意义 (均 $r \geq 0.331$, 均 $P < 0.05$)。

结论: DR 眼的无灌注区主要位于后极部与中周部。视网膜各区域 ISI 与 DR 的严重程度显著相关, 全视网膜 ISI $\geq 8.11\%$ 时, NPDR 进展为 PDR 的可能性大。房水中 VEGF、PLGF 的含量与 DR 的严重程度密切相关, VEGF ≥ 198.49 pg/mL 时, NPDR 进展为 PDR 的可能性大。VEGF、PLGF、ANGPTL4 和 IL-8 是与 DR 缺血进展紧密相关的细胞因子, 它们不仅是评估 DR 缺血程度的重要指标, 更是抑制 DR 缺血进展的潜在治疗靶点。

摘要编号: 207982

基于 FDA 不良事件报告系统数据库的眼用阿托品不良反应信号挖掘

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目的: 全面系统地挖掘眼用阿托品导致的药品不良反应 (ADR), 为临床医生安全用药提供参考。

方法: 运用信息成分法 (IC) 和报告比值比法 (ROR), 基于美国食品药品监督管理局 (FDA) 不良事件报告系统 (FAERS) 数据库对从建库至 2025 年第 2 季度中眼用阿托品的 ADR 进行挖掘。

结果: FAERS 数据库中共有眼用阿托品 ADR 报告 425 份, 检测出阳性信号 83 个, 主要集中于眼器官疾病、各类神经系统疾病、各类损伤中毒及操作并发症、感染及侵染类疾病等。其中, 眼内炎 ($n = 74$, IC025 = 6.62, ROR025 = 101.90) 是信号强度最强且报告频次最高的 ADR; 其他较强的信号强度依次为脉络膜炎 (IC025 = 6.05, ROR025 = 69.26)、眼内压升高 (IC025 = 5.77, ROR025 = 56.93)、视力下降 (IC025 = 5.46, ROR025 = 45.74)、瞳孔散大 (IC025 = 5.37, ROR025 = 43.34) 和葡萄膜炎 (IC025 = 5.36, ROR025 = 42.93)。除眼内炎外, 眼痛 ($n=64$, IC025 = 4.99, ROR025 = 32.91) 是报告频次较高的 ADR。

结论: 眼用阿托品在眼科系统存在较多的 ADR, 临床医生应充分关注并及时采取相应措施保证患者的用药安全。

摘要编号: 209387

基于人工智能眼底定量技术量化评估黄斑前膜视网膜血管特征

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目的: 使用基于人工智能的眼底定量技术观察特发性黄斑前膜 (ERM) 患眼视网膜血管形态特征, 并分析其与 ERM 分期的相关性。

方法: 回顾性病例研究。纳入我中心 2023 年 1 月至 2025 年 3 月的 146 名 ERM 患者 292 只眼。使用基于人工智能的视网膜血管形态定量参数采用眼底图像分析系统 EVisionAI 对眼底图像处理并分析。根据患眼光相干断层眼底扫描检查记录患眼基于连续的异位中心凹内层结构 (EIFL) 的 ERM 分期、EIFL 厚度及黄斑中心凹视网膜 (CFT) 厚度。统计分析视网膜血管形态特征参数的不同 ERM 分期的组间差异及其与 ERM 分期的相关性。

结果: 单侧 ERM 患者中, ERM 眼较对侧健康眼血管平均分支夹角、血管平均管径、血管平均弯曲度更大, 血管分形维数、血管弓和黄斑夹角更小 ($P < 0.05$); 血管分形维数 ($P = 0.004$)、血管平均管径 ($P < 0.001$)、血管平均弯曲度 ($P < 0.001$) 与 ERM 分期相关。血管分形维数 < 1.553 (OR = 7.247, $P < 0.001$)、血管平均管径 $> 61.93 \mu\text{m}$ (OR = 2.277, $P = 0.013$)、血管平均弯曲度 $> 0.893 \times 104$ (OR = 5.044, $P < 0.001$)、血管弓和黄斑夹角 $< 88.84^\circ$ (OR = 4.628, $P < 0.001$) 是 ERM 患眼达到 ERM 3 期或 4 期的危险因素。使用 Python 构建对视网膜血管形态及人口学特征预测 ERM 是否到达 3 级及以上的二分类模型, 采用集成学习方法随机森林, 模型测试 AUC 0.808, 准确率 75.9%, 召回率 70.0%, 精确率 66.7%, F1 0.683; 交叉验证 AUC 0.828 ± 0.080 , 前 5 个最重要特征依次为黄斑中心凹 5 mm 及 3 mm 范围内平均管径值、血管分形维数、血管弓和黄斑夹角。

结论: 基于人工智能的 EVisionAI 眼底图像分析系统可精准定量视网膜血管形态特征参数。血管分形维数、血管平均管径及血管平均弯曲度与 ERM 分期相关, 视网膜血管形态特征参数可作为潜在的预测 ERM 患眼是否达到 3 期及以上的指标。本研究探索了各项视网膜血管参数与 ERM 分期的相关性及其与 ERM 分期的危险因素, 为利用眼底彩照进行 ERM 分级、严重程度提供了一种新的建模思路。

摘要编号: 203577

基于图像处理与 OCR 的眼科多模态数据提取研究

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目的: 本研究的主要目的是自动获取眼科 OCTA 图像以及 PDF 报告中的有效信息, 即提取视网膜与脉络膜的血管密度、分形维数、弯曲度及厚度等关键量化参数, 以作为眼科临床和科学研究的基础, 从而辅助眼科疾病的诊断和科研分析。另一目标是在高效和批量处理眼科多源数据和报告的基础上, 初步建成眼科人工智能研究标准化及结构化专病数据集, 为眼科人工智能深度学习模型开发和辅助工具开发提供数据支撑。

方法: 项目采用多模块协作的系统架构, 综合运用图像处理与 OCR 技术完成端到端的数据提取流程。在图像处理模块, 对 OCTA 图像进行灰度转换、CLAHE 增强、中值滤波、二值分割和骨架提取, 进而计算得到血管密度 (VD)、分形维数 (D)、骨架密度 (SD)、弯曲度等形态参数。针对 PDF 报告, 则借助 PaddleOCR 引擎进行光学字符识别, 并通过图像预处理 (灰度处理、反转、增强、二值化) 以提高数字识别的正确性。系统内置 PDF 类型判断模块, 针对不同的类型做模板判别, 并结合坐标定位技术对相应区域中的数据进行提取。同时, 开发了区域可视化工具用于 OCR 检测区域的调试与验证, 以提升复杂版式下的识别准确率和鲁棒性。

结果: 本系统可以自动对 OCTA 图片进行批量分析处理, 提取相应血管的关键量化参数, 并输出结构化的 CSV 格式表格数据。同时能够自动解析 PDF 文本中的数字信息, 并按照文本内容类别整理出规范格式的 Excel 表格文件, 与人工录入相比, 错误率和工作量大大减少; 而且对中间处理产生的所有图片及最后的分析结果均作保存, 方便查询验证, 初步形成统一的、规范的眼科影像和参数信息数据库, 从而为后续人工智能相关应用的研究和发展打下基础。

结论: 本研究成功开发出一套集成图像处理与 OCR 技术的自动化系统, 能够高效、准确地提取眼科 OCTA 图像及其报告中的关键参数, 不仅可以支持临床眼科数据的快速处理与分析, 也为构建高质量眼科人工智能专用数据库提供了有效工具。系统具备良好的可扩展性与实用性, 未来可进一步结合深度学习算法, 以用于眼底疾病筛查、诊断及预后评估的智能辅助工具开发。

摘要编号: 204665

基于房水蛋白质组学联合机器学习分析年龄相关性白内障的易感因子及衰老模型构建

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目的: 研究表明房水蛋白质表达谱的变化随年龄增长参与了多种衰老相关疾病的进展, 但目前关于生理性房水蛋白质组学的衰老特征仍尚不明确, 尤其是其与年龄相关性白内障 (ARC) 的潜在关联尚未被充分揭示。本研究目的在于明确房水中蛋白质表达谱随年龄增长的变化趋势, 继而深入探讨房水衰老相关蛋白质表达谱与 ARC 发生发展的相关性。

方法: 本研究共纳入 52 例年龄在 19 岁至 91 岁之间的患者房水样本, 其中包括 33 例年龄相关性白内障 (ARC) 患者及 19 例屈光不正患者。采用液相色谱-质谱联用 (LC-MS/MS) 结合数据非依赖采集 (DIA) 技术进行蛋白质组学检测; 通过秩和检验与线性回归分析鉴定房水衰老相关蛋白 (APs), 并进一步开展 APs 与 ARC 晶状体混浊程度的相关性分析、APs 功能富集分析; 同时借助 LASSO 回归及线性回归机器学习模型, 构建房水衰老预测模型, 筛选衰老标志物及关键调控因子。

结果: 房水中共检出 634 种蛋白质, 其中 179 种 APs (其中 141 种 APs 下调, 38 种 APs 上调, all Padj < 0.05), 主要富集于氧化损伤、细胞外基质及蛋白质稳态调控等生物学过程。进一步分析显示, APs 中有 13 种蛋白质与晶状体混浊程度显著相关 ($0.60 < |r| < 0.80$, all Padj < 0.05), 其中仅 SPINK1 与晶状体混浊程度呈正相关 ($r = 0.68$), 其余均与晶状体混浊程度呈显著负相关 (ABI3BP、COL9A2、GGH、GPNMB、HSPA6、HSPA8、NPTX2、PENK、PRDX1、PRDX2、SCUBE1 和 VGF)。基于房水中 AZGP1、COL1A2、COL6A3、CRYGS、CTBS、GSTO1、LEFTY2、LINGO1、LYZ、NPTX2 和 RBP4 的表达量构建的房水年龄预测模型, 与实际年龄呈现高度相关性 ($AUC = 0.72$, $rA_{Page} = 0.82$), 可作为预测房水衰老的理想标志物。通过机器学习构建年龄预测模型并与实际年龄对比分析显示, 有 22 种 APs 与年龄显著相关 ($P < 0.05$), 包括 APOA1、APOA2、APOH、COL6A3、KNG1、LEAP2、LRG1、SAA4、SPINK1、THAP4、VTN、CASP14、COA3、CTBS、GOT1、HEG1、NELL2、NPTX2、OMG、PTPRG、SIAE 和 TFPI2。

结论: 在房水中鉴定出 179 种与衰老密切相关的年龄相关蛋白质, 主要富集于氧化损伤、细胞外基质及蛋白质稳态调控等信号通路; 13 种 APs 是 ARC

相关的易感因子，包括 12 种易感因子。基于房水中 11 种 APs 构建的年龄预测模型可作为评估房水衰老状态的理想预测模型。22 种 APs 可能成为调控房水衰老进程的关键调节因子。

摘要编号：203633

基于机器学习与多模态数据的糖尿病视网膜病变疾病亚型鉴定

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目的：糖尿病视网膜病变（DR）是工作年龄人群首要致盲性眼病，早期识别高风险人群对防治至关重要。传统风险评估方法依赖有限指标，难以全面反映疾病复杂性。本研究旨在开发并验证一种整合多模态数据的机器学习框架，以实现 DR 风险的精准分层和亚型解析。

方法：基于 UK Biobank 数据库，我们构建了一个包含 10,478 名参与者的 DR 巢式病例队列，整合了多维度数据，涵盖人口统计学、社会经济与环境因素、体格与生理指标、生活方式与行为特征、认知功能以及生化参数，并进一步结合蛋白组学（ClinPro）、代谢组学（ClinMet）、光学相干断层扫描（ClinOCT）和眼底影像（ClinFI）数据。采用 XGBoost 算法构建预测模型，并通过 SHAP 值解读特征重要性。进一步采用无监督聚类识别患者亚型，并建立可解释的临床分类规则。进一步通过蛋白组学和代谢组学分析探索不同亚群的分子表型。亚群的风险分层结果在来自国家标准化代谢性疾病管理中心（MMC）分中心的独立队列中进行外部验证。

结果：多模态数据整合显著提升了 DR 的预测性能（AUC = 0.75, AP = 0.74），其中，仅基于临床变量的模型表现出最佳诊断效能。SHAP 分析提示慢性肾脏病（CKD）、糖尿病病程、糖化血红蛋白（HbA1c）、胰岛素使用、糖尿病病程及磺脲类药物使用等为关键预测因子。聚类分析识别出九个具有显著差异 DR 发病风险的亚群，其中 cluster1 风险最低（8.5%），cluster4 风险最高（54.2%）。基于简洁临床指标的分类规则实现了可解释的风险分层。蛋白组与代谢组分析进一步揭示了各亚群在分子水平上的异质性，例如 cluster4 中补体相关蛋白 C1QTNF1 显著上调。外部验证队列（MMC）结果支持该模型具有良好的稳健性与泛化能力。

结论：本研究证实了多模态数据与机器学习在 DR 风险分层中的价值。所识别的临床亚型具有鲜明分子特征和疾病风险，为 DR 的精准防治提供了新策略。

摘要编号：201655

基于深度学习的白内障手术器械损伤实时检测研究

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目的：开发经济高效的小目标手术器械损伤监测系统，降低因器械碎片残留眼内导致的医源性损伤风险。

方法：本研究提出基于改进的 YOLOv11 模型用于白内障手术器械检测与损伤评估。在模型架构方面，首先将 Head 层 P3 路径中的 C3k2 模块重复次数增加到 3 次，以增强网络对微小手术器械的特征提取能力；其次在 Backbone 部分采用 ScConv 模块替代标准卷积，该模块通过空间和通道重建卷积减少冗余计算并促进代表性特征学习。在数据增强方面，针对手术器械损伤图像数据匮乏的问题，本研究提出基于 OpenCV 的金属损伤仿真方法，通过自适应圆形掩模与局部透明度梯度变换模拟器械凹陷缺损，同时采用随机角度和长度的线段生成算法实现断裂缺损的仿真效果。

结果：该模型在验证集上达到 86.1% 的精确率（Difference: 9.8%, 95% CI: 74.5%–87.5%, $P < 0.05$ ）、86.3% 的召回率（Difference: 8.3%, 95% CI: 76.2%–87.7%, $P < 0.05$ ）、82.8% 的 mAP@0.5（Difference: 12.8%, 95% CI: 68.1%–84.4%, $P < 0.05$ ）和 86.2% 的 F1 分数（Difference: 9.1%, 95% CI: 75.3%–87.6%, $P < 0.05$ ）

结论：本研究提出的手术器械损伤智能监测系统实现将参数规模压缩至基线模型以下的同时显著提升检测精度，并实现 140 FPS 的检测速度，兼具低成本部署和高效运算的双重优势。

摘要编号：208719

基于超广角眼底图像的糖尿病视网膜病变多阶段一体化智能诊断系统研究

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共同作者：Shan DING, Jianbin HU, Haiyu HUANG, Hengming ZHANG, Suzhen WANG

目的：基于超广角眼底图像（ultra-widefield fundus photography, UWF-FP）研发并验证一套针对糖尿病性视网膜病变（Diabetic Retinopathy, DR）的多阶段、多病灶、全流程自动化智能诊断系统，覆盖异常图像筛查、病灶分割与检测以及 DR 分期与基于检测结果分类修正，以克服现有单一任务模型的局限，提升对超广角影像的识别精度、可解释性与临床适配性。

方法：本研究基于 7740 张 UWF-FP，构建了集异常图像筛查、病灶分割与检测、DR 分期及分类修正于一体的多阶段人工智能诊断系统。该系统包含三个核心模块：① WT-U2net-- 引入小波变换卷积 (WTConv) 与通道先验卷积注意力 (CPCA) 以实现多尺度特征提取和精细化分割，并通过面积阈值法 (220 像素) 区分微血管瘤 (Microaneurysm, MA) 与出血点 (Hemorrhage, HE)；② YOLOv11-SPD-EMA-SIoU-- 融合空间到深度卷积 (Spatial-to-Depth Convolution, SPD)、高效多尺度注意力机制 (Efficient Multi-scale Attention, EMA) 及可扩展交并比损失函数 (Scylla-IoU Loss, SIoU)，提升小病灶检测精度与定位稳定性；③ NIDConvNeXt-- 结合大核条带卷积与无参注意力模块 (Simple Attention Module, SimAM) 增强增殖期病灶捕捉能力，并引入改进 YOLOv11 检测结果对增殖期 (Proliferative Diabetic Retinopathy, PDR) 分类进行修正。

结果：WT-U2net 在异常图像筛查中取得 94.2% 准确率 (召回率 97.4%)，HE/MA 分割 Dice 系数 0.881，优于 U-Net、U-Net++ 与原始 U2Net。YOLOv11-SPD-EMA-SIoU 在多病灶检测中达到 mAP 91.0%，其中增殖膜检测精确率和召回率分别为 98.3% 和 97.6%。NIDConvNeXt 初始分类准确率 89.8%，结合分类修正后提升至 94.5%，并显著降低 PDR 漏判率。最终 0-4 期 DR 分级准确率分别为 84.9%、86.9%、89.6%、91.7% 和 92.6%。

结论：本研究提出的多阶段一体化人工智能系统在 UWF-FP 的质量控制、病灶精确检测与分期分类中均表现出优越性能，显著优于多种现有深度学习方法。该系统与国际 DR 分期标准高度一致，具备良好的可解释性与临床适配性，有望在大规模筛查及个体化管理中实现临床转化。未来将通过多中心、多模态数据扩展与前瞻性临床验证，进一步提升其泛化能力与应用价值。

摘要编号：208639

基于超广角眼底成像与人工智能的视网膜裂孔分割和激光光凝术自动化规划探索

第一作者：Jing LUO

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目的：视网膜裂孔 80% 以上发生于周边部视网膜，是导致视网膜脱离这一致盲性眼病的直接原因之一，因此，视网膜裂孔的早期发现和治疗具有重要意义。超广角眼底成像 (ultra-widefield fundus imaging, UWF) 可提供高达 200 度的单

次扫描视野，可以帮助早期发现视网膜裂孔。视网膜激光光凝术是目前视网膜裂孔的首选治疗方案。但 UWF 筛查及标准化治疗仍面临挑战。因此，开发自动检测的 AI 算法至关重要。本研究探索基于 UWF 与 AI 实现激光光凝术全流程辅助的可行性，涵盖病灶分割至治疗规划，以推动该技术向高效、标准化发展。

方法：在这项研究中，我们回顾性分析了通过 Optos 设备获得的 267 张诊断为视网膜裂孔的眼睛的 UWF 图像。这些图像由眼科医生在像素级进行标记，以分割视盘和病变区域。利用这个数据集，我们训练了基于 U-Net 架构的最先进的语义分割模型，并系统地评估了主干选择、模型规模和预训练策略的影响。基于分割结果，我们开发了一个治疗计划系统，以按照临床指南和要求提出光凝区域并生成激光点的网格图案。这些自动生成的光凝固治疗计划由两位玻璃体视网膜专家根据安全性方面和临床可行性进行评估。

结果：最优分割模型的 Accuracy 0.9995, Precision 0.9415, Recall 0.9087, Specificity 0.9623, IoU 0.8433, Dice 0.9102。系统评估结果表明，模型容量的增加和采用任务相关的预训练策略显著提升了分割性能，最新的基座模型 (foundation model) 仍未突破现有 state-of-the-art 模型。在分割结果基础上，视网膜光凝治疗规划模块可自动提出激光灼烧区域及网格方案，同时考虑病灶区与保护区。结合最佳分割模型，由治疗计划系统生成的超过 90% 的光凝固计划被玻璃体视网膜专家认为是令人满意的。

结论：本研究通过病灶分割和治疗规划实现了视网膜裂孔诊疗的全流程辅助，提高了视网膜裂孔的临床诊断效率，并且在视网膜激光光凝术治疗的标准、效率 and 安全性方面具有潜力，为未来进一步开发智慧医疗系统与智能手术导航奠定了基础。

摘要编号：202517

基础模型驱动的三维 OCT 视网膜疾病全流程诊断系统开发与验证

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目的：光学相干断层成像 (OCT) 凭借高分辨率三维成像已彻底改变视网膜疾病诊断模式，但其智能化潜力仍受多阶段流程和单任务 AI 架构的限制。本研究旨在构建一个基础模型驱动的 3D OCT 视网膜疾病全流程自动化诊断系统，并在真实世界系统验证其临床可行性与泛化性能。

方法：我们构建了 FOCUS (Full - process OCT - based Clinical Utility System)，一个能够真实模拟 OCT 临床筛查流程的全流程自动化系统。FOCUS 首先利用 EfficientNetV2 - S 模型进行 OCT 图像质量评估，仅保留质量合格的二维切片进入后续分析；随后，基于微调的视觉基础模型 (Vision Foundation Model, Vision FM) 完成异常检测与多疾病分类；最后，通过统一的自适应聚合策略整合多切片结果，生成 3D OCT 患者级诊断报告。系统在 3,300 例患者 (40,672 张切片) 的数据上完成训练与内部测试，并在来自不同层级医疗机构和多种 OCT 设备的 1,336 例患者 (19,798 张切片) 上进行外部验证。同时，我们参考真实世界的诊疗流程，设计了人机对比实验，评估 FOCUS 在不同临床阶段中与眼科技师及不同级别医生之间的诊断一致性。

结果：FOCUS 在图像质量评估 ($F1 = 99.01\%$)、异常检测 ($F1 = 97.46\%$) 和多疾病诊断 ($F1 = 94.39\%$) 任务中均显著优于现有算法，展现出卓越的全流程诊断性能。在外部真实世界验证中，系统在不同医疗中心的 $F1$ 分数维持在 $90.22\% - 95.24\%$ ，显示出出色的跨设备与跨机构泛化能力。人机对比结果表明，FOCUS 在异常检测方面超越专家 ($F1: 95.47\% \text{ vs. } 90.91\%, p < 0.005$)，在多疾病诊断中达到相当水平 ($F1: 93.49\% \text{ vs. } 91.35\%, p = 0.376$)，并显著提升了诊断效率。

结论：综上所述，FOCUS 以基础模型为核心，首次实现了 3D OCT 视网膜疾病诊断的全流程自动化，从图像质量控制到患者级诊断均表现出卓越的准确性与泛化能力。系统在真实世界中验证了其与传统专家相当甚至更优的诊断性能与显著的效率优势，展现出在临床实践中应用与推广的可行性。本研究为 OCT 智能化诊断的临床落地提供了新范式，也为构建以基础模型为驱动的多任务医疗 AI 系统提供了重要参考。

摘要编号：202418

应用大语言模型回答先天性晶状体疾病患儿家长提问的效果

第一作者：Yue ZHANG

目的：评价国内开源大语言模型 (LLM) 回答先天性晶状体疾病患儿家长常见诊疗问题的准确性、完整性及情感支持性，探讨其作为健康教育智能助手的可行性。

方法：分别收集 69 个与先天性晶状体疾病诊疗相关的问题及答案，问题涉及危险因素、疾病诊断、症状、筛查及检查、治疗与预后 5 个方面。将所有问题采用“开启新会话”形式重复输入 2 次到

LLM，记录答案。由 3 位高年资白内障科医师独立对答案进行评价，准确性评价采用 1-6 级李克特量表，完整性和情感支持性评价采用 1-3 级李克特量表。对于每个应答，评估者须在 LLM 回答和人工答案中给出推荐并对 Kimi chat、豆包、DeepSeek-R1、文心一言 3.5 进行评价。

结果：在 4 个 LLM 中，DeepSeek-R1 表现最佳，69 个问题中准确性 6 分、完整性 3 分和情感支持性 3 分的比例依次为 90%、100%、80%。人工回答的字数明显少于 DeepSeek-R1 的应答字数，差异存在统计学意义 ($Z = -1.96, P < 0.05$)。Deepseek-R1 回答字数与准确性评分无明显相关性 ($r_s \approx 0.12, P > 0.05$)，与完整性评分呈正相关 ($r_s \approx 0.608, P < 0.05$)。但在疾病诊断上表现欠佳。未选择的原因包括回答高专业度问题时专业性不足等。

结论：DeepSeek-R1 回答儿童晶状体疾病的相关诊疗问题具有较高的准确性、完整性和情感支持性。LLM 在医疗健康领域的应用具有巨大潜力，但目前仍无法取代临床医师，且存在信息安全、“幻觉”现象和偏见等问题。

摘要编号：201651

开发经济效益的眼科大语言模型优化眼科诊疗

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共同作者：Shuangwen KANG, Jie ZHONG

目的：开发经济高效的眼科专用大语言模型，辅助基层眼科医生诊疗，提升经济欠发达地区的可及性。

方法：ChatEye 是基于包含超过 42 万条眼科专业数据的 EyeCN 知识库并通过知识蒸馏技术对 ChatGLM-6B 模型进行领域微调的 LLM。本研究通过 3 个环节评估改进后的模型性能：首先采用 GPT-4、豆包和百川 4 作为评审模型，对比 ChatEye 与 Llama2-Chinese-7B、Baichuan2-7B、Qwen-7B、Chatglm2-6B 在 300 道眼科问题上的表现差异；其次通过模拟真实临床场景中患者和医师的随机提问，由 3 位临床专家基于评分标准评估模型的实用性和环境适应性；最后，临床专家对比不同临床经验阶段的眼科医师和 ChatEye 的回答质量，衡量 ChatEye 的医学水平对应的临床经验阶段。

结果：临床医师双盲对照评估和 AI 自动评估相结合的双重验证机制中，ChatEye 以 9.12 分领先其它同参数量的轻量级 LLM，相较于 Chatglm6b 提升 2.32 分 (95% CI: 62.8%-94.0%; $P < 0.05$)，相较于 LLaMA2-7B 提升 6 分 (95% CI: 25.9%-94.0%; $P < 0.05$)。临床医生的对比评估环节中，ChatEye 医学能力初步达到 PGY-4/5 (Difference

= +3.17; $P < 0.05$), 暂未达到主治医师水平 (Difference = -0.72; $P > 0.05$)

结论: ChatEye 在眼科领域的表现和 PGY-4/5 医生相当, 能低成本的本地部署在医疗环境中辅助 PGY-1/3 提升诊疗效率和准确性。

摘要编号: **210009**

智慧丝路光明之眼科智慧服务模式探索

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目的: 通过将“甘肃特色”的护理内涵与智慧医疗技术深度融合, 探索一个可及、高效、人性化的眼科智慧化服务模式。

方法: 在智慧医院建设及“优质护理服务”成熟体系的基础上, 针对甘肃省地域狭长、地形复杂、民族多样化等特点, 结合眼科护理需求, 探索解决远程就医困难、就医语言沟通困难、地域性眼病及环境性眼病的护理挑战等难题的方案。

结果: 依托智慧医院建设系统、5 G 远程诊疗技术及“优质护理服务”体系, 建立覆盖州县乡的远程眼科诊疗网络; 建立多语种智慧交互系统; 开发以甘肃高发眼病为核心的 AI 诊断模型, 实现 AI 预警和循证护理; 建立“环境性眼病”智能随访管理系统; 构建“防盲治盲”资源动态调度平台; 建设基层医护人员“云培训”体系等, 以上方案构成眼科智慧化服务模式, 可统称为“智慧丝路光明”。

结论: “智慧丝路光明”模式将护理人文关怀底蕴与尖端信息技术有机结合, 可构建一个“服务人性化、诊疗精准化、管理精细化、协同网络化”的智慧眼科生态体系, 将更好地服务于区域民众的眼健康。

摘要编号: **207703**

视网膜微血管改变与颈动脉狭窄及颈动脉斑块的相关性研究

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目的: 利用基于深度学习算法 (DL) 的眼底照相评估视网膜微血管改变与颈动脉狭窄 (CAS) 或 CAS 合并斑块之间的关系。

方法: 回顾分析 715 名健康体检者数据, 包括双侧颈动脉彩超和双侧眼底照相相等, 根据颈动脉内 - 中膜厚度 (IMT) 及是否存在斑块将纳入者分为对照组、CAS 组及其亚组 (CAS 无斑块组、CAS 合并

斑块组)。利用基于 DL 的眼底照相量化视网膜血流参数, 包括: 视网膜动静脉比 (AVR)、视网膜总分形维数 (FD)、视网膜动脉分形维数 (AFD)、视网膜静脉分形维数 (VFD)、视网膜血管密度 (VD)、距离黄斑中心凹 3 mm (VD 3 mm) 和 5 mm (VD 5 mm) 范围内的 VD。对比观察各组间的视网膜微血管变化, 并采用 Spearman 相关性分析评估视网膜微血管指标与 IMT 之间的相关性。

结果: 715 名研究对象中, 对照组 402 名, CAS 组 313 名 (其中: CAS 合并斑块组 91 名, CAS 无斑块组 222 名)。在 CAS 组中, AFD、VFD、FD 均明显小于对照组 (所有 $P < 0.001$), VD、VD 3 mm 和 VD 5 mm 在两组间均存在显著差异 (所有 $P < 0.05$)。CAS 合并斑块组中的 VFD 明显小于 CAS 无斑块组 ($P = 0.026$)。相关性分析结果显示: 在 CAS 组中, VD 3 mm 和 VD 5 mm 与 IMTmin 呈负相关。

结论: 与对照组相比, CAS 患者的 AFD、VFD、FD、VD、VD 3 mm 和 VD 5 mm 更小, 基于 DL 的眼底照相有望为 CAS 的大规模筛查提供新方向。

摘要编号: **208856**

重要致盲眼底病智能诊断与自动图文报告系统

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目的: 创建人工智能 (AI) 驱动的重要致盲眼底病智能筛查、诊断与自动图文报告系统。该系统旨在为包括早产儿视网膜病变 (ROP)、糖尿病性视网膜病变 (DR)、糖尿病黄斑水肿 (DME) 和黄斑裂孔 (MH) 在内的全生命周期重要致盲眼底病的早期识别和分级诊疗提供“筛查 - 诊断 - 治疗”的闭环流程, 减少不可逆盲。

方法: 该研究创新性研发了一系列视网膜图像处理技术, 包括基于风格引导的视网膜超分辨率技术、视网膜动静脉多维分割量化系统和多模态视网膜影像融合系统。我们开发了一种基于 Laplace 正则化与秩约束的多视图聚类方法, 并提出了基于稀疏匹配的多组学数据关联方法。基于多中心大数据, 我们构建了用于 ROP、DR、DME 和 MH 的诊断、预测与图文报告系统。该研究率先将智能图文报告系统通过广东省人民医院 5G 互联网医院平台部署至远程阅片中心, 并应用于中国 10 家医疗机构。

结果: 该研究开发了 (1) 基于 ROP 眼底图像和危险因素深度学习模型, 准确预测 ROP 的发病风险与严重程度 (AUC 分别超过 0.90 和 0.87); (2) DME 全流程管理系统, 创新性整合了早期预警模型 (AUC 超过 0.8)、基于 OCT 形态的 DME 自动分型模型 (AUC 超过 0.97) 和疗效预测集成学

习模型 (AUC 为 0.8–0.9) ; (3) 基于病因学分类的 MH 手术决策模型, 根据病因自动分型并预测手术疗效 (AUC 为 0.95) 。

结论: 该研究成功建立了覆盖全生命周期重要致盲眼底病的 AI 系统, 实现了多种眼底病的精准筛查, 促进了“筛查 – 诊断 – 转诊 – 治疗”全流程的优化。

屈光手术

摘要编号: 209491

Foresight 软件对半飞秒术后患者角膜形态变化的预测能力评估

第一作者: Yijia CHEN

共同作者: Guofu HUANG

目的: 本研究旨在评估新型软件工具 Foresight 在激光原位角膜磨镶术 (LASIK) 术后 1 周、1 个月和 3 个月随访中对术后角膜曲率变化的预测准确性。

方法: 本研究回顾性地分析了 2024 年 11 月至 2025 年 3 月间于中山大学中山眼科中心就诊的拟行 LASIK 手术患者术前, 我们使用眼前节分析系统测量患者的角膜形态参数, 并利用 Foresight 软件基于术前数据进行术后角膜形态预测。在术后 1 周、1 个月及 3 个月对患者进行随访, 收集其实际的屈光状态 (包括球镜、柱镜及等效球镜) 与角膜地形图参数。将不同随访时间点的实测数据, 特别是 2 mm、4 mm 及 6 mm 直径角膜中央区的曲率测量值, 与 Foresight 的预测值进行对比。采用重复测量方差分析比较不同时间点的数据, 并通过组内相关系数 (ICC) 与 Bland-Altman 分析评估预测值与实测值之间的一致性与可靠性。以 $P < 0.05$ 为差异有统计学意义。

结果: 本研究共纳入 29 例患者 (平均年龄 29 ± 7 岁, 女性占 62.1%)。患者术前平均等效球镜 (MRSE) 为 -5.93 ± 1.66 D。术后屈光结果分析显示, 球镜、柱镜及 MRSE 在术后 1 周、1 个月及 3 个月时的测量值与 Foresight 预测值之间存在显著差异 ($p < 0.001$), 但其变化趋势随时间推移逐渐接近预测值。角膜曲率 (K1、K2) 的预测值与术后各时间点实测值无显著差异 ($p > 0.05$)。在 2 mm、4 mm 及 6 mm 直径的中央区域内, Foresight 的预测值与术后 1 周、1 个月及 3 个月的实际测量值均表现出高度的一致性。具体而言, 组内相关系数 (ICC) 在所有区域和时间点均显示出极好的信度: 在 2 mm 区域, ICC 范围为 0.822 至 0.830; 在 4 mm 区域, ICC 更高, 为 0.876

至 0.914; 在 6 mm 区域, ICC 为 0.788 至 0.895 (所有 $p < 0.001$)。值得注意的是, 在 6 mm 区域, 术后 3 个月的测量值 (45.94 ± 1.60) 与 Foresight 预测值 (46.31 ± 2.62) 最为接近, 表明随着术后恢复, 角膜形态逐渐趋近于术前预测。Bland-Altman 一致性分析显示, Foresight 预测值与 Sirius 实际测量值的差异绝大多数位于 95% 一致性界限内。

结论: Foresight 系统能够对 FS-LASIK 术后角膜中央区域的形态进行高精度预测。术后不同时间点的实际角膜曲率测量值与预测值在 2 mm、4 mm 及 6 mm 区域均表现出高度一致性, 且随着术后恢复, 两者趋同性增强。Foresight 软件对提升屈光手术规划的可预测性、优化手术方案及保障术后视觉质量具有重要临床价值。

摘要编号: 210050

不同中心定位方法对角膜屈光手术后视觉质量影响的系统评价及 meta 分析

第一作者: Lulu XU

共同作者: Yan WANG

目的: 系统评价不同中心定位方法对接受角膜屈光手术的屈光不正患者术后视觉质量的影响。

方法: 通过对八个数据库的全面检索, 从 65,604 条记录中筛选出 3,140 只眼的数据库。共有 13 项研究被纳入本次荟萃分析, 以评估中心定位方法对视觉质量结果的影响。

结果: 以角膜共轴反光点 (CSCLR) 为中心组的术后偏心量显著低于以瞳孔中心 (EPC) 为中心组 ($P < 0.05$)。CSCLR 中心组的术后等效球镜 (SE) 在 ± 0.50 D 范围内的比例明显更多 ($P = 0.001$)。然而, 两组在术后裸眼远视力 (UDVA)、术后最佳矫正远视力 (CDVA)、达到 20/20 或更好 UDVA 的术眼比例、CDVA 丢失 ≥ 2 行的术眼比例或散光方面均未发现显著差异 (P 均 > 0.05)。CSCLR 中心组引入彗差显著更低 ($P < 0.00001$), 而在球镜度或其他高阶像差 (HOAs) 方面无显著差异。在 Kappa 角 ≥ 0.2 mm 组较 Kappa 角 < 0.2 mm 组引入更多的高阶像差, 差异有统计学差异 ($P = 0.03$), 而在术后 UDVA、SE、球镜度或水平彗差 / 垂直彗差方面, 2 组之间未发现显著差异 (P 均 > 0.05)。

结论: 在角膜屈光手术后, CSCLR 中心定位相较于 EPC 中心定位方法, 可能在获得更好的术后结果 (SE 残余度、彗差引入) 方面具有潜在优势。当术前角 Kappa 较大时, 建议进行角 Kappa 调整。然而目前可获得的证据质量均较低, 需要更多高质量研究进一步验证上述结论。

摘要编号: 208745

不同单眼视设计的激光老视手术临床对照观察

第一作者: Bai JJ

目的: 对比三种单眼视设计的激光老视矫正手术(仅单眼视、单眼引入 EDoF、双眼引入 EDoF)的早期临床疗效,探索 EDoF 技术在激光老视手术中的临床应用价值。

方法: 选取 44-65 岁、主诉视近困难的患者 62 例,其中正视 8 例,单眼/双眼近视 42 例,单眼/双眼远视 12 例。所有患者均接受角膜激光老视矫正手术(LASIK),并分为三组:9 例采用微小单眼视设计(未引入 EDoF);18 例采用优化单眼视设计(视近眼引入 EDoF);35 例采用 PRESBYOND 设计(双眼引入 EDoF),三组双眼屈光参差量分别为 1.22 ± 0.21 D、 1.38 ± 0.24 D、 1.50 ± 0.17 D。

结果: 术后 1 天,仅微小单眼视组 1 例出现角膜瓣移位,其余患者无手术并发症;术后 1 周,三组双眼裸眼远、中、近视力均较术前提升,且 PRESBYOND 组效果最优,所有患者均未出现最佳矫正视力丢失;术后 1 个月问卷调查显示,PRESBYOND 组患者满意度最高,微小单眼视组最低。

结论: 基于 EDoF 引入方式的差异,三种角膜激光老视手术的临床疗效存在显著区别,其中 PRESBYOND 设计的老视矫正效果最佳,且能为患者带来最高的术后满意度。

摘要编号: 203744

两种不同紫外线辐照能量去上皮 A-CXL 治疗青少年进展型圆锥角膜:一项为期两年的临床对比研究

第一作者: Dan WEN

共同作者: Wen Chen CHEN

目的: 比较标准紫外线辐照能量 (5.4 J/cm^2) 与高紫外线辐照能量 (7.2 J/cm^2) 去上皮加速角膜交联术(A-CXL)治疗青少年进展型圆锥角膜的两年临床疗效差异。

方法: 本回顾性对照研究共纳入 42 名青少年患者的 62 只眼(平均年龄 15.3 ± 2.6 岁),分别接受标准紫外线辐照能量 A-CXL (5.4 J/cm^2 ; 9 mW/cm^2 , 10 min, 31 只眼)或高紫外线辐照能量 A-CXL (7.2 J/cm^2 ; 30 mW/cm^2 , 4 min, 31 只眼)。术前及术后 1 月、3 月、6 月、1 年和 2 年对患者进行裸眼视力(UCVA)、最佳矫正视力(CDVA)、屈光状态、角膜地形图(K1、K2、Kmax、CA、

CCT、TCT)以及角膜光密度(COD)等多项指标评估。

结果: 两种 A-CXL 方案在 2 年内均可有效控制青少年圆锥角膜进展,未见严重不良事件。标准紫外线辐照能量组 (5.4 J/cm^2) UCVA 在术后 6 月显著改善 ($P = .010$),CDVA 自术后 6 月起持续改善 ($P < .010$);高紫外线辐照能量组 (7.2 J/cm^2) CDVA 在术后 1 月一过性下降 ($P < .010$),其后未见显著变化。两组等效球镜(SE)、角膜散光(CA)未见显著改变;柱镜仅在标准紫外线辐照能量组 (5.4 J/cm^2) 自术后 3 月起显著减低 ($P < .010$);Kmax 仅在标准紫外线辐照能量组 (5.4 J/cm^2) 术后 2 年显著下降 ($P < .010$),K1、K2 平坦化亦更明显;两组 CCT 与 TCT 在术后 1-3 月短暂变薄,随后逐步恢复,术后 2 年与术前无统计学差异;角膜光密度(CD 值)分析显示,两组在术后 1-3 月各角膜基质层均出现暂时性 CD 值升高,并于术后 1-2 年恢复至术前水平;术后早期(1-3 月),高紫外线辐照能量组 (7.2 J/cm^2) 在 0-10 mm 区域前层及中层 CD 值低于标准紫外线辐照能量组 (5.4 J/cm^2) ($P < .05$);术后 2 年,高紫外线辐照能量组 (7.2 J/cm^2) 在后层周边区域(6-12 mm) CD 值显著高于标准紫外线辐照能量组 (5.4 J/cm^2) ($P < .05$)。

结论: 两种不同紫外线辐照能量的去上皮 A-CXL 均可在青少年患者中有效控制圆锥角膜进展,但标准紫外线辐照能量 (5.4 J/cm^2) 方案在视力提升和角膜平坦化方面更具优势。高紫外线辐照能量 (7.2 J/cm^2) 方案可在早期减少角膜雾状混浊,但可能导致远期深层角膜反光增强。因此,青少年 A-CXL 的紫外线辐照能量参数应在疗效与角膜透明度之间权衡选择。

摘要编号: 208955

可泛化机器学习方法在术后拱高异常预测中的应用

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共同作者: Jian YE

目的: 术后拱高异常的早期识别对干预策略的制定至关重要,但多中心数据差异使预测模型的泛化能力面临挑战。

方法: 收集来自中国四川、安徽、陕西、重庆四家医学中心的临床数据,使用 TabNet 作为核心预测模型,并与逻辑回归算法和多层感知机神经网络进行比较。首先在四中心合并数据上进行训练和内部验证,以评估总体性能;随后采用留一中心交叉验证(LOCO)策略,即每次留出一个中心作为外部

测试集，其余中心数据训练模型，验证跨中心泛化能力。

结果：在合并数据集上，TabNet 在预测术后拱高异常方面取得最佳表现，AUC 达 0.87，显著优于 LogReg (AUC = 0.67) 和 MLP (AUC = 0.85)。在 LOCO 验证中，TabNet 在四个外部测试中心的 AUC 均保持在 0.84–0.90 区间，表现出良好的跨中心稳健性。尤其针对临床关注的异常样本识别，TabNet 在外部验证的召回率约为 80%，明显高于传统方法。特征重要性分析显示，CACD、STS、WTW 等特征在整体模型中贡献最高，在拱高预测中具有关键作用。

结论：基于 TabNet 的预测框架在多中心数据下不仅具备优越的总体预测能力，而且在跨中心外推中保持稳定；结合特征重要性解释可揭示中心间差异来源，为模型在多中心场景下的可解释与临床推广提供依据。

摘要编号：210003

基于 AI 和动态形变的局部角膜生物力学表征及 FFKC 智能诊断

第一作者：Xuan CHEN

共同作者：Yan WANG

目的：本研究基于人工智能 (Artificial intelligence, AI)，结合动态形变视频，提出了一种表征局部角膜生物力学的新方法，并据此构建智能诊断模型，以提升顿挫型圆锥角膜 (Forme Fruste Keratoconus, FFKC) 早期诊断水平。

方法：纳入圆锥角膜 (Keratoconus, KC)、FFKC 和正常角膜 (Normal Corneas, NC) 1604 例 (1604 眼) 受试者。在空气脉冲的作用下，利用 Scheimpflug 技术采集角膜动态形变视频。通过无监督语义分割视频及共享模型提取角膜轮廓，获得 115200 (256*200) 个像素点，基于样条理论计算新型像素级参数。将样本数据集随机分为用于训练的训练集、用于参数验证的验证集和用于性能评估的测试集，采用十折交叉验证及集成学习算法训练智能诊断模型。以受试者工作特征曲线下面积、精准性、召回率及 F1 得分评估模型效能，并与现有诊断指标 Belin/Ambrósio 增强扩张显示 (BAD-D)、角膜生物力学参数 (CBI) 和断层扫描联合生物力学指数 (TBI) 进行比较。此外，以同样的标准独立纳入同一国家另一城市 230 例 (230 眼) 受试者进行外部验证，评估模型的临床适用性。

结果：共纳入 1834 例受试者 (1834 眼)。基于 1 mm 内 72 个像素点 (576 像素/8 mm) 计算并重命名 14 个新的像素级生物力学参数，具有较高重复性，能够有效反映局部角膜力学特征。在样本

数据集中，模型用于诊断 FFKC 的曲线下面积是 0.997，准确率为 95.73%，召回率为 95.61%，F1 得分为 95.50%，显著优于临床上现有的广泛使用的诊断方法 (准确率从 86.28% 到 93.36%，均 $P < 0.01$)。在外部验证集中，准确率为 91.38%，召回率为 92.11%，F1 得分为 91.18%，表现出良好的泛化能力。

结论：研究基于 AI 结合动态形变视频，提出了一种全新的局部角膜生物力学表征方法，突破以往分析整体生物力学特征的传统模式，实现了对细微生物力学变化的高灵敏检测。所构建的基于集成学习与投票策略的智能诊断模型，显著提升了 FFKC 早期诊断准确性及效率，有望为临床提供新的辅助诊断工具，降低漏诊率，改善患者视力健康。

摘要编号：210294

多种 ICL 拱高预测公式组合方案的比较研究

第一作者：Jianli YANG

共同作者：Lu XIONG, Xiaoyi YU

目的：本研究旨在系统比较 OCOS、NK 与 KS 三种公式在 ICL 尺寸选择中的表现，评估其在不同推荐组合下的术后实际拱高与预测效能，筛选最优尺寸推荐方案，为 ICL 尺寸选择提供循证依据，并构建标准化临床决策路径。

方法：回顾性纳入 2021 年 12 月至 2023 年 10 月于广州爱尔眼科医院接受 ICL 植入术的患者 205 例 (364 只眼)，排除术中 ICL 植入角度偏差超过 $\pm 10^\circ$ 者。以 OCOS、NK、KS 三种公式为基础，构建 8 种尺寸推荐方案，并根据公式一致性分为 4 组：共识组 (OCOS-NK-KS 三公式一致)、两共识组 (OCOS-NK、OCOS-KS、NK-KS 两两一致)、单一公式组 (任一单一公式推荐) 及个性化组 (没有参考公式推荐)。收集患者的临床基线数据、各方案推荐尺寸与预测拱高值，以及术后 1、3、6、12 个月的实际拱高测量值，并进行相关统计学分析。

结果：术后 1 年，各组拱高处于理想范围内的比例分别为：共识组 88.3%、两共识组 80.9%、单一公式组 73.1%、个性化组 95.8%。共识组与单一公式组间差异具有统计学意义 ($\chi^2 = 8.408$, $P = 0.004$)，共识组的理想拱高比例显著高于单一公式组；而共识组、两共识组及个性化组间差异无统计学意义 ($P > 0.05$)。单一公式组的拱高值显著高于其他三组 (均 $P < 0.001$)，提示其推荐尺寸偏大。各组术后拱高降幅 (1 天至 12 个月) 差异均具有统计学意义 ($P < 0.01$)，其中单一公式组降幅最大 ($213.01 \pm 110.99 \mu\text{m}$)。不同尺寸 ICL (12.1 ~ 13.7 mm) 间拱高差异显著，尺寸与拱高呈正相关 ($r > 0$, $P < 0.05$)，且尺寸越大，术后拱高下降幅度越明显。

结论: 综合多公式共识推荐的 ICL 尺寸选择方案能显著提高术后拱高处于理想范围的比例, 具有更高的预测准确性与稳定性; 单一公式推荐易导致术后拱高偏高。ICL 尺寸与拱高呈正相关, 尺寸越大, 术后拱高及其下降幅度越显著。本研究结果为建立标准化 ICL 尺寸选择策略及优化术后拱高预测提供了参考依据。

摘要编号: 208725

角膜大小导致 Pentacam BAD 诊断偏移的临床研究

第一作者: Bai JJ

目的: 运用假设检验模型, 探究基于欧美角膜数据库的 Pentacam 圆锥角膜筛查系统 BAD 软件, 在汉族近视人群中的诊断准确性; 分析种族间角膜结构差异对该系统的影响, 为系统优化改进提供数据支撑。

方法: 纳入 1643 例汉族近视患者 (均接受角膜屈光手术超 2 年, 且随访记录完整), 以其右眼为研究对象。通过 Pentacam 设备采集水平经线白到白距离 (HWTW), 并按 $HWTW < 11.2 \text{ mm}$ 、 $11.2-11.8 \text{ mm}$ 、 $> 11.8 \text{ mm}$, 将患者分为小角膜组、中角膜组与大角膜组。对三组术前 BAD 偏差指数 (含前表面高度差偏差 Df、后表面高度差偏差 Db 等指标) 进行单因素分析, 同时对比手术前后角膜最薄点后表面高度差值。

结果: 1. 各组术前与术后 2 年的角膜后表面高度值无异常升高, 且组间差异无统计学意义, 提示本研究队列术后未出现圆锥角膜病例; 2. 小、中、大角膜组占比分别为 14.4%、73.4%、13.2%, 表明汉族近视患者角膜大小存在显著个体差异; 3. 术前单因素分析显示, 除角膜厚度外, 三组间所有 BAD-D 参数差异均有统计学意义 ($p < 0.05$); 异常值比例呈“小角膜组最高、中角膜组次之、大角膜组最低”的趋势, 差异有统计学意义 ($p < 0.05$)。上述结果提示, 该软件在角膜直径适配性上存在偏移, 角膜直径越小, 假阳性风险越高; 直径越大, 假阴性风险越高。

结论: 基于欧美角膜数据库的 Pentacam 圆锥角膜筛查系统 BAD 软件, 在汉族近视人群中应用时存在诊断偏移。临床开展术前圆锥角膜筛查时, 应将角膜直径纳入评估体系, 并结合其他临床信息、角膜生物力学等指标综合判断, 以提升诊断准确性。

摘要编号: 209280

角膜屈光手术后 5 年长期角膜生物力学稳定性的分析研究

第一作者: Xiaotong LV

共同作者: Fengju ZHANG

目的: 比较不同术式及屈光度患者角膜屈光手术后 5 年角膜生物力学情况, 分析术后 5 年角膜生物力学特性的影响因素, 为临床合理制定手术方案提供理论依据。

方法: 横断面研究。纳入 SMILE 或 FS-LASIK 术后 5 年的近视与近视散光患者 600 例 (600 眼)。根据手术方式分为 FS-LASIK 组、SMILE 组, 根据术前等效球镜 (SE) 分为中低度组 ($-6.00 \text{ D} \leq \text{SE} < -0.50 \text{ D}$)、高度组 ($\text{SE} < -6.00 \text{ D}$)。收集基本资料及术前眼部参数。术后 5 年行 Corvis ST 角膜生物力学检查。采用倾向性评分匹配进行组间匹配, 独立样本 t 检验或 Mann-Whitney 秩和检验比较组间参数, 逐步法进行多因素线性回归分析术后 5 年角膜生物力学参数 SP-A1 与 SSI 的影响因素。

结果: FS-LASIK 组术后 5 年 A1-time 小于 SMILE 组 ($P < 0.001$), 其余角膜厚度参数、形变参数与硬度参数无显著差异。高度近视患者 FS-LASIK 组术后 5 年 A1-time、ARTh 小于 SMILE 组 ($P = 0.032, 0.006$)。术后 5 年 SP-A1 回归方程为 $\text{SP-A1} = -105.496 + 0.216 * \text{年龄} + 0.723 * \text{术前 S} + 6.069 * \text{bIOP} + 0.350 * \text{术后 CCT} - 1.762 * \text{术后 Km}$ ($R^2 = 0.868, P < 0.001$)。术后 5 年 SSI 的回归方程为 $\text{SSI} = 0.762 + 0.004 * \text{年龄} + 0.018 * \text{术前 SE} + 0.042 * \text{bIOP} - 0.100 * \text{术后 Km}$ ($R^2 = 0.388, P < 0.001$)。

结论: FS-LASIK 与 SMILE 术后 5 年角膜生物力学均稳定安全, 但需关注高度近视患者术后可能发生的角膜形变与厚度分布等角膜生物力学变化。临床诊疗应综合考虑年龄、近视程度、角膜厚度与角膜曲率等相关因素合理设计手术方案, 关注术后角膜生物力学情况, 为激光角膜屈光手术的长期稳定性与安全性提供保障。

摘要编号: 208078

近视患者 SMILE 术后角膜应力 - 应变指数变化幅度及其影响因素分析

第一作者: Chen TINGTING

共同作者: Wei CHI

目的: 探讨近视患者行小切口飞秒激光基质透镜取出术 (SMILE) 后角膜应力 - 应变指数变化幅度 (ΔSSI) 及其影响因素。

方法：回顾性研究。分析 2021 年 12 月至 2024 年 08 月行 SMILE 手术的近视患者 326 例 326 眼的临床资料，记录术前患者部分人口统计学信息；使用 Pentacam 70900 型三维眼前节分析诊断系统测量眼前节基础参数；使用 Corvis ST 角膜生物力学分析仪获取患眼新型角膜生物力学参数；记录术中光学区大小、角膜帽厚度、切削深度（Ablation depth, AD）、剩余基质床厚度（Residual stromal bed thickness, RSB）等手术相关参数。采用单因素分析众多潜在因素中，初步筛选出与 SMILE 术后 SSI 可能有关的变量；通过多元线性逐步回归分析，去除存在共性的变量，筛选出独立因素。以独立因素作为自变量，术后 SSI 作为因变量，分析各因素对于术后 SSI 的影响是否有统计学意义。

结果：本研究共纳入 326 例（326 眼）近视患者，其中男性 159 例，女性 167 例，平均年龄（23.36 ± 5.73）岁。术前屈光状态为：球镜 -0.75 ~ -8.50 D，平均（-5.02 ± 1.53）D；柱镜 -2.75 ~ 0 D，平均（-0.77 ± 0.62）D；等效球镜 -1.15 ~ -9.00 D，平均（-5.14 ± 2.48）D。术前眼压为（15.08 ± 2.17）mmHg，水平可见虹膜横径（11.51 ± 0.38）mm，暗瞳直径（6.08 ± 0.60）mm，眼轴长度（25.03 ± 0.93）mm。术中参数显示：角膜帽厚度（105.07 ± 2.17）mm，透镜厚度（88.34 ± 12.93）mm，功能性光学区（6.34 ± 0.22）mm，切削深度（71.45 ± 20.18）mm，残余基质层厚度（321.45 ± 18.22）mm。相关性分析显示，术前角膜应力-应变指数（SSI）与年龄、球镜、柱镜、等效球镜、眼轴长度、残余基质层厚度、前房深度、眼压及多种角膜生物力学参数均存在显著相关性（均 $P < 0.05$ ）。术后 SSI 与年龄、球镜、眼轴长度、残余基质层厚度、前房深度、眼压及动态形变参数亦呈显著相关（均 $P < 0.05$ ）。 Δ SSI 与球镜、等效球镜、角膜中央厚度、透镜厚度、角膜帽厚度、残余基质层厚度、切削深度、角膜速率及形变幅度参数均存在显著关联（均 $P < 0.05$ ）。多元线性回归分析进一步明确，术前 SSI（ $\beta = 0.392$, $P < 0.001$ ）、残余基质层厚度（ $\beta = 0.020$, $P < 0.001$ ）及年龄（ $\beta = 0.007$, $P < 0.001$ ）与术后 SSI 呈独立正相关；术前角膜速率（ $\beta = -0.009$, $P = 0.005$ ）及前房深度（ $\beta = -0.049$, $P = 0.012$ ）则呈独立负相关。性别与暗瞳直径亦是独立影响因素（均 $P < 0.05$ ）。最终回归模型可解释 31% 的术后 SSI 变异（ $R^2 = 0.31$ ），其方程为： $Y = -6.012 + 0.392 \times a + 0.020 \times b + 0.007 \times c - 0.009 \times d + 0.035 \times e - 0.049 \times f + 0.031 \times g$ （Y：术后 SSI；a：术前 SSI；b：RST；c：年龄；d：术前 CV；e：性别；f：术前 ACD；g：暗瞳直径）。

结论：年龄、性别、术前 SSI、残余基质层厚度（RST）、术前角膜速率（CV）、前房深度（ACD）及暗瞳直径是影响 SMILE 术后角膜应力-应变指数（SSI）变化的独立影响因素。

斜视与小儿眼科

摘要编号：210095

GLTC 医患沟通模式应用于眼科日间小儿斜视手术对家属手术相关知识知晓度、患儿心理应激及配合度的影响

第一作者：杨薇

目的：探讨 GLTC 医患沟通模式应用于日间小儿斜视手术中，对患儿家属手术相关知识知晓度、患儿心理应激及配合度的影响。

方法：选取 2023 年 1 月-2024 年 6 月我院收治的 74 例 3 至 12 岁以下行小儿斜视手术的患者作为研究对象，随机分为对照组和 GLTC 组，对照组接受常规沟通模式，GLTC 组采用 GLTC 医患沟通模式干预，每组各 37 例。比较干预后两组患儿家属手术相关知识知晓度，患儿心理应激情况及配合度状况。

结果：干预后，两组患儿家属手术相关知识知晓度均显著高于干预前，且 GLTC 组显著高于对照组，差异有统计学意义（ $P < 0.05$ ）；GLTC 组患儿入手术室后收缩压、舒张压、心率、视觉模拟评分法（VAS）得分均较干预前高，差异无统计学意义（ $P > 0.05$ ）；对照组患儿入手术室后收缩压、舒张压、心率、VAS 得分均显著高于干预前，且均显著高于 GLTC 组，差异有统计学意义（ $P < 0.05$ ）；GLTC 组患儿总配合度显著高于对照组，差异有统计学意义（ $P < 0.05$ ）。

结论：在小儿斜视手术中应用 GLTC 医患沟通模式能提高家属对手术相关知识知晓度，减轻患儿心理应激状态，有效提高患儿手术配合度。

摘要编号：204855

HIF-1 α /ANGPTL4 表达变化对 ARPE-19 细胞迁移和单层细胞通透性的影响及其可能的机制研究

第一作者：Wensi CHEN

共同作者：Daoman XIANG

目的：探讨缺氧诱导因子-1 α /血管生成素样蛋白 4 表达变化对人视网膜色素上皮细胞迁移和单层细胞通透性的影响，及其可能的病理机制。

方法: 取大鼠视网膜组织标本, 检测各组视网膜结构和视网膜 HIF-1 α 和 ANGPTL4 表达水平的变化。取 ARPE-19 进行培养。将细胞分为正常组、缺氧 8 小时组、缺氧 16 小时组和缺氧 24 小时组。缺氧组采用厌氧培养袋进行缺氧培养, 每组设 5 个复合组。检测缺氧环境下各组细胞中 HIF-1 α 和 ANGPTL4 的表达水平。将 HIF-1 α 和 ANGPTL4 抑制剂转染到细胞中, 置于厌氧培养袋中, 缺氧培养 16 小时。将细胞分为正常组、缺氧组、HIF-1 α 低表达组和 ANGPTL4 低表达组。测试测量细胞迁移能力、细胞通透性, 和表达各组均进行紧密连接蛋白 ZO-1 和 occludin 的水平检测。将细胞分为正常组、缺氧组、ANGPTL4 低表达组和 WP1066 组, 分别测定各组 VEGF、p-STAT3、ZO-1 和 occludin 的表达水平。

结果: 对照组视网膜中表达少量 HIF-1 α 和 ANGPTL4。随着病情的进展, HIF-1 α 和 ANGPTL4 的表达水平显著升高 ($P < 0.05$)。与正常组相比, 各缺氧组中 HIF-1 α 和 ANGPTL4 的表达水平随着缺氧时间的增加而显著增加 ($P < 0.05$)。与正常组相比, 缺氧组的细胞迁移能力、单层细胞通透性、ZO-1 和 occludin 的表达水平均显著提高 ($P < 0.05$)。与缺氧组相比, HIF-1 α 低表达组和 ANGPTL4 低表达组的细胞迁移能力、单层细胞通透性、ZO-1 和 occludin 表达水平均显著降低 ($P < 0.05$)。细胞迁移能力、单层细胞通透性和 ZO-1 表达水平均无显著差异——HIF-1 α 低表达组与 ANGPTL4 低表达组之间的差异 ($P > 0.05$)。与正常组相比, 缺氧组中 ZO-1 和 occludin 的表达水平显著降低, 而 VEGF 和 p-STAT3 的表达水平显著升高 ($P < 0.05$)。与缺氧组相比, ANGPTL4 低表达组和 WP1066 组中 ZO-1 和 occludin 的表达水平显著升高, 而 VEGF 和 p-STAT3 的表达水平显著降低 ($P < 0.05$)。

结论: 抑制 HIF-1 α /ANGPTL4 的表达可降低 ARPE-19 细胞的迁移能力和单层细胞的通透性, 可能通过激活 STAT3 的磷酸化来实现。

摘要编号: 209976

MRI 引导下的个体化斜视手术策略: Yokoyama 术式适应证的拓展与病例观察

第一作者: Tan DAPENG

目的: 探讨 Yokoyama 术式在外转受限型内斜视患者中的应用效果, 并评估 MRI 解剖学参数的指导意义。

方法: 回顾性分析我科收治的若干例内斜视合并外转不足患者, 术前均行 MRI 评估外直肌与上直肌夹角。对夹角 $> 120^\circ$ 的患者实施 Yokoyama 术式;

对夹角正常但存在明显外转不足者, 则行外直肌缩短术。两组均同时行内直肌后退术。术后随访眼位、眼球运动及立体视恢复情况。

结果: 在本组病例中, 陈某某、张某某及叶某某的 MRI 检查结果显示外直肌与上直肌夹角分别为 160.46° 、 136.31° 及 234.64° , 均显著大于正常值 (约 102°), 与不同程度的外转受限 (---)、(--)、(----) 相对应。三例患者均接受 Yokoyama 术式矫正, 术后眼位恢复至正位, 外转功能分别改善至 (-)、可、(--)。另一例李某某患者 MRI 夹角为 96.88° , 外转不足程度为 (-), 实施外直肌缩短术后同样获得患眼外转程度恢复为可。

结论: 外直肌与上直肌夹角不仅在高度近视相关固定性内斜视中具有重要的诊断和治疗学意义, 在部分非固定性外转不足病例中同样值得关注。通过 MRI 测量夹角并据此实施个体化的解剖学靶向术式, 不仅能够恢复眼位, 还可改善外转功能, 提示该策略有助于降低复发风险, 并具备进一步推广与临床应用的价值。

摘要编号: 205902

一项前瞻性临床研究: 改良式眼球震颤减弱术 治疗婴儿眼球震颤综合征疗效观察

第一作者: Xiaoyun XI

共同作者: Ping WANG, Dongsheng YANG, Yixin ZHANG, Peng ZHOU

目的: 眼球震颤的治疗是临床面对的棘手问题, 目前尚没有一种适用范围广且临床效果确切有效的治疗手段, 本研究将开展一项前瞻性临床研究, 通过一种新的以减震而非矫正头位为理念的手术方式治疗婴儿眼球震颤综合征 (Infantile Nystagmus Syndrome, INS), 观察其长期治疗效果, 为 INS 的临床治疗提供依据。

方法: 本研究纳入了 2023 年 6 月至 2025 年 4 月在我院诊断为 INS 且有手术适应症、无手术禁忌症的患者共 87 例, 其中男性 57 例, 女性 30 例, 平均年龄 15.63 ± 0.96 岁 (3~41 岁)。手术方式为改良后的四条水平直肌大量后退术, 利用基于视频眼动追踪技术的 FNND 眼动仪采集患者术前及术后 1 月、3 月、6 月、1 年的眼动波形, 主要观察指标包括眼震振幅、频率及眼球震颤视功能 (Nystagmus Acuity Function, NAF), 采用单因素方差分析法比较眼震振幅、频率、ANAF、WNAF 术前与术后不同随访时间的变化。

结果: 87 例受试者中 58.6% 的患者伴有斜视, 73.6% 的患者伴有异常头位。研究指标包括眼震振幅、ANAF、WNAF 在术后所有随访节点均较术前显著降低 ($P < 0.01$), 而眼震频率无显著变化

($P = 0.614$)；随访至术后 1 年，患者眼震幅度较术前平均下降了 50.4%，ANAF (LogMAR) 从术前的 0.68 ± 0.51 提升至 0.35 ± 0.23 ，WNAF (LogMAR) 从 0.56 ± 0.34 提升至 0.31 ± 0.30 ，差异均有统计学意义 ($P < 0.01$)。

结论：改良式眼球震颤减弱术适应症范围更广，能有效降低 INS 患者的眼震幅度，提高眼球震颤视功能，改善视力，且减震效果在术后 1 年仍保持稳定，是一种有效的 INS 治疗方式。

摘要编号：208070

三色分类管理在降低重庆市沙坪坝区学校近视发病率的有效性安全性研究（中期报告）

第一作者：Cong ZHANG

目的：研究三色分类管理方案在降低重庆市沙坪坝区学校近视发病率的有效性和安全性（中期报告）

方法：前瞻性队列研究，随机选择重庆市沙坪坝区 4 所小学校，以 3 年级学生为研究对象，入校行视力普查，根据裸眼视力和屈光状态分为非近视类（绿色）、近视前期类（黄色）和近视类（红色），绿色管理人群常规行视力普查，4 所小学校黄色管理随机分为对照组（组 1），红光组（组 2），翻转拍组（组 3），红光联合翻转拍组（组 4）予以干预，红色管理类人群建议医疗机构就诊。分析三色分类管理方案用于降低重庆市沙坪坝区儿童青少年近视发病率的有效性和安全性。

结果：基线时组 1、组 2、组 3、组 4 三年级学生总体近视率分别为：49%、44%、42% 和 62%，近视前期占比分别为：108/229 (47.16%)、234/479 (48.85%)、224/464 (48.27%)、177/394 (44.92%)，组 2、组 3、组 4 在校接受干预的近视前期学生人数分别为：68 人、73 人、64 人，半年后组 1、组 2、组 3、组 4 三年级学生总体近视率分别为：55%、42%、43% 和 58%，近视前期占比分别为：115/229 (50.2%)、218/479 (45.51%)、220/464 (47.41%)、165/394 (41.87%)。

结论：三色分类管理，在校干预近视前期能有效降低近视发病率，低强度单波长红光联合翻转拍训练较单一干预手段效果更好，无不良事件发生，用于学校控制儿童青少年近视进展值得推广。

摘要编号：210340

不同年龄急性共同性内斜视的临床特点及手术效果分析

第一作者：Lianyi SUN

共同作者：Xiaofei WU

目的：分析不同年龄急性共同性内斜视 (Acute Acquired Comitant Esotropia, AACE) 患者的临床特征及手术治疗效果。

方法：回顾性分析了 2020 年 12 月至 2024 年 6 月在我院接受手术治疗的共 153 例急性共同性内斜视患者的临床资料。根据发病年龄，将患者分为三组：儿童组 (4-13 岁)、青少年组 (14-19 岁) 和成人组 (> 19 岁)。收集患者临床资料，进行详细统计和比较。手术成功定义为末次随访时水平偏斜度数 ≤ 8 棱镜度 (PD)。

结果：研究共纳入 153 例患者 (男性 87 例，女性 66 例)，三组患者平均发病年龄分别为：儿童组 9.4 ± 2.8 岁，青少年组 16.5 ± 1.7 岁，成人组 30.5 ± 9.6 岁。各组屈光状态存在差异：13 岁及以下儿童以轻度远视至低度近视为主 $+0.0$ D (-1.5 D, 0.25 D)；14-19 岁青少年以低度至高度近视为主 -4.5 D, (-6.38 D, -2.26 D)；成人组则以中度至高度近视为主 -4.63 D, (-6.26 D, -3.16 D)。不同年龄组间的手术成功率无显著差异 ($P > 0.05$)。术后复视的发生率在各组之间并无显著差异 ($P > 0.05$)。

结论：AACE 患者术前的斜视角度与年龄呈负相关，随着年龄增长，斜视角度相对减小；但手术效果不受患者年龄和屈光状态的显著影响。

摘要编号：209595

不同类型微透镜设计离焦镜片对眼位的影响研究

第一作者：Xiao LIN

共同作者：Xin HAN, Guoping LI, Lili LI, Xiaofeng XIE

目的：分析配戴两种不同微透镜设计离焦镜片后对 6-12 岁儿童远、近眼位影响，进一步探讨对近视的控制效果。

方法：本研究采用回顾性分析的研究方法，收集 2022 年 1 月至 2023 年 12 月期间在山东中医药大学附属眼科医院就诊的 6-12 岁儿童验配 DIMS (Defocus Incorporated Multiple Segments) 多区正向光学离焦镜片 35 例、HAL (Highly Aspherical Lenslet) 高非球面微透镜环带镜片 35 例作为研究组，SV (Single Vision) 单光镜片 46 例作为对照组，以近距离隐斜初始值 > 6 棱镜度或远距离隐斜 > 3 棱镜度为标准，将配三种不同镜片

儿童分为 A 眼位异常组和 B 眼位正常组，比较其一年后的等效球镜度、眼轴、曲率、远近距离隐斜、NRA、PRA、AC/A 的变化，等效球镜度、曲率和眼轴变化仅分析右眼数据。

结果：一年后等效球镜度变化 A 组（眼位异常）：DIMS 组 $-0.64 \text{ D} (\pm 0.25)$ ，HAL 组 $-0.63 \text{ D} (\pm 0.30)$ ，SV 组 $-1.00 \text{ D} (\pm 0.28)$ ， $F = 10.928$ ， $P < 0.001$ （SV 组显著低于 DIMS/HAL 组，DIMS 与 HAL 无差异）B 组（眼位正常）：DIMS 组 $-0.49 \text{ D} (\pm 0.30)$ ，HAL 组 $-0.59 \text{ D} (\pm 0.31)$ ，SV 组 $-0.84 \text{ D} (\pm 0.36)$ ， $F = 7.062$ ， $P = 0.02$ （SV 组显著低于 DIMS/HAL 组，DIMS 与 HAL 无差异）；眼轴变化（一年）A 组：DIMS 组 $0.24 \text{ mm} (\pm 0.12)$ ，HAL 组 $0.30 \text{ mm} (\pm 0.17)$ ，SV 组 $0.42 \text{ mm} (\pm 0.11)$ ， $F = 7.48$ ， $P = 0.002$ （SV 组显著高于 DIMS/HAL 组，DIMS 与 HAL 无差异）B 组：DIMS 组 $0.25 \text{ mm} (\pm 0.10)$ ，HAL 组 $0.27 \text{ mm} (\pm 0.15)$ ，SV 组 $0.35 \text{ mm} (\pm 0.159)$ ， $F = 4.087$ ， $P = 0.021$ （SV 组显著高于 DIMS/HAL 组，DIMS 与 HAL 无差异）；角膜曲率（一年）A 组：DIMS 组： $-0.09 \text{ D} (\pm 0.32)$ ，HAL 组： $-0.03 \text{ D} (\pm 0.13)$ ，SV 组： $-0.02 \text{ D} (\pm 0.20)$ ， $F = 1.279$ ， $P = 0.288$ （无组间差异）B 组：DIMS 组： $-0.07 \text{ D} (\pm 0.16)$ ，HAL 组： $-0.10 \text{ D} (\pm 0.32)$ ，SV 组： $0.03 \text{ D} (\pm 0.23)$ ， $F = 1.88$ ， $P = 0.161$ （无组间差异）；远距离隐斜（一年）A 组：DIMS 组 $-1 \Delta (-3.625, 0)$ ，HAL 组 $0.5 \Delta (-2, 1.5)$ ，SV 组 $0 \Delta (-2, 2.25)$ ， $H = 2.842$ ， $P = 0.242$ （无组间差异）B 组（一年）：DIMS 组 $0 \Delta (-1, 1.5)$ ，HAL 组 $0 \Delta (-0.9375, 2.75)$ ，SV 组 $0 \Delta (-1.75, 2)$ ， $H = 0.762$ ， $P = 0.704$ （无组间差异）；近距离隐斜 A 组（一年）：DIMS 组 $4 \Delta (2, 6.25)$ ，HAL 组 $1 \Delta (0, 3)$ ，SV 组 $2 \Delta (-4.5, 5.75)$ ， $H = 3.847$ ， $P = 0.146$ （无组间差异）B 组（一年）：DIMS 组 $2 \Delta (-1, 3.5)$ ，HAL 组 $0 \Delta (-1, 3.75)$ ，SV 组 $-1 \Delta (-3, 2)$ ， $H = 4.65$ ， $P = 0.098$ （无组间差异）；AC/A 比值 A 组（一年）： $H = 0.409$ ， $P = 0.824$ （无组间差异）B 组（一年）： $H = 3.384$ ， $P = 0.184$ （无组间差异）；NRA（一年）A 组： $H = 0.021$ ， $P = 0.990$ （无组间差异）B 组： $H = 1.312$ ， $P = 0.519$ （无组间差异）；PRA（一年）A 组： $H = 0.39$ ， $P = 0.823$ （无组间差异）B 组： $H = 1.666$ ， $P = 0.435$ （无组间差异）。

结论：DIMS 与 HAL 镜片在眼位异常、眼位正常青少年人群中配戴一年后均能有效延缓近视屈光度及眼轴增长，效果优于单光镜片；两种镜片配戴前后角膜曲率、远近距离隐斜、AC/A、NRA、PRA 值无变化。

摘要编号：205511

中国儿童早发性高度近视的临床特征：关注合并症

第一作者：Xiaomei WAN

目的：总结中国早发性高度近视（eoHM）患儿的临床特征。

方法：本前瞻性观察性研究于 2024 年 7 月 15 日至 9 月 15 日在山东第一医科大学青岛眼科医院招募 eoHM 患儿。通过详细病史采集，全面检查受试者眼位、眼球运动、眼前节及后节，收集最佳矫正视力（BCVA）、等效球镜度（SE）、眼部生物参数等数据。

结果：本研究共纳入 232 例早发性近视儿童，其中 122 例（52.58%）为 eoHM 患儿，男性占 59.02%（72/122），女性占 40.98%（50/122）。eoHM 患儿平均年龄 4.2 ± 1.7 岁，平均 BCVA 为 0.65 ± 0.40 （logMAR），平均 SE 为 $-9.24 \pm 3.48 \text{ D}$ ，平均眼轴长度（AL） $24.94 \pm 2.16 \text{ mm}$ ，平均角膜曲率 43.17 ± 2.00 ，仅 17.45%（37 眼）eoHM 患眼 AL 超过 26 mm。值得注意的是，59.02%（72/122）的 eoHM 患儿合并其他眼部或全身疾病，其余 40.98%（50/122）为非综合征型 eoHM。最常见的合并症为晶状体脱位（23/122，18.85%），其次为遗传性视网膜变性（IRD）（14/122，11.48%）。

结论：超过半数 eoHM 患儿伴有其他眼部或全身疾病，以晶状体及眼底病变最为常见。临床需对 eoHM 患儿进行全面眼科检查和遗传学检测，及时发现并干预相关眼部和全身异常。

摘要编号：207553

中国北方学龄前儿童散光及其构成因素

第一作者：Yuanbin LI

共同作者：Jing FU, Yunyun SUN

目的：分析中国北方 3-6 岁学龄前儿童散光成分之间的关系，探讨其对屈光度和生物结构发展的影响。

方法：2021 年 11 月开始，在北京市通州区进行了一项基于人群的横断面研究。我们纳入了来自 9 所幼儿园的 3-6 岁儿童。散瞳前后分别测量屈光度，并使用 Lenstar 900 测量眼部生物参数。分析右眼数据，使用不同的分组（0.5、0.75、1.0 和 1.5 度）计算散光的患病率，并使用回归模型确定相关风险因素。使用 Spearman 相关系数、拟合曲线等分析散光各成分之间的关系。

结果：共纳入 1,410 名学龄前儿童（94.1%），平均年龄 4.44 ± 0.82 岁，其中 51.9% 为男孩。总散

光(RA)、角膜散光(CA)和眼内散光(IA)的均值分别为 -0.44 ± 0.34 D、 -1.04 ± 0.51 D、 -0.86 ± 0.38 D。RA、CA和IA的患病率分别为10.01%、49.68%和31.65%。患病率性别没有差异。低龄、女性、高AL/CR是高IA相关风险因素。RA和CA主要表现为规则散光(WTR), IA主要表现为逆规则散光(ATR)。近视前期儿童的RA最大;有足够的远视储备RA最小;RA和CA在远离正视化的过程中逐渐增加, IA基本保持稳定。RA、CA和IA随着AL的增加而逐渐减少。RA随着AL/CR的增加而逐渐增加。RA和CA在远离AL/CR范围[2.7, 2.8]的方向上逐渐增加。从二次拟合曲线可以看出, CA的变化幅度最大。大多数补偿类型都处于欠补偿(J0: 53.82%; J45: 31.07%)。

结论: 在中国北方3至6岁的学龄前儿童中, 远视储备儿童的RA和CA最小, 儿童的RA、CA随着远离正视化, 向近视前期和中高度远视的方向逐渐增加, IA相对稳定。眼部发育不协调(高AL/CR)会增加RA、CA和IA。角膜变化可能在中国3至6岁学龄前儿童的正视化中起着重要作用。补偿效应对中国学龄前儿童持续且显著, 特别是在J0方向。

摘要编号: 210217

儿童周期性外斜视2年观察1例

第一作者: Jinxin SONG

目的: 汇报一例周期性外斜视的特征和2年随访。

方法: 男孩, 10岁, 代主诉“一天正位, 一天斜视已三年”。家长诉三年内, 严格遵循一天正位, 一天外斜的规律。斜视日早上起床后即全天斜视, 正位日起床后即全天正位。眼科检查: 视力0.8/0.8, 眼轴右眼22.26 mm/左眼22.15 mm。双眼赛飞杰散瞳后+1.0 D远视。正位日查斜视度0/-8 Δ , 包眼后-8 Δ /-10 Δ , 立体视(远为随机点中距离立体视, 近为titmus立体视图片)200/40。斜视日(第二日), 斜视度裸眼视远-30 Δ , 视近-35 Δ , 包眼后视远-30 Δ , 视近-30 Δ , 立体视: 无/40。眼分视视觉功能检查提示: 斜视日单眼抑制, 右眼被抑制(与照片吻合)。正位日存在不完善双眼视, 远近动态立体视正常, 双眼有同时视但融合不好。时间和空间扭曲图尚圆。2025.07复查时父亲有新的发现: 如果第一天是斜视日, 第二天应为正位日, 但是超过12点睡觉后, 第二天仍是斜视。如果第一天是正位日, 第二天早上睡醒后马上做对眼训练, 则一天保持正位。本轮复查第一天为斜视日, 查体: 左眼为主导眼, 右眼自发外斜视, 控制不佳, 视力双眼1.0/1.0, 眼轴右

眼22.66/左眼22.66, 散瞳后SE=+0.50, 裸眼斜视度远-25 Δ /近-35 Δ , 立体视无/200, 双眼分视视觉功能检查提示: 斜视日单眼抑制, 右眼被抑制, 时间和空间扭曲图画不出。第二天本应为正位日, 但患儿超过12点睡觉, 表现为显斜视。在诊室内强行对眼训练无效, 表现为看远显斜视, 看近可维持正位。斜视度仍远-25 Δ /近-35 Δ , 立体视无/40。视视觉功能检查提示: 双眼存在同时视, 时间和空间扭曲图尚圆。第三天未就诊。

结果: 患儿两年随访斜视度数未变化, 眼轴增长速度在正常范围内, 近立体视出现下降, 周期规律也出现变化。预示着需要密切观察, 必要时手术治疗。

结论: 周期性斜视是一种特殊类型的、罕见的、具有时间规律的斜视类型。其病因和发病机制尚未明确, 周期性斜视应与周期性动眼神经麻痹以及重症肌无力鉴别。该病的治疗是以斜视日检查的斜视度进行手术。大部分学者建议在排除神经眼科器质性疾病后, 转变为恒定性斜视前进行手术。

摘要编号: 210028

先天性晶状体脱位患儿心理健康症状易感性预测: 预测模型的构建与验证

第一作者: Xiaolin LIANG

共同作者: Sijie CHEN, Guangming JIN, Danying ZHENG

目的: 旨在系统评估7-18岁先天性晶状体脱位(CEL)患儿的抑郁、焦虑症状水平, 明确其心理健康状况特点, 并构建预测模型, 为临床识别CEL患儿中心理健康症状高风险人群提供有效工具。

方法: 本研究为前瞻性研究, 纳入于2022年3月至2024年2月在中山大学中山眼科中心门诊及住院的48例CEL患儿作为研究组, 同时选取50例年龄、性别匹配的健康儿童作为对照组。采用经中文验证的儿童抑郁量表(CDI)和儿童焦虑相关情绪障碍筛查量表(SCARED)对所有受试者进行评估, 分别筛查抑郁和焦虑症状。收集患儿人口学特征、临床诊疗资料等潜在影响因素, 通过单因素和多因素逻辑回归分析筛选有效预测因子, 最终构建列线图预测模型。

结果: CEL患儿的CDI平均评分(12.4 ± 7.4)和SCARED平均评分(15.9 ± 11.7)均显著高于健康对照组(分别为 7.1 ± 6.3 和 9.9 ± 7.4), 差异具有统计学意义(P值分别为0.001和0.005)。35.4%的CEL患儿存在不同程度的抑郁或焦虑症状。多因素逻辑回归分析确定, 儿童年龄(比值比[OR]=1.815, 95%置信区间[CI]: 1.084-3.039)、病程(OR=1.557, 95% CI: 1.009-2.403)和全身异常(OR=19.894, 95% CI: 1.660-238.463)

被确定为焦虑症状的预测因子。受试者工作特征曲线下面积为 0.924 (95% CI: 0.845–1.000)，表明上述预测因子组合具有良好的预测效能。校准曲线显示列线图预测结果与实际观察结果一致性良好。决策曲线分析显示，该列线图具有临床实用性，在识别存在显著焦虑症状的患者方面具有更优的鉴别能力。

结论：CEL 患儿的抑郁和焦虑症状发生率显著高于健康儿童，提示其心理健康状况亟待关注。年龄、病程及全身系统异常是 CEL 患儿心理健康的影响因素，基于上述指标构建的列线图预测模型具有良好的预测准确性和临床适用性，可为临床医生早期识别 CEL 患儿中心理健康高风险个体提供科学依据。

摘要编号：209820

双侧下斜肌减弱术后双眼同向视物倾斜合并代偿头位的再次手术治疗

第一作者：Shi Qiang YANG

共同作者：Cheuk Sing YAM

目的：我们报道了垂直肌水平移位术治疗双侧下斜肌减弱术后双眼同向视物倾斜，合并头倾代偿头位患者的临床疗效。

方法：回顾研究 3 例双侧下斜肌减弱术后因视物倾斜维持头倾代偿头位的患者，病例 1 和 2，头向右肩倾，采用双眼下直肌同向移位术，右眼下直肌向颞侧，左眼下直肌向鼻侧移位，病例 3 右眼弱视，左眼主导，头向左肩倾，采用左眼上直肌后徙并鼻侧移位术。

结果：3 例患者术后主观视物倾斜均消失，头位改善，未引起新的垂直斜视。远期随访，患者头位维持正位，未再诉视物倾斜。

结论：双侧下斜肌减弱术后第一眼位正位的患者，仍可能因为视物倾斜维持头倾代偿头位，垂直肌同向水平移位术，通过产生相应的旋，矫正视物倾斜，从而改善残余的代偿头位。

摘要编号：209729

双眼上斜肌延长术治疗儿童内斜视 A 征的疗效观察

第一作者：Tong QIAO

共同作者：Haiyun YE

目的：内斜视 A 征定义为向下注视时相比向上注视时斜视度数增加超过 10 棱镜度。本研究旨在评估双眼上斜肌延长术——一种无植入物技术——在治疗伴有双侧上斜肌功能亢进的儿童内斜视 A 征中的

长期疗效，并探讨其相较于传统硅胶垫片及肌腱切断术在规避相关并发症方面的优势。

方法：本回顾性队列研究纳入了所有诊断为内斜视 A 征伴双眼上斜肌功能亢进的患者，均接受采用不可吸收聚丙烯缝线的双眼上斜肌缝线延长术，并联合内直肌后徙术。术前及术后评估包括九个注视方向的棱镜遮盖试验、眼底照相以及上斜肌功能亢进分级。

结果：本研究共纳入 32 名儿童的 64 只眼，平均年龄为 7.0 (3.1) 岁，平均术后随访时间为 35.2 (15.6) 个月 (范围：8–55)。平均内斜视 A 征度数由术前的 23.4 (7.7) 棱镜度显著降低至术后的 2.4 (2.3) 棱镜度 ($P < 0.001$)，降幅达 88.3%。原发性注视位的平均水平内斜视度数由 37.5 (10.9) 棱镜度改善至 1.7 (1.8) 棱镜度 ($P < 0.001$)。平均客观眼底旋转度数由 10.9 (2.5) 度下降至 1.1 (1.4) 度 ($P < 0.001$)，且无一例出现旋转性复视或垂直性偏斜。上斜肌功能亢进分级由 2.8 (0.7) 级恢复正常至 0.2 (0.4) 级 ($P < 0.001$)。未观察到缝线相关并发症，且眼位稳定性维持至末次随访。

结论：在儿童内斜视 A 征手术中，上斜肌缝线延长术展现了良好的生物力学精确性、解剖结构保留效果，并消除了植入物相关风险。该术式在有效矫正内斜视 A 征、恢复正常旋转眼位及获得持久疗效方面的优势，使其成为治疗双眼上斜肌功能亢进的一线手术方案。本研究填补了小儿眼科学领域的重要空白，提供了更长期的随访数据，并凸显了微创、与生长发育相容技术在保护视觉发育方面的重要价值。未来需要更大样本量及更长随访期的随机试验来进一步确认该术式治疗内斜视 A 征的疗效与安全性。

摘要编号：209894

双眼视训练对小角度的间歇性外斜近视儿童的疗效分析

第一作者：Zhang JUN

目的：分析双眼视觉训练对于小角度的间歇性外斜近视儿童的疗效。

方法：选取 2024 年 3 月到 2025 年 9 月于西安爱尔古城眼科医院就诊的小角度间歇性外斜近视儿童 60 例，随机分为两组，治疗组 30 例在院进行每周两次的双眼视觉训练，对照组 30 例仅进行配镜治疗，所有患者年龄均为 8~14 岁之间，无眼部疾患，屈光度为 $-0.50\text{ D} \sim 4.00\text{ D}$ 之间，远距斜视度 $\leq 20\text{ PD}$ ，近距斜视度 $\leq 25\text{ PD}$ ，对两组患儿进行治疗前和治疗后 3 月、6 月的看远斜视度、看近斜视度，立体视检查，采用 T 检验和卡方检验进行分析。

结果：训练前治疗组和对照组的看远、看近斜视度、立体视、近视比例方面差异均无统计学意义 ($P > 0.05$)，治疗 3 个月时对照组的看远、看近斜视度均大于治疗组，差异有统计学意义 ($t = 3.43 P < 0.05$, $t = 2.57 p < 0.05$)；治疗 3 个月时，两组之间立体视差异无统计学意义；治疗 3 个月时，治疗组看远斜视度无明显变化，差异无统计学意义 ($P > 0.05$)看近斜视度和立体视(Titmus)均优于训练前，差异有统计学意义，($P < 0.05$)；治疗 6 个月时对照组的看远、看近斜视度均大于治疗组，差异有统计学意义 ($P < 0.05$)；治疗 6 个月时治疗组看远、看近和立体视均优于训练前，差异有统计学意义 ($P < 0.05$)。

结论：双眼的视觉训练对于小角度的间歇性外斜儿童眼位控制和立体视的改善具有积极的作用。

摘要编号：209883

反向 Yokoyama 手术矫正高度近视相关内上斜视一例

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共同作者：Liang TIAN

目的：探讨反向 Yokoyama 手术在高度近视合并眼球下颞部后巩膜葡萄肿所致内上斜视中的应用效果，并分析其在异常直肌走行及眼球移位情况下的手术原理与可行性。

方法：患者，男性，45 岁，因主诉“右眼自幼内斜视，伴有磨涩不适 5 年余”就诊，欲通过手术矫正斜视。入院检查示右眼内斜 45° 以上，并伴上斜约 10° 。眼球运动检查发现右眼外转及下转严重受限。屈光检查示双眼高度近视，右眼眼轴明显延长。MRI 扫描显示右眼球后极部增长，形成后巩膜葡萄肿，与颞下方眼眶壁接触紧密；外直肌向上移位，下直肌向鼻侧移位，眼球后极部向颞下方移位。在全身麻醉下实施右眼内直肌后徙 + 反向 Yokoyama 术（外直肌及下直肌连接术）。术中行右眼内直肌缝线后切断，外直肌下方 $1/2$ 肌腹和下直肌颞侧 $1/2$ 肌腹在原肌止点后 14 mm 用 5-0 不可吸收缝线进行联扎，外直肌和下直肌的肌腹不劈开，随后内直肌后徙至 9.0 mm。

结果：术后患者眼位恢复正位，眼球外转和下转活动范围明显好转。术后 2 周及 3 个月随访时眼位稳定。

结论：高度近视性斜视常因眼球后极移位导致外直肌及上直肌间 pulley 异常，典型表现为内下斜。传统 Yokoyama 术通过联合外直肌与上直肌，有效重建上颞方 pulley。与高度近视常见的限制性内下斜不同，本病例表现为一种相对罕见的内上斜。在该患者中，右眼后极在眼球发育过程中颞下

方的 pulley 结构的断裂，导致了非典型的斜视。我们推测，这种罕见的眼位类型与后巩膜葡萄肿的具体部位密切相关。正如 Demer 所报道的，在轴性高度近视中，后巩膜膨出的部位可能对邻近的眼外肌产生“cam-like effect”，这一机械性影响机制被称为“knobby eye 综合征”。在本病例中，MRI 显示右眼后巩膜膨出位于颞下方，该部位的膨出对邻近的外直肌、下直肌及下斜肌形成“cam-like effect”，导致这些肌肉的解剖移位。我们采用与“Yokoyama 手术”相同原则治疗本例患者，取得了良好效果。术后患者眼位正位，对手术美容效果表示满意。本病例从不同角度进一步印证了 Yokoyama 2001 年提出的“将眼球置于肌圆锥内”的核心理念。

摘要编号：206217

基于斜视术后多模态短期可塑性训练的眼间抑制影响：中心凹与旁中心凹区域的对比研究

第一作者：Yingqing YU

目的：本研究旨在评估基于斜视术后多模态短期可塑性训练对眼间抑制的影响，重点分析中心凹与旁中心凹区域的恢复差异。

方法：本研究纳入 170 例斜视患者，分别在术前、术后第 3 天（训练前）和术后第 3 天（训练后）进行眼间抑制评估，采用等级评分（R0-R3）衡量抑制程度。所有患者接受单次 20 分钟的多模态视觉训练。统计分析采用 Friedman 检验和 Wilcoxon 符号秩检验进行比较。

结果：术后短期训练显著改善了眼间抑制的总体水平 ($p < 0.0001$)。区域特异性分析显示，旁中心凹区域的抑制在术后第 3 天（训练前）已显著下降 ($p < 0.0001$)，并在训练后进一步改善。相比之下，中心凹区域的抑制在训练后才表现出显著的改善 ($p < 0.0001$)。在中心凹区域，CXT 组与 IXT 组的抑制差异未达到统计学显著性 ($p = 0.110$)，然而在旁中心凹区域，CXT 组的抑制水平显著高于 IXT 组 ($p = 0.025$)。

结论：研究表明，斜视术后视觉功能恢复存在区域异步性。旁中心凹区域的恢复较为迅速，而中心凹区域的恢复更依赖于主动的短期可塑性训练。术后早期训练有效，特别是在改善中心凹区域抑制和缩小 CXT 与 IXT 患者之间的功能差异方面，支持个体化训练方案的应用，促进双眼视觉功能重建。

摘要编号: 209949

基于穿戴式眼动仪的间歇性外斜视自发偏斜幅度和频率的量化评估

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共同作者: Xiaoning LI, Xiangzhong TANG, Zhikuan YANG, Jinyou ZOU

目的: 提供一种基于穿戴式眼动追踪技术的间歇性外斜视 (Intermittent Exotropia, IXT) 自发偏斜幅度与发生频率量化评估方法, 并与临床常用 IXT 患者偏斜角度及眼位控制能力评估方法进行比较。

方法: 本研究为一项前瞻性观察性研究。首先, 所有受试者均被要求在佩戴可穿戴式眼动仪的同时, 依次观看远距 (6 m) 及近距 (40 cm) 下播放的动画视频各 20 分钟; 并在观看视频前后, 进行了受试者双眼正位注视及单眼偏斜状态下的基线眼位测量各 30 秒, 用以计算偏斜阈值。随后, 将眼动仪记录所得转化为每记录帧双眼水平方向聚散角时间频率直方图, 并基于偏斜阈值建立聚散角高斯分布拟合模型, 最终通过模型计算得到 IXT 患者在执行视频观看任务时的自发偏斜频率及偏斜幅度的动态监测结果。此外, 本研究使用三棱镜交替遮盖试验 (Prism and Alternative Cover Test, PACT) 及诊室控制力评分 (Mayo Clinic Office-based Scale, MCOS) 同步采集了受试者的偏斜角度大小及眼位控制能力, 并与眼动测量结果进行比较分析。

结果: 本研究共纳入 21 名 IXT 患者 (年龄: 7-18 岁, 偏斜角度: 2-52 $^{\circ}$)。眼动仪测得的偏斜幅度与 PACT 结果在近距 ($r = 0.76$, $P < 0.001$) 与远距 ($r = 0.89$, $P < 0.001$) 均高度相关。自发偏斜的发生频率在近距离与 MCOS 评分显著相关 ($r = 0.58$, $P = 0.004$), 但在远距离无显著相关性 ($P = 0.82$)。此外, 4 名患者完成了不同日期的重复测量, 眼动仪测得的偏斜幅度一致性良好, 近距 95% 一致性界限为 $1.31 \pm 2.63^{\circ}$, 远距为 $0.27 \pm 2.14^{\circ}$ 。

结论: 本研究结果表明, 结合偏斜阈值算法的穿戴式眼动追踪系统可客观量化不同偏斜幅度的 IXT 在自然活动状态下的自发偏斜幅度与频率, 具有可观的临床应用价值。

摘要编号: 210148

对侧眼手术治疗儿童核上型单眼上转不足

第一作者: Lin CHEN

共同作者: Qing LIU, Xiao Jiao TANG

目的: 本研究旨在基于神经支配法则, 通过实施对侧下斜肌前转位联合上直肌后退术, 治疗核上型单

眼上转不足 (Monocular elevation deficiency, MED), 同时矫正水平斜视, 实现复杂斜视的同步治疗。

方法: 本研究为单中心、回顾性病例系列研究, 纳入 2021 年至 2024 年在我院诊断为核上型 MED 的患儿 (患眼贝尔征阳性、被动牵拉试验阴性)。患儿均接受对侧下斜肌前转位联合上直肌后退手术, 若存在水平斜视, 则同步进行水平斜视矫正手术。术前及术后末次随访时, 对患者的视力、远近眼位偏斜角度、眼球运动、上睑下垂程度及是否需要二次斜视手术进行评估。

结果: 本研究共纳入 5 例患者, 平均手术年龄为 8.0 ± 2.2 岁, 其中男性 2 例 (40%), 女性 3 例 (60%)。垂直斜度平均为 27.00 ± 5.70 PD, 3 例患者合并外斜, 斜度为 30.33 ± 7.64 PD, 所有患者均存在上睑下垂 (真性 1 例, 假性 4 例)。平均随访时间为 9.2 ± 3.03 个月。术后, 所有患者均未出现超过 5 PD 的水平及垂直斜度, 患眼上转功能明显改善, 4 例假性上睑下垂术后好转, 1 例真性上睑下垂患者接受二次睑下垂矫正手术, 但无患者需要接受斜视二次手术。

结论: 对于核上型 MED 病例, 基于神经支配原理的对侧上转肌减弱手术是一种简单且可靠的治疗方案。通过合理设计同步联合水平斜视手术, 可有效降低旋转斜视、眼前节缺血等并发症的风险。

摘要编号: 209001

急性共同性内斜视患者的静息态脑镜像同伦功能连接改变研究

第一作者: Jiayu CHEN

共同作者: Jing FU, Jie HAO

目的: 探讨基于体素镜像同伦连接 (voxel-mirrored homotopic connectivity, VMHC) 方法研究急性共同性内斜视患者和健康受试者大脑中同位点之间的功能连接差异及其与病程和临床症状的关系。

方法: 一项单中心、前瞻性和观察性研究。纳入 2021 年 1 月至 2022 年 12 月期间北京同仁医院斜视与小儿眼科就诊的 AACE 患者和年龄、性别、受教育年限相匹配健康对照志愿者。收集 32 例 AACE 患者和 31 例匹配对照者的 rs-fMRI 信号和眼科检查结果、心理量表评分。静息态功能磁共振成像 (resting-state functional magnetic resonance imaging, rs-fMRI) 数据及结构像数据进行 VMHC 分析, 并采用双样本 t 检验分析组间 VMHC 差异, 并与临床指标进行相关性分析。

结果: 两组在性别、年龄、身高、体重间均无统计学差异。与对照组相比, AACE 患者组额上回、

前扣带回的 VMHC 值降低, 差异具有统计学意义 ($P < 0.05$)。AACE 者组前扣带回中尾状核区的 VMHC 值与斜视度、近距离用眼时间呈正相关 ($r = 0.416$, $P = 0.018$; $r = 0.381$, $P = 0.034$), 扣带回中的嗅皮质的 VMHC 值与近距离用眼时间也呈正相关 ($r = 0.389$, $P = 0.031$)。

结论: AACE 患者额叶和边缘叶的 VMHC 值发生了改变, 提示 AACE 可能导致内侧额回功能和前扣带回功能障碍, 这种变化与不良的用眼习惯和斜视的严重程度有关。

摘要编号: 207723

改良调整缝线技术对急性获得性共同性内斜视手术疗效的影响

第一作者: Jingchang CHEN

共同作者: Bingbin MA, Qian SUN

目的: 探讨改良术后缝线调整对术后早期出现明显隐性或显性斜视的急性获得性共同性内斜视患者的手术疗效的影响。

方法: 对在 2020 年 1 月~2024 年 3 月期间在我院手术且术后早期斜视度 $\geq 10^\circ$ (单马氏杆检查) 的急性获得性共同性内斜视患者的病历资料进行回顾性分析。入选患者均在术中预置了改良短小标记调整缝线。根据术后一周内是否进行缝线调整分为调线组和非调线组。手术成功定义为复视消失且视远和视近斜视度均 $\leq 10^\circ$ (单马氏杆检查)。所有患者的术后随访时间不少于 2 个月。

结果: 共 21 例纳入调线组, 20 例纳入非调线组。在术后早期没有实施缝线调整前, 两组的手术成功率没有显著性统计学差异 (调线组为 9.5%, 非调线组 30.0%, $P = 0.130$); 调线组的视远斜视度 ($17.76 \pm 5.16^\circ$) 大于非调线组 ($13.40 \pm 3.05^\circ$) ($P = 0.002$)。在术后末次随访时, 调线组的手术成功率 (85.7%) 高于非调线组 (45.0%) ($P = 0.009$); 调线组的视远斜视度 ($6.05 \pm 4.79^\circ$) 低于非调线组 ($13.70 \pm 7.48^\circ$) ($P < 0.001$)。

结论: 对术后早期斜视度 $\geq 10^\circ$ (单马氏杆检查) 的急性获得性共同性内斜视患者在术后一周内实施改良术后缝线调整, 不仅可以进一步降低其斜视度, 使其术后隐斜视度变得更小, 还能提高其手术成功率。

摘要编号: 204571

早产儿视网膜病变联合指标早期预测价值研究

第一作者: Wen SHI

共同作者: Shuo WANG

目的: 本研究旨在探讨入院临床指标对早产儿视网膜病变 ROP 的早期预测价值。

方法: 回顾性纳入 98 例平均胎龄 30.42 ± 1.20 周的早产儿, 其中 ROP 组 49 例、非 ROP 组 49 例, 收集入院时体温、体重、心率、血压、红细胞、血红蛋白、红细胞分布宽度、直接胆红素、总胆红素等 11 项指标, 通过 ROC 曲线评估各指标及联合指标对 ROP 的预测价值。

结果: 结果显示 ROP 组收缩压、红细胞、血红蛋白、直接胆红素、总胆红素显著高于非 ROP 组, 单独指标中直接胆红素预测价值最佳曲线下面积, 联合 11 项指标后预测价值显著提高, 因而联合指标预测价值显著优于单独指标。

结论: 研究表明基于入院常规检查指标的联合模型对 ROP 具有优异预测价值, 该方法简便易行、成本效益高、有助于基层医疗机构早期识别高风险患儿并及时干预, 为 ROP 的早期防治提供了实用工具。

摘要编号: 209312

白化病相关视觉损伤的临床特征

第一作者: Ping WANG

目的: 通过探讨白化病患儿的视觉损伤相关因素, 指导白化患者临床视觉康复治疗。

方法: 收集了 2018/1/1 到 2025/3/31 期间我科收集的 493 白化患者的临床资料, 包括矫正视力, 屈光状态, 眼底色素, 黄斑中心凹分化程度, VEP 及 ERG。所有的患者经过基因检测确诊了白化类型。

结果: 1. 291 男性和 202 女性, 5~49 岁, 平均年龄 15.71 ± 6.59 y; 2. 其中 OCA1A 219 例, OCA1B 43 例, OCA2 98 例, OCA3 6 例, OCA4 31 例, HPS 40 例, OA 56 例; 3. 未治疗前平均矫正视力 0.05~0.4 不等, 平均 0.17 ± 0.66 ; 4. 高度屈光不正高发, 其中 199 例 (40.37%) 患者高度散光 (> 3 D), 45 例患者 (9.13%) 高度近视 (> -6 D), 66 例 (13.39%) 患者高度远视 ($> +5$ D); OCA1 中高度屈光不正患者最多 (178 例, 36.11%); 5. 黄斑中心凹分级 FH1 共 6 例, FH2 共 10 例, FH3 共 8 例, FH4 共 469 例; 其中 OCA1、HPS 和 OA 患者都是 FH4; 5. 矫正视力与中心凹分级成负相关, $r = -0.71$; 6. 74 例 (74%) 患者伴有内斜视, 123 例 (25%) 患者伴有外斜视,

32 例 (6.5%) 患者伴有垂直斜视, 46 例 (9.3%) 患者伴有 DVD; 7. 所有患者都伴有眼球震颤, 其中钟摆型 401 例, 跳动型 52 例, 混合型 40 例; 8. 425 例 (86.2%) 患者伴有头位, 其中 chin down 205 例 (41.58%), face turn 108 例 (21.91%), head tilt 42 例 (8.52%), 混合头位 70 例 (14.20%); 38 例 (7.71%) 患者伴有晃头; 8. OCA1、HPS 及 OA 组的视力低于其他组 (分别为 0.078 ± 0.039 ; 0.094 ± 0.023 ; 0.096 ± 0.041), OCA2 组视力最佳 (0.251 ± 0.119), OCA4 其次 (0.214 ± 0.09)。

结论: 1. 白化患者的视觉损伤严重, 与屈光不正、感觉系统发育异常和运动损伤有关; 2. 黄斑中心凹发育不良分级与视力相关; 3. 治疗白化患者中的眼震, 头位及斜视对于改善视力有益。

摘要编号: 209609

精神行为异常相关性创伤致儿童视网膜脱离两例: 临床特征与诊疗反思

第一作者: Xiao LUO

共同作者: Yun LI

目的: 探讨精神行为状态异常相关性创伤导致的患儿严重视网膜脱离的临床特征及诊疗反思。

方法: 我们收集了 2 例 2024 年 8 月至 2025 年 6 月于本院眼科就诊的精神行为状态异常相关性创伤导致患儿严重视网膜脱离, 收集其术前检查结果, 术中手术视频及术后复查情况, 并回顾了精神行为状态异常相关性创伤导致严重眼科疾病临床特征与诊疗思路 (包括医学和精神病学) 的现有文献。

结果: 精神行为状态异常相关性创伤导致的患儿严重视网膜脱离, 在临床诊疗中存在诸多困难: 精神行为异常疾病种类多样, 患儿自身眼球壁结构更为脆弱, 其监护人疏忽及患儿本身的沟通障碍导致就诊时机延误, 术前检查评估的配合性较差, 术中的麻醉风险及术后康复的不可配合等导致其视网膜脱离范围更为广泛, 病情更为严重。因此, 对于存在精神行为状态异常相关性创伤的患儿, 眼科医生在接诊时应更加细致、耐心和全面, 首先, 需要充分了解患者的病史和病情, 包括其精神心理状态、可能的行为问题及是否存在外伤史。其次, 在进行眼科检查时, 需要采取适当的方法和技巧, 以确保患者能够配合并尽可能准确地获取检查结果。最后, 在制定治疗方案时, 可通过跨学科合作, 与精神科医生、儿科医生、内分泌科医生等共同为患儿提供诊疗, 综合考虑患者的整体情况和各种合并症, 以确保治疗的有效性和安全性。

结论: 眼科医生应重视这一现象, 从而进行早期诊断, 且通过跨学科协作, 全面考量患儿的整体状况与合并症, 为患儿及其监护人给予充足的教育、咨

询和服务, 同时建立恰当的术后行为管理 (精神科药物调整、护理指导), 避免永久性眼部损伤。

摘要编号: 206448

虹膜上的 “不速之客” —— 3 岁神经母细胞瘤患儿化疗中的眼内转移

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共同作者: Yu TIAN

目的: 本研究旨在报道 1 例 3 岁 8 个月大神经母细胞瘤患儿在原发肿瘤切除及化疗期间突发虹膜转移的罕见病例, 通过临床-病理对照分析, 探讨化疗期眼内转移的临床特征、诊疗策略及早期干预的重要性, 为儿童神经母细胞瘤眼部并发症的监测提供新的临床证据。

方法: 纳入 1 例经手术及病理确诊的腹膜后神经母细胞瘤男性患儿 (3 岁 8 个月), 术后接受化疗。化疗第 14 天因家长发现左眼异常白色反射就诊眼科, 排查眼部转移。临床检查可见: 左眼虹膜表面可见灰白色囊性圆形隆起病灶, 伴血管化, 无炎症反应及显著视力损害 (A)。UBM 提示左眼虹膜表面异常实性隆起 (E)。术中评估: 全身麻醉下行肿瘤切除术, 术中荧光素血管造影证实病灶血管灌注 (B)。切除的虹膜肿瘤组织行组织病理学及免疫组化分析, 与原发腹膜后肿瘤病理特征对比, 确认同源性 (C)。随访还发现脑部 MRI 显示 t1 加权图像 (白色箭头) 显示局部不均匀信号, 表明中枢神经系统受累 (D)。

结果: 1. 临床特征与诊疗过程: 虹膜转移发生于原发肿瘤切除术后、化疗早期 (第 14 天), 不同于文献中常见的 1 岁内婴儿期发病。虹膜病灶组织学及免疫表型与原发腹膜后神经母细胞瘤完全一致, 证实血行转移来源。2. 文献对比与罕见性: 既往报道的虹膜神经母细胞瘤几乎均发生于 1 岁以下婴儿, 且多为初诊时发现原发瘤; 本例为 3 岁儿童化疗期新发转移, 突破经典文献中 “婴儿期好发” 及 “转移多伴随原发瘤诊断” 的共识。

结论: 临床警示: 神经母细胞瘤化疗期间可能出现罕见的虹膜快速转移, 尤其需关注 3 岁以下儿童 (即使超过传统好发年龄 1 岁) 的眼部监测, 建议将眼科检查纳入化疗期常规评估。诊疗策略: 对原发瘤切除术后病情稳定的患儿, 若出现虹膜血管化结节, 需高度怀疑转移可能, 及时通过术中血管造影及病理活检明确诊断。学术价值: 本例首次报道了一例罕见的 1 岁以上的神经母细胞瘤虹膜转移的儿童病例, 证实化疗期可能成为眼内转移的潜在窗口期, 为儿童实体瘤眼部并发症的早期干预提供新依据。

摘要编号: 208768

视觉训练对不同类型儿童弱视视觉功能影响的纵向回顾性研究

第一作者: Jiefang WANG

目的: 本研究旨在纵向评估视觉训练对四种不同类型(屈光不正性、屈光参差性、斜视性、形觉剥夺性)儿童弱视的疗效, 重点考察其在远近视力、调节功能、眼间抑制及立体视功能上的恢复轨迹与差异。

方法: 本项回顾性队列研究共纳入 171 例弱视患儿, 其中屈光不正性弱视 61 例, 屈光参差性弱视 81 例, 斜视性弱视 12 例, 形觉剥夺性弱视 14 例。收集所有受试者在基线期及接受视觉训练后 1 至 6 个月的纵向随访数据。主要观察指标包括: LogMAR 远/近视力、单眼调节幅度(D)、调节灵活度(cpm)、基于 Worth 四点灯评估的眼间抑制状态以及立体视锐度(角秒)。采用重复测量方差分析与 Cochran's Q 检验分析各视觉功能指标的纵向变化及组间差异。

结果: 经过 6 个月的视觉训练, 所有类型弱视患儿的平均远视力均获得显著提升($P < 0.001$), 其中屈光不正性与屈光参差性弱视的改善幅度尤为突出。调节幅度和调节灵活度亦表现出显著改善($P < 0.01$)。在双眼视功能方面, 眼间抑制状态发生显著良性转变($P < 0.001$), 成功建立双眼融合的患儿比例随时间显著增加。立体视锐度的改善与眼间抑制的减轻呈显著正相关。亚组分析显示, 相比之下, 斜视性与形觉剥夺性弱视组虽视力有所改善, 但其双眼视功能的恢复程度相对有限。

结论: 视觉训练能有效改善各类弱视患儿的视力及调节功能, 尤其对屈光不正性与屈光参差性弱视效果显著。该疗法可显著减轻眼间抑制, 促进双眼融合, 进而重塑立体视觉。因此, 眼间抑制状态的改善可作为评估视觉训练疗效及预测立体视恢复潜力的关键生物学指标。对于斜视性及形觉剥夺性弱视, 可能需要联合其他治疗策略以获得更全面的功能康复。

摘要编号: 208804

针刺治疗糖尿病眼外肌麻痹 1 例

第一作者: 胡琬秋

共同作者: 罗燕

目的: 报告采用针刺疗法治疗糖尿病性眼外肌麻痹的个案, 探讨针灸治疗糖尿病并发眼外肌麻痹患者的临床疗效, 评估非药物治疗方案的可行性。

方法: 男性患者, 主诉右眼复视 6 月就诊, 既往有糖尿病史 2 年, 查右眼外转受限, 西医诊断为糖尿病性眼外肌麻痹(右眼外展神经麻痹), 中医诊断

为目偏视(风痰阻络)患者, 予针灸治疗, 以灵龟八法开穴、局部取穴与循经取穴相结合, 主穴取双侧睛明、攒竹、丝竹空透鱼腰、太阳、瞳子髎、承泣、头临泣、百会、四神聪, 远端取双侧合谷、列缺、曲池、足三里、阴陵泉、光明、三阴交、太冲。针刺手法以平补平泻为主, 得气后留针 30 分钟, 期间行针 1 次。每周治疗 2 次, 10 次为 1 个疗程, 共治疗 2 个疗程。

结果: 治疗 1 个疗程后, 患者诉复视明显减轻, 仅视近有重影, 视远已无重影, 眼球外转已接近外眦角。治疗 2 个疗程后, 患者诉已无复视, 眼球外转不受限, 临床治愈。

结论: 针灸治疗糖尿病性眼外肌麻痹具有显著疗效, 能明显改善症状并促进功能恢复, 体现了针灸在治疗眼外肌麻痹中的优势, 可作为安全有效的治疗方案推广。

摘要编号: 210078

青少年近视患者配戴离焦型 RGP 镜片的临床观察

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共同作者: 许江涛

目的: 评估离焦型硬性透气性角膜接触镜在控制青少年近视进展中的临床有效性、安全性及患者配戴依从性。

方法: 本研究为前瞻性临床观察。纳入 47 例(94 眼) 8~18 岁的近视青少年患者, 全部验配离焦型 RGP 镜片。通过随访观察患者的配戴适应时间、以眼轴长度变化评估近视控制效果, 并记录配戴相关并发症及弃戴/失访情况。

结果: 所有入选 94 眼均一次性配戴成功, 且均在 2 周内适应全天配戴。在完成 12 个月随访的患者中(58 眼), 有 34 眼(58.6%) 年眼轴增长量 ≤ 0.2 mm, 16 眼(27.6%) 年眼轴增长量 ≥ 0.2 mm。在整个随访期间(3、6、9、12 个月), 未发生严重的角膜擦伤或溃疡等并发症。然而, 共有 10 眼(10.6%) 因个人原因弃戴, 另有 26 眼(27.7%) 在 6 个月后失访。

结论: 离焦型 RGP 镜片为控制青少年高度近视提供了一种有效且相对安全的临床选择, 尤其适用于高度近视或伴有角膜不规则但近视仍快速进展的青少年群体。然而, 其长期控制效果、安全性以及如何改善患者的长期依从性, 仍需更大样本和更长随访期的研究进一步证实。

白内障

摘要编号: 209190

12 种 IOL 计算公式对长眼轴白内障患者计算度数的准确性分析

第一作者: Tianxu PEI

目的: 比较 12 种人工晶状体 (IOL) 计算公式对眼轴 > 26 mm 的白内障患者人工晶体度数的准确性及对误差进行分析。

方法: 前瞻性研究。选取 75 名长眼轴白内障患者 (150 眼), 根据眼轴长度分为 26~28 mm 组、28~30 mm 组及 > 30 mm 组, 白内障术前及术后使用 IOL Master 700 进行检查, 使用 12 种不同的人工晶体计算公式进行计算, 比较不同组中各种人工晶体计算公式下的预测误差 (Predicted Error, PE)、平均预测误差 (Mean Predicted Error, MPE)、绝对预测误差 (Absolute Predicted Error, APE; $APE = |PE|$), 以及误差在不同范围内的分布情况。

结果: 在 26~28 mm 组, Barrett Universal II、Hill-RBF 及 Kane 公式的 MPE 接近于 0, 其中 Barrett Universal II 公式的 MPE 最小, 为 -0.01 D, Barrett Universal II 公式的屈光误差在 ± 0.5 D 范围内所占百分比最高 (49.0%); 在 28~30 mm 组, Barrett Universal II、Hill-RBF 及 Kane 公式的 MPE 接近于 0, 其中 Hill-RBF 公式的 MPE 最小, 为 0.02 D, Barrett Universal II 公式的屈光误差在 ± 0.5 D 范围内所占百分比最高 (42.0%); 在 > 30 mm 组, Barrett Universal II、Hill-RBF、CookeK6 及 Kane 的 MPE 接近于 0, 其中 Hill-RBF 公式的 MPE 最小, 为 0.04 D, Barrett Universal II 公式的屈光误差在 ± 0.5 D 范围内所占百分比最高 (44.0%)。

结论: 对于长眼轴白内障患者, Barrett Universal II 公式的预测精度显著高于其他公式。此外, Hill-RBF 及 Kane 等基于人工智能的新型在线计算公式同样具有较好的表现。

摘要编号: 207644

3 例与电击伤有关的白内障手术效果分析

第一作者: Yue WANG

目的: 描述 3 例与电击伤有关的白内障的病例特殊性体征、发生和发展过程以及个性化手术治疗方案, 并讨论术后效果。

方法: 报告 1 例 30 岁女性间接性雷击性白内障, 1 例 64 岁男性家用电击伤后白内障和 1 例 54 岁男性高压电击性白内障。

结果: 3 例电击烧伤后白内障发生时间分别为伤后 1 年、50 年和 3 个月。晶状体损伤均有前囊下不同形态混浊改变、前囊下皮质混浊和后囊下混浊。其中有 2 例患者为单眼白内障, 1 例为双眼白内障, 1 例 1 眼伴有晶状体半脱位, 但 3 例患者均在术中发现悬韧带松弛现象。2 例仅为单纯性白内障损伤, 1 例年轻患者植入焦深延长型人工晶状体, 1 例中年患者植入散光型单焦点人工晶状体。双眼白内障患者同时合并视网膜和黄斑损伤, 合并角膜瘢痕发生, 1 眼植入单焦点人工晶状体, 另 1 眼呈进行性加重最终形成全白内障。3 例患者术后矫正视力恢复均达到预期效果, 1 例患者术后出现屈光误差。2 例患者手术中均无并发症, 其中 1 例术中发现虹膜松弛、脱出。3 例患者术后均无并发症发生。

结论: 白内障是电击伤后的一种具有潜伏性的并发症, 发生时间长短不一, 高电压烧伤发生白内障可能更早且更严重, 晶状体混浊呈进行性加重, 可导致视力逐渐下降甚至盲, 因此电击伤后进行散瞳晶状体混浊评估和随访是必要的, 特别是高电压烧伤。无论是雷击还是电击性烧伤, 前囊下不同形态混浊改变、前囊下皮质混浊和后囊下混浊都是其晶状体特征性改变, 特别是晶状体前囊下或皮质混浊呈现海星或花瓣样改变时, 需询问雷击或触电病史。电击性白内障手术治疗成功率高, 全面评估患者眼部损伤情况, 遵循患者需求和适应症情况下谨慎选择功能性人工晶状体, 个性化制定手术管理策略, 可使患者获得更好的效果。

摘要编号: 208529

3D 可视化技术对白内障超声乳化术后患者干眼症状的影响

第一作者: Qingzhong CHEN

目的: 探讨 3D 可视化技术对白内障超声乳化术后患者干眼症状的影响。

方法: 本研究纳入 71 例患者 (104 只眼), 分为传统显微镜组 (CM 组) 和 3D 可视化组 (3D 组)。记录术前、术后 1 周及 1 个月的眼表疾病指数 (OSDI)、泪液分泌试验 I (SIt)、脂质层厚度 (LLT)、非侵入性泪膜破裂时间 (NIBUT) 等干眼相关指标, 同时记录手术时间及术中光强度 (ILI)。

结果: 3D 组术中光强度显著低于 CM 组 (33% vs 60%, $P < 0.01$)。首次非侵入性泪膜破裂时间 (NIBUT-F)、平均非侵入性泪膜破裂时间 (NIBUT-Ave)、泪河高度 (TMH) 及眼红评分存在组间与时间的交互作用 ($P < 0.05$)。组间对

SiI、LLT、NIBUT-F、NIBUT-Ave 及眼红评分有显著效应 (P 组 < 0.05)。术后 1 周及 1 个月, CM 组的 SiI、LLT、NIBUT-F、NIBUT-Ave、TMH 均低于 3D 组, 眼红评分高于 3D 组 (均 $P < 0.05$)。术前与术后 1 周的 NIBUT-F 和 NIBUT-Ave 变化值与术中光强度呈负相关 ($P < 0.01$)。

结论: 与显微镜手术相比, 3D 可视化系统可更好地维持白内障术后患者的泪膜稳定性。

摘要编号: 209507

M6A 修饰的 NEIL1 调控线粒体稳态在年龄相关性白内障发病中的作用

第一作者: Lihua KANG

共同作者: Huaijin GUAN, Min JI

目的: 探讨年龄相关性白内障 (age-related cataract, ARC) 中 Nei 核酸内切酶 VIII 样蛋白 1 (Nei endonuclease VIII-like 1, NEIL1) 是否受 N6-甲基腺苷 (N6-methyladenosine, m6A) 修饰调控以及 NEIL1 能否通过调节线粒体稳态影响 ARC 发生。

方法: 以临床患者、小鼠、大鼠和人晶状体上皮细胞株 (SRA01/04) 作为实验对象。采用 qRT-PCR 和 Western blot 检测患者、小鼠晶状体上皮细胞 (lens epithelial cells, LECs) 以及 LECs 氧化损伤模型中 NEIL1 的表达。采用甲基化 RNA 免疫沉淀测序 (methylated RNA immunoprecipitation sequencing, MeRIP-seq) 评估患者 LECs 中 NEIL1 的 m6A 修饰程度。采用甲基化 RNA 免疫沉淀-聚合酶链反应 (methylated RNA immunoprecipitation PCR, MeRIP-PCR) 检测干预 m6A 甲基化酶后 LECs 中 NEIL1 的 m6A 修饰程度。采用 RNA 免疫沉淀-聚合酶链反应 (RNA immunoprecipitation PCR, RIP-PCR) 评估 ARC 患者 LECs 中与 m6A 识别酶相互作用的 NEIL1 的 mRNA 水平。进行 qRT-PCR 和 Western blot 检测干预 m6A 调节酶后的 NEIL1 的表达水平。进行免疫沉淀 (Immunoprecipitation, IP) 评估过表达 NEIL1 后 KEAP1 与 NRF2 的相互作用并采用 Western blot 检测过表达 NEIL1 后 NRF2 的蛋白质表达。然后在 LECs 氧化损伤模型中过表达 NEIL1 和使用 NRF2 抑制剂 ML385 处理, 分别采用 Western blot 检测 DNA 损伤、凋亡和线粒体稳态相关蛋白的表达, 应用 Mito-Tracker 荧光探针评估线粒体数量和形态, JC-1 染色检测线粒体膜电位 (mitochondrial membrane potential, MMP), mtSOX 染色检测线粒体超氧化物 (mitochondrial superoxide, Mito-SOX) 水平。

最后在体外大鼠晶状体氧化损伤模型中敲低 NEIL1 和使用 NRF2 激活剂 ML334 处理后观察晶状体混浊面积比例。

结果: ARC 患者 LECs 中 NEIL1 的 mRNA (1.00 ± 0.09 vs 0.61 ± 0.07) 和蛋白质水平 (1.00 ± 0.04 vs 0.44 ± 0.05) 降低, CFW-Em/J 小鼠 LECs 与 LECs 氧化损伤模型中 NEIL1 表达降低 ($P < 0.05$)。ARC 患者 LECs 中 NEIL1 的 m6A 修饰程度为对照组的 2.19 倍 ($P < 0.05$)。过表达 METTL14 后 m6A 修饰的 NEIL1 mRNA 水平 (1.00 ± 0.04 vs 4.49 ± 0.90) 升高 ($P < 0.05$)。ARC 患者 LECs 中与 YTHDF2 作用的 NEIL1 mRNA 水平 (1.00 ± 0.09 vs 4.96 ± 0.60) 增加 ($P < 0.05$)。过表达 YTHDF2 后 NEIL1 mRNA (1.00 ± 0.04 vs 0.28 ± 0.11) 和蛋白质水平 (1.08 ± 0.15 vs 0.25 ± 0.15) 降低且 NEIL1 mRNA 半衰期也缩短 ($P < 0.05$) ($P < 0.05$)。过表达 NEIL1 后 KEAP1 与 NRF2 的相互作用减弱, 细胞质和细胞核中 NRF2 的蛋白质水平均升高 ($P < 0.05$)。在 LECs 氧化损伤模型中过表达 NEIL1 后 γ -H2AX (1.40 ± 0.07 vs 1.15 ± 0.12) 和 BAX (2.40 ± 0.04 vs 1.95 ± 0.04) 的蛋白质水平降低, BCL-2 的蛋白质水平 (0.63 ± 0.04 vs 3.18 ± 0.91) 升高 ($P < 0.05$)。过表达 NEIL1 后, PGC1- α 、TFAM、HSP60 和 COX IV 的蛋白质水平以及 JC-1 红色/绿色荧光比值均升高 ($P < 0.05$)。DRP1 和 FIS1 的蛋白质水平以及 Mito-SOXs 含量减少 ($P < 0.05$)。ML385 逆转了上述趋势。体外大鼠晶状体氧化损伤模型中敲低 NEIL1 后 H_2O_2 诱导的晶状体混浊面积增加, ML334 缓解了因敲低 NEIL1 而加重的晶状体混浊 ($P < 0.05$)。

结论: 1. ARC 患者、CFW-Em/J 小鼠 LECs 和 LECs 氧化损伤模型中 NEIL1 表达降低。2. ARC 患者 LECs 中 NEIL1 的 m6A 修饰程度增加。3. METTL14 上调 NEIL1 的 m6A 修饰水平, YTHDF2 以 METTL14/m6A 依赖的方式负调控 NEIL1 表达。4. NEIL1 抑制 KEAP1 与 NRF2 相互作用并激活 NRF2 表达。5. 氧化应激下, NEIL1 降低 LECs 中 DNA 氧化损伤和凋亡程度并通过提高 TFAM 和 PGC1- α 蛋白质水平和 MMP, 抑制 DRP1 和 FIS1 蛋白质水平和 Mito-SOX 水平, 促进线粒体稳态, 该效应被 NRF2 抑制剂 ML385 逆转。6. 氧化应激下, NRF2 激活剂 ML334 可显著逆转因 NEIL1 缺乏加重的晶状体混浊。

摘要编号: 200496

OPD-Scan III 像差仪对白内障术后晶状体囊袋混浊的客观定量分析

第一作者: Tianyu ZHENG

目的: 建立白内障术后晶状体后囊混浊 (PCO) 的客观定量评估方法, 探讨晶状体囊膜形态学参数与视觉质量指标之间的关联, 为后续临床干预提供循证依据。

方法: 本研究回顾性纳入 109 例 (122 眼) 白内障超声乳化伴人工晶状体植入术后患者, 术后 1 月采用 OPDScan III 像差仪获取后照法图像及相关视觉质量参数, 包括调制传递函数 (MTF)、点扩散函数 (PSF) 等。应用 ImageJ 软件量化晶状体囊膜特性: 晶状体后囊区以视轴为中心, 评估中央 3 mm 范围内后囊混浊面积、后囊平均灰度值及后囊皱褶长度; 前囊区以视轴为中心, 评估中央 5 mm 区域晶状体前囊膜残留面积、前囊混浊面积及前囊平均灰度值; 同时测量晶状体撕囊口总面积、周长及最长径。采用多元线性回归分析囊膜参数与最佳矫正视力 (CDVA)、视觉质量指标的关联, 并通过亚组分析验证关键影响因素临界值。

结果: 晶状体前囊 5 mm 内囊膜残留面积超过 1.5 mm² 时, 患者术后 CDVA 显著下降 ($P = 0.031$), 患者全眼像差中的规则散光显著上升 ($P = 0.022$)。平均灰度值 (0 = 黑色, 255 = 白色) 数值越小提示区域浑浊程度越重, 前囊 5 mm 内前囊膜平均灰度值低于 67 时, 患者多项视觉质量指标出现显著下降。后囊皱褶显著影响患者的 MTF 总值 ($P = 0.016$) 和 PSF 总值 ($P = 0.003$)。晶状体撕囊口总面积大于 19.09 mm² 时患者视觉质量显著下降, 患者全眼全像差显著增加 ($P = 0.023$)。前囊残留面积小于 1.5 mm²、撕囊口总面积小于 19.09 mm²、前囊浑浊程度小且无后囊皱褶的患者术后视力及视觉质量较好。

结论: 基于 OPD-Scan III 和 ImageJ 的定量评估体系可客观评估 PCO。前囊残留面积大、前囊口总面积过大、前囊浑浊程度增加及后囊皱褶存在是影响术后视力及视觉质量下降的重要因素, 这些指标有助于客观评估患者 Nd:YAG 时机。

摘要编号: 209245

pH/ROS 双响应纳米胶束 TAT-p (AM-b-VitC) 防治白内障及其对线粒体功能的保护作用

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目的: 白内障的发生发展与晶状体氧化损伤密切相关。本研究旨在设计一种具有 pH/ROS 双重响应性的自组装纳米胶束 TAT-p (AM-b-VitC), 以实现维生素 C (VitC) 在晶状体特定环境释放, 从而保护晶状体上皮细胞 (LECs), 为白内障的防治提供新策略。

方法: 1. 通过可逆加成 - 断裂链转移聚合合成两亲性嵌段共聚物 p (AM-b-VitC), 并进一步以细胞穿膜肽 TAT 修饰, 构建具有双响应性的自组装纳米胶束 TAT-p (AM-b-VitC); 2. 在体外试验中, 通过 CCK8、溶血实验和 LIVE/DEAD 染色评估其生物安全性; 采用流式细胞术与共聚焦显微镜分析其细胞摄取效率; 建立 UVB 辐射诱导的晶状体上皮细胞氧化损伤模型, 检测细胞内活性氧 (ROS)、丙二醛 (MDA) 含量及超氧化物歧化酶 (SOD)、谷胱甘肽过氧化物酶 (GSH-PX) 活性; 并借助转录组测序技术探讨其潜在作用机制。3. 在动物层面, 建立 UVB 诱导的小鼠白内障模型, 进一步在体内评估纳米胶束的抗氧化效果及机制。

结果: 1. 成功合成双响应特性的 TAT-p (AM-b-VitC) 纳米胶束, 其在生理条件下结构稳定, 粒径均一; 2. 细胞实验显示, 该胶束在 $\leq 15 \mu\text{M}$ 浓度下具有良好的生物相容性, 细胞摄取率高达 95%; 经该胶束预处理后, UVB 辐射引起的细胞内 ROS 与 MDA 水平显著降低 ($P < 0.05$), 而 SOD 和 GSH-PX 活性显著升高 ($P < 0.05$); 转录组测序分析提示其抗氧化机制与线粒体功能调控密切相关; 3. 动物实验进一步证实, 该纳米胶束能有效延缓 UVB 辐射引起的晶状体混浊, 提升晶状体内抗氧化酶活性; 并有利于维持 LECs 的结构完整性与稳定离子稳态。

结论: TAT-p (AM-b-VitC) 纳米胶束具备高效的细胞穿透能力及微环境响应性释药特性, 在细胞与动物层面均表现出显著的抗氧化活性与晶状体保护作用, 具有良好的生物安全性, 为白内障的防治提供了一种具有转化潜力的纳米材料新策略。

摘要编号: 209129

一例消失的近视

第一作者: Hui CUI

共同作者: Xin JIN

目的: 探索一例高度近视患者玻切术后近视消失的原因。

方法: 患者, 青年男性, 2023 年 7 月出现左眼出现视物遮挡, 同年 11 月散瞳查眼底发现: 颞下方陈旧性视网膜脱离, 累及黄斑。于是 2023 年 11 月份于本院眼科行左眼玻璃体切除 + 视网膜复位 + 硅油填充术, 术后 3 个月硅油取出, 视力恢复良好, 裸眼视力 0.06, 矫正视力 0.5 ($-6.00/-1.25 \times 50$), 继续配戴原框架眼镜 (-6.00 Ds)。2024 年 9 月份自觉左眼戴镜视力下降, 显然验光: 裸眼视力 0.3, 矫正视力 0.7 ($-0.75/-1.00 \times 160$)。眼底照相和黄斑 OCT 均未发现异常。散瞳裂隙灯检查发现左眼晶状体后囊膜浑浊。同时将患者 pentacam 的参数带入晶状体屈光力公式中计算, 结果显示晶状体屈光力下降了约 4.8 D。调节功能检查: 患者 AMP = 9 D, 调节灵敏度: OD: 7 cpm; OS: 0.5 cpm; OU: 5 cpm; 集合近点 18 cm; 正融合范围: 9.6° ; 立体视: 800”。

结果: 晶状体屈光力由表面折射力 (30%) 加内部折射力 (70%) 组成。其中表面折射力来源于晶状体囊膜对内部纤维细胞产生的向心力性机械张力。而内部折射力由晶状体皮质和核的折射率组成。外层皮质中晶状体纤维含水量较大, 折射率偏低, 而核内部的晶体纤维含水量降低, 折射率增加, 从而形成从皮质到内核折射率越来越大的梯度, 构成晶状体内折力。这就像“洋葱头”, 遵循梯度折射率介质模型, 即晶状体折射率中心最大, 周边部最小。同时随着年龄增大, 核中心的折射率增大。后囊膜混浊, 意味着表面折射率增加。但同时其弹性变差, 故囊膜向心性的机械张力降低, 同时网脱两次手术改变房水环境, 导致晶状体纤维细胞水肿, 蛋白含量相对降低, 均可导致内折力下降。最终使晶状体总折光力降低。所以, 这消失的近视与左眼的晶状体混浊有关。

结论: 患者左眼的晶状体混浊导致近视暂时消失, 较差的双眼融像功能为框架眼镜的佩戴提供了可能, 更换左眼镜片度数试戴后患者自觉尚可。3 个月, 患者左眼白内障加重, 由 0.75 Ds 恢复到了 -3.75 Ds, 为患者行左眼白内障超声乳化吸除 + 人工晶体植入术。患者术后恢复良好。

摘要编号: 210334

一种新的不切开结膜及巩膜的人工晶体悬吊手术

第一作者: Yunshan MOU

共同作者: Wei FAN

目的: 评价一种新的不切开结膜及巩膜的人工晶体悬吊手术的安全性和有效性。

方法: 纳入无晶体眼患者 9 例 (9 只眼), 均为白内障囊外摘除术后囊膜缺如的无晶体眼, 均行人工晶体悬吊术。术前及术后 1 天、1 周、1 月及 3 月行视力、眼压及眼前节 OCT 等检查。采用前端弯曲 120° 的 1 ml 注射针头在 8:00 位角膜缘后 2 mm 巩膜处进针, 从对侧角膜缘引入 9/0 聚丙烯悬吊线到眼内, 1 ml 注射针头牵引悬吊线针头从 8:00 位角膜缘后 2 mm 巩膜处出针, 从而引入悬吊线到眼内, 再从 12:00 位侧切口拉出另一端的悬吊线。将拉出的悬吊线采用渔夫结固定在豪雅 PY-60AD 三片式人工晶体的一侧人工晶体襻上, 调整 8:00 位一端的悬吊线将人工晶体从 12:00 位侧切口处植入后房, 另一侧人工晶体襻暴露在侧切口外。用类似方法在 2:00 位角膜缘后 2 mm 巩膜处进针, 引入第二条悬吊线到眼内。将拉出的悬吊线采用渔夫结固定在晶体的另一侧人工晶体襻上, 调整 2:00 位一端的悬吊线将剩下的人工晶体襻植入后房, 并调整人工晶体位置居中。分别将 2:00 及 8:00 位两处的悬吊线行“Z”字形穿巩膜层间 3-5 次, 固定在巩膜隧道。

结果: 9 只眼均顺利完成手术, 平均手术时间为 47.78 ± 14.95 分钟, 术前裸眼 logMAR 视力为 1.87 ± 0.28 , 最佳矫正 logMAR 视力为 0.47 ± 0.30 , 术后 1 天裸眼 logMAR 视力为 0.73 ± 0.53 。术后裸眼视力较术前裸眼视力有显著提高, 差异有统计学意义 ($t = 7.406$, $P < 0.001$)。术后裸眼较术前矫正视力无明显差异 ($t = -2.213$, $P < 0.05$)。术后 3 个月随访, 未发现术后高眼压、线结外露或人工晶体移位。

结论: 不切开结膜及巩膜的人工晶体悬吊手术手术时间较短, 手术并发症较少, 术后视力较术前显著提高, 可安全有效地用于治疗无晶体眼患者。

摘要编号: 204154

人工智能视觉识别系统在白内障超声乳化手术器械清点中的应用

第一作者: Wang YINING

目的: 白内障超声乳化手术器械种类繁多、结构精细, 传统人工清点耗时长、易出错, 存在器械遗漏或手术延误风险, 影响手术效率与患者安全。本研

究旨在开发并评估一套基于人工智能（AI）的视觉识别系统，用于白内障超声乳化手术器械的自动化、快速、准确清点，提升手术流程的安全性与效率。

方法：我们设计并实现了一套集成式 AI 视觉识别系统。系统核心包括：（1）高分辨率摄像模块：实时捕获器械托盘图像；（2）深度学习目标检测模型：基于改进的 YOLOv5 架构，在包含数千张真实手术场景下各类白内障超声乳化器械（如超声乳化手柄、注吸手柄、劈核器、各类套管、显微器械等）图像的数据集上进行训练与优化，精准识别器械种类；（3）计数与位置追踪算法：对识别出的器械进行实时计数，并标记其位置；（4）用户交互界面：直观显示清点结果（器械名称、数量、状态）。系统在模拟手术室环境和真实手术准备间进行测试，评估其在复杂背景、器械堆叠情况下的识别准确率、清点速度及鲁棒性，并与资深护士双人手工清点进行对比。

结果：在包含 15 套标准白内障超声乳化器械包的测试中，AI 系统展现出卓越性能：识别准确率，平均器械种类识别准确率达 98.7%。计数准确率，器械数量清点准确率达 99.2%。处理速度，单次完整器械清点耗时 < 3 秒，远快于传统手工清点（平均 86 ± 12 秒）。鲁棒性，在不同光照条件及轻度器械重叠场景下表现稳定。用户反馈，参与测试的手术室护士普遍认为系统操作简便，显著减轻工作负担，提升了清点信心。

结论：本研究成功开发并验证了基于人工智能的视觉识别系统在白内障超声乳化手术器械清点中的高效应用。该系统实现了近乎实时的、高精度的自动化器械清点，克服了人工清点的固有缺陷，大幅提升了手术室的工作效率和安全性。该系统具有广阔的临床应用前景，可无缝整合入手术室工作流程，为手术安全提供强有力的智能化保障。

摘要编号：207927

低度数散光人群中 FSAK 辅助多焦点人工晶状体植入的疗效分析

第一作者：Dan YANG

目的：评估飞秒激光辅助角膜弧形切开术（FS-AK）联合多焦点人工晶状体（MIOL）植入矫正轻中度规则角膜散光（0.8–1.5 D）合并白内障的临床疗效。

方法：采用回顾性研究设计，纳入 2024 年 9 月至 2025 年 3 月接受手术的 52 例患者（70 眼）。术前散光度 0.80–1.50 D（均值 1.28 ± 0.32 D）。FSAK 基于术前角膜地形图及散光轴向设计个性化参数（以角膜缘为中心直径 8 mm 处进行前穿透角膜弧形切开，切削深度为 80%，弧长为 $43^\circ - 57^\circ$ ），植入 AM4UH 多焦点人工晶状体。术后随

访 6 个月。观察指标：裸眼远/中/近视力（UDVA / UIVA / UNVA）、最佳矫正远视力（CDVA）、残余散光、离焦曲线、对比敏感度、高阶像差（HOA、SA）、视觉质量问卷（VF14）及并发症。

结果：UDVA 由 0.48 ± 0.19 提高至 0.02 ± 0.04 logMAR ($P < 0.001$)、UIVA 由 0.42 ± 0.16 提高至 0.08 ± 0.06 logMAR、UNVA 由 0.57 ± 0.22 提高至 0.06 ± 0.05 logMAR。95.7%UDVA $\geq 20/25$ ，94.3%UNVA $\geq J1$ ；残余散光 0.35 ± 0.18 D（矫正效率 82.3%），SIA/TIA 比值 0.96 ± 0.11 ；离焦曲线：在 -2.0 D 至 +1.0 D 区间视力均 ≥ 0.18 logMAR (20/30)；对比敏感度（明视）较术前提升 1.8 倍 ($P < 0.01$)；总高阶像差术前 0.33 ± 0.10 术后 $0.24 \pm 0.07 \mu\text{m}$ ($P < 0.05$)。VF-14 评分由 $68.3 \pm 7.5 \rightarrow 94.1 \pm 4.2$ ($P < 0.001$)，92% 患者完全脱镜；无严重并发症；4 眼（5.7%）出现短暂性干眼，1 眼（1.4%）报告轻度眩光（2 个月内缓解）；所有 IOL 位置居中。

结论：FS-AK 联合 AM4UH MIOL 植入可显著降低轻中度角膜散光（残余散光 0.35 D）、提供优质全程视力（远中近距离达标率 $> 94\%$ ）及实现高脱镜率（92%）。该联合术式是矫正轻中度散光合并白内障的安全高效方案。

摘要编号：200455

使用公式性能指数分析 ESCRS 计算器中内置 IOL 计算公式在不同眼部生物学参数分布特征下的准确性

第一作者：Wei LOU

目的：使用公式性能指数（FPI）评估 ESCRS 计算器中 7 款人工晶体（IOL）计算公式在不同生物学参数分布特征下的准确性。

方法：回顾性收集 256 例接受常规白内障的患者。术前使用 IOLMaster 700 进行眼轴长度（AL）、角膜曲率（K）、角膜曲率半径（CR）、前房深度（ACD）、晶状体厚度（LT）、中央角膜厚度（CCT）及角膜白到白（WTW）等眼部生物学检查。均植入单一单焦点晶体（SN60WF）。术后 1 个月行主觉验光。比较 Barrett Universal II（BUII）、Cooke K6（K6）、EVO 2.0、Hill-RBF、Hoffer QST、Kane 及 Pearl-DGS 共 7 款 ESCRS 计算器中内置 IOL 计算公式的准确性。选用 ESCRS 计算推荐的 IOL 常数。使用 FPI 评估各公式在总体人群及各生物学参数亚组的准确性。

结果：在总体人群中，Hill-RBF 的 FPI（0.507）最高，其次是 EVO2.0（0.463）和 Kane（0.450）。亚组分析显示，在短眼轴组（AL ≤ 22.0 mm，n

= 12) 和长眼轴组 ($AL \geq 26.0$ mm, $n = 30$) 中, 表现最佳的公式分别是 Pearl-DGS ($FPI = 0.442$) 和 Kane ($FPI = 0.416$); 在平坦角膜组 ($K \leq 42$ D, $n = 17$) 及陡峭角膜组 ($K \geq 42$ D, $n = 20$) 中, 表现最佳的公式均为 Pearl-DGS ($FPI = 0.476$; $FPI = 0.425$); 在 $AL/CR \leq 3.01$ ($n = 67$) 及 $AL/CR \geq 3.19$ ($n = 65$) 亚组中, 表现最佳的公式分别是: BUII ($FPI = 0.535$) 和 K6 ($FPI = 0.493$)。

结论: ESCRS 计算器中内置的 IOL 计算公式准确性存在差异, 应依据生物学参数分布特征个体化选择公式, 以优化术后屈光结果。

摘要编号: 203542

六种老视矫正型人工晶状体的光学性能与偏移耐受性的比较研究

第一作者: Weijia YAN

共同作者: Wen XU

目的: 老视矫正型人工晶状体 (IOL) 通过多焦点设计满足远、中、近距离视力需求, 但其光学性能差异及术后可能出现的 IOL 偏移 (如倾斜或偏心) 对视觉质量的影响尚无系统评估。本研究采用先进的离体光学评估方法, 对目前国际临床常用的六种老视矫正型 IOL 的光学性能及偏移耐受性进行比较分析, 旨在为临床医生提供基于光学设计的 IOL 选择依据, 并为优化术后视觉质量提供参考。

方法: 研究纳入六种老视矫正型 IOL: AT Lisa Tri (Carl Zeiss Meditec, Germany)、Tecnis Synergy (Johnson & Johnson Surgical Vision, USA)、AcrySof IQ PanOptix (Alcon Laboratories, USA)、AT Elana 841P (Carl Zeiss Meditec, Germany)、FineVision HP POD F (PhysIOL, Liege, Belgium) 和 Acriva Trinova Pro C Pupil Adaptive (VSY Biotechnology, Istanbul, Turkey), 通过 OptiSpheric IOL PRO2 设备, 在单色光与多色光条件下, 结合模拟平均角膜球差 ($+0.27 \mu\text{m}$) 及无像差角膜模型, 评估 IOL 的调制传递函数 (MTF)、模拟视力 (SimVA) 及焦深特性。进一步模拟 IOL 偏心 (0–1 mm) 和倾斜 (5°), 分析不同空间频率 (25–100 lp/mm) 下的 MTF 变化。

结果: (1) 光学性能差异: 所有 IOL 远视力 (SimVA ≤ 0.03 logMAR) 表现相近, 但中、近焦点位置及光能分配差异显著。Triumf 中焦点 (80 cm) 表现优异但近视力较弱; PanOptix 中焦点 (61 cm) 与近焦点 (44 cm) 区分度低; Synergy 近视力峰值突出但中焦点 (67 cm) 偏移临床预期。

(2) 瞳孔依赖性: Trinova Pro 在 4.5 mm 瞳孔下中焦光能占比增加, 而 AT Lisa Tri 近焦占比提

升; Synergy 与 PanOptix 在较小瞳孔下光学质量下降更显著。(3) 偏移耐受性: Tecnis Synergy (高球差矫正, $-0.27 \mu\text{m}$) 对偏心最敏感 (MTF 损失达 78.8%), 而 AT ELANA (无球差矫正) 耐受性最佳 (MTF 损失 $\leq 28.4\%$)。倾斜 5° 对 MTF 影响较小, 但在大瞳孔 (4.5 mm) 及无像差条件下, 高空间频率 MTF 显著降低。

结论: 老视矫正型 IOL 的光学性能及偏移耐受性因设计差异显著。临床医生应结合患者用眼需求 (远、中、近视力)、瞳孔特征及囊袋稳定性, 个性化选择 IOL: 中距离优先者可选 Triumf、AT Lisa Tri; 近距离优先者适合 Synergy、Trinova Pro C; 偏移高风险患者 (如大瞳孔或囊袋不稳定) 推荐低球差矫正或非球面中性设计。未来需结合临床数据验证结果, 并开发精准术前评估工具, 以优化 IOL 选择及术后视觉质量。

摘要编号: 201696

创建 KNNS 筛选法提升角膜近视激光矫正术后人工晶体屈光力计算准确性的临床评估

第一作者: Ye XIANGYU

目的: 评价一种新型人工晶体计算公式筛选方法 (KNNS 法) 用于角膜近视激光矫正术后人工晶体屈光力计算的准确性。

方法: 收集既往角膜屈光患者的白内障术后 4 周以上的屈光结果及术前生物测量参数形成训练集, 使用人工智能算法建立 KNNS 预测模型, 并纳入 2013 年 1 月~2023 年 1 月期间行白内障超声乳化联合人工晶体植入术的角膜屈光术后患者 204 例 (204 眼) 为研究对象。使用 KNNS 法筛选患者适配的人工晶体计算公式 (包含 Haigis-L、EVO-L、Barrett True-K mpcp/ppcp、FY-L), 收集术后 4 周以上屈光结果。计算及比较 KNNS 法、Haigis-L 公式、EVO-L 公式、Barrett True-K mpcp/ppcp 公式、FY-L 公式的平均算术和绝对屈光预测误差 (MPE、MAE)、中位数绝对误差 (Med AE) 以及屈光预测误差在 ± 0.25 D、 ± 0.50 D、 ± 0.75 D 和 ± 1.00 D 以内的百分比。

结果: KNNS、Haigis-L、EVO-L、Barrett True-K mpcp、Barrett True-K ppcp、FY-L 公式的 MAE 为 (0.40 ± 0.41) D、(0.63 ± 0.49) D、(0.48 ± 0.38) D、(0.46 ± 0.34) D、(0.52 ± 0.36) D、(0.48 ± 0.38) D, 比较有统计学差异; Med AE 为 0.28 D、0.63 D、0.38 D、0.34 D、0.36 D、0.38 D。KNNS 法预测误差在 ± 0.25 D、 ± 0.50 D、 ± 0.75 D 和 ± 1.00 D 以内的百分比为 38.6%、69.1%、83.1%、90.8%。六种方法在 ± 0.25 D、

± 0.50 D、 ± 0.75 D 以内的百分比比较有统计学差异。

结论：KNNS 法能进一步提升现有常见角膜近视激光术后人工晶体屈光力计算公式的准确性，降低术后屈光误差程度。

摘要编号：209746

前房深度与老年性白内障患者术后屈光误差的相关性分析

第一作者：Yong WANG

目的：分析前房深度（ACD）与白内障术后屈光误差的关系。

方法：本研究采用分析性横断面研究，收集白内障患者术前术眼前房深度（anterior chamber depth, ACD）、角膜曲率（keratometric, K）、眼轴长度（axial length, AL）、白到白（white to white, WTW）及晶状体厚度（lens thickness, LT）。根据前房深度，将患者分为极浅前房组（ $ACD < 2.0$ mm）、浅前房组（ $2.0 \text{ mm} \leq ACD < 2.5$ mm）和正常前房组（ $2.5 \text{ mm} \leq ACD < 3.5$ mm）；将浅前房的患者分为短眼轴组（ $AL < 22.0$ mm）及非短眼轴组（ $AL \geq 22.0$ mm）。术后 3 个月通过综合验光结果评估患者术后屈光状态，并根据 SRK/T 公式计算患者术后屈光误差（prediction error, PE），比较各组间平均屈光误差（mean arithmetic PE, ME）、平均绝对误差（mean absolute PE, MAE）、中位数绝对误差（median absolute error, MedAE）以及屈光误差在 ± 0.50 D、 ± 1.00 D、 $> \pm 1.00$ D 范围内百分比差异。

结果：共纳入行白内障手术的老年性白内障患者共 200 例（200 眼），其中男性 82 例（41%），女性 118 例（59%），患者的年龄为（ 67.7 ± 11.2 ）岁。其中前房深度为（ 2.86 ± 0.59 ）mm，角膜曲率为（ 44.16 ± 1.62 ）D，眼轴长度为（ 23.46 ± 1.38 ）mm，白到白为（ 11.62 ± 0.40 ）mm，晶状体厚度为（ 4.61 ± 0.51 ）mm。Pearson 相关性分析显示，前房深度与白内障患者术后屈光误差呈中度负相关（ $r = -0.228$, $P \leq 0.001$ ）。术后 3 个月 PE、ME、MAE 及 MedAE 分别为（ -0.38 ± 0.64 ）D、 -0.38 D、 0.59 D 和 0.50 D。极浅前房组、浅前房组和正常前房组的术后 MAE 分别为 0.87 D、 0.69 D 和 0.55 D，术后 MedAE 分别为 0.67 D、 0.51 D 和 0.46 D。屈光误差在 ± 0.50 D、 ± 1.00 D、 $> \pm 1.00$ D 范围内百分比分别为 51.6%、84%、16.8%。短眼轴组的 AL 为 21.53 ± 0.47 mm，ACD 为 2.24 ± 0.20 mm，眼轴正常组的 AL 为

22.93 ± 0.66 mm，ACD 为 2.10 ± 0.32 mm，两组的术后 MAE 分别为 0.96 D 和 0.69 D。

结论：随着前房深度的减小，白内障患者术后屈光状态逐渐向近视漂移，前房深度越浅，漂移程度越大。眼轴长度正常的浅前房白内障患者术后屈光误差低于短眼轴浅前房者。

摘要编号：209336

单焦点、增强型单焦点和波前重塑景深延长型三种人工晶状体临床应用效果的研究

第一作者：Zhongxu MA

共同作者：Ha LI, Lintian WU, Zhe YU, Shuai ZHAO

目的：比较单焦点 Tecnis ZCB00、增强型单焦点 Eyhance ICB00 和波前重塑设计的景深延长型 AcrySof IQ Vivity 在视觉效果、主观视觉质量和眼镜脱镜率的差别。

方法：将无眼部合并症，且规则角膜散光小于 0.75 屈光度（D）的患者纳入并进行白内障超声乳化手术。排除弱视、眼轴长度小于 22.0 mm 或超过 25.0 mm、既往有眼表或内眼手术史、急性或慢性葡萄膜炎、青光眼病史、糖尿病伴糖尿病性视网膜改变、假性剥脱综合征、眼底黄斑病变或视神经病变、圆锥角膜，角膜内皮细胞计数不良的病例。将所有病例随机分为三组，每组病例双眼先后进行白内障手术。分别植入单焦点 Tecnis ZCB00、增强型单焦点 Eyhance ICB00 和波前重塑设计的景深延长型 AcrySof IQ Vivity。术后 6 个月，检查单眼和双眼的裸眼远视力和矫正后的远视力，以及裸眼中视力和矫正远视后的中视力（UIVA），以及远视矫正后的近视力、明视对比敏感度、双眼离焦曲线、客观散射指数（OSI）、Strehl 比、调制传递函数（MTF）截止值、光晕及眩光等不良光学现象以及眼镜的脱镜率。

结果：共评价了 45 例患者（每个 IOL 组 15 例患者）的 90 只眼。3 组中单眼和双眼 UDVA 均非常好。Eyhance 的双眼 UIVA 弱于 AcrySof IQ Vivity，三者显示了相似的双眼 UNVA。AcrySof IQ Vivity 在 1.0 D 时的离焦曲线高度强于 Eyhance ICB00，后者又强于 ZCB00 的表现。Eyhance 组与 Vivity 组在中距离下时，后者的脱镜率更优，而 Vivity 组在光晕和眩光等异常光学现象方面的评分略差于后两组。

结论：增强型单焦点 Eyhance 在中距离视觉结果和脱镜率方面比 AcrySof IQ Vivity 更差，但优于普通单焦点 ICB00，三者在裸眼和矫正后的远视力方面相似，ICB00 提供了较低的晕轮和眩光的主观感受，综合表现 Eyhance ICB00 和 Vivity 各有优势。

摘要编号: 209083

基于转录组学筛选早发性白内障生物标志物的研究

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共同作者: Fengyan ZHANG

目的: 基于转录组学探讨早发性白内障相关的差异表达基因及潜在治疗靶点。

方法: 转录组学研究。收集早发性白内障及年龄相关性白内障患者的一般临床资料, 经匹配后采集晶状体前囊样本, 进行 mRNA 测序 (messenger RNA-sequencing, mRNA-seq) 分析。使用基因本体论 (Gene Ontology, GO) 与京都基因与基因组百科全书 (Kyoto Encyclopedia of Genes and Genomes, KEGG) 对差异表达基因 (differentially expressed genes, DEGs) 进行功能富集分析, 并构建 ceRNA 互作网络。采用实时定量聚合酶链反应 (quantitative real-time PCR, qRT-PCR) 对具有显著性差异的关键基因进行验证。

结果: 共鉴定出 678 个 DEGs, 其中上调 33 个, 下调 645 个。GO 分析获得 679 个富集词条, 以“细胞器”、“蛋白结合”与“生物发育”最为显著。KEGG 通路主要富集于肿瘤相关通路、mTOR 信号通路及 HIF-1 信号通路。qRT-PCR 验证结果与 mRNA-seq 数据趋势一致。

结论: ACTN4、COX7A1、SCG5、SERPINE1 可能是潜在的早发性白内障生物标志物。

摘要编号: 200495

多焦点人工晶状体在青壮年发育性与非发育性白内障中的应用效果比较研究

第一作者: Tianyu ZHENG

目的: 比较青壮年发育性白内障 (DCs) 与非发育性白内障 (NDCs) 患者植入多焦点人工晶状体 (MIOLs) 后的视觉效果。

方法: 前瞻性队列研究。2018 年 12 月至 2023 年 9 月确诊为 DC (14 例 16 只眼) 和 NDC (13 例 17 只眼) 的 20-45 岁患者纳入研究。DC 组为无明显诱因的发育性白内障。NDC 组包括高度近视性白内障、葡萄膜炎性白内障、激素性白内障、糖尿病性白内障及成年期外伤导致的外伤性白内障的患者。排除存在弱视体征者。所有患者均接受 MIOLs (包括多焦点及多焦点散光 IOLs) 植入, 在术后 1 个月接受随访, 检测指标包括: 裸眼远视力 (UDVA)、最佳矫正远视力 (CDVA)、裸眼中视力 (UIVA)、最佳矫正远视力下中视力 (DCIVA)、裸眼近视力 (UNVA)、最佳矫正远视力下近视力 (DCNVA)、

波前像差、调制传递函数 (MTF)、点扩散函数 (PSF) 以及对比敏感度 (CS)。功能性视力评估采用视觉功能指数表 14 (VF14)。

结果: 两组患者在 UDVA、CDVA、UIVA、DCIVA、40 cm 处 DCNVA、33 cm 处 UNVA 或 33 cm 处 DCNVA 方面均未观察到显著差异 ($P > 0.05$)。然而, DC 组术后 40 cm 处 UNVA 优于 NDC 组 ($P = 0.04$)。总体而言, NDC 组与 DC 组的视觉质量相近。DC 组总像差显著小于 NDC 组, 而角膜像差更大; 同时, DC 组表现出更优的 MTF (HO)、CS 及 VF-14 评分 ($P < 0.05$)。

结论: 与 NDC 组相比, DC 组患者在植入 MIOLs 后取得了满意的视觉效果, 甚至在 UNVA 和视觉质量方面表现更优。这一差异可能与 DC 组患者具有更强的伪调节能力有关。这表明在严格掌握适应证的前提下, 在 DC 患者中植入 MIOLs 可获得良好的视觉预后。

摘要编号: 205673

对 12 种人工晶状体度数计算公式在高度近视合并后巩膜葡萄肿患者中的准确性进行评估

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共同作者: Yulan WANG, Chunxia YU

目的: 本研究评估了 12 种人工晶状体 (IOL) 计算公式在预测高度近视性白内障合并后巩膜葡萄肿患者术后屈光情况方面的准确性。

方法: 本前瞻性观察研究纳入了 44 名患者 (71 只眼), 这些患者均患有高度近视性白内障并伴有后巩膜葡萄肿, 研究地点为上海眼病防治中心 (2022 年 1 月至 2024 年 6 月)。使用 IOLMaster 700 进行眼部生物测量。使用 12 种公式计算术后屈光结果: SRK/T、Barrett Universal II、Haigis、Hoffer Q、Holladay 1、Holladay 2、Kane、EVO 2.0、Hill-RBF 3.0、Cooke K6、Pearl DGS 和 Zhu-Lu。进行超声乳化术并植入人工晶状体, 1 个月后评估预测误差 (PE)。对 PE 与 PS 分类、术前裸眼视力、术前最佳矫正视力 (BCVA)、术后 BCVA、患者年龄、眼轴长度 (AL)、前房深度、晶状体厚度和角膜曲率之间的相关性进行了分析。

结果: Zhu-Lu、Kane、Hill-RBF、Pearl DGS、EVO 2.0、Cooke K6、Barrett Universal II 公式显示出更高的准确性 (更低的绝对 PE 值和更理想的误差分布), 优于 SRK/T、Haigis、Holladay 1、Holladay 2 和 Hoffer Q 公式。后一组在绝对误差值与眼轴长度之间存在显著的正相关关系 ($P < 0.05$), 而前一组则未观察到显著的相关性。

结论: Zhu-Lu、Kane、Hill-RBF、Pearl DGS、EVO 2.0、Cooke K6 和 Barrett Universal II 公式为高度近视且伴有后巩膜葡萄肿的患者提供了可靠且稳定的人工晶状体度数预测。相比之下，SRKT、Haigis、Holladay 2、Holladay 1 和 Hoffer Q 公式在随着眼轴长度增加时准确性下降。

摘要编号: 207751

对称 pFSAK 矫正白内障患者角膜散光的效果评估

第一作者: Jing SIMA

共同作者: Zunxia HU, Li LI

目的: 评估 pFSAK 在矫正白内障患者角膜散光方面的有效性, 并分析影响其矫正效果的相关因素。

方法: 1. 自身对照队列研究。观察 > 0.75 D 规则角膜散光行 pFSAK 术后 6 月角膜散光的连续变化, 切口于角膜 8 mm 直径处、85% 深度。Alpins 法分析散光矫正效果。分析年龄、眼轴、眼压、平均角膜曲率值 (Keratometry mean, Km)、中央角膜厚度 (Central corneal thickness, CCT)、周边角膜厚度 (Peripheral corneal thickness, PCT) 与矫正系数 (Correction index, CI) 的相关性, 并比较不同散光度数及散光类型的矫正效果、残余角膜散光与屈光散光 (Refractive Astigmatism, RA) 的差异、角膜视觉质量的变化。

结果: 共研究病例 123 人 157 眼。术前角膜散光为 1.22 ± 0.40 D, 术后 1 周、1 月、3 月、6 月角膜散光分别降至 0.83 ± 0.54 D、 0.77 ± 0.34 D、 0.78 ± 0.49 D、 0.74 ± 0.34 D。术后 1 周 CI 高于术后 1 月、3 月、6 月 (P 均 < 0.05), 但术后 1 月、3 月、6 月比较差异无统计学意义 (P 均 > 0.05)。术前散光 < 1.5 D 与 ≥ 1.5 D 两组的 CI 差异无统计学意义。逆规散光的 CI 高于顺规及斜轴散光。CI 与眼轴、眼压、Km、CCT、PCT 无相关性, 而年龄会影响矫正效果 ($P = 0.000$) 且呈正相关, 得到回归方程: $CI = 0.407 + \text{年龄} \times 0.008$ 。目标诱导散光 (Target-induced astigmatism, TIA)、实际手术引起的散光 (Surgery-induced astigmatism, SIA)、CI 分别为 1.22 ± 0.40 D、 0.76 ± 0.49 D、 $CI = 0.62 \pm 0.3$ 。残余角膜散光与残余 RA 大小无明显差异。术后不规则散光指数较术前增大 ($P = 0.000$), 角膜 PSF 及平均 MTF 均较术前提升, 差异均有统计学意义 (P 均 = 0.000)。

结论: 1. 对称 pFSAK 矫正白内障患者的角膜散光安全有效, 矫正效果于术后 1 月趋于稳定, CI 对不同大小的角膜散光具有相似的矫正效果。采用 Donnenfeld 算法 (Donnenfeld Nomogram, DONO), ATR 矫正效果最优, 年龄是影响 CI 的

因素, 超过 74 岁会过矫。pFSAK 术后虽增加了角膜高阶像差, 但提高了光学质量。若联合 MIOL 植入, 建议将 TIA 控制在 1.9 D 以下。

摘要编号: 200492

小角膜白内障手术的术源性散光 (SIA) 及其影响因素分析

第一作者: Tianyu ZHENG

目的: 探究小角膜患者与正常白内障患者白内障术后 SIA 及相关矢量参数 (包括目标矫正散光 TIA、误差角度 AE、平坦化效应 FE、扭矩) 的差异, 探讨影响小角膜患者白内障术后 SIA 的关键因素。

方法: 本研究回顾性纳入 141 例 (170 眼) 白内障超声乳化伴人工晶状体植入术后患者, 小角膜组 (51 眼) 和正常对照组 (119 眼), 术前及术后 1 个月分别采用 IOLMaster 700 测量患者眼轴 (AL)、白到白 (WTW) 等眼部参数, 术后 1 个月计算 SIA 及相关矢量参数。通过独立样本 T 检验比较小角膜组患者与正常对照组患者 SIA 的差异, 并采用多元线性回归分析术前生物学参数对 SIA 及相关矢量参数的影响。

结果: 小角膜组的 SIA (0.86 ± 0.75 D)、TIA 显著高于正常对照组的 SIA (0.52 ± 0.36 D)、TIA ($p = 0.05$)。WTW 是 SIA ($p = 0.023$)、TIA ($p = 0.015$) 的显著负相关因素, 年龄与 SIA ($p = 0.047$)、TIA ($p = 0.041$) 呈显著正相关。角膜曲率与 TIA 显著正相关 ($p = 0.018$), 术前散光是 AE 的显著负相关因素 ($p = 0.005$), 年龄 ($p = 0.004$)、术前散光 ($p = 0.016$) 是 FE 的显著正相关因素。WTW、年龄和 AL 可解释 12.2% 的 SIA 变异, 年龄、AL 和术前散光分别可解释 FE (10.8%) 和 AE (9.3%) 的变异。WTW < 11.8 mm 提示 SIA > 0.5 D 的风险上升。此外, 左眼术后易出现更大的扭矩, 逆规散光组的 TIA 显著高于顺规散光组和逆规散光组 ($p = 0.001$)。

结论: 小角膜患者的术后 SIA 较正常对照更大, 其影响因素包括年龄、WTW 及 AL, 其中 WTW < 11.8 mm 提示 SIA 有大于 0.5 D 的风险。

摘要编号: 205956

应用波前像差分析辅助决策先天性白内障合并晶状体后圆锥手术时机一例

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目的: 探讨在晶状体局限性混浊未直接遮挡视轴的儿童先天性白内障病例中, 如何通过波前像差分析

等客观功能学指标，评估晶状体光学质量，为超越传统形态学指征的手术决策提供依据。

方法：报告一例 5 岁 3 月 男性患儿，诊断为右眼先天性白内障（鼻下方混浊）合并晶状体后圆锥。在常规评估（视力、裂隙灯、眼底照相）基础上，重点采用散瞳后 iTrace 波前像差分析，量化中央 3 mm 及 6.5 mm 区域的全眼、眼内及角膜的像差（特别是高阶像差 HOA），并计算晶状体功能指数（DLI），以评估晶状体的光学性能。

结果：像差分析显示，尽管混浊位于旁中心，但患儿右眼存在显著的、眼镜无法矫正的眼内高阶像差（中央 3 mm HOA: 1.378 μm ），且散瞳后 HOA 急剧增加（中央 6.5 mm HOA: 5.680 μm ），DLI 值极低（0.34），证实晶状体光学质量严重受损。基于此，行右眼超声乳化联合 IOL 植入术。术后 1 月，患儿矫正视力由术前的 0.3 显著提升至 0.8。

结论：波前像差引导的诊断技术——特别是眼内高阶像差（HOA）分析和晶状体功能指数（DLI）评估——可以辅助评估白内障相关的光学功能障碍。在儿童患者中，在确定手术指征时，因为 HOA 和 DLI 可以反映导致弱视关键的风险因素，这些指标可以补充单纯依赖视力检查、裂隙灯照相及眼底像的形态学评估。未来的诊疗方案可以考虑将像差测量纳入针对局限性混浊的先天性白内障标准评估流程，以便在视觉发育的可塑期内实现及时干预。

摘要编号：210335

探究普拉洛芬联合聚乙二醇对白内障术后干眼症患者泪膜稳定性、视觉功能的影响

第一作者：琦耿

目的：研究普拉洛芬联合聚乙二醇对白内障术后干眼症患者泪膜稳定性、视觉功能的影响。

方法：前瞻性选取 2024 年 3 月至 2025 年 1 月陆军特色医学中心大坪医院收治的白内障合并睑板腺功能障碍的 90 例作为研究对象。按照随机数字表法将其分为观察组和对照组，每组各 45 例。对照组采用聚乙二醇滴眼液治疗，观察组在其基础上联合普拉洛芬治疗。2 组均治疗 4 周。治疗后评价治疗效果，比较 2 组眼睛干涩感、视力波动、灼烧感、异物感出现时间，比较 2 组治疗前后泪液核苷酸结合寡聚化结构域样受体 1（NOD-1）、C 反应蛋白（CRP）、白细胞介素 6（IL-6）水平，记录 2 组出现的不良反应。

结果：观察组总有效率明显高于对照组 [95.1% (47/49) 比 82.5% (40/49)]，差异有统计学意义 ($P = 0.025$)。观察组眼睛干涩感、视力波动、灼烧感、异物感改善时间均短于对照组，差异均有

统计学意义 (均 $P < 0.05$)。2 组治疗后泪液中的 NOD-1、CRP 和 IL-6 浓度均低于治疗前 (均 $P < 0.05$)；且观察组治疗后泪液中的 NOD-1、CRP 和 IL-6 浓度均低于对照组 (均 $P < 0.05$)。2 组不良反应发生率比较，差异无统计学意义 ($P = 0.558$)。

结论：联合使用普拉洛芬和聚乙二醇对白内障术后干眼症患者泪膜稳定性、视觉功能，可迅速改善患者的临床症状，治疗可显著提高其泪膜稳定性，促进视觉功能的恢复，且对患者的眼部炎症有明显改善作用，安全性较好。

摘要编号：201666

正常角膜内皮白内障患者术后角膜水肿预测机器学习模型的开发与验证

第一作者：Shuaixin LU

共同作者：Lingling BA, Peiyao HUANG, Simo PAN, Jing SUN, Jie WANG, Kai WEN, Xiaohua ZHANG, Min ZHOU, Xinmiao ZHOU

目的：开发并验证用于预测白内障超声乳化术后早期角膜水肿的机器学习模型，研究对象为术前角膜内皮正常的患者。

方法：一项回顾性队列研究分析了接受白内障超声乳化术的 564 只眼的数据库。根据术后第 1 天复查结果，将有中央角膜厚度增加 > 50 微米、中央基质混浊和虹膜纹理模糊症状的眼诊断为角膜水肿。Lasso 回归初步筛选出 26 个临床特征中的 9 个关键变量。开发了 11 种机器学习模型和一个逻辑回归模型。采用混合递归特征消除和穷举搜索策略确定最佳特征子集。使用 AUC、准确率、灵敏度、特异度和布里尔分数等指标评估模型性能。

结果：核心预测变量包括累积耗散能量、年龄和晶状体核硬度。优化后的支持向量机模型在内部验证中表现出色（曲线下面积 $\text{AUC} = 0.92$ ，准确率 = 91.56%），并且在独立测试集上也保持了很强的泛化能力 ($\text{AUC} = 0.89$ ，准确率 = 84.50%)。其他模型如梯度提升和偏最小二乘判别分析在优化后也表现良好。传统的逻辑回归 (LR) 模型表现欠佳（优化后的 $\text{AUC} = 0.81$ ）。

结论：机器学习模型，尤其是支持向量机，能够有效预测角膜内皮正常的白内障患者术后发生角膜内皮水肿的风险。累积耗散能量、年龄和晶状体核硬度是关键预测因素。这些模型可能有助于个性化风险评估，并改善临床决策。

摘要编号: 208528

治疗性角膜绷带镜对术前轻中度干眼症的白内障患者的术后疗效观察

第一作者: Qingzhong CHEN

目的: 探讨 AIR OPTIX 治疗性角膜绷带镜 (BCLs) 对术前合并干眼症 (DED) 的白内障术后患者的临床应用效果。

方法: 白内障术前合并轻中度 DED 患者 188 例, 根据术后 0-7 天是否佩戴 BCLs 分为对照组 (94 眼) 和 BCLs 组 (94 眼)。术前、术后 1 周、1 个月评价无创泪膜破裂时间 (NIBUT)、泪河高度 (TMH)、角膜荧光素染色 (CFS)、Schirmer 试验、眼表疾病指数 (OSDI)、最佳矫正视力。

结果: 两组患者年龄、性别、各项干眼指标差异无统计学意义 ($P > 0.05$)。术后 1 周, BCLs 组 NIBUT、TMH 显著高于对照组 (5.53 ± 1.21 vs 5.18 ± 1.00 , $P = 0.033$; 0.18 ± 0.03 vs 0.16 ± 0.03 , $P < 0.001$), BCLs 组 CFS 和 OSDI 显著低于对照组 (0.27 ± 0.47 vs 0.46 ± 0.56 , $P = 0.015$; 16.64 ± 3.45 vs 18.91 ± 4.03 , $P < 0.001$)。术后 1 个月, BCLs 组 NIBUT 和 TMH 显著高于对照组 (5.89 ± 1.21 vs 5.32 ± 0.82 , $P < 0.001$; 0.18 ± 0.02 vs 0.16 ± 0.02 , $P < 0.001$), BCLs 组 OSDI 评分显著低于对照组 (16.33 ± 3.28 vs 19.24 ± 3.08 , $P < 0.001$)。

结论: 术前合并 DED 的白内障患者术后配戴 AIR OPTIX BCLs 可提高泪膜稳定性, 减轻患者主观干眼症状。

摘要编号: 208382

眼球构型对人工晶状体倾斜和偏心的影响及预测模型构建

第一作者: Xiteng CHEN

共同作者: Nan GAO, Fang TIAN

目的: 对不同前节大小和眼轴长度患者的 AS-OCT 参数进行统计分析, 并构建预测模型以评估术后人工晶状体倾斜和偏心情况。

方法: 本研究共纳入 156 只眼。收集的参数包括眼轴长度、WTW、术前人工晶状体倾斜和偏心、前房深度、晶状体厚度, 以及术后一个月的人工晶状体倾斜和偏心。根据 LP/AL 比值将患者分为大前节组和小前节组。比较两组间各参数的差异及术后大于 5° 的倾斜和大于 3 mm 的偏心的发生率。此外, 还比较了不同眼轴组中大前节和小前节的占比。逻辑回归被用于构建术后发生显著倾斜风险的预测模型。

结果: 两组间眼轴长度、前房深度、术后人工晶状体倾斜和术后视力存在显著差异。大前节组术后人工晶状体倾斜程度显著高于小前节组, 且在大前节组中显著倾斜和偏心的发生率更高。与其他组相比, 短眼轴组中大前节的比例最高。回归分析显示, 术前人工晶状体倾斜是术后倾斜的独立风险因素, 所构建的风险预测模型表现出了良好的预测性能及临床收益。

结论: 本研究提供了不同眼球构型对白内障术后人工晶状体倾斜和偏心影响的新见解, 为手术设计和人工晶状体类型的选择提供了指导。

摘要编号: 207930

磨砂襻 Toric IOL 囊袋生物整合效应研究: 旋转动力学长期稳定性及关键影响因素

第一作者: Dan YANG

目的: 评估磨砂襻处理的 Toric 人工晶状体 (IOL) 植入术后的旋转稳定性, 并分析其与前房深度 (ACD)、晶体厚度 (LT)、眼轴长度 (AL) 的关联性, 为临床优化散光矫正方案提供依据。

方法: 选取 2024 年 6 月-2024 年 12 月行白内障超声乳化联合磨砂襻 Toric IOL 植入术的患者 86 例 (102 眼)。术后 1 月、3 月采用 iTrace 视觉功能分析仪测量 IOL 轴位偏移角度, 记录旋转度数 ($> 5^\circ$ 定义为显著旋转)。同时采集术前及术后 ACD (前房深度)、LT (晶体厚度)、AL (眼轴长度) 等生物学参数 (IOL Master 700), 通过多元线性回归分析旋转稳定性与各参数的相关性。

结果: 磨砂襻 Toric IOL 术后平均旋转度数为 $2.8^\circ \pm 1.5^\circ$, 6 个月内显著旋转发生率仅为 4.9%。ACD 是影响旋转稳定性的首要因素 ($r = -0.62$, $P < 0.001$)。ACD < 2.8 mm 的患眼旋转风险增加 3.2 倍 (OR = 3.2, 95% CI: 1.8-5.7), 且 ACD 每增加 0.1 mm, 旋转度数减少 0.4° 。LT 与旋转度数呈正相关 ($r = 0.58$, $P < 0.01$), LT > 4.6 mm 时旋转风险提升 2.8 倍 (OR = 2.8, 95% CI: 1.5-5.2); AL 与旋转稳定性弱相关 ($r = -0.31$, $P = 0.03$)。旋转 $> 5^\circ$ 的患眼高阶像差 (HOA) 增幅达 42%, 显著影响散光矫正效果 ($P < 0.05$)。

结论: 磨砂襻设计通过增强囊袋摩擦显著提升 Toric IOL 旋转稳定性。ACD 和 LT 是预测旋转风险的关键指标: 浅前房 (ACD < 2.8 mm) 或厚晶体 (LT > 4.6 mm) 患者需谨慎设计手术方案, 必要时联合 ACD 修正以优化预后。

摘要编号: 203419

结膜下注射地塞米松前药微晶在超声乳化术后长效抗炎作用的研究

第一作者: 周雪琰

共同作者: Xia HUA, Xiaoyong YUAN

目的: 本研究旨在系统评价酸敏感地塞米松缩丙酮前药微晶制剂 (SKD MCs) 单次结膜下注射后在白内障超声乳化术后眼部炎症的长效抗炎作用, 并探究微晶制剂眼部组织分布与长期安全性。

方法: 建立新西兰白兔 Phaco-IOL (超声乳化联合人工晶体植入术) 模型, 实验组术毕结膜下分别注射 SKD MCs 及 Maxidex, 标准治疗组为 Maxidex 点眼 (3 次/天, 28 天)。通过裂隙灯、AS-OCT 以及临床评分体系对术后眼前节炎症进行动态评估, ELISA、Luminex 检测及 IF 染色评估炎症因子水平。使用两种剂量 (0.4 mg 与 0.8 mg Dex equiv.), 在正常兔模型中研究结膜下注射 SKD MCs 在眼部组织的分布及安全性, HPLC-MS/MS 检测药物浓度, H&E 染色及偏光显微镜评估注射部位药物库情况及眼部 MCs 分布。监测视网膜厚度、眼压、体重及主要脏器病理学指标来评价其眼部安全性。

结果: 在 Phaco-IOL 模型中, 单次注射 SKD MCs (0.4 mg Dex equiv.) 在 28 天内与 Maxidex 滴眼液 (3 次/天) 具有相当的抗炎效果, 且显著优于相同剂量的 Maxidex 结膜下注射, 其抗炎作用仅维持 7 天。剂量依赖性研究表明, 两种剂量 SKD MCs 在 28 天内抗炎效果无统计学差异。药物分布研究显示, SKD MCs 注射后在角膜、虹膜-睫状体等前节炎症相关组织中可持续释放活性药物, 持续时间超过 84 天, 且高剂量组 (0.8 mg Dex equiv.) 结膜中的药物浓度始终较高; 而 Maxidex 注射后仅 7 天内可检测到地塞米松, 解释了其短效抗炎作用。组织切片和偏光显微镜观察表明结膜下注射 SKD MCs 形成可视药物库, 具有良好的组织相容性, 仅引起轻微暂时性局部炎症反应。在长期观察中, 各组视网膜结构及厚度保持稳定, 眼压仅在高剂量组短暂升高, 随后恢复正常, 系统毒性评估亦未见异常。

结论: SKD MCs 作为一种疏水性缩酮键连接的地塞米松前药微晶制剂, 能够通过单次结膜下注射在术后提供长达 84 天的稳定抗炎效果, 具有优异的组织滞留性及良好的生物安全性。相比常规滴眼或传统注射方案, SKD MCs 为术后及慢性眼部炎症提供了更高依从性和更强持续作用的新型治疗策略, 具有良好的临床转化潜力。

摘要编号: 209897

靶向激活 OGG1 可抑制早期年龄相关性皮质性白内障中晶状体上皮细胞的副凋亡

第一作者: Huaijin GUAN

目的: 研究早期年龄相关性皮质性白内障 (ARCC) 患者的晶状体上皮细胞 (LECs) 中可能存在的程序性细胞死亡方式, 并探索早期干预策略。

方法: 收集早期 ARCC 患者的晶状体前囊膜进行综合分析。采用透射电子显微镜对 LECs 进行超微结构检查。通过蛋白质印迹分析对细胞死亡相关蛋白标志物进行定量, 包括副凋亡相关标志物 (ALIX、GRP78)、凋亡相关标志物 (活化的半胱天冬酶 3 和半胱天冬酶 9)、焦亡相关标志物 (N-GSDMD) 以及 ferroptosis 相关标志物 (GPX4)。通过免疫荧光评估细胞内囊泡与细胞器的共定位情况。采用蛋白质印迹、激光微照射和免疫荧光等多种方法评估 8- 羟基鸟嘌呤 DNA 糖苷酶 (OGG1) 蛋白的表达及活性。利用大鼠晶状体体外培养模型研究 OGG1 激活剂 TH10785 对副凋亡的治疗潜力。

结果: 形态学变化显示, ARCC 患者的 LECs 出现明显的内质网 (ER) 肿胀, 且无典型的凋亡特征。副凋亡相关蛋白发生显著改变, 而其他细胞死亡通路标志物 (凋亡、焦亡和 ferroptosis) 则保持不变。在活性氧诱导的类凋亡模型中, 囊泡结构与内质网特异性荧光呈唯一共定位。观察到 DNA 损伤标志物 7,8- 二氢 -8- 氧鸟嘌呤水平升高, 同时 OGG1 活性降低。在离体大鼠晶状体培养中, OGG1 激活剂 TH10785 显示出抑制晶状体上皮细胞副凋亡的功效。

结论: 在早期 ARCC 患者的 LECs 中发现了副凋亡现象。TH10785 可激活 OGG1, 从而抑制晶状体上皮细胞的副凋亡, 这为早期 ARCC 的干预提供了一种新的治疗途径。

摘要编号: 207926

飞秒激光辅助与传统超声乳化手术对于治疗膨胀期白色白内障的疗效对比研究

第一作者: Dan YANG

目的: 探讨非接触的飞秒激光设备与传统超声乳化手术在膨胀期白色白内障疗效对比。

方法: 纳入 2023 年 1 月至 2023 年 11 月于大连市第三人民医院行超声乳化白内障吸除手术, 并在术前行飞秒激光前囊膜切开的膨胀期白色白内障患者 100 例 (100 只眼) 的临床资料为观察组, 行手工撕囊的 100 例为对照组。飞秒激光采用 Catalys 平台。观察术中并发症: 观察组负压丢失情况, 两组出现前囊膜未游离、囊膜偏中心、前囊膜放射状撕

裂、后囊膜破裂、玻璃体脱出、术中瞳孔缩小情况等。术后1天、1周、1月、3月的BCVA、角膜内皮细胞计数术前术后差值。术后并发症：结膜下出血、后囊膜皱褶、后囊膜混浊（PCO）、前囊膜皱缩（ACO）。术后6月IOL的倾斜及偏心情况。

结果：200例患者年龄47-80岁，男性102例，女性98例。两组未发生前囊膜放射状撕裂及后囊膜破裂和玻璃体脱出，观察组8例发生舌状粘连（8%），6例（6%）前囊膜不完全切开，运用维纳斯剪及25G囊膜剪后均安全剥离开，均顺利完成手术。两组BCVA均较术前明显提高，两组间术前术后角膜内皮细胞计数差异无统计学意义。术后6月随访时观察组有6例患者发生PCO，1例发生ACO，对照组有27例发生PCO，20例发生ACO，差异有统计学意义（ $P < 0.05$ ）。观察组中无明显IOL倾斜和偏心，对照组6月IOL在水平和垂直方向上的偏心值和倾斜度明显高于观察组（ F 值2.67），差异有统计学意义（ $P < 0.05$ ）。

结论：飞秒激光前囊膜切开位置精确居中，形状正圆，避免术后因囊袋不对称收缩引起的IOL偏心 and 倾斜，同时飞秒激光可以降低pco及aco的发生率，从而可保证术后视觉质量的长期稳定。

摘要编号：**204720**

马凡综合症一家系缝线固定高端人工晶状体临床应用研究

第一作者：Yunxian GAO

目的：评估马凡综合征患儿接受晶状体摘除联合悬吊式人工晶状体（IOL）植入术的临床疗效，并比较单焦点与衍射型双焦点悬吊IOL对学龄儿童术后视觉质量，特别是近视力影响的差异。

方法：纳入2024年至2025年间来自同一家系的2例儿童和3例成年女性马凡综合征患者。一例4岁男性患儿行双眼全脱位晶状体摘除联合单焦点散光矫正型IOL悬吊术；另一例8岁男性患儿及三位成年女性患者行双眼同类手术联合衍射型双焦点IOL悬吊植入。收集术前及术后视力、眼压、视觉质量分析、离焦曲线、光干扰问卷及并发症等资料进行统计分析。

结果：所有患者手术均顺利完成，术后恢复良好。在近视力方面，植入衍射型双焦点IOL的儿童表现出明显优势，其双眼未矫正远视力（UDVA）为 $-0.08 \log\text{MAR}$ ，未矫正近视力（UNVA）达 $+0.10 \log\text{MAR}$ ，阅读流畅性、视觉质量及中近视舒适度均优于植入单焦点IOL的病例，且未出现显著光干扰现象。而接受单焦点IOL的患儿UDVA为 $+0.40 \log\text{MAR}$ ，UNVA为 $+0.70 \log\text{MAR}$ ，近用时仍需配戴 $+3.00 \text{ D}$ 近附加眼镜。三位成年

女性患者中，一例因术前弱视，UDVA与UNVA均为 $+0.40 \log\text{MAR}$ ；其余两例UDVA为 $+0.10 \log\text{MAR}$ ，UNVA为 $+0.22 \log\text{MAR}$ 。

结论：悬吊式IOL植入术治疗马凡综合征伴晶状体全脱位安全有效。衍射型IOL可为学龄期儿童提供更优的全程视力，有助于双眼视功能发育及生活质量的提高。本研究证实悬吊式衍射型IOL在此类儿童患者中具有应用优势，并突显早期手术干预对预防弱视和改善视力预后的重要意义。此外，研究提示儿童人工晶状体假性调节力可能强于成人，但低龄儿童应用散光矫正型IOL后散光状态存在动态变化，需长期随访。

摘要编号：**209086**

高度近视性白内障的危险因素

第一作者：Su XU

共同作者：Fengyan ZHANG

目的：探讨高度近视患者发生白内障的相关因素，评估晶状体功能失调指数（DLI）在高度近视白内障中的诊断价值。

方法：病例对照研究。连续纳入110例高度近视患者，根据是否合并白内障分为两组。分析眼前节解剖参数、晶状体功能失调指数、血脂代谢指标与白内障发生的相关性。

结果：两组眼前节解剖参数及血脂代谢指标差异无统计学意义（ $P > 0.05$ ）。白内障组晶状体功能失调指数显著低于非白内障组（ $P = 0.016$ ），晶状体功能失调指数与白内障发生呈负相关（ $rs = -0.381$, $P = 0.007$ ）。受试者工作特征曲线分析显示，晶状体功能失调指数在诊断高度近视性白内障方面具有较高的鉴别能力（ $AUC = 0.725$ ）。

结论：晶状体功能失调指数可能是高度近视患者白内障发生发展的关键指标，在早期诊断和疾病进展评估中具有重要价值。其潜在的生物学机制和临床应用前景有待进一步研究。

摘要编号：**209179**

高度近视患者白内障术中植入囊袋张力环对视觉质量及囊袋稳定性的长期影响

第一作者：Yingying YU

共同作者：Yongzhen BAO, Han WANG, Yiming ZHANG

目的：探讨囊袋张力环（CTR）对高度近视眼白内障术后屈光误差、囊膜收缩、人工晶状体（IOL）位置以及视觉质量的影响。

方法：前瞻性研究。对2024年3月至2025年3月在北京大学人民医院行白内障超声乳化联合人工晶

状体手术术中植入囊袋张力环的 69 例高度近视白内障患者进行随访，搜集术前及术后 1 个月（45 例 70 眼）、3 个月（45 例 70 眼）、6 个月（43 例 63 眼）9 个月（29 例 44 眼）及 1 年（15 例 23 只眼）的最佳视力、非接触眼压、屈光度、IOL 偏心度和偏心距、衡量视觉质量相关的高阶像差均方根值、高阶 MTF、前囊撕囊口相关数据等。

结果：术后 1、3、6、9 和 12 个月高阶 MTFa (4 mm) 为 $47.53 \pm 16.78\%$, $49.01 \pm 17.12\%$, $46.79 \pm 15.54\%$, $49.88 \pm 18.04\%$ 和 $47.21 \pm 13.14\%$, 差异无统计学差异。术后 3、6、9 和 12 个月较术后 1 个月的 IOL 偏心距为 0.101 ± 0.171 , 0.135 ± 0.183 , 0.124 ± 0.099 和 0.104 ± 0.083 mm, 差异无统计学意义。术后 1、3、6 和 9 个月的撕囊口面积分别为 26.547 ± 4.085 、 26.032 ± 3.501 、 25.925 ± 3.511 和 25.768 ± 2.277 mm², 无统计学差异；1、3、6 和 9 个月的晶状体襻所在径线长度分别为 5.816 ± 0.528 、 5.775 ± 0.473 、 5.781 ± 0.370 和 5.820 ± 0.155 mm, 无统计学差异；1、3、6 和 9 个月的垂直晶状体襻撕囊口径线长度分别为 5.771 ± 0.446 、 5.714 ± 0.440 、 5.807 ± 0.439 和 5.809 ± 0.461 mm, 无统计学差异。

结论：术后 1、3、6、9 和 12 个月高阶 MTFa (4 mm) 为 $47.53 \pm 16.78\%$, $49.01 \pm 17.12\%$, $46.79 \pm 15.54\%$, $49.88 \pm 18.04\%$ 和 $47.21 \pm 13.14\%$, 差异无统计学差异。术后 3、6、9 和 12 个月较术后 1 个月的 IOL 偏心距为 0.101 ± 0.171 , 0.135 ± 0.183 , 0.124 ± 0.099 和 0.104 ± 0.083 mm, 差异无统计学意义。术后 1、3、6 和 9 个月的撕囊口面积分别为 26.547 ± 4.085 、 26.032 ± 3.501 、 25.925 ± 3.511 和 25.768 ± 2.277 mm², 无统计学差异；1、3、6 和 9 个月的晶状体襻所在径线长度分别为 5.816 ± 0.528 、 5.775 ± 0.473 、 5.781 ± 0.370 和 5.820 ± 0.155 mm, 无统计学差异；1、3、6 和 9 个月的垂直晶状体襻撕囊口径线长度分别为 5.771 ± 0.446 、 5.714 ± 0.440 、 5.807 ± 0.439 和 5.809 ± 0.461 mm, 无统计学差异。

眼内炎，葡萄膜炎，巩膜炎

摘要编号：208577

免疫检查点 VISTA 在自身免疫性葡萄膜炎中的作用机制研究

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共同作者：Hui CHEN, Meifen ZHANG

目的：新型免疫检查点 VISTA 在各种自身免疫性疾病中表现出十分独特的表达谱和免疫调控作用。然而，目前有关 VISTA 的研究主要集中在动物模型中，在患者中的还十分有限，且尚未见到 VISTA 在自身免疫性葡萄膜炎（AU）中的研究报道。本研究旨在明确 VISTA 在 AU 中的表达特点及其临床意义，并初步探索其作用机制。

方法：首先，采用多色流式细胞术全面检测了 AU 患者外周血各类免疫细胞亚群的 VISTA 表达谱。接下来，分别通过筛选性研究和自身对照病例系列研究确定了中性粒细胞表面 VISTA 表达水平的临床意义，并收集健康志愿者与 AU 患者的外周血中性粒细胞开展体外细胞功能实验，研究了 VISTA 激动剂和拮抗剂对中性粒细胞功能的作用。最后，在 EAU 小鼠中进一步明确了 VISTA 的表达位置、水平及其对于疾病发生、发展的调控功能。

结果：免疫检查点 VISTA 主要在人外周血各类髓系细胞表面组成性表达，在淋巴细胞表面表达程度较低。与健康对照相比，AU 患者外周血 13 种免疫细胞亚群表面的 VISTA 表达水平均不同程度降低，其中以中性粒细胞最为显著。筛选性研究和自身对照研究均提示，VISTA 表达与疾病活动性显著相关，而其他临床指标无显著相关性。当活动期 AU 患者眼内炎症缓解时，中性粒细胞表面 VISTA 表达明显升高。体外细胞实验证明，VISTA 拮抗剂可显著加强 AU 患者中性粒细胞活化，并促进中性粒细胞胞外诱捕网（NETs）形成，而 VISTA 激动剂则具有相反的作用。在健康小鼠中，VISTA 在视网膜光感受器细胞外节组成性表达，在 EAU 小鼠中表达下降，并在疾病高峰期降至最低水平。体内实验发现，VISTA 拮抗剂 13F3 可使 EAU 小鼠疾病发生时间提前、疾病严重程度加重、视网膜结构和功能破坏增加、NETs 组分髓过氧化物酶和瓜氨酸组蛋白 H3 释放增多，且上述变化均呈剂量依赖性。

结论：自身免疫性葡萄膜炎患者和小鼠体内 VISTA 表达减少与疾病活动性密切相关。中性粒细胞表面 VISTA 减少可促进中性粒细胞活化和 NETs 形成。本研究首次提供了多个证据，证明 VISTA 减少可能与自身免疫性葡萄膜炎的发生、发展相关。

摘要编号: 204750

比较三种术式治疗葡萄膜炎继发性青光眼的有效性及安全性研究

第一作者: Yuqin WANG

共同作者: Lin FU, Guoxing LI, Zhiqi TAO

目的: 探索白内障超声乳化吸除术联合房角分离术 (Phaco-GSL)、小梁切除术 (Trab) 和 Ahmed 引流阀植入术 (AGV) 治疗葡萄膜炎继发性青光眼 (UG) 的有效性及安全性, 为临床术式选择提供证据。

方法: 本研究为单中心回顾性队列研究, 纳入 2013-2024 年温州医科大学附属眼视光医院 58 例 UG 患者的 62 只眼, 分为三组: Phaco-GSL 组: 16 眼; Trab 组: 29 眼; AGV 组: 17 眼。主要结局指标为成功率: $6 \text{ mmHg} \leq \text{眼压} \leq 21 \text{ mmHg}$, 分为完全成功 (未使用青光眼药物) 和合格成功 (使用和未使用青光眼药物), 随访时间点为术后 1、3、6、12 月。

结果: 术后 6 月, Phaco-GSL、Trab、AGV 组的完全成功率 (69.2%、65.4%、87.5%, $P = 0.327$) 和合格成功率无显著差异 (92.3%、76.9%、100%, $P = 0.066$)。术后 12 月, 三组的眼压降幅为 $24.63 \pm 11.85 \text{ mmHg}$ 、 $23.29 \pm 7.94 \text{ mmHg}$ 、 $22.13 \pm 10.11 \text{ mmHg}$ ($P = 0.771$); 成功率无显著差异; 三组均无严重并发症。与 Trab 组 (75.9%) 相比, Phaco-GSL 组的术后干预频率 (25%) 更低 ($P = 0.002$), 主要为 YAG 激光后囊切除术、YAG 激光前囊膜渗出膜切除术, YAG 激光周边虹膜切除术, 前房穿刺术。

结论: Phaco-GSL 治疗 UG 的眼压控制效果与 Trab、AGV 无显著差异, 无严重并发症且术后护理需求较另外两种术式更少, 为 UG 合并白内障的患者提供了新的术式选择。

摘要编号: 209106

玻璃体内注射糖皮质激素在控制局部炎症之外可重塑全身免疫反应

第一作者: Kaixuan WANG

目的: 葡萄膜炎是一种威胁视力的眼内炎症性疾病, 其反复发作可导致眼内组织不可逆损伤。虽然玻璃体内糖皮质激素疗法 (尤其是缓释植入剂) 在控制眼内炎症方面显示出显著疗效, 但此类眼内长效治疗对全身免疫平衡的调节作用尚不明确。

方法: 我们对接受氟轻松玻璃体内植入剂治疗的葡萄膜炎患者开展了一项前瞻性观察研究。通过采集患者治疗前后的外周血样本, 进行单细胞 RNA 测序、蛋白质谱分析和 Luminex 液相芯片检测, 以

探究局部治疗是否诱导了全身免疫调节。此外, 我们利用实验性自身免疫性葡萄膜炎小鼠模型, 进一步研究了玻璃体内糖皮质激素治疗如何改变眼部及全身的免疫应答。

结果: FAI 局部治疗在控制慢性非感染性葡萄膜炎相关眼内炎症方面表现出强大效力, 并恢复了全身免疫平衡。外周血单个核细胞的单细胞 RNA 测序结果证实了这一点, 显示与细胞因子产生、免疫细胞激活及炎症反应相关的基因表达受到抑制。值得注意的是, CD14^+ 单核细胞向促炎表型的分化受到抑制, 而 CD4^+ T 细胞的活化程度降低且亚群发生重构。实验性自身免疫性葡萄膜炎小鼠模型研究表明, 玻璃体内注射曲安奈德在控制眼内炎症的同时, 促进了血 - 视网膜屏障完整性的恢复并通过抑制树突状细胞的活化及其向淋巴组织的迁移, 降低了淋巴结中 Th1/Th17 细胞的比例, 最终重建全身免疫稳态。

结论: 本研究证实, 通过局部糖皮质激素缓释制剂长期有效控制眼内炎症, 能够进一步改善全身免疫平衡。这一发现深化了我们对局部 - 全身免疫相互作用的理解, 并为自身免疫性葡萄膜炎的治疗提供了新的视角。

摘要编号: 209852

甘露糖化仿生纳米斗篷治疗自身免疫性葡萄膜炎

第一作者: Jia SHU

共同作者: Peizeng YANG

目的: 自身免疫性葡萄膜炎是一种易复发、威胁视力的炎症性疾病, 现有治疗方法存在眼部靶向性差、活性氧清除能力不足及对关键炎症通路调控有限等问题。本研究旨在构建一种多功能甘露糖化仿生纳米粒, 集成主动靶向、活性氧清除及 STING 信号通路抑制功能, 以实现自身免疫性葡萄膜炎的协同治疗。

方法: 合成铜锌双金属有机框架 (Cu/Zn-MOF) 作为载体, 负载 STING 拮抗剂 H-151, 构建 H-151@Cu/Zn-MOF 核心。进一步制备脂质体, 并与巨噬细胞膜融合形成杂化膜 (LM), 修饰甘露糖 (Man) 后包覆于核心表面。利用透射电镜、Western blot 及共聚焦显微镜对材料形貌及膜融合效果进行表征; 通过体外自由基清除实验评估其抗氧化能力。建立 LPS 诱导的 RAW264.7 巨噬细胞炎症模型及实验性自身免疫性葡萄膜炎 (EAU) 小鼠模型, 分别从细胞因子表达、巨噬细胞极化、血 - 视网膜屏障通透性、免疫细胞比例及组织病理变化等方面评估其抗炎效果与免疫调节作用。

结果: H-151@Cu/Zn-MOF@LM@Man 呈菱形十二面体结构, 粒径约 120 nm, 包封率为 63.7%, 载药量为 31.85%。材料具备 pH 响应性释药特性, 杂化膜修饰可延缓 H-151 释放。体外实验显示, 该纳米粒可有效清除多种自由基及活性氧, 显著抑制 LPS 诱导的巨噬细胞中 TNF- α 、IL-1 β 和 IL-6 等促炎因子的表达, 并抑制 M1 型巨噬细胞极化。在 EAU 模型中, 该纳米粒可靶向聚集于眼内炎症部位, 减轻视网膜炎症及血管渗漏, 抑制 M1 型巨噬细胞 / 小胶质细胞极化; 同时, 可调节脾脏免疫细胞平衡, 降低 Th1、Th17 比例, 提高 Treg 比例。体内安全性评估显示, 该纳米粒未引起明显肝肾毒性及主要器官病理损伤。

结论: 本研究成功构建了一种兼具仿生靶向、活性氧清除与 STING 通路抑制功能的甘露糖化纳米粒, 能够通过巨噬细胞膜伪装及甘露糖受体介导的内吞作用实现眼内炎症部位的双重靶向, 有效穿越血 - 视网膜屏障并被炎症细胞摄取。该纳米粒在抑制 STING-TBK1-NF- κ B 通路的同时清除活性氧, 打破炎症恶性循环, 重塑免疫平衡, 从而显著缓解眼部及全身炎症反应, 且具备良好的生物安全性。本研究为自身免疫性葡萄膜炎及其他 STING 相关炎症疾病提供了一种具有转化潜力的协同治疗新策略。

摘要编号: 209251

纳米硒调控葡萄膜炎巨噬细胞极化的机制研究

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共同作者: Ruijin RAN, Hua WANG

目的: 在自身免疫性葡萄膜炎 (Autoimmune Uveitis, AU) 中, 巨噬细胞主要通过分泌 IL-6、TNF- α 等促炎因子加剧炎症反应, 呈递自身抗原给 T 细胞后激活机体适应性免疫反应。而硒纳米颗粒可轻易穿透组织间隙, 增强细胞免疫和吞噬功能, 靶向调控免疫分化和炎症因子表达。因此本实验目的在于探究纳米硒调控巨噬细胞极化平衡以抑制自身免疫性葡萄膜炎免疫反应的分子机制。

方法: (1) 多点皮下注射诱导 Lewis 大鼠 EAU 模型, 测定眶静脉血硒浓度, 明确与其免疫反应的相关性。(2) 软模板法制备纳米硒, 完成表征及硒含量测定。(3) 梯度浓度下完成纳米硒对 ARPE-19、RF-6A 细胞毒性、摄取实验, 明确合适作用浓度范围。q-PCR 验证纳米硒对眼部细胞炎症相关及巨噬细胞极化相关基因表达的调控作用。(4) WB 明确纳米硒调控其极化平衡的多条信号通路作用机制。(5) 流式细胞学分析检测纳米硒干预后的巨噬细胞炎症型极化方向变化程度及趋势。

结果: (1) EAU 大鼠眶静脉血硒含量随炎症程度加重而递减。(2) 纳米硒可直接调控炎症型 ARPE-19 细胞的 IL6、TNF- α mRNA 及蛋白表达量。(3) WB、qPCR 结果表明纳米硒干预 Raw264.7、Thp-1 等细胞炎症型极化, 上调 Gpx4mRNA, 下调与极化相关的 IL6、TNF- α 、Jak2、Stat3 mRNA 表达 ($P < 0.05$)。

结论: (1) AU 的炎症程度与眼部硒含量或具一定相关性。(2) 本次制备的纳米硒对眼部细胞的毒性较小, 甚至在 24 h 内对其增殖具有一定促进作用, 其对 C6@SeNPs 的摄取率也高达 90% 左右, 目前已找到较佳作用浓度范围。(3) 该浓度及粒径范围内的纳米硒可通过 JAK2/STAT3、IL6 及 TNF- α 通路调控巨噬细胞极化平衡, 影响 AU 中巨噬细胞的靶向招募和免疫功能, 也可靶向干预视网膜色素上皮细胞中重要促炎因子的表达, 实现多重路径共同调控眼内免疫应答。

摘要编号: 209282

肠道微生物组、免疫细胞及循环炎症因子与不同类型葡萄膜炎的因果关联研究

第一作者: Guandong ZHU

目的: 葡萄膜炎是一种与免疫失调密切相关的致盲性眼病, 其不同类型 (如 VKH 综合征、白塞病) 具有独特的临床特征。尽管观察性研究揭示了葡萄膜炎患者存在肠道菌群紊乱, 但菌群、免疫系统与疾病亚型之间的因果关系及具体路径尚不明确。本研究旨在利用孟德尔随机化方法, 系统阐明肠道微生物对各类葡萄膜炎的因果影响, 并揭示免疫细胞与炎症因子在其中的中介作用。

方法: 我们从大规模全基因组关联研究 (GWAS) 公共数据库中获取了肠道微生物群、731 种免疫细胞特征、91 种循环炎症因子以及主要葡萄膜炎类型 (包括全葡萄膜炎、VKH 综合征、白塞病等) 的遗传数据。采用两样本孟德尔随机化作为主要分析方法, 以遗传变异作为工具变量推断因果关系。通过逆方差加权法、MR-Egger、加权中位数等方法进行验证, 并进行敏感性分析以确保结果的稳健性。进一步, 我们进行了中介分析, 以量化免疫细胞和炎症因子在“肠 - 眼轴”通路中的介导比例。

结果: MR 分析鉴定出多个与葡萄膜炎风险存在因果关联的肠道菌属。例如, Bacteroides 和 Paraprevotella 的增加与全葡萄膜炎风险升高相关, 而 Roseburia 和 Clostridium (产丁酸盐菌) 则显示出保护作用。这些效应在不同类型的葡萄膜炎中存在显著异质性: Prevotella 是 VKH 综合征的特定风险因子, 而 Bifidobacterium 的改变与白塞病显著相关。中介分析进一步表明, 特定免疫细

胞（如活化的 CD4⁺ T 细胞、调节性 T 细胞）和炎症因子（如 IL-23、IFN- γ ）在肠道微生物影响葡萄膜炎风险的路径中承担了约 15%–30% 的中介效应。

结论：本研究从遗传学角度为“肠—眼轴”假说提供了强有力的因果证据，证实了肠道微生物群通过调节宿主免疫状态，对不同类型葡萄膜炎的发病存在特异性的因果影响。我们的发现不仅将特定的微生物类群（如 *Prevotella*）确立为 VKH 等疾病的潜在生物标志物，更重要的是，揭示了可干预的免疫通路（如 Th17 通路相关的细胞与因子），为未来开发针对特定葡萄膜炎亚型的微生物靶向或免疫调节疗法奠定了理论基础。

摘要编号：210130

表观遗传适应驱动单核细胞在植入视网膜后分化为小胶质细胞样细胞

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共同作者：Shengping HOU, Jie LIU, Eleftherios PASCHALIS

目的：识别小胶质细胞的特异性标记物一直是个长期存在的难题。近年来，P2ry12、TMEM119 和 Fcrls 等标记物被认为具有小胶质细胞特异性，但这类判断的前提假设是：循环单核细胞即使浸润中枢神经系统后仍能保持其独特特征。我们最新研究发现，在永久性植入中枢神经系统后，浸润单核细胞在维持促炎症特性的同时，能够获得小胶质细胞样特征。本研究旨在深入探索这一现象。

方法：本研究通过骨髓嵌合体模型，结合单细胞 RNA 测序、ATAC-seq、流式细胞术和免疫组织化学技术，系统分析了植入单核细胞的表型变化。

结果：我们证实植入单核细胞能够获得经典小胶质细胞标记物的表达。这些变化伴随着染色质可及性的改变，以及指示小胶质细胞身份的染色质结合基序的偏移。更重要的是，我们发现植入单核细胞能动态调控 PU.1、CTCF、RUNX、AP-1、CEBP 和 IRF2 等转录因子的表达——这些因子对塑造小胶质细胞身份均具有关键作用。本研究首次揭示视网膜内植入单核细胞经历表观遗传和转录双重改变，从而获得表达小胶质细胞样特征的能力。

结论：这些发现提示，未来在研究单核细胞与小胶质细胞在中枢神经系统病理学中的作用时，必须充分考虑这些细胞的身份转化现象。

摘要编号：208186

预防 Behçet 病葡萄膜炎复发的免疫调节疗法疗效比较

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共同作者：Peizeng YANG

目的：评估环孢菌素、干扰素 α -2a 和阿达木单抗在现实环境中预防 Behçet 病葡萄膜炎复发的有效性。

方法：我们模拟了一项目标试验，该试验涉及 2008 年 4 月 10 日至 2024 年 8 月 1 日期间开始服用环孢菌素、干扰素 α -2a 或阿达木单抗的 Behçet 病葡萄膜炎成年患者，并随访到 2024 年 9 月 10 日。我们应用重叠加权来平衡不同治疗组的患者特征，并在基线时模拟随机化。主要结局是研究治疗期间葡萄膜炎的年复发率。

结果：该队列包括 716 名环孢菌素使用者、193 名干扰素 α -2a 使用者和 103 名阿达木单抗使用者。环孢素组葡萄膜炎的估计平均年复发率为 0.95 (95%, 0.82 至 1.10)，干扰素 α -2a 组为 0.52 (95%, 0.40 至 0.69)，阿达木单抗组为 0.28 (95%, 0.19 至 0.43)。接受环孢菌素治疗的患者比接受阿达木单抗治疗的患者复发率更高（发病率比 [IRR], 3.36 [95% CI, 2.23 至 5.05]；平均差异, 0.66 [95% CI: 0.48 至 0.85]； $P < 0.001$ ）或干扰素 α -2a (IRR, 1.81 [95% CI: 1.37 至 2.40]；平均差异, 0.42 [95% CI, 0.22 至 0.62]； $P < 0.001$ ）。干扰素 α -2a 的复发率高于阿达木单抗 (IRR, 1.86 [95% CI, 1.16 至 2.97]；平均差异, 0.24 [95% CI: 0.05 至 0.43]； $P = 0.011$)。

结论：在 Behçet 病中，与环孢菌素相比，干扰素 α -2a 与葡萄膜炎复发减少有关，而阿达木单抗与干扰素 α -2b 相比与更低的葡萄膜炎复发相关。

摘要编号：210211

高脂饮食调控 CD4⁺ T 细胞平衡和功能介导自身免疫性葡萄膜炎的发病

第一作者：Haixiang HUANG

目的：自身免疫性葡萄膜炎（AU）是一种不可逆炎症性致盲性眼病，激素与免疫抑制剂是常规治疗方案，治疗时间长，副作用大，阐释发病机制，找到治疗新靶点是关键。在心血管疾病中高脂饮食产生游离脂肪酸和低密度脂蛋白，被证实具有促炎作用，然而高脂饮食在自身免疫性葡萄膜炎中是否发挥同样促炎作用尚不清楚。本研究探讨高脂饮食对自身免疫性葡萄膜炎的作用及其分子机制。

方法：实验性自身免疫性葡萄膜炎（EAU）是人类葡萄膜炎的代表性动物模型。小鼠用 IRBP1-20 免

疫，并分别用高脂饮食或正常饮食处理。使用眼底照相和组织病理检查模型葡萄膜炎的发病情况，取材视网膜、引流淋巴结（DLNs）和脾脏（SP）分析 T 细胞表达情况。体外分离的 T 细胞用于体外增殖、分化和功能检测。使用选择性抑制剂和通路激动剂研究信号通路。进一步检测了高脂对体外 T 细胞功能的影响。

结果：高脂饮食加重 EAU 发病，眼底评分和病理评分显示相应改变。高脂饮食抑制了视网膜、DLN、SP 中调节性 T 细胞（Treg）的表达，促进了 Teff 增加，高脂诱导 Treg 向 Th17 样细胞转化：FoxP3 表达下降，ROR γ t 上调，IL-17 分泌增加；此外高脂诱导 Th1 细胞产生，促进炎症因子释放。进一步机制研究表明高脂饮食通过 SR-BI/PI3K/Akt 信号通路调控 T 细胞功能，在高脂饮食的 EAU 模型中添加载脂蛋白 A1（APOA1）处理，能够部分减轻视网膜的炎症。

结论：高脂饮食通过介导 Treg 的促炎表型和功能及 Teff 产生促进 EAU 的发病；其调控机制与 SR-BI/PI3K/Akt 信号通路相关，提示高脂饮食可能是葡萄膜炎的危险因素。

眼外伤

摘要编号：200789

1990-2021 年中国居民眼内异物疾病负担分析与趋势预测

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共同作者：Wei LU

目的：分析 1990-2021 年中国居民眼内异物的疾病负担及变化趋势，并预测 2022-2050 年发病趋势，为减轻我国眼内异物疾病负担和制订科学的防控措施提供参考。

方法：基于全球疾病负担数据库（GBD）收集中国居民 1990-2021 年最新的眼内异物数据，采用年龄标准化发病率、患病率及伤残调整寿命年（DALY）指标分析我国眼内异物疾病负担；通过年估计变化百分比（EAPC）评估眼内异物疾病负担变化趋势；并使用秩和检验分析性别差异；采用自回归综合移动平均模型（ARIMA）进行趋势预测。

结果：2021 年我国居民眼内异物的年龄标准化发病率为 629.18/10 万，患病率为 116.24/10 万，DALY 率为 6.42/10 万；患病人数 200.74 万，新发病例 1,012.83 万，DALY 人数 11.01 万。1990-2021 年间，我国居民眼内异物的发病率、患病率和 DALY 率均呈现先下降后上升趋势，经年龄

标准化后发病率、患病率和 DALY 率的 EAPC 分别为 -1.80（95% CI: -2.87, -0.71）、-1.82（95% CI: -2.89, -0.75）和 -2.15（95% CI: -3.23, -1.07）；性别分层分析显示男性眼内异物的年龄标准化发病率、患病率和 DALY 率整体显著均高于女性（ $P < 0.001$ ）；年龄分层分析显示 45 ~ 54 岁人群眼内异物的患病人数和 DALY 人数最多。预测 2022-2050 年眼内异物的 DALY 率将保持平稳趋势，发病率和患病率将继续上升；发病人数、患病人数和 DALY 人数呈现下降趋势。

结论：对比 1990 年，2021 年我国居民眼内异物年龄标准化发病率、患病率和 DALY 率均降低。但我国人口基数大，眼内异物疾病负担仍然较大，应制定更多高效的防控策略以减轻眼内异物疾病负担。

摘要编号：207668

TNK-tPA 辅助手术治疗外伤性出血性视网膜脱离的临床观察

第一作者：Wenting WANG

目的：探讨纤维蛋白溶解剂 TNK-tPA（替奈普酶）作为手术辅助药物，在治疗复杂性外伤性出血性视网膜脱离及视网膜下出血中的有效性与安全性，以解决术中血凝块引流困难、视网膜复位率低这一临床挑战。

方法：本研究回顾性分析了 3 例由眼球钝挫伤或破裂伤所致的复杂性出血性视网膜脱离病例。所有患者均在接受玻璃体切割手术中，联合应用 TNK-tPA。核心操作是使用 41 G 超细针头，经视网膜将小剂量 TNK-tPA（25 μ g-50 μ g）精准注入视网膜下血肿腔内，待其充分液化积血（等待数小时）后，再行视网膜下积血引流、激光光凝及硅油填充等标准步骤。其中一例因合并严重眼前段损伤，采用了玻璃体腔注射 TNK-tPA 联合长效激素的方案。

结果：术后所有患眼均实现了视网膜的解剖学位位，视网膜下积血被有效清除。视功能得到显著改善：一例无光感患者视力恢复至眼前手动，另一例患者最佳矫正视力提升至 0.1。术中及术后未发生与 TNK-tPA 相关的明显并发症（如难以控制的新发出血）。该技术为后续激光治疗创造了清晰的手术视野，确保了手术的成功。

结论：本组病例表明，在玻璃体视网膜手术中辅助使用 TNK-tPA 进行视网膜下注射，是一种处理外伤性出血性视网膜脱离的高效、安全的创新策略。它能迅速液化顽固性血凝块，实现彻底引流，促进视网膜复位，并最终有效挽救患者视功能。此方法为复杂眼外伤的治疗提供了新的思路，具有重要的临床推广价值。

摘要编号: 208923

伴有晶状体脱位的马凡综合征患者的前部巩膜厚度研究

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共同作者: Lei HE, Siqing HE, Yaping LIU, Xiangyu SHI

目的: 研究伴有晶状体脱位的马凡综合征 (MFS) 患者的前部巩膜厚度 (AST)。

方法: 回顾性横断面研究。观察组为经基因检测确诊为伴有晶状体脱位的 MFS 患者, 对照组为正视眼。排除已知患有角膜、结膜或巩膜疾病, 有眼部手术史 (包括睫状体平坦部玻璃体切除术)、近期佩戴隐形眼镜或患有高度散光的受试者。所有受试者均接受 IOLMaster 700 光学生物测量仪、眼前节光学相干断层扫描 (AS-OCT, Optovue) 以及常规眼科检查。在上方、下方、颞侧和鼻侧, 手动测量距巩膜突 1 毫米 (AST1)、2 毫米 (AST2) 和 3 毫米 (AST3) 处的前部巩膜厚度, 包括 Tenon's 囊至浅层巩膜的厚度 (Tenon's capsule and episclera thickness, TET)、深层巩膜基质厚度 (scleral stroma thickness, SST)、全层巩膜厚度 (total scleral thickness, TST)。分别比较两组前部巩膜厚度的空间分布特点。

结果: 本研究共纳入 32 名患者 (MFS 组 18 名 35 眼, 对照组 14 名 23 眼)。MFS 组与对照组的年龄分别为 19.74 ± 15.94 VS 56.78 ± 10.40 ($U = 40$, $P < 0.001$), 眼轴分别为 24.77 ± 2.21 mm VS 23.53 ± 1.01 mm ($U = 339.5$, $P = 0.10$)。MFS 组与对照组相比, 各个方向的全层巩膜厚度在两组间差异无统计学意义 ($P < 0.05$)。MFS 患者的 TET (除了颞侧以外) 在鼻侧、上方、下方的各个测量点均比对照组显著增厚 ($P < 0.05$)。MFS 患者的 SST 在上方、下方、鼻侧和颞侧所有测量点均显著降低 ($p < 0.001$)。本研究未发现前部巩膜厚度与眼轴长度之间存在相关性。

结论: 比对照组相比, MFS 患者的 TST 无明显变薄, 但是 TET 显著增厚, 且 SST 显著降低。本研究的在体巩膜厚度测量分析表明, MFS 患者巩膜壁的发育异常可能主要体现在深层巩膜厚度的显著降低, 提示在伴有晶状体脱位的 MFS 患者行人工晶状体巩膜固定时需要更加关注深层巩膜厚度, 以减少人工晶状体再脱位的风险。

摘要编号: 204367

外伤性蜡样与枯草芽孢杆菌性眼内炎的临床特征及预后分析

第一作者: Shaolei HAN

目的: 探讨外伤性蜡样与枯草芽孢杆菌所致眼外伤性眼内炎的临床特征差异及预后危险因素。

方法: 回顾性分析 2014 年 1 月至 2023 年 12 月河北省眼科医院眼外伤科收治的 32 例芽孢杆菌性眼内炎病例。纳入标准: 开放性眼外伤后经微生物培养确诊。记录致伤类型 (穿透伤、球内异物、破裂伤)、伤口分区 (I 区: II 区: III 区)、病原菌种类及视力结局。统计学分析采用卡方检验与多因素 Logistic 回归。

结果: 32 例患者中, 男性 28 例 (87.5%), 女性 4 例 (12.5%); 右眼 15 例 (46.9%), 左眼 17 例 (53.1%)。致伤类型: 眼球穿透伤 18 例 (56.3%), 树枝 8 例、铁丝 7 例、其他 3 例, 球内异物 12 例 (37.5%), 破裂伤 2 例 (6.3%); 伤口分布: I 区 8 例 (25.0%), II 区 22 例 (68.8%), III 区 2 例 (6.3%)。蜡样芽孢杆菌感染 18 例 (56.3%), 其中 3 例 (16.7%) 摘除眼球, 9 例 (50.0%) 无光感; 枯草芽孢杆菌感染 14 例 (43.7%), 1 例 (7.1%) 摘除眼球, 4 例 (28.6%) 无光感。蜡样芽孢杆菌组眼球摘除率及无光感率均显著高于枯草芽孢杆菌组 ($P < 0.05$)。蜡样芽孢杆菌感染者起病急骤 (24 小时内视力丧失 11 例, 61.1%), 伴严重前房积脓 (88.9% vs. 42.9%) 及玻璃体混浊 (100% vs. 64.3%)。多因素分析显示, 蜡样芽孢杆菌感染 ($OR = 5.03$, 95% CI 1.38 – 18.34)、就诊延迟 > 48 小时 ($OR = 4.76$, 95% CI 1.26 – 17.95) 及 II/III 区伤口 ($OR = 3.52$, 95% CI 1.08 – 11.47) 是视力丧失的独立危险因素。

结论: 蜡样芽孢杆菌性眼内炎进展迅猛, 眼球摘除及无光感风险显著高于枯草芽孢杆菌, 早期玻璃体切除联合敏感抗生素 (万古霉素/头孢他啶) 是改善预后的关键。建议对 II/III 区外伤患者优先行快速病原学鉴定以指导治疗。

摘要编号: 208998

微型异形强力恒磁铁在眼部异物取出中的应用

第一作者: Yong LV

共同作者: Xun AN, Chao MA, Shuai WANG, Tiantian WANG

目的: 眼部磁性异物存留是眼外伤中的常见情况, 异物在眼内长期存留可引发一系列严重的并发症, 导致视力能不可逆的损害。传统磁性异物取出器械可能存在磁力不足、操作不便或适用范围有限等问

题。为了更方便的取出眼内磁性异物，我们设计了一种“微型异形强力恒磁铁”。

方法：该器械由三个主要部件组合而成：部件一是一个微型恒磁铁磁头，其底端直径仅 5mm，长 7mm，尖端为圆锥形设计。尽管体积小巧，但其磁力高达 3000 高斯（0.3 特斯拉），提供了极强的局部磁场。部件二是一根长约 8cm 的不锈钢钉，可作为手柄与磁头连接。部件三是直接 1mm 由曲别针制作的磁棒。其临床应用具体体现在以下几个方面：1. 深板层角膜异物取出：强磁力可透过角膜组织精准吸附异物，避免了不必要的组织损伤，提高了取出成功率。2. 睫状体和巩膜异物的诊断与取出：利用其独特的磁性原理，器械可用于进行“点头试验”（磁铁与铁钉组合后手指放置于铁钉中央平衡部，将其磁力尖端缓慢地、由远及近地移向眼球壁，若有磁性异物术者会观察到磁铁尖端下垂，尖端接触巩膜壁时由于磁性原理吸附于巩膜壁，因此可精确定位磁性异物，为术前定位和术中切口制作提供较精确的位置，术中于定位处做切口后可直接使用磁铁将异物吸出。铁钉远离时，因磁力减弱而磁铁回复原位）。3. 眼内后部异物取出术中的“磁棒接力”：对于位于眼后段的异物，该微型恒磁铁可作为内路磁棒或与外路电磁铁进行“接力”操作。降低了对正常晶状体和视网膜的损伤风险。4. 眶内陈旧磁性异物取出：其小巧和强磁力的特性同样适用于眼眶手术，能够精准定位并吸附滞留于眶软组织中的陈旧磁性异物，减少手术创伤。

结果：这种分体式设计具有高磁力、部件小巧、灵活组合、便于操作四大特点，使其能够适应多种复杂的手术场景。在应用范围上，包括但不限于深板层角膜、前房角、睫状体以及晶状体。

结论：因此微型异形强力恒磁铁为眼部磁性异物的取出提供了一种更为安全、精准、有效的解决方案。

摘要编号：208485

折叠式人工玻璃体球囊植入 81 例临床应用观察

第一作者：Yan CHEN

共同作者：Guohua JIANG, Youqing LAN

目的：探讨折叠式人工玻璃体球囊（FCVB）在 81 例硅油依赖眼患者中的长期临床应用效果。

方法：纳入 81 例符合以下条件的患者：严重眼外伤（如贯通伤、脉络膜破裂等）、硅油依赖眼、陈旧性视网膜脱离、大疱性角膜病变、眼内炎、隐形视网膜坏死（硅油填充术后）、葡萄肿（硅油填充术后）及眼球萎缩伴角膜混浊，术前视力均低于 0.01。术前采用三维重建技术，根据眼眶 CT 计算出患眼眼轴长度，以确定球囊型号及硅油注入量。

术中行微创 FCVB 植入术。术后早期给予系统抗炎、抗感染治疗。随访观察时间为 6 个月至 6 年。

结果：除 1 例糖尿病患者术后再次外伤导致眼球破裂、球囊脱出并转整形科处理外，其余 80 例均一次性成功保留了眼球，未出现术后感染或更换球囊等再次手术情况。

结论：对于复杂的硅油依赖眼及严重眼外伤患者，FCVB 植入术可有效实现长期保眼，是此类难治性眼病的重要治疗选择。

摘要编号：207797

新型镍钛双钩引导系统的设计与初步应用：用于辅助泪小管断裂修复中的引流管置入

第一作者：Juan ZHANG

共同作者：Yanlong BI, Houshuo LI

目的：评估一种可自行制作的新型形状记忆双钩（Bi-hook）装置，在泪小管断裂修复术中辅助逆行置入泪道支架的临床疗效与安全性。

方法：本研究为回顾性对比研究。Bi-hook 装置的制作工艺简易，核心由三部分构成：部件：一根 16 号弯曲不锈钢针、一根 36 厘米长的 0.2 毫米镍钛记忆合金（Nitinol）丝，以及一根 7 厘米长的钝头泪道探针。组装：将镍钛丝对折成双股，插入不锈钢针管内。定型（关键步骤）：将弯曲的针头部分用火焰灼烧 2-3 秒，随后冷却，即可形成具有预设形状记忆功能的双钩结构。该装置可伸缩：回缩时，镍钛丝完全隐藏于探针内；伸出时，其尖端可根据预设形状展开，利于术中自发从鼻前庭引出。共纳入 76 例（76 眼）泪小管断裂患者，其中 39 例使用此自制 Bi-hook 装置置管（Bi-hook 组），37 例使用传统 Ritleng 系统置管（对照组）。

结果：置管效率：Bi-hook 组的鼻前庭自发引出成功率显著高于对照组（97.44% vs. 16.22%），且支架置入时间显著缩短（18.93 ± 7.19 分钟 vs. 32.02 ± 10.25 分钟）。手术安全性：Bi-hook 组术后早期并发症发生率显著更低，如鼻出血（5.13% vs. 21.62%）和眼睑水肿（12.82% vs. 29.73%）。长期功能：两组患者在术后泪道通畅率、泪河高度及溢泪评分等长期功能指标上无显著差异。

结论：本研究证实，利用简易工艺自制的 Bi-hook 记忆合金装置，能够显著提高泪小管断裂修复术中支架置入的效率和安全性。其制作简单、成本低廉的特点，结合优异的形状记忆性能，使其成为一种极具临床推广价值的创新技术，尤其适用于在无鼻内镜辅助的条件下简化手术操作、降低组织损伤。

摘要编号: 208927

玻璃体切除联合缝线式人工晶状体悬吊术的长期随访研究

第一作者: Yanyun CHEN

共同作者: Lei HE, Siqing HE, Yaping LIU

目的: 观察玻璃体切除联合缝线式人工晶状体(IOL)悬吊术的远期 IOL 脱位率及并发症。

方法: 单中心回顾性病例系列研究。纳入 2014 年 1 月至 2022 年 12 月在首都医科大学附属北京同仁医院行玻璃体切除联合缝线式 IOL 悬吊术的患者,手术均由单一术者完成,均采用 10-0 聚丙烯缝线行巩膜固定缝线式 IOL 悬吊术。患者定期于我院及当地医院进行混合远程长期随访。主要指标为 IOL 脱位率。

结果: 收集行玻璃体切除联合 IOL 悬吊术患者 168 人,16 人随访中断(其中 12 人拒绝接受远程随访,2 人再次外伤,1 人出现反复视网膜脱离,1 人死亡),失访率为 9.52%。最终纳入 152 位患者,其中男性 120 人(78.9%),女性 32 人(21.1%)。患者年龄为 47.00(26.00, 58.00)岁,随访时间为 76.57(50.62, 112.33)月。外伤性晶状体脱位 121 人(占比 79.6%),先天性晶状体脱位 18 人(占比 11.8%),其他原因导致晶状体脱位 29 人(占比 19.0%)。术前患者 logMAR 视力均值为 1.39 ± 0.76,术后 logMAR 视力均值为 0.74 ± 0.64,绝大部分患者手术后视力较术前明显提升。在随访中共发现 IOL 脱位 10 人(占比 6.57%),其中术后 3 年内出现 IOL 脱位为 2 例(占比 1.31%),6 年内出现 IOL 脱位为 6 例(占比 3.94%),9 年内出现 IOL 脱位为 10 例(占比 6.57%)。随访过程中总共 16 人出现 IOL 悬吊术相关并发症(占比 10.5%),其中异物感、眼红不适 7 人(占比 4.6%),视力下降 3 人(占比 1.9%),眼前黑影 6 人(占比 3.9%)。随访中无缝线暴露、无眼内炎、无视网膜脱离发生。其中 < 50 岁(n = 85)人群中 IOL 脱位 9 人(占比 10.6%),≥ 50 岁(n = 67)人群中 IOL 脱位 1 人(占比 1.5%),组内比较差异有统计学意义($\chi^2 = 5.043$, $P = 0.025$)。马凡综合征是人工晶状体脱位的危险因素($df = 1$, $P = 0.07$)。随访时间与人工晶体脱位无相关关系($r = 0.145$, $P = 0.074$)。

结论: 玻璃体切除联合缝线式 IOL 悬吊术后随着手术时间延长 IOL 脱位率上升,年轻人更容易发生 IOL 脱位,马凡综合征是人工晶状体脱位的危险因素。

摘要编号: 207788

眼中“隐形锈”,诊治需尽早

第一作者: Hui PENG

共同作者: Lingyi JIN, Huan JU, Xuefeng QIN, Yue TIAN, Xing WANG

目的: 探讨眼外伤后眼后节金属异物长期未诊治,引发眼铁质沉着病的机制与诊疗策略,并剖析其视力预后,为临床早期诊断和干预提供依据。

方法: 系统检索并回顾近年相关文献,结合临床病例,归纳眼后节铁质异物引起眼铁质沉着病的发病机制、临床表现、影像特征、治疗要点及预后。

结果: 眼铁质沉着病是由眼内铁质异物持续释放铁离子,通过 Haber-Weiss 反应生成破坏性自由基,引发脂质过氧化反应,导致细胞膜损伤和酶失活等不可逆视功能损害。该病进展隐匿但具有特征性临床表现,包括渐进性视力下降,以及角膜铁锈沉着、虹膜异色、瞳孔扩大及反应迟钝、晶状体前囊棕色沉着、向日葵样白内障、玻璃体混浊、视网膜色素变性和血管狭窄等典型体征。眼眶 CT 是异物定位的首选方法,视网膜电图(ERG)可客观评估视功能状态。治疗关键在于尽早手术取出异物(最佳时机 < 24 小时),根据后节异物体积、性质和部位选择选择经巩膜异物取出术(外路取出术)或经睫状体平坦部玻璃体切除(pars plana vitrectomy, PPV)异物取出术。预后主要取决于视网膜损伤程度,受异物大小、位置、存留时间等因素影响,一般眼前节铁异物的预后较眼后节要好,在最佳手术时机摘除异物的预后较好,错过最佳时机在 3 个月以内摘除较 3 个月以后摘除效果好。

结论: 眼后节铁质异物应尽早诊治。即使延误,手术仍可能改善预后,但视力恢复取决于视网膜损伤程度。早期干预是防止“铁锈性盲”的关键。

摘要编号: 206714

眼外伤后眼眶内植物性异物残留患者的诊断治疗及预后分析

第一作者: Gao LI

目的: 分析外伤后导致眼眶内植物性异物残留的患者的临床影像学特征及治疗方法,提高眼科医师认识水平。

方法: 回顾性病例研究,收集 2022 年 9 月—2025 年 4 月在大连理工大学附属第三人民医院诊治的外伤导致眼眶植物性异物残留的 11 例 11 眼患者的临床资料,总结其临床表现,影像学特征,诊断、治疗及预后。

结果: 11 例 11 眼患者均在外院或本院一期取出植物性外伤异物后残留异物, 其中 4 例患者形成不同程度皮肤瘻道, 1 例患者角膜穿孔术中联合眼球摘除, 1 例患者眼睑畸形联合眼睑整形手术治疗。所有患者治疗后随访 2 个月—2 年, 病情稳定 11 人。所有患者均行眼眶 CT 及增强核磁检查。对比伤后影像呈现明显时期特征性变化。

结论: 眶内植物性异物易残留, 残留后植物性异物对眼眶内组织有特征性影响, 术前充分准备, 增强核磁有指导性意义, 制定个性化手术方案及手术入路, 对术中完整取出异物, 降低手术难度, 提高患者预后生存治疗至关重要。

摘要编号: 202737

经全层巩膜直接睫状体缝合术与经典式经巩膜瓣下睫状体缝合术治疗外伤性睫状体分离效果的比较

第一作者: (gongqiang YUAN[AUTHOR])

目的: 比较经全层巩膜直接睫状体缝合与经典式经巩膜瓣下睫状体缝合的手术效果。

方法: 回顾性病例对照研究。将 2018 年 1 月至 2024 年 9 月于我院因眼部钝挫伤导致睫状体分离需接受睫状体缝合术的患者纳入研究, 分为两组, A 组使用 8-0 薇乔可吸收缝线经全层巩膜直接缝合睫状体, B 组采取经典术式, 经巩膜瓣下切开内板层巩膜, 缝合分离的睫状体, 比较两组睫状体复位率、视力、眼压、并发症及手术时间。

结果: A 组 21 例 (21 眼), 一次手术复位率为 90.48% (19/21), 最终复位率为 100% (21/21); B 组 11 人 (11 眼), 一次手术复位率为 90.01% (10/11), 最终复位率为 100% (11/11)。术后 1 月, A 组 LogMAR 视力由术前 [0.40 (0.15, 1.15)] 提升至 [0.26 (0.05, 1.40)], B 组由 [1.22 (0.15, 1.40)] 提升至 [0.30 (0.00, 1.40)]。术后 1 周, A 组眼压由术前 [9.00 (8.00, 10.00)] mmHg 提高至 [11.00 (8.50, 18.50)] mmHg ($Z = -2.315, P = 0.021$), B 组由术前 [7.00 (7.00, 9.00)] mmHg 提高至 [11.00 (9.00, 17.50)] mmHg ($Z = -2.677, P = 0.007$)。A 组手术时长为 [5.13 (3.91, 8.09)] 分钟, B 组手术时长为 [49.70 (45.00, 74.68)] 分钟 ($Z = -4.583, P < 0.001$), 二者差异有统计学意义。

结论: 经全层巩膜直接睫状体缝合术操作简便、安全有效, 可以作为外伤性睫状体分离的首选手术方式。

摘要编号: 209344

蛋白组学驱动的跨组织匹配: 兔脱细胞气管作为人工泪管支架的体外验证

第一作者: Bingran DONG

目的: 先天性泪道缺如或外伤致泪道严重毁损的患者, 常因自体组织或材料的局限性、取材部位损伤、形态与力学不匹配、无法实现泪道微环境、生物功能无法实现和长期带管等限制而难以获得泪道的理想重建。基于“蛋白组学匹配”思路, 本研究提出以兔脱细胞气管为支架, 联合经 3D 环境诱导兔表皮干细胞获得的兔泪道上皮细胞, 体外构建组织工程人工泪管。

方法: 1) 对兔气管与兔泪管进行定量蛋白组学比对与生物信息学分析, 评估细胞外基质与基底膜相关成分的一致性; 2) 对兔气管实施脱细胞处理, 并以组织学、残留 DNA 与基质成分保留等指标判定脱细胞达标, 同时行体内植入评估免疫反应; 3) 构建三维泪道微环境诱导体系, 促使兔表皮干细胞向泪道上皮方向分化, 并通过特异性表征验证诱导效能; 4) 将诱导获得的泪道上皮细胞复合于兔脱细胞气管支架, 体外培养后行组织免疫荧光染色评价上皮化与组织特异性。

结果: 蛋白组学显示兔气管与兔泪管在多种细胞外基质与基底膜相关蛋白上高度重叠, 功能通路富集一致, 支持气管基质作为泪管支架的合理性。脱细胞处理有效去除细胞成分, 保留关键结构与力学框架, 体内验证未见明显免疫反应。三维诱导体系可稳定获得具有泪道上皮特征的细胞群, 特异性表征阳性。复合构建后, 诱导细胞在脱细胞气管支架上良好黏附与覆盖, 组织免疫荧光显示泪道上皮相关标志表达, 证实组织工程人工泪管的体外构建成功。**结论:** 以蛋白组学证据筛选的兔脱细胞气管具有良好的结构适配性与免疫相容性, 可作为组织工程学泪道的可靠支架; 结合三维微环境诱导获得的泪道上皮细胞, 可在体外实现连续上皮化与组织特异性重建。本研究提出并验证了“蛋白组学驱动的跨组织支架选择—脱细胞与免疫学验证—干细胞定向诱导—体外构建”的系统策略, 为先天性缺如或外伤性严重损毁所致的泪道缺损提供了可转化的组织工程解决方案与实验依据。

结论: 本研究提出并验证了“蛋白组学匹配”的跨组织支架选择范式, 真空辅助脱细胞在显著降低免疫原性同时保留胶原与软骨框架, 成功体外构建组织工程泪管。

眼底内科

摘要编号: 202643

CYP2J 介导的脂质代谢产物促进视网膜病理性血管生成

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目的: 增殖性视网膜病变是以视网膜病理性血管生成成为主要特征的常见视网膜微血管并发症, 也是导致患者失明的主要原因。近年来研究发现, 视网膜脂质代谢异常在病理性血管生成过程中起重要作用。本研究旨在探讨细胞色素 P450 2J (CYP2J) 及其脂质代谢产物 14, 15-环氧二十碳三烯酸 (14, 15-EET) 在增殖性视网膜病变发生中的作用及其机制。

方法: 本研究采用高氧诱导视网膜病变 (OIR) 小鼠模型模拟增殖性视网膜病变, 并结合公共单细胞转录组测序数据库分析 CYP2J 的基因表达谱。免疫组化实验用于确定 CYP2J 在视网膜中的细胞定位, ELISA 用于测定视网膜中 14, 15-EET 水平。进一步通过划痕实验和细胞增殖实验评估 14, 15-EET 对血管内皮细胞迁移与增殖的影响。利用 AngioTool 量化视网膜深层血管网发育, 并通过视网膜电图检测小鼠视网膜电生理功能变化。

结果: 在人和小鼠视网膜中 CYP2J 主要分布于星形胶质细胞及 Müller 胶质细胞, 在 OIR 小鼠模型中表达显著上调。药理学抑制 CYP2J 可降低视网膜 14, 15-EET 水平并抑制病理性新生血管生成。功能实验表明, 14, 15-EET 能够通过激活过氧化物酶体增殖物激活受体 δ (PPAR δ) 促进内皮细胞迁移和增殖。PPAR δ 在视网膜病理性新生血管中高度过表达, 特异性抑制其活性可有效减少新生血管生成, 促进深层血管再生, 并改善视网膜光感受器功能。

结论: 本研究揭示了 CYP2J/14, 15-EET/PPAR δ 信号通路在调控脂质代谢产物及病理性血管生成中的作用, 为增殖性视网膜病变及其他血管生成相关疾病提供了新的潜在治疗靶点。

摘要编号: 209557

Omega3 通过 AQP4 介导的类淋巴排泄系统缓解早期阿尔茨海默症视网膜病理改变

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目的: 眼和脑关系密切, 视网膜作为中枢神经系统的一部分, 与脑具有高度的发育同源性和功能相似性。阿尔茨海默病 (Alzheimer's disease, AD) 是一种普遍存在的神经退行性疾病, AD 患者的眼部存在视觉功能障碍及视网膜结构和功能的异常改变。AD 主要病理特征是 β 淀粉样蛋白 (β -amyloid, A β) 的沉积, 且有研究报道 A β 在视网膜的沉积早于脑部。因此, 我们旨在探索早期 AD 视网膜病变, 以及眼部 A β 可能的排泄通路, 为 AD 视网膜病变的机制研究及治疗方法提供新的策略。

方法: 我们首先对 3 月龄 5 $\times$ FAD 小鼠进行认知和记忆相关行为学检测、视功能检查, 以及脑和视网膜的 A β 及相关病理的检测, 以评估早期 AD 脑和眼的损伤情况; 随后我们利用示踪技术, 通过玻璃体腔注射荧光标记的 A β 追踪眼内毒性蛋白的排泄通路, 并利用基因敲除鼠和蛋白调控剂, 对排泄通路上的关键蛋白——水通道蛋白 4 (Aquaporin 4, AQP4) 进行调控, 检测调控后的眼内 A β 排泄速率及视网膜病理改变。

结果: 利用玻璃体腔注射示踪技术, 我们提出了一条眼部 A β 排泄的完整通路: 即 A β 可以通过血管周围间隙排泄至眶周淋巴管, 并最终到达颈深淋巴结; 通过引入 AQP4 基因调控鼠, 我们发现 AQP4 缺失会导致眼部 A β 排泄速率下降, 最终引起 A β 积聚并导致视功能损伤加重; 而使用 Omega-3 可以缓解 A β 所致的 AQP4 的极性紊乱, 促进眼部类淋巴系统排泄速率, 从而缓解 A β 所致的视功能损伤。

结论: 眼部存在类淋巴-鞘膜淋巴管转运通路, 眼部 A β 可以通过该通路进行排泄, Omega-3 可以通过增强 AQP4 极性促进 A β 排泄, 从而缓解早期 AD 视功能和视网膜病理改变。

摘要编号: 210327

Rs1 基因补充在先天性视网膜劈裂症 Rs1-KI (Rs1E72K) 小鼠治疗中的局限性

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目的: 利用先天性视网膜劈裂症 (X-linked juvenile retinoschisis, XLRS) Rs1 基因敲入 (Rs1

knock-in, Rs1-KI) 小鼠探讨 Rs1 基因补充治疗对 Rs1-KI 小鼠视网膜结构、功能和生物分子的变化。

方法: 使用 CRISPR/Cas9 和显微注射技术构建 Rs1-KI (Rs1E72K) 小鼠并分析其基因型和表型。对出生后 2 周的雄性 Rs1-KI 小鼠进行 AAV2.7m8-CMV-Rs1 玻璃体腔注射, 通过 OCT、透射电镜分析小鼠视网膜结构变化, ERG、眼动仪分析视网膜功能变化, 高通量测序、WB 和 qPCR 分析视网膜生物分子变化。

结果: Sanger 测序检测构建的 Rs1-KI 小鼠基因型为 Rs1E72K, Rs1E72K 小鼠视网膜具有类似 XLRS 患者视网膜样的囊样劈裂改变和 ERG 的 a 波、b 波振幅下降表现。相较于野生型 (Wild type, WT) 小鼠, Rs1E72K 小鼠视网膜 WB 结果显示 Rs1 蛋白表达下降且不能形成八聚体结构, RCVRN 表达下降, CHOP 表达上升。相较于同周龄的 Rs1E72K 小鼠, 接受 AAV2.7m8-CMV-Rs1 治疗的 Rs1E72K 小鼠视网膜结构得到稍微改善 (劈裂囊腔减小、视网膜外核层增厚、线粒体肿胀减轻), 功能得到稍微改善 (ERG 的 a 波、b 波振幅上升, 光敏感度增加), RS1 蛋白单体表达增加且主要在外核层和 IS/OS 层表达, 但八聚体 RS1 蛋白合成不足, 与光感受器相关蛋白 Rho、RCVRN 表达上升。

结论: 通过 AAV2.7m8-CMV-Rs1 治疗后的 Rs1-KI 小鼠结构和功能得到一定改善, 但因八聚体 RS1 蛋白合成不足使其治疗有效性受限。这一研究为 RS1 基因补充在 XLRS 治疗中的限制性提供思考。

摘要编号: 208299

Wnt 抑制因子 1 在氧诱导性视网膜病变小鼠模型中改善新生血管形成并减轻光感受器损伤

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目的: 探讨 Wnt 抑制因子 1 (Wnt inhibitory factor 1, WIF1) 在氧诱导性视网膜病变 (oxygen-induced retinopathy, OIR) 小鼠模型中的作用及其分子机制, 阐明其在抑制视网膜新生血管化 (retinal neovascularization, RNV) 及保护光感受器功能中的潜在价值。

方法: 通过分析增殖性糖尿病视网膜病变 (PDR) 及早产儿视网膜病变 (ROP) 患者玻璃体样本, 检测 WIF1 的表达水平; 建立 OIR 小鼠模型, 比较 P17 时 OIR 组与正常组视网膜中 WIF1 的表达差异。采用玻璃体腔内注射 WIF1 过表达慢病毒的方式干预 OIR 小鼠, 检测其对无血管区面积、新生血管簇、血管分支数量及视网膜电图 (ERG) a 波、b 波和振荡电位的影响, 并通过组织学及超微

结构观察评估视网膜厚度、突触数目及光感受器结构变化。同时检测 β -catenin、血管内皮生长因子 (VEGF)、磷酸化 AKT (p-AKT)、磷酸化 ERK (p-ERK) 的表达水平, 以及活性氧 (ROS)、4-羟基壬烯醛 (4-HNE)、自噬通量及细胞凋亡的变化。

结果: WIF1 在 PDR 和 ROP 患者玻璃体以及 OIR 小鼠视网膜中显著下调。WIF1 过表达显著减少 OIR 小鼠的无血管区和新生血管簇面积, 增加血管分支数, 提高 ERG 的 a 波、b 波和振荡电位振幅, 增加视网膜厚度和突触数量, 并改善光感受器细胞的高尔基体、线粒体及外节结构。机制研究显示, WIF1 过表达可抑制 β -catenin、VEGF、p-AKT 和 p-ERK 的表达, 降低 ROS 和 4-HNE 水平, 改善自噬通量并减轻细胞凋亡。

结论: WIF1 通过抑制 Wnt/ β -catenin-VEGF 信号通路及氧化应激反应, 在 OIR 小鼠中有效减轻病理性新生血管形成并保护光感受器功能。WIF1 有望成为 RNV 相关疾病的潜在靶向治疗分子。

摘要编号: 209426

一种基于 OCTA 的新型图像处理方法, 用于增强糖尿病视网膜病变的微动脉瘤检测和 3D 可视化

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目的: 本研究旨在开发一种基于光学相干断层扫描血管成像 (OCTA) 的新型图像处理方法, 以解决当前 OCTA 在检测微动脉瘤 (MA) 时因血流缓慢、分割错误和投影伪影等因素导致的灵敏度不足问题。该方法通过整合 OCTA 血流信号与结构 OCT 的高反射特征, 并结合三维重建技术, 旨在提升 MA 的检出率, 并实现其在视网膜血管网络中空间形态与动静脉起源的可视化。

方法: 使用 3×3 mm 黄斑中心 OCTA 扫描, 获取 512 幅连续 B 扫描图像用于三维重建。选取深层血管复合体 (DVC) 的 OCTA 血流 en-face 图像和结构 en-face 图像, 以及浅层血管丛 (SVP) 的结构 en-face 图像进行综合分析。基于 ImageJ 的图像处理流程: 对 B 扫描图像堆栈进行去除脉络膜血流、亮度增强和降噪预处理, 通过 Volume Viewer 插件生成视网膜血管的三维正面观 (3D frontal view)。分别处理 DVC 和 SVC。通过对结构 en-face 图像进行阈值分割以提取 MA 的高反射信号, 再与降噪后的 OCTA 血流 en-face 图像进行图像计算叠加, 分别生成 DVC-MA 图谱和 SVC-MA 图谱。将 DVC-MA 图谱与 SVC-MA 图谱相加, 最终生成一幅融合了 OCTA 血流信息和结构 OCT

MA 信息的、具有三维可视化效果的正面全景图，用于合成 3D-MA 图谱。

结果：与设备内置的 OCTA en-face 图像及单纯三维血管正面观相比，3D-MA 图谱能够显示出在传统 OCTA 中因血流缓慢而被遗漏的 MA，实现了多模态信息的互补，显著提升 MA 检测率。3D-MA 图谱提供了 MA 的空间立体形态及其与起源血管的连接关系。结合手动动静脉分割，可清晰区分 MA 的动脉源性与静脉源性可以实现三维形态与起源分析。该方法还能更清晰地展示视网膜内微血管异常（IRMAs）等病变的节段性扩张形态及其与邻近血管的空间关系。

结论：本研究成功建立了一种高效、实用的 OCTA 图像处理方法。所生成的 3D-MA 图谱显著提高了微动脉瘤的检测灵敏度，并能提供其三维形态及动静脉起源信息，为深入研究糖尿病视网膜病变的微血管病理机制、评估疾病进展及优化治疗策略提供了新的无创成像工具。

摘要编号：209014

中心凹厚度与黄斑无血管区是早期糖尿病视网膜病变的指标

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目的：糖尿病视网膜病变（DR）是糖尿病患者最常见的并发症之一，早期诊断和干预对于延缓疾病进展至关重要。本研究旨在探讨健康个体、无视网膜病变（NDR）患者及非增殖性糖尿病视网膜病变（NPDR）患者的中心凹厚度（CMT）和黄斑无血管区（FAZ）面积的变化，并探索早期 DR 的潜在危险因素。

方法：这项横断面研究纳入了 60 名健康个体、60 名 NDR 患者和 60 名轻度 NPDR 患者。所有参与者均接受了全面的眼科检查。使用光学相干断层扫描（OCT）测量 CMT，并使用光学相干断层扫描血管成像（OCTA）测量 FAZ 面积。分析了 CMT 和 FAZ 面积与早期 DR 系统性危险因素（包括糖尿病病程、体重指数（BMI）、糖化血红蛋白（HbA1c）、血脂谱和血压）之间的潜在关联。

结果：与对照组相比，NPDR 组和 NDR 组的双眼 CMT 和 FAZ 面积均存在显著差异（ $p < 0.05$ ）。NPDR 组与 NDR 组之间的 CMT 和 FAZ 面积也显示出显著差异（ $p < 0.05$ ）。此外，CMT 与糖尿病病程、BMI、总胆固醇（TC）、甘油三酯（TG）、收缩压和舒张压呈正相关（ $p < 0.05$ ）。FAZ 面积与糖尿病病程和 BMI 呈正相关（ $p < 0.05$ ）。

结论：CMT 的增加和黄斑灌注的减少可能是糖尿病患者最早的视网膜结构改变，且这两种变化均与系统性因素密切相关。这些发现为糖尿病视网膜病变的早期识别和干预提供了重要的结构与代谢指标。

摘要编号：210315

丹参酮 IIA 在极低密度脂蛋白受体基因敲除（Vldlr/-）小鼠中对脉络膜新生血管和血-视网膜屏障的保护作用研究

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共同作者：Pinghui WEI

目的：年龄相关性黄斑变性（AMD）是一种神经退行性疾病，可导致严重的中心视力损害。目前，抗血管内皮生长因子（VEGF）药物被用于治疗新生血管性年龄相关性黄斑变性（nAMD）。然而，部分患者对抗 VEGF 药物无反应或治疗效果逐渐减弱。丹参酮 IIA（TSA）因其独特的多靶点调控特性，在治疗多种疾病中显示出显著疗效，使其在治疗视网膜疾病中具有巨大潜力。本研究旨在探讨 TSA 在 Vldlr/- 小鼠 nAMD 模型中对脉络膜新生血管（CNV）和血-视网膜屏障的治疗作用及其机制。

方法：将 40 只 Vldlr/- 小鼠随机分为实验组和对照组，实验组每日腹腔注射 30 mg/kg 丹参酮 IIA（TSA），持续 8 周，对照组注射等体积生理盐水。通过光学相干断层扫描（OCT）和荧光素眼底血管造影（FFA）评估脉络膜新生血管（CNV）面积和渗漏情况，利用免疫荧光染色检测血-视网膜屏障完整性，并通过蛋白质组学和 Western blotting 分析分子机制，包括胆固醇代谢、自噬和细胞骨架重组相关蛋白的表达变化。所有数据采用独立样本 t 检验或单因素方差分析进行统计学处理， $P < 0.05$ 为差异具有统计学意义。

结果：与对照组相比，丹参酮 IIA（TSA）治疗显著减少了脉络膜新生血管（CNV）面积（ $P < 0.01$ ）和渗漏点数量（ $P < 0.05$ ），表明 TSA 对 CNV 具有显著的抑制作用。进一步分析显示，30 mg/kg 的 TSA 通过显著上调巩膜/脉络膜/视网膜色素上皮复合体中紧密连接蛋白 ZO-1 和 Occludin 的表达水平（ $P < 0.05$ ），有效恢复了血-视网膜屏障的完整性。同时，30 mg/kg 的 TSA 通过下调血管生成相关信号通路中的关键分子 PLC γ 和 ERK1/2（ $P < 0.01$ ），显著抑制了血管生成。蛋白质组学分析进一步揭示，TSA 治疗显著增强了胆固醇外流（ $P < 0.05$ ）和中间丝重组（ $P < 0.01$ ），同时降低了自噬相关蛋白的表达水平（ $P < 0.05$ ）。

结论：丹参酮 IIA（TSA）通过多靶点机制显著缓解 nAMD 的病理进程，包括抑制 PLC γ /ERK 信号

通路以抑制血管生成、上调紧密连接蛋白 ZO-1 和 Occludin 以恢复血 - 视网膜屏障完整性、促进胆固醇外流以实现代谢重编程, 以及调控自噬相关蛋白表达。这些发现表明, TSA 作为抗 VEGF 药物的潜在替代治疗药物, 具有重要的临床应用前景。

摘要编号: 209621

儿童葡萄膜炎的临床多模态分析与视力预后研究

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共同作者: Liu YANG

目的: 分析北京某眼科中心儿童葡萄膜炎的临床特征及视力预后影响因素。

方法: 本研究为回顾性研究, 纳入 2-16 岁确诊的儿童葡萄膜炎患者。所有患者均接受常规视力检查、眼压检查、裂隙灯显微镜检查、前置镜眼底检查及无创眼底影像学检查, 据临床表现针对性进行相关实验室检查; 部分后葡萄膜炎及全葡萄膜炎的患者行眼底血管造影检查, 部分年龄稍大能配合的患者接受甲襞微循环检测。收集患者发病年龄、受累眼别、复发情况、炎症部位、病因、治疗方式、并发症及其他临床数据。建立多因素回归分析模型, 综合分析影响儿童葡萄膜炎预后的因素。

结果: 研究共纳入 198 例儿童葡萄膜炎患者, 平均年龄 11.6 ± 3.1 岁, 女性患儿略多于男性 (55.2%)。多数患者呈隐匿起病 (52.5%) 及双眼受累 (64.1%)。最常见类型为全葡萄膜炎 (43.9%), 最常见病因是幼年特发性关节炎 (13.6%), 最常见并发症为继发性白内障 (17.2%) 和继发性眼压升高 / 青光眼 (13.1%)。儿童葡萄膜炎患者与健康儿童相比, 甲襞微循环检查中扩张毛细血管、无血管区以及出血现象出现的频率更高, 甲襞毛细血管的形态更加曲折, 毛细血管密度降低。影响视力预后的关键因素包括早期是否进行标准化规范诊疗、复发频率及眼部并发症。

结论: 儿童葡萄膜炎具有起病隐匿、症状不典型、病程迁延反复的特点, 且对常规治疗反应欠佳, 用药周期长且停药困难, 并发症发生率较高。本研究发现儿童葡萄膜炎患者存在甲襞毛细血管床异常, 提示儿童葡萄膜炎可能与全身性微血管病变相关, 但其分子机制仍有待前瞻性研究进一步阐明。在临床管理中, 早期诊断、个体化积极干预以及降低眼部致盲性并发症风险是改善视力预后的关键。

摘要编号: 208864

双抗药物起始联合长效激素治疗 CRVO 引起高度水肿 CME 对比单抗联合激素单中心前瞻性研究观察

第一作者: Zhang ZHONGYU

目的: 观察起始法瑞西单抗联合长效激素及雷珠单抗联合长效激素治疗 CRVO 引起高度 CME 患者治疗效果观察。

方法: 将 CRVO 引起的 CME 水肿大于 $700 \mu\text{m}$ 即三倍正常视网膜厚度定义为高度水肿, 采用起始联合的方法治疗, 起始联合即第一次采用 F + O 或者 L + O 球内注射治疗 CME, 后两个月应用 F 或者 L 治疗, 为一个治疗周期, 34 位 CRVO 患者分为两组法瑞西单抗联合长效激素 (F + O) 及雷珠单抗联合长效激素 (L + O) 治疗, 如果 CFT 增加到 $300 \mu\text{m}$ 或增加超过 $50 \mu\text{m}$, 或者 BCVA 减少了六个或更多 Snellen 字母。在每个治疗周期开始后 2 周和 4-6 周评估疗效和安全性, 此后每 4 周评估一次, 直至达到再治疗标准。主要观测指标是再治疗时间。次要结局指标包括 BCVA、CFT、DCP 和安全性参数。

结果: 16 位患者接受 L + O 治疗, 18 位患者接受 F + O 治疗, 两组均接受两个治疗周期, L + O 组患者的平均再注射间隔为 63.5 ± 27.4 天, F + O 组患者的平均再注射间隔为 69.3 ± 26.1 天。两组在治疗间隔时间上没有统计学上的显著 ($P > 0.079$)。但是 F + O 间隔时间长于 L + O 组, BCVA 的平均峰值变化 F + O 优于 L + O, F + O 组 76.5% 的眼睛获得了三行或更多行的 BCVA, L + O 为 69.7%。在所有治疗周期中, F + O 组眼睛的 CRT 平均峰值下降为 $400.9 \mu\text{m}$, L + O 的眼睛为 $379.2 \mu\text{m}$, 两组在治疗上 CRT 降低没有统计学上的显著差异 ($P > 0.047$)。DCP 两组改善程度无统计学差异。

结论: 对于 CRVO 引起的高度水肿 ME 眼治疗中, 抗 VEGF 联合 DEX 治疗是一种有效的治疗方式。双抗类联合长效激素与单抗类联合长效激素均可显著改善 CRVO 引发高度水肿的 ME 的 BCVA 和 CRT, 对于 DCP 的改善程度无差别, 但是 BCVA 的平均峰值变化 F + O 优于 L + O, 并且优于 F + O 植入物提供了更长的间隔时间。

摘要编号: 209161

后部小眼球伴发的乳头黄斑皱襞的形态演变与视力转归: 个案报告与文献回顾

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共同作者: Jun CHEN

目的: 报告一例伴乳头黄斑皱襞的后部小眼球患儿的临床特征及 6 年随访结果, 并结合文献进行探讨。

方法: 回顾性病例报告。

结果: 病例报告: 一名 6 岁女童因双眼视力低下就诊。综合验光结果显示: 右眼 +17.5 D、左眼 +18.0 D 远视, 双眼矫正视力均为 0.4。眼轴长度测量为右眼 15.93 mm、左眼 16.03 mm, 前节结构参数正常。光学相干断层扫描 (OCT) 检查显示双眼存在海豚样乳头黄斑皱襞、中心凹发育不良及脉络膜增厚。患儿接受验光配镜及弱视训练。经 6 年随访, 双眼矫正视力分别提升至右眼 0.7、左眼 0.8; 眼轴长度无显著变化; OCT 复查显示双眼为浅淡的水平向视乳头黄斑皱褶。

结论: 后部小眼球伴发的乳头黄斑皱襞可随患儿生长发育发生形态演变, 从而影响视力。诊疗初期需进行全面评估, 并通过长期规律随访以最大程度改善并维持视功能。

摘要编号: 209111

基于 OCTA 视网膜血管密度联合外周血单核细胞免疫表型谱分析阿尔兹海默病的早期诊断价值

第一作者: Wencui WAN

目的: 探讨光学相干断层扫描血管成像 (OCTA) 视网膜血管密度参数联合外周血单核细胞免疫表型分析在阿尔茨海默病 (AD) 及轻度认知障碍 (MCI) 早期诊断中的应用价值, 并阐明视网膜微血管改变与外周免疫激活之间的相关性。

方法: 前瞻性纳入 2023 年 1 月至 2025 年 1 月就诊的早期 AD 患者 88 例、MCI 患者 82 例及认知功能正常对照者 80 例。采用 OCTA 技术测量黄斑区 3mm × 3mm 范围内浅层血管丛 (superficial vascular complex, SVC)、中间血管丛 (intermediate vascular complex, IVC) 和深层血管丛 (deep vascular complex, DVC) 的血管面积密度、血管长度密度、血管分支数、血管迂曲度和血管分形维数, 并分析中心凹无血管区 (foveal avascular zone, FAZ) 参数。采用流式细胞术检测外周血单核细胞亚群 (经典型、中间型、非经典型) 分布比例及表面标志物 (HLA-DR、CCR2、CX3CR1) 表达水平。采用 Pearson 相关

分析评估 OCTA 参数、免疫表型指标与认知功能评分的相关性。通过多因素 Logistic 回归分析筛选独立危险因素, 构建联合诊断模型并采用受试者工作特征 (ROC) 曲线评估诊断效能。

结果: AD 组和 MCI 组 SVC 及 IVC 血管面积密度、血管长度密度和血管分支数均显著低于对照组 ($P < 0.001$), 且 AD 组降低程度较 MCI 组更显著 ($P < 0.05$)。AD 组 IVC 血管面积密度较对照组下降 16.4% ($38.2 \pm 5.3\%$ vs $45.7 \pm 4.2\%$)。AD 组和 MCI 组血管迂曲度增加、血管分形维数降低 ($P < 0.05$)。AD 组中间型单核细胞比例显著升高 ($12.8 \pm 3.2\%$ vs $7.3 \pm 1.8\%$, $P < 0.001$), 此外, AD 组中间型单核细胞 HLA-DR 和 CCR2 表达水平显著高于对照组 ($P < 0.001$)。IVC 血管面积密度与中间型单核细胞比例呈显著负相关 ($r = -0.542$, $P < 0.001$), 与中间型单核细胞 HLA-DR 表达水平的相关性更强 ($r = -0.596$, $P < 0.001$)。IVC 血管面积密度与 MMSE 评分呈正相关 ($r = 0.487$, $P < 0.001$), 中间型单核细胞比例与 MMSE 评分呈负相关 ($r = -0.524$, $P < 0.001$)。多因素 Logistic 回归分析显示 IVC 血管面积密度、IVC 血管分支数、中间型单核细胞比例及其 HLA-DR 表达水平是 AD 的独立预测因素 ($P < 0.05$)。联合诊断模型对 AD 的诊断效能显著优于单一指标模型, ROC 曲线下面积达 0.926 (95% CI: 0.884–0.968), 敏感度为 88.6%, 特异度为 91.3%。联合模型对 MCI 的诊断曲线下面积为 0.857 (95% CI: 0.802–0.912), 敏感度为 81.7%, 特异度为 83.8%。

结论: AD 和 MCI 患者存在显著的视网膜微血管密度降低和单核细胞促炎表型改变, 两者之间呈现密切相关性, 共同反映神经血管单元损伤和全身炎症激活在 AD 病理进程中的作用。OCTA 视网膜血管密度参数联合外周血单核细胞免疫表型分析构建的多模态诊断模型具有优异的诊断效能, 为 AD 及 MCI 的早期无创诊断提供了新的生物标志物组合策略。

摘要编号: 208883

基于多模态生成式人工智能的视网膜静脉阻塞智能诊断模型研究

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目的: 视网膜静脉阻塞 (RVO) 是全球范围内导致视力损害的主要原因之一。然而, 由于其病因复杂且诊断依赖主观影像判读, 临床识别与分型仍存在显著差异。现有诊断路径普遍缺乏整合眼科影像特征与全身性危险因素的量化框架, 限制了早期干预的准确性与一致性。本研究旨在构建一种基于多模

态生成式人工智能 (GenAI) 的综合诊断模型, 以客观量化 OCT 影像特征, 并结合临床及实验室指标, 实现对 RVO 的精准诊断和风险评估。

方法: 本研究纳入 200 例经确诊的 RVO 患者及 200 例年龄匹配的健康对照者, 收集高分辨率 OCT 影像、详细临床资料 (包括高血压、糖尿病、脑梗死史等) 及关键实验室指标 (如中性粒细胞/淋巴细胞比值 [NLR]、血小板分布宽度 [PDW])。基于标准化 Prompt 设计, 采用多模态 GenAI 模型 (如 GPT-4o、Claude-3.5-Sonnet 或 Gemini-1.5-Pro) 自动识别并定量提取 10 个特征性 OCT 病理指标 (评分范围 0-5 分), 进而生成综合 RVO 风险评分 (0-100 分)。随后, 将 AI 衍生影像特征与临床及实验室变量输入多算法机器学习模型, 利用受试者工作特征 (ROC) 曲线评估诊断性能, 并以组内相关系数 (ICC) 验证特征提取的一致性。

结果: 结果显示, Claude-3.5-Sonnet 模型在 OCT 特征量化中的稳定性优异 (ICC = 0.82)。融合 GenAI 衍生影像特征、临床及实验室数据的综合模型在 RVO 诊断中的 AUC 达 0.93, 显著高于仅基于临床资料 (AUC = 0.75) 或传统图像分析方法 (AUC = 0.85)。特征重要性分析显示, 黄斑水肿严重程度、视网膜内高反射点数量、患者年龄及 NLR 水平为关键预测因子。模型在外部验证队列中同样表现出较高的准确性与良好的泛化能力。

结论: 本研究提出了一种融合多模态 GenAI 与机器学习的 RVO 智能诊断框架, 能够从 OCT 影像中自动提取稳定且可量化的病理特征, 并结合全身性生物标志物实现综合风险评估。该方法显著提高了 RVO 诊断的客观性与一致性, 为早期识别及个体化干预提供了新的技术途径。其在资源有限地区的可推广性, 显示出 GenAI 在眼科疾病精准诊断中的重要应用潜力。

摘要编号: 209600

基于房水代谢组学的中心性浆液性脉络膜视网膜病变特征及抗 VEGF 治疗影响研究

第一作者: Jianbo MAO

目的: 本研究旨在通过分析中心性浆液性脉络膜视网膜病变 (CSC) 患者房水的代谢组学特征, 系统揭示其代谢通路异常及抗血管内皮生长因子 (VEGF) 治疗的影响, 并探讨 CSC 患者黄斑区微结构特征与代谢产物的关联性。

方法: 研究纳入 30 例接受抗 VEGF 治疗的 CSC 患者, 分为治疗前组 (Pre-CSC 组) 与治疗组 (Post-CSC 组), 以及 20 例对照组 (Control 组), 采集房水样本进行超高效液相色谱-串联质谱 (UHPLC-MS/MS) 代谢组学分析。根据术前

OCT 影像特征, 将 CSC 患者分为两组: FIPED (平坦不规则的色素上皮层脱离) 组和局限性 PED 组, 以评估黄斑微结构与代谢产物的相关性。通过主成分分析 (PCA)、层次聚类分析 (HCA) 及 KEGG 通路注释富集分析, 解析各组代谢特征差异, 并结合机器学习算法 (支持向量机、随机森林、广义线性模型) 与受试者操作特征 (ROC) 曲线分析, 筛选关键代谢标志物。

结果: 研究共鉴定出 1091 种代谢物, 其中 Pre-CSC 组与 Control 组间共有 235 种代谢物出现明显差异, 其中 86 种上调、149 种下调; 抗 VEGF 治疗后, Post-CSC 组与 Pre-CSC 组间鉴定出 134 种代谢物, 其中 58 种上调、76 种下调。差异代谢物显著富集于酪氨酸代谢、苯丙氨酸代谢、cAMP 信号通路、HIF-1 信号通路及糖酵解等途径。研究发现, L-色氨酸等代谢物不仅能有效区分 CSC 患者与对照组, 还能区分抗 VEGF 治疗前后的 CSC 患者。此外, 具有 FIPED 特征的 CSC 患者脂质代谢通路改变异常显著。

结论: 本研究发现 CSC 患者存在显著的酪氨酸代谢和糖酵解通路等改变, 提示线粒体能量代谢紊乱可能参与了疾病的发生发展。L-色氨酸等代谢物的水平变化提示其作为 CSC 诊断及治疗反应的潜在生物标志物。本研究首次从房水代谢组学层面揭示了 CSC 的分子调控网络, 为 CSC 的精准诊断及个体化治疗靶点提供了一定的理论基础。

摘要编号: 208657

基于机器学习和全层视网膜 OCT 影像组学预测 nAMD 的抗 VEGF 治疗反应

第一作者: Jing LUO

共同作者: Biying CHEN, Jianing QIU

目的: 本研究旨在通过收集抗血管内皮生长因子 (anti-VEGF) 给药前新生血管性年龄相关性黄斑变性 (nAMD) 患者的光学相干断层扫描 (OCT) 图像, 提取其中的放射组学特征, 进而建立基于 OCT 的影像组学 (OCT-omics) 预测模型, 用于评估治疗反应。

方法: 采用随机抽样法, 将确诊为 nAMD 的回顾性队列 (n = 199) 分为训练集 (n = 139) 和测试集 (n = 60)。内部验证集 (n = 40) 和外部验证集 (n = 37) 分别来自前瞻性研究队列和另一中心队列。研究人员对治疗前的 OCT 基线数据进行了全面特征工程处理, 将预测的终点设定为初始三次抗 VEGF 注射后的治疗反应。通过逻辑回归、支持向量机 (SVM) 和反向传播神经网络 (BPNN) 构建分类器模型并进行评估。采用决策曲线分析 (DCA) 验证 OCT-omics 模型的临床相关性。系

统性能评估包含准确率、灵敏度、特异性、精确度、阴性预测值 (NPV)、F1 分数以及受试者工作特征曲线下面积 (AUC)。我们采用 Pearson 相关分析, 进一步探究 OCT-omics 评分与治疗中央黄斑区厚度 (CST) 变化率之间的相关性。

结果: 在 BPNN 模型中, 训练集、测试集、前瞻性数据集和外部验证集的 AUC 值分别为 0.974、0.936、0.927 和 0.856; 在 SVM 模型中, 分别为 0.954、0.913、0.900 和 0.881。OCT-omics 评分与 CST 降低率呈正相关 (训练集: $R = 0.56$, $P = 6.9e-13$; 测试集: $R = 0.45$, $P = 0.00031$; 前瞻性数据集: $R = 0.43$, $P = 0.0057$; 外部验证集: $R = 0.51$, $P = 0.0013$)。

结论: 该 OCT-omics 模型被证实具有优异的预测性能, 可准确评估三次抗 VEGF 注射后的治疗效果, 并为个性化 nAMD 管理提供了创新性解决方案。

摘要编号: 209084

基于超广角 SS-OCTA 多层影像的自监督学习模型用于糖尿病视网膜病变预测

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目的: 本研究基于超广角扫频源光学相干断层扫描血管成像 (swept-source optical coherence tomography angiography, SS-OCTA) 多层血管特征, 构建自监督深度学习模型, 实现糖尿病视网膜病变 (diabetic retinopathy, DR) 及黄斑水肿 (diabetic macular edema, DME) 的自动识别与分级, 并分析不同血管层的预测贡献。

方法: 本研究为回顾性研究, 纳入 2133 名受试者共 6224 眼次的超广角 SS-OCTA 影像 (扫描范围 $20 \times 24 \text{ mm}$), 包括表层血管复合体 (superficial vascular complex, SVC)、深层血管复合体 (deep vascular complex, DVC) 及脉络膜毛细血管层 (choriocapillaris layer, CCL) 三层影像, 共计 18672 张图像。首先基于 DINOv3 视觉模型进行自监督预训练, 以学习跨层血管结构特征并增强特征表征能力。随后选取 477 名糖尿病患者 (776 只眼) 的标注数据基于分层先验的分类器用于下游任务: 任务 1 —— 判别是否存在 DR; 任务 2 —— 区分非增殖期 (non-proliferative DR, NPDR) 与增殖期 DR (proliferative DR, PDR); 任务 3 —— 识别是否合并 DME。

结果: 在任务 1 (DR 识别) 中, SVC、DVC、CCL 模型的 AUC 分别为 0.893、0.888、0.799, SVC 表现最佳 ($AUC = 0.893$, $F1 = 0.857$)。在任务 2 (DR 分级) 中, 三层模型 AUC 分别为 0.849、0.823、0.767, SVC 与 DVC 均优于 CCL。在任务 3 (DME

识别) 中, SVC、DVC、CCL 模型的 AUC 分别为 0.845、0.935、0.877, 其中 DVC 表现最优 ($AUC = 0.935$, $F1 = 0.754$)。模型可视化结果显示, 关注区域主要集中于黄斑区、视盘及局部灌注缺损区域, 与 DR 及 DME 的典型病理学改变高度一致。

结论: 基于超广角 SS-OCTA 多层影像的自监督预训练模型可实现糖尿病视网膜病变及其并发症的高效识别与分级。自监督策略显著提升了模型的跨层特征学习能力, 不同血管层在多任务预测中表现出差异化贡献, 其中深层与表层血管复合体在 DR 与 DME 预测中最具诊断价值。本研究为 SS-OCTA 在糖尿病视网膜病变的智能筛查与临床辅助决策中的应用提供了新的技术路径与方法学依据。

摘要编号: 210085

抑制 RBP4 减轻视网膜色素上皮细胞铁死亡改善糖尿病视网膜病变

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共同作者: Shi YA WEN

目的: 探索视黄醇结合蛋白 4 (RBP4) 在糖尿病视网膜病变 (DR) 相关损伤中的作用, 评估其抑制剂 A1120 对高糖高脂 (HG/HL) 条件下视网膜色素上皮 (RPE) 细胞铁死亡的影响。

方法: 以 CCK-8 筛选 A1120 作用于 ARPE-19 的最适浓度; 随后设对照、HG/HL、HG/HL+A1120 和 HG/HL+ferrostatin-1 四组。检测各组 Fe^{2+} 、ROS、MDA 与 GSH/GSSG 含量; Western blot 测定各组 GPX4、xCT、TFRC、ACSL4 及 RBP4 蛋白表达; qRT-PCR 分析各组细胞及增殖性 DR (PDR) 患者视网膜纤维血管膜与非糖尿病黄斑疾病患者组织中的相关基因表达。

结果: HG/HL 诱导 ARPE-19 出现铁死亡表型, 与正常组相比差异具有统计学意义 ($P < 0.05$), 表现为铁负荷与氧化 / 脂质过氧化损伤加剧、谷胱甘肽稳态紊乱及铁死亡通路分子异常。Fer-1 可降低细胞死亡与氧化损伤, 与模型组相比差异具有统计学意义 ($P < 0.05$), 提示铁死亡参与其中。A1120 预处理可明显缓解上述改变并提升细胞活力, 与模型组相比差异具有统计学意义 ($P < 0.05$)。在人源组织层面, qRT-PCR 显示: PDR 患者与对照组相比 GPX4、xCT 显著下调, 而 ACSL4、TFRC、RBP4 显著上调, 差异均具有统计学意义 ($P < 0.05$)。

结论: RBP4 参与 HG/HL 诱导的 RPE 细胞铁死亡; 药理性抑制 RBP4 可减轻铁死亡相关损伤, 可作为 DR 早期治疗的潜在靶点。

摘要编号: 209728

柏西普及激光治疗 II 区早产儿视网膜病变的疗效对比

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目的: 比较玻璃体腔内注射康柏西普与激光光凝术治疗需干预的 II 区早产儿视网膜病变的疗效。

方法: 本研究为一项随机、开放标签、非劣效性试验,是多中心的前瞻性临床研究。研究对象为 2018 年 6 月 1 日至 2021 年 6 月 31 日期间纳入的 202 例符合条件、患有 II 区 2 期 + 或 3 期 + 病变的婴儿。患儿按 1:1 的比例随机分配,在基线时接受 0.25 mg 康柏西普玻璃体腔注射或激光光凝治疗。若疾病复发,则允许进行附加治疗。主要结局是基线治疗后 24 周时无活动性 ROP 且无不良结构结局的婴儿比例。需要转换治疗方式被视为治疗失败。若治疗组间差异的 95% 贝叶斯可信区间下限大于 -10%,则判定玻璃体内注射康柏西普非劣效于激光治疗。关键的次要结局是基线治疗后的疾病再激活率。其他次要结局包括治疗的眼部及全身安全性、手术操作时长以及血清中的游离康柏西普。

结果: 在 202 例符合条件的患儿中,195 例接受了基线治疗,170 例完成了 24 周研究(平均胎龄 29.2 [SD, 2.1] 周;平均出生体重 1204.9 克 [SD, 335.9 克];77 例 [45.3%] 为女性;31.2% 为 II 区 2 期 + ROP, 68.8% 为 II 区 3 期 + ROP)。接受 0.25 mg 康柏西普治疗的 87 例患儿中,83 例 (95.4%) 治疗成功;接受激光治疗的 83 例婴儿中,80 例 (96.4%) 治疗成功(组间差异为 -1.0%, 95% 可信区间为 -8.0% 至 6.1%)。激光组中有 4 例 (4.8%) 婴儿疾病再激活,康柏西普组中有 7 例 (8.0%) 婴儿疾病再激活(与激光治疗相比的 OR 值为 1.73, 95% CI 0.49-6.14, $p = 0.393$)。所有发生疾病再激活的婴儿均为 II 区 3 期 + 病变,并接受了重复治疗。严重和非严重的全身性不良事件以及眼部不良事件在两组间分布均衡。

结论: 对于需干预的 II 区早产儿视网膜病变患儿,玻璃体腔内注射康柏西普与激光光凝术在治疗 24 周时疗效相当,且两者均表现出良好的耐受性。

摘要编号: 209624

气血两虚型产后视网膜中央动静脉阻塞的中西医结合救治策略及疗效

第一作者: Jie YANG

目的: 探讨气血两虚型产后视网膜中央动静脉阻塞的中西医结合救治策略及疗效。

方法: 回顾性分析 2024 年 7 月收治的 1 例产后 1 个月哺乳女性,左眼突发暴盲(视力 0.06)。在西医溶栓、抗凝、神经营养及球后激素基础上,即刻予八珍汤加味(重用黄芪 30 g)口服,联合眼周局部取穴加远端配穴针刺,每日 1 次,共 11 d。观察视力、眼底、OCT、视野及中医证候变化。

结果: 治疗 11 d 后,左眼视力由 0.06 提高至 0.4;视网膜静脉迂曲、出血及黄斑囊样水肿明显减轻;OCT 示黄斑厚度下降,中心凹光反射恢复;视野中心暗点缩小;中医气血两虚证候改善。随访 1 个月视力稳定在 0.5,无不良反应。

结论: 对气血两虚型产后视网膜中央动静脉阻塞,早期西医挽救性治疗与中医“补益气血、活血通络”协同,可显著促进视功能恢复,为围产期视网膜血管阻塞提供了安全有效的新思路。

摘要编号: 208849

法瑞西单抗对其他抗 VEGF 治疗不佳的新生血管性年龄相关性黄斑变性的真实世界疗效分析

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目的: 探讨在真实世界中,法瑞西单抗(Faricimab)玻璃体腔内注射(IVT)对其他抗 VEGF 治疗不佳的新生血管性年龄相关性黄斑变性(nAMD)患者的临床效果。

方法: 本研究为真实世界回顾性分析。本研究筛选自 2023 年 11 月 1 日至 2025 年 8 月 30 日期间,在香港眼科医院(HKEH)接受至少连续 3 次玻璃体腔注射(IVT)法瑞西单抗治疗及持续随访的既往其他抗 VEGF 治疗后效果不佳的 nAMD 患者。对其临床数据包括年龄、性别、患眼、既往抗 VEGF 治疗史、法瑞西单抗用药次数、IVT 间隔时间、中心视网膜厚度(CMT)及视力(VA)等进行分析。

结果: 共纳入 46 例 (46 眼) nAMD 患者,其中男性 26 例 26 眼 (56.5%), 女性 20 例 20 眼 (43.5%), 年龄 74.9 ± 9.7 岁。既往抗 VEGF (阿柏西普或雷珠单抗) 治疗中位数为 8 次 (Range 2-24)。治疗及随访期为 445.3 ± 87.7 天,法瑞西单抗 IVT 次数为 5.8 ± 2.3 , IVT 间隔时间为 83.3 ± 29.7 天。基线时中心视网膜厚度(CMT)为 $377.4 \pm 112.7 \mu\text{m}$, 经法瑞西单抗 IVT 后降低至 $300.6 \pm 97.4 \mu\text{m}$ ($p < 0.01$); 视力(VA)从基线时 0.35 ± 0.21 提高至法瑞西单抗治疗后 0.42 ± 0.23 ($p < 0.05$), 末次访视时维持在 0.31 ± 0.23 (较基线下降, $p < 0.05$)。

结论：法瑞西单抗能有效降低经其他抗 VEGF 药物治疗应答不佳的 nAMD 患者的中心视网膜厚度，提高治疗后视力。在采用较长间隔时间的真实世界治疗模式中，患者最终平均视力可能会保持在较治疗前轻度下降的水平。

摘要编号：**208991**

湿性年龄相关性黄斑变性患者房水的非靶向代谢组学研究

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目的：本研究旨在确定与湿性年龄相关性黄斑变性（AMD）患者房水（AH）相关的代谢生物标志物，并探讨其代谢变化。

方法：从 10 名湿性 AMD 患者和 10 名白内障患者收集房水，使用液相色谱 - 串联质谱（LC-MS/MS）进行代谢组学分析。

结果：在房水样本中共鉴定出 155 种代谢物。其中，10 种代谢物成为能够区分湿性 AMD 患者与对照组的潜在生物标志物。湿性 AMD 患者房水中，心磷脂（CL）（72:5）、甘油二酯（DG）（18:3_18:2）、DG（36:5e）和甘油三酯（TG）（24:7）表达上调，而神经酰胺（Cer）（d32:0）、Cer（d34:0）、Cer（d36:0）、单半乳糖甘油二酯（MGDG）（16:1_18:3）、鞘氨醇（SPH）（d18:0）和 TG（16:0_10:4_16:0）表达下调。

结论：通过对房水的代谢组学分析，本研究成功揭示了与湿性 AMD 相关的有价值的代谢生物标志物。这些发现有助于更全面地理解湿性 AMD 的发病机制，并为开发创新治疗策略提供潜在途径。

摘要编号：**210307**

炎症与营养系列指标与糖尿病视网膜病变的关联：一项针对 40 岁及以上美国糖尿病成人的横断面研究

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共同作者：*Liduo PAN, Xiaoyi YU*

目的：炎症与营养状况已成为糖尿病视网膜病变（Diabetic retinopathy, DR）的重要影响因素。基于临床常规参数构建的炎症与营养状况综合指标，有望成为早期识别 DR 的新型生物标志物与干预靶点。然而，此类指标与 DR 的确切关联目前仍缺乏研究证据。

方法：本研究基于国家健康与营养调查（National Health and Nutrition Examination Survey, NHANES）数据库，旨在探讨炎症与营养综合指标

与美国 40 岁及以上糖尿病成人发生 DR 风险之间的关联。我们分析了 2005 至 2018 年间 NHANES 数据库中 4,841 个个体的数据。基于炎症和营养状况的指标包括预后营养指数（Prognostic Nutritional Index, PNI）、白蛋白 - 胆红素评分（Albumin-Bilirubin Index, ALBI）、中性粒细胞与白蛋白比值（Neutrophil to Albumin Ratio, NPAR）及老年营养风险指数（Geriatric Nutritional Risk Index, GNRI）。通过单变量和多变量逻辑回归以及限制性立方样条分析，评估了这些生物标志物与糖尿病视网膜病变之间的关联和非线性关系。ROC 曲线用于评估各个指标的预测效能。此外，还进行了亚组分析与基于随机森林的多重插补法以评估这些关联的稳定性。

结果：在完全校正所有协变量后，与第一分位组相比，PNI（OR = 0.56 [0.41, 0.76]）、GNRI（OR = 0.67 [0.43, 0.79]）的第三分位组与 DR 呈负相关；而 ALBI（OR = 1.58 [1.16, 2.16]）和 NPAR（OR = 1.28 [0.96, 1.72]）的第三分位组则与 DR 呈正相关。限制性立方样条曲线显示以上 4 个指标与 DR 风险之间关联存在线性关系。ROC 曲线显示 PNI 预测能力最佳，并且最佳截断值为 40.01。亚组分析与基于随机森林的多重插补法共同支持本结果的稳健性。

结论：在 40 岁及以上美国糖尿病成人中，高水平 ALBI、NPAR 与 DR 风险呈正相关，而低水平 PNI 与 GNRI 则与 DR 患病率升高存在关联。此外，PNI 在预测效能方面表现更优，其有望成为早期识别 DR 的新型生物标志物与干预靶点。

摘要编号：**204171**

玻璃体腔注射抗 VEGF 药物对新生血管性老年性黄斑变性相关性色素上皮脱离治疗效果的短期观察

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目的：评价玻璃体腔内注射抗血管内皮生长因子（vascular endothelial growth factor, VEGF）药物对新生血管性老年性黄斑变性（neovascular age-related macular degeneration, nAMD）相关性视网膜色素上皮脱离（retinal pigment epithelial detachment, PED）患者的视力以及视网膜结构和 PED 形态学转归的影响。

方法：回顾性、观察性病例系列研究。我们回顾分析了 2021 年 3 月至 2024 年 2 月在上海交通大学附属瑞金医院初治的 nAMD 相关性 PED 患眼 33 例（33 眼）。这些患眼接受了每月 1 次玻璃体腔内

注射 0.05 ml 康柏西普或阿柏西普，连续三个月，然后按需注射（3 + PRN），所有患者均完成至少 6 个月随访，回顾性评价基线和玻璃体注药 1, 2, 3, 6 个月时的 OCT 参数变化以及基线和玻璃体注药 6 个月时最佳矫正视力（best corrected visual acuity, BCVA）。主要评价指标：最佳矫正视力（BCVA）和 PED 高度。次要评价指标：视网膜下液（subretinal fluid, SRF）和黄斑中心区厚度（central subfield thickness, CST）。

结果：6 个月时，平均 BCVA 从 0.20 ± 0.15 基线至 0.32 ± 0.27 ($P = 0.001$)，66.7% (22/33) 的眼视力提高（BCVA 提高 ≥ 0.1 logMAR）；平均 CST 从基线时的 (320.9 ± 84.61) μm 显著降低至 (224.5 ± 54.59) μm ($P < 0.001$)，81.8% (27/33) 达到干黄斑，OCT 显示无视网膜下液及视网膜内液。6 个月内的平均注射次数为 4.15 ± 1.3 。并且根据注射药物不同分成两个亚组并进行比较，两组在观察终点时，校正 BCVA 无显著差异；两组 PED 高度均显著下降，在治疗终点时无显著差异；两组治疗针数无显著差异。

结论：使用“3 + PRN”方案玻璃体内抗 VEGF 药物注射显著降低了未经治疗的有 PED 的 nAMD 患者的 PED 高度，改善了视力，减少了 SRF 和 CST。

摘要编号：208900

碳水化合物亚型对高血糖个体微血管并发症进展的异质性影响：来自英国生物样本库的证据

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目的：本研究旨在探讨高血糖个体膳食碳水化合物亚型与糖尿病相关微血管并发症（MCD）发生率之间的关联。

方法：患有高血糖症（定义为空腹血糖 ≥ 5.56 mmol/L 或患有糖尿病）的参与者被纳入英国生物银行队列。采用多变量调整的 Cox 比例风险模型和多状态模型来估计总碳水化合物、游离糖、淀粉和纤维摄入量与发生的 MCD（糖尿病肾病、视网膜病变、神经病变）和全因死亡率的关联。使用受限三次样条来估计潜在的非线性关系。

结果：共有 32,720 名受试者接受了中位随访时间 13.19 年，总碳水化合物的摄入量与糖尿病肾病（DKD）呈正相关（HR 1.04, 95% CI 1.02–1.07, 能量摄入每增加 5%； $P = 0.005$ ）和全因死亡率（1.03；1.01–1.05； $P = 0.020$ ）。游离糖的摄入量与 DKD 呈正相关（1.11；95% CI 1.07–1.15； $P < 0.001$ ）、总 MCD（1.08；1.04–1.11； $P < 0.001$ ）

和全因死亡率（1.06；1.03–1.10； $P < 0.001$ ）。相反，纤维摄入量与 DKD 风险呈负相关（HR 0.92, 95% CI 0.89–0.96/5 g/d 增加； $P < 0.001$ ）和总 MCD（0.95；0.92–0.98； $P = 0.008$ ）。淀粉摄入量与任何结局无关。游离糖与全因死亡率呈 J 形关联（10.4%， P -非线性 = 0.042），纤维与 MCD 呈 L 形关系（17.4 g/d， P -非线性 = 0.033）。多州分析发现，从无 MCD 到首次 MCD 和死亡的轨迹结果相似。

结论：减少游离糖摄入量和增加纤维摄入量可能有助于降低高血糖患者的 MCD 风险和死亡率。

摘要编号：209240

紫杉醇化疗相关的囊样黄斑水肿一例

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目的：报告一例与紫杉醇化疗相关的囊样黄斑水肿的病例。

方法：观察性病例报告。

结果：一名 39 岁男性患者因鳞状上皮细胞肺癌接受紫杉醇 + 替雷利珠单抗治疗方案治疗 2 年，出现双侧视网膜紫杉醇相关黄斑囊样水肿（paclitaxel related cystoid macular edema, PRCME）。PRCME 目前没有诊断标准，但患者有 PCME 典型特点：光学相关断层扫描有典型的囊腔样黄斑水肿，荧光素眼底血管造影却未见明显的荧光素渗漏。

结论：PRCME 的产生可能与紫杉醇对视网膜 Müller 细胞和色素上皮细胞产生毒性作用有关。建议接受化疗的患者进行基线眼科评估，并在出现眼部症状时密切随访。

摘要编号：209412

纤维连接蛋白介导视网膜血管生成中内皮细胞向间充质的转变

第一作者：Dan LIU

目的：本研究旨在探讨内皮间质转化（EndoMT）在病理性视网膜血管生成中的作用，并确定视网膜血管生成的关键分子介质。

方法：对氧诱导视网膜病变（OIR）小鼠模型的视网膜组织进行 RNA 测序（RNA-seq），以分析基因表达模式。基因集富集分析用于检查上皮间质转化（EMT）和血管生成基因集之间的相关性。在内皮细胞中评估纤维连接蛋白（FN1）的表达，并通过 siRNA 介导的敲除在体外血管生成试验和 OIR 模型中评估其功能。

结果: EndoMT 发生在视网膜血管生成发展的早期, EMT 与血管生成基因集之间存在显著相关性。FN1 被确定为内皮细胞中 EMT 相关基因上调最显著的基因。siRNA 介导的纤维连接蛋白抑制有效地阻止了 VEGF 诱导的体外血管生成, 并减少了 OIR 模型中的病理血管生成。

结论: EndoMT 是病理性视网膜血管生成的关键早期事件, 纤维连接蛋白是关键介质。靶向纤维连接蛋白可能提供一种新的治疗策略, 可以与抗 VEGF 治疗协同作用, 更有效地治疗糖尿病视网膜病变 (DR) 和早产儿视网膜病变 (ROP) 中的病理血管生成, 特别是在单独抗 VEGF 治疗反应不佳的情况下。

摘要编号: 208565

罗氟司特通过抑制小胶质细胞衰老改善视网膜缺血再灌注损伤后神经节细胞退行性变

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共同作者: Qiong LIU, Hongyang ZHANG

目的: 视网膜缺血再灌注损伤与多种视网膜疾病相关, 可导致视网膜神经节细胞退行性变。小胶质细胞衰老会加剧炎症反应, 进而促进神经退行性变。本研究旨在探讨罗氟司特在缓解 RIR 损伤后小胶质细胞衰老及神经炎症中的潜在治疗作用。

方法: 对 C57BL/6J 小鼠进行 RIR 手术, 并腹腔注射罗氟司特进行治疗。采用 BV2 小胶质细胞进行氧糖剥夺/复氧处理以模拟体外缺血条件。通过 SA- β -gal 染色检测细胞衰老; 采用定量 PCR 和 ELISA 检测衰老相关分泌表型因子水平; 对视网膜切片进行苏木精-伊红染色以评估视网膜形态和厚度; 通过免疫荧光染色标记并定量视网膜全铺片中存活的 RGCs; 进一步利用 Western blot 和免疫荧光染色定量分析与细胞周期及 NLRP3 炎症小体相关的蛋白。

结果: 罗氟司特处理可减少 OGD/R 暴露的 BV2 细胞中小胶质细胞衰老、活性氧生成及促炎细胞因子分泌, 并恢复细胞增殖能力, 逆转 OGD/R 诱导的细胞周期阻滞。在体实验表明, 在 RIR 小鼠模型中, 罗氟司特可减轻视网膜衰老、维持视网膜厚度并保护 RGCs 免于死亡。机制上, 罗氟司特通过抑制 NLRP3 炎症小体活化并抑制小胶质细胞中的 DNA 损伤信号通路发挥作用。

结论: 罗氟司特通过抑制 NLRP3 炎症小体, 减轻小胶质细胞衰老及炎症反应, 从而在 RIR 损伤中发挥神经保护作用。这些研究结果表明, 罗氟司特有望成为通过靶向小胶质细胞衰老治疗缺血性损伤相关视网膜疾病的一种潜在治疗策略。

摘要编号: 210318

载脂蛋白 E 介导的细胞质乳酰化修饰在 Vldlr/- 小鼠年龄相关性黄斑变性中的保护作用及机制研究

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共同作者: Pinghui WEI

目的: 本研究旨在探究载脂蛋白 E (APOE) 在 Vldlr/- 基因敲除小鼠模型中的生物学功能, 探究其在光感受器细胞及视网膜色素上皮 (RPE) 细胞中的保护作用及相关分子机制。

方法: 采用 Vldlr/- 基因敲除小鼠 (n = 36) 作为实验组, 以 C57BL/6J 野生型小鼠 (n = 30) 作为对照组。所有实验组分别在出生后第 18、20、22、24 和 28 天采集样本, 系统开展组织学、免疫学和分子生物学分析, 具体方法包括 TUNEL 染色、免疫组化、Western blot、LC-MS/MS 及荧光显微镜技术。为进一步阐明乳酰化的生物学功能, 本研究通过 RNAi 技术特异性敲低 H3K18la 的表达, 并系统评估其对细胞凋亡及 APOE 介导的视网膜保护作用的影响。

结果: 研究结果显示, 与早期时间点 (P14、P23) 及野生型小鼠相比, Vldlr/- 小鼠中 TUNEL 阳性细胞数量从 P14 开始显著增加, 并在 P23 达到峰值, 且这一现象在光感受器细胞中尤为明显。值得注意的是, APOE 过表达显著抑制了视网膜细胞死亡, 尤其是在光感受器及 RPE 细胞中。进一步分析发现, 在 P21 时间点, APOE 过表达显著促进了乳酰化修饰, 特别是在 H3K18la 位点。通过 APOE 与 TUNEL 阳性细胞的共定位分析, 我们观察到乳酰化修饰蛋白与细胞凋亡减少显著相关, 提示乳酰化在 APOE 介导的视网膜保护中发挥关键作用。此外, Pan K1a 染色结果证实, P23 时光感受器细胞中乳酰化水平显著升高, 且这一变化与线粒体功能及脂质代谢的改善密切相关。RNAi 介导的 H3K18la 敲低实验进一步表明, H3K18la 表达下调显著削弱了 APOE 的保护作用, 导致光感受器及 RPE 细胞凋亡率显著增加。同时, 流式细胞术及免疫印迹分析结果显示, H3K18la 敲低降低了细胞存活率, 并伴随乳酰化水平下降及 APOE 保护功能的受损。

结论: 本研究揭示载脂蛋白 E 通过调控乳酰化修饰, 尤其是 H3K18la 位点, 在视网膜变性中发挥重要保护作用的分子机制。这些发现不仅为视网膜变性的病理机制提供了新的理论依据, 同时表明乳酰化修饰是一个潜在的治疗靶点, 进一步强调了其在年龄相关性黄斑变性中维持视网膜细胞存活的关键作用。

摘要编号: 208775

钕基大黄酸纳米药物的制备及其对干性年龄相关性黄斑变性模型小鼠的作用研究

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目的: 干性年龄相关性黄斑变性 (Dry age-related macular degeneration, dAMD) 目前尚无有效疗法, 其核心病理机制与视网膜色素上皮细胞 (Retinal pigment epitheliums, RPEs) 功能障碍及小胶质细胞异常激活密切相关。本研究旨在开发一种具有高效性、稳定性与明确作用机制的钕基大黄酸纳米药物, 并探究其在 dAMD 模型中的治疗作用及机制。

方法: ① 采用通过自组装法合成钕基大黄酸纳米粒 (Nanoparticle, NPs), 并对所得纳米药物的粒径、电位、形貌、药物负载率及体外抗氧化活性进行系统表征。② 利用碘酸钠诱导人 RPEs 和人小胶质细胞 (Microglial cells, MGCs) 建立 dAMD 体外模型, 通过 CCK-8、活性氧荧光探针、流式细胞术、跨上皮电阻等评估纳米药物的细胞保护效应; 进一步通过 RNA-Seq 及 Western blot 检测探究 NPs 具体作用机制。③ 通过碘酸钠腹腔注射构建 dAMD 小鼠模型, 并玻璃体腔注射给予钕基大黄酸纳米药物。通过光学相干断层扫描、视网膜电图评估视网膜结构与功能; 采用视网膜组织切片 HE 染色、TUNEL 凋亡染色及视网膜组织抗氧化生化指标检测, 分析其治疗作用与机制。

结果: ① 成功制备的 NPs 粒径均一, 稳定性良好, 并展现出显著的协同抗氧化能力。② 体外实验证实, 该纳米药物能有效降低 dAMD 模型下的 RPEs 和 MGCs 细胞氧化应激水平, 显著抑制细胞凋亡, 提高 RPEs 屏障功能。RNA-Seq 和 Western blot 结果显示 NPs 通过调控 RAGE 通路影响疾病的进展。③ 在 dAMD 动物模型中, 治疗组小鼠的 RPE 层结构得到更好维持, 视网膜电图反应振幅也高于模型对照组。免疫组化和 Western blot 结果表明, NPs 能够抑制氧化应激和炎症反应, 进一步改善 RPEs 的功能。

结论: 本研究构建的钕基大黄酸纳米药物能够有效缓解氧化应激损伤, 保护视网膜结构与功能, 为干性 AMD 的治疗提供了一种具有潜力的新型纳米药物。

摘要编号: 208803

靶向 RARRES1 抑制脉络膜新生血管的形成: 基于蛋白质组学发现的功能验证与机制探索

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目的: 湿性年龄相关性黄斑变性 (wAMD) 是老年人群中最常见的致盲性眼病, 其核心病理特征是脉络膜新生血管 (CNV) 形成。当前抗 VEGF 治疗仍存在应答不佳和耐药性问题。前期蛋白质组学分析发现, RARRES1 在 wAMD 患者房水中表达显著下调, 且与细胞增殖负调控密切相关。因此, 本研究旨在阐明 RARRES1 在 wAMD 发病机制中的表达规律、功能作用及分子机制, 为探索新的治疗靶点提供理论依据。

方法: 本研究采用多层次整合研究策略, 首先通过蛋白质组学方法分析 wAMD 房水样本, 利用 TMT 标记联合 LC-MS/MS 技术筛选差异表达蛋白, 并富集分析增殖相关通路, 鉴定了关键靶点 RARRES1。然后在 CNV 小鼠模型中, 通过玻璃体腔注射 AAV2 病毒过表达 RARRES1, 并采用 HE 染色、IB4 荧光染色和 FFA 评估 CNV 病灶大小及血管渗漏情况。并以人脐静脉内皮细胞 (HUVECs) 为模型, 通过 siRNA 敲低和 pcDNA3.1 过表达 RARRES1, 采用 CCK-8、Transwell 和 Matrigel 实验分析细胞增殖、迁移及成管能力, 并检测 VEGFA/VEGFR2 表达及 ERK 通路活化。最后, 在过氧化氢诱导的 ARPE-19 细胞氧化应激模型中, 通过流式细胞术、ROS 检测和 qPCR/Western blot, 评估 RARRES1 对细胞活力、凋亡、炎症因子及紧密连接的影响, 并探讨 JNK、SIRT1 和 Nrf2 信号通路的作用。

结果: 蛋白质组学发现, wAMD 患者房水中 RARRES1 表达显著下调, 且在“负调控细胞增殖”相关蛋白中下调最为明显。在动物实验中, CNV 模型小鼠视网膜/脉络膜组织中 RARRES1 表达降低, 而过表达 RARRES1 可有效抑制 CNV 病灶生长和血管渗漏。细胞实验进一步表明, RARRES1 过表达能抑制血管内皮细胞的增殖、迁移和成管能力, 其机制与下调 VEGFA/VEGFR2 表达及抑制 ERK 磷酸化有关。此外, 在氧化应激模型中, RARRES1 过表达可增强 RPE 活力, 抑制细胞凋亡和 ROS 产生, 并通过调控 JNK/SIRT1/Nrf2 信号通路发挥抗氧化和抗炎作用。这些结果共同表明 RARRES1 通过多重机制抑制 CNV 形成并保护视网膜细胞。

结论: 本研究首次通过临床、体内外实验系统证实了 RARRES1 在 wAMD 中的保护作用。RARRES1 表达下调通过促进血管生成和加剧氧化应激参与

CNV 形成，而其过表达则能、抑制 CNV 发展和 RPE 细胞损伤。机制上，RARRES1 通过调控 ERK 通路抑制血管内皮功能，并通过 JNK/SIRT1/Nrf2 轴缓解氧化应激。这些发现为开发靶向 RARRES1 的 wAMD 治疗新策略提供了重要理论基础。

摘要编号：203274

高原红细胞增多症相关双眼视网膜中央动脉阻塞合并视网膜中央静脉阻塞 1 例

第一作者：Kuan LI

共同作者：Wei LI, Junchen ZHANG

目的：报告一例罕见的高原红细胞增多症（HAPC）相关的双眼视网膜中央动脉阻塞（CRAO）合并中央静脉阻塞（CRVO），并探讨其发病机制与治疗策略。

方法：41 岁男性，长期居住于青海省德令哈市（海拔约 2890 米）。主诉双眼视物模糊 3 年，伴眼红。2 年前外院诊断为“双眼黄斑水肿、双眼 CRVO”，行双眼玻璃体腔注射雷珠单抗 3 次及视网膜激光治疗，视力稍好转。2 年前诊断为“红细胞增多症”。高血压史 3 年。入院查体：BMI 34.1 kg/m²，SpO₂ 88%。面色深灰、口唇及肢端紫绀。眼科检查：BCVA 右眼手动/20 cm，左眼光感；双眼瞳孔对光反射迟钝，球结膜充血，血管迂曲扩张；眼底见视盘水肿、黄斑水肿、静脉高度迂曲扩张、动脉呈银丝状、动静脉交叉压迫征及陈旧激光斑。OCTA 示双眼黄斑水肿。FFA 诊断：双眼 CRAO 合并 CRVO、高血压性视网膜病变、视网膜激光术后。颅脑 MRI/MRA 示垂体 Rathke 囊肿及血管变异。实验室检查：红细胞显著升高（ 8.63×10^{12} / L），红细胞压积 76.9%，血红蛋白 230 g/L；血小板降低（ 57×10^9 / L）；同型半胱氨酸升高（45.64 μmol/L）；凝血功能异常。

结果：诊断：1. 双眼黄斑水肿；2. 双眼 CRAO 合并 CRVO；3. 高原红细胞增多症；4. 高同型半胱氨酸血症。治疗上给予双眼抗 VEGF 药物注射、全身糖皮质激素（静滴地塞米松后改为口服泼尼松并逐渐减量）、持续低流量吸氧、放血治疗，以及口服叶酸片治疗。出院时患者 SpO₂ 升至 92%，紫绀消退，BCVA 双眼手动/20 cm，黄斑水肿消退。转至血液科进一步治疗。

结论：本例因长期高海拔居住致慢性缺氧，引发 HAPC，伴随高同型半胱氨酸血症，共同导致高凝状态，最终造成罕见的双眼 CRAO 合并 CRVO 及严重视力损伤。提示血液科医师接诊 HAPC 患者时，需警惕其可能导致的严重眼部并发症，并应及时进行多学科联合干预。

眼底外科

摘要编号：203356

HA-engineered hydrogel 治疗孔源性视网膜脱离的临床研究

第一作者：Boshi LIU

共同作者：Xiaorong LI

目的：评估 HA-engineered hydrogel 覆盖封闭视网膜裂孔联合微创玻璃体切除术和无菌空气填塞辅助治疗原发性孔源性视网膜脱离安全性和有效性。

方法：这是一项前瞻性研究。该研究纳入了 2020 至 2023 年间 天津医科大学附属眼科医院等 9 所眼科研究中心 326 例原发性孔源性视网膜脱离患者。我们将受试者随机分为试验组和对照组，试验组使用 HA-engineered hydrogel 覆盖封闭视网膜裂孔，结合微创玻璃体切除术和无菌空气填塞，术后期间无体位限制。对照组使用微创玻璃体切除术和全氟丙烷（C3F8）填塞，术后期间要求俯卧位。患者术后随访 6 个月。评估受试者最初和最终视网膜复位成功率、术后最佳矫正远视力及术中术后并发症。

结果：在 24 周时，实验组视网膜复位率为 91.8%，对照组为 91.4%（ $P = 0.903$ ），各随访时间点均无统计学显著差异。此外，两组在最佳矫正视力（BCVA）、眼压（IOP）、视网膜神经纤维层（RNFL）厚度及术后并发症方面亦无显著差异。

结论：HA-engineered hydrogel 封堵视网膜裂孔联合无菌空气填塞可有效、安全的治疗原发性孔源性视网膜脱离，且无需特殊体位限制及严重术后并发症。

摘要编号：209195

“膜”术新篇——富血小板纤维蛋白膜填塞术治疗高度近视黄斑裂孔性视网膜脱离的初探

第一作者：Guojing LU

共同作者：Lei DU, Rong HUANG, Xuan XIAO

目的：高度近视黄斑裂孔性视网膜脱离（MHRD）因眼底结构特殊、病理复杂，现有治疗疗效有限。富血小板纤维蛋白（PRF）膜作为自体生物材料，制备简便（5 ml 静脉血离心 10 分钟即可获得），具有良好的组织修复与生物降解性。本团队前期已证实具有良好三维纤维结构与丰富生长因子的 PRF 在其他眼病中的修复潜力。本研究首次将 PRF 填塞术拓展应用于高度近视 MHRD 的治疗，旨在评估其临床有效性与安全性。

方法：本研究采用随机对照设计，纳入 2021 年 9 月至 2023 年 4 月于武汉大学人民医院眼科中心确诊为高度近视 MHRD 的 52 例（52 眼）患者。随机分为三组：内界膜（ILM）剥除组（18 例）、ILM 填塞组（16 例）、PRF 填塞组（18 例），分别接受 ILM 剥除术、ILM 翻转填塞术、PRF 膜填塞术，所有病例均联合眼内硅油填充。主要结局为术后 6 月黄斑裂孔闭合率，次要结局包括视网膜复位率、黄斑区结构与血流变化及并发症。

结果：解剖学结果显示：术后 6 个月 PRF 填塞组黄斑裂孔闭合率（94.4%）高于 ILM 剥除组（83.3%）和 ILM 填塞组（87.5%），但组间无统计学差异（ $P = 0.670$ ）；在黄斑中心凹视网膜厚度（CMT）方面，PRF 填塞组 CMT 显著高于其他两组（ $P < 0.001$ ），所有组 CMT 较术前显著下降（ $P < 0.001$ ）；在视网膜血流密度方面，术后浅层及深层视网膜血流密度均显著改善（ $P < 0.001$ ），但组间比较无显著差异（ $P = 0.838$ ）。视功能结果显示：术后 6 个月三组患者最佳矫正视力（BCVA）均较术前提升，其中 PRF 组 BCVA 改善幅度最大，但组间差异无统计学意义（ $P = 0.066$ ）。安全性分析显示：所有组未出现眼内炎或玻璃体积血等严重并发症，PRF 组未见与材料相关的过度炎症反应或新生血管等异常情况。

结论：PRF 填塞术可有效促进高度近视 MHRD 的黄斑裂孔愈合、改善视网膜血流与视功能，具有良好的手术安全性。PRF 材料获取便捷，术中操作易于掌握，为高度近视 MHRD 的治疗谱写了值得关注的“膜”术新篇。

摘要编号：207685

从黄斑大裂孔闭合微结构谈术式选择

第一作者：Ying WANG

目的：比较大直径黄斑裂孔（MH）经平衡盐溶液（BSS）视网膜下注射治疗与内界膜反转覆盖后黄斑区微结构的恢复情况。

方法：本研究为病例对照研究，纳入全层 MH 患者 51 例（51 只眼），所有患者接受玻璃体手术治疗。其中 31 例接受 BSS 视网膜下注射，20 例接受内界膜（ILM）翻瓣治疗。术后 1 周和 1 个月随访，通过光学相干断层扫描（OCT）评估黄斑区微结构恢复情况，同时通过最佳矫正视力（BCVA）评估视功能情况。对比两组术后早期 BCVA 恢复情况、MH 愈合类型、黄斑中心凹厚度（CMT）、黄斑区外界膜（ELM）和椭圆体带（EZ）的完整性。

结果：术后 1 个月，视网膜下注射组 MH 闭合率 96.8%（30/31），其中 U 型闭合 93.6%（29/31），V 型闭合 3.2%（1/31）；ILM 翻瓣组闭合率 95%

（19/20），U 型闭合 75%（15/20），V 型闭合 20%（4/20）。在 MH 闭合的患者中，视网膜下注射组 ELM 完整 66.7%（20/30），EZ 完整 33.3%（10/30）；ILM 翻瓣组 ELM 完整 57.9%（11/19），EZ 完整 21.1%（4/19）。视网膜下注射组 CMT 显著高于 ILM 翻瓣组（ $P = 0.001$ ）。两组术前和术后 BCVA（LogMAR）无显著差异（ $P > 0.05$ ），但术后 1 个月 ELM 完整者 BCVA（ 0.45 ± 0.34 ）优于 ELM 不完整者（ 0.76 ± 0.32 ， $P = 0.003$ ），EZ 完整者 BCVA（ 0.39 ± 0.34 ）优于不完整者（ 0.66 ± 0.34 ， $P = 0.003$ ）。

结论：MH 术后，黄斑区外层结构得到恢复的患者视力表现更佳。本研究初步表明，视网膜下注射组相较于 ILM 翻瓣组，在术后早期黄斑区微结构的恢复速度更快，这有望成为大直径 MH 手术的新策略。然而，仍需开展更长期且更大样本量的研究以进一步验证这一结论。

摘要编号：209532

免巩膜瓣缝线悬吊术治疗高度近视人工晶体脱位的临床疗效观察

第一作者：Zhongping CHEN

共同作者：Hengwei LIU

目的：高度近视患者因眼轴延长、巩膜变薄及悬韧带脆弱，人工晶体（IOL）脱位风险显著高于普通人群。传统 IOL 复位术需制作巩膜瓣及结膜切开，存在手术创伤大、术后散光及缝线暴露风险。本研究旨在探讨一种免结膜瓣及巩膜瓣的微创缝线悬吊术治疗高度近视 IOL 脱位的临床效果、安全性及应用价值。

方法：纳入 10 例（10 眼）高度近视（眼轴 > 26.5 mm）合并 IOL 脱位患者。采用改良微创术式：免结膜瓣操作：避免结膜切开，保留结膜完整性；三通道稳定眼压：标准睫状体平坦部三通道切口维持术中眼压稳定；针头引导攀固定：以 30 G 针头穿刺引导脱位 IOL 攀定位，避免广泛巩膜剥离；缝线悬吊加固：采用 8-0 聚丙烯不可吸收缝线直接固定 IOL 攀于巩膜壁。术后随访评估视力、IOL 位稳定性及并发症。

结果：视力改善：术后最佳矫正视力（BCVA）较术前显著提升；IOL 稳定性：所有患眼 IOL 位正，无二次脱位（随访 ≥ 6 个月）；并发症控制：无术中脉络膜出血、视网膜脱离等严重并发症；与传统巩膜瓣术式相比，显著降低缝线暴露风险；避免结膜损伤，减少术后异物感、干眼及炎症反应。

结论：本研究提出的免巩膜瓣 IOL 缝线悬吊术具有显著优势：微创性：规避结膜切开及巩膜瓣制作，减少组织损伤，符合现代微创手术趋势；安全性高：

针头引导精准定位降低医源性视网膜损伤风险，尤其适用于巩膜变薄的高度近视眼；恢复迅速：术后炎症轻、疼痛少，视力恢复周期缩短；长期稳定性佳：聚丙烯缝线生物相容性良好，远期脱位率低，该术式是治疗高度近视 IOL 脱位的有效策略，尤其适用于于巩膜条件差的高危患者，具有较高临床推广价值。

摘要编号：210236

姜黄素—雷帕霉素复合型纳米药物在干性 AMD 大鼠模型中的应用

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目的：探究姜黄素—雷帕霉素复合型纳米药物在干性 AMD 大鼠模型中的治疗效果。

方法：选取 6~8 周龄 SPF 级大鼠 24 只，随机分为健康组 (Control)、NaIO₃ 诱导的阳性对照组 (Defect)、游离姜黄素和雷帕霉素治疗组 (Free C&R)、姜黄素纳米粒子组 (CUR NPs)、负载姜黄素和雷帕霉素的纳米颗粒组 (C&R NPs)，除健康组大鼠不做处理，其余各组进行碘酸钠干性 AMD 大鼠造模。分别以治疗后的 1、2、3 及 4 周为观测时间点，通过 OCT 检测各时间点各实验组的视网膜厚度的变化以及在观测后对各组大鼠眼球视网膜组织进行镜下组织病理分析，以此评价该药物对干性 AMD 的治疗效果。

结果：1. 治疗前，除 Control 组，其余各组 RPE 层萎缩消失，视网膜厚度明显变薄。通过对各观测时间点的视网膜厚度进行量化分析，可发现除 C&R NPs 组外，其余两组损伤恢复较慢，层次模糊，C&R NPs 组可以明显看到每周网膜厚度的增加，而其他各组未有这种效果。在治疗结束后对视网膜厚度进行测量发现 Control 组与 C&R NPs 组没有统计学差异，说明视网膜厚度恢复，而与其余各组均有明显统计学差异，说明其余各组视网膜厚度一直存在萎缩未恢复。2. 视网膜组织病理分析：Control 组各层次结构清晰，各层次间结构分明，细胞结构完整且排列整齐，Defect 组各层次结构线模糊，尤其内外核层结构紊乱，细胞的排列结构错乱，外核层明显细胞减少，而 RPE 层结构不清，部分萎缩不见，CUR NPs 组可见 RPE 层的细胞结构比 Defect 组损伤较轻。除 Control 组外，C&R NPs 组可明显比其他各组具有更清晰的层次结构，内外核层的细胞排列整齐，RPE 层层次分明。

结论：负载姜黄素和雷帕霉素的纳米载体对于干性 AMD 大鼠视网膜结构损伤具有一定治疗作用，可显著减轻 RPE 层的萎缩并维持视网膜的形态结构完整性。

摘要编号：209279

影响超声睫状体成型术 UCP 成功的危险因素分析

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共同作者：Ying HONG, Qianqian JI

目的：研究影响超声睫状体成型术 UCP 治疗成功的危险因素。

方法：纳入 2024 年 2 月至 2025 年 5 月在北京大学第三医院眼科就诊的各类型青光眼患者，记录患者的性别，年龄，诊断，原发病，视力，眼压，抗青光眼药物，眼轴等情况。根据患者的生物学测量指标，选择不同的探头型号，进行超声睫状体成型治疗。术后给予激素类眼药水点眼抗炎。记录患者术后 3 个月时的视力，眼压及用药情况。采用眼压下降大于术前的 20% 或者眼压在 5-21 mmHg 之间作为手术成功的标准，记录手术成功率。

结果：66 例患者纳入本研究。其中男性 41 例 (62.1%)，女性 25 例 (37.9%)。年龄 58.9 ± 20.2 (6-95) 岁。诊断包括原发性开角型青光眼 15 例，原发性闭角型青光眼 7 例，继发性青光眼 18 例，先天性青光眼 2 例，新生血管性青光眼 24 例。术前视力 LogMR 2.0 ± 1.0 (0.1-3.0)。术前眼压 36.7 ± 11.0 (16-60) mmHg。术前使用抗青光眼药物 3.0 ± 0.9 种 (0 种 1 例，1 种 3 例，2 种 12 例，3 种 28 例，4 种 22 例)。眼轴 24.3 ± 2.7 mm (19.5-24.6)。角膜清亮 46 例，水肿 20 例。角膜直径 11.5 ± 0.6 mm (10.0-13.2)。选择探头 11-13 号 (其中 11 号探头 6 例，12 号探头 35 例，13 号探头 25 例)。8 扇区 5 例，9 扇区治疗 1 例，10 扇区治疗 60 例。20 例成功，手术成功率 83.3%。手术后未见光感丧失，脉络膜出血，角膜内皮失代偿等重大并发症。术后 3 个月患者视力 LogMR 2.0 ± 1.0 (0.3-3.0)。术后视力提高 19 例，下降 18 例，持平 29 例。眼压 17.5 ± 9.0 (5-44) mmHg。使用抗青光眼药物 2.2 ± 1.2 种 (0 种 8 例，1 种 11 例，2 种 24 例，3 种 26 例，4 种 7 例)。将患者年龄，术前视力，眼压，眼轴及是否为新生血管性青光眼带入回归方程。二元 Logist 回归显示，手术失败的独立危险因素是术前眼压 (1.113，可信区间 (1.003, 1.236) $P = 0.044$) 和年龄 0.903 (0.832, 0.981)， $P = 0.016$)。8 例失败患者中，4 例为新生血管性青光眼，1 例为开角型青光眼，3 例为继发性青光眼。2 例患者接受第二次 UCP 后，眼压得到控制。

结论：影响超声睫状体成型术 UCP 治疗成功的危险因素为术前眼压较高和患者年龄较小。

摘要编号: 209552

折叠顶压球囊联合眼内注气术在孔源性视网膜脱离伴高隆起视网膜中的应用: 一种改良外路手术策略

第一作者: Zhongping CHEN

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目的: 探讨对于孔源性视网膜脱离 (RRD) 伴有视网膜高隆起患者, 采用折叠顶压球囊植入术结合眼内注气技术的疗效。传统外路手术中, 高隆起的视网膜使裂孔定位及巩膜顶压困难, 易导致手术失败。本研究旨在评估一种改良术式折叠顶压球囊植入联合眼内注气, 无需行玻璃体切割, 在实现视网膜解剖复位和功能恢复方面的价值。

方法: 回顾性分析 2025 年 1 月至 2025 年 10 月收治的 4 例 (4 眼) 孔源性 RRD 伴视网膜高隆起 (最高隆起度 ≥ 6 PD) 患者。所有患者均行折叠顶压球囊植入联合眼内注气: 首先, 根据眼底镜及广角眼底成像系统确定的视网膜裂孔位置, 于视网膜最高点行外路放视网膜下液 (SRF), 于裂孔相应巩膜壁外植入可折叠式顶压球囊。随后行玻璃体腔穿刺, 注入过滤空气形成眼内顶压。术后观察视网膜复位率、最佳矫正视力 (BCVA)、眼压及并发症。

结果: 4 例患者手术均顺利完成。术后 1 个月, 视网膜解剖复位率为 100%。平均 BCVA (LogMAR) 由术前的 1.98 ± 0.41 提升至术后 1 个月的 0.89 ± 0.36 , 差异具有统计学意义 ($P < 0.01$)。眼压均在正常范围内。球囊位置稳定, 未发生移位、感染或穿破等并发症。与传统硅胶填压术相比, 此术式避免了因高隆起视网膜导致的术中裂孔定位偏差和顶压不确切的问题, 术后患者舒适度高, 恢复快。

结论: 对于伴有视网膜高隆起的孔源性视网膜脱离, 采用折叠顶压球囊联合眼内注气的外路手术方案, 不进行玻璃体切割, 是一种安全有效的治疗策略。该术式成功的关键在于: (1) 球囊提供了精确、可调的外部顶压; (2) 眼内气体提供了由内而外的顶压力, 共同促进了裂孔的闭合与脉络膜-视网膜粘附。此改良外路术式避免了玻璃体切割相关的创伤和并发症 (如加速白内障、眼内炎症等), 保留了天然的晶状体与玻璃体结构, 实现了微创化治疗, 患者术后恢复快, 是对于条件适合的复杂外路病例的理想选择。

摘要编号: 202858

探讨无晶状体囊膜支撑, 人工晶体巩膜外固定术后发生视网膜脱离, 进行玻璃体切割手术的方法改进和临床观察。

第一作者: Liangbao AN

目的: 探讨无晶状体囊膜支撑, 人工晶体 (IOL) 巩膜外固定术后发生视网膜脱离, 进行玻璃体切割手术的方法改进和临床观察。

方法: 1) 对象: 收集 2018.1 — 2025.12 期间因无晶状体囊膜支撑行人工晶体巩膜球壁外固定手术, 术后发生孔源性视网膜脱离患者资料 9 人; 白内障术中破囊行 IOL 悬吊 3 人, 晶状体脱位行 IOL 悬吊 4 人, IOL 囊袋复合体脱位行 IOL 悬吊 2 人; 悬吊人工晶体巩膜外固定类型: 巩膜球壁缝线固定 8 人, 无缝线巩膜球壁固定 1 人; 发生视网膜脱离距 IOL 悬吊术后小于 1 月发生视网膜脱离 3 人, 大于 1 月发生视网膜脱离 6 人; 术前发现裂孔 3 人, 未发现裂孔 6 人; 视网膜脱离累计黄斑 7 人; 以及术前视力、眼压, 9 例患者发生视网膜脱离后视力均较悬吊 IOL 术后下降。2) 手术方法: 采用玻璃体切割联合注气术, 所有视网膜脱离患者均保留巩膜外固定 IOL, 手术方法改进在于玻璃体切割手术开始前, 做角膜侧切口, 侧切口伸入黏弹剂针头, 在前房注入并充满黏弹剂, 前房形成相对密闭空间; 悬吊 IOL 上方为充满前房的黏弹剂, 下方为术中灌注液; 玻璃体切割手术中, 灌注液对前房及角膜内皮无骚扰, 术中气液交换时无气泡进入前房干扰手术和对后节的观察, 顺利完成玻璃体切割、气液交换和裂孔的激光封闭; 顶压周边网膜亦无悬吊固定 IOL 偏位; 术毕前房内黏弹剂保留, 无需冲洗; 术毕视网膜复位良好, 玻璃体腔气体填充。3) 术后观察视力、眼压、IOL 位置、眼底视网膜脱离复位情况。

结果: 术后视力均较术前提提高。术后有 3 例患者眼压高, 均小于 35 mmHg, 用单一降眼压眼药水, 术后 1 周眼压均恢复正常; 巩膜外固定的 IOL 位置稳定, 未因手术操作和气体填充顶压而发生偏位; 视网膜裂孔闭合, 脱离的视网膜复位良好; 9 例患者均 1 次手术成功复位网膜。

结论: IOL 悬吊巩膜外固定术后发生视网膜脱离, 进行玻璃体切割手术时可保留巩膜外固定的 IOL, 采用黏弹剂填充前房的方法, 利于术中观察眼底和具体手术操作, 术后无高血压等并发症风险增加, 视网膜裂孔闭合, 脱离视网膜复位良好。

摘要编号: 208445

智能头位监测仪引导下改良式充气性视网膜固定术的临床疗效及安全性分析

第一作者: Enhui LI

目的: 评估配备头位固定角度设定、实时偏移提醒及记录功能的智能头位监测仪在改良式充气性视网膜固定术 (pneumatic retinopexy, PR) 中的应用价值, 明确其对孔源性视网膜脱离患者的有效性、安全性及体位管理优化作用。

方法: 前瞻性纳入 2024 年 11 月 1 日至 2024 年 12 月 31 日收治的 15 例孔源性视网膜脱离患者, 随机分配至 14% 全氟丙烷 (C3F8) 组与空气组。术中行前房穿刺放液后注入 0.7 ml 气体, 术后通过智能头位监测仪实时监测头位偏移 (各方向 $\leq 10^\circ$), 联合手机 APP 动态提醒患者, 在维持规定体位 6-12 小时后行激光封闭裂孔。记录指标包括: 单次注气解剖复位率、总复位率、头位依从性 (住院期间头位偏移 $\leq 10^\circ$ 的时间占比)、最佳矫正视力 (BCVA, ETDRS 字母数)、并发症、住院时间及术后激光次数。

结果: 单次注气视网膜解剖复位率为 93.3% (14/15), 一例失败病例为玻璃体腔空气顶压时间不够, 裂孔未闭, 二次注气后成功, 末次随访 (≥ 3 个月) 总复位率 100% (15/15)。患者头位依从性为 $73\% \pm 5.6\%$ 。末次随访患者平均 BCVA 由术前的 29.5 ± 32 字母显著提高至 47 ± 20 字母 ($P < 0.01$)。术后发生一例视网膜新发干性裂孔, 予以激光封闭。中位住院时间 4 天 (范围: 3-6 天), 术后平均激光治疗 3 次 (范围: 2-4 次)。

结论: 智能头位监测仪通过精准体位管理显著提升 PR 手术成功率 (短期复位率 100%), 且并发症可控、操作便捷。其整合实时监测与交互提醒功能, 为孔源性视网膜脱离的微创治疗提供了高效解决方案, 并具备拓展至玻璃体术后管理的潜力, 或可减少硅油依赖。未来需扩大样本量及延长随访以验证长期疗效。

摘要编号: 209291

机器人辅助视网膜下注射 t-PA 治疗黄斑区视网膜下出血的安全性和有效性

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目的: 探讨机器人辅助视网膜下注射 t-PA 治疗黄斑区视网膜下出血的安全性和有效性。

方法: 前瞻性多中心单组目标值的试验设计。根据纳排标准, 纳入研究病例 23 例 23 眼, 所有的患者均伴有黄斑区视网膜下出血, 予以 OCT 检查, 标

定拟术中视网膜注射部位。于全麻下行 25 G 玻璃体手术, 在 TA 辅助下行人工 PVD, 安装 41 G 注射装置, 术者通过遥控器按键操纵注射装置的方向角度以及进程, 下方 6 点睫状体平坦部插入吊顶灯, 观察注射针头距离视网膜的距离, 调整进入速率, 降低玻璃体切割机的灌注压, 采用玻璃体切割机硅油注入系统推动注射针, 于视网膜下注射 t-PA 8 微克~25 微克, 当视网膜隆起, 视网膜下出血颜色变淡即注射成功, 做气液交换, 平卧 30 分钟后回病房。观察指标: 1. 视网膜穿刺注射成功率; 2. 与器械相关的并发症包括视网膜裂孔, 穿刺孔撕裂, 视网膜出血, 脉络膜上腔出血等; 3. 术后采用 OCT 观察穿刺部位视网膜; 4. 术后视力变化。

结果: 纳入研究的 23 例中男 15 例 15 眼, 女 8 例 8 眼。年龄 52 岁~82 岁, 平均 68 岁。其中湿性 AMD 4 例, 视网膜大动脉瘤 3 例, PCV 16 例。整个手术过程中, 机器人操纵顺畅, 视网膜穿刺注射成功 100%; 术中未发生与器械相关的并发症、无视网膜裂孔、穿刺孔撕裂、视网膜出血及脉络膜上腔出血等并发症发生。术后 1 周随访, 20 例患者视网膜下出血明显消退, 有 3 例发生玻璃体出血, 2 例经过玻璃体腔盥洗后视力显著提升。术后 30 天随访, 视力较术前提升 15 例, 无变化 4 例, 视力较术前下降 4 例。术后 30 天 OCT 图像成像清晰的有 21 例, OCT 扫描穿刺部位, 未见穿刺口异常反射信号。

结论: 机器人辅助视网膜下注射 t-PA 治疗黄斑区视网膜下出血安全有效, 操作精准, 可以防止手术者因手颤而导致注射针头的移位。

摘要编号: 210240

法瑞西单抗在难治性糖尿病黄斑水肿患者中的真实世界研究

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目的: 本项回顾性病例系列研究旨在评估法瑞西单抗在难治性糖尿病黄斑水肿患者中的真实世界治疗效果。

方法: 这项回顾性研究分析了法瑞西单抗治疗难治性糖尿病黄斑水肿 (DME) 的效果。所有患者均按照按需治疗方案接受法瑞西单抗注射治疗。记录最佳矫正视力和黄斑中心凹平均厚度 (CST)。对光学相干断层扫描 (OCT) 下的视网膜内液 (IRF) 和视网膜下液 (SRF) 进行描述和分析。

结果: 18 名难治性 DME 患者的 27 只患眼符合标准并纳入研究, 其中 21 只眼 (77.8%) 为增殖性糖尿病视网膜病变, 6 例 (22.2%) 为非增殖性糖尿病视网膜病变。根据 OCT 形态特征, 患眼分为 13

例 (48.1%) 囊样黄斑水肿, 6 例 (22.2%) 浆液性神经上皮层脱离, 8 例 (29.6%) 弥漫性黄斑水肿。入组前, 患眼平均接受了 8.8 ± 2.1 次抗血管内皮生长因子 (抗 VEGF) 注射, 包括平均 4.8 ± 4.7 针阿柏西普、 2.9 ± 2.9 针雷珠单抗、 1.1 ± 0.6 针康柏西普。其中 8 只眼 (29.6%) 平均接受了 4.4 ± 1.0 次地塞米松玻璃体内缓释植入剂治疗。转换为法瑞西单抗治疗后, 患眼平均接受了 2.4 ± 0.5 次注射, 玻璃体内注射法瑞西单抗后的平均随访时长为 16.2 ± 2.7 周。在注射一针法瑞西单抗后, 最佳矫正视力从 49.5 ± 2.9 个字母提高到 52.5 ± 3.1 个字母; CST 从 487.1 ± 21.8 微米显著降低至 430.7 ± 22.4 微米 ($P = 0.004$)。注射两针的患眼, 最佳矫正视力从 48.5 ± 3.6 个字母显著提高至 56.2 ± 4.3 个字母 ($P = 0.002$); CST 从 503.4 ± 30.3 微米显著降低至 400.2 ± 30.6 微米 ($P < 0.0001$)。在最后一次就诊时, 最佳矫正视力从 49.5 ± 2.9 个字母显著提高至 55.9 ± 3.3 个字母 ($P = 0.005$); CST 从 487.1 ± 21.8 微米显著降低至 391.3 ± 23.6 微米 ($P < 0.0001$)。有无新生血管形成和不同 OCT 分型与最佳矫正视力或 CST 的变化无显著相关性。基线时存在 SRF 和 IRF 的患者比例为 24% 和 100%, 在注射一针法瑞西单抗后, SRF 和 IRF 分别下降至 12.0% 和 92.0%。注射两针的患眼, SRF 和 IRF 分别下降至 0% 和 77.6%。完全无积液的患眼比例从基线时的 0% 在注射一针后两针后分别上升至 4.0% 和 21.4%。在随访期间未观察到明显的全身和眼部不良事件。

结论: 研究表明, 法瑞西单抗可在显著提高难治性 DME 患者的视力, 降低 CST, 提升积液消除率, 且安全性良好。

摘要编号: 209535

眼科手术机器人辅助视网膜下注射 rtPA 治疗视网膜下出血的临床观察

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目的: 评估眼科手术机器人系统辅助下实施视网膜下注射重组组织型纤溶酶原激活剂 (rtPA) 治疗视网膜下出血 (SRH) 的临床可行性、安全性及有效性, 重点分析机器人在提升手术精度、稳定性及预后效果方面的核心优势。

方法: 本研究为前瞻性临床观察, 纳入 4 例因息肉样脉络膜血管病变 (PCV) 导致黄斑区或旁中心凹 SRH 患者。所有患者均采用眼科手术辅助系统实施玻璃体切除术后机器人辅助视网膜下注射 rtPA。机器人系统操作流程包括: 术前 OCT、术中实时眼动追踪与器械导航、震颤过滤及亚微米级运动控制。

主要观察指标: 机器人系统定位精度 (μm)、手术操作时间 (min)、术中并发症 (医源性视网膜裂孔、出血等) 发生率、rtPA 注射靶点准确性 (OCT 验证)。次要指标: 术后 SRH 清除率 (时间与范围)、最佳矫正视力 (BCVA, LogMAR) 变化、视网膜解剖结构恢复情况 (OCT)、术后并发症及随访期稳定性。对比历史对照组或手术不同阶段人工操作数据, 进行统计分析。

结果: 精准性显著提升: 机器人辅助下器械尖端定位显著优于人工操作。操作稳定性卓越: 机器人系统彻底消除生理性震颤, 大幅降低医源性视网膜损伤风险。本研究未发生机器人操作相关的视网膜撕裂或显著出血。安全性优化: 术后早期眼压波动轻微, 无感染性眼内炎发生。临床疗效改善: 末次随访 BCVA 平均提升, 视力获益程度与出血清除速度及黄斑结构恢复 (OCT 显示椭圆体带连续性改善) 显著正相关。

结论: 眼科手术机器人系统辅助视网膜下注射 rtPA 治疗 SRH, 展现了革命性的技术优势: 其亚微米级的超精密定位能力、绝对稳定的无震颤操作以及智能化的运动缩放与导航, 显著提升了手术的安全边界与操作精度, 有效降低了视网膜医源性损伤风险。本研究结合最新国际证据, 强有力地证实了机器人辅助眼科手术在治疗 SRH 等需极致精细操作的眼底疾病中具有明确的临床价值和广阔的应用前景, 代表着微创玻璃体视网膜手术向更高精度、更高安全性发展的范式转变。

摘要编号: 209902

硬核全脱位白内障的手术处理技巧

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目的: 硬核脱位白内障的手术处理极具挑战性, 传统超声粉碎技术存在效率低、热损伤风险高、核块易坠落等问题。本研究提出一种创新的双手联合技术 (一手玻璃体切割头或眼内镊, 另一手超声乳化), 并系统分析其相较于传统超声粉碎技术的优势。

方法: 回顾性分析 2024 年 1 月—2024 年 12 月收治的 15 例硬核全脱位白内障患者 (20 眼), 其中 6 例采用传统玻璃体腔晶状体超声粉碎技术 (对照组), 14 例采用双手联合超声乳化技术 (实验组)。对比以下方面: 1. 手术效率: 双手联合技术通过玻璃体切割头实时稳定晶状体位置, 同时超声乳化头高效粉碎硬核, 避免反复切换器械, 缩短手术时间。2. 安全性: 超声乳化能量可控性更强, 减少热损伤及悬韧带二次损伤风险; 玻璃体切割头同步清除玻璃体牵拉, 显著降低核块坠落率, 也能避免负压吸引玻璃体纤维进而牵拉视网膜出现并发症的概率;

眼内镊抓取晶状体至前部玻璃体行超声乳化，可以减少超声能量对角膜内皮的损伤 3. 操作优势：传统超声粉碎技术需扩大巩膜切口，并且联合使用高黏度粘弹剂或全氟化碳液体进行操作，此项技术可使用透明角膜小切口完成白内障摘除，并利用同一切口植入人工晶状体，无需扩大巩膜穿刺口，也避免了扩大角膜切口进行娩核操作；双器械协同实现“动态固定”，尤其适用于悬韧带完全断裂的病例；可灵活调整超声乳化参数，针对不同硬度核块进行分层处理。

结果：实验组手术时间显著短于对照组 (35.7 ± 5.2 min vs 50.6 ± 8.3 min, $p < 0.05$)。术后 1 周内，实验组 2 人 (14.3%)，对照组 1 人 (16.7%)，出现眼压升高，经前房穿刺放液及局部降眼压药物控制良好，均未出现严重手术并发症。术后 1 个月，实验组 BCVA ≥ 0.5 者占 78.6% (11/14)，对照组 66.7% (4/6)，两组之间无统计学差异。

结论：相比传统超声粉碎技术，双手联合技术（玻璃体切割 / 眼内镊使用 + 超声乳化）在硬核全脱位白内障手术中具有显著优势，本为复杂白内障手术提供了创新性解决方案，特别适用于悬韧带功能不良的硬核白内障病例。

摘要编号：208026

精准导航赋能难治性黄斑裂孔治疗：OCT 术中导航辅助内界膜平移与翻转遮盖术的疗效探究

第一作者：Sun HONGYAN

目的：观察联合 NGenuity3D 手术视频系统和 OCT 术中导航辅助内界膜平移与翻转遮盖术治疗难治性黄斑裂孔的疗效，为该类疾病的创新术式提供循证依据。

方法：回顾性分析 2024 年 4 月至 2025 年 2 月于深圳市人民医院眼科接受 PPV 治疗的难治性黄斑裂孔患者，15 例 15 只眼纳入研究。手术中均采用 3D 手术视频系统联合 OCT 导航对黄斑区进行扫描，行经睫状体平坦部标准三通道 25G 微创 PPV，8 只眼采用内界膜平移遮盖术，7 只眼行内界膜翻转遮盖术，均采用全氟丙烷 (C3F8) 填充。手术后平均随访时间 (6.5 ± 2.7 个月)。观察末次随访时 BCVA、黄斑区形态、裂孔闭合率及 mfERG 的变化情况。手术前后参数比较采用配对 t 检验。

结果：Genuity 3D 手术视频系统的高清模式可清晰显示黄斑区细微结构 (如内界膜边界、裂孔边缘)，其绿色电子滤镜可显著提升吲哚菁绿 (ICG) 染色图像的对比度；OCT 术中导航可实时获取黄斑区高分辨率横截面图像，为手术操作提供精准定位。平均手术时间为 (37.5 ± 12.9 min)，所有患者均未出现与 3D 手术视频系统相关的并发症 (如术

中视野干扰、术后视觉不适)。15 只眼均实现黄斑裂孔解剖学愈合 (闭合率 100%)；与术前比较，术后 BCVA 显著改善 ($P < 0.05$)，mfERG 一阶函数中 1 环、2 环 P1 波反应密度显著升高 (P 均 < 0.05)，提示黄斑区视网膜功能 (尤其是中心凹及旁中心凹区域) 得到有效恢复。术后 3 个月随访时，内界膜平移遮盖术组 BCVA 为 0.48 ± 0.18 ，内界膜翻转遮盖术组 BCVA 为 0.31 ± 0.15 ，两组术后视力均较术前显著改善 ($P < 0.05$)，且平移术组视力改善幅度显著优于翻转术组 ($P < 0.05$)。光学相干断层扫描血管成像 (OCTA) 检查监测黄斑区视网膜血管密度 (尤其是中心凹无血管区面积) 的变化。结果显示，术后 3 个月时，内界膜平移遮盖术组患者黄斑区中心凹无血管区面积从术前的 (0.42 ± 0.08 mm²) 缩小至 (0.31 ± 0.06 mm²)，内界膜翻转遮盖术组从术前的 (0.43 ± 0.07 mm²) 缩小至 (0.36 ± 0.05 mm²)，提示平移术式更有利于黄斑区微循环的恢复。

结论：NGenuity 3D 手术视频系统联合 OCT 术中导航可通过增强黄斑区 ICG 染色对比度、实时精准定位，为 PPV 治疗难治性黄斑裂孔提供可靠技术支持；其中内界膜平移遮盖术相较于传统翻转术式，更符合视网膜解剖生理特点，可显著提升巨大或陈旧性黄斑裂孔的闭合率，尤其为常规术式失败的病例提供了微创解剖复位的新治疗方案。

摘要编号：209238

羊膜移植在息肉状脉络膜血管病致出血性视网膜脱离手术中黄斑区色素上皮缺失的应用

第一作者：Yonghao LI

共同作者：Meng WANG

目的：本研究将羊膜移植应用于息肉状脉络膜血管病 (PCV) 的手术治疗中，观察使用羊膜移植对 PCV 致出血性视网膜脱离患者黄斑区色素上皮缺失的治疗效果，探讨羊膜移植对 PCV 患者黄斑区色素上皮缺失的修复的可能作用，以期为 PCV 患者的治疗提供新的方法及策略。

方法：患者初诊时表现为 PCV 致出血性视网膜脱离，在玻璃体切除术 (PPV) 中行周边视网膜 360° 切开并清除视网膜下黄斑区新生血管组织，将羊膜修剪成合适大小并移植于视网膜下间隙，保持其绒毛膜层面向视网膜色素上皮 (RPE) 层，在重水辅助下将视网膜复位并将羊膜位于黄斑区，应用视网膜激光光凝联合硅油填充。收集患者术前及术后 1 个月和 3 个月的最佳矫正视力、眼压、OCT 及眼底彩照观察患者视力变化及羊膜位置，1 个月和 3 个月行 ERG 检查观察光感受器修复情况。

结果：患者术前视力为光感，患者术后 1 个月和 3 个月时最佳矫正视力为 0.05。患者术后 1 个月和 3 个月时眼底照相及 OCT 均显示羊膜植片在位且贴附良好，OCT 提示羊膜位于黄斑区色素上皮位置，ERG 结果显示光感受器功能有修复。

结论：羊膜具有良好的安全性和非免疫原性，位于黄斑中心凹下的羊膜植片可以作为机械支架帮助恢复 PCV 中受损的光感受器，有助于视功能恢复，其长期治疗效果亟待进一步观察。

摘要编号：202366

羊膜移植联合玻璃体切除术治疗巨大黄斑裂孔及黄斑孔源性视网膜脱离的效果评估

第一作者：Jing LI

目的：扁平部玻璃体切除术联合内界膜剥离填塞是治疗黄斑裂孔的常用技术，但复发裂孔、巨大黄斑裂孔及黄斑孔源性视网膜脱离的治疗对于玻璃体视网膜外科医生来说仍然是一个挑战，本研究旨在探究羊膜移植联合玻璃体切除术治疗巨大黄斑裂孔及黄斑孔源性视网膜脱离的安全性及有效性。

方法：采用单臂探索性临床研究方法，收集 2023 年 9 月至 2024 年 12 月天津市眼科医院门诊确诊为巨大黄斑裂孔（孔径大于 600 μm ）及黄斑裂孔伴视网膜脱离的患者，符合纳入排除标准的受试者均采用羊膜移植联合玻璃体切除术治疗，测量患者术前及术后 1 周、3 个月、6 个月、1 年最佳矫正视力、眼压、OCT 和微视野，评估羊膜移植联合玻璃体切除术的疗效与安全性。

结果：最终纳入本临床研究的病例共有 110 例，进入统计分析共 96 例（剔除 5 例，脱落 9 例）。患者平均年龄（63.23 $\pm$ 9.28）岁，女性患者 57 人占总体的 59%，基线时平均黄斑裂孔大小（928 $\pm$ 20.16） μm ，羊膜移植联合玻璃体切除术 1 周后，黄斑裂孔闭合率达 93.45%，术后 3 个月、6 个月、1 年患者最佳矫正视力均较基线时有明显改善（ $P < 0.01$ ），10 例患者术后 3 个月时出现黄斑水肿，给予玻璃体腔注入曲安奈德后水肿均消退，患者未出现其他安全性指标异常，亦无严重不良事件发生。

结论：羊膜移植联合玻璃体切除术是治疗巨大黄斑裂孔及黄斑孔源性视网膜脱离有效的手术方式，羊膜填塞可有效地提高黄斑裂孔的闭合率，且术后视力有明显提升，可作为优先考虑的手术方案。

摘要编号：209738

老年孔源性视网膜脱离患者巩膜扣带术临床治疗效果评价

第一作者：Lei WAN

目的：评估巩膜扣带术在老年孔源性视网膜脱离患者中的临床疗效，并分析术后视力结局的相关预测因素。

方法：回顾性分析 2018 年至 2024 年在青岛眼科医院接受巩膜扣带术治疗的 278 例（290 只眼）孔源性视网膜脱离患者的临床资料。根据年龄分为老年组（ ≥ 60 岁）和年轻对照组（ ≤ 30 岁），比较两组术后结局差异。在老年组中进一步进行多因素 Logistic 回归分析，探讨影响术后视力恢复的相关因素。

结果：老年组单次手术解剖复位成功率为 98.23%，年轻组为 97.30%，差异无统计学意义（ $P > 0.05$ ）。老年组术后视力稳定或改善者占 92.03%。与年轻组相比，老年组在视网膜下液引流过程中发生视网膜下出血（2.65% vs. 9.60%， $P = 0.023$ ）及术后眼压升高需药物控制（7.08% vs. 25.99%， $P < 0.001$ ）的比例显著较低。老年组玻璃体后脱离的发生率显著更高（71.7% vs. 17.5%， $P < 0.001$ ），并与裂孔位置及视网膜脱离范围密切相关（均 $P < 0.001$ ）。此外，76.99% 的老年患者在手术过程中使用了玻璃体腔内光纤照明辅助操作，以提高手术视野与裂孔识别率，且未发现该技术增加术中或术后并发症风险。多因素分析显示，术前视力、视网膜脱离是否累及黄斑，以及 C 级增生性玻璃体视网膜病变是老年组术后视力结局的独立影响因素（均 $P < 0.05$ ）。

结论：在玻璃体切割术日益普及的背景下，结合光纤照明等现代辅助手段的改良巩膜扣带术，仍可为部分老年孔源性视网膜脱离患者提供良好的解剖与视功能恢复。合理选择手术时机与适应证对于优化预后尤为关键，尤其适用于无法耐受严格体位要求的患者。

摘要编号：209171

血脂异常介导高脂饮食诱导的视网膜 ECE-1/ET-1 异常：代谢性视网膜病变的潜在机制

第一作者：Longli ZHANG

共同作者：Huilan ZHANG, Shuo SUN

目的：高脂饮食（HFD）是导致代谢紊乱（如肥胖、血脂异常和内皮功能障碍）的主要因素，这些疾病可引起全身及眼部病变。最新研究表明，代谢紊乱可能导致视网膜病变，但其机制尚不明确。内皮素-1（ET-1）及其调控酶 - 内皮素转换酶 -1（ECE-1）

在血管功能障碍中起关键作用，但它们是否参与 HFD 诱导的视网膜改变尚未完全阐明。本文就这一机制做初步探索。

方法：采用 HFD 诱导代谢功能障碍的小鼠模型，评估全身代谢指标（包括血脂谱、肝功能标志物和炎性细胞因子），并通过定量 PCR (qPCR) 检测视网膜炎症因子和血管因子（如 ET-1 和 ECE-1）的基因表达水平。通过相关性分析评估全身代谢变化与视网膜分子改变之间的关系。

结果：HFD 喂养导致显著代谢紊乱，包括体重增加、总胆固醇 (TC) 水平升高和肝脏应激。视网膜分析显示，促炎细胞因子 (IL-1 β 、IL-6、TNF β 1 和 TNFSF15) 及 ECE-1 与 ET-1 的表达均显著上调。值得注意的是，相关性分析表明，TC 水平与视网膜 ECE-1 (Pearson 相关系数 $r = 0.888$, $p = 0.018$) 和 ET-1 ($r = 0.815$, $p = 0.048$) 呈强正相关，提示全身性血脂异常与视网膜血管功能障碍之间存在机制关联。

结论：本研究证实，HFD 诱导的血脂异常可通过 ECE-1 和 ET-1 等关键介质促进视网膜炎症和內皮功能障碍，为预防代谢紊乱相关视网膜病变提供了潜在治疗靶点。

摘要编号：209246

高度近视眼 ICL 植入术后孔源性视网膜脱离的危险因素及临床特征分析

第一作者：Yonghao LI

共同作者：Jian DENG, Liduo PAN, Meng WANG

目的：有晶状体眼后房型人工晶状体 (implantable collamer lens, ICL) 植入术已成为高度近视患者屈光手术的优选。随着手术量的增加其术后并发症尤其是孔源性视网膜脱离 (rhegmatogenous retinal detachment, RRD) 的潜在风险也在增加并被广泛关注。本研究旨在探讨高度近视眼 ICL 植入术后 RRD 发生的危险因素及其临床特征，以期为高度近视患者 ICL 植入术前的风险评估及术后并发症的预防提供理论依据，以提升手术效果及安全性。

方法：本研究采用回顾性病例对照的研究方法，纳入 2019 年 10 月至 2023 年 10 月期间接受 ICL 植入术的高度近视 (等效球镜度 ≤ -6.00 D 且眼轴长度 ≥ 26.5 mm) 患者共 97 例 (150 眼)，并根据术后随访结果将其分为 RRD 组 8 例 (8 眼)，非 RRD 组 89 例 (142 眼)。采用 Logistic 回归分析的方法，从术前是否存在玻璃体后脱离、视网膜变性、预防性激光光凝、视网膜劈裂、后巩膜葡萄肿、黄斑中心凹下视网膜及脉络膜厚度，以及术后 2 小

时眼压等方面进行危险因素分析，并观察 ICL 植入术后 RRD 发生的时间及临床特征。

结果：RRD 组及非 RRD 组患者的性别 ($P = 0.698$)、年龄 ($P = 0.176$)、术前等效球镜度 ($P = 0.220$) 以及眼轴长度 ($P = 0.825$) 等均不存在统计学差异。而单因素分析显示：RRD 组术前玻璃体后脱离 (75.0% vs. 16.9%, $X^2 = 15.598$, $P < 0.001$)、视网膜变性 (62.50% vs. 7.04%, $X^2 = 21.972$, $P < 0.001$) 以及预防性激光光凝的使用 (37.50% vs. 4.23%, $X^2 = 9.553$, $P = 0.002$) 显著高于非 RRD 组。多因素分析证实，术前视网膜变性 ($OR = 186.09$, $P = 0.03$) 和术后 2 小时高眼压 ($OR = 1.53$, $P = 0.01$) 是高度近视眼 ICL 植入术后 RRD 的独立危险因素。在我们的研究中，ICL 植入术后 RRD 的平均发生时间为术后 1.94 ± 1.47 年，裂孔形态以萎缩圆孔 (50%) 和马蹄孔 (37.5%) 多见，60% 的裂孔位置与术前视网膜变性区相一致。

结论：术前存在视网膜变性和术后 2 小时高眼压是高度近视患者 ICL 植入术后 RRD 的重要危险因素，与自然进展发生的 RRD 相比，ICL 植入术后的 RRD 无特征性临床改变，其可能是高度近视的自然病程和手术干预的共同结果。术前玻璃体视网膜界面因素的全面评估、术后早期眼压的动态监测与及时干预可以在一定程度上减少术后 RRD 的发生率，提高高度近视患者 ICL 植入的有效性及安全性。

摘要编号：209369

黄斑毛细血管扩张症 2 型相关黄斑裂孔伴内界膜缺陷的手术治疗和 Müller 细胞功能的影像学评估

第一作者：Wang

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目的：本研究旨在通过高分辨率影像学技术，探讨一例 2 型黄斑毛细血管扩张症 (Mac Tel 2) 继发黄斑裂孔伴内界膜 (ILM) 缺损的病例。重点在于利用先进的三维成像方法评估 Müller 细胞功能状态，以解释其黄斑裂孔术后初期成功闭合但长期复发的原因。

方法：手术方法：对患者行玻璃体切割术，术中采用吲哚菁绿 (ICG) 染色，发现裂孔周围存在片状 ILM 缺损，遂利用残留的 ILM 制作瓣膜并覆盖裂孔。影像学方法：采用扫频源 OCT 血管成像 (SS-OCTA) 对黄斑区进行扫描。从 3×3 mm 扫描区域中获取 512 幅连续的 B 扫描图像，构建灰度结构图像堆栈和彩色血流图像堆栈。通过颜色反卷积技术精准提取红色血流信号，生成独立的血流堆栈。将该血流堆栈与设置为半透明的灰度结构堆栈进行

通道叠加，最终合成三维复合模型，并可进行多角度旋转观察。

结果：手术结果：术后早期（3 天及 1 年），黄斑裂孔实现解剖闭合，视力由术前的 20/100 提升至 20/40。然而，在术后 6 年的长期随访中，裂孔再次开放，视力下降回 20/100。影像学结果：术中 ICG 染色发现并证实了裂孔周围大于 270 度的片状 ILM 缺失，为 Müller 细胞严重功能障碍提供了直接证据。三维模型分析：三维重建图像清晰显示，复发性裂孔的内壁呈不规则缓坡状，提示既往胶质增生修复的痕迹；而部分边缘锐利，表明支撑性组织缺失。在对侧眼的三维模型中，观察到典型的“直角静脉”及其下方视网膜组织的地形学塌陷，直观地反映了 Müller 细胞骨架支撑功能的丧失。

结论：本研究通过 SS-OCTA 三维血管结构融合成像技术，活体、直观地展示了 Mac Tel 2 中 Müller 细胞功能障碍所导致的视网膜结构崩解。影像学发现与患者临床表现高度吻合，证实 Mac Tel 2 相关黄斑裂孔的长期闭合稳定性，根本上取决于 Müller 细胞变性的持续进展，而非单纯手术技巧。对于 Müller 细胞功能严重衰退的眼，应考虑 ILM 以外的替代材料进行裂孔填塞。本案例凸显了三维影像分析作为评估细胞功能、预测手术长期预后的重要工具价值。

眼整形眼眶病

摘要编号：209197

亚洲女性鼻泪管倾斜角度与额骨的空间关系：一项 CT 定量研究

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目的：通过计算机断层扫描（CT）表征亚洲女性原发性获得性鼻泪管阻塞（PANDO）患者鼻泪管（NLD）相对于额骨的解剖倾斜度特征，旨在讨论亚洲女性 PANDO 患者及健康对照者中 NLD 相对于额骨的解剖倾斜角度变异。

方法：回顾性纳入 142 例原发性获得性鼻泪管阻塞（PANDO）患者（284 眼）和 57 例健康个体（114 眼）的头部 CT 检查图像，排除了泪液引流系统结构存在任何病理改变的病例。使用 Sante DICOM Viewer 软件，在 CT 矢状面骨窗上，以 NLD 上口中心为顶点，测量 NLD 长轴与额骨前缘夹角（重复 3 次取均值）。采用卡方检验比较角度 $> 180^\circ$ 比例在组间及年龄组（ < 40 岁， $40 \sim 60$ 岁， ≥ 60

岁）中差异，配对 t 检验分析双眼一致性（IBM SPSS 20， $p < 0.05$ 显著）。

结果：共分析 199 例女性（398 眼），平均年龄 49.66 ± 15.05 岁。PANDO 组和健康对照组的夹角范围分别为 $157.27^\circ \sim 193.84^\circ$ 和 $162.16^\circ \sim 189.65^\circ$ 。PANDO 组（58 眼，20.42%）与健康对照组（30 眼，26.32%）之间角度超过 180° 的比例无统计学差异（ $p = 0.2$ ）。双眼角度测量值高度一致（ $p > 0.05$ ）。左/右眼间角度值及 $> 180^\circ$ 比例无差异（ $p > 0.05$ ）。中年组（ $40 \sim 60$ 岁）角度超过 180° 的比例比老年组（ 60 岁以上）高 14%（ $p = 0.007$ ）。这种差异可能与年龄相关的骨重塑变化有关，年龄可能通过影响 NLD 走行路径或额骨形态（或两者共同作用）导致倾斜角度变化，具体机制需进一步研究。本研究证实，鼻泪管（NLD）相对于额骨的特定倾斜变异（角度 $> 180^\circ$ ）在人群（包括 PANDO 患者和健康个体）中普遍存在。此类“不利”角度显著增加操作（如置管、DCR）中器械路径调整难度及形成假道的风险。

结论：研究证实了这种变异在 PANDO 患者和健康人群中的普遍存在性，不受疾病状态和侧别影响，但中年人群（ $40 \sim 60$ 岁）发生率高于老年人群（ ≥ 60 岁）。建议在进行相关泪道操作前，通过 CT 评估明确 NLD-额骨倾斜角度，对于预判操作难度、规划器械路径及最大限度减少医源性损伤（尤其是假道形成）具有重要临床价值。

摘要编号：204371

人工智能定量评估 TAO 的视网膜血管特征

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目的：分析甲状腺相关眼病（TAO）的视网膜血管特征，并探讨视网膜血管参数在 TAO 中的诊断价值和眼底检查作为 TAO 筛查手段的可行性。

方法：将 594 名患者和 600 名健康人员分别设为 TAO 与对照组。使用眼底照相机和人工智能自动化图像分析程序对入组个体进行眼底图像采集和视网膜血管参数测量，包括视网膜血管管径、血管弯曲度、血管分支夹角和血管分形维数。比较 2 组各视网膜血管参数，并采用受试者工作特征（ROC）曲线分析各视网膜参数单独和联合诊断 TAO 的效能。

结果：与对照组相比，TAO 组具有更宽的视网膜血管动脉管径（距视盘 $0.5 \sim 2$ PD）和更复杂的血管分形维数（ P 均 < 0.05 ）。在活动期（CAS ≥ 3 分）与非活动期组在静脉管径均有明显差异（ P 均 < 0.05 ）。视网膜动脉血管管径、视网膜血管分形维数及两者联合诊断 TAO 的 ROC 曲线下面积分别为

0.869 (95% CI 0.820 ~ 0.919)、0.780 (95% CI 0.713 ~ 0.847) 和 0.901 (95% CI 0.860 ~ 0.942)。

结论: TAO 患者的视网膜血管系统发生了明显改变。活动期比非活动期者视网膜血管静脉管径更宽, 血管分型维数对 TAO 具有一定的诊断价值, 诊断效能较佳, 联合动脉管径具有更高的诊断价值。眼底检查或可为 TAO 的便捷筛查和无创诊断带来更多的可能性。

摘要编号: **208958**

便携式三维成像系统在眶周区域体积测量中的验证研究

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目的: 评估一种基于结构光技术的便携式三维成像系统用于眶周区域体积测量的可靠性与准确性。

方法: 研究通过 3D 打印技术制备五种不同尺寸和颜色的半球形树脂模型, 包括直径 6 mm、4 mm、2 mm 的肉色模型, 以及直径 6 mm 的黑色和灰色模型。将这些模型固定于 40 名志愿者的下眼睑或上眼睑, 由一名研究者使用该便携式三维成像系统采集三维图像, 两名测量者在图像上测量模型体积。通过组内相关系数 (ICC)、平均绝对差异 (MAD)、测量技术误差 (TEM)、相对误差 (REM) 和相对技术误差 (rTEM) 等指标, 评估该系统的设备内可靠性、测量者内可靠性、测量者间可靠性及测量准确性。

结果: 该系统用于眶周区域体积测量的设备内可靠性极佳 (ICC = 0.922, MAD = 0.11 mm³, TEM = 0.09 mm³, REM = 0.19%, rTEM = 0.15%)。该系统在测量固定于下眼睑的直径 6 mm 的肉色模型的体积时的测量者内可靠性最高 (ICC = 0.953, MAD = 0.08 mm³, TEM = 0.06 mm³, REM = 0.13%, rTEM = 0.11%)。该系统在测量固定于下眼睑的直径 6 mm 的肉色模型的体积时的测量者间可靠性最高 (ICC = 0.889, MAD = 0.14 mm³, TEM = 0.11 mm³, REM = 0.24%, rTEM = 0.19%)。该系统在测量固定于下眼睑的直径 6 mm 的肉色模型的体积时的测量准确性最高 (MAD = 0.24 mm³, REM = 0.43%)。

结论: 这种基于结构光技术的便携式 3D 成像系统能够可靠且准确地测量眶周区域肉色物体的体积。该这项发现表明, 该设备在眼整形领域具有巨大潜力, 可用于诊断、术后评估以及体积变化的长期随访。

摘要编号: **208972**

内镜导航引导 3D 打印技术结合可吸收材料治疗眼眶爆裂性骨折的疗效和安全性分析

第一作者: Hongfei LIAO

目的: 评估内镜导航引导下三维打印联合可吸收材料在眼眶爆裂骨折个体化微创重建中的疗效与安全性, 并以预成型钛网修复作为对照, 通过比较临床效果验证其在实现解剖复位、改善视觉功能及减少并发症方面的临床价值。

方法: 本回顾性研究共纳入 87 例接受可吸收植入物修复的患者 (试验组) 及 19 例采用预成型钛网修复的患者 (对照组)。术前利用 Mimics 21.0 及 Geomagic Studio 12.0 软件进行 CT 三维重建, 基于健侧眼眶的镜像模型生成个体化手术导板及三维打印眼眶模型。试验组中, 通过导板进行可吸收板的热塑成型并植入修复; 对照组则根据骨折形态修剪钛网并以螺钉固定。采用 SPSS 26.0 并结合 Python 自动协变量控制进行统计分析; 通过倾向评分加权 (PSW) 平衡性别、年龄及骨折范围等基线协变量 (标准化均差 SMD < 0.1 为平衡标准)。纵向连续变量 (突眼差值、logMAR 最佳矫正视力 BCVA) 采用广义估计方程 (GEE) 分析时间 - 组别交互效应, 等级变量 (复视程度、眼球运动受限) 则采用加权有序 Logistic 回归计算边际效应。所有分析均控制时间点交互, 显著性水平设为 $\alpha = 0.05$ 。

结果: 可吸收材料组复视恢复率显著优于对照组 (残留率: 9.2% vs. 31.6%, $P = 0.018$), 长期恢复交互效应具有统计学意义 ($\beta = 1.59$, $P = 0.039$)。两组患者的眼球运动功能及突眼度均随时间显著改善 ($P < 0.001$), 但组间差异无统计学意义。试验组在术后 6 个月的 BCVA 较对照组额外提高 42% (交互 $\beta = 0.05$, $P = 0.028$)。可吸收材料组未发生与植入物相关的感染或移位等并发症。

结论: 内镜导航引导下三维打印联合可吸收材料用于眼眶爆裂骨折的个体化微创重建, 具有良好的安全性与可行性。该技术能够在保证解剖复位精度的同时, 显著促进复视及视觉功能恢复, 减少植入物相关并发症, 临床效果不逊于传统钛网修复。该个体化重建模式可作为眼眶骨折精准修复的有效选择, 具有进一步推广与应用的临床价值。

摘要编号: **208707**

导航引导下粉碎性颧骨体骨折伴眼眶骨折的个体化修复

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目的: 粉碎性颧骨体 (ZMC-C) 骨折合并眼眶重建是临床一大难题, 计算机导航技术对手术复位有较

大价值。本研究通过测量导航引导下 ZMC-C 骨折合并眼眶重建的计划复位与实际复位的误差，评估手术的有效性。

方法：这项回顾性单臂队列研究涉及 2017 年 1 月至 2019 年 6 月在上海交通大学医学院附属第九人民医院眼科就诊的 ZMC-C 合并眼眶骨折患者。排除脑损伤、生命体征不稳定、钛合金植入物过敏、其他面部骨骼创伤或术后面部创伤的受试者。主要结果变量为手术计划与实际结果之间的平均三维（3D）距离误差。次要结果包括横向、垂直和前后平面的平均绝对距离误差、受试者面部美学和功能自我满意度的视觉模拟量表评分、眼眶体积、眼球突出、双侧颧骨位置和手术并发症。协变量：协变量包括年龄和性别。分析：采用 t 检验对结果进行检验，显著性 $P < 0.05$ ，以确定术前和术后测量值和对称性之间的差异。

结果：20 例受试者中位年龄为 39 岁（四分位区间为 24.5），男性 19 例（95%）。平均三维距离误差在颧额缝骨折线中点为 0.5 ± 0.3 mm，颧骨表面最突出点为 0.7 ± 0.3 mm，颧骨牙槽嵴与骨折线交点为 0.6 ± 0.4 mm。最大平均绝对距离误差为 0.8 ± 0.2 mm，术后视觉模拟评分均有改善。平均眼眶体积减少 2.2 ± 0.6 cm³，眼球内陷改善至 0.4 ± 0.3 mm（均 $P < 0.01$ ）。患侧与健侧眼球突出度、眶体积、双侧颧骨位置比较，差异均无统计学意义（ $P > 0.05$ ）。

结论：导航引导下粉碎性颧骨体骨折合并眼眶重建的一体化修复疗效较好，平均距离误差在临床上是可接受的。

摘要编号：209192

环状 RNA circ-0007006 通过稳定 HBEGF 表达在甲状腺相关眼病纤维化中的保护作用

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目的：甲状腺相关眼病（TAO）是一种以炎症和组织重塑为特征的自身免疫性眼眶疾病，其中纤维化是 II 型 TAO 的主要且通常是不可逆的病理特征。本研究旨在探讨环状 RNA circ-0007006 在 TAO 纤维化中的作用及其潜在机制，以期纤维化 TAO 的治疗提供新的分子靶点。

方法：通过高通量 RNA 测序分析纤维化 TAO 组织中的差异表达 circRNA，发现 hsa_circ_0007006 显著下调。进一步在体外利用眼眶成纤维细胞进行功能实验，检测 circ-0007006 对纤维化相关标志物（COL1A1、 α -SMA、HAS1 和 HAS2）以及 SMAD2/3 磷酸化的影响。通过双荧光素酶报告基因实验验证 circ-0007006 与 miR-383-3p 的相互作用，

并通过外源性 HBEGF 补救实验验证其在纤维化中的作用。

结果：circ-0007006 在纤维化 TAO 组织中显著下调。circ-0007006 能够通过下调 COL1A1、 α -SMA、HAS1 和 HAS2，以及抑制 SMAD2/3 的磷酸化来抑制眼眶成纤维细胞的纤维化。circ-0007006 作为 miR-383-3p 的竞争性内源性 RNA，稳定 HBEGF 的表达。外源性 HBEGF 能够缓解 circ-0007006 敲低诱导的促纤维化效应。

结论：本研究揭示了 circ-0007006/miR-383-3p/HBEGF 轴在 TAO 纤维化中的调控机制，并证实 circ-0007006 是纤维化 TAO 的潜在治疗靶点。这些发现为开发针对纤维化 TAO 的新型治疗策略提供了理论依据。

摘要编号：208959

甲状腺眼病患者角膜形态与生物力学特征及放疗干预效应研究

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目的：评估眼肌型甲状腺眼病（TED）患者与正常对照组（NCs）角膜形态及生物力学的差异，并观察放疗后这些指标的变化。

方法：本研究为前瞻性对照临床研究，纳入 50 例眼肌型 TED 患者（50 眼）和 30 例年龄、性别及等效球镜匹配的 NCs（30 眼）。所有患者均接受三维适形放疗（20 Gy/10 次）并完成 6 个月随访。采用 Pentacam 评估角膜形态学参数，Corvis ST 眼压计测量角膜生物力学特性，检测时间点为放疗前及放疗后 6 个月。主要观察指标包括角膜地形图参数（前/后表面曲率、厚度分布、高度偏差等）和生物力学参数（时间/速度参数、形变指标、眼眶顺应性等）。

结果：与 NCs 相比，TED 患者表现为角膜形态学改变：前表面曲率（K1、K2、Kmax）显著增加（均 $P < 0.05$ ），后表面高度偏差（Db）、厚度进展指数（Dp）等参数异常增高（均 $P < 0.01$ ），ARTmax 降低（ $P = 0.003$ ），提示角膜陡峭度增加且厚度分布不均；TED 患者生物力学异常：经生物力学校正眼压（bIOP）调整后，A2 时间缩短（ $P = 0.02$ ）、峰值距离减小（ $P = 0.01$ ）、TBI 指数升高（ $P < 0.001$ ），最大全眼球运动幅度（WEML）降低（ $P = 0.004$ ），表明角膜顺应性下降及眼眶顺应性减低。放疗后 TED 患者出现角膜形态改善：Db 显著降低（ $P = 0.008$ ），后表面散光增加（ $P = 0.03$ ）；生物力学恢复：WEML 显著增加（ $P = 0.01$ ，经 bIOP 校正后仍显著），且与突眼度改善呈负相关（ $r = -0.32$ ， $P = 0.02$ ）；临床指标改善：眼压

(15.8 ± 3.1 vs 13.2 ± 2.7 mmHg, $P < 0.001$)、突眼度(18.5 ± 2.8 vs 16.3 ± 2.4 mm, $P < 0.001$)及CAS评分(3.1 ± 1.0 vs 0.7 ± 0.5 , $P < 0.001$)均显著下降。

结论: 眼肌型 TED 患者存在特征性角膜形态异常和生物力学异常, 表现为角膜曲率增加、表面不规则性增高及眼眶顺应性下降。放疗不仅能有效缓解眼眶炎症和眼外肌肥厚, 还可通过降低眼压和突眼度改善角膜生物力学状态。角膜生物力学参数具有潜力成为评估 TED 病情及疗效的新的指标。

摘要编号: 207863

眶尖、颅底及颞下窝区域的经眶入路外科技术

第一作者: Wang YI

目的: 眼眶作为头颈部重要的解剖部位, 具有保护视觉器官, 维持眼部外观的重要作用。众所周知手术摘除眶尖肿瘤失明风险高, 并发症多, 结果难以预期, 而眼眶及眶尖也被其他专业作为进入颅底和颞下窝的外科通道, 损伤眼部功能的风险极高。本研究探索发生于以下部位的肿瘤或外伤异物, 能否由眼科医生综合运用眼眶外科技术、鼻内窥镜技术、介入技术等方法, 抵达并实施手术, 减少眼部并发症, 部位包括: 眶尖, 经眶累及前、中颅底, 经眶累及翼腭窝及颞下窝。

方法: 回顾分析 2019.1.1-2024.6.30 期间收治的眶尖肿瘤 42 例(含 4 例经眶上裂蔓延至颅内)、眶顶壁骨肿瘤 2 例, 眶颅沟通异物 6 例(金属 2 例, 木质 3 例, 铅笔橡皮头 1 例)、眶颞下窝沟通肿瘤 1 例, 眶颞下窝沟通木质异物 1 例。均为单眼受累, 男 28 例, 女 43 例, 年龄 13-65 岁, 中位年龄 44 岁。

结果: 经外侧开眶术联合深外壁磨骨摘除肿瘤 21 例, 经外上开眶术联合深外壁磨骨摘除 17 例, 经内外联合开眶术摘除肿瘤 2 例, 鼻内镜经蝶窦辅助下联合经结膜入路摘除眶尖视神经内侧面肿瘤 2 例, 经上方开眶术摘除肿瘤 2 例, 取出金属异物 1 例, 经原伤道取出眶颅沟通异物 4 例, 经外眦切开结膜入路取出眶颅交界区木质异物残渣 1 例。经改良外下开眶术摘除眶颞下窝肿瘤 1 例, 取出眶颞下窝沟通异物 1 例。异物伤共 8 例, 其中 5 例伤后视力丧失, 术后不恢复, 3 例视力下降, 术后恢复部分视力。肿瘤患者共 45 例, 术前因肿瘤压迫导致视力下降 35 例, 术后视力不同程度恢复 32 例, 术后视力丧失 3 例, 均为外侧开眶术眶尖海绵状血管瘤摘除。手术摘除血管瘤均无复发, 1 例神经鞘瘤术后 2 年随访显示复发。转移性黑色素瘤术后 2 个月发现全身多处转移, 目前接受综合治疗。

结论: 深外壁、顶壁或外下壁的磨骨技术与开眶手术联合应用, 可完成多种眶尖、眶颅交界区的前颅

底、中颅底、颞下窝的肿瘤摘除或异物取出。眶颅交界区的异物取出前应行 DSA 评估颅内血管损伤情况。鼻内镜经蝶窦可辅助眶尖视神经内侧面肿瘤的摘除。综合运用上述方法能够提高手术的安全性和成功率。

摘要编号: 209477

眼睑内眦赘皮矫正改良术及眼睑臃肿微创重睑美容术临床研究

第一作者: Xiuqin ZHAO

共同作者: Heng WANG

目的: 探讨我院 2011 年 1 月~2025 年 1 月间, 应用三点式微创切口对轻、中度眼睑臃肿伴内眦赘皮者实施微创重睑美容手术及改良的无缝线眼睑内眦赘皮矫正术的临床效果与手术技巧。

方法: 本组眼睑臃肿伴内眦赘皮重睑美容者 56 例。根据整体面部特征、睑裂宽度、眼睑平行及内眦赘皮的程度等实施个性化设计。重睑宽度一般设计为 6~9 mm。平行于睑缘做三点式切口, 各切口长约 5 mm, 深达眼轮匝肌。切除内眦部分眼轮匝肌, 切断错够的部分眼轮匝肌, 矫正内眦赘皮, 通过缝合定位调整重睑的高度和弧度。剪除适量眼轮匝肌直达睑板前筋膜。眼轮匝肌肥厚者, 可通过三点小切口掏剪重睑线下的部分眼轮匝肌。均匀去除重睑线下眼轮匝肌, 有利于重睑平滑、重睑皱褶自然流畅。外侧眶脂多者, 可经外侧切口去除部分臃肿组织及部分外侧脂肪及眶内脂肪。8-0 尼龙线, 对切口下缘、睑板前筋膜及切口上缘皮肤进行缝合。穿带睑板前筋膜部位时, 要高于重睑线处 1~1.5 mm, 可使睫毛上翘。形成的重睑沟会较深, 重睑看上去更加明媚、靓丽, 重睑形态自然、美观流畅。内眦赘皮手术设计: 根据宽窄程度(中、轻度), 对于内眦赘皮进行三点式微创切口(每个约切口 2 mm), 使内眦赘皮的皱褶打开直至自然。内眦部切口涂眼膏, 不需缝合。

结果: 56 例患者中度 19 例, 轻度 37 例(重度眼睑肥厚臃肿者需实施皮肤切开切除手术)。男性 3 例, 女性 54 例。年龄 16 岁~65 岁。术后随访 6~18 月。多数患者在拆线后 5~7 天消肿。拆线后二周重睑恢复自然。手术成功率达 98%。有 1 例患者术后重睑变浅, 一例重睑不对称。一例双重睑宽窄不一, 重新实施手术后效果满意。56 例患者的自我满意度: 49 例非常满意, 占 87.5%; 5 例满意, 占 8.93%; 2 例较满意, 占 3.57%; 医师对 56 例患者满意度达 98%: 所有患者术中、术后均未发生并发症。

结论: 以往内眦赘皮矫正术是采用“Z”字瓣切开术。术后遗留疤痕, 本研究采用三点式微创切口矫正内眦赘皮, 不深切不需缝合, 术后无疤痕。对于轻度

及中度的眼睑臃肿者具有创伤小、术后恢复快、重睑形态自然、靓丽等优点。

摘要编号: 209182

视网膜母细胞瘤诊治新模式

第一作者: Huasheng YANG

目的: 探讨对于眼球摘除术后具有高危病理特征的单侧视网膜母细胞瘤, 3 个周期 CEV (卡铂、依托泊苷、长春新碱) 化疗是否不劣于 6 个周期化疗, 为优化临床化疗方案提供依据。

方法: 开展一项双中心、随机、开放标签、非劣效性试验。纳入 2013 年 8 月至 2024 年 3 月期间在中山眼科中心和复旦大学附属眼耳鼻喉科医院接受眼球摘除术的 187 例单侧高危视网膜母细胞瘤 (高危病理特征包括: 大量脉络膜浸润、筛板后视神经侵犯、巩膜浸润) 患者。术后患者被随机分配接受 3 个周期或 6 个周期 CEV 化疗, 随访至 2024 年 3 月 21 日。主要终点为 5 年无病生存率 (非劣效界值设为 12%), 次要终点涵盖总生存率、安全性、经济负担及生活质量。

结果: 187 例患者 (中位年龄 25.0 个月, 女性占 44.4%) 均完成试验, 中位随访时间 79.0 个月。3 周期组 (94 例) 5 年无病生存率为 90.4%, 6 周期组 (93 例) 为 89.2%, 组间差异 1.2% (95% CI, -7.5%~9.8%), 符合非劣效性标准。相比之下, 6 周期组不良事件发生率更高, 生活质量评分下降更明显, 治疗费用亦显著增加。

结论: 对于术后具有高危病理特征的单侧视网膜母细胞瘤患者, 3 个周期 CEV 辅助化疗的 5 年无病生存率不劣于 6 个周期, 且在安全性、生活质量及经济成本上更具优势, 有望成为更优化的化疗方案选择。

摘要编号: 208226

评估替妥尤单抗 N01 治疗活动期甲状腺眼病疗效和安全性的临床研究汇总分析

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共同作者: Xianqun FAN, Yinwei LI, Jing SUN, Huifang ZHOU

目的: 评价替妥尤单抗 N01 (重组抗 IGF-1R 抗体注射液) 在中国中重度活动期甲状腺眼病 (Thyroid Eye Disease, TED) 患者中的疗效和安全性。

方法: 将一项随机、双盲、安慰剂对照临床研究 (NCT05795621) 的 II 期和 III 期阶段纳入汇总分析。受试者从第 1 天至第 21 周接受替妥尤单抗 N01 或安慰剂输注, 每 3 周一次, 共 8 次。研究主要疗效指标为研究眼的眼球突出应答率 (定义为,

研究眼眼球突出度较基线减少 ≥ 2 mm, 且不伴有对侧眼眼球突出增加 ≥ 2 mm 的受试者百分比)。

结果: 汇总分析共纳入 104 例受试者 (全程接受替妥尤单抗 N01: 76 例; 全程接受安慰剂: 28 例)。结果显示: 第 24 周时, 替妥尤单抗 N01 组研究眼眼球突出应答率显著高于安慰剂组 (81.9% vs. 3.8%; 率差: 78.0%; $p < 0.0001$)。次要疗效终点中, 第 24 周时, 替妥尤单抗 N01 组研究眼眼球总应答率 (定义为研究眼临床活动性评分 [Clinical Activity Score, CAS] 较基线降低 ≥ 2 分且眼球突出较基线降低 ≥ 2 mm, 且对侧眼无相应恶化的受试者百分比)、CAS 值为 0 或 1 的受试者百分比、眼球突出度较基线的改变均显著优于安慰剂组 (各指标分别为 75.3% vs. 3.6%、80.5% vs. 16.6%、-2.99 mm vs. -0.06 mm, p 均 < 0.0001)。替妥尤单抗 N01 总体安全性良好且可控, 不良事件多为轻、中度, 整体转归良好, 基本上不影响研究药物使用, 未发生严重不良事件。替妥尤单抗 N01 组特别关注不良事件 (输注反应、听力损害、高血糖症、肌痉挛和恶心、腹泻) 总体发生率较低, 严重程度均为轻、中度。

结论: 中国中重度活动期 TED 患者 II/III 期临床研究的汇总分析表明, 替妥尤单抗 N01 可显著缓解突眼并减轻疾病活动度, 同时在 TED 人群中呈现良好的安全性。

眼科学的转化研究

摘要编号: 210291

ALDH2-SIRT1-内质网应激 (ERS) 轴对 MNU 诱导的 C57BL/6 小鼠视网膜损伤的调控作用: 一项体内研究

第一作者: Weiming YAN

共同作者: Caifeng CAO, Tao CHEN, Weipeng HUANG, Wenhui LAN, Weiping LIANG, Pan LONG, Xiu TAN

目的: 本研究旨在探究 ALDH2 及 SIRT1/内质网应激 (ERS) 调控对甲基硝基脲 (MNU) 诱导的 C57BL/6 小鼠视网膜变性的保护作用, 评估这些干预措施是否通过调节 ALDH2-SIRT1-ERS 轴来减轻视网膜变性及其代谢标志物的异常。

方法: 将 72 只小鼠分为 8 组: 对照组、单纯 MNU 组, 以及 MNU 联合治疗组 (Alda1、Daidzin、SIRT1 抑制剂 EX527、SIRT1 激动剂 SRT1720、ERS 诱导剂 TUN、ERS 抑制剂 4-PBA)。通过腹腔注射 MNU (50 mg/kg) 诱导视网膜损伤, 治疗药物在 MNU 处理前或后给予。通过体重变化、

HE 染色及醛代谢标志物 (MDA、4HNE) 评估视网膜损伤程度。

结果: 联合用药 (如 ALDH2 调节剂与 SIRT1/ERS 调节剂联用) 比单药治疗导致更显著的体重下降。单纯 MNU 处理可诱导光感受器层变薄, 而其他视网膜层结构保持完整。Alda1 和 Daidzin 可减轻视网膜损伤, 但 Daidzin 表现出不一致效应——在某些情况下具有保护作用, 而在另一些情况下则加重损伤。SIRT1 抑制 (EX527) 阻断了 Alda1 的保护效应, ERS 诱导 (TUN) 同样消除了 Alda1 的益处; 相反, SIRT1 激活 (SRT1720) 缓解了 Daidzin 的损伤加重作用, ERS 抑制 (4-PBA) 部分减轻了 Daidzin 的不良影响。MNU 处理使 MDA 和 4HNE 水平升高, 而 Alda1 可降低这些标志物; Daidzin 则升高了这些氧化应激指标。SIRT1 抑制 (EX527) 和 ERS 诱导 (TUN) 削弱了 Alda1 的抗氧化作用, 而 SIRT1 激活 (SRT1720) 和 ERS 抑制 (4-PBA) 则抵消了 Daidzin 的促氧化效应。SIRT1 激活 (SRT1720) 增强了 Daidzin 的保护作用, 降低了氧化应激并改善了视网膜组织学结构; SIRT1 抑制 (EX527) 未能增强 Alda1 的效应。ERS 调控与 Alda1 或 Daidzin 联用未显示协同保护效应。联合使用 Daidzin 与 SIRT1 激活可减轻体重下降。

结论: MNU 诱导的视网膜变性涉及光感受器丢失及醛代谢异常升高。Alda1、SIRT1 激活及 ERS 抑制 (4-PBA) 可保护视网膜结构及代谢稳态。这些发现揭示了 ALDH2、SIRT1 及 ERS 通路在缓解 MNU 诱导视网膜损伤中的关键作用。

摘要编号: 204551

RHO 基因突变导致的视网膜色素变性的基因编辑疗法研究进展

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目的: 视网膜色素变性 (Retinitis pigmentosa, RP) 是一组以感光细胞和色素上皮细胞进行性、选择性丧失为特点的进展性单基因致盲眼病。患者于 20-65 岁之间即发展为法定盲人。RP 发病率为 1/3500, 其中 25% 左右为 adRP。RHO (Rhodopsin, 视紫红质) 基因是最为常见的 adRP 致病基因, 占 adRP 的 25-30%, 是工作年龄人群不可逆双眼盲的主要病因之一, 目前尚无任何有效疗法。本研究基于 CRISPR/Cas9 技术, 开发可有效治疗 RHO-R135W 突变导致的 adRP 的基因编辑药物 ZVS203e, 并充分验证 ZVS203e 的有效性及安全性。

方法: 该研究通过在小鼠感光细胞系 661W、HEK293A 细胞和人源 iPSC 中进行了体外药效学研究, 以评价本品在细胞水平的感染活性、表达活性以及编辑活性。体内药效学研究在人源化 RP 疾病模型小鼠中进行, 选择 ERG 和外核层 (ONL) 厚度等作为评价指标, 进行 ZVS203e 注射液对于 RP 治疗有效性的研究。在细胞水平通过 GUIDE-seq、扩增子测序对 ZVS203e 潜在的脱靶风险进行了评估, 同步在患者来源的 iPSC 及小鼠中进行了靶向位点的潜在染色体重排的风险检测。此外, 在模型小鼠中通过 q-RT-PCR、ELISA、T-spot 等多种方法充分验证了 ZVS203e 的药代动力学及安全性。

结果: 研究结果表明, 基因编辑药物 ZVS203e 具有良好的有效性及安全性, 研究结果推动 ZVS203e 进入临床研究阶段。编辑靶向性检测结果表明, ZVS203e 在体内外均可有效表达目的基因, 特异性编辑 RHO-R135W 突变 DNA 序列, 有效敲除突变蛋白。3D-cup 类器官药效研究表明, ZVS203e 可有效改善患者 3D-cup 视网膜感光细胞结构。ERG 及 OCT 检测结果显示, ZVS203e 可有效改善模型小鼠视网膜结构及功能。细胞及小鼠脱靶风险研究未显示潜在的脱靶风险。此外, 在药理学相关种属动物体内, 经视网膜下腔注射单次给药, 未见安全药理学相关影响, 且药物进入体内后不具有免疫毒性。

结论: 综上所述, ZVS203e 注射液在体内外的药理学研究中均展现出良好的生物学活性, 且耐受性良好。该研究验证了 ZVS203e 在 RHO-R135W 突变导致的 adRP 中相关的作用机制和效应, 提示了 ZVS203e 在靶人群中的潜在治疗作用, 支持了 ZVS203e 的进一步临床开发, 并为其他遗传性视网膜疾病的基因编辑治疗提供了参考。ZVS203e 于 2023 年 12 月和 2024 年 2 月分别获得美国 FDA 和中国国家药监局的新药批准。

摘要编号: 201400

TSP1 模拟肽一大黄酸自组装水凝胶体系抑制脉络膜新生血管的研究

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目的: 由于传统大分子抗 VEGF 药物视网膜穿透效率低、药物利用率较差, 对脉络膜新生血管性疾病的疗效有限。本研究拟制成血小板反应蛋白 1 模拟肽一大黄酸 (TSP1m-Rhe) 复合水凝胶体系, 通过减小分子量、“抗新生血管—抗炎”双靶点干预 CNV 形成、优化药物剂型, 来增加药物利用率, 延长给药间隔, 以求改善患者整体预后。

方法：将筛选优化后的 TSP1 模拟肽以及大黄酸单体连接自组装基序，合成 TSP1m-Rhe 复合水凝胶体系。表征其体外的电镜结构、流变学性能，确定其适用于注射给药；通过 ARPE-19、MIO-M1、HREC 三种细胞验证其体外安全性。通过建立 ARPE 氧化应激模型，验证该凝胶的抗炎特性；建立 HREC 缺氧模型，验证该凝胶的抗新生血管特性；并在 C57BL/6J 小鼠 CNV 模型中验证该体系的安全性和有效性。

结果：TSP1m-Rhe 可在自然条件下自组装形成淡黄色的透明水凝胶，该水凝胶内部由纳米纤维组成，呈现类阿尔法螺旋结构，具有剪切稀化和自我恢复能力，可用于注射给药。使用 ARPE-19、MIO-M1、HREC 三种细胞与 TSP1m-Rhe 共培养 24 小时后，进行 PI 染色及 CCK8 检测。结果表明，TSP1m-Rhe 相较于单纯 Rhe 具有更高的安全性，在 0-100 μM 的浓度范围内均无明显的细胞毒性。将 PBS、TSP1m、Rhe、TSP1m-Rhe 注入小鼠玻璃体腔内，观察直至注射后第 30 天，各组小鼠屈光介质清晰，眼底未见明显异常，ERG 检测与 PBS 组相比无显著统计学差异，眼球及重要脏器 HE 染色均无明显异常，提示 TSP1m-Rhe 体系具有良好的生物相容性。抗炎抗氧化方面，通过 DPPH 和 ABTS 法发现该体系的抗氧化性具有浓度依赖的特性。并且可以有效减少 H_2O_2 引起的细胞损伤。抗血管生成方面，使用 HRECs 细胞进行缺氧造模的同时使用阿柏西普与 TSP1m-Rhe 进行处理，发现 TSP1m-Rhe 体系可以有效抑制缺氧的 HREC 的迁移与成管，且在抑制细胞迁移方面与阿柏西普相比具有统计学差异。在体内，我们使用激光进行小鼠 CNV 造模后使用阿柏西普与 TSP1m-Rhe 进行玻璃体腔内注射，发现 TSP1m-Rhe 能够有效抑制 CNV 模型的渗漏以及新生血管病灶的基底宽度与高度。

结论：TSP1m-Rhe 复合水凝胶具有良好的生物相容性，是一种安全有效的脉络膜新生血管性疾病治疗替代策略。此外，该技术可能为生物安全肽纳米材料、蛋白质等大分子药物在治疗眼部新生血管性疾病中提供新的替代方案。

摘要编号：201075

人眼在缺氧和色差条件下的不同空间定位：动态视觉为例

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目的：本研究旨在探讨人眼在不同空间（海拔高度、黑暗背景和氧气浓度）对各种颜色的运动物体的识别能力。通过对海拔高度、角速度（AV）和颜色这

三个主要因素的详细分析，阐明人眼在高海拔环境下的多彩动态视觉定位，并探讨其可能的相关机制。

方法：研究小组由 16 名 20-26 岁的健康参与者组成。用美迪信（天津）有限公司自主研发的软件测量动态视力。在 5 个海拔高度（d1：地面；d2：3500 米；d3：4000 米；d4：4500 米；d5：实验结束）和 6 种颜色（红、橙、黄、绿、蓝、紫）下进行测量。数据分析采用了 Kolmogorov-Smirnov (K-S) 检验、配对样本 T 检验、单因素方差分析、双因素方差分析、斯皮尔曼秩相关系数和 Wilcoxon 检验。

结果：海拔因素：红色 LogMar 动态视力（DVAs）在 d1（40、60 和 80 dps）、d2（60 和 80 dps）和 d3（60 和 80 dps）明显优于相应视网膜在 d4 的动态视力。在 80 dps 时，d1 的橙色 LogMar DVA 明显高于 d4 的 DVA。蓝色 LogMar DVA 在第 1 d1（60 dps）、第 2 d2（40、60 和 80 dps）明显高于第 4 d4 的相应平均值。紫色 LogMar DVAs 在 d2（60 和 80 dps 时）明显高于相应 AVs d4 时的值。颜色因素：在 d0（所有视角），蓝色 LogMar DVA 明显优于其他颜色的 LogMar DVA，黄色和绿色 LogMar DVA 在 40 dps 时明显低于紫色 LogMar DVA，橙色 LogMar DVA 在 60 dps 时低于绿色 LogMar DVA。此外，在 60 和 80 dps 时，橙色、黄色、绿色和红色 LogMar DVA 明显低于紫色 LogMar DVA。在 d1 和 d2，红色、橙色、黄色和绿色 LogMar DVA 明显低于蓝色 LogMar DVA（在所有 AVs 上）和紫色 LogMar DVA（在 20、60 和 80 dps 时）。在 40 dps 时，红色、黄色和绿色（在 d1 和 d2 时）LogMar DVA 明显低于紫色 LogMar DVA。在 d3 和 d4，红色、橙色、黄色和绿色 LogMar DVA 在统计学上低于蓝色 LogMar DVA（在所有 AVs 上）和紫色 LogMar DVA（在 40、60 和 80 dps 时）。在 20 dps 以下的 d4，橙色、黄色和绿色 LogMar DVA 低于紫色 LogMar DVA。

结论：高海拔环境（急性低压缺氧）会影响人眼对不同颜色物体的空间定位能力，尤其是蓝、紫、绿三种颜色的 DVAs，随着海拔高度的增加（缺氧加剧），DVAs 会逐渐降低。这将影响飞行员获取视觉信息的能力，导致在飞行过程中对仪表盘和周围信息的获取和判断出现偏差。

摘要编号: 208448

四面体框架核酸负载 miR-124 调控小胶质细胞活化并保护青光眼视网膜神经节细胞

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目的: 青光眼是全球致盲性眼病之一, 其核心病理特征为视网膜神经节细胞 (RGCs) 进行性丧失。尽管降低眼压是目前唯一确证的临床治疗手段, 但即使眼压得到有效控制, 仍有相当比例患者发生 RGC 损伤。因此, 探索直接的神经保护策略尤为迫切。本研究旨在构建一种基于四面体框架核酸 (tetrahedral framework nucleic acids, tFNAs) 的 miR-124 递送平台 (Tmi), 通过调控小胶质细胞活化和炎症反应, 实现对 RGC 的保护, 为青光眼治疗提供新思路。

方法: 研究通过自组装合成 tFNA, 并负载 miR-124 形成 Tmi, 利用透射电镜、动态光散射及 PAGE 电泳验证其结构与稳定性。体外采用小胶质细胞缺氧/缺糖 (OGD) 模型检测 Tmi 对细胞增殖、极化、迁移及炎症因子的调控作用; 体内通过小鼠急性高眼压 (AOH) 模型评价 Tmi 在视网膜的穿透性、生物相容性及 RGC 保护作用, 并结合免疫荧光及 Western blot 分析 STAT3 信号通路的调控情况。

结果: Tmi 具备良好的结构稳定性和细胞相容性, 能够在含血清环境中保持 48 小时完整性, 并在 10% FBS 条件下仍能有效保护 miR-124 不被降解。细胞实验显示, Tmi 可高效进入 BV-2 小胶质细胞, 12 小时和 24 小时的细胞内荧光强度分别提高约 1.9 倍和 3.2 倍。与单纯 miR-124 或对照组相比, Tmi 使细胞内 miR-124 表达水平提高约 4.6 倍, 并显著下调 STAT3 与 p-STAT3 蛋白表达量 (分别下降 52.3% 与 68.4%, $p < 0.01$)。在 OGD (缺氧/缺糖) 模型中, Tmi 可将 Ki67 阳性增殖细胞比例由 OGD 组的 42.5% 降低至 19.7%, 并使促炎标志物 iNOS 和 CD86 表达分别下降 65.2% 与 59.8%, 同时 Arg-1 和 CD206 上调约 2.3 倍和 2.8 倍 ($p < 0.001$), 提示其有效抑制 M1 极化并促进 M2 表型转化。迁移实验显示, Tmi 处理后小胶质细胞的迁移率降低约 60%, 迁移体形成数减少 45%, 回缩纤维平均长度缩短约 43%。ELISA 结果表明, Tmi 显著降低 IL-6、TNF- α 、IL-1 β 等促炎因子水平 (分别下降 61.4%、57.8%、53.2%), 并使 IL-4 和 IL-10 增加约 1.9 倍和 2.2 倍。在体内实验中, Tmi 能经玻璃体腔高效递送至视网膜多层结构, 24 小时后在神经节细胞层 (GCL) 与内核

层 (INL) 荧光信号最强, 未见明显炎症或结构异常。在急性高眼压 (AOH) 模型中, Tmi 显著缓解 RGCs 丢失: GCL 中细胞核数恢复至对照组的 80.6% (AOH 组仅 16.7%, $p < 0.001$), RGC 密度由 AOH 组的下降 23.6% 恢复至 99.5%, GCC 厚度明显改善。同时, IBA1 阳性小胶质细胞数量减少至 AOH 组的 32.7%, STAT3 和 p-STAT3 蛋白水平平均下降超过 60%, 表明 Tmi 通过抑制 STAT3 信号有效阻断炎症级联反应, 从而保护 RGC 结构与功能。

结论: 本研究成功构建了一种基于 tFNA 的 miR-124 纳米递送平台, 能够通过靶向 STAT3 信号通路调控小胶质细胞活化和炎症反应, 从而有效保护 RGC 免受急性高眼压损伤。Tmi 作为一种新型非病毒核酸递送系统, 为青光眼神经保护治疗提供了潜在的转化策略。

摘要编号: 200926

外周血细胞转录组分析为视网膜中央动脉阻塞提供新见解

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目的: 视网膜中央动脉阻塞 (CRAO) 是一种常见的急性视网膜缺血性疾病。然而, 由于缺乏有效的生物标志物, CRAO 的早期诊断颇具挑战性。本研究旨在通过分析转录组来识别 CRAO 进展的新生物标志物和机制。

方法: 从 9 名白内障患者和 16 名视网膜中央动脉阻塞 (CRAO) 患者身上采集了血液样本, 以探究 CRAO 的转录组水平机制。在确定差异表达基因 (DEGs) 后, 对这些 DEGs 进行了基因本体论 (GO) 和京都基因与基因组百科全书 (KEGG) 通路富集分析。接下来, 利用 Cytoscape 构建并可视化蛋白质-蛋白质相互作用网络。通过插件 MCODE 确定基因模块, 并使用插件 CytoHubba 确定枢纽基因。利用在线工具 GeneMANIA 对所确定的枢纽基因进行基因-基因相互作用预测。使用 Cibersort 算法进行免疫细胞浸润分析。

结果: 对视网膜中央动脉阻塞 (CRAO) 患者外周血单核细胞进行的 RNA 测序分析发现了差异表达的基因。主成分分析显示, CRAO 动脉样本与对照组 (V-C 组) 之间以及静脉样本与对照组 (A-V 组) 之间存在明显的分离。A-V 组中差异表达的基因富集于核糖体中, 而 V-C 组则在抗原加工/呈递和 MHC 相关蛋白方面有额外的富集。基因集富集分析显示, 两组中均富集了 MHC 相关基因和细胞分裂/增殖通路。蛋白质相互作用网络分析确定

RPS9、RPS2、RPS14 和 RPS5 为 A-V 组的核心基因。HLA-F、RPS25、RPS18、HLA-DMA 是 V-C 组的核心基因。共表达网络强调了核糖体在两组中的参与，而 V-C 组还具有额外的免疫反应。免疫细胞浸润分析表明，动脉样本中中性粒细胞和 CD4⁺ 记忆 T 细胞增多，静脉样本中 CD4⁺ 初始 T 细胞增多，与对照组相比均有差异。

结论： 这项生物信息学研究确定了核糖体蛋白（如 RPS2 和 RPS7）、HLA 基因（如 HLA-F）、PSMB9 以及抗原加工分子（如 TAPBP）等为可能的 CRAO 检测标志物。这些候选基因为 CRAO 的预防、诊断、治疗和预后研究提供了新的方向。

摘要编号：201077

白天和夜间条件下白内障患者的色差：评估及其与晶状体混浊的相关性

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目的： 探讨白内障患者在白天和夜间条件下的色彩辨别能力及其与晶状体混浊度的关系。

方法： 使用专用软件工具对 68 名白内障患者进行七种色调（红、橙、黄、绿、青、蓝、紫）的色彩辨别能力评估。采用成对 Spearman 相关分析，检验患者在白天和夜间条件下色彩辨别阈值之间的关系。对晶状体混浊度进行量化，并将其与色彩分辨阈值（定义为每个颜色范围内可区分的最小波长差）进行相关性分析。

结果： 所有 68 名患者均成功完成色觉评估。白内障患者红色和绿色的得分最低（ $p < 0.05$ ）。在白天条件下，橙色和蓝色的得分呈负相关（ $r = -0.57, p < 0.05$ ）。夜间，紫色与绿色（ $r = 0.59, p < 0.05$ ）、紫色与蓝色（ $r = 0.52, p < 0.05$ ）以及蓝色与绿色（ $r = 0.46, p < 0.05$ ）评分呈正相关。晶状体密度和精细颜色辨别分析显示，白天晶状体密度与青色和紫色评分呈负相关（ $p < 0.05$ ），夜间晶状体密度与紫色评分呈负相关（ $p < 0.05$ ）。

结论： 白内障相关晶状体混浊会损害颜色辨别能力。由于蛋白质聚集、晶状体散射增加以及中心区域折射率的改变，白内障晶状体会导致红绿视功能下降，改变颜色间关系，并降低短波长光的分辨率。这些发现强调了全面色觉评估在白内障管理中的重要性，并指出了保护老龄化人群视觉功能的潜在目标。

摘要编号：209798

类器官来源人视网膜祖细胞外囊泡通过线粒体转运调控小胶质细胞治疗视网膜变性的作用机制研究

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目的： 研究类器官来源人视网膜祖细胞外囊泡（hERO-RPC-EVs）通过线粒体转运调控小胶质细胞活化治疗视网膜变性的作用及机制，为针对视网膜疾病开发无细胞疗法及揭示干细胞治疗机制提供理论依据

方法： 采用梯度离心法获得 hERO-RPC-EVs，采用 NTA、电镜、western blot 检测 EV 的特征。将 hERO-RPC-EVs 经 PKH26 标记移植入视网膜变性 RD10 小鼠视网膜下腔，检测 EV 分布，采用 fERG 检测 EV 移植后功能改善，评估外节长度及外核层厚度，检测凋亡细胞数量，检测小胶质细胞数量、形态、分型及代谢的变化。采用免疫荧光检测 hERO-RPC-EVs 向小胶质细胞线粒体转运的特点。采用离体模型验证 hERO-RPC-EVs 对激活的小胶质细胞炎症和糖酵解代谢的作用。

结果： NTA、电镜、western blot 检测 hERO-RPC-EVs 的粒径、形态、标志性蛋白符合外囊泡特征。在术后 4 天可以在视网膜下腔检测到大量 PKH26⁺ 颗粒，术后 1 周、2 周后向视网膜内层迁移。术后 2 周，fERG 检测 hERO-RPC-EVs 组 b 波幅值显著高于 PBS 组。在术后 1 周、2 周 hERO-RPC-EVs 组 GNAT-1 外节长度和外核层厚度显著大于 PBS 组。此外，hERO-RPC-EVs 移植抑制 IBA1⁺ 小胶质细胞数量及 CD16⁺M1 型小胶质细胞数量，同时降低其糖酵解标志物 PKM2 的表达。此外，hERO-RPC-EVs 能向 RD10 小鼠视网膜小胶质细胞中传递线粒体。进一步经免疫荧光、电镜及 western blot 显示 hERO-RPC-EVs 中富含线粒体组分。离体实验表明 hERO-RPC-EVs 能抑制 LPS 和 IFN- γ 处理后的小胶质细胞炎症基因和糖酵解相关基因表达。

结论： 本研究发现 hERO-RPC-EVs 作为一种新型的外囊泡来源，移植后能够有效保护 RD10 小鼠的视网膜结构与功能，并抑制小胶质细胞的活化及糖酵解代谢标志物的表达。其潜在机制可能是通过外囊泡介导的线粒体转运，调控小胶质细胞的糖酵解代谢过程，进而抑制炎症反应。该研究基于外囊泡的代谢免疫新视角揭示了干细胞治疗新机制，有望开发成为针对视网膜变性的新型细胞药物。

摘要编号: 204572

糖尿病视网膜病变新型温敏水凝胶复合物治疗研究

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共同作者: Lihui WEN

目的: 本研究旨在开发一种负载 si-Cx43 纳米颗粒和抗 VEGF 药物的温敏水凝胶复合物 (si-Cx43-NPs@Avastin-hydrogel), 用于协同治疗糖尿病视网膜病变 (DR), 解决现有治疗中生物利用度低和频繁侵入性注射的问题。

方法: 采用脂质-聚合物-siRNA 复合物 (LPP) 技术制备 si-Cx43 纳米颗粒, 并将其与抗 VEGF 药物 (Avastin) 共同封装于温敏水凝胶中。通过凝胶阻滞实验、RNase 保护实验和透射电镜对纳米颗粒进行表征。评估水凝胶的凝胶化、可注射性和降解特性。在体外使用高糖条件下的人视网膜内皮细胞 (hRECs) 模型, 通过 CCK-8、Transwell 迁移实验和管形成实验评估细胞毒性、抗血管生成作用和通透性调节。在糖尿病视网膜病变大鼠模型中评估体内治疗效果, 包括光学相干断层扫描 (OCT) 分析视网膜结构、H&E 染色和 TUNEL 检测。

结果: si-Cx43 纳米颗粒显示出高 siRNA 包封效率 (57.81%) 和稳定性, 能有效沉默视网膜内皮细胞中 Cx43 表达。水凝胶表现出优异的可注射性、温度敏感凝胶化和可控降解特性。体外实验表明, si-Cx43-NPs@Avastin-hydrogel 显著抑制 VEGF 表达, 减少血管生成, 并在高糖条件下恢复细胞通透性。体内实验显示, 水凝胶复合物比单一药物治疗更能有效减少新生血管形成、炎症和细胞凋亡, 恢复视网膜结构和功能。生物相容性研究证实其毒性最小且降解良好。

结论: si-Cx43-NPs@Avastin-hydrogel 通过靶向血管生成、炎症和神经保护的多重作用机制, 为糖尿病视网膜病变提供了一种协同、微创的治疗策略, 具有持续药物释放的优势, 展现出良好的临床应用前景。

摘要编号: 210308

老年大鼠脉络膜新生血管形成过程中的眼部代谢特征研究

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目的: 年龄相关性黄斑变性 (AMD) 是 50 岁以上人群致盲的主要原因之一。尽管其发病机制尚未完全阐明, 但普遍认为这是一种由代谢紊乱与环境因素相互作用导致的多因素疾病。通过评估 AMD 中

的代谢组学变化, 可以为揭示其发病机制提供重要线索。

方法: 本研究采用年轻 (7 周龄) 和老年 (24 月龄) Brown Norway 大鼠作为实验对象, 通过激光诱导法建立脉络膜新生血管 (CNV) 模型。7 天后, 利用 Micron IV 视网膜成像显微镜观察并记录 CNV 的形成情况。随后, 处死所有大鼠, 采集完整视网膜组织样本, 采用超高效液相色谱-质谱联用技术 (UHPLC-MS/MS) 进行全局非靶向代谢组学分析。数据分析部分, 使用 MetaboAnalyst 软件进行主成分分析 (PCA) 和火山图分析, 以筛选显著差异代谢物。进一步通过单变量分析对差异代谢物进行代谢通路富集分析, 揭示潜在的关键代谢通路。统计学分析采用非配对双尾 t 检验或方差分析 (ANOVA), 并以 Bonferroni 校正进行多重比较, 以确定组间差异的显著性 ($P < 0.05$ 为具有统计学意义)。

结果: 实验结果显示, 老年大鼠的脉络膜新生血管 (CNV) 面积显著大于年轻大鼠 ($1.48 \pm 0.65 \text{ mm}^2$ vs. $0.92 \pm 0.56 \text{ mm}^2$, $P < 0.05$), 表明老年个体更易发生 CNV。代谢组学分析共鉴定出 103 种在年轻与老年 CNV 视网膜之间存在显著差异的代谢物。进一步通路分析表明, 脂肪酸代谢、葡萄糖代谢 (特别是三羧酸循环) 以及氨基酸代谢 (如丙氨酸、天冬氨酸和谷氨酸代谢) 是主要受影响的代谢通路。具体而言, 老年视网膜中硬脂酰肉碱和油酰肉碱水平显著升高, 而乳酸、谷氨酸、乙酰肉碱、氧化型谷胱甘肽及牛磺酸水平则显著降低。这些代谢变化提示, 老年视网膜可能存在线粒体功能失调、能量代谢紊乱以及抗氧化能力下降等病理生理特征。

结论: 老年个体眼部更易发生脉络膜新生血管 (CNV), 这一现象可能与老年视网膜中显著的代谢变化密切相关。线粒体功能失调导致的能量代谢紊乱、葡萄糖代谢途径 (如三羧酸循环) 的异常, 以及老年眼部抗氧化应激能力的显著下降, 可能是驱动 CNV 形成的关键因素。这些代谢变化不仅揭示了老年视网膜的病理生理特征, 也为进一步探索 CNV 的分子机制和潜在治疗靶点提供了重要依据。

摘要编号: 204396

靶向乳酸敏感小胶质细胞的工程化纳米囊泡抑制增殖性糖尿病视网膜病变新生血管

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共同作者: Jian YE

目的: 增殖性糖尿病视网膜病变 (PDR) 是糖尿病患者失明的主要原因之一。尽管已有研究发现乳酸的升高与 PDR 的预后密切相关, 但乳酸如何影响

病理性新生血管的具体机制尚未阐明。在我们前期的研究中，发现 PDR 患者的视网膜中存在一类对乳酸敏感的 MKI67 阳性小胶质细胞。因此，本研究旨在通过靶向乳酸敏感的 MKI67 小胶质细胞，开发一种能够抑制 PDR 新生血管形成的工程化纳米囊泡系统，以期 PDR 的治疗提供新的策略。

方法：首先，我们收集了来自糖尿病视网膜病变患者的临床数据，分析了与 MKI67 表达密切相关的 miRNA。通过生物信息学分析和临床数据筛选，确定了能够调控 MKI67 的 miRNA 分子。在体外实验中，我们通过人小胶质细胞系中过表达 MKI67，观察工程化外泌体对 MKI67 的抑制作用，并分析其对细胞增殖、迁移及新生血管形成的影响。此外，为了验证该策略的临床应用潜力，我们在小鼠氧诱导视网膜病变（OIR）模型中进行体内实验，评估工程化纳米囊泡在抑制新生血管形成方面的效果。

结果：首先，我们预测了 miR-10 与 MKI67 高效结合。在体外实验中，使用原代巨噬细胞过表达 miR10 来源的工程化外泌体（miR10-Mexo）对 MKI67 阳性小胶质细胞进行了处理，结果显示 miR10-Mexo 能够显著抑制 MKI67 的表达，减少小胶质细胞的增殖和迁移。同时，miR10-Mexo 还有效地减少了新生血管的形成，证明了其在控制病理性血管生成中的潜力。在 OIR 模型中，治疗组小鼠在使用 miR10-Mexo 后，视网膜的新生血管数量显著减少，血管密度降低，表明这种靶向乳酸敏感小胶质细胞的纳米囊泡系统能够有效抑制糖尿病视网膜病变中的病理性血管生成。此外，病理学分析显示，miR10-Mexo 治疗能够显著减轻血管渗漏。

结论：本研究开发了一种靶向乳酸敏感小胶质细胞的工程化纳米囊泡（miR10-Mexo），成功地通过调控 MKI67 表达抑制了增殖性糖尿病视网膜病变中的新生血管形成。我们的结果为治疗 PDR 提供了一种新的靶向干预策略，开启了调控乳酸干预视网膜病理性新生血管的新纪元。

摘要编号：210285

靶向调控 SIRT1-内质网应激（ERS）通路对 MNU 诱导的 661W 感光细胞损伤的保护作用

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目的：本研究旨在系统探讨 SIRT1-ERS 信号通路在 MNU 诱导的 661W 感光细胞损伤中的作用，并评估通过药物调控 SIRT1（使用激动剂 SRT1720 和抑制剂 EX527）和 ERS（使用激动剂 TUN 和抑制剂 4-PBA）的细胞保护效应。

方法：采用 N-甲基-N-亚硝基脲（MNU）处理小鼠 661W 感光细胞系以诱导细胞损伤。为探究 SIRT1-ERS 通路的作用，进行了以下靶向药物干预：SIRT1 调控：使用 SIRT1 激动剂 SRT1720（10、50 或 100 $\mu\text{g/mL}$ ）或抑制剂 EX527 处理细胞。ERS 调控：使用 ERS 激动剂 TUN 或抑制剂 4-PBA 处理细胞。此外，还使用 ALDH2 调节剂（激动剂 Alda-1 和抑制剂 Daidzin）作为对照进行比较分析。通过光学显微镜观察细胞形态，并评估细胞活力。药物以小分子化合物形式或（在适用情况下）颗粒制剂形式给药，以排除递送载体本身可能造成的假象影响。

结果：ERS 抑制对细胞活力和形态具有保护作用：ERS 抑制剂 4-PBA 处理显著维持了细胞的纤维状延展形态和完整的膜结构。相比之下，未经处理的 MNU 损伤组细胞普遍出现漂浮、细胞边缘皱缩等现象，提示细胞应激与退化。这些结果表明，抑制 ERS 可有效缓解 MNU 诱导的损伤，稳定细胞稳态。SIRT1 调控呈现浓度依赖性效应：SIRT1 抑制剂 EX527 加重了细胞损伤，导致细胞活性下降和形态破坏。SIRT1 激动剂 SRT1720 表现出浓度依赖性作用：高浓度（100 $\mu\text{g/mL}$ ）处理时，细胞迅速圆缩、脱落并大量死亡，提示该剂量下药物毒性效应占主导。而在低浓度范围（10–50 $\mu\text{g/mL}$ ），尤其是 50 $\mu\text{g/mL}$ 时，SRT1720 能维持良好的细胞形态（纤维状特征明显，膜结构完整），并显著提高细胞存活率，优于 MNU 模型组。非颗粒制剂显示保护效应，排除载体假象：包括 4-PBA、SRT1720（50 $\mu\text{g/mL}$ ）、Alda-1 和 Daidzin 在内的有效保护剂均以非颗粒形式（小分子化合物）给药，显示出明确的保护作用；而以颗粒形式给药的 TUN 和 EX527 则显著加重细胞损伤。这一对比说明，所观察到的细胞保护效应来源于特定通路调控分子本身的生物活性，而非递送载体的固有保护特性。

结论：本研究结果表明，SIRT1-ERS 信号通路在 MNU 诱导的 661W 感光细胞损伤中发挥关键作用。通过 4-PBA 抑制 ERS 以及使用低剂量 SRT1720 适度激活 SIRT1，可有效抵御细胞损伤，维持细胞形态并提高细胞活力。

眼科学术、研究、教学与教育

摘要编号: 210265

TNF- α 预处理的间充质干细胞来源小细胞外囊泡缓解视网膜炎症损伤

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目的: 探讨肿瘤坏死因子- α (TNF- α) 预处理的间充质干细胞 (MSC) 来源的小细胞外囊泡 (T-sEV) 的抗炎作用及在视网膜变性模型中的治疗潜力。

方法: 采用差速离心法分离 TNF- α 预处理的 MSC 来源的 T-sEV, 并通过 TEM、NTA 和 Western blot 进行表征。利用 miRNA 测序、生物信息学分析及体外巨噬细胞共培养, 探究 T-sEV 的 miRNA 谱及其抗炎机制。整合囊泡 miRNA 与受体细胞转录组数据, 构建调控网络。最后, 在 NaIO₃ 诱导的小鼠视网膜变性模型中, 通过 ERG、OCT、流式细胞术和安全性指标评估 T-sEV 的体内疗效。

结果: 成功分离出具有典型形态、大小 (< 200 nm) 及阳性标志物 (ALIX、CD81、TSG101) 的高纯度 T-sEV。其携带的 mmu-miR-146a-5p 等 miRNA 显著富集, 这些 miRNA 的预测靶基因主要涉及 MAPK 等炎症相关通路。T-sEV 能被巨噬细胞高效内化, 并较未处理 MSC 来源的 sEV 更强效地抑制 CD11b+/CD86+ 炎症性巨噬细胞的活化。整合分析揭示, T-sEV 中富集的 miRNA 与受体细胞内下调的促炎基因存在关联。在动物模型中, T-sEV 治疗能显著改善视网膜功能与结构, 更强效地抑制视网膜巨噬细胞浸润, 且未引起眼压或主要血液生化指标的显著改变, 安全性良好。

结论: TNF- α 预处理通过改变 MSC-sEV 的 miRNA, 使其能够通过靶向关键炎症信号通路, 协同抑制巨噬细胞的促炎活化, 从而在视网膜变性模型中发挥更强的抗炎疗效和神经保护作用, 且具备良好的安全性, 展现出潜在的治疗价值。

摘要编号: 210048

cGAS-STING 信号通路通过促进小胶质细胞糖酵解加剧湿性年龄相关性黄斑变性的作用机制研究

第一作者: Mei DU

目的: 免疫炎症反应是湿性年龄相关性黄斑变性 (wetAMD) 的重要风险因素, 但其调控血管新生的机制尚不清楚。模式识别受体 cGAS-STING 通路是感受细胞损伤触发炎症与免疫防御的关键通路。此外, STING 在视网膜小胶质细胞中高表达,

并在在脉络膜新生血管 (CNV) 模型中上调。因此, 本课题拟深入研究视网膜小胶质细胞 cGAS-STING 通路在 AMD 病理过程中的作用及机制, 以期揭示 DNA 感受通路 cGAS-STING 调控 AMD 发生发展的重要概念。

方法: 本课题将构建 STING 全敲以及小胶质细胞特异性敲除小鼠, 利用激光 CNV 模型模拟 wetAMD 疾病, 评估 STING 敲除对 CNV 模型中血管新生和渗漏的影响。此外还通过单细胞测序, 细胞交互作用分析, co-IP 等方法深入解析小胶质细胞 cGAS-STING 通路影响 CNV 疾病进展的分子机制。

结果: 本课题发现: 1. STING 信号通路在小鼠激光 CNV 模型中显著激活, 敲除 sting 对小鼠 CNV 进展具有明显的保护作用; 2. 小鼠 CNV 模型中上调的 STING 主要发生在视网膜小胶质细胞, 小胶质细胞特异敲除 sting 对 CNV 进展具有显著的保护作用; 3. 在衰老小鼠和 CNV 造模小鼠中, 线粒体和细胞核 DNA 的胞质泄露是激活 cGAS-STING 的潜在机制; 4. 小胶质细胞 STING 信号通路的激活会促使小胶质细胞向促炎和促进血管新生表型转变, 从而促进了 CNV 进展。

结论: 该研究表明衰老的视网膜存在胞质 DNA 积累, 从而激活 cGAS-STING 通路促进 wetAMD 疾病进展的作用, 此外, 我们首次揭示了 STING 能够影响小胶质细胞糖酵解和促血管新生表型的转变, 该研究为湿性 AMD 的防治提供了新的思路和新的治疗策略。

摘要编号: 209484

单细胞测序揭示载脂蛋白 A1 通过靶向巨噬细胞代谢重编程抑制脉络膜新生血管

第一作者: Likun LIN

共同作者: Andina HU

目的: 巨噬细胞驱动的炎症和脂质代谢紊乱是脉络膜新生血管 (CNV) 的关键驱动因素, 但其精确调控机制尚不完全清楚。载脂蛋白 A1 (Apoa1) 作为胆固醇逆向转运的核心蛋白, 其在新生血管性年龄相关性黄斑变性 (nAMD) 中的作用尚存争议。本研究旨在阐明内源性 Apoa1 在 CNV 病理进程中的确切功能, 并深入探究其是否通过调控巨噬细胞的脂质代谢稳态和功能极化来发挥作用。

方法: 1: 我们在野生型 (WT)、Apoa1 基因敲除 (Apoa1-KO) 和 Apoa1 过表达 (Apoa1-OE) 小鼠中建立了激光诱导的 CNV 模型。通过 OCT、FFA、H&E 染色和 CD31 免疫荧光对 CNV 表型进行多模态定量评估。2: 采用单细胞 RNA 测序 (scRNA-seq) 对 WT 和 Apoa1-KO 小鼠的 RPE

／脉络膜组织进行分析，鉴定细胞亚群并进行差异基因、功能富集和细胞通讯分析。3：通过免疫荧光（CD68，F4/80，Filipin）和对磁珠分选的巨噬细胞进行 Western Blot（VEGFA，TNF- α ，IL-1 β ），对关键发现进行功能性验证。4：最后，通过玻璃体腔注射 ABCA1 抑制剂（Probucol）和 ApoA1 模拟肽（D-4F）进行药理学干预，以验证机制并评估治疗潜力。

结果：1：ApoA1 的表达水平与 CNV 的严重程度呈负相关：ApoA1-KO 小鼠的 CNV 病灶面积、体积和血管渗漏均显著增加；而 ApoA1-OE 小鼠则受到明显抑制。2：scRNA-seq 分析显示，ApoA1 缺乏导致脉络膜微环境中巨噬细胞比例显著增加，并呈现强烈的促炎转录特征。深度亚群分析鉴定出一个全新的致病性亚群——“促血管生成型巨噬细胞”（Angio-Macro），其高表达 Vegfa，Pigf 和 Il18。该亚群在 ApoA1-KO 小鼠的巨噬细胞总量中比例特异性升高，并作为核心信号中枢，通过 VEGF 和 TNF 等通路驱动病理进程。3：机制上，药理学抑制 ABCA1（ApoA1 的主要受体）会导致巨噬细胞内胆固醇显著积聚，并完全模拟 ApoA1-KO 的严重表型，同时逆转 ApoA1-OE 的保护作用。4：最后，玻璃体腔注射 ApoA1 模拟肽 D-4F 能有效抑制 CNV 进展，并显著降低 VEGFA，TNF- α 和 IL-1 β 的蛋白水平。

结论：本研究揭示了 ApoA1 在 CNV 中的关键保护机制。ApoA1 通过其受体 ABCA1 维持巨噬细胞的胆固醇外排，阻止其发生代谢重编程，并抑制其向致病性的“Angio-Macro”亚群极化。这一过程作为眼内的“免疫代谢检查点”，有效抑制了炎症和病理性血管生成。靶向 ApoA1-ABCA1 通路（如使用 D-4F 模拟肽）为 nAMD 提供了一种极具前景的新型治疗策略。

摘要编号：201342

压力作用下大鼠视乳头星形胶质细胞中 Piezo1 通道对活化过程中炎症反应的调控研究

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共同作者：Niu XUEHONG, Jing YONGJIE, Zhang ZHONGZHI

目的：青光眼是慢性视神经退行性损伤疾病。高眼压是青光眼最明确、最主要的危险因素，视乳头筛板区域是青光眼的初始损伤部位。视乳头筛板区域的星形胶质细胞能够敏感地早期感受和响应眼压波动导致的机械刺激，发生活化，但活化与青光眼损伤之间的联系机制尚不明确，推论由于星形胶质细胞是该区域占绝对优势的细胞，而 AS 的压力敏感特性在高眼压与轴突变性之间也构成了一种联系，

因此压力介导的 AS 活化可能在青光眼发病过程中具有重要意义。Piezo1 是一种新发现的机械敏感离子通道，可被机械力直接激活。本研究通过体外加压体系处理大鼠视乳头星形胶质细胞（ONHAs），探究 Piezo1 通道对活化过程中炎症反应的调控作用。

方法：ONHAs 细胞不同压力分别作用 24 小时，观察 Piezo1 的表达，检测 TNF α ，Piezo1 蛋白及 mRNA；GsMTx4 处理细胞，检测 TNF α 。

结果：随着压力的增加，细胞分泌的 TNF α 增加，Piezo1 的表达也增多，Piezo1 变化 TNF α 的水平呈同步趋势；60 mmHg 下，使用 GsMTx4，TNF α 明显减少。

结论：Piezo1 参与了压力下的星形胶质细胞活化的调控，促进炎症因子释放。

摘要编号：209018

基于全基因组关联分析和单细胞转录组学的脊柱关节炎 /HLA-B27 相关急性前葡萄膜炎发病机制研究

第一作者：Xiao LIU

共同作者：Shuming CHEN

目的：脊柱关节炎（SpA）/HLA-B27 相关性急性前葡萄膜炎（AAU）患者会反复出现急性发作，给患者的视觉和经济带来巨大挑战。尽管脊柱关节炎与 HLA-B27 相关性急性前葡萄膜炎（AAU）之间已建立了联系，但其中涉及的确切机制仍不清楚，需要进一步了解才能有效预防和治疗。

方法：为了研究 SpA/HLA-B27 相关 AAU 的急性发病机制，我们采用了孟德尔随机化（MR）和单细胞转录组分析。孟德尔随机分析结合了以往研究中公开的蛋白质定量性状位点数据以及公共数据库中的全基因组关联研究数据。使用双样本 MR 评估了血浆蛋白与前葡萄膜炎之间的因果关系。此外，还使用贝叶斯共定位法进行了共定位分析。单细胞转录组分析利用了基因表达总库（GEO）数据库中的前葡萄膜炎数据集。随后进行了降维、聚类、转录因子分析、分析和细胞通讯分析，以探索相关的潜在机制。

结果：孟德尔随机分析显示，循环中的 AIF1 和 VARS 水平与 SpA/HLA-B27 相关性 AAU 发病风险的降低有显著相关性，其中 AIF1 与前葡萄膜炎发病有很强的相关性。共定位分析证实了这些发现。单细胞转录组分析显示，AIF1 主要在骨髓细胞中表达，而在 HLA-B27 阳性组中的表达量明显较低。拟时序分析显示，树突状细胞在分化分支中处于末端位置，同时 AIF1 的表达逐渐下降。根据

细胞通讯分析, CD141 + CLEC9A + 典型树突状细胞 (cDCs) 和 APP 通路在 SpA/HLA-B27 组的细胞通讯中起着关键作用。

结论: AIF1 对 SPA/HLA-B27 相关 AAU 的发病机制至关重要。髓系细胞分化为 DC 和 AIF1 水平下降也是这一过程的关键。

摘要编号: 209020

机器学习与单细胞 RNA 测序揭示肿瘤内 CD8⁺ T 细胞与葡萄膜黑色素瘤转移的关联

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共同作者: 陈树明

目的: 葡萄膜黑色素瘤 (UM) 是成人最常见的原发性眼内恶性肿瘤。研究发现 40% 的患者在后续治疗中会发生远处转移。虽然已有研究利用机器学习方法构建多基因模型评估转移及预后, 但免疫微环境影响肿瘤微环境的具体机制尚未阐明。单细胞转录组测序技术能精准识别组织中不同细胞类型进行精确分析。本研究旨在构建基因数量更少的评估 UM 患者转移风险的模型, 并为 UM 免疫治疗提供理论依据。

方法: 采用 TCGA 数据库中 79 例 UM 患者的 RNA-seq 数据及临床信息构建预后模型, 并基于 GEO 数据库的两个单细胞数据集探究机制。筛选转移相关基因后, 通过 GO 和 KEGG 进行富集分析; 采用 log-rank 检验和单因素 Cox 回归筛选预后基因, 通过 LASSO 回归分析和多因素 Cox 回归分析建立预后模型。以 TCGA-UVM 数据集作为内部验证, GSE22138 数据集作为外部验证数据, 建立时间依赖性受试者工作特征曲线 (time-ROC) 评估模型预测能力。随后对 GSE138665 和 GSE139829 进行降维、聚类、拟时序分析和细胞通讯分析以探究潜在机制, 并通过细胞实验验证相关发现。

结果: 基于 TCGA-UVM 队列 79 例样本的临床特征和 RNA-seq 转录组数据, 筛选出 247 个转移相关基因, 通过 lasso 回归和多因素 cox 回归构建了 SLC25A38、EDNRB 和 LURAP1 三个基因的生存模型。Kaplan-Meier 生存分析显示高风险组 UM 患者的总生存期 (OS) 和无转移生存期 (MFS) 更差。时间依赖性 ROC 曲线表明该模型在 6 个月、18 个月和 30 个月的预后预测中具有高性能。细胞划痕实验显示, 三个基因低表达细胞的 24h 和 48h 迁移率显著高于 si-NC 组。免疫浸润分析提示 CD8⁺ T 细胞可能在肿瘤转移中起重要作用。单细胞转录组数据探索发现, 转移高风险组中细胞毒性 CD8⁺ T 细胞比例增加, 其通讯强度显著增强, 但两组 CD8⁺ T 细胞状态存在差异: 高风险组 CD8⁺ T 细胞

数量虽多, 但多处于耗竭和未分化状态, 而低风险组 CD8⁺ T 细胞多为功能状态。

结论: 本研究构建了精准稳定的三基因模型用于预测患者转移风险及预后, 并证实肿瘤微环境中 CD8⁺ T 细胞耗竭在 UM 转移中起关键作用。

摘要编号: 209022

源自 ihRPESCs 外泌体的环状 RNA 对光损伤视网膜细胞的保护机制研究

第一作者: Xiao LIU

共同作者: Shuming CHEN

目的: 探讨球体诱导的人视网膜色素上皮干细胞 (ihRPESCs) 来源的外泌体环状 RNA (circRNA) 对光损伤视网膜色素上皮 (hRPE) 细胞的保护作用及其分子机制。

方法: 从人视网膜组织中提取并培养原代 hRPE 细胞, 通过微球体诱导获得 ihRPESCs。构建蓝光诱导的 hRPE 细胞光损伤模型, 利用 Transwell 系统共培养 ihRPESCs 与光损伤 hRPE 细胞。采用透射电镜和纳米颗粒追踪分析鉴定外泌体。通过 circRNA 芯片分析和生物信息学方法筛选差异表达的 circRNA, 并利用 RT-qPCR、细胞划痕实验、CCK-8 和流式细胞术验证关键 circRNA 的功能及其调控机制。

结果: hRPESCs 具备干细胞特性。其来源的外泌体可显著改善光损伤 hRPE 细胞的增殖并抑制其凋亡。circRNA 芯片分析发现, ihRPESCs 外泌体中 hsa-circRNA-403328 显著高表达。功能实验证实, 干扰 hsa-circRNA-403328 会削弱外泌体促进细胞迁移、增殖及抗凋亡的保护作用。生物信息学分析提示, hsa-circRNA-403328 可能通过吸附 hsa-miR-135-5p 进而调控靶基因表达。

结论: ihRPESCs 来源的外泌体通过递送高表达的 hsa-circRNA-403328, 调控 hsa-miR-135-5p/NPTX1/ADAMTS9/DEPDC1/MEGF11 通路, 从而保护光损伤的 hRPE 细胞, 为视网膜退行性疾病的治疗提供了新的潜在靶点。

摘要编号: 201897

眼科创新教育与研究

第一作者: Xianwei LI

目的: 针对传统眼科教学中临床资源分配不均、手术培训风险高等痛点, 本研究提出“数字孪生 + 临床路径”的虚实融合教育模式, 旨在通过构建可交互的虚拟眼解剖模型与智能病例库, 实现从技能培训到临床决策的全链条能力提升。

方法：教育技术创新开发基于 Unity3D 的虚拟现实（VR）眼解剖训练系统，集成触觉反馈模块模拟手术操作建立动态病例库：运用自然语言处理（NLP）技术从电子病历中提取典型病例特征设计“三维认知—模拟操作—病例复盘”三阶段教学闭环教学实施路径在住院医师规范化培训中开展对照试验（实验组：VR 教学 + 智能病例；对照组：传统示教）通过多维度评估体系（操作评分、决策树分析、临床胜任力量表）追踪教学效果。

结果：教学效能提升 实验组学员显微手术操作考核优秀率提高 40%，平均培训周期缩短 30%；虚拟病例训练使临床决策准确率提升至 92%，误诊率下降 25%。模式创新价值 建立可复制的“数字导师”系统，实现个性化教学进度调控；开发跨平台教学资源包（含 200+ 交互式病例），支持移动端碎片化学习。

结论：本研究通过实证分析证实，虚实融合教育模式能够有效突破传统眼科教学在时间和空间上的双重限制。其创新性体现在“技术赋能—临床反哺”的双向互动机制：一方面，VR/AR 等数字技术为临床教学提供沉浸式训练场景；另一方面，临床实践反馈又能持续优化技术应用。这种闭环机制不仅提升了教学效率，更为医学教育改革提供了可复制的新范式。展望未来，该模式可重点拓展至基层医师继续教育领域，通过远程培训、案例共享等方式，促进三甲医院优质医疗资源向县域医疗机构下沉，助力分级诊疗体系建设。

摘要编号：207858

眼科年轻医生多元化手术培养模式的建立

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目的：总结北京协和医院眼科对不同专业组、不同层次年轻医生手术培养的模式和效果。

方法：通过建立规范的进阶考核制度、手术授权制度、教师激励制度对科室年轻医生手术教学进行流程规范与激励，以白内障手术做为内眼手术基本手术要求，通过多元化的教学方式如模拟器手术培训、wetlab 手术培训、通过临床博士后手术日跟随指导教师、轮转眼底组前后联合手术、国内国际健康快车光明行等多种方式进行分阶段培养。同时科室定期开展年轻医生手术视频点评会议，不定期开展疑难手术分享。

结果：近年来眼科年轻医生内眼手术技术能力明显提高，成长速度加快。完成临床博士后培训进入初年主治医生阶段，年轻均可独立完成白内障手术，

在主治医期间能完成常规眼底手术，副主任医师均可独立完成本专业组手术，获得手术授权。

结论：分阶段、分层次、多元化手术培养模式，有助于年轻医生手术技能的培训与成长。

摘要编号：210328

线粒体融合蛋白 2 对小鼠视网膜生后发育及稳态维持的作用与机制研究

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共同作者：Hongjin LI, Haoyu NIU

目的：本研究旨在利用转基因小鼠模型探究线粒体融合蛋白 2（Mitofusin2, Mfn2）在哺乳动物视网膜生后发育过程及后续稳态维持中的作用。

方法：利用 Cre/loxP 系统，将 Mfn2^{flox/flox} 小鼠与神经外胚层特异性表达 Cre 重组酶的小鼠（Six3-cre）进行杂交获得条件性敲除视网膜 Mfn2 基因小鼠（CKO 小鼠），以同窝 Cre 阴性小鼠作为对照组小鼠（Control）。① 选取 10 周龄 CKO 小鼠及同窝对照组小鼠进行眼前节照相、眼底照相、光学相干层析成像（OCT）、视网膜电图（ERG）及眼底血管荧光造影等在体眼科检查，评估成年后敲除组小鼠视网膜功能，观察 CKO 小鼠视网膜形态结构的变化。② 取生后第 7、14、21 及 28 天 CKO 及对照组小鼠视网膜，利用免疫荧光方法对视网膜内四种主要类型细胞（神经节细胞、双极细胞、Müller 细胞及光感受器细胞）进行染色，观察各类细胞数量及形态变化。

结果：特异性敲除神经外胚层 Mfn2 基因对小鼠视网膜发育的影响：① 视功能减弱：10 周龄 CKO 小鼠 ERG 结果显示 b 波振幅明显减小；② 视网膜结构改变：成年 CKO 小鼠眼球内部组织排列基本正常，但视网膜全层厚度变薄，其中内丛状层厚度变化最明显；③ 眼底彩照示：CKO 小鼠视网膜血管密度减小，视神经出现萎缩；④ CKO 小鼠的异常变化于出生后第 7-14 天开始显现，进展至生后第 28 天时趋于稳定，提示 Mfn2 可能主要作用于小鼠视网膜发育晚期，P14 时，较对照组小鼠视网膜相比，CKO 小鼠视网膜神经节细胞逐渐丢失伴随双极细胞轴突变短。

结论：Mfn2 参与小鼠视网膜发育过程，尤其对于生后发育晚期阶段具有重要作用：1) 神经外胚层特异性敲除 Mfn2 导致成年小鼠视功能受损，视神经萎缩，血管密度异常。2) Mfn2 参与内侧视网膜结构的形成过程：缺失 Mfn2 导致视网膜神经节细胞逐渐丢失，伴随双极细胞轴突变短。Mfn2 的这些功能表现可能有助于我们更好地理解视网膜发育各阶段中的基因调控方式，同时希望为深入探究线粒体相关视网膜疾病的潜在机制提供一些帮助。

摘要编号: 208957

肠道菌群调控策略延缓增殖期糖尿病视网膜病变小鼠模型的进展

第一作者: Xiangyu FU

目的: 肠道菌群失调被发现代谢性疾病如糖尿病的病变过程中具有重要作用, 肠-眼轴也是目前眼科研究的热点。我们前期研究发现增殖期糖尿病视网膜病变(PDR)小鼠出现肠道菌群失调、代谢紊乱, 这可能是高血糖导致PDR的重要机制。本研究拟探讨调控肠道菌群在PDR小鼠模型中的作用。

方法: VhlKO (Vhlflox/flox, α -Cre) 小鼠在糖尿病造模成功后, 继续给予广谱抗生素以清除原驻肠道菌群, 然后进行VSL#3益生菌灌胃(VSL组)或肠道粪便菌群移植(FMT组), 直至出生后8周左右。观察这两种肠道菌群干预对PDR模型的肠道微环境、肠道菌群、肠道代谢物以及视网膜表型(ERG视功能、各种细胞类型、血管、胶质细胞)的影响。收集小鼠视网膜进行RNA测序及单细胞RNA测序以探究调节肠道菌群影响PDR表型的机制。

结果: VSL#3益生菌和FMT都可以改善高血糖导致的肠道组织病理变化, VSL#3可逆转VhlKO的PDR小鼠肠道内厚壁菌门和拟杆菌门的相对比例, 促进拟杆菌属和副拟杆菌属的定植。FMT主要促进了一些短链脂肪酸的合成代谢。两种处理均使多种氨基酸与神经递质代谢、能量供应通路、初级胆汁酸生物合成等有益过程得以加强。暗适应ERG发现VSL组在1.0 cds/m²以上的光刺激强度下的内外层视网膜功能均得以改善, FMT可改善10.0 cds/m²刺激下的b波波幅。VSL组视网膜新生血管密度下降而双极细胞的丢失得以挽救。两个处理组均显著降低了视网膜活化胶质细胞的数量, 减轻视网膜内炎症反应。视网膜转录组RNA测序及qPCR均验证了血管生成通路和炎症通路的下调。单细胞RNA测序显示, VSL#3处理可逆转高血糖激活的异常神经退行性病变通路和代谢通路并一定程度上恢复视杆细胞和双极细胞的神经元功能与平衡, 改善小胶质细胞和Müller细胞各亚群比例异常倒置。细胞间通讯分析发现干预肠道菌群可有效恢复受高血糖影响的光信号传达以及神经元的兴奋-抑制平衡。

结论: 口服VSL#3益生菌和FMT可以通过改善肠道菌群进而缓解PDR表型, 这提示肠道菌群可能是PDR发生发展的重要机制及治疗靶点。

摘要编号: 204929

腺苷脱氨酶 2 缺乏症 (DADA2) 眼部表现的十年中国队列分析

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共同作者: Min SHEN, Weihong YU, Xiao ZHANG

目的: 分析罕见病腺苷脱氨酶 2 缺乏症 (DADA2) 患者眼部表现、基因型及其他临床表现的相互关联。

方法: 连续纳入 2015 年 8 月至 2025 年 9 月在北京协和医院经基因检测确诊 DADA2 的患者, 完善眼部检查, 包括最佳矫正视力、眼压、眼位、眼球运动、光学相干断层扫描(OCT)、荧光血管造影(FFA)等。分析其临床特征、实验室检查、基因型及诊治经过。

结果: 共纳入 DADA2 患者 14 例, 年龄 16 ~ 58 岁, 其中 12 例 (85.7%) 存在不同程度眼部受累, 如视网膜血管炎 (3 人, 21.4%)、眼动脉阻塞 (1 人, 7.1%)、斜视 (1 人, 7.1%)、复视 (2 人, 14.3%)、眼球震颤 (2 人, 14.3%)、眼球运动受限 (2 人, 14.3%) 等。3 人 (21.4%) 以眼部异常为疾病首表现, 5 人 (35.7%) 在起病 1 年内出现眼部异常。DADA2 患者眼部异常与基因型未见明显关联, 视网膜血管炎患者常伴全身其他部位炎症; 复视/眼球震颤/眼球运动受限患者均随后确诊脑梗。首次报道 DADA2 患者眼动脉闭塞 1 例及全身多发血管瘤样扩张累及视网膜 1 例。

结论: DADA2 的眼部表现早发且多样化, 其疾病机制以炎症、闭塞为主, 其中视网膜血管炎与眼动脉阻塞对视力预后影响严重。DADA2 患者出现复视等眼部异常可能提示新发脑梗。

摘要编号: 209149

超乳小白的中印之旅解锁青年眼科医生的成长密码

第一作者: Hang REN

共同作者: Kriti BHATT, Nandita TRIVEDI

目的: 白内障手术是眼科的基础手术之一, 它看起来操作简单、平淡无奇, 似乎是千篇一律, 然而当我终于获得机会真正踏上白内障手术的学习之路后, 才越发体会其中的精妙。就如看武林高手出招, 行云流水, 一气呵成, 但轮到新手上场, 却步步维艰, 如临深渊。在印度 Aravind 眼科医院学习的数月时光中, 我经历了从信心满满到灰头土脸, 再到重振旗鼓的艰难心路历程。本文我将从初学者角度分享白内障手术学习的感悟, 帮助更多中国青年眼科医生高效安全的成长。

方法: 通过系统解析手法小切口白内障 (MSICS, Manual Small Incision Cataract Surgery)、巩膜隧道切口超声乳化 (超乳) 至透明角膜切口超乳

的渐进式学习体系，深入剖析印度 Aravind 眼科医院针对新手白内障医生的科学培养模式，从而达到探讨该路径对初学者的普适性效果与成长启示的目的。

结果：训练开始于在 stimulator 模拟器上熟悉隧道切口和侧切口、截囊针撕囊、水分离、转核娩核、simcoe 套管吸除皮质、人工晶体植入和调位以及水密切口等基础操作，配合羊眼强化手感，手术室现场观摩手术视频后，迅速熟悉手术步骤并在资深医师指导下严格筛选患者，从巩膜隧道切口做起，指导老师在屏幕上密切观察初学者的动作和姿势，及时纠正或接手。初学者从起初的一两个步骤逐渐积累至独立完成全部步骤，所需平均时间约 1 个月，完成数量为 20-25 例。每日术后小组内及时复盘并在模拟器与动物实验巩固肌肉记忆，理论课程同步更新知识体系。在完成 MSICS 基础上采用巩膜隧道切口练习刻槽、劈核、超乳、双手 I/A 注吸、硬性人工晶体植入和调位等操作。最后进阶至透明角膜切口并在此基础上完成白内障手术操作。

结论：这种针对青年眼科医生的培养模式非常成熟，学习曲线短，符合“适当、可负担、可接近”三原则。该模式的关键在于“实践-反思-提升”的螺旋上升路径，既保障患者安全，又加速医生成长。作为青年医生需要始终牢记行云流水的操作背后，是无数次的刻意练习与精准纠错。

摘要编号：205538

近 30 年甲状腺相关眼病研究现状和热点的可视化文献计量学分析

第一作者：Wang YINING

目的：基于文献计量学探讨甲状腺相关眼病领域的研究现状及热点。

方法：文献计量学分析。于 2025 年 3 月检索 Web of Science 核心数据库 1995 年至 2024 年间发表的甲状腺相关眼病的英文相关文献。采用 Excel 软件对数据进行管理统计，并对频次数据制作图形。文献发文量年变化趋势、文献被引用频次、国家或地区分布、机构、期刊和作者发文量等分析利用 CiteSpace 和 VOSviewer 软件系统构建。

结果：最终纳入文献 4,757 篇。近 30 年来甲状腺相关眼病研究领域文献数量呈明显上升趋势。发表文献数量排名前 3 的国家是美国、中国和意大利。美国的多国合作发文数量最多，其次为中国、德国。发文量前 5 位的机构是意大利比萨大学、美国加利福尼亚大学洛杉矶分校、美国密歇根大学、中国上海交通大学和韩国延世大学。来自美国密歇根大学医学院的 Terry J Smith 是发文量最多的作者。发文量排名前 3 位的期刊依次为 Ophthalmic

plastic and reconstructive surgery、Thyroid and Journal of Clinical Endocrinology & Metabolism。关键词及突现词研究结果显示，当前甲状腺相关眼病的研究主要集中在发病机制、疾病管理、替妥木单抗、患病率、纤维化以及指南的制定。

结论：近 30 年来甲状腺相关眼病研究领域文献数量呈明显上升趋势，甲状腺相关眼病的发病机制、患病率及疾病管理为热点研究领域，替妥木单抗、纤维化以及指南的制定是目前及未来研究的重点。

摘要编号：205543

近 50 年黄斑裂孔研究热点及发展趋势的文献计量学分析

第一作者：Wang YINING

目的：分析 1975 年至 2024 年间黄斑裂孔领域的研究热点和发展趋势。

方法：文献计量学研究。数据库采用美国科学情报研究所 Web of Science 核心数据集，检索黄斑裂孔相关文献。检索时间为 1975 年 1 月 1 日至 2024 年 12 月 31 日。文献发文量年变化趋势、文献被引用频次、国家、地区分布、发文期刊、作者发文量等分析采用 R 软件的 bibliometrix 软件包；关键词聚类分析和突现词分析采用 CiteSpace 软件进行。

结果：共纳入 4704 篇黄斑裂孔领域相关文献。该领域 1975 年至 2024 年年发文量整体呈快速上升趋势，尤其在 2000 年和 2010 年前后出现快速增长。美国、日本和中国是黄斑裂孔领域发文数量较多的国家，同时美国的多国合作发文量也最多。发文量最多的作者是来自中国台湾国立台湾大学的 Chung-May Yang。发文量位居前五位的大学或机构为美国迈阿密大学、英国墨菲尔眼科医院、中国首都医科大学、德国慕尼黑大学和日本大阪大学。关键词及突现词结果显示，当前黄斑裂孔的研究主要集中在形成机制、分类和治疗方面，以及高度近视对黄斑裂孔形成作用。

结论：近 50 年来黄斑裂孔研究领域的文献数量增长趋势明显。高度近视在黄斑裂孔中的作用，根据黄斑裂孔的分类和分型针对性选择手术方式，板层黄斑裂孔相关视网膜前增生膜的研究是目前及未来研究的重点。

摘要编号: 205049

通过化学诱导多能干细胞可有效获得人视网膜色素上皮细胞

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共同作者: Xuran DONG, Chun ZHANG

目的: 通过化学诱导多能性的方法, 从人脂肪来源的基质细胞 (hADSCs) 获得视网膜色素上皮 (RPE) 细胞。

方法: 按照已报道的方案, 利用人化学诱导多能干细胞试剂盒对 hADSCs 进行重编程。在成功建立的 40 株人化学诱导多能干细胞 (hCiPSC) 可传代细胞系中, 随机选取 12 个细胞系进行鉴定与分化实验。最后, 对 hCiPSC 来源的 RPE 细胞进行了包括 RPE 相关基因的动态变化、蛋白定位以及功能学表现等相关检测。

结果: 所有 hCiPSC 细胞系均表现出典型的人胚胎干细胞 (hESC) 形态, 并表达多能干细胞的表面标志物和转录因子, 同时 hCiPSC 在多能标志基因的转录组水平上也与 hESC 具有相似的表达模式。拟胚体和畸胎瘤实验均显示 hCiPSC 具备向三胚层分化的能力。对于 hCiPSC 分化获得的 RPE 细胞, 其 RPE 标志基因的表达水平随成熟时间逐渐升高。细胞富集成熟 20 天后, 细胞表现出明显的色素沉着和典型的六边形结构。免疫荧光证实了 RPE 相关标志物的表达。此外, 在培养基中检测到高水平的色素上皮衍生因子和血管内皮生长因子, 并且其含量随培养时间延长而增加; 这些 RPE 细胞还能够有效吞噬光感受器外节。

结论: 化学小分子的应用能够高效、稳定地获得 hCiPSC 细胞系, 并进一步分化为 RPE 细胞。该方法为个体化细胞治疗眼科疾病提供了新的前景。

摘要编号: 207543

马钱苷减轻 A β 所致视网膜损伤的效应评价及作用机制初步探索

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目的: 评价马钱苷减轻 A β 所致视网膜损伤的效应并初步探索其作用机制。

方法: 实验研究。取 12 只 8 周龄 C57/BL6J 雄性小鼠, 随机分为 4 组, 模型组, 治疗组, 对照组及空白组各 3 只。模型组给予小鼠双眼玻璃体腔注射 A β 1-42 (2 ug/ul) 2 ul, 对照组给与小鼠双眼玻璃体腔注射 PBS 2 ul, 空白组给与小鼠双眼玻璃体腔注射操作但不注入任何物质; 治疗组给与马钱苷高剂量 (50 mg/kg) 灌胃, 在造模前 3 天开始, 连续灌胃 10 天, 其余各组给与同等条件下 PBS 灌胃。

造模 7 天后, 分别进行彩色眼底照相及 OCT 检查。HE 染色观察小鼠视网膜组织形态改变; 免疫荧光染色检测视网膜中 Iba-1, IL-1 β , NLRP3 的表达情况, TUNEL 染色观察视网膜组织中细胞凋亡情况; 电镜检查观察视网膜组织中线粒体损伤情况。

结果: 与对照组和空白组相比, 模型组视网膜外层结构紊乱, 视网膜外层呈波浪状改变, 并出现 RPE 细胞排列紊乱及空泡样变性; 治疗组视网膜外层结构紊乱, RPE 细胞排列紊乱和空泡样变性较模型组轻, 但较对照组和空白组重。眼底彩照上黄白色病灶占比治疗组较模型组低, 但较对照组和空白组高, 差异具有统计学意义 ($P < 0.05$)。OCT 证实黄白色病灶位于视网膜外层。与对照组和空白组相比, 马钱苷高剂量组治疗组视网膜内核层及外核层中 Iba-1, IL-1 β , NLRP3 表达量增多, 但较模型组表达量少 ($P < 0.05$)。TUNEL 染色各组未见明显差异。模型组及治疗组电镜可见线粒体肿胀, 模型组肿胀线粒体占比更多, 但差异不具有统计学意义 ($P > 0.05$)

结论: 马钱苷可以通过抑制炎症和保护线粒体减轻 A β 所致视网膜损伤。

眼科流行病学, 防盲

摘要编号: 210301

1990 年至 2021 年年龄相关性眼病的全球负担与跨国不平等: 一项时间趋势与社会经济差异的综合分析

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共同作者: Jing TANG

目的: 年龄相关性眼病是全球致盲和视力损伤的主要原因之一, 随着全球人口老龄化问题加剧, 其影响也日益受到关注。本研究旨在系统评估过去三十年来全球不同国家和地区年龄相关性眼病的患病情况、不平等状况及其变化趋势, 并分析相关影响因素。

方法: 我们基于全球疾病负担研究 2021 数据, 对年龄相关性眼病进行了二次流行病学分析。通过评估伤残损失寿命年和年龄标准化残疾率, 对全球年龄相关性眼病的疾病负担进行了衡量。采用 Joinpoint 回归对 1990 至 2021 年间疾病负担的时间趋势进行了分析。使用斜率不平等指数和集中指数来评估研究期间不平等状况的变化。

结果: 从 1990 年到 2021 年, 全球年龄相关性眼病的伤残损失寿命年从 78.503 上升到 100.006, 而年龄标准化残疾率则从每 10 万人 112.815 下降

至 92.803。尽管全球青光眼的相对疾病负担有所增加，但其他类型的年龄相关性眼病在绝对和相对不平等方面均有所减少。社会人口学指数较低的国家在减少这些不平等方面表现出轻微改善。在 1990 年至 2021 年期间，低社会人口学指数国家的年龄相关性眼病的斜率不平等指数有所改善，其中年龄相关性黄斑变性从 -9.250 降至 -6.033，白内障从 -258.131 降至 -173.762，青光眼从 -21.090 降至 -20.064。年龄相关性黄斑变性和白内障的集中指数从 1990 年的 -0.167 和 -0.335 分别降至 2021 年的 -0.129 和 -0.272，而青光眼的集中指数则从 -0.208 上升至 -0.263。年龄相关性眼病的疾病负担在各地区间存在显著差异，但大多数地区在低社会人口学指数国家的不平等状况方面有所改善，这在斜率不平等指数和集中指数的变化中得到了体现。

结论：尽管全球范围内 AREDS 的相对疾病负担有所改善，但地区间仍存在显著差异，这强调了制定及时且有效的年龄相关性眼病预防和管理策略的重要性，尤其是在社会人口学指数较低的国家。

摘要编号：210133

40 岁及以上成年人估计葡萄糖处理率与眼部疾病的关联：来自两项大型人群调查的证据

第一作者：Jian DENG

共同作者：Liduo PAN, Xiaoyi YU

目的：由眼部疾病引起的视力损伤是全球重大公共卫生问题，胰岛素抵抗与眼部疾病密切相关。估计葡萄糖处理率（Estimated Glucose Disposal Rate, eGDR）作为一种评估胰岛素抵抗的无创工具，或可具备识别多种眼病并预测其预后的临床价值。本研究旨在基于美国与韩国的两项大规模人群调查数据阐明这一关系，并利用中介分析深入探讨其潜在机制。

方法：这项横断面研究选取了来自美国（n = 5058, NHANES 2005-2008）和韩国（n = 4841, KNHANES 2008-2012）的 40 岁及以上具有代表性的人群样本。采用加权多变量逻辑回归、限制性立方样条与亚组分析，深入探讨了 eGDR 与白内障、青光眼、年龄相关性黄斑变性、糖尿病视网膜病变（Diabetic retinopathy, DR）、以上任一眼病等多种眼部疾病之间关联。为明确 eGDR 与 DR 的特异性关联，本研究在全体人群分析基础上，专门在糖尿病患者亚组中进行了针对性分析。通过受试者工作特征（Receiver operating characteristic, ROC）曲线评估了 eGDR 的预测效能，并采用中介分析深入探究了影响该关联的潜

在中介变量。E 值分析、亚组分析及基于随机森林的多重插补法用于评估结果的稳健性。

结果：在两个数据库中，初步分析显示较高的 eGDR 水平与五种眼部疾病的患病风险降低存在关联。在完全校正协变量后，最高 eGDR 水平对 DR 显示出显著保护作用（NHANES: OR 0.65, 95% CI: 0.55-0.78; Q4 VS Q1, OR 0.34, 95% CI: 0.14-0.86; KNHANES: OR 0.56, 95% CI: 0.44-0.70; Q4 VS Q1, OR 0.07, 95% CI: 0.01-0.62）。在糖尿病患者亚组中完全校正协变量后，同样发现最高 eGDR 水平对 DR 具有显著保护作用。此外，eGDR 对任一眼部疾病也呈现保护效应（NHANES: OR 0.80, 95% CI: 0.69-0.92; KNHANES: OR 0.56, 95% CI: 0.44-0.70）。限制性立方样条分析证实 eGDR 与 DR 及任一眼部疾病风险之间存在线性负相关关系。ROC 曲线显示 eGDR 的预测最佳截断值分别为 6.50（NHANES）和 6.97（KNHANES）。中介分析表明，空腹血糖、TyG 指数和 TyHbG 指数部分介导了该保护性关联。E 值分析、亚组分析及基于随机森林的多重插补法共同验证了本研究结果的稳健性。

结论：在 40 岁及以上美国与韩国成年人中，较高的 eGDR 水平与眼部疾病风险降低存在保护性关联，这一关联在糖尿病视网膜病变中尤为明显。在全球老年化的大趋势下，eGDR 有望成为眼部疾病预测与干预的新靶点。

摘要编号：208068

AI 辅助糖尿病性视网膜病变远程阅片模式下的县域眼科医共体建设

第一作者：Cong ZHANG

目的：探索 AI 辅助糖尿病性视网膜病变远程阅片模式下，以重庆大学附属沙坪坝医院为主体，以社区卫生服务中心为依托的县域眼科医共体建设的必要性和可行性。

方法：使用北京依未科技的人工智能眼底阅片软件，建设重庆大学附属沙坪坝医院眼科糖尿病视网膜病变远程阅片中心，联通沙坪坝区基层社区卫生服务中心，通过基层社区卫生服务中心对糖尿病建档患者定期行免散瞳眼底照相，计算糖尿病视网膜病变阳性率和转诊率，探索 AI 辅助糖尿病视网膜病变远程阅片模式下县域眼科医共体建设的必要性和可行性。

结果：2023 年 4-2024 年 10 月，已成功构建重庆大学附属沙坪坝医院眼科糖尿病视网膜病变远程阅片中心，8 家基层社区卫生服务中心参与。共筛查糖尿病患者 6327 人，糖尿病性视网膜病变阳性人数 778 人，阳性率（778/6327）为 12.30%，其

中转诊到我院的人数 188 人，转诊率 (188/778) 24.16%，占糖尿病建档患者比例为 (188/6327) 3.00%。转诊患者需要外科（眼底激光、玻璃体腔注射、玻璃体切割手术）干预者 109 人，占转诊人数的 (109/188) 57.98%，需要定期随访者 79 人，占转诊人数的 (79/188) 42.02%。

结论：AI 辅助糖尿病性视网膜病变远程阅片县域眼科医共体模式可以提高糖尿病性视网膜病变的早期检出率 (3.00%)，通过精准转诊、早期治疗，能降低患者及社会的经济负担。AI 辅助糖尿病性视网膜病变远程阅片县域眼科医共体模式通过互联网 + 医疗破解基层医疗卫生机构缺乏眼科专科医师的瓶颈，持续提升基层社区卫生服务中心的医疗服务能力。AI 辅助糖尿病性视网膜病变远程阅片县域眼科医共体模式下转诊率偏低 (24.16%)，需向基层医务人员和患者进一步普及糖尿病性视网膜病变的危害。AI 辅助糖尿病性视网膜病变远程阅片县域眼科医共体模式需要政府、医疗机构、企业共同参与。

摘要编号：210270

不同年龄段人群角膜散光的差异性研究

第一作者：Jiawei SONG

共同作者：Dongmei LIU

目的：通过分析近 5 年我院白内障患者前表面角膜散光 and 全角膜散光在度数、轴向和类型等数据，探讨角膜散光在不同年龄段人群中的差异。从而对不同年龄段角膜散光变化趋势进行预测，达到科学推测角膜散光变化的目的。

方法：回顾性研究。本研究收集近 5 年接受白内障治疗的患者检查数据，选取数据完整且无角膜病变的眼为研究对象，共计 163 例 (319 只眼)，以年龄为依据十岁为一段分为十组。由 IOL-master700 测得全角膜散光、前表面角膜散光大小和轴向，使用 SPSS 21.0 分析上述数据，因各样本是互相独立的随机样本且符合正态分布，多组间相互比较使用方差分析。

结果：以十岁为一个年龄段，从 0 岁到 99 岁十个年龄段各年龄段全角膜散光的数值分别为 -1.49 ± 0.81 ， -1.76 ± 1.13 ， -1.60 ± 0.87 ， -1.10 ± 1.02 ， -0.94 ± 0.81 ， -0.74 ± 0.47 ， -0.78 ± 0.53 ， -0.98 ± 0.64 ， -1.43 ± 0.69 ， -2.25 ± 1.51 。可得全角膜散光在 50 至 59 岁之前呈下降趋势，平均每十年下降 0.125 D，之后开始增加，平均每 10 年增加 0.378 D。从类型上说，总角膜散光发生转折的年龄段为 35 至 45 岁，角膜前表面散光为 55 岁至 65 岁，其趋势为向逆规散光发展。全角膜散光在该转折年龄段前以每十岁逆规散光比重增加 4.55% 的速度发展，在之后以 9.47% 的速度发

展。各年龄段角膜前表面散光的数值分别为 -1.67 ± 0.86 ， -1.76 ± 1.13 ， -1.59 ± 0.87 ， -1.21 ± 1.09 ， -0.90 ± 0.95 ， -0.72 ± 0.46 ， -0.66 ± 0.51 ， -0.86 ± 0.52 ， -1.05 ± 0.82 ， -1.98 ± 1.38 。可得角膜前表面散光在 60 至 69 岁之前呈下降趋势，平均每 10 年下降 0.144 D，之后平均每 10 年增加 0.44 D。从类型来说，角膜前表面散光以每十岁逆规散光比重增加 5.55% 的速度发展，在之后以 11.67% 每 10 年的速度发展。角膜后表面散光在 50 至 59 岁之前整体呈下降趋势，平均每 10 年下降 0.02 D，之后平均每 10 年整体增加 0.065 D。全角膜散光和角膜前表面散光在不同年龄段均具有差异性。

结论：全角膜散光随年龄增长呈现向逆规散光发展的趋势，并且在青少年和老年中趋势较缓，中年趋势较大，该趋势应当在矫正散光的白内障手术中予以考虑。

摘要编号：210263

不同年龄段白内障患者瞳孔大小差异性研究

第一作者：Jiawei SONG

共同作者：Dongmei LIU

目的：研究不同年龄段白内障患者瞳孔大小及 Kappa 角差异性，探讨瞳孔及 Kappa 角的变化及影响因素。

方法：采用回顾性病例研究，收集 2017 年 9 月至 2023 年 2 月在我院行 OPD-Scan III、IOL-Master 700 检查的 129 例 (156 眼) 患者的临床资料，年龄 5 ~ 95 岁 (平均 58.78 ± 25.64 岁)，将患者依据年龄分为 30 岁以下、30 ~ 39 岁、40 ~ 49 岁、50 ~ 59 岁、60 ~ 69 岁、70 ~ 79 岁、80 ~ 89 岁及 90 岁以上的八个组，分析瞳孔大小及 Kappa 角在不同年龄段白内障患者中的分布特点及改变，Pearson 相关分析瞳孔及 Kappa 角与其他眼球生物测量参数的相关性。

结果：① 不同年龄段患者的明视 Kappa 角、暗视瞳孔直径、暗视 Kappa 角、明视 Kappa 角与暗视 Kappa 角之间差值的差异性均有统计学意义 (P 均 < 0.05)，八组患者的明视瞳孔直径平均为 3.51 ± 0.88 mm，差异无统计学意义 ($P = 0.241$)。明视瞳孔直径与年龄的线性回归方程不显著 ($P = 0.486$)，即明视瞳孔直径与年龄没有相关关系；明视 Kappa 角与年龄的线性回归方程 $Y = 0.001 \times X + 0.194$ ， $P = 0.009$ ， $R^2 = 0.043$ ；暗视瞳孔直径与年龄的线性回归方程 $Y = -0.025 \times X + 6.686$ ， $P < 0.001$ ， $R^2 = 0.345$ ；暗视 Kappa 角与年龄的线性回归方程 $Y = 0.002 \times X + 0.204$ ， $P = 0.001$ ， $R^2 = 0.067$ ；明视 Kappa 角与暗视 Kappa 角之间的差

值与年龄的线性回归方程 $Y = -0.001 \times X + 0.244$, $P = 0.019$, $R^2 = 0.035$ 。② 明视瞳孔直径、暗视瞳孔直径、明视 Kappa 角、暗视 Kappa 角、明视 Kappa 角与暗视 Kappa 角之间差值与屈光度均无明显相关性 ($r = -0.057, 0.053, 0.124, 0.097, -0.015$, P 均 > 0.05) ; 明视瞳孔直径、暗视瞳孔直径、明视 Kappa 角、暗视 Kappa 角、明视 Kappa 角与暗视 Kappa 角之间差值与眼轴长度均无明显相关性 ($r = 0.145, 0.064, -0.01, -0.001, 0.031$, P 均 > 0.05) ; 明视瞳孔直径、明视 Kappa 角与暗视 Kappa 角之间差值与前房深度均无明显相关性 ($r = -0.056, -0.047$, P 均 > 0.05) , 暗视瞳孔直径与前房深度呈中等正相关 ($r = 0.339$, $P < 0.001$) , 明视 Kappa 角、暗视 Kappa 角与前房深度呈中等负相关 ($r = -0.346, -0.349$, P 均 < 0.001) 。

结论: 白内障患者随着年龄的增长, 暗视瞳孔直径有减小的趋势, 明视 Kappa 角与暗视 Kappa 角有增大的趋势。随着年龄的增长, 前房深度逐渐变浅, 暗视瞳孔直径也逐渐缩小, 而明视 Kappa 角与暗视 Kappa 角逐渐增大。瞳孔大小及 Kappa 角与屈光度和眼轴长度无相关性。

摘要编号: 207665

两例经基因确诊的 Knobloch 综合征 1 型患者临床特征与手术干预分析

第一作者: Wenting WANG

目的: 报道两例经基因检测确诊为 Knobloch 综合征 1 型 (KNO1) 的患儿, 分析其眼部临床表现的异同, 探讨早期诊断及手术干预的时机、方式与效果, 提高临床医生对此罕见病的认识。

方法: 病例 1: 2 岁女性, 主诉“自幼视力差”。查体: 视力不配合。检影验光: 右眼 $+1.00 / -2.50 \times 160$, 左眼 -7.00 。右眼虹膜后粘连, 晶状体局限性后囊混浊; 左眼周边晶状体后囊混浊。眼底: 右眼后极部视网膜脱离 (RD), 颞侧视网膜前增殖膜; 左眼视网膜萎缩变薄, 黄斑结构不清。诊断: 右眼孔源性 RD (考虑牵拉性因素), 双眼先天性白内障。行右眼玻璃体切割术 (PPV) 联合硅油填充术。病例 2: 4 岁男性, 主诉“自幼发现视力差”。视力: 双眼均 0.03, 矫正无助 (右眼: $-13.00 D$, 左眼: $-11.00 D$)。双眼眼球震颤。晶状体混浊。眼底: 双眼视网膜萎缩; 右眼颞侧及下方视网膜劈裂样改变, 左眼颞侧视网膜劈裂样改变。诊断: 双眼视网膜劈裂, 双眼先天性白内障。先后行双眼 PPV + 视网膜激光光凝 + 白内障超声乳化吸除 + 人工晶状体植入术 (IOL)。

结果: 基因诊断 两例患儿均通过全外显子组测序 (WES) 或目标基因 panel 检测, 确诊为 COL18A1 基因致病性突变导致的 Knobloch 综合征 1 型。病例 1 (术后): 右眼硅油填充状态下视网膜平伏。术后视力 (行为观察) 较术前似有改善 (具体定量困难)。术后 6 个月取出眼内硅油。病例 2 (术后): 双眼视网膜劈裂范围未进一步扩大, 激光斑清晰。白内障术后屈光介质透明。双眼矫正视力仍为 0.15。术后随访稳定。共同特征 两例均自幼视力低下, 伴有显著屈光不正 (高度近视倾向), 双眼先天性白内障, 视网膜发育不良/萎缩。病例 1 以 RD 为主要表现, 病例 2 以视网膜劈裂为主要表现。

结论: 本报告展示了两例经基因确诊的 Knobloch 综合征 1 型患儿: 临床表现异质性: 虽共享核心特征 (视力差、白内障、视网膜异常、高度近视倾向), 但具体视网膜病变 (RD vs. 劈裂) 及严重程度存在差异。基因诊断价值: 基因检测 (COL18A1) 是确诊此罕见综合征的金标准, 对明确诊断、遗传咨询至关重要。

摘要编号: 209558

中国人群遗传性视网膜纤毛病: 基于 2602 例患者队列的基因谱系与临床表型关联研究

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共同作者: Liping YANG

目的: 遗传性视网膜纤毛病 (IRCs) 是一组由纤毛结构或功能缺陷导致的遗传性视网膜变性疾病, 具有高度的遗传异质性和临床多样性。目前已知超过 200 个基因与遗传性视网膜疾病相关, 其中许多与纤毛功能有关。本研究旨在通过大样本队列研究, 系统分析中国 IRCs 患者的致病基因突变频谱、临床表型特征及其关联, 为精准诊断和遗传咨询提供依据。

方法: 对临床表现为遗传性视网膜变性疾病的就诊患者进行基本信息的采集、整理, 抽取其外周静脉血进行基因检测, 并进行相应的眼科专科检查。基因检测主要采用芯片捕获高通量测序方法以及直接 Sanger 测序验证两种技术, 以受检者静脉血液标本为材料进行基因测序。

结果: 从本课题组检测的 2602 个 IRD 患者中, 检出 1199 例纤毛病相关基因突变的患者, 共涉及 45 种不同基因。数据库中以 CYP4V2 突变患者最为常见, 符合以往研究结果。在检出的纤毛病患者中, 又以 USH2A 突变患者占比最高, 占 24.9%, 其中以 exon13 突变发生频率最高, 占 12.1%。检出纤毛病突变基因中, 如 USH2A、ABCA4、EYS 等多与纤毛功能相关。

结论: 本研究完善了中国遗传性视网膜纤毛病的突变频谱与基因特点, 且与其他种族有着显著差异。为后续治疗靶点的筛选提供有效的参考方向。

摘要编号: **203493**

中国住院患者机械性眼外伤的发病率、危险因素及预后分析: 基于中国眼外伤研究 2021-2023 年数据

第一作者: Han HAN

共同作者: Yongjie CHEN, Hua YAN

目的: 基于中国眼外伤登记系统 (China Ocular Trauma Study, COTS), 采用多中心横断面研究设计, 系统分析了中国机械性眼外伤的流行病学特征及其预后影响因素, 为完善我国眼外伤防治体系提供了重要的循证医学依据。

方法: 本研究基于中国眼外伤研究 (China Ocular Trauma Study, COTS) 开展多中心横断面分析, 纳入 2021 年 1 月至 2023 年 12 月全国 99 家医院的机械性眼外伤住院患者。按每 10 万人口计算发病率, 并将损伤类型分为开放性眼球损伤 (Open-globe injury, OGI) 和闭合性眼球损伤 (Closed-globe injury, CGI)。术后不同时间点评估患者视力恢复情况。

结果: 眼外伤累积发病率为 1.77/10 万, 其中男性 (2.9/10 万) 和 50-54 岁人群 (7.11/10 万) 发病率最高。纳入的 21 个省份的 OGI 与 CGI 分布中, 福建省 (13.69/10 万) 和河南省 (7.26/10 万) 眼外伤发病率居全国前列。OGI 发病率显著高于 CGI (1.26 vs. 0.30/10 万)。老年患者 (60-79 岁)、合并角膜或视神经损伤者及需硅油填充术者视力预后较差。影响视力预后的关键因素在 OGI 中为硅油依赖、玻璃体损伤及损伤类型, 在 CGI 中为玻璃体损伤、黄斑损伤及角膜损伤。

结论: 本研究首次提供了中国眼外伤的全国性分析, 揭示男性及 50-54 岁人群高发率特征, 且开放性眼外伤预后更差。研究结果强调需针对高危人群制定预防策略, 并通过及时干预改善眼外伤患者预后视力。

摘要编号: **207768**

中国成都大规模研究: 青少年近视足矫正率随近视度数增加而下降

第一作者: Jing WEI

目的: 近视是全世界儿童青少年日益严重的健康问题。本研究调查了中国西部城市成都市学生近视相关情况, 分析近视戴镜率和近视足矫率及其影响因素, 了解近视预防现状。

方法: 这项以学校为基础的横断面研究调查了 2020-2022 年中国成都市 7 区 1,582 所学校, 共纳入 6-18 岁 (小学、初中、高中) 学生共 417,337 名。检查项目包括裸眼远视力、裂隙灯检查和非散瞳电脑验光。非睫状肌麻痹近视定义为 $SE \leq -0.50 D$ + 未矫正视力 (UCVA) $> 0 \log MAR$ (对于 6 岁儿童或更大年龄), 近视戴镜率定义为在研究的人群范围中, 近视戴镜的人数 / 近视的人数 (%), 近视足矫定义为近视配镜后视力正常 (6 岁及以上 $\leq 0 \log MAR$)。在政府的支持下, 本项目每年将进行 1-2 次。进行统计学分析以确定近视与各种参数之间的关联。

结果: 整个调查对象平均年龄为 (10.96 $\pm$ 3.5 岁), 小学生 248,194 名, 初中生 99,300 名, 高中生 69,843 名, 总体近视患病率为 48.7%, 其中近视戴镜率为 65.7%, 近视足矫率为 50.5%。随着年龄和教育程度的增加, 中高度近视患病率、戴镜率和足矫率增加, 低度近视的足矫率 (46.5%) 高于中度近视的足矫率 (47.1%), 高于高度近视的足矫率 (39.6%)。男生戴镜率小于女生戴镜率 (63.4% vs 68.0%), 但是近视足矫率男生高于女生 (51.2% vs 49.8%), 近视眼镜的正确利用率为 33.17%, 随着年龄和教育程度的增加而增加, 中度近视人群眼镜的正确利用率最高, 为 40.7%。

结论: 成都市儿童青少年近视患病率相对较低, 戴镜率和足矫率有待提高, 发现随着近视度数的增加, 青少年近视足矫率反而降低。

摘要编号: **203003**

人工智能在眼科防盲及患者教育中的应用研究

第一作者: Xianwei LI

目的: 探讨人工智能技术在眼科防盲筛查和患者健康教育中的实践价值, 解决基层筛查覆盖率低、公众眼健康意识不足等问题, 为构建智能化眼健康管理提供依据。

方法: 1. 技术路径 智能筛查系统: 基于 12 万张眼底照片训练的 RAIDS 模型, 可识别 10 种眼底疾病, 敏感度达 89.8%。教育平台: 采用 ChatZOC 大语言模型构建数字患者系统, 模拟临床问诊场景。2. 实施场景 防盲筛查: 在基层社区部署便携式眼底相机 + AI 诊断系统, 实现糖尿病视网膜病变等早筛。患者教育: 通过智能问答系统提供个性化术后指导, 提升患者依从性。

结果: 防盲成效: 鹰瞳 AI 系统在 65 家体检机构验证中, 筛查效率提升 75%, 误诊率降低至 1% 以下。青光眼 AI 筛查系统使早期检出率提升 40%, 干预时机提前 2-3 年。教育效果: 数字患者教学系统使医学生病史采集能力提升 20%, 65% 反馈交互

更真实高效。智能宣教平台术后复诊率提高 30%，并发症发生率下降 25%。经济效益：基层筛查成本降低 60%，单例检查耗时从 15 分钟缩短至 3 分钟。

结论：1. AI 技术显著提升防盲筛查效率和教育效果，尤其适用于资源匮乏地区。2. 需加强数据标准化建设和伦理审查，确保算法公平性与安全性。3. 未来应推进“筛查—诊断—教育”全链条 AI 整合，构建智能化眼健康生态。

摘要编号：204445

从血液到视觉：地中海贫血中铁过载的眼部生物标记物

第一作者：Danna CHEN

共同作者：Shitong HUANG, Yunxia LENG, Ningfeng LI, Yingying LIANG

目的：输血依赖性地中海贫血患者（TDT）反复输血引发的体内铁过载，可导致多器官损伤。目前其早期诊断和监测手段为有创性或价格高昂。本研究旨在探索 TDT 患者铁过载相关的眼部生物标记物，为铁过载早期诊断和动态监测提供线索。

方法：本研究采用横断面研究设计，纳入 29 例 TDT 患者（58 眼）作为实验组及 29 例健康志愿者（58 眼）作为对照组，利用光学相干断层扫描等影像学技术检测眼部结构与功能变化，收集研究对象的临床资料、血液及眼部生物参数 85 个（包含角膜及视网膜、脉络膜）、血清铁蛋白评估全身铁负荷水平。通过相关分析、多元回归及 ROC 曲线等统计方法评估标记物的诊断价值，建立铁过载预测模型。

结果：与对照组相比，TDT 患者黄斑中心区神经节细胞层、视网膜神经纤维层和神经节细胞复合体（GCC）厚度显著变薄（所有 P 值均 < 0.05 ），视盘区的表层血管复合体、深层血管复合体、神经节细胞层的毛细血管网、视盘视网膜最深部（通常在内核层）的毛细血管网、脉络膜毛细血管的血流密度、脉络膜厚度增加（所有 P 值均 < 0.05 ），而脉络膜血管指数（CVI）平均升高 6%（ $P = 0.035$ ）。Pearson 相关分析显示，中央区 GCC 厚度与铁螯合治疗持续时间呈正相关（ $r = 0.280$, $P < 0.05$ ）；视盘深部血管从 DCP、视盘 AC、MRV7 及 CVI 与血清铁蛋白水平呈显著正相关（ $P < 0.01$ ）。Logistics 回归分析结果表明，角膜内皮细胞面积、视盘鼻侧的层血管丛 SVPb、ACn、Cpz、MRV8、CVI 是铁过载的独立影响因素，MVR5 为非独立影响因素，其中仅角膜内皮细胞面积属于保护因素，其余都是危险因素，以 CVI 影响最大。以上影响因素联合检测的 ROC 线下面积为 0.95，灵敏度达

83.5%，特异度为 81.2%，较单一指标具有更高的诊断效能；铁螯合治疗持续时间是中央区 GCC 厚度的独立影响因素（ $\beta = 0.306$, $P = 0.011$ ）。此外，62.30% 的 TDT 患者存在视盘倾斜，34.43% 表现为豹纹状眼底，6.56% 伴有弹性纤维假黄瘤。

结论：本研究证实 TDT 患者铁过载可导致显著的眼部结构与功能损害，筛选出数个潜在生物标记物具有良好的诊断价值，构建的基于眼部参数的铁过载预测模型可能有助于铁过载的早期诊断和病情监测。

摘要编号：210250

儿童黄斑区脉络膜厚度三维分布随年龄与近视的变化模式

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目的：分析儿童黄斑区脉络膜厚度（ChT）三维分布模式及其与年龄和眼轴长度（AL）的关联。

方法：横断面研究。该研究以分层整群抽样方法在内蒙古巴彦呼舒地区抽取 2 所小学和 2 所中学，对 4 所学校的全部学生进行全面眼科检查，包括利用谱域光学相干断层成像（SD-OCT）技术对黄斑区进行水平扫描。每张扫描图像采用改进的开源深度学习算法（Choroidalyzer）对脉络膜区域进行自动分割和厚度测量。取受检者右眼进行图像和统计分析，最终生成由 12×12 网格构成的覆盖 6×6 mm 黄斑区域、以中央凹为中心的三维脉络膜厚度分布图谱。并评估该厚度分布模式与年龄和眼轴长度的关系。

结果：共纳入 3508 名儿童（平均年龄 13.6 ± 3.0 岁，范围 7–18 岁，男性 47.7%）。总体黄斑区域平均脉络膜厚度为 $271.8 \pm 56.1 \mu\text{m}$ ，在不同近视程度组（无近视、低度、中度、高度近视）间差异具有统计学意义（ $P < 0.001$ ）。研究观察到与年龄相关的颞—鼻方向不对称分布模式：鼻侧区与年龄呈最强负相关（ $r = -0.1$, $P < 0.001$ ），而颞侧则基本稳定（ $r = 0.0$, $P = 0.258$ ）。其中中央区和鼻侧脉络膜的变薄速度分别较颞侧快 6.6 倍和 7.8 倍。而随眼轴长度增加脉络膜则出现同心性变薄模式，表现为中央凹区变薄更为明显（ $r = -0.5$, $\beta = -29.7 \mu\text{m}/\text{mm}$, 均 $P < 0.001$ ），而外围区的变化相对较小（ $r = -0.4$, $\beta = -19.4 \mu\text{m}/\text{mm}$, $P < 0.001$ ）；与外围区相比，中央凹和旁中央区的变薄速度分别快约 1.5 倍和 1.3 倍。

结论：基于脉络膜厚度三维分布，我们揭示了儿童两种主要的脉络膜厚度时空变化模式：随年龄增长的颞—鼻不对称模式以及随眼轴增长的同心性变薄模式。该结果反映了生理生长和近视相关重塑在

空间和时间上的动态特征，并为早期识别近视进展及基于脉络膜的近视管理决策提供了潜在影像学标志。

摘要编号：209547

基于基线和纵向临床数据建立个性化糖尿病视网膜病变进展的风险预测模型

第一作者：Bing LIU

目的：基于基线和纵向临床数据建立个性化糖尿病视网膜病变（DR）进展的风险预测模型，协助基层医生对 DR 患者分层管理，及时转诊 / 干预，提升转诊效率。

方法：采用 SPSS 26.0 和 R 4.4.1 版本进行统计分析。应用免散瞳眼底照相机（Topcon TRC. NW 400）连续 2 年采集眼底视网膜图像并应用量化人工智能辅助诊断系统进行分析。任一眼睛 DR 分期增加和 / 或同一分期眼底病变数量增加为 DR 进展组（273 例），眼底病情无增加为 DR 无进展组（328 例）。数据集按照 7: 3 的比例随机分为训练组和验证组。通过 lasso 回归结合 logist 多因素分析识别与结局的危险因素，建立预测模型。利用受试者工作特征（ROC）曲线评估模型性能，AUC 量化模型的诊断能力。通过绘制校准曲线验证模型校准的效果。采用决策曲线分析（DCA）评估模型的临床实用性。统计显著性水平设定为 $P < 0.05$ 。

结果：可调控因素 HbA1c（OR = 1.473, 95% CI: 1.249–1.739, $P < 0.001$ ）、BMI 差值（OR = 1.457, 95% CI: 1.214–1.747, $P < 0.001$ ）、腰围差值（OR = 1.083, 95% CI: 1.039–1.128, $P < 0.001$ ）和不可调控因素年龄（OR = 1.047, 95% CI: 1.021–1.073, $P < 0.001$ ）、高血压年数（OR = 1.041, 95% CI: 1.012–1.071, $P = 0.006$ ）、糖尿病年数（OR = 1.05, 95% CI: 1.016–1.085, $P = 0.004$ ）是显著的危险因素，建立预测模型。在训练集中，模型的 AUC 为 0.799（95% CI 0.757–0.841），在验证集中的 AUC 为 0.788（95% CI 0.722–0.853），具有较好的预测能力及净收益。

结论：积极主动管理可调控因素是阻止 DR 进展的核心，个性化预测模型可提升基层医生对 DR 患者的有效转诊性，为破解社区 DR 患者随访困境提供一个方案。

摘要编号：208110

基于江苏省中小学生近况的流行病学筛查策略研究

第一作者：Xiyao ZHANG

目的：近视已成为影响我国学生眼健康的重大公共卫生问题。江苏省作为经济发达与近视高发地区，中小学生人数近千万，近视防控形势严峻。前期研究已证实 13–18 岁中学生群体可采用简化筛查策略，但针对 6–12 岁小学生这一关键预防年龄段，尚缺乏高效且精准的筛查方案。本研究旨在系统比较江苏省现行的多种近视筛查方案与金标准的检测结果，评估其筛查效能，以期建立适用于本省低学段人群的优化筛查策略，为公共卫生决策提供科学依据。

方法：本研究于 2020 年与 2023 年共调查了 3500 名 6 ~ 12 岁的江苏省汉族小学生，所有纳入对象均无其他严重眼病。研究系统性地比较了七种近视筛查方案与金标准的一致性。筛查方案包括：方案 1（非睫状肌麻痹等效球镜度 $SE < -0.50 D$ ）、方案 2（裸眼远视力 < 5.0 ）、方案 3（轴率比 AL/CR > 3 ）、方案 4（两两组合：4.1 为方案 1 + 2，4.2 为方案 1 + 3，4.3 为方案 2 + 3）以及方案 5（方案 1、2、3 三者联合）。所有方案均以睫状肌麻痹后 $SE \leq -0.50 D$ 作为诊断近视的金标准进行比对。

结果：金标准检查结果显示，所调查的 3500 名学生的总近视率为 50.0%，且近视率随年龄增长呈现显著上升趋势，从 6 岁组的 16.8% 递增至 12 岁组的 78.0%。将各筛查方案与金标准比较发现，所有方案均与金标准存在统计学差异（ $P < 0.001$ ）。其中，方案 2（裸眼视力 < 5.0 ）的阳性检出率最高（合计 64.0%），在所有年龄段均显著高估了近视率。方案 1（非睫状肌麻痹 $SE < -0.50 D$ ）和方案 3（AL/CR > 3 ）的合计阳性率与金标准最为接近，分别为 49.9% 和 48.3%。各类组合方案（方案 4.1、4.2、4.3 及方案 5）的阳性检出率普遍低于金标准，呈现出更高的特异性但灵敏度有所降低，其中方案 5（三联合）的阳性率最低（合计 39.1%）。

结论：在条件允许时，6 ~ 8 岁学生推荐使用金标准（睫状肌麻痹验光）；9 ~ 12 岁学生推荐采用方案 4.1（非睫状肌麻痹 $SE < -0.50 D$ 联合裸眼视力 < 5.0 ）进行筛查；若仅能采用单一手段，则推荐方案 1（非睫状肌麻痹 $SE < -0.50 D$ ）。组合筛查方案未显著优于两种手段联合。本研究基于大样本实证比较，构建了适用于江苏省小学生群体的近视筛查策略体系。

摘要编号: 208601

心血管—肾脏—代谢综合征 0-3 期人群中葡萄糖处置率与年龄相关性眼病的关联: 大样本前瞻性队列研究

第一作者: Linge JIAN

目的: 探讨心血管—肾脏—代谢 (CKM) 综合征 0-3 期人群中, 葡萄糖处置率 (eGDR) 与年龄相关性眼病——包括黄斑变性、青光眼、白内障、糖尿病视网膜病变 (DR) 及视网膜脱离 (RD) ——发病风险的关系。

方法: 基于 UK Biobank 的前瞻性队列研究, 共纳入 223,120 名受试者。依据肥胖程度、代谢危险因素及亚临床心血管疾病确定 CKM 分期; eGDR 越低提示胰岛素抵抗越严重。研究终点为黄斑变性、青光眼、白内障、DR 及 RD 的新发事件。采用 Cox 比例风险模型估计风险比 (HR) 及其 95% CI, 并以限制性立方样条探索非线性关系。

结果: 黄斑变性 (HR 0.92, 95% CI 0.87-0.97, $P = 0.001$) 与青光眼 (HR 0.91, 95% CI 0.87-0.95, $P < 0.001$) 均与 eGDR 呈线性负相关; 白内障与 eGDR 呈 U 型关联 (P 非线性 = 0.001), DR 呈 L 型关联 (P 非线性 = 0.018)。按 eGDR 四分位分层后, DR (Q4 vs Q1: HR 0.15, 95% CI 0.04-0.52, $P = 0.003$) 与 RD (Q4 vs Q1: HR 0.65, 95% CI 0.47-0.89, $P = 0.007$) 的风险差异具有统计学意义。分层效应分析显示, 上述关联在 CKM 综合征晚期阶段更为显著。

结论: eGDR 与 CKM 综合征患者的眼病风险密切相关, 且在晚期阶段尤为突出。该指标有望用于 CKM 管理中的眼科筛查分层。

摘要编号: 203386

新生儿疾病导致的全球失明负担: 现状评估与未来趋势预测

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共同作者: Shanhong LI

目的: 失明是新生儿疾病及其四个主要亚型引起的重要并发症, 严重影响患者的生活质量。本研究旨在系统评估全球范围内由新生儿疾病引起的失明负担变化趋势, 为公共卫生政策的制定提供依据。

方法: 本研究数据来源于《全球疾病负担研究 2021》。分析指标包括年龄标准化患病率和伤残调整生命年, 结合年度变化百分比和 Joinpoint 回归模型评估疾病负担趋势。健康不平等状况通过社会人口学指数 (SDI)、不平等斜率指数和集中指数进行评估。采用分解分析明确疾病负担变化的成因,

并利用贝叶斯年龄—时期—队列模型预测至 2040 年的发展趋势。

结果: 2021 年, 全球由新生儿疾病引起的失明患者超过 426 万人, 较 1990 年分别增长了 60.92% (患病人数) 和 61.33% (伤残年)。年龄标准化患病率和伤残年率均呈上升趋势, 年均变化率分别为 0.29% (95% 置信区间 [CI]: 0.26~0.32) 和 0.31% (95% CI: 0.28~0.34), 主要由人口增长和流行病学变化驱动。低 SDI 地区的疾病负担更高, 全球健康不平等现象仍然存在。2005 年至 2021 年间, 45~54 岁人群的失明患病率达到峰值。2040 年预测显示: 若延续 1990 至 2021 年的趋势, 失明率将下降; 但若依据 1990 至 2019 年 (新冠疫情前) 趋势, 未来或仍有小幅上升。

结论: 由新生儿疾病引起的失明全球疾病负担依然严峻。低 SDI 地区负担尤为严重, 同时因疾病缓慢累积所导致的迟发性失明风险可能被低估。亟需优化医疗资源配置, 加强对新生儿疾病幸存者的长期视力健康随访和干预管理。

摘要编号: 210040

早年体型轨迹与原发开角型青光眼风险: 一项队列研究

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目的: 原发性开角型青光眼 (Primary Open-Angle Glaucoma, POAG) 是全球范围内导致不可逆失明的主要原因之一。尽管体型已被认为可能与 POAG 风险相关, 但既往研究结果并不一致, 这可能部分归因于身体质量指数 (Body Mass Index, BMI) 测量时间点的差异, 目前尚缺乏针对早年体型变化轨迹与 POAG 风险的系统研究。

方法: 本研究基于英国生物银行共 467,768 名参与者的数据。儿童期体型通过与同龄人比较分为低、平均和高三类; 成年期体型则依据 BMI 经性别分层的年龄与年龄平方回归模型的残差进行分类。根据儿童期与成年期体型的组合, 构建了九种早年体型轨迹。采用 Cox 比例风险模型评估儿童期体型、成年期体型及其轨迹与 POAG 发病风险的关联, 计算风险比 (HR) 及 95% 置信区间 (CI)。

结果: 在 467,768 名参与者中, 与平均—平均轨迹相比, 成年期体型较低的个体 POAG 风险显著升高 (低—低: HR = 1.35, 95% CI: 1.17-1.55, $P < 0.001$; 平均—低: HR = 1.35, 95% CI: 1.18-1.53, $P < 0.001$; 高—低: HR = 1.49, 95% CI: 1.17-1.91, $P = 0.001$)。独立分析中, 成年期体型较低者较平均体型者 POAG 风险更高 (HR = 1.30, 95% CI: 1.19-1.43, $P < 0.001$), 而儿童期体型较高者

POAG 风险则略增(HR = 1.14, 95% CI: 1.00–1.29, P = 0.046)。根据儿童体型的分层分析显示, 儿童期体型较小但成年期达到平均(HR = 0.79, 95% CI: 0.68–0.93, P = 0.004)或高体型(HR = 0.58, 95% CI: 0.44–0.77, P < 0.001)的个体, POAG 风险显著降低。相反, 儿童期体型较高但成年期显著减重者, POAG 风险明显上升(HR = 1.66, 95% CI: 1.19–2.32, P = 0.003), 而中度减重至平均体型者风险无显著增加(HR = 1.25, 95% CI: 0.95–1.65, P = 0.111)。

结论: 通过早年体型轨迹分析, 体型与 POAG 风险之间的关联得到了进一步的阐明。研究结果提示, 成年期低体型与 POAG 风险升高密切相关, 应避免早年过度减重, 这对于降低 POAG 发病风险及疾病负担可能具有重要意义。

摘要编号: 206431

系统性炎症反应指数与年龄相关性黄斑变性风险的相关性研究

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目的: 近年来的研究表明, 慢性轻度全身性炎症可能促进年龄相关性黄斑变性(AMD)的发生。系统性炎症反应指数(SIRI)作为一种新型炎症标志物, 已被验证可作为疾病的潜在预测指标。然而, 关于 SIRI 与 AMD 风险之间的相关性尚未有报道。本基于人群的研究旨在利用美国国家健康与营养调查(NHANES)的数据, 探究 SIRI 与美国人 AMD 风险之间的关联。

方法: 我们对 2005 年至 2008 年的 NHANES 数据进行了横断面分析。纳入了年龄在 40 岁及以上且有 SIRI 和 AMD 数据的参与者。SIRI 计算公式为(外周血中性粒细胞计数 × 单核细胞计数 / 淋巴细胞计数。AMD 则根据视网膜照片的标准化分级来定义。采用多因素 Logistics 回归模型评估 SIRI 与 AMD 风险之间的关联, 并对潜在的混杂因素进行了调整。同时, 还进行了敏感性分析和亚组分析。此外, 通过限制性立方样条(RCS)曲线探讨了 SIRI 与 AMD 风险之间的关系。

结果: 该研究共纳入 5365 名参与者, 其中 425 人(7.9%)患有 AMD。患有 AMD 的参与者中 SIRI 的中位数显著高于未患 AMD 的参与者(1.23 vs 1.04, P < 0.001)。在调整了潜在的混杂因素后, 较高的 SIRI 与 AMD 发病几率的增加独立相关(调整后的比值比 [OR]: 1.18, 95% 置信区间 [CI]: 1.07–1.29; P = 0.001)。SIRI 水平处于最高分段的个体比处于最低分段的个体, 其完全调整后的 OR 为 1.36 (95% CI: 1.05–1.77; P for trend =

0.006), 同时, RCS 分析也揭示了 SIRI 与 AMD 风险之间的剂量反应关系(P = 0.002)。亚组分析显示, 男性参与者(OR tertile3 vs tertile1: 1.48, 95% CI: 1.01–2.15; P = 0.043)、患有高血压的参与者(OR tertile3 vs tertile1: 1.47, 95% CI: 1.06–2.04; P = 0.020)、肥胖的参与者(OR tertile3 vs tertile1: 1.64, 95% CI: 1.02–2.62; P = 0.040)以及从未吸烟的参与者(OR tertile3 vs tertile1: 1.71, 95% CI: 1.14–2.57; P = 0.009)中, SIRI 与 AMD 风险之间存在显著的正相关关系。在针对总样本中 SIRI 评分低于 5% 或高于 95% 的个体进行的敏感性分析中。在敏感性分析中对所有混杂变量进行调整后, SIRI 与 AMD 风险之间的正相关关系仍保持显著(OR: 1.27, 95% CI: 1.03–1.56; P = 0.023)。

结论: 我们的研究表明, 在美国人群中, SIRI 升高与 AMD 风险增加独立相关。这些结果强调了 SIRI 作为识别 AMD 高风险个体的生物标志物的潜在价值, 从而促进 AMD 的早期干预和预防。未来, 需要进一步的前瞻性研究来验证这些发现, 并阐明全身性炎症与 AMD 发病机制之间的潜在机制。

摘要编号: 210330

表观遗传时钟在年龄相关性眼部疾病的预测和因果关系的作用研究

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目的: 表观遗传学时钟是指源自 DNA 甲基化(DNA_m)信息数据的重要衰老遗传指标。证据表明, 表观遗传学时钟 PhenoAge 和 GrimAge 的 CpG 位点的 DNA_m 水平加速改变和年龄相关疾病的风险增加相关。本研究探索表观遗传学时钟加速是否在年龄相关性眼病(包括老视、白内障、糖尿病视网膜病变、高血压视网膜病变、青光眼、年龄相关性黄斑变性)等中的因果关系和可能的生物标记物。

方法: 我们进行两样本的孟德尔随机化(MR)研究, 以检查表观遗传年龄加速的遗传预测效应, 这些效应通过 HannumAge (10 个单核苷酸多态性(SNPs))、Horvath 固有年龄(22 个 SNPs)、PhenoAge (10 个 SNP) 和 GrimAge (5 个 SNPs), 对年龄相关性眼病(老视、白内障、糖尿病及高血压眼底病变、青光眼、黄斑变性)进行测量。我们从荟萃分析中获得了生物衰老的全基因组关联数据(N = 35710), 并从 UKB (N 例 = 2565–12470; N 对照 = 163445–340202)、FinnGen (N 例 = 833–142011; N 对照 = 15861–105974) 获得全基因组相关数据。主要分析使用乘

法随机效应逆方差加权 (IVW) MR 进行。使用固定效应荟萃分析合并个体研究估计值。敏感性分析包括 MR Egger、加权中值、加权模式和使用汇总效应估计 (CAUSE) 方法的因果分析。

结果: 孟德尔随机化 IVW MR 结果表明, GrimAge 和 PhenoAge 加速率越高, 罹患白内障、黄斑变性以及老视的风险越高 ($OR = 1.19$; 1.17 ; 1.16 , GrimAge 加速率每年增加, $95\% CI$ $1.05-1.19$, $p = 0.0001$)。遗传预测效应的方向在敏感性 MR 分析中一致。与其他年龄相关性眼病相比较, PhenoAge 加速对 AMD 遗传预测效果 (IVW $OR = 1.13$, $95\% CI$ $1.08-1.21$, $p = 0.002$) 最强。

结论: 表观遗传学时钟 PhenoAge 和 GrimAge 加速在年龄相关性眼病中 (白内障、黄斑变性以及老视) 等中存在因果关系。PhenoAge 中 CpG 位点的 DNAm 加速对 AMD 有显著的遗传预测效果。

摘要编号: 208411

西安市儿童青少年屈光发育的区域差异及近视进展关联性研究

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目的: 为了解西安市儿童青少年屈光发育的区域差异及近视进展情况, 并分析导致近视进展的相关影响因素, 评价眼轴与轴率比诊断近视的准确性, 为西安市儿童青少年近视防控提供新策略。

方法: 采用分层整群随机抽样, 参与本研究的所有学生进行裸眼远视力 (UCVA)、最佳矫正视力 (BCVA) 及非睫状肌麻痹下的电脑验光检查, 并随机选取学生进行眼生物学测量, 其中包括角膜曲率、眼轴长度、眼轴长度与角膜曲率半径之比 (轴率比, AL/CR) 检查, 邀请连续 3 次参加眼生物学测量的学生测量身高和体重。采用 SPSS 软件进行数据的统计分析, 计量数据为采用 K-S 方法检验符合正态分布, 采用 t 检验, 检验不符合正态分布, 将使用秩和检验。采用 Pearson 相关分析探讨近视率与轴率比、眼轴长度、等效球镜增长的相关性, 等效球镜与轴率比、眼轴长度增长的相关性。采用 ROC 曲线判断评估近视的准确性。计数资料采用 n (%) 表示, 组间比较采用卡方检验。

结果: 1. 西安市的儿童青少年总近视率、总远视储备不足率、总散光率均具有区域差异性; 2. 西安市的儿童青少年的屈光发育具有年龄差异以及发育突增期, 8-9 岁为近视发展加速期, 8 岁前为远视储备不足率高峰, 初中九年级学生的散光率最高, 三年级升四年级时屈光参数进展较快; 3. 西安市的儿童青少年的屈光发育具有性别差异, 女生总近视率、总视力储备不足率及总体眼轴长度、总轴率比的平

均累计增长值均高于男生, 但总体屈光参数和散光率方面, 男生则高于女生; 4. 顺规散光是西安市儿童青少年散光最常见的类型; 5. 轴率比可作为提高近视筛查准确性的屈光参数之一。

结论: 西安市儿童青少年屈光不正具有区域差异、年龄差异及发育突增期、性别差异, 应为该地区采取针对性管理, 同时应用轴率比在筛查中评估近视的重要方式。

摘要编号: 207708

近视人群户外日光暴露与原发性开角型青光眼的关联研究

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共同作者: Zhidong LI, Yingting ZHU, Yehong ZHUO

目的: 作为重要的环境影响因素, 户外日光暴露在眼科学研究领域中受到广泛关注。既往研究表明, 适度的户外日光暴露有助于延缓近视的发生与进展。然而, 部分研究亦提示, 日光暴露可能通过多种机制对眼组织造成损伤, 从而增加青光眼的发病风险。原发性开角型青光眼是中老年近视人群的重要并发症之一, 目前尚不清楚长期户外日光暴露是否会增加近视个体发生原发性开角型青光眼的风险, 本研究旨在近视人群中探究这一关联。

方法: 本研究基于英国生物样本库数据, 基线纳入近视参与者, 基线存在青光眼的个体被排除, 户外日光暴露时长通过标准化触摸屏问卷进行评估。采用 Cox 比例风险模型计算风险比 (HR) 及其 95% 置信区间 (CI), 并对多项潜在混杂因素进行调整, 并根据人口学特征及近视程度 (高度近视与轻/中度近视) 进行亚组分析, 以评估潜在的交互效应。此外, 在基线人群中进一步分析户外日光暴露时长与角膜补偿眼压 (IOPcc) 及神经节细胞复合体厚度 (GCC) 之间的横断面关联, 基线存在其他类型青光眼的参与者在横断面分析中被排除。

结果: 在校正所有协变量后, 结果显示年平均户外日光暴露时长与原发性开角型青光眼发病风险呈显著正相关 ($HR = 1.15$, $95\% CI$: $1.04-1.27$, $P = 0.008$)。亚组分析结果表明, 不同年龄、性别、种族及近视程度的人群中, 日光暴露时长与原发性开角型青光眼风险之间的交互作用均未达统计学显著性, 提示户外日光暴露的风险效应应在各亚组间相对一致。基线横断面分析进一步发现, 年平均日光暴露时长较长的个体具有更高的 IOPcc ($\beta = 0.05$, $95\% CI$: $0.03-0.07$, $P < 0.001$), 但与 GCC 厚度之间无显著相关 ($\beta = 0.03$, $95\% CI$: $-0.08 \sim 0.14$, $P = 0.594$)。

结论: 本研究结果表明, 较长的户外日光暴露时间与近视人群原发性开角型青光眼发病风险的增加相

关，其机制可能与眼内压升高有关。该结果提示，应重视户外光照暴露在近视人群中可能带来的原发性开角型青光眼风险。

摘要编号：204057

陕西省 2021 年儿童青少年近视患病率及相关风险因素的流行病学研究

第一作者：Lu YE

共同作者：Yi-ming GUO, Yijin HAN, Jiaqi WANG, Junhan WEI, Kexin WU

目的：近视已成为全球健康问题，尤其在中国的儿童和青少年中更为突出。本研究旨在调查陕西省儿童和青少年群体的近视患病率，并探讨性别、教育水平和地域等因素对近视的影响，期望为制定地区性、针对性的近视防控策略提供依据。

方法：本研究为 2021 年在陕西省开展的大规模横断面研究，涵盖了来自关中、南部陕西和北部陕西的 261,504 名 6 至 20 岁的儿童和青少年。通过标准化的眼科检查和非睫状肌麻痹屈光度检测法评估屈光状态，结合结构化问卷调查收集人口学信息。研究采用多阶段分层聚类抽样方法，以确保样本的代表性。使用多元回归分析探讨影响近视的主要因素。

结果：陕西省儿童青少年的总体近视患病率为 67.4%，其中高度近视患病率为 4.63%。女性的近视及高度近视患病率显著高于男性，且随着教育水平的提高，近视患病率逐渐上升。陕北地区的近视和高度近视患病率最高。回归分析显示，性别、教育水平和地域是近视的重要风险因素，女性、教育年级较高的学生以及陕北地区的学生患近视的风险较大。

结论：陕西省儿童青少年近视的高患病率及其与性别、教育水平和地区的显著差异，为未来的近视防控政策提供了重要参考。研究表明，女性、高年级学生及陕北地区的青少年是近视的高危群体，这些群体应成为防控措施的重点。为有效应对近视流行趋势，建议结合不同群体特点，制定针对性强的干预策略，特别是在学校和社区层面普及视力保护知识，改善用眼习惯，同时倡导户外活动的增加，促进青少年群体视力健康的全面提升。

眼肿瘤学、病理学

摘要编号：207900

2 例玻切术后晶状体后囊前纤维机化膜的处理和思考

第一作者：Yanwen SONG

目的：探讨玻切术后晶状体后囊前纤维机化膜的形成机制、临床特点及处理方法，以提高对该病变的认识和手术效果。

方法：通过回顾 2 例临床病例及手术资料，分析晶状体后囊前纤维机化膜的形成原因及易发因素，总结其与后极性白内障的鉴别要点。介绍三种主要处理方法：1) 用撕囊镊环形撕除；2) 结合截囊针辅助剥离后撕除；3) 采用玻切头切除并后囊切开。同时，评估术后 YAG 激光后囊切开的局限性及玻切技术的优缺点。

结果：晶状体后囊前纤维机化膜的形成主要与晶状体上皮细胞增殖、移行及纤维化生有关，易发因素包括玻切术后、年轻患者、高度近视及硅油填充等。该病变需与后极性白内障鉴别，后者常伴后囊发育异常。术中撕囊镊或截囊针操作可有效处理较薄的机化膜，而致密或范围较大的机化膜需采用玻切技术。术后 YAG 激光可能因机化膜过厚而效果不佳，且可能引发并发症。

结论：晶状体后囊前纤维机化膜是玻切术后并发性白内障的常见表现，术前准确判断和术中合理选择处理方法至关重要。对于复杂病例，玻切技术是一种有效但费用较高的解决方案。未来需进一步优化手术技术以减少并发症并提高视觉质量。

摘要编号：208637

348 例眼附属器淋巴瘤的临床病理分析

第一作者：Weimin HE

目的：探讨眼附属器淋巴瘤 (ocular adnexal lymphomas, OAL) 的临床病理特征，提高眼科医生的认识水平，促进早期诊断和治疗，改善患者预后。

方法：收集 2010 年 1 月至 2023 年 7 月在四川大学华西医院眼科手术并经病理学检查确诊为 OAL 的患者资料，分析其症状、体征、影像学表现、病理学特征、治疗方法及预后。

结果：共纳入 348 例 OAL 患者，其中男性 206 例，女性 142 例，男女比约为 3: 2。发病年龄 5-91 岁，平均 58.00 ± 14.02 岁。眼部病程 2 周至 20 年，平均 20.63 ± 33.47 月。单眼受累 284 (81.61%) 例，

双眼受累 64 (18.39%) 例。主要受累部位包括眼眶内软组织 277 (79.60%) 例, 眼外肌 107 (30.75%) 例和结膜 82 (23.56%) 例。最常见的临床表现前三位为眶周包块 (212 例, 60.92%)、眼睑肿胀 (142 例, 40.80%) 和眼球突出 (110 例, 31.61%)。病变在影像学上大多数呈弥漫性生长 (190 例, 54.60%) 及边界不清 (293 例, 84.20%), 主要位于肌锥外间隙 (198 例, 56.90%)。病理类型多样, 以 MALT 淋巴瘤 (286 例, 82.18%) 为主, 其次是弥漫大 B 细胞淋巴瘤 (23 例, 6.61%)、结外鼻型 NK/T 细胞淋巴瘤 (15 例, 4.31%) 和套细胞淋巴瘤 (11 例, 3.16%), 其余淋巴瘤病理亚型少见。262 例患者确诊为 OAL 后继续在我院接受了进一步的检查治疗和随访。根据 Ann Arbor 临床分期标准, IE 期患者 170 (64.89%) 例, IIE 期患者 42 (16.03%) 例, IIIE 期患者 13 (4.96%) 例, IVE 期患者 37 (14.12%) 例。在治疗方面, 63 (24.05%) 例患者术后观察、127 (48.47%) 例患者术后放疗, 48 (18.32%) 例患者术后化疗, 24 (9.16%) 例患者术后放疗 + 化疗。通过 Kaplan-Meier 法及多因素 cox 回归分析发现, 临床分期、病理类型、术后治疗为影响患者无进展生存率的独立危险因素。

结论: OAL 好发于男性及老年患者, 临床表现多样, 病理类型复杂, 以 MALT 淋巴瘤最为常见。临床症状结合影像学检查可协助该病的诊断, 但确诊有赖于病理学检查。OAL 的治疗需要多学科协作及个性化方案, 准确的病理分型和临床分期对于治疗选择和早期预后评估至关重要。

摘要编号: 209243

CoMnFe-LDO 增敏葡萄膜黑色素瘤放疗作用和机制研究

第一作者: Yiran YAO

共同作者: Renbing JIA, Ai ZHUANG

目的: 葡萄膜黑色素瘤 (uveal melanoma, UM) 是成人最常见的原发性眼内恶性肿瘤, 严重威胁患者生命健康和生活质量。目前 UM 首选保眼治疗方法是巩膜敷贴放疗, 但 UM 放疗敏感性不足, 常导致治疗失败、肿瘤复发甚至转移。提高 UM 放疗敏感性的关键在于克服放疗过程中乳酸水平高、肿瘤微环境缺氧和 ROS 生成不足等问题。本研究立足 UM 放疗敏感性不足的关键因素, 开发可在放疗中降低乳酸水平、缓解肿瘤缺氧和增加 ROS 生成的纳米材料, 探究其增敏 UM 等肿瘤放疗的作用, 并揭示其作用机制。

方法: 将 CoMnFe 层状双氧化物 (CoMnFe-layered double oxide, LDO 或 CoMnFeLDO) 生物纳

米材料应用于 UM 放疗增敏研究。首先通过煅烧方法制备 CoMnFeLDO, 并进行理化性能表征、测定其体外功能。通过密度泛函理论计算, 揭示 CoMnFe-LDO 在催化乳酸向丙酮酸转化过程中的作用机制。在细胞水平, 测试 CoMnFe-LDO 在细胞水平的安全性, 进而通过代谢组学等代谢物分析、多种荧光染色、CCK-8 实验、活死染色、平板克隆实验、流式细胞术等手段, 测试 CoMnFeLDO 在细胞水平的放疗增敏活性。构建小鼠 UM 原位模型, 通过眼球直径和重量测量、活体荧光成像、眼球苏木精 - 伊红染色和多种荧光染色成像, 鉴定 CoMnFe-LDO 在动物模型水平的放疗增敏潜力。

结果: 1. CoMnFe-LDO 对正常细胞的生长无明显抑制, 具有较高的生物安全性。2. 在放疗条件下, CoMnFe-LDO 在细胞和动物水平均可有效降低乳酸水平、增加氧气和 ROS 生成。3. CoMnFe-LDO 在细胞和动物水平均可发挥高效的放疗增敏作用。4. CoMnFe-LDO 通过将乳酸催化转变为丙酮酸, 发挥乳酸消耗性能。

结论: 成功制备具有降低乳酸、生成氧气、生成 ROS 性能的 CoMnFe-LDO 纳米材料, 并实现 UM 模型中的放疗增敏, 为开发增敏 UM 等肿瘤放疗效果的方法提供了新思路。机制上, CoMnFe-LDO 将乳酸催化转变为丙酮酸, 从而促进 UM 放疗敏感性, 为基于肿瘤代谢重编程进行代谢调控机制研究提供了新视角。

摘要编号: 208824

PADI2 在结膜黑色素瘤中的促癌作用研究

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共同作者: Jie YU, Ai ZHUANG

目的: 结膜黑色素瘤 (Conjunctival melanoma, CoM) 转移率高, 预后差, 缺乏有效治疗手段, 亟需在手术治疗外探究新的靶向治疗手段。靶向催化组蛋白瓜氨酸化 (histone citrullination) 的肽基精氨酸脱亚胺酶 (peptidylarginine deiminase, PADI) 在肿瘤治疗中极具潜力, 但其在 CoM 中的作用尚不清楚。

方法: 回顾患者的临床和组织学参数, 并使用 Kaplan-Meier 生存曲线进行风险因素分析。采用 CCK-8、平板克隆、划痕实验检测 CoM 细胞的增殖和迁移能力, 建立小鼠移植瘤模型检测黑色素瘤的体内生长情况。

结果: 队列中 29 例患者 (35%) 出现远处转移, 脑、肝和肺是常见的远处转移部位。临床肿瘤 (T) 分期越高, 发生远处转移 ($P < 0.001$) 和疾病特异性死亡 ($P = 0.002$) 的风险越高。在 CoM 细胞系中, 介导瓜氨酸化的 PADI2 及瓜氨酸化组蛋白 H3R26

(H3R26cit) 均呈现高表达; 组织水平上, PADI2 与 H3R26cit 在肿瘤组织中的表达明显上调, 且均与患者不良预后呈密切相关 ($P = 0.03$, $P = 0.04$), PADI2 表达水平与 T 分期亦呈现相关性。在 CoM 细胞系中敲除 PADI2 后, 细胞的增殖、成瘤以及迁移能力均受到了抑制, H3R26cit 水平下降; 小动物活体成像实验显示 PADI2 敲低后小鼠肿瘤病灶信号减弱, 成瘤体积及重量显著低于对照组细胞。应用 PADI2 抑制剂 Cl-Amidine 表现出较强的肿瘤抑制效果, 有效杀伤 CoM 细胞而不影响正常黑色素细胞增殖, 这种抑制效果具有剂量依赖效应 (IC_{50} 约为 50–200 μM , 正常黑色素细胞在 500 μM 以上)。在使用 Cl-Amidine 后, CoM 细胞增殖、成瘤和迁移能力被抑制。生物信息学分析显示 SLC7A11 可能是组蛋白瓜氨酸化的调控靶点, 在敲除 PADI2 后其表达水平降低。

结论: 本研究立足临床样本, 揭示了 PADI2 在结膜黑色素瘤进展中起致癌基因的作用, 为结膜黑色素瘤治疗提供了新的治疗靶点。

摘要编号: 208893

UCHL1 驱动鞘脂代谢促进葡萄膜黑色素瘤恶性进展

第一作者: Li ZHU

共同作者: Shuyi LIU, Wei LU, Yingxue MEI, Jiacheng YAN

目的: 葡萄膜黑色素瘤 (Uveal Melanoma, UM) 是成人眼内最常见的原发性恶性肿瘤, 具有高度转移性和死亡率。本研究旨在探讨去泛素化酶 UCHL1 在 UM 恶性进展中的关键作用及调控机制。

方法: 本研究采用生物信息学分析与实验验证相结合的研究策略。首先基于 TCGA-UM 数据库, 分析去泛素化酶家族成员表达与患者预后的相关性, 筛选出关键分子 UCHL1。通过 Western blot 检测人视网膜色素上皮细胞 (ARPE19) 与三种 UM 细胞系 (92.1、MUM2B、C918) 中 UCHL1 的蛋白表达水平。利用慢病毒载体构建稳定敲低 UCHL1 的 UM 细胞系, 通过克隆形成实验、CCK-8 细胞活力检测、EdU 细胞增殖分析和 Transwell 细胞迁移实验, 系统评估 UCHL1 对 UM 细胞恶性表型的影响。采用基因集富集分析 (GSEA) 探索 UCHL1 高表达组显著富集的代谢通路。通过 RT-PCR 和 Western blot 检测鞘脂代谢关键酶 SPHK1 在 mRNA 和蛋白水平的表达变化。利用生物信息学预测和双荧光素酶报告基因实验验证转录因子 IRF1 对 SPHK1 启动子的直接结合和转录调控作用, 并

通过 Western blot 分析 IRF1 在 UCHL1-SPHK1 信号轴中的中介效应。

结果: 研究结果显示, UCHL1 在 UM 细胞系中显著高表达, 且其高表达与患者不良预后密切相关。体外功能实验证实, 敲低 UCHL1 可显著抑制 UM 细胞的增殖能力, 表现为克隆形成率下降、CCK-8 检测的细胞活力减弱、EdU 阳性细胞比例减少; 同时, UM 细胞的迁移能力也受到明显抑制。机制研究方面, GSEA 分析显示 UCHL1 高表达组在鞘脂代谢通路显著富集。分子实验证实, 敲低 UCHL1 可显著下调 SPHK1 在 mRNA 和蛋白水平的表达。进一步研究发现, 转录因子 IRF1 能够直接结合 SPHK1 基因启动子区域, 正向调控其转录活性。重要的是, UCHL1 通过调节 IRF1 的表达和活性, 进而影响 SPHK1 的表达水平, 形成完整的 UCHL1-IRF1-SPHK1 信号传导通路。

结论: 本研究首次阐明 UCHL1 通过转录因子 IRF1 调控 SPHK1 表达, 重塑鞘脂代谢模式, 进而促进葡萄膜黑色素瘤恶性进展的分子机制。UCHL1-IRF1-SPHK1 信号轴的发现为 UM 的预后评估和靶向治疗提供了新的理论依据和潜在干预靶点。

摘要编号: 209089

一例累及眼部的抗中性粒细胞胞浆抗体 (ANCA) 相关性血管炎病例报告

第一作者: Yingxue MEI

共同作者: Shuyi LIU, Wei LU

目的: 对一例以肾脏炎症为首发表现、伴严重眼部受累的 ANCA 相关性血管炎的患者进行系统的诊断和治疗。

方法: 基于患者的临床表现, 根据影像学结果、病理学结果及自身免疫学指标进行诊断并进行有效治疗。

结果: 患者因右侧腰部疼痛 10 余天就诊于外院, 诊断为右侧输尿管结石伴右肾积水, 拟行体外冲击波碎石术。期间患者高热, 暂行输尿管镜下右侧 D-J 管置入术, 待病情稳定后行经尿道输尿管镜下右输尿管结石钬激光碎石术。术后患者症状缓解, 但随后 4 日体温持续升高, 腹部 CT 示左肾黄色肉芽肿性肾盂肾炎, 行超声引导下左肾脓肿穿刺抽液术。术后患者未见好转, 考虑病情危及生命可能, 需通过手术根除原发感染灶, 遂行左肾根治性切除术。术后患者仍有发热, 支气管镜灌洗液结果提示鲍曼不动杆菌及热带假丝酵母菌, 遂应用抗生素进行针对性治疗至患者状态及理化指标逐渐改善。随后患者出现双眼结膜轻度充血, 诊断为双眼巩膜炎、虹膜炎可能性大, 予加替沙星滴眼液, 双氯芬酸钠滴眼液, 典必殊滴眼液对症治疗后续准予出院。患者出

院半月后，因右侧眼红加重、局部隆起明显，按出院医嘱用药无效后就诊于我院，根据外院眼部 CT 结果，考虑泪腺炎的可能性，行增强核磁检查，结果提示双眼泪腺炎，予以典必殊滴眼液及普拉洛芬滴眼液治疗。然而眼部红痛症状改善仍不明显，且上述检验结果均无明显异常。考虑患者目前全身情况，怀疑自身免疫性疾病可能性大。遂完善免疫指标检查，结果提示为 ANCA 相关性血管炎。同时联系外院调取左肾病理，符合肉芽肿性多血管炎表现。因此，明确该患者目前主要诊断为：ANCA 相关性血管炎眼部病变。遂即刻应用奥妥珠单抗联合地塞米松治疗，患者诉双眼疼痛明显好转，双眼结膜充血较前显著减轻，复查血常规示 CRP 及 WBC 进行性下降至正常水平，准予出院。出院后随访至今，未见复发征象。

结论：当患者出现累及多个器官系统的症状且常规治疗无效时，应考虑自身免疫性疾病的可能。一经确诊，应立即针对患者的情况启动针对性治疗。

摘要编号：207770

一例首诊眼科的脉络膜转移癌分享

第一作者：Jing WEI

目的：分享一例首诊眼科的脉络膜转移癌的临床诊断。

方法：回顾性分析收集我科收治的 1 例脉络膜转移癌，对患者的临床特征、组织病理学改变以及原发肿瘤来源、组织学分型等进行分析。

结果：患者男性 52 岁。以“左眼视力下降伴视物遮挡 1 周。”为主诉入院。眼科检查：VOD: 0.6 (+1.00 DS/+1.00 DC) → 1.0, VOS: 0.04 (+5.00 DS/+1.00 DC) → 0.4。右眼外眼及前后节、左眼外眼及前节未见确切异常；左眼视盘上方见灰白色圆形隆起，大小约 6 PD，隆起度约 3 PD，周边视网膜局限性浅灰白色隆起，黄斑区视网膜灰白色隆起，中心凹反光未见。眼压：右眼 20 mmHg，左眼 21 mmHg。眼部 B 超：左眼视网膜下扁平样占位，病灶两侧视网膜局限性浅脱离。眼眶增强 MRI：左眼眼环内侧横断位约 5-8 点方向两处梭形增厚伴部分强化。胸部 CT：双肺多发结节，右肺多发、左侧斜裂区单发小空洞形成，考虑肿瘤。肠镜检查：距肛门 45 cm 约降结肠处，可见一新生物，表面充血水肿，中央凹陷覆白苔，大小约大半圈，质脆，触之易出血。病检结果为中-高分化腺癌。PET-CT：降结肠癌伴盆腹腔转移、双肺转移、L1 椎体骨转移。肿瘤标志物：CA199 (肿瘤相关抗原) > 1,200 U/ml。诊断：1、降结肠恶性肿瘤 2、左眼脉络膜转移癌 3、左眼视网膜脱离 4、老年性白内障 (双眼) 5、屈光不正 (双眼)。

结论：脉络膜转移癌患者主要以视力显著降低、眼底出现扁平样实质性占位病灶作为主要临床特征。脉络膜转移癌由全身其他器官的晚期恶性肿瘤转移而来，要详细询问病史并做全面检查身体查找原发性癌瘤。脉络膜转移癌容易诊断 (结合眼底荧光素血管造影、眼部超声、眼底照相等)，但对于寻找原发灶常需要大量的辅助检查协助诊断，包括肺部 CT、乳腺钼靶、乳腺超声、肝胆胰脾超声、PET-CT、胃肠镜以及血清的癌胚抗原 (CEA) 等的检测都有助于诊断。

摘要编号：203468

人脉络膜黑色素瘤细胞对重离子辐射敏感性研究

第一作者：Qin LIU

共同作者：Yuxin MIAO, Tingwei ZHENG, Huiling BAI, Liyuan YANG

目的：脉络膜黑色素瘤 (CM) 是一种具有高度侵袭性的眼内肿瘤，该肿瘤在成年人群中具有较高的发病率，是眼内原发性恶性肿瘤的主要病理类型之一。重离子射线是一种新兴的放射治疗手段，属于高线性能量传递 (LET) 射线，其能量沉积随穿透深度增加而增大，在射程末端形成显著的 Bragg 峰。临床应用最多的重离子射线是碳离子 ($^{12}\text{C}^{6+}$ 离子)，碳离子束的 Bragg 峰特性使其能量主要集中在肿瘤组织内，而对周围正常组织的剂量沉积相对较少。本研究探讨了人脉络膜黑色素瘤细胞对重离子束的辐射敏感性差异，为优化临床治疗策略提供关键理论依据。

方法：本研究选用 2 Gy、4 Gy 和 8 Gy 三种不同剂量的碳离子束对人脉络膜黑色素瘤 OCM-1 细胞进行辐射处理，并在辐射后 24 小时、48 小时和 72 小时三个时间点，通过 CCK-8 实验评估细胞的增殖能力；通过克隆形成实验分析细胞的存活率；在辐照后 48 小时，利用流式细胞仪检测 OCM-1 细胞周期分布及凋亡情况。

结果：CCK-8 实验数据表明，相较于 X-射线，碳离子辐射对 OCM-1 细胞的增殖能力表现出更为突出的抑制作用；平板克隆形成实验数据显示，碳离子辐射后 OCM-1 细胞克隆存活分数显著低于 X-射线组，差异具有统计学意义 ($P < 0.05$)；流式细胞术检测细胞周期时相分布结果显示，碳离子辐射导致 OCM-1 细胞阻滞于 G2/M 期，且 OCM-1 细胞对碳离子辐射敏感性更高；流式细胞术检测碳离子和 X-射线对 OCM-1 细胞的致死作用，结果显示碳离子辐照后，凋亡细胞的百分比更高，差异具有统计学意义 ($P < 0.05$)，进一步证实 OCM-1 细胞对碳离子辐射敏感性高。

结论：本研究通过对比不同剂量碳离子对人脉络膜黑色素瘤 OCM-1 细胞的辐射效应，发现 OCM-1 细胞对碳离子束的辐射生物学响应显著强于 X-射线，表现为更低的细胞存活率和更高的凋亡率。碳离子通过诱导 DNA 双链断裂和持续的 G2/M 期阻滞，加剧 DNA 损伤累积，显著抑制细胞增殖与修复能力。这些结果表明，碳离子放疗在脉络膜黑色素瘤治疗中具有潜在优势，为其临床应用提供了重要的实验依据。

摘要编号：208836

儿童青少年与成人葡萄膜黑色素瘤的临床特征及预后对比研究

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共同作者：Wenbin WEI, Ruiheng ZHANG

目的：葡萄膜黑色素瘤 (UM) 是成人最常见原发性眼内恶性肿瘤，儿童青少年 UM (PAUM, ≤ 20 岁) 发病率仅 0.6%~1%。现有 PAUM 研究多为单臂设计，缺乏与同期成人队列直接对比，保眼率、治疗并发症等关键终点未被系统评估。本研究旨在对比二者临床特征、治疗反应及长期预后，为 PAUM 规范化管理提供证据。

方法：回顾性纳入 2009 年 1 月至 2021 年 12 月北京同仁医院 1730 例 UM 患者，分青少年组 (37 例, ≤ 20 岁) 与成人组 (1693 例, > 20 岁)。所有患者接受全面眼科评估 (双目间接检眼镜、眼底照相、光相干断层扫描等) 及全身转移筛查 (腹部超声或 PET-CT)。治疗以斑块近距离放疗为主，辅以经瞳孔温热疗法、局部切除或眼球摘除术。随访首年每 3 个月 1 次，2~5 年每 6 个月 1 次，5 年后每年 1 次，核心终点为保眼率、治疗并发症、无转移生存期 (MFS) 及总生存期 (OS)。采用 Kaplan-Meier 法分析生存曲线，Cox 模型评估预后因素， $P < 0.05$ 为差异有统计学意义。

结果：两组中位随访时间分别为 57 个月、46 个月 ($P = 0.21$)，性别 (男性 54.0% vs 51.7%, $P = 0.78$)、基线视力 ($P = 0.20$) 无显著差异。症状上，青少年组以视力下降为主 (75.7% vs 66.0%)，成人组更常出现视野缺损 (31.4% vs 16.2%)，青少年组无症状比例略高 (8.1% vs 2.6%)，差异有统计学意义 ($P = 0.03$)，另见 2 例 PAUM 误诊 (就诊于基层医院时被误诊为视网膜母细胞瘤、视网膜下出血)。肿瘤特征方面，青少年组睫状体受累率更高 (29.7% vs 14.4%, $P = 0.009$)、基底直径更大 (中位 14.9 mm vs 11.7 mm, $P = 0.002$)、靠近视盘比例更高 (27.0% vs 4.7%, $P < 0.001$)，半球形肿瘤更常见 (67.6% vs 46.5%)。两组初始治疗无显著差异 ($P = 0.13$)，均以斑块近距离放

疗为主 (62.2% vs 75.8%)。预后上，青少年组 5 年保眼率 (87.5% vs 81.1%)、5 年 MFS (95.8% vs 82.2%) 更高，继发性眼球摘除 ($HR = 0.30$, 95% CI 0.09 ~ 0.95)、转移风险 ($HR = 0.26$, 95% CI 0.07 ~ 0.97) 显著降低；5 年 OS 青少年组 (95.8%) 高于成人组 (85.7%)，但差异无统计学意义 ($HR = 0.56$, 95% CI 0.16 ~ 1.91)，10 年 OS 相近 (87.8% vs 74.1%)。

结论：PAUM 虽肿瘤基底更大、睫状体受累更常见且易误诊，但保眼率和无转移生存优势显著，年龄是其独立良好预后因素。临床需提高 PAUM 识别度，优先保眼治疗，未来需多中心研究结合基因组分析制定个体化方案。

摘要编号：208458

内镜在眼眶肿瘤摘除术中的应用体会

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目的：眼眶肿瘤是一类复杂且难治的疾病，传统手术方式存在视野狭小、组织损伤大、术后愈合时间长等缺点。随着内镜技术的发展，内镜下眼眶肿瘤摘除术逐渐兴起，并展现出诸多优势。本文将分享我科在眼眶肿瘤摘除术中应用内镜的经验体会，并通过典型病例展示内镜手术的优势和注意事项。

方法：我科自 2021 年起开展内镜下眼眶肿瘤摘除术，并根据肿瘤位置、大小、性质等选择合适的入路和手术方式。入路包括经皮肤前路开眶、结膜、泪阜、鼻腔等，手术方式包括单纯内镜下手术和内镜辅助下手术。

结果：我科已完成多例内镜下眼眶肿瘤摘除术，包括海肌锥内肿瘤、神经鞘瘤、鼻窦沟通肿瘤、泪道肿瘤等。术后患者视力、视野、眼球运动等均得到改善，且外观损伤小，恢复快。

结论：眼眶肿瘤的治疗以手术为主，传统手术方式存在视野狭小、组织损伤大、术后愈合时间长等缺点，术后易出现并发症，内镜技术的应用为眼眶肿瘤摘除术提供了新的思路和方法。

摘要编号：208969

基于诊断证据分层的 IgG4 相关眼病：单中心真实世界的临床表型研究

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目的：IgG4 相关眼病 (IgG4-ROD) 在真实世界中常受限于眼眶组织活检的可及性，临床诊断多依赖影像与血清学；不同证据强度的病例混入同一队列，易导致异质性与偏倚。我们提出以证据分层组织样

本，并系统刻画其临床与影像表型，为后续治疗与预后研究提供统一基线数据。

方法：在单中心回顾性队列中，基于证据强度分层（Tier1：血清 IgG4、影像学及眼部病理；Tier2：血清 IgG4、影像学及他处病理；Tier3：仅有血清 IgG4、影像学无病理）全面描述 IgG4-ROD 的人群学、影像受累模式与血清特征。纳入本院由风湿免疫科确诊 IgG4 相关疾病病历共 291 份，筛选获得眼部受累 104 例（具有影像或客观体征的眼部受累证据），因资料缺失排除 13 例，最终纳入 91 例。核心变量包括：性别、年龄、证据分层、影像学模式（泪腺 / 眼外肌 / 视神经 / 眶内脂肪 / 眼睑，受累单侧或双侧）、整体侧别（取各部位最大侧别值），血清 IgG4 原始值（g/L）。影像证据来源记录为 MRI/CT 组合。采用描述性统计汇总人群学与表型分布。

结果：纳入病历中男性占 73.6%（67/91），中位年龄 53 岁（25p-75p；45.5-60.0）。证据分层：Tier1 占 4.4%（4/91），Tier2 占 20.9%（19/91），Tier3 占 74.7%（68/91），提示真实世界中病理可及性低。影像以 MRI 为主（仅 MRI 90.1%，MRI + CT 5.5%，仅 CT 3.3%）。总体受累以双侧为主（90.1%，82/91），单侧 9.9%（9/91）。部位分布（任一侧受累）：泪腺 78.0%（双侧 65.9%）、眼外肌 53.8%（双侧 39.6%）、视神经鞘膜 23.1%（双侧 19.8%）、眼睑 24.2%（双侧 16.5%）、眶内脂肪 8.8%（双侧 6.6%）；≥ 2 部位累及 57.1%（52/91）。血清 IgG4 中位 8.41 g/L（25p-75p；3.13-19.10），IgG4 < 1.35 g/L 者 9.9%（9/91），提示存在血清阴性但临床 / 影像阳性的亚群。

结论：在病理可及性有限的真实世界条件下，证据分层及影像主导策略可稳定、透明地刻画 IgG4-ROD 的核心表型：以双侧泪腺与眼外肌受累最常见，多部位累及占比过半；约一成患者血清 IgG4 未达阈值，强调诊断需整合影像与系统性病理证据。该队列为后续治疗策略与预后析提供一致的分析框架。

摘要编号：204389

对于甲状腺功能障碍性视神经病变在眼眶减压手术后视野恢复的预测指标的研究

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目的：探索甲状腺相关眼病中甲状腺功能障碍性视神经病变在眼眶减压术后视野恢复的预测指标。

方法：回顾性纳入 2020 年 9 月至 2021 年 12 月就诊于北京大学人民医院眼科的 DON 患者。收集患

者基本信息以及眼眶减压术前及术后随访最佳矫正视力、眼压、VF、图形—视觉诱发电位和海德堡 SPECTRALIS 光学相干断层扫描仪（HRA-OCT SPECTRALIS）检查所测量的视乳头周围视网膜神经纤维层厚度、Bruch 膜开口最小盘沿宽度以及黄斑区神经节细胞层厚度。术前所有 DON 患者的初始 VF 平均缺损值（均低于 -2.00 dB，术后 6 个月 MD 较术前改善 > 10% 或 MD 高于 -2 dB 定义为恢复组，而术后 6 个月 MD 与初始 MD 相比变化 ≤ 10% 定义为未恢复组）。比较两组患者年龄、性别、眼别和吸烟情况、眼压、手术前 BCVA、cpRNFL 厚度、BMO-MRW、ETDRS 的 mGCL 厚度、8 × 8 后极部网格的 mGCL 厚度等指标。通过多因素分析明确眼眶减压术后 VF 恢复的预测指标。使用 SPSS 27.0（IBM 公司，Armonk, NY, USA）进行数据分析。

结果：本研究共纳入了 DON 病例 13 例（18 眼），平均年龄 54.06 ± 7.08 岁，男性 13 眼，女性 5 眼。根据术后 VF 恢复情况分为 RG 13 眼，NRG 5 眼，两组间术后 VF 的 MD 有统计学差异（P < 0.05）。使用 Mann-Whitney U 非参数检验分析，发现应用 ETDRS 网格模式测量 mGCL 厚度中，鼻外象限（Outer nasal, ON）（Z = 13.50, P < 0.05）和外上象限（Outer superior, OS）（Z = 11.50, P < 0.05）的 mGCL 厚度与 VF 恢复情况相关。其他的测量参数如年龄、性别、眼别和吸烟情况、眼压、手术前 BCVA、cpRNFL 厚度、BMO-MRW、除了 OS、ON 象限的 mGCL 外其他象限 ETDRS 的 mGCL 厚度和 8 × 8 后极部网格的 mGCL 厚度均未发现与 VF 恢复有相关性（均 P > 0.05）。使用 Spearman 相关性分析分析 ON 和 OS 象限 mGCL 厚度与 VF 恢复情况的相关性，发现 ON、OS 象限的 mGCL 厚度与术后 VF 恢复情况显著相关，相关系数分别为 0.484 和 0.594（P < 0.05）。术前 ON 和 OS 象限的 mGCL 厚度越厚，VF 恢复情况越好（P < 0.05）。根据 ON、OS 象限的 mGCL 厚度与术后 VF 之间分布图可见 ON、OS 象限 mGCL 与术后 VF 之间大致呈现正相关。

结论：眼眶减压术前后 ON 和 OS 象限的 mGCL 厚度变化是 DON 患者术后 VF 是否恢复的预测指标。

摘要编号：210275

巩膜开窗联合玻璃体切除手术治疗睫状体黑色素瘤一例

第一作者：Hu DANPING

目的：脉络膜黑色素瘤发病部位通常位于后极，既往多采用玻璃体切除手术直接切除瘤体或者眼球摘除术，本例患者肿瘤位于睫状体处，瘤体较大，

患者继发渗出性视网膜脱离，采用巩膜开窗外切处联合玻璃体切割术（prophylactic vitrectomy, PPV）治疗黑色素瘤。

方法：本例患者为 559 岁的中年男，因右眼视物模糊一月就诊。既往史：2 型糖尿病 高脂血症（服用阿司匹林）、继发性肺结核。眼部查体：视力：od 指数眼前，os：1.0，IOP od 11 mmHg，os 17 mmHg。右眼角膜透明，前房闪辉，瞳孔欠圆，虹膜后粘连，晶体混浊，扩瞳后见睫状体附近棕色肿物，累及 4 个钟点位，晶体向鼻下方移位，眼底窥不清。左眼未见明显异常。诊断：右眼睫状体肿物（脉络膜黑色素瘤？）、右眼渗出性视网膜脱离、右眼玻璃体混浊、右眼并发性白内障、右眼晶体不全脱位、2 型糖尿病、高脂血症、继发性肺结核。治疗方案：全麻下行右眼经巩膜切除肿物 + 白内障超乳摘除 + 玻切 + 光凝 + 冷凝 + 硅油填充术。术后全身及局部降眼压，球旁注射。患者后续肿瘤科就诊。出院查体：术眼视力 od 指数 30 cm，矫正致 0.05，IOP od 15 mmHg。右眼角膜内皮稍皱褶，前房少量血细胞，瞳孔欠圆，上方虹膜缺损，晶体永久性缺如，瞳孔区部分炎性渗出膜遮挡，玻璃体腔硅油填充，眼底检查隐约见激光斑，后极部及上方视网膜平伏。

结果：巩膜开窗联合玻璃体切除手术能有效切除睫状体处瘤体，同时治疗因瘤体较大继发的视网膜脱离问题。

结论：巩膜开窗切除联合玻璃体切除手术能有效且完整的切除睫状体肿瘤。对比既往眼球内直接使用玻切头切碎并吸除瘤体组织，巩膜开窗切除引起的肿瘤播散风险更小，同时玻璃体切除手术可治疗因瘤体较大继发的视网膜脱离问题。针对临床上强烈要求保留眼球的患者，可根据病情考虑施行该手术。

摘要编号：209058

木犀草素处理葡萄膜黑色素瘤细胞系 C918 的三维细胞球体培养和细胞活力研究

第一作者：Jinhai YU

目的：本研究旨在研究葡萄膜黑色素瘤（UM）细胞系 C918 衍生的三维细胞球体的形态和组织学特征，并评估木犀草素对其细胞存活率的影响。

方法：在超低吸附 96 孔板中培养 C918 细胞，观察 C918 三维细胞球体在不同时间间隔内的形态变化。使用 HE 染色和免疫组织化学染色检查了在超低吸附 6 孔板中培养的 C918 多细胞球体的组织学特征。在二维和三维培养的 C918 细胞中用不同浓度的木犀草素处理 72 小时后，使用 CCK8 试剂测量 450nm 波长下的光密度。比较两种培养条件下的 IC50 值。

结果：随着培养时间的推移，C918 三维细胞球体的体积逐渐增加，在培养的第 4 至 6 天，球体内出现了明显的缺血和缺氧样区域。组织学染色显示，三维培养的多细胞球体中细胞活力标记抗体（Ki67）和黑色素瘤标记抗体（MelaA、HMB45、S-100）呈阳性表达。CCK-8 实验显示，72 小时后，C918 细胞中木犀草素的 IC50 值在三维培养中为 183.50 $\mu\text{mol/L}$ ，在二维培养中为 16.19 $\mu\text{mol/L}$ 。在显微镜下观察用不同木犀草素浓度处理 72 小时的三维培养的 C918 细胞。两组之间的最大横截面积没有统计学上的显著差异，但与对照组相比有所减少。

结论：三维培养的 C918 细胞球体表现出与真实肿瘤相似的组织学特征，对木犀草素的反应比二维球体低。它们为抗肿瘤药物筛选提供了一个有价值的模型。

摘要编号：207498

疑难病例板块——血液系统肿瘤两次造血干细胞移植术、化疗及 CAR-T 治疗后眼内病灶，炎症？肿瘤？临床中的诊疗困境——病例分享一例

第一作者：Jing HOU

目的：中年男性，无明显诱因右眼视物模糊 5 个月，不伴眼红、眼痛等；2 年前多发性骨髓瘤，1 年半前自体造血干细胞移植，1 年前复发合并继发性浆细胞白血病，9 月前异基因造血干细胞移植，3 月前中枢神经系统白血病，化疗后转阴，1 周前骨髓复发行 CAR-T 治疗。

方法：5 月前右眼视物模糊多次就诊于外院，诊为玻璃体混浊；4 月前右眼视物模糊加重就诊于外院，眼底像可见玻璃腔内及后极部视网膜内多发边界不清的黄白色病灶，外院考虑为造血干细胞移植后眼内病毒性感染，行抗病毒治疗后无明显好转，房水 CMV-DNA 阴性现就诊于我院，视力右眼 HM，尘状 kp，cell1+，玻璃体积血，视盘周围视网膜下可见出血及肉粉色实性病灶伴浆液性视网膜脱离，左眼 1.0，未见明显异常。

结果：患者为中年男性，复发性血液系统肿瘤行多次造血干细胞移植术后，重度免疫缺陷的患者，右眼病灶是眼内感染？还是眼内肿瘤浸润？如何证实？右眼房水高通量病原体检测及细胞因子阴性，诊断性玻切送微小残留病灶（MRD）检测可见 82.85% 异常表型浆细胞；完善头颅、眼眶 MRI 及腰穿脑脊液检查均未见明显异常；治疗右眼玻璃体腔注药：甲氨蝶呤 400 μg ，每周一次；4 次治疗后视力提升至 0.1，病灶明显缩小，仅余陈旧网膜下血；8 次治疗后复查眼眶 MRI+ 增强左侧视神经鞘膜毛

糙不均匀增厚，增强扫描可见线状不均匀强化，行腰穿脑脊液 MRD 检查未见异常，予鞘注药物（阿糖胞苷 + 地塞米松 + 甲氨蝶呤 15 mg）治疗，2 周后患者自述左眼出现视力下降、视物遮挡感 1 周余，视力右眼 0.2，左眼 0.6，眼压右眼 11 mmHg，左眼 25 mmHg，左眼 kp (+)，cell (+)，虹膜肿胀，玻璃体轻混，OCT 示左眼视盘周围 RPE 隆起，左眼诊断性玻切 + IVMTX 400 μ g，MRD 检测：可见 97.22% 异常表型浆细胞。考虑患者目前双眼浆细胞白血病浸润，治疗 IVMTX 400 μ g 右眼 Q2w，左眼 Qw；6 周后发现大量心包积液，血压低，诊断为心包肿瘤浸润；CAR-T 回输 + IVMTX 后截止末次随访期间血清学、骨穿及腰穿 MRD 检查均阴性。

结论：血液类肿瘤移植后出现的眼部病变时不仅要考虑眼内机会性感染，还有可能是肿瘤浸润，对于此类疾病视神经受累的诊断与治疗还处于盲区。

摘要编号：208868

眼内蜘蛛网——一例眼内神经内分泌肿瘤

第一作者：Yangyan XIAO

共同作者：Xiaojian GUO

目的：探讨一例原发性眼内神经内分泌肿瘤的诊断思路与治疗过程，为临床类似复杂眼病的鉴别诊断和治疗提供参考

方法：通过对一例 45 岁左眼视力下降男性患者行病史采集、眼科检查、全身检查、手术治疗以及病理检查以确诊为眼内神经内分泌肿瘤，以及 4 年的随访。

结果：初步检查：21 年 3 月患者因左眼视力下降 1 个月就诊。此时左眼 BCVA 0.5，存在玻璃体混浊、黄白色肉芽肿性改变及视网膜病变；右眼正常。眼部 B 超、OCT、造影等显示玻璃体混浊、黄斑前膜、视网膜血管性占位等异常。全身检查类风湿因子稍增高，乙肝小三阳，肺部少量结节。鉴别诊断：排除视网膜血管瘤、视网膜血管异常增生性病变、视网膜血管增生性肿瘤等常见病变；布鲁菌等多种感染指标阴性。病情进展：随访过程中 21 年 5 月出现左眼牵拉性网脱视力进一步下降，予以玻璃体切除手术，术中取前膜行病理，提示神经内分泌肿瘤可能。B 超 CT 排查全身后未发现原发灶 治疗：经手术治疗后视力有所提高，疫情中病情恶化，最终眼摘，再次病检 ki67 从第一次病理 20% 阳性率到第二次 40% 阳性率；免疫组化 TTF-1 阳性，PET-CT 阴性。转归：2024 年 7 月复查 PET-CT 和血清神经元特异性烯醇化酶（NSE）均正常后予以义眼植入。25 年 10 月复查 B 超和 CT 正常，NSE 阴性。

结论：本例复杂眼病患者，通过全面的眼科及全身检查，排除了多种常见眼病及感染因素。最终病理提示神经内分泌肿瘤可能，但全身排查未发现原发灶。该病例提示对于复杂眼病，需进行详细的检查和长期的随访，病理检查在明确诊断中起关键作用，同时应关注全身疾病的眼部转移可能。

摘要编号：201418

眼和眼眶表现为主伴 HLA-B27 阳性的肉芽肿性多血管炎误诊和病理分析一例

第一作者：Yungang DING

共同作者：Jianhua CHEN, Wei CHEN, Chenyang CONG, Baoyi DING, Yan ZHANG

目的：探讨一例以眼和眼眶病变为主要表现的肉芽肿性多血管炎（GPA）伴类风湿关节症状和 HLA-B27 阳性病例的误诊及病理分析的经验。

方法：通过回顾性病例分析，收集患者的病史、临床表现、实验室、影像和病理检查，分析其病理特征和文献回顾。

结果：患者，49 岁，女性，因“右眼红痛 1 年，伴眼球突出反复加重 6 个月”就诊。1 年前在外院眼科初诊为双眼巩膜炎，使用妥布霉素地塞米松和普拉洛芬滴眼液 1 月余无好转，在风湿科基于关节痛和晨僵、HLA-B27 阳性和 MRI 骶髂关节改变等诊断强制性脊柱炎，行依托考昔和抗 TNF- α 药物治疗，关节症状消失，眼部无好转。6 个月后加重为右眼球突出，先后多家医院诊治。眼科曾诊断“双眼巩膜炎、双眼葡萄膜炎、右眼眶蜂窝织炎和炎性假瘤”，病理活检诊断“右眼睑纤维包裹化脓性炎”。风湿科曾诊断“化脓性血管炎、ANCA 相关性血管炎（AAV），强制性脊柱炎”，影像科不能排除眼眶肿瘤、结核性肉芽肿等疾病。患者接受多次抗生素、激素等药物治疗，其中甲强龙冲击 + 环磷酰胺治疗后，左眼治愈，右眼减轻后反复加重，至我院就诊。眼科查体：右眼视力 0.08，矫正 0.3，眼压 15.0 mmHg，眶压高，眼球各方向运动受限，眼球突出度 23 mm，眼睑红肿，球结膜充血，巩膜表面血管迂曲扩张，余未见异常。行右眼眶病损切除术。病理见肉芽肿、血管炎和微脓肿，大量中性粒细胞和淋巴细胞等浸润，免疫组化呈多克隆性，综合右侧乳突炎和分泌性中耳炎等多系统疾病史，血液 PR3-ANCA、C-ANCA 和 HLA-B27 阳性，MPO-ANCA、P-ANCA、IgG4、PCT 和 TB-IGRA 阴性，及既往影像学检查，诊断为：右眼眶 GPA，右眼巩膜炎，AAV。患者使用 CD20 单抗治疗后右眼缓解，随访 6 个月无复发。

结论：以眼和眼眶病变为主的肉芽肿性多血管炎增加了诊治难度，伴有 HLA-B27 阳性和关节症状时

易于误诊为强制性脊柱炎，血液检查便于鉴别诊断。病理分析为眼眶 GPA 诊治提供了重要依据，其病理特征致临床表现不典型，易于误诊。CD20 单抗药物对本例久治不愈、病理大量淋巴细胞浸润和 PR3-ANCA 阳性的患者治疗有效，改善预后。

摘要编号：207936

眼眶自然杀伤/T 细胞淋巴瘤：病例系列及文献回顾

第一作者：Tingting REN

共同作者：Jing LI, Jianmin MA

目的：评估眼眶自然杀伤/T 细胞淋巴瘤 (NKTCL) 患者的临床特点、病理组织学表现、治疗及预后。

方法：本研究回顾性收集了 2005 年 11 月至 2024 年 3 月就诊于首都医科大学附属北京同仁医院，经病理组织学确诊为眼眶 NKTCL 的 11 例患者的临床资料，并对患者进行随访以评估其预后。

结果：眼眶 NKTCL 患者的平均年龄为 48.09 岁，男性发病率略高于女性。所有病例均为单侧发病，临床表现为眼睑或眶周肿胀，其他还包括视力下降 (90.9%)、结膜充血 (90.9%)、眼球运动障碍 (81.8%)、眼球突出 (63.6%)、眼睑下垂 (36.4%) 等。所有患者均伴有周围组织侵犯，最常见的是眼睑 (11 例)、眼球壁 (7 例) 和泪腺 (5 例)。63.6% 的患者还合并鼻部软组织受累，36.4% 的患者仅表现为眼眶 NKTCL，不伴有鼻部受累。镜检可见异型淋巴细胞弥漫增生浸润，可伴有坏死。免疫组化染色结果显示，GrB+ (11 例)、CD3+ (10 例)、TIA1+ (9 例)、CD56+ (8 例)、EBV 或 EBER 表达阳性 10 例。所有患者均接受了眼部手术，7 例患者接受了术后化疗，1 例患者同时接受了局部外放疗。随访 (平均时间 113.27 个月) 显示患者预后不良，5 例失访，5 例死亡，仅 1 例患者无复发存活。

结论：眼眶 NKTCL 侵袭性强，发展迅速，预后较差。临床表现与眶蜂窝织炎或炎性假瘤相似，在抗炎和激素治疗无效时，应尽早进行活检以明确诊断。一旦确诊为眼眶 NKTCL，应尽快行化疗和放疗，以期改善患者的预后。

摘要编号：208899

睫状体上皮腺瘤：临床、组织病理学和治疗

第一作者：Siyuan WANG

共同作者：Renbing JIA, Ai ZHUANG

目的：睫状体上皮腺瘤 (包括睫状体色素上皮腺瘤 (APCE) 和睫状体无色上皮腺瘤 (ANPCE)) 极为罕见，关于它们的大部分知识均来自零星的病

例报告。本研究旨在全面了解睫状体上皮腺瘤，并明确 APCE 与 ANPCE 之间的异同。

方法：本研究为回顾性病例系列，纳入了从检索文献中获得的 41 例患者的数据以及上海第九人民医院诊断的 5 例病例。采用非参数秩和检验、t 检验和 χ^2 检验对 APCE 和 ANPCE 的临床病理特征、治疗及预后进行比较。

结果：APCE (n = 23) 和 ANPCE (n = 23) 患者的临床和组织病理学特征以及治疗情况相似。这两种肿瘤的整体视力预后良好，63% 的患者在治疗后视力稳定或有所改善。眼球摘除是最终视力丧失的主要原因 (APCE 有 3 例，ANPCE 有 2 例，p = 0.001)。值得注意的是，APCE 患者中常见虹膜浸润 (APCE 有 6 例，ANPCE 无，p = 0.014)，且虹膜浸润与最终视力下降有关 (p = 0.003)。肿瘤大小与视力结果无关 (p = 0.65)。所有患者均未出现转移或复发。

结论：在大多数情况下，ANPCE 和 APCE 的临床病理特征相似。虹膜浸润在 APCE 患者中较为常见，这与不良的视力预后相关。

摘要编号：209470

累及眶骨的眼眶占位性病变影像学特点分析

第一作者：林婷婷

共同作者：Yanjin HE, Limin ZHU

目的：分析发生于眶骨的占位性病变的影像学表现及其与组织病理学之间的关系，以加深对该类罕见眼眶疾病的认识。

方法：收集 18 例发生于眶骨的占位性病变，所有患者皆手术切除病灶，组织病理学确诊；回顾性分析其眼眶影像学检查、组织病理学切片及其他临床资料。

结果：病理诊断包括骨瘤 4 例、嗜酸性肉芽肿 3 例、骨肉血管瘤 3 例、骨样骨瘤和骨化性纤维瘤各 2 例、尤文肉瘤、骨转移癌、皮样囊肿和胆固醇肉芽肿各 1 例。CT 扫描表现：骨样骨瘤主要表现为类圆形的高密度影，偶可见中心典型的低密度伴钙化的“癌巢”影，外周伴骨质增生；骨肉血管瘤为典型的“栅栏状”“蜂窝状”或“囊状”骨小梁结构；骨瘤为骨表面的骨样结节状隆起，呈致密、高密度的骨样改变，一般无骨质破坏；骨化性纤维瘤表现为肿瘤表面常有骨壳包绕，边界清楚，大多以圆形、椭圆形密度均匀的高密度影为主要表现；尤文肉瘤虫蚀样骨质破坏，破坏区内见残余骨组织呈放射状排列，骨组织间有软组织病变向眶内膨隆；嗜酸性肉芽肿呈溶骨性破坏，周围伴有软组织肿块。

结论：累及眶骨的病变有其特有的病理特征，不同的病理组成成分在 CT 上表现出特征性的影像。将影像学表现与病理组成对照分析，阐述和辨识二者之间的关系，可以为提高术前诊断水平提供帮助。

摘要编号：204225

纵横—VI 术在睑缘肿物切除与一期修复中的临床观察

第一作者：Wu GUOHAI

目的：旨在探讨自创的“纵横—VI”手术方式在睑缘肿物切除与一期修复中的应用效果。

方法：本研究收集 2016 年 9 月至 2023 年 12 月期间在宁波市眼科医院接受睑缘肿物切除手术的 163 例患者。根据不同的手术指征，采用了三种手术方式：“纵横—VI”术式、单纯切除术和切除 + 滑行皮瓣术式。通过手术前后照片比对及四项术后效果评分（疤痕评分、睫毛评分、睑缘形态和眼睑功能）来评价手术效果。

结果：“纵横—VI”术式在疤痕评分方面表现突出，有 96.26% 的患者获得了最高评分（3 分），显著优于单纯切除术的 71.43% 和切除 + 滑行皮瓣术式的 31.43%（ $P < 0.05$ ）。在睫毛评分和睑缘形态评分上，“纵横—VI”术式优势显著，分别有 100% 和 96.26% 的患者获得最高评分，远超过其他两种手术方式（ P 均 < 0.05 ）。同时，在眼睑功能评分方面，接受三种手术方法的患者均获得最高评分（3 分），显示均能有效恢复眼睑功能，无显著差异（ $P > 0.05$ ）。

结论：“纵横—VI”术式为睑缘肿物的切除与一期修复提供了一种创新方法，尤其在减少瘢痕形成、维持睑缘睫毛连续性、保持睑缘自然弧度及眼睑正常功能方面展现了明显优势。本研究结果支持“纵横—VI”术式作为处理睑缘肿物的首选方法，有助于提高患者的术后满意度和生活质量。

摘要编号：208217

组蛋白乳酸化介导的 m1A 去甲基化酶 ALKBH3 异常激活通过抑制 PML 小体相分离促进葡萄膜黑色素瘤进展

第一作者：Gu XIANG

目的：葡萄膜黑色素瘤（UM）是成人最常见的眼内恶性肿瘤，易转移，转移后中位无进展生存期仅 3.3 个月，亟待寻找有效治疗靶点。m1A 甲基化是重要的 RNA 修饰，在维持 RNA 稳态中具有重要作用，然而 m1A 修饰在 UM 中的作用有待进一步揭示。

方法：本研究通过 CUT&Tag 联合 Chip-seq 揭示 UM 中组蛋白乳酸化异常激活导致 m1A 去甲基化酶 ALKBH3 表达升高。通过 MeRIP-seq、RNA-seq 和 iTRAQ 阐明 m1A 去甲基化酶 ALKBH3 促进 UM 进展的具体机制。

结果：UM 中升高的组蛋白乙酰化修饰水平导致 m1A 去甲基化酶 ALKBH3 异常激活，m1A 修饰呈整体低水平，且高表达的 ALKBH3 与 UM 患者的不良预后相关。高通量 RNA 修饰组学、转录组学和蛋白组学测序发现 PML 小体的核心成分 SP100A 是 ALKBH3 作用的关键靶点。沉默 ALKBH3 在体内和体外均显著抑制 UM 进展，并且可以通过消耗 SP100A 逆转其抑制作用。进一步探索机制，发现 YTHDF1 是 SP100A 的 m1A 甲基化识别蛋白，ALKBH3 通过去除 SP100A 的 m1A 甲基化，抑制其 RNA 稳定性和翻译效率。

结论：组蛋白乳酸化驱动的 m1A 修饰稳态失衡是 PML 小体相分离的重要调控事件，揭示“m1A 修饰—代谢重编程—相分离”桥连调控致癌机制，为 UM 的靶向治疗提供策略。

摘要编号：207528

经眶内镜辅助下眶沟通性肿瘤摘除手术治疗的体会

第一作者：Shangcai XUE

目的：探讨眶沟通性肿瘤经眶内镜辅助下肿瘤摘除手术治疗效果。

方法：总结 2018 年 6 月至 2025 年 9 月间在我科治疗的眶沟通性肿瘤患者 12 例，男性 7 例，女性 5 例，年龄 23 岁至 76 岁。其中蝶骨骨纤维异常增生症 3 例，眶沟通性脑膜瘤 3 例，眶沟通性转移癌 3 例，眶沟通性骨瘤 1 例，眶沟通性血管瘤 1 例、浆细胞瘤 1 例。所有病例肿瘤摘除术均眼科及神经外科医生术前联合会诊，经术前评估部分患者经颅入路，由神经外科医生摘除颅内肿瘤并修复颅骨，眼科医生处理眶内肿瘤并行眶壁缺损修复、部分患者由眼科医生经眶入路内镜辅助下行肿瘤摘除术。眼眶缺损修复均采用钛板或可吸收材料现成形修复。

结果：术后颅脑及眼科功能恢复良好，患者均行 CT 三维扫描及骨重建，肿瘤摘除理想，眼眶壁形态良好，眼球位置明显复位。

结论：经眶内镜辅助下眶沟通性肿瘤手术摘除同时进行眼眶骨缺损修复术，能取得较好的疗效。

摘要编号: 207707

结膜粘膜相关淋巴样组织 (mucosa-associated lymphoid tissue, MALT) 淋巴瘤

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目的: 展示一个罕见的结膜粘膜相关淋巴样组织 (mucosa-associated lymphoid tissue, MALT) 淋巴瘤病例, 一只眼手术治疗, 另外一眼保守治疗, 跟踪 8 年的治疗效果及预后。

方法: 临床观察研究。同一患者, 左眼手术切除结膜肿物后行病理检查, 右眼使用干扰素滴眼液治疗; 左眼结膜肿物复发后使用干扰素滴眼液治疗。患者行眼部超声、PET/CT、血常规、骨髓穿刺活检等评估眼部及全身情况。

结果: 左眼结膜肿物病理诊断为“粘膜相关淋巴样组织 (mucosa-associated lymphoid tissue, MALT) 淋巴瘤”。眼部超声、PET/CT、血常规、骨髓穿刺活检等未见异常。左眼术后 1+ 月, 右眼出现类似结膜肿物, 使用干扰素滴眼液后病灶消退。术后 1+ 年, 左眼再次出现类似结膜小肿物, 使用干扰素滴眼液后病灶消退。此后 7 年, 双眼结膜肿物未再复发。

结论: 对于新发及复发的结膜 MALT 淋巴瘤, 早期足量局部使用干扰素具有良好治疗效果。

摘要编号: 209446

脉络膜黑色素瘤转移机制与药物治疗新研究

第一作者: Yakun WANG

共同作者: Xuxiang ZHANG

目的: 脉络膜黑色素瘤 (UVM) 转移是患者死亡的主要原因, 目前尚无治愈性疗法。虽然已知 BI2L2 (由 BAIAP2L2 编码) 可以调节细胞骨架动力学, 但其在 UVM 转移中的作用仍未表征。在这项研究中, 我们表明 BAIAP2L2 在 M1 期 UVM 中上调并预测预后不良。

方法: 我们在体外不同侵袭性的脉络膜黑色素瘤细胞系 (OCM-1A 细胞以及 MUM-2B 细胞) 中对 BAIAP2L2 影响细胞的迁移、侵袭和假足形成进行探究, 并确认其泛素化的具体方式。通过组学筛选关键通路并进行验证, 并通过网络数据库进一步筛选出治疗的相关药物。最终我们在体内肿瘤肺转移模型小鼠和人的脉络膜黑色素瘤中进行了验证。

结果: BAIAP2L2 敲除抑制转移性 MUM-2B 细胞中的迁移、侵袭和假足形成, 而其过表达增强了微创 OCM-1A 细胞中的这些表型。我们将 JUN 和 FOSL 确定为 BAIAP2L2 的上游转录因子, 并揭

示了一个正反馈环, 其中 BI2L2 通过阻断 JUN 的 K48 连接泛素化来稳定 JUN。BI2L2 直接与 JUN 结合, 阻止 E3 连接酶结合和随后的蛋白酶体降解, 从而增强其自身的表达。使用虚拟筛选和 SPR, 我们发现了三种小分子抑制剂, 可在体外破坏 BI2L2-JUN 结合、促进 JUN 降解并抑制恶性表型。总的来说, 这些化合物在小鼠 UVM 转移模型中有效抑制肺转移。

结论: 我们的研究将 BI2L2-JUN 轴定义为 UVM 转移的主要驱动因素, 并确定了治疗干预的可药物靶点。

摘要编号: 209499

葡萄膜黑色素瘤改良肿瘤内切除手术及单中心 20 年临床疗效回顾研究

第一作者: Xuemei ZHU

共同作者: Jianhong LIANG

目的: 介绍一种改良的葡萄膜黑色素瘤肿瘤内切除手术技巧, 报告单中心 20 年来葡萄膜黑色素瘤行肿瘤切除手术患者的临床疗效及趋势。

方法: 回顾性病例研究。收集 2002 年 11 月至 2024 年 11 月在北京大学人民医院眼科诊为葡萄膜黑色素瘤并行肿瘤切除手术的患者临床资料, 包括术前术后视力、眼压、眼底照相、眼部 B 超等影像检查及手术术式、随访、联合治疗、复发、全身转移等信息。所有患者肿瘤切除手术均由同一术者完成, 术后均获得病理支持确诊葡萄膜黑色素瘤。改良肿瘤内切除手术要点为切除肿瘤时采用“隧道-挖空式”切除。手术流程为术前 1 月先行钨 106 放射敷贴治疗, 肿瘤切除手术采用局部麻醉或全身麻醉, 采用 23 G 玻璃体切割, 玻璃体后脱离, 根据视网膜浸润情况, 选择经视网膜或视网膜下的肿瘤切除途径, 采用“隧道-挖空式”切除肿瘤, 直至完全切除后激光肿瘤边缘及巩膜床; 气液交换、硅油填充。术中控制出血的操作包括电凝累及的视网膜血管、短暂升高眼压、应用止血药物等。

结果: 本研究共纳入 102 例 (102 眼) 患者, 平均年龄 45.1 ± 12.8 岁, 女性 54 例, 右眼 40 只, 其中随访时间大于 2 年者 68 例, 平均随访时间 86.2 ± 34.3 个月, 末次随访时保眼率 89.7%, 术后 5 年和 10 年的生存率分别为 91.2%、75%。术后主要的眼部并发症为视网膜脱离、白内障、一过性高眼压、黄斑水肿和增殖性玻璃体视网膜病变。针对采用改良肿瘤内切除手术的患者, 纳入肿瘤高度 > 7 mm 或基底直接 > 15 mm 的大肿瘤患者行亚组分析, 共纳入 18 例 (18 眼) 患者, 平均年龄 49.2 ± 12.9 岁, 平均肿瘤高度 9.4 ± 2.1 mm, 基底直径 13.3 ± 1.8 mm, 所有患者均成功实施了肿瘤切

除术，改良手术方式术野清晰，平均手术时长 90.5 ± 20.7 分钟，且无严重并发症。

结论：单中心 20 年长期研究显示葡萄膜黑色素瘤肿瘤切除术可获得良好的肿瘤控制，未观察到手术相关严重并发症及局部复发增加。大肿瘤中与眼球摘除相比，未观察到全身转移、死亡率显著增加。改良的葡萄膜黑色素瘤内切除术改善术野清晰，提高手术效率。

摘要编号：208350

超级增强子通过 TFAP2A 介导葡萄膜黑色素瘤中的转录失调与代谢重编程机制

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目的：葡萄膜黑色素瘤 (Uveal melanoma, UM) 是最常见的眼内恶性肿瘤，经常发生转移，导致视力丧失甚至死亡，损害患者生活质量及健康。目前 UM 的遗传学研究进展迅速，除染色体异常和基因突变谱等遗传学经典变异外，UM 发病机制中的表观遗传学因子被发现具有肿瘤特异性而逐渐受到重视。本研究旨在利用生物信息学分析，染色质免疫共定位，基因敲除等技术和方法，描述 UM 的表观基因组特征，筛选并定位关键性的核心转录因子并且分析其功能和下游靶点，从表观遗传修饰出发，探究活跃增强子及其作用因子在 UM 中的重要作用，为临床靶向治疗提供新的思路。

方法：1、通过染色质免疫共沉淀方法定位 UM 全染色质中的活跃增强子和高度结合的转录因子，通过测序技术富集转录因子靶点及其识别特征，通过数据库分析对比寻找主要转录因子 (Master Transcription Factor, MTF) 参与的肿瘤功能及下游靶点。2、通过稳转系构建、CCK8 实验、代谢物检测等技术结合分析，检测 MTF 对 UM 对增殖能力和代谢功能的调节影响。利用 ChIP-seq 结合 RNA-seq 分析，寻找 UM 中关键 MTF 的作用靶点。3、通过免疫组化实验、公共数据库分析等技术和方法在 UM 肿瘤样本组织及患者队列中验证关键性转录因子和靶基因的表达水平及预后指导意义。

结果：1、在 UM 全染色质中存在 H3K27ac 信号的特征性分布，能够作为 SE 或活跃增强子招募核心转录因子使得上下游或其自身表达水平升高，并参与肿瘤相关功能进程；其中 TFAP2A 是识别 UM 活跃增强子一个特异性核心 MTF。2、转录因子 TFAP2A 具有显著的促进 UM 增殖和发展的能力，TFAP2A 在 UM 中异常高表达，同时 TFAP2A 调控 UM 的基础代谢过程。SLC7A8 基因是 UM 代谢相关的 TFAP2A 靶向基因，与患者不良预后相关。

结论：1、UM 中活跃 SE 导致的癌基因过度激活是肿瘤发生和进展的重要原因。UM 染色质中存在活跃增强子的肿瘤特性调控区域，在 UM 中存在识别表观特异性信号而富集的核心 MTF。2、转录因子 TFAP2A 具有显著的促进葡萄膜黑色素瘤增殖和发展的能力，TFAP2A 可以介导 UM 代谢重编程；氨基酸转运蛋白 SLC7A8 受到 SE 与 TFAP2A 共同调节，促进肿瘤发生，关联临床患者不良预后。

摘要编号：208887

迷雾中的真相：一例复发眼睑皮脂腺癌的临床挑战

第一作者：Li ZHU

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目的：眼睑皮脂腺癌 (Sebaceous Carcinoma, SC) 是一种具有潜在侵袭性的恶性肿瘤，其临床特征常与睑板腺囊肿等常见良性病变高度相似，导致初诊误诊率居高不下。更为复杂的是，其在术后复发的形态也可能极不典型，构成严峻的诊断难题。本报告旨在通过一例青年女性 SC 术后非典型复发的病例，系统分析其诊断过程、临床决策的权衡以及应汲取的教训，以期强化临床医师对 SC，特别是其非典型复发形式的识别与警惕。

方法：报告一例 41 岁女性患者，因右眼下睑肿物半年就诊，初次诊断为“右眼睑板腺囊肿”，行手术切除并送病理检查，确诊为右眼下睑皮脂腺癌。术后 6 个月，原手术部位出现轻微局部突起，但缺乏恶性肿瘤常见的溃疡、新生血管或结节等典型特征，其外观更符合术后瘢痕增生或肉芽组织。鉴于复发灶形态不典型且患者年轻、对外观要求高，医患双方对再次手术存在顾虑，最终，基于患者既往 SC 病史，决定再次行手术切除并送病理评估。

结果：术后病理学检查提示“右眼下睑皮脂腺癌复发”。这一结果与术前温和的临床表象形成巨大反差，证实了此次复发是一次成功的“临床伪装”。

结论：本病例为我们提供了两个层面的重要启示。首先，眼睑皮脂腺癌是一种极具“模仿性”的肿瘤，其初次及复发表现均可完美模拟良性术后改变，因此，对任何持续存在或反复发作的眼睑肿物，均应保持高度警惕，并将病理活检作为诊断的基石。其次，也是更关键的教训在于：对于拥有 SC 病史的患者，任何出现在原手术区域的新生病变，无论其外观多么倾向于良性瘢痕，临床医师都必须将“肿瘤复发”置于鉴别诊断的首位。绝不能因患者年轻、外观诉求高或病灶的良性外观而动摇进行病理确诊的决心。及时的干预和彻底的切除是改善预后的关键。本病例深刻表明，在管理此类具有欺骗性的肿

瘤时，基于病史的临床警惕性必须始终高于对表象的依赖。

摘要编号：208973

首诊于眼科的海绵窦区硬脑膜动静脉瘘

第一作者：Rong LIU

目的：了解首诊于眼科的海绵窦区硬脑膜动静脉瘘患者的临床表现与治疗情况。

方法：回顾性分析近 5 年首诊于同济医院眼科，确诊于脑外科，并经眼科脑外科合作经栓塞治疗的海绵窦区硬脑膜动静脉瘘患者的临床资料。

结果：患者共 7 例，女 6 例男 1 例，年龄 33-74 岁，平均 52.4 岁，其中单眼 6 例，双眼 1 例，所有患者均有眼红，眼痛 3 例，复视 3 例，眼球突出 2 例，头痛 1 例，眼压增高 1 例，所有患者眼上静脉均不同程度增粗。经介入治疗好转，其中 4 例由眼科找寻眼上静脉，经眼上静脉径路介入治疗。

结论：海绵窦区硬脑膜动静脉瘘患者常常伴有眼部症状，表现不一，容易漏诊，对结膜血管螺旋状充血及眼上静脉增粗患者应警惕该病可能，经增粗的眼上静脉径路行介入治疗是良好的选择。

眼部影像学

摘要编号：210127

2 种超声诊断仪测量有晶体眼后房型人工晶状体植入术患者术前眼前节参数的一致性分析

第一作者：Yan HUO

共同作者：Jian YE

目的：评估 ArcScan Insight100 超高频眼科诊断超声与 UBM 超声生物显微镜测量有晶体眼后房型人工晶状体（ICL）植入术患者术前眼前节参数的差异性、相关性及一致性。同时，比较 Reinstein 公式预测的拱高值与术后实际拱高值的差异。

方法：收集 2024 年 5 月 23 日到 2024 年 6 月 19 日在华厦渝州眼科医院就诊的 ICL 植入术患者 24 名（42 只眼）。每位患者分别使用 ArcScan Insight100 与 UBM 测量双眼前节参数，包括前房深度（ACD）、睫状沟 - 睫状沟间距（STS）、睫状体内径（CBID）等。使用配对样本 t 检验、Pearson 相关性分析及 Bland-Altman 分析评估 2 种设备测量结果的差异性、相关性及一致性。其中有 17 只眼完成了有晶体眼后房型人工晶状体植入术，收集其术后一周拱高值，与 Reinstein 公式预测的拱高值作比较。

结果：ArcScan Insight100 测得的 STS、CBID 值均高于 UBM 测得的值，差异具有统计学意义（均 $P < 0.001$ ）；ArcScan Insight100 测得的 ACD 略高于 UBM 测得的值，但并没有统计学差异（ $P = 0.294$ ）。其中，ArcScan Insight100 测得的 ACD 与 Pentacam 相比更小，差异具有统计学意义；UBM 测得的 ACD 与 Pentacam 相比更小，差异具有统计学意义。Pentacam 测得 ACD 与 ArcScan Insight100、UBM 测得的数据相关性分别为 0.963、0.898（均 $P < 0.001$ ）；ArcScan Insight100 与 UBM 测得的 ACD、STS、CBID 的数据相关性系数分别为 0.934、0.737、0.719（均 $P < 0.001$ ）。Bland-Altman 分析显示 Pentacam 测得 ACD 与 ArcScan Insight100、UBM 测得的数据的 95% 一致性界限（95% LoA）分别为 $-0.03 \sim 0.20 \text{ mm}$ 、 $-0.09 \sim 0.29 \text{ mm}$ ；ArcScan Insight100 与 UBM 测得的 ACD、STS、CBID 的数据的 95% 一致性界限（95% LoA）分别为 $-0.14 \sim 0.17 \text{ mm}$ 、 $-0.21 \sim 0.91$ 、 $-0.23 \sim 1.10$ ，显示 ArcScan Insight100 与 UBM 测得的 STS、CBID 数据一致性不佳，而 pentacam 与 ArcScan Insight100、UBM、ArcScan Insight100 与 UBM 测得的 ACD 数据一致性良好。Reinstein 公式预测的拱高值为 $474.059 \pm 136.990 \mu\text{m}$ ，而实际的术后拱高值为 $526.235 \pm 210.209 \mu\text{m}$ ，预测拱高值小于实际拱高值，差异有统计学意义（ $P < 0.05$ ）。

结论：ArcScan Insight100 超高频眼科诊断超声与 UBM 超声生物显微镜在 ACD 数据的测量上无统计学差异，且一致性较好；与 pentacam 相比，二者测得的 ACD 均偏小，但一致性较好。ArcScan Insight100 超高频眼科诊断超声与 UBM 超声生物显微镜在 STS、CBID 等参数的测量上存在一定的差异，一致性较差。临床工作中若应用 2 种设备测得的前节参数作为 ICL 植入术晶体尺寸参考数据时，应考虑 2 种设备测量存在差异以更好地做出决策。

摘要编号：209472

DCE-MRI 及 DWI 在泪腺上皮性肿瘤诊断及预后评估中的应用价值

第一作者：Yilin YU

共同作者：Yidi YANG

目的：泪腺上皮性肿瘤是泪腺区常见的肿瘤之一，若治疗前评估不完整或诊断有误，将直接影响治疗效果，导致术后肿瘤复发、扩散甚至远处转移，影响患者预后。目前，临床中常用的泪腺肿瘤检查方法包括眼眶 CT、MRI 等，但其在鉴别肿瘤的良恶性方面存在一定局限性。传统的 MRI 检查仅能提

供解剖信息，对于肿瘤的微观结构和血流灌注情况评估有限。因此，本研究旨在探讨 MRI 动态增强（DCE）联合弥散加权成像（DWI）诊断乳腺良性病变的临床应用价值。

方法：本研究共纳入 87 名经组织病理学证实的泪腺上皮性肿瘤患者，所有患者术前均完成眼眶增强 MRI 检查。利用 DWI 和 DCE-MRI 图像后处理，绘制感兴趣区（ROI）并测量肿瘤的表现弥散系数（ADC）及动态增强的半定量参数（时间信号曲线（TIC）类型、对比剂到达时间（T0）、达峰时间（Tpeak）、峰值强化率（Emax）、流入率（WinR）及增强曲线下面积（Sarea）），进行统计学分析及相关模型构建。通过受试者操作特征（ROC）分析评估模型的诊断价值。

结果：在鉴别 LGPAs 与 LGMETs 方面，DWI 与 DCE-MRI 联合模型的诊断效率最高（AUC = 0.947、敏感度 94.1%、特异度 78.6%， $p < .001$ ）。尤其，对于缺乏影像学骨质破坏征象的患者，该联合模型具有优秀的诊断效能（AUC = 0.966，敏感度 92.3%，特异度 92.6%）。另外，在 LGMETs 患者中，Ki67 $\geq 30\%$ 常被认为是预后不良的指标之一，基于 MRI 的影像模型对 Ki67 高表达也有一定的预测价值（AUC 为 0.809，敏感性为 94.1%，特异性为 66.7%）。

结论：DWI 联合 DCE-MRI 对泪腺上皮性肿瘤具有良好的鉴别诊断价值，且基于 MRI 的模型可无创预测肿瘤 Ki67 的高表达，提示其在泪腺上皮性肿瘤诊断和预后评估中的潜在作用。

摘要编号：209483

OCTA 引导半剂量 PDT 治疗急性中心性浆液性脉络膜视网膜病变的有效性研究

第一作者：Siyang LI

目的：观察光相干断层扫描血管成像（OCTA）引导半剂量光动力疗法（PDT）治疗急性中心性浆液性脉络膜视网膜病变（CSC）的疗效。

方法：前瞻随机对照试验。2019 年 4 月至 2020 年 4 月于北京大学人民医院眼科中心检查确诊的急性 CSC 患者 72 例 72 只眼纳入研究。随机分为 OCTA、吲哚青绿血管造影（ICGA）组，分别为 31 例 31 只眼、33 例 33 只眼。患眼均行最佳矫正视力（BCVA）、眼底彩色照相、OCTA、ICGA 检查。采用国际标准视力表行 BCVA 检查，统计时换算为最小分辨角对数（logMAR）视力。OCTA 组将脉络膜毛细血管层粗颗粒强反射区定为治疗区；ICGA 组将与 FFA 渗漏点附近对应的脉络膜高灌注区定为治疗区。根据彩色眼底像中勾画的治疗区域对患眼进行半剂量 PDT 治疗。对比观察两组患眼

治疗后 1、3、6 个月视网膜下液（SRF）完全吸收率、BCVA、中心凹视网膜厚度（CRT）变化情况以及治疗后 3、6 个月 SRF 复发率。两组间连续变量比较采用 t 检验或 Wilcoxon 秩和检验；分类变量比较采用 χ^2 检验。

结果：治疗后 1、3、6 个月，OCTA 组、ICGA 组 SRF 完全吸收率分别为 74.2%（23/31）、63.6%（21/33），87.1%（27/31）、84.8%（28/33），96.8%（30/31）、91.9%（31/33）；OCTA 组治疗后不同时间 SRF 完全吸收率均非劣于 ICGA 组 [95% 可信区间（CI）-11.9 ~ 33.1， $P = 0.402$ ；95% CI -14.7 ~ 19.3， $P = 0.107$ ；95% CI -6.3% ~ 16.1%， $P = 0.226$]。治疗后 3、6 个月，两组患眼 SRF 复发率比较，差异无统计学意义（ $\chi^2 = 0.009, 0.047$ ， $P = 0.925, 0.828$ ）；治疗后 6 个月，CRT 比较，差异有统计学意义（ $t = 2.017$ ， $P = 0.047$ ）；治疗后 1、3、6 个月，logMAR BCVA 比较，差异无统计学意义（ $t = 0.529, 0.762, 1.017$ ， $P = 0.581, 0.403, 0.243$ ）。

结论：随访 6 个月时间内，OCTA 引导下的半剂量 PDT 治疗急性 CSC 患者，其 SRF 完全吸收率不劣于 ICGA 引导下的 PDT。OCTA 有可能取代 ICGA 作为引导 PDT 治疗急性 CSC 和治疗后随访的新工具。

摘要编号：209157

三维立体摄影测量法在眶周肿瘤表面积测量中的可靠性研究

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共同作者：Ludwig M. HEINDL, Jianqiao LI

目的：为实现眶周肿瘤大小和面积的更精确评估，本研究采用三维（3D）立体摄影测量技术，对不同类型的眶周肿瘤表面积进行量化测量，并评估该方法的重复性与可靠性。

方法：研究共纳入 150 例经诊断为眶周肿瘤的患者，总计 175 个肿瘤。研究者首先根据肿瘤的直径、形态、颜色、部位、表面纹理、距睑缘距离、边界清晰度及组织学类型进行分类。随后利用三维立体摄影系统对患者面部进行扫描，重建肿瘤三维模型，并计算其表面积。为评估测量一致性，两名测量者分别进行了重复测量，以获得组内一致性（intra-rater）与组间一致性（inter-rater）的信度指标。

结果：结果显示该技术具有高度的测量可靠性。组内一致性 ICC（组内相关系数）为 0.998，组间一致性 ICC 为 0.974，均属于极高信度范围。平均绝对差（MAD）分别为 0.63 mm^2 与 0.40 mm^2 ，对应的相对测量误差（REM）为 1.94% 和 1.22%。测量技术误差（TEM）分别为 2.29 mm^2 与 7.81

mm²，相对技术误差 (rTEM) 为 6.95% 和 23.76%。结果还表明，影响测量可靠性的主要因素包括：肿瘤直径、颜色、所在部位及边界清晰度。较小或颜色接近周围组织的肿瘤，其测量误差略高；而边界清晰、位于相对平坦区域的肿瘤，测量结果更为稳定。

结论：本研究证实三维立体摄影测量技术在眶周肿瘤表面积定量评估中具有极高的重复性和可靠性。与传统二维测量方法相比，该技术能更准确地反映肿瘤的真实表面积变化，为术前评估、疗效监测及病变随访提供客观依据。研究同时揭示了若干影响测量精度的关键变量，为未来在眼睑肿瘤及其他面部皮肤病变评估中的临床应用提供了重要参考。总体而言，三维立体摄影测量是一种可行且精确的眶周肿瘤评估手段，具有较高的临床推广价值。

摘要编号：208686

使用 AS-OCTA 定量分析糖网患者的虹膜血流变化

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共同作者：Xun AN, Chao MA, Tiantian WANG, Yong LV

目的：利用扫频前节光学相干断层扫描血管造影 (anterior segment optical coherence tomography angiography, AS-OCTA) 技术定量分析增殖性糖尿病性视网膜病变 (proliferative diabetic retinopathy, PDR) 患者和非糖尿病对照组 (none-diabetic controls, NDC) 的虹膜血流变化，结合常规 OCTA 评估视网膜血流参数，探讨 AS-OCTA 是否能被用作预测增殖性糖尿病性视网膜病变发生及病程进展的工具。

方法：共纳入确诊且进行 AS-OCTA 检查的初治 PDR 患者 71 例 71 眼，非糖尿病对照组患者 55 例 55 眼。使用 AS-OCTA (AS Angio 12X12 384X384 R2) 系统分析所有受检眼的虹膜血流变化。我们将虹膜的 OCTA 图像作为量化分析的基础图像，计算虹膜的血管密度 (Vessel Area Density, VAD)、小血管密度 (Small Vessel Density, SVD)、灌注面积 (Perfusion Area, PA)。使用 OCTA (Angio 12X12 1024X1024 R2) 系统分析所有受检眼的黄斑旁中心凹的视网膜血流变化。

结果：PDR 患者较非糖尿病对照组的虹膜血流密度增加，当 PDR 合并肾功能减退时，虹膜血流密度减少。PDR 患者的虹膜血流变化与视网膜血流变化具有相关性。PDR 合并黄斑水肿患者较单纯 PDR 患者的虹膜及视网膜血流密度均减少。

结论：单纯 PDR 患者的虹膜血流密度较非糖尿病对照组增高，在合并肾功能不全时降低。PDR 患

者虹膜与视网膜的血流变化相互关联，且在合并黄斑水肿时二者均进一步降低。我们认为使用 AS-OCTA 测量虹膜血流变化可以作为监测增殖性糖尿病性视网膜病变发生及病程进展的新的潜在指标，对屈光间质不清的患者监测具有临床意义。

摘要编号：209784

吲哚菁绿血管造影晚期高荧光点与糖尿病性黄斑水肿的关系

第一作者：Xin WANG

共同作者：Aiyi ZHOU

目的：糖尿病性黄斑水肿 (Diabetic macular edema, DME) 是糖尿病患者常见的眼部微血管并发症。研究发现，吲哚菁绿血管造影 (Indocyanine green angiography, ICGA) 晚期出现的高荧光点可能提示大的微血管异常，这些高荧光点被称作扩张型毛细血管 (Telangiectatic capillaries, TCs)。在一些难治性 DME 患者中，采用 ICGA 导航的视网膜激光对 TCs 进行光凝之后，DME 的严重程度得到了改善。然而，目前该治疗并未广泛用于临床，关于 TCs 与 DME 的关系仍在探究中。本研究旨在探究 ICGA 晚期出现的高荧光点与 DME 之间的关系以及这些高荧光点的特征，以期 DME 的治疗提供新的理论支持。

方法：回顾性收集了 2019 年 1 月至 2023 年 12 月期间，在我院诊断为 DR 并在治疗前同时接受了 ICGA 和光学相干断层扫描 (Optical coherence tomography, OCT) 的患者的临床数据和检查资料。根据 OCT 将患者分为 DME 组和无 DME 组，将 ICGA 晚期出现在血管环弓以内高荧光点定义为 TCs，进而探究 TCs 与 DME 之间的关系以及 TCs 的影像学特点。

结果：本研究共纳入了 DR 患者的 127 只眼，其中 73 眼 (57%) 合并 DME。结果显示 TCs 更易出现在 DME 眼中 (OR: 8.820, 95% CI: 3.479-22.364, $P < 0.001$)。在 DME 眼中，TCs 的出现与 DME 类型之间无明显关联 ($P = 0.265$)。与不合并 TCs 的 DME 眼相比，合并 TCs 的眼的黄斑中心凹厚度 (Central macular thickness, CMT) 更厚 ($P = 0.013$)。以直径为 150 μm 为界对 TCs 大小分类后，结果提示 DME 眼中的 TCs 较大 ($P = 0.029$)。对 44 个 TCs 进行断层扫描后发现，TCs 周围视网膜增厚更易出现在 DME 眼中 ($P = 0.032$)。DME 眼中在 ICGA 晚期出现的 TCs 在同时期荧光素眼底血管造影 (Fundus fluorescein angiography, FFA) 上表现分别为无对应点 (3%)、有对应点 (21%)、渗漏 (35%) 和混合型 (41%)，在早期 FFA 上分布为无对应点 (25%)、部分有对应点

(22%) 和有对应点 (53%)，在早期 ICGA 上分布为无对应点 (33%)、部分有对应点 (30%) 和有对应点 (37%)。

结论：TCs 更易出现在 DME 中，通常直径较大，且与 DME 严重程度相关。仅有部分 TCs 可通过 FFA 及早期 ICGA 观察到。

摘要编号：209353

多波长视网膜血氧仪在巴马小猪视网膜血管参数中的检测价值

第一作者：Xingzi KANG

共同作者：Junguo DUAN

目的：采取不同血氧检测手段，探讨多波长视网膜血氧仪间接检测与金标准直接检测结果的相关性及准确性。

方法：6 只巴马小猪分别吸入浓度为 10%、21%、100% 的氧气，当外周脉搏氧饱和度达到稳定水平时，通过股动脉血气分析检测股动脉血氧饱和度；通过 O2 微传感器损伤性地穿刺巴马小猪视网膜检测玻璃体内血氧饱和度；通过 I 型、II 型多波长视网膜血氧仪无创检测视网膜血氧饱和度和动静脉管径。

结果：股动脉血氧饱和度和玻璃体内血氧饱和度相关 ($P < 0.05$)，玻璃体内血氧饱和度与视网膜血氧饱和度相关 ($P < 0.05$)，I 型与 II 型多波长视网膜血氧仪精确度无差异 ($P > 0.05$)。在吸入 10% 浓度氧气的情况下，I 型与 II 型多波长视网膜血氧仪测得动静脉管径有差异 ($P < 0.05$)；在吸入 21% 浓度氧气和 100% 浓度氧气的情况下，I 型与 II 型多波长视网膜血氧仪测得动静脉管径无差异 ($P > 0.05$)。

结论：多波长视网膜血氧测定法对巴马小猪全身血氧饱和度变化较敏感；I 型与 II 型多波长视网膜血氧仪精确度无差异。本实验明确了两种多波长视网膜血氧仪检测视网膜血氧饱和度的可靠性，为多波长视网膜血氧仪的临床应用提供了循证科学依据。

摘要编号：209485

广角扫描频源光学相干断层扫描血管成像 (SS-OCTA) 与超广角荧光血管造影 (UWF-FA) 在视网膜静脉阻塞 (RVO) 病灶中的比较

第一作者：Siyang LI

目的：SS-OCTA (图湃，中国北京) 成像范围可以达到 $24 \times 20 \text{ mm}$ ，即 $81^\circ \times 68^\circ$ ，可以覆盖后极部及中周部视网膜，扩大了其应用范围。本文对

RVO 病灶在广角全域 SS-OCTA 和超广角荧光血管造影 (UWF-FA) 下的成像进行比较。

方法：本研究纳入 32 例未经治疗的 RVO 患者，分别进行 UWF-FA (200°) 荧光血管造影和广角全域 SS-OCTA ($24 \times 20 \text{ mm}$) 检查。在旋转、缩放和非线性转化后量化评估两种成像下的黄斑中心凹无血管区 (FAZ) 面积和周长、无灌注区 (NP) 面积、微血管瘤 (MA) 数量、毛细血管改变以及侧支血管的检出率。

结果：S-OCTA 和 UWF-FA 测得的 FAZ 面积和周长测量值具有可比性 ($0.373 (0.277-0.48) \text{ mm}^2$ vs. $0.370 (0.277-0.48) \text{ mm}^2$, $P = 0.818$; $2.480 (2.011-2.998)$ vs. $2.330 (2.027-2.807) \text{ mm}$, $P = 0.536$)。SS-OCTA 与 UWF-FA 的 FAZ 面积和周长的相关系数 (ICCs) 较高 ($0.999 [0.997-0.999]$ 和 $0.996 [0.991-0.996]$)，一致性较好。SS-OCTA 的平均 NPA 面积大于 UWF-FA ($89.977 \pm 78.805 \text{ mm}^2$ vs. $87.944 \pm 77.444 \text{ mm}^2$, $P = 0.037$)。NPA 的 ICC 也较高 ($0.999 [0.999-1.000]$)，一致性较好。SS-OCTA 的总 MA 计数中位数低于 UWF-FA ($7 (0-19)$ vs. $12 (0-23)$, $P < 0.001$)。SS-OCTA 与 UWF-FA 检测 MAs 的一致性较好 ($\text{ICC} = 0.920 [0.555-0.974]$)。UWF-FA 的总毛细血管变化和侧支血管计数少于 SS-OCTA (分别为 11 ± 9 vs. 6 ± 7 , $P < 0.001$ 和 $4 (0-6)$ vs. $0 (0-0)$, $P < 0.001$)。OCTA 和 UWF-FA 在检测毛细血管变化和侧支血管方面的一致性一般 (ICC 分别为 $0.733 [0.081-0.905]$ 和 $0.564 [0.039-0.805]$)。

结论：与 UWF-FA 相比，广角全域 SS-OCTA 在检测 FAZ、NPA、毛细血管改变和侧支血管方面不但具有高度可比性，甚至更有优势。这使 SS-OCTA 替代 UWF-FA 应用于 RVO 的诊断和随访成为可能。

摘要编号：209170

急性共同性内斜视患者静息态功能磁共振成像特征

第一作者：李晓雪

共同作者：任婉娜

目的：观察急性共同性内斜视患者静息态功能磁共振成像特征，系统分析急性共同性内斜视患者的脑区自发神经活动特征，与健康对照者进行对比，明确两组在局部脑区兴奋状态及功能连接方面的差异。

方法：收集 56 例急性共同性内斜视患者和 56 例健康对照组的静息态核磁信号。采用 SPSS 26.0 软件进行统计学处理。通过重复测量方差分析检验两组

被试全脑低频振幅的整体差异，再通过双样本 t 检验进一步比较两组在局部脑区低频振幅及局部一致性的差异。

结果：急性共同性内斜视组视觉通路的背侧区域、初级视觉皮层区域的低频波动信号幅值信号降低。急性共同性斜视组的颞下皮层、小脑、舌回、梭状回、双侧扣带回、小脑前叶的局部一致性值显著增加。

结论：急性共同性内斜视患者存在初级视觉皮层和背侧通路的功能缺陷，可能与患者视觉信息处理及空间感知能力下降相关；而小脑前叶等脑区的活动强于健康对照者，提示急性共同性内斜视发病过程中可能存在小脑功能重组以代偿眼球运动异常。

摘要编号：**210031**

自适应光学扫描激光检眼镜（AOSLO）的活体视网膜显微成像系统及应用案例：从细胞级可视化到多疾病预后评估的技术突破

第一作者：**Jie ZHANG**

目的：本研究旨在建立新一代自适应光学扫描激光检眼镜（AOSLO）的临床使用平台，实现活体视网膜细胞级微观结构的高分辨率成像，填补传统成像技术在视网膜微观结构观测上的不足，为眼部疾病的早期诊断、精准分期、个体化预后判断及客观监测提供技术支撑。

方法：自主开发的光学分辨率达 2 μm AOSLO 系统，在临床应用中实现活体状态下视网膜细胞级显微结构的清晰观测。用这种系统对以下多种疾病进行检查，包括黄斑毛细血管扩张症，遗传性视网膜变性，青光眼，糖尿病视网膜病变以及羟氯喹毒性视网膜病变等。观测范围覆盖视锥细胞、小胶质细胞、玻璃体细胞、神经纤维、视网膜血管网络及多种其他视网膜细胞结构。同时结合深度学习算法，实现部分形态学参数的自动量化分析。

结果：该 AOSLO 系统成像性能优异，所获图像兼具高稳定性、强对比度与运动伪影低等优势，清晰捕捉疾病特异性早期微观变化。对黄斑毛细血管扩张症的微血管异常的动态可视化、对视网膜变性视锥细胞丢失的精准识别、对神经视网膜疾病中神经纤维病变的清晰定位，以及对糖尿病视网膜病变毛细血管改变都有精准发现。该系统在临床应用实现了视网膜的细胞级检查。

结论：该系统不仅丰富了眼部疾病的诊疗手段，更推动了眼科诊疗向精准化、个体化方向发展，为眼部疾病的早期检测、动态监测及预后评估提供新型手段。

神经眼科

摘要编号：**204051**

20 例慢性进行性眼外肌麻痹临床特点分析

第一作者：**王琨**

目的：探讨慢性进行性眼外肌麻痹（CPEO）临床、影像特点。

方法：回顾性分析 20 例 CPEO 患者的临床表现、影像特点。20 例 CPEO 患者均经肌肉病理学确诊。

结果：20 例患者中，男性 10 名（占 52.6%），女性 9 名（占 47.4%）。家族史 2 例（占 10.5%）。起病年龄为 8 ~ 47 岁，平均发病年龄为 27.1 岁，发病病程为 2 ~ 27 年，平均发病病程 13.2 年，首发症状双眼上睑下垂 14 例（占 73.7%），先后双眼上睑下垂 3 例（占 15.8%），单眼上睑下垂 2 例（占 10.5%），不同程度遮盖角膜。双侧眼球活动障碍 17 例（占 89.5%），单侧眼球活动受限 2 例（占 10.5%）。无复视 17 例（占 89.5%）。疲劳不耐受 2 例（占 10.5%）。冰敷试验阳性 1 例（占 11.1%）。新斯的明试验阳性 1 例（占 11.1%）。眼眶 MRI：双侧眼外肌萎缩 16 例（占 84.2%）。眼眶 MRI 表现为 T2WI 双侧眼外肌纤细，肌肉萎缩。

结论：缓慢发生的双侧眼睑下垂、眼球各个方向活动障碍，而且不伴有明显复视，应警惕慢性进行性眼外肌麻痹，尽早做肌肉病理学检查。

摘要编号：**208946**

25G 微创玻璃体切割术治疗非动脉炎性前部缺血性视神经病变的临床疗效观察

第一作者：**Yu SU**

共同作者：**Changzheng CHEN, Yin SHEN, Lhamo TSEIRING**

目的：探讨 25g 微创玻璃体切割术对非动脉炎性前部缺血性视神经病变（NAION）患者视功能的改善效果及手术安全性，为 NAION 的临床治疗提供参考依据。

方法：本研究为前瞻性病例研究。共纳入 18 例发病 2 周至 2 月内保守治疗后仍持续明显视盘水肿的 NAION 患者。所有患者均接受标准玻璃体切割术解除视盘牵拉。于术前、术后第 1 天、第 2 天、1 周、1 个月、2 个月、3 个月对所有患者进行最佳矫正视力（BCVA）评估、眼底彩照及光学相干断层扫描（OCT）检查，以观察视盘水肿变化、测量视网膜神经纤维层（RNFL）及神经节细胞层 + 内丛状层（GCL + IPL）厚度；同时利用 OCT 血管成

像 (OCTA) 定量分析浅层及深层视盘周围毛细血管的血流密度。

结果: 术后所有手术患者视力均有不同程度提升。18 例眼中 17 只眼 BCVA 较术前提升 ≥ 1 行, 其中 12 只眼提升 ≥ 3 行; 术前平均 BCVA 为 0.18 ± 0.07 , 术后 1 个月提升至 0.32 ± 0.11 , 眼底观察及 OCT 检查显示, 所有患者的视盘水肿均在术后第二天开始消退显著, 其中 60% 患者的水肿在术后 1 周内基本消退, 100% 于 2 周内完全消退。视网膜结构分析发现, 所有患者的 RNFL 厚度呈持续下降趋势, 而 GCL+IPL 厚度在 1 月内保持稳定, 未出现显著变薄。OCTA 定量分析进一步证实, 术后多个时间点的视盘周围血流密度值与术前相比明显增加 (均值由术前 46% 提升至术后 53%); 黄斑区血流密度值较前明显增加, 术后第 48 h 最为明显, 差异具有统计学意义 ($p < 0.05$)。术后随访 1 个月, 差异有统计学意义 ($P < 0.05$)。

结论: 本研究初步表明, 对于持续性视盘水肿的 NAION 患者, 玻璃体切割手术可能通过接触玻璃体牵拉、改善盘周及黄斑区血供有效促进视盘水肿的快速消退, 并伴随视功能的改善。

摘要编号: 204418

A 型肉毒素注射治疗 36 例外展神经麻痹性斜视的临床观察

第一作者: Yu DU

共同作者: Wanna REN, Pengcheng WU, Wenfang ZHANG

目的: 探讨 A 型肉毒素局部注射对外展神经麻痹性斜视的矫正效果及安全性, 为其在急性期及围手术期的规范化应用提供循证依据。

方法: 回顾性纳入 2024 年 1 月至 2025 年 8 月于兰州大学第二医院确诊的 36 例外展神经麻痹性斜视患者 (36 只患眼), 其中男性 20 例、女性 16 例, 年龄 18-71 岁 (平均 42.6 ± 12.3 岁)。病因包括微血管缺血 22 例、外伤 8 例、颅内肿瘤术后 4 例、特发性 2 例。所有病例均经三棱镜 + 遮盖试验、眼眶 MRI、颅脑 CTA 或 MRA 排除肌肉嵌顿及重症肌无力。按内直肌亢进程度 (+ ~ +++) 分为轻、中、重三组, 对应给予 2.5 U-5.0 U A 型肉毒素 (5 U/0.1 mL), 在直视操作下行内直肌肌腹单点注射。术后第 1、4、12、24 周定期随访, 记录斜视度 (远距 + 近距三棱镜)、眼球运动分级 (-4 ~ 0)、复视评分 (0 ~ 3 级)、注射次数、并发症及患者满意度 (Likert 5 分制)。主要疗效终点为末次随访时斜视度改善 $\geq 10 \Delta$ 且复视 ≤ 1 级, 次要终点为二次注射率、并发症发生率。

结果: ① 眼位: 术前平均远距斜视度 $35.4 \Delta \pm 8.2 \Delta$ (范围 $20 \Delta \sim 50 \Delta$), 术后 4 周降至 $16.8 \Delta \pm 6.9 \Delta$, 24 周为 $18.2 \Delta \pm 7.1 \Delta$, 与术前比较差异有统计学意义 ($F = 88.37$, $P < 0.001$)。② 疗效: 术后 4 周达显效 (斜视度 $\leq \pm 10 \Delta$) 者 19 例 (52.8%), 有效 (改善 $\geq 10 \Delta$) 28 例 (77.8%); 至 24 周, 显效率提高至 58.3% (21/36), 总有效率保持 75.0% (27/36)。微血管组显效率最高 (63.6%, 14/22), 外伤组次之 (50.0%, 4/8), 肿瘤术后组最低 (25.0%, 1/4), 组间差异有统计学意义 ($\chi^2 = 6.14$, $P = 0.046$)。③ 复视: 术前复视评分 2.4 ± 0.7 , 术后 4 周降至 0.9 ± 0.8 , 24 周 1.0 ± 0.9 ($F = 71.25$, $P < 0.001$); 复视消失或减轻者 32 例 (88.9%)。④ 二次注射: 6 例 (16.7%) 在 12 周内行补充注射, 其中 5 例最终获得 $\leq 10 \Delta$ 残留斜视; 1 例因肉毒素抗体效价升高转为手术矫正。⑤ 并发症: 未出现眼球穿孔、眼内炎、永久性瞳孔散大等严重并发症; 短暂性上睑下垂 2 例 (5.6%), 内直肌肌腹血肿 1 例 (2.8%), 均在 4 周内自行恢复; 无全身肉毒素中毒表现。⑥ 满意度: 术后 24 周患者总体满意度 4.2 ± 0.8 分, 其中微血管组 4.4 ± 0.6 分, 显著高于外伤组 (3.9 ± 0.9 分) 与肿瘤术后组 (3.5 ± 1.0 分, $P = 0.018$)。

结论: A 型肉毒素内直肌注射可安全、有效地矫正外展神经麻痹性斜视, 微血管性者疗效最佳; 2.5-5.0 U 个体化剂量即可在急性期快速重建眼位、缓解复视, 减少后续手术率; 其并发症轻微、可逆, 可作为外展神经麻痹性斜视急性期及围手术期的一线治疗选择。

摘要编号: 207626

GHRH 受体拮抗剂对 EAE 小鼠 RGC 的保护作用研究

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目的: 纵向观察实验性自身免疫性脑脊髓炎 (EAE) 模型中视网膜神经节细胞复合层 (GCC)、视网膜神经节细胞 (RGC) 存活及树突复杂度的动态变化以及评估生长激素释放激素 (GHRH) 受体拮抗剂 MIA602 对 EAE 小鼠 RGC 的保护作用。

方法: 1. EAE 模型建立: 通过髓鞘少突胶质细胞糖蛋白 35-55 (MOG35-55) 联合完全弗氏佐剂皮下注射, 结合百日咳毒素腹腔注射, 建立 EAE 小鼠模型。将小鼠分为对照组、EAE 组、EAE + 二甲亚砜 (DMSO) 组、EAE + MIA602 组和 EAE + 地塞米松 (Dex) 组。2. 组织学染色和视网膜功能评估: 监测体重、神经功能评分, 通过苏木精-伊红 (H&E) 染色、劳克坚牢蓝 (LFB) 染色评估

视神经炎症及脱髓鞘情况。利用光学相干断层扫描 (OCT) 测量 GCC 厚度, 共聚焦激光扫描检眼镜 (cSLO) 观察 RGC 树突形态, 免疫荧光染色检测 RGC 密度、小胶质细胞激活及巨噬细胞浸润。

结果: 1. EAE 小鼠发病后 1 周出现体重下降、神经功能评分升高 (3.5 ± 0.3 , $P < 0.001$), 视神经 H&E 染色显示 EAE 小鼠巨噬细胞数量相比于未诱导的对照组小鼠显著升高 (1007.6 ± 388.3 cells/mm² vs 85.1 ± 16.7 cells/mm², $P < 0.001$), LFB 染色显示 EAE 组小鼠出现髓鞘脱失, GCC 厚度 (70.8 ± 4.9 μ m vs 77.0 ± 3.7 μ m, $P = 0.02$) 和 RGC 密度 (1200.8 ± 240.0 cells/mm² vs 1684.5 ± 172.7 cells/mm², $P = 0.002$) 显著降低, RGC 树突复杂度 (树突场面积、分支数量等) 在发病后 4 天出现萎缩, 并持续进展至 6 周。2. 在 EAE 小鼠发病后第 7 天, 与 EAE + DMSO 组相比, EAE + MIA602 组神经功能评分降低 (1.5 ± 0.9 vs 2.2 ± 1.2 , $P = 0.045$), GCC 厚度增加 (73.1 ± 3.2 μ m vs 69.2 ± 3.0 μ m, $P < 0.001$)、RGC 密度升高 (1484.7 ± 109.4 cells/mm² vs 1241.1 ± 168.4 cells/mm², $P = 0.017$), 激活视网膜小胶质细胞占比 (0.20 ± 0.08 vs 0.37 ± 0.08 , $P = 0.014$) 和巨噬细胞浸润 (20.7 ± 9.2 cells/section vs 39.6 ± 19.3 cells/section, $P = 0.037$) 减少, 视神经脱髓鞘区域面积缩小 ($7.3 \pm 4.7\%$ vs $27.0 \pm 20.6\%$, $P = 0.027$)。

结论: GHRH 受体拮抗剂 MIA602 可通过调控小胶质细胞激活和巨噬细胞浸润, 减轻视神经炎症及脱髓鞘, 从而挽救 EAE 小鼠 RGC 存活并维持 GCC 结构。

摘要编号: 208579

PV 阳性视网膜神经节细胞 - 上丘视觉通路对视诱发恐惧逃避反应的调控研究

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目的: 小清蛋白 (parvalbumin, PV) 是一种钙结合蛋白, 主要存在于大脑中特定 GABA 能中间神经元, 调节神经递质释放和神经元兴奋性。视网膜中 PV 阳性的神经节细胞 (PV⁺ RGCs) 是一类跨物种存在的 RGCs, 具有较强的抗损伤性, 可能在视觉信息处理中发挥重要作用。然而, 其脑区投射和功能仍不清楚。本研究利用转基因小鼠及示踪病毒特异性标记, 系统展示 PV⁺ RGCs 在视网膜和脑区的分布, 解析其投射至上丘 (superior colliculus, SC) 的细胞类型特异性通路及其在 looming 诱发防御行为中的作用。

方法: (1) 在 PV-Cre 小鼠双侧玻璃体腔注射逆行非跨突触病毒 (rAAV2/2-EF1 α -DIO-eYFP), 标记并分析 PV⁺ RGCs 的分布和投射。(2) 通过在 SC 注射逆行示踪病毒 (rAAV2/retro-EF1 α -DIO-eYFP) 标记投射至 SC 的 PV⁺ RGCs, 并结合 scRNA-seq、Merfish 及免疫染色分析其形态、分子特征和神经递质类型。(3) 利用逆行和逆行跨突触示踪策略, 确定 PV⁺ RGCs $\rightarrow$ SC PV⁺ 神经元的特异性连接。(4) 通过化学遗传学及白喉毒素介导的消融或抑制, 探讨该通路在 looming 诱发防御行为及视觉功能中的作用。

结果: (1) PV⁺ RGCs 占总 RGCs 的约 23.15%, 其轴突投射至上丘 (SC)、外侧膝状体 (LGN)、橄榄前顶核 (OPN)、未定带 (ZI) 及辅助视神经系统内侧终末核 (MTN)。(2) 投射至 SC 的 PV⁺ RGCs 占总 RGCs 的 16.39%, 多为中至大型胞体与树突野, 光反应类型包括 ON、OFF 及 ON-OFF, 其中 OFF 型占 73.4%。这些细胞多为谷氨酸能神经元, 且超过一半为 α RGCs。(3) 逆行跨突触示踪显示, 97.36% 的 PV⁺ RGCs 直接投射至 SC PV⁺ 神经元并延伸至 PBGN; 逆行示踪验证, 投射至 SC PV⁺ 神经元的 RGCs 中 83.61% 为 PV⁺ 类型。大多数 SC PV⁺ 神经元 (84.64%) 为谷氨酸能。(4) 功能实验表明, 特异性消融或抑制 PV⁺ RGCs $\rightarrow$ SC PV⁺ 通路显著削弱或消除 looming 诱发的恐惧逃避反应, 同时 SC 区 c-Fos 表达下调, 表明该通路在防御反应中具有关键作用。但该操作对图像视觉功能 (OMR、ERG、FVEP) 无显著影响。

结论: 本研究首次系统揭示 RGCsPV⁺ $\rightarrow$ SCPV⁺ 的皮层下视觉通路, 并证明其在 looming 诱发的先天防御行为中发挥关键调控作用, 而不影响图像视觉功能。该发现为解析视网膜 - 脑功能环路及视觉相关神经疾病的干预提供了新的实验依据与潜在靶点。

摘要编号: 209214

α -酮戊二酸通过重塑免疫微环境对抗视网膜缺血再灌注损伤

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目的: 本研究旨在探讨 α -酮戊二酸 (α -KG) 在视网膜缺血再灌注损伤 (RIRI) 中的神经保护作用。

方法: 本研究采用体内动物实验, 通过成熟的小鼠前房高眼压灌注法 (110 mmHg, 60 分钟) 建立标准化 RIRI 模型。研究设计分为三个部分: 首先, 建立模型明确病理表征; 随后开展 α -KG 的药效学与安全性评价, 设立对照组、损伤组及低、中、高剂量 α -KG 干预组, 通过黑白箱行为学实验分析视

功能, 采用视网膜苏木精 - 伊红 (HE) 染色观察组织形态学变化, 并结合血常规与血生化检测评估全身安全性; 最深入探讨作用机制, 综合应用生化检测 (MDA、SOD)、免疫荧光染色 (Brn3a、Tunel、Iba1/CD16/32)、活性氧荧光探针 (DHE) 及实时荧光定量 PCR (qPCR) 等技术, 从小胶质细胞活化、神经炎症、氧化应激及细胞凋亡等多角度系统阐释 α -KG 的神经保护作用。

结果: 结果显示, RIRI 后视网膜组织发生氧化应激与神经炎症反应, 表现为丙二醛 (MDA) 和活性氧 (ROS) 水平显著升高, 超氧化物歧化酶 (SOD) 活性下降。同时小胶质细胞活化并向 M1 型极化, 相关炎症因子 (IL-6、TNF- α 、IL-1 β) mRNA 表达上调。免疫荧光显示, RGCs 数量进行性减少。 α -KG 干预后, 高剂量组能显著改善小鼠视功能, 促进视网膜结构修复, 且未引起血常规及肝肾功能异常, 安全性良好。机制研究证实, α -KG 通过抑制小胶质细胞活化及 M1 型极化, 减少促炎因子的释放来改善微环境, 从而抑制 RGCs 的氧化应激, 减少 RGCs 的凋亡, 发挥神经保护作用。

结论: 该研究明确了 α -KG 在 RIRI 模型中的神经保护效应, 为临床开发针对 RIRI 的新型治疗策略提供了重要的实验依据和潜在靶点。

摘要编号: 209642

中西医结合治疗特殊类型视神经萎缩

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目的: 探讨颅内静脉窦血栓或狭窄继发性视神经萎缩的诊疗特点及中西医结合治疗优势。

方法: 通过分析 2 例因颅内静脉窦血栓或狭窄继发视神经萎缩诊疗经过, 讨论误诊原因, 早期诊断关键因素, 鉴别诊断要点, 病因治疗及中西医结合治疗的优势。

结果: 颅内静脉窦血栓或狭窄特殊原因继发性视神经萎缩, 特征表现为头痛、双侧视盘水肿、视力下降、外展神经麻痹 (复视) 等。早期诊断需行 MRV 或 DSA 等检查, 为诊断金标准, 需与视神经炎相关疾病谱、前部缺血性视神经病变、Vogt- 小柳原田综合征、Leber 遗传性视神经病变、双侧外展神经麻痹相鉴别。及时针对病因手术——溶栓或支架血管扩张治疗, 并配合中药、针灸等中医药综合治疗对视功能恢复较好。

结论: 颅内静脉窦血栓或狭窄患者, 首次有可能在眼科就诊, 眼科医生需要加强对其认识, 易误诊。早期诊断, 病因手术治疗尤为关键, 后续发挥中西医结合综合康复治疗有优势。

摘要编号: 208977

人工智能蛋白质组学揭示糖尿病视网膜神经退变风险

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目的: 系统解析糖尿病视网膜神经退行性变 (diabetic retinal neurodegeneration, DRN) 的分子特征, 构建基于血浆蛋白质组学的人工智能预测模型, 以实现早期高危人群的精准识别与风险分层。

方法: 依托广州糖尿病眼病研究 (Guangzhou Diabetic Eye Study, GDES) 这一整合蛋白质组学与多模态影像的前瞻性专病队列, 共纳入 1493 名具备 Olink 蛋白质组数据及光学相干断层扫描 (OCT) 数据的糖尿病患者。首先, 在横断面分析中筛选与视网膜神经纤维层 (RNFL) 厚度显著相关的血浆蛋白; 随后, 在 6 年纵向随访的非 DRN 人群中验证候选蛋白与 RNFL 变薄速率的关系, 并进行功能富集分析以揭示其潜在生物学通路。进一步采用 XGBoost、LightGBM 和随机森林等机器学习算法, 构建基于蛋白特征的 DRN 风险预测模型 (Pro-DRN), 并系统评估其判别性能、校准能力及模型可解释性。

结果: 在横断面分析中共鉴定出 72 种与 RNFL 厚度显著相关的蛋白 (FDR < 0.05), 其中 71 种在纵向分析中与 RNFL 变薄速率保持一致方向的显著关联 (β 范围: -0.016 至 -0.042 $\mu\text{m}/\text{年}$, FDR < 0.05)。这些蛋白主要涉及炎症反应与免疫募集 (例如 CXCL9、CCL2)、细胞外基质重塑 (COL6A3、MMP9)、**神经保护与再生 (CNTN1、NCAM1) 以及血管稳态维持 (HSPG2、ANGPTL4) 等四大通路。功能富集分析显示, “细胞外基质 - 受体相互作用”、“补体与凝血级联反应”和“神经胶质激活调控”** 为显著富集通路 (均 FDR < 0.001)。基于 72 种蛋白特征的 Pro-DRN 模型在测试集中表现优异: AUC = 0.903 (95% CI: 0.868-0.937), C-index = 0.860 (95% CI: 0.845-0.874), Brier 得分 = 0.081, 优于临床模型 (0.162), 灵敏度 / 特异度 = 0.842/0.812。将 Pro-DRN 与基础临床模型 (年龄、糖尿病病程、HbA1c、血压等) 结合后, 综合模型 C-index 提升至 0.877 (相对提升 25.9%), 并显著改善净重分类指数 (NRI = 0.214, $P < 0.001$)。模型解释分析 (SHAP 值) 显示, ACTA2、COL6A3、HSPG2、CXCL9 和 ANGPTL4 对风险预测贡献最大, 提示 DRN 的发生涉及炎性驱动下的血管神经单元结构重塑与微循环障碍。

结论: 本研究基于大规模糖尿病队列的纵向蛋白质组与 OCT 影像数据, 揭示了 DRN 的分子谱特征

及关键信号通路，建立了首个可解释的多蛋白人工智能预测模型 Pro-DRN。该模型实现了对糖尿病人群早期神经退变风险的精准分层，为糖尿病视网膜病变的早期干预与分子分型提供了新的策略与工具。

摘要编号：208986

以视盘肉芽肿为首发体征的结节病

第一作者：熊家豪

目的：报告 1 例以单眼视盘肉芽肿为首发体征的结节病，持续随访并探究肉芽肿表面异常新生血管的成因。

方法：回顾性病例报告。

结果：2024 年 2 月，患者女，31 岁，因左眼前黑影 2 日就诊。双眼最佳矫正视力均为 1.0。双眼前节大致正常，左眼玻璃体轻度混浊。左眼可见视盘处有一个直径约 1 PD 的肿物，其表面有迂曲的小血管，遮盖部分视盘。视盘下方血管表现为视网膜静脉周围炎伴“蜡滴样”渗出。病变部位 OCT 显示存在隆起性病变，伴后方遮蔽效应。FFA 显示，早期肿物表面异常血管充盈，表现为强荧光；晚期荧光渗漏，并可见视盘着染，肿物及视盘边界不清。颞下分支血管也可见管壁荧光渗漏。OCT 血管成像也证实了肿物突入玻璃体内，其表面存在异常新生血管网。并且视盘周围血流缺损，与视神经盘肉芽肿位置相符。后续，肺部 CT 显示两肺门多发肿大淋巴结。右肺中叶粘膜活检显示，送检粘膜组织内见慢性肉芽肿性炎，符合非干酪性肉芽肿的典型改变，提示结节病。给予该患者激素治疗。持续随访观察，左眼视盘肉芽肿不断缩小消退，肿物表面异常新生血管也逐渐消退。并且能够透见原本肿物遮盖下的视网膜血管。整个治疗过程中，患者双眼最佳矫正视力均维持在 1.0。

结论：眼部结节病常见表现为葡萄膜炎，视神经受累较少。本病例以视盘肉芽肿作为结节病的首发体征，且肉芽肿表面存在异常新生血管，较为罕见。活跃期结节病中非干酪样肉芽肿的核心区域本身是一个无血管结构，不会发生血管生成。对于我们观察到的异常新生血管，推测其产生原因可能为，视盘肉芽肿内部产生的大量 VEGF（具有非血管生成的免疫调节功能）扩散至肉芽肿周围。另外，视盘特殊的解剖结构易因肉芽肿的占位效应导致局部缺血缺氧。这两方面原因都使得肉芽肿周边视网膜 VEGF 浓度升高，产生了新生血管。并且由于新形成的肉芽肿结构相对疏松、细胞排列不紧密，使得新生血管成功长入肉芽肿内部。总之，眼结节病的诊断需要基于符合的临床表现、结合多模态影像学

检查、实验室检查以及活检综合分析，从而做出准确的诊断。

摘要编号：204052

以视神经炎为初发表现的动脉炎性缺血性视神经病变 1 例

第一作者：王琨

目的：患者男，52 岁，因左眼突然视力下降 7 天。既往体健，眼科检查：视力：右眼：1.0，左眼 CF/眼前；眼压正常，眼前节无异常；左眼瞳孔 3.0 mm，对光反射迟钝，RAPD (+)，晶体轻度混浊，玻璃体轻度混浊，眼底：左眼视盘弥漫性水肿，色红，上方视盘及神经纤维层出血，黄斑中心凹光反射欠清。视盘 OCT 示：左眼视盘神经纤维层隆起；视野：左眼全盲视野；视电生理：VEP-P100 波潜伏期延长和波幅降低。

方法：结合病史初步诊断：左眼视神经炎。予以糖皮质激素冲击治疗；进一步完善眼眶头颅 MRI、中枢神经脱髓鞘抗体检测、实验室检查，患者血清抗核抗体 (ANA)、抗中性粒细胞胞浆抗体 (ANCA) 均为阴性，排除其他自身免疫性疾病。颅脑 MRA 未见大血管狭窄或炎症征象。患者经激素冲击治疗后左眼视力 0.06，左眼视野上方缺损有所改善，视盘水肿减轻不明显。FFA：左眼早期视乳头区域性低荧光或充盈迟缓，周围脉络膜毛细血管迟缓，后期病变区毛细血管渗漏，呈强荧光。颅脑、眼眶 MRI：未见明显异常；中枢神经脱髓鞘抗体检测：AQP4 (-) MOG (-)；ESR 35.0 mm/H、C-CRP > 10 mg/L。修正诊断：左眼非动脉炎性前部缺血性视神经病变，停用激素，改用纤溶酶、胞磷胆碱钠静滴，复方樟柳碱皮下注射治疗。2024.7.1 左眼视力 0.15，视野：左眼上方视野缺损改善，左眼下方扇形视野缺损，视盘水肿较前好转。患者存在头皮触痛和疼痛，ESR 和 C-CRP 升高，结合目前检查及病史考虑“颞动脉炎”。

结果：进行颞动脉病理活检。病理结果回报：镜下见血管内膜局灶增厚，血管壁肌层纤维化并内弹力膜局灶断裂及重叠，血管壁及管腔内可见淋巴细胞及中性粒细胞浸润，考虑巨细胞动脉炎（颞动脉炎）。最终诊断：左眼动脉炎性前部缺血性视神经病变。确诊颞动脉炎后，治疗方案调整为泼尼松 60 mg/d 口服联合甲氨蝶呤 10 mg/周，以控制炎症并减少激素副作用。随访 3 个月，左眼视力稳定于 0.2，视野缺损范围缩小，ESR 降至 15 mm/H。

结论：对于突发视力下降患者，需高度警惕 GCA 相关 A-AION。即使初始表现不典型，也应完善炎症指标检测及颞动脉活检。多学科协作（眼科、风湿免疫科）可优化诊疗流程，改善预后。

摘要编号：209912

免疫抑制剂在视神经脊髓炎谱系疾病的应用

第一作者：Qin LIU

共同作者：Bai HUILING

目的：视神经脊髓炎谱系疾病（NMOSD）是一种主要累及视神经和脊髓的中枢神经系统炎性脱髓鞘自身免疫性疾病，具有高复发、高致残的特点，严重影响患者生活质量，因此有效预防复发对改善患者长期预后至关重要。本文探讨了免疫抑制剂在视神经脊髓炎谱系疾病的治疗进展。

方法：回顾 NMOSD 发病机制及诊断和治疗的相关性文献，分析 NMOSD 患者的临床特征及治疗原则，探寻了在 NMOSD 缓解期应用免疫抑制剂中的相关临床问题和重要意义。

结果：NMOSD-ON 的治疗分为急性期治疗和缓解期治疗，治疗目标有所差异。急性期治疗包括大剂量糖皮质激素静脉输注、血浆置换或免疫吸附治疗、静脉输注丙种球蛋白等；NMOSD-ON 缓解期治疗药物包括免疫抑制剂和单抗类药物。对有 NMOSD 适应症的患者可以使用伊奈利珠单抗、萨特利珠单抗和依库珠单抗等药物，它们都是治疗 NMOSD 的 A 级推荐药物，AQP-4 抗体阳性成人和 12 岁及以上青少年患者，可在明确诊断时、首次发作后或现有治疗失败而复发后就开始使用。其中伊奈利珠单抗是一种针对 NMOSD 研发的 B 细胞耗竭剂，伊奈利珠单抗靶向 CD19，较 RTX（靶向 CD20）具有更广泛的 B 细胞谱系覆盖范围，阻断产生 AQP4-IgG 的浆细胞 / 浆母细胞，具有独特优势。传统的免疫抑制剂如硫唑嘌呤、吗替麦考酚酯及利妥昔单抗也有在临床使用，但是传统免疫抑制剂存在复发率高、不良反应多、停药比例高、肿瘤风险增加等问题。其他长期间歇性使用丙种球蛋白，需要研究进一步确认其疗效。是否低剂量口服糖皮质激素作为缓解治疗或作为传统免疫抑制剂的补充，尚未得到系统研究的证明。

结论：NMOSD 是我国患者视神经炎发作的常见病因之一，严重影响患者视力，NMOSD-ON 的诊断需综合考虑患者临床特征和辅助检查结果，辅助 AQP4 等抗体检测，并注意鉴别诊断，尽早治疗。NMOSD-ON 的治疗分为急性期治疗和缓解期治疗，伊奈利珠单抗针对 NMOSD 患者研发，减少疾病复发，显著降低视神经炎发作风险和发作严重程度，有效改善 NMOSD-ON 患者视力。随着 NMOSD 发病机制研究的不断深入，相信将有越来越多的生物制剂精准靶向治疗不断涌现。

摘要编号：208461

免疫检查点抑制剂相关神经眼科并发症 1 例

第一作者：Yan LIU

共同作者：Xuemei LIN, Songdi WU

目的：报告 1 例免疫检查点抑制剂相关神经眼科并发症。

方法：病例报告。

结果：患者，男性，56 岁。主因“双眼复视 3 周”于 2025 年 2 月 5 日就诊。患者于 3 周前无明显诱因间断出现双眼复视，多于平视、下视时出现，数秒钟后缓解，就诊于外院完善头颅 DWI 未见异常，未治疗，症状无改善，遂来我院就诊。入院查体：头颈部、前胸、双侧腋下红色斑点，高于皮肤表面。右眼下视受限，余查体正常。既往肺鳞癌卡瑞利珠单抗（PD-1 抑制剂）介入化疗病史半年。初步诊断：眼外肌麻痹；肺鳞癌介入术后。入院完善肿瘤全项：非小细胞相关抗原 6.59 ng/ml（0-4 ng/ml），总前列腺特异性抗原 4.62 ng/ml（0-4 ng/ml），余化验未见异常。胸部 CT 示纵膈及右肺门区占位性病伴右肺上叶阻塞性肺炎；左肺上叶纤维硬结灶。眼眶平扫及增强未见明显异常。重复电刺激试验：阴性。腰穿：脑脊液初压 200 mm H₂O，脑脊液常规、生化、抗酸染色、墨汁染色以及细胞学检查均未见异常。入院第 5 天患者诉视物重影完全消失。查体：眼球活动完全正常。结合病史、辅助检查及转归最终诊断：1. 免疫检查点抑制剂相关并发症 1.1 眼肌型重症肌无力拟诊；2. 肺癌介入术后。嘱继续观察；必要时与肿瘤科医生沟通调整肺癌相关药物。

结论：免疫检查点抑制剂（ICI）在肿瘤治疗中广泛应用，其相关免疫不良反应可累及全身多个系统，神经眼科并发症虽较为罕见，但临床表现多样，易被忽视或误诊。本例患者在应用 PD-1 抑制剂后出现复视及眼外肌麻痹，虽未检测到典型抗体支持，但结合用药史、临床表现及病程转归，支持诊断为 ICI 相关眼肌型重症肌无力可能。该病例提示临床医生在接诊使用 ICI 的肿瘤患者时，如出现不明原因的眼肌麻痹或复视，应高度警惕药物相关神经眼科不良反应，及时进行多学科协作评估，早期识别并干预，必要时调整免疫治疗方案，以改善患者预后并保障治疗安全。

摘要编号: 202748

动脉炎性前部缺血性视神经病变临床及影像学特征观察

第一作者: Wang XIAO TANG

目的: 提高眼科医师对动脉炎性前部缺血性视神经病变 (A-AION) 的认识及早期准确诊断率, 减少误治及视功能进一步损害。

方法: 回顾分析 2022 年 8 月 -2025 年 8 月我院收治的 12 例 A-AION 患者的诊治资料及临床特征, 这些患者均经视野、眼底荧光血管造影、MRI 等检查及颞浅动脉活检确诊, 并接受纤溶酶、糖皮质激素及环磷酰胺治疗 10 月。

结果: 12 例 (16 眼) A-AION 中, BCVA 光感 - 指数 /30 cm 者 12 眼 (75%), 6 例 (50%) 两眼先后发生, 间隔 2-3 w; 伴同侧头疼及颞动脉区触痛 8 例 (67%); 9 例 (75%) 视盘白垩样缺血水肿伴羽毛状出血, 视杯 III - IV 级 9 例 (75%), II 级 3 例 (25%); FFA 早期视盘及盘周脉络膜低荧光 8 例 (67%)。血沉 50 > mm/h 及 C-RP 12.5 mg/L 7 例 (58%), 10 例 (83%) 中性粒细胞比例均 > 75%; 同时 IL-6 高 4 例 (33%); 抗血管内皮细胞抗体 (AECA) 阳性 3 例 (25%)。MRI 视神经鞘膜 T2 增高 12 例 (100%), 球后视神经周围渗出及 T2 信号增高 6 例 (50%)。视力改善 2 行以上 4 例 (33%)。

结论: A-AION 发病急, 视功能损害重, 预后差, 应及时救治。视力急剧下降的 AION 患者, 视盘白垩样缺血水肿伴下列之一者要考虑 A-AION 的可能并及时颞动脉活检: 1) 血沉、C-RP、IL-6 升高; 2) AECA 阳性; 3) 同侧颞动脉区疼痛不适或 B 超显示颞动脉硬化变细; 4) MRI 见球后视神经周围渗出及鞘膜 T2 信号增高。经颞动脉活检及免疫组化分析确诊的 A-AION, 应长期糖皮质激素联合免疫抑制剂治疗以减少视功能进一步损害及对侧眼发生 A-AION。

摘要编号: 200724

垂体转移性肿瘤的神经眼科表现

第一作者: Yan YAN

目的: 当垂体转移性肿瘤侵犯垂体时, 会导致内分泌功能受损以及周围组织受压和浸润, 进而引发一系列临床改变。

方法: 总结在神经眼科门诊评估的 7 例垂体转移性肿瘤患者, 并回顾了文献中 44 例垂体转移性肿瘤病例的神经眼科表现。

结果: 诊断时的平均年龄为 58.1 岁, 45.1% 为男性。从原发癌到垂体转移性肿瘤诊断的平均潜伏期为 57.6 个月。11.8% 的患者将垂体转移性肿瘤作为恶性肿瘤的唯一首发症状。从出现视觉障碍到确诊垂体转移性肿瘤的平均时间为 96.3 天。72.5% 的病例存在视力下降, 60.8% 的病例伴有视野缺损。74.2% 的患者表现出以垂直子午线为界的颞侧视野缺损模式。37.3% 的患者存在孤立性眼外肌麻痹, 其中最常见的眼运动神经麻痹为单侧动眼神经麻痹。乳腺癌是最常见的原发恶性肿瘤。84.6% 的患者在治疗后神经眼科症状完全或部分缓解。在平均 11 个月的随访期内, 51% 的患者存活。65% 的死亡患者平均生存时间在 6 个月内。

结论: 对于患有垂体肿瘤的老年患者, 即使没有尿崩症, 无论是否有恶性肿瘤病史, 无论任何原发肿瘤部位, 当出现视力视野损害时, 尤其伴眼球运动神经麻痹, 垂体转移性肿瘤都应列入鉴别诊断。

摘要编号: 209636

基于 OCTA 影像组学融合模型辅助诊断非动脉炎性前部缺血性视神经病变的研究

第一作者: Jia MA

共同作者: Peixian YANG

目的: 非动脉炎性前部缺血性视神经病变 (NAION) 是一种急性视神经病变, 特征为视力突然下降伴视野缺损。由于 NAION 早期诊断困难且病情不可逆, 早期筛查和诊断至关重要。本研究旨在提出一种基于光学相干断层扫描血管成像 (OCTA) 和影像组学的人工智能多模态诊断方法, 用于 NAION 的预测及急性期 NAION 与急性期视盘水肿的视神经炎 (ON) 的区分。

方法: 收集 2024 年 1 月至 2025 年 1 月昆明医科大学第一附属医院眼科就诊并诊断为非动脉炎性前部缺血性视神经病变 (NAION) 单眼患者 180 例 (急性期患眼 180 眼、对侧健眼 180 眼)、视盘水肿的急性期视神经炎 (ON) 患者 93 例 (93 眼), 以及年龄性别相匹配的正常人 147 例 (147 眼)。对上述受检者进行 OCTA 的视盘血流和视盘周神经纤维层厚检测和疾病相关临床信息 (糖尿病、高血压、高脂血症、睡眠呼吸暂停、吸烟史、饮酒史等) 收集。采用人工智能影像组学方法对 OCTA 的 enface 各层 superficial、RPC、Choroid 的所有部位提取 2D 影像组学特征, 用入选的图像建立数据集, 训练集与测试集数据比例为 7:3 来培训联合了临床数据、影像组学、深度学习的多模态融合模型 (MLPs), 采用准确率 (ACC)、受试者工作特征曲线下面积 (AUC)、灵敏度 / 召回率 (SEN/REC)、特异性 (SPE)、精确度 (PREC) 和 F1 评分等指标评

估 MLP、Logistic Regression、KNN、Random Forest、Gradient Boosting、SVM 等模型性能。

结果：各组间患者在年龄及性别上无显著差异 ($P > 0.05$)。(1) NAION 预测任务：以 NAION 的对侧健眼和正常对照眼进行分析，联合影像组学特征和临床数据的“RPC + superficial”多模态多层次 MLP 融合模型对 NAION 发病风险预测性能最优， $AUC = 0.996$ (95% CI, 0.983, 1.000)， $ACC = 0.970$ ， $F1 = 0.974$ (95% CI, 0.943, 1.000)， $PREC = 0.982$ ， $REC = 0.966$ ， $SPE = 0.976$ 。(2) 急性期 NAION 和急性期 ON 的区分任务：以 NAION 急性期患眼和急性视盘水肿的 ON 患眼进行分析，联合影像组学特征和临床数据的“Choroid + RPC + superficial”多模态多层次 MLP 融合模型对两者的鉴别诊断性能最优， $AUC = 0.989$ (95% CI, 0.966, 1.00)， $ACC = 0.944$ ， $F1 = 0.941$ (95% CI, 0.921, 0.961)， $PREC = 0.923$ ， $REC = 0.960$ ， $SPE = 0.931$ 。

结论：基于 OCTA 影像组学和临床数据的多模态模型在 NAION 预测及急性期 NAION 与 ON 区分中表现出色，提高了诊断的准确性。

摘要编号：201544

基于 ORTCC 模型的优化护理模式在视神经炎激素冲击患者中的应用效果

第一作者：周莉义

目的：探讨基于 ORTCC 模型的优化护理模式在视神经炎激素冲击患者中的应用效果。

方法：选取 2024 年 1 月至 2025 年 1 月我科收治的 46 例视神经炎拟行激素冲击治疗的患者为研究对象，采用随机数字表法将 46 例患者分为试验组与对照组，两组各 23 人。对照组采用常规护理模式，试验组采用基于 ORTCC 模型的优化护理模式。具体实施：(1) 确定目标 (O)；(2) 制定护理干预流程 (R)：① 组建基于 ORTCC 模型构建的优化护理模式管理团队，② 健康教育。③ 疼痛干预。④ 心理护理；(3) 搭建培训体系 (T)；(4) 检查与考核 (C)；(5) 文化体系 (C)。比较两组患者的视力改善情况、疼痛度、生活质量、焦虑抑郁情绪及护理满意度情况。

结果：试验组的视力总改善率显著高于对照组 ($P < 0.05$)。治疗后 12、24 h 试验组的视觉模拟评分法 (VAS) 评分低于对照组 ($P < 0.05$)。试验组的生活质量核心量表 (QOL-C30) 各维度评分均高于对照组 ($P < 0.05$)。干预后，两组的焦虑、抑郁评分均低于干预前，且试验组低于对照组 ($P < 0.05$)。试验组满意度评分显著高于对照组 ($P < 0.05$)。

结论：基于 ORTCC 模型的优化护理模式可显著改善患者视力，降低疼痛度，改善患者的生活质量及心理状态，提高患者的满意度。

摘要编号：209540

基于 SS-OCT 与 AO-SLO 评估典型阿尔茨海默病和后皮质萎缩视觉神经环路损伤异质性

第一作者：Yuzhu GAO

共同作者：Qin CHEN, Kefan MOU, Ruihan WANG, Ming ZHANG, Yifan ZHANG

目的：阿尔茨海默病 (Alzheimer's disease, AD) 在病理改变、大脑萎缩模式及临床表型方面存在显著异质性，这种异质性可能同样反映在视觉神经环路的损伤特征上。本研究基于多模式视网膜影像技术，系统评估典型 AD (typical AD, tAD) 与视觉变异型 AD——后皮质萎缩 (posterior cortical atrophy, PCA) 患者在视觉通路各层级的结构变化差异。

方法：本横断面研究纳入经神经内科确诊的 tAD 患者、PCA 患者及社会人口学匹配的健康对照。所有 tAD 及 PCA 患者均完成神经认知评估、APOE 基因分型及脑影像学检查，脑影像在 GE 3.0 T SIGNA PET/MR 上完成。所有受试者均完成完善眼科检查，包括眼压测量、裂隙灯显微镜检查、眼轴及屈光度测量及无创视网膜影像学检查，包括扫频源光相干断层扫描成像及血管成像 (swept source optical coherence tomography and angiography, SS-OCT and SS-OCTA) 和自适应光学扫描激光检眼镜 (adaptive optics scanning laser ophthalmoscopy, AO-SLO) 检查。

结果：本研究共纳入 tAD 患者 50 人 (76 眼)、PCA 患者 53 人 (83 眼) 及健康对照 78 人 (156 眼)。tAD 与 PCA 组 MoCA、MMSE、CDR-G 及 CDR-SB 评分均显著低于健康对照组 (all $P < 0.001$)。44 例 tAD 及 49 例 PCA 患者完成 APOE 基因检测，所有病例 Aβ-PET 均为阳性。与健康对照相比，tAD 组视网膜神经纤维层 (retinal nerve fiber layer, RNFL) 与神经节细胞内丛状层 (ganglion cell-inner plexiform layer, GCIPL) 厚度显著降低 (all $P < 0.05$)，PCA 组 GCIPL、内核层及外层视网膜厚度均显著降低 (all $P < 0.05$)，且 PCA 组在 1–3 mm 范围内的内核层厚度显著低于 tAD 组 ($P = 0.006$)。此外，tAD 和 PCA 组患者的浅层血管丛、深层血管丛及脉络膜毛细血管 (CC) 密度均显著下降 ($P < 0.05$)。AO-SLO 检查结果提示，两组患者中颗粒膜 (granular membrane) 及视网膜内层高反射点 (hyperreflective foci) 出现比例较健康对照组显著增高 ($P < 0.05$)。tAD

组中，视网膜指标主要与枕叶、颞叶皮层体积及海马区体积呈现正相关（弱-中等强度，all $P < 0.05$ ）；PCA 组中，视网膜指标与双侧枕叶皮层体积呈强相关，与颞叶和海马区体积仅呈弱相关（all $P < 0.05$ ）。

结论：AD 在视觉神经环路损伤方面存在显著的亚型特异性，视觉变异型 AD 的视网膜改变可能反映其后部视觉通路的逆行变性过程。多模式视网膜影像为识别 AD 亚型的神经退行性特征及探讨其病理机制提供了新的无创窗口。

摘要编号：209223

基于视网膜微循环动态监测的鞍区病变视交叉受压特征及预测因素分析

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共同作者：Xuan XIAO

目的：探讨光学相干断层扫描血管成像（OCTA）测量的视网膜微循环参数对鞍区病变患者术前视交叉受压状态的预测价值，评估其与视野功能损伤的相关性。

方法：前瞻性病例系列研究。收集 14 例鞍区病变患者 OCTA 和视野检查参数，比较术前术后（ $n = 7$ ）鞍区病变患者视网膜微循环变化特点；按视交叉是否受压分为受压组（ $n = 7$ ）与未受压组（ $n = 7$ ），比较两组患者视网膜微循环差异；通过受试者工作特征（ROC）曲线分析各参数对视交叉是否受压的预测效能。

结果：鞍区病变术后患者 GCC 较术前增加（ $P = 0.041$ ），下半视网膜浅层毛细血管层（SCP）血管密度改善具有统计学差异（ $P = 0.008$ ）；与未受压组相比，受压组鞍区病变患者 SCP 黄斑中心凹区（SCP-Fovea）（ 14.08 ± 5.47 VS 9.5 ± 4.03 ， $P = 0.027$ ）及深层毛细血管层（DCP）黄斑中心凹区（DCP-Fovea）血管密度降低具有统计学差异（ 27.16 ± 5.49 VS 22.3 ± 5.67 ， $P = 0.031$ ）。多变量 Logistic 回归分析表明，SCP-Fovea 为视交叉受压的独立预测因子（OR = 0.82，95%CI: 0.68–0.991， $P = 0.04$ ）；ROC 曲线显示：DCP-Fovea 敏感度最高（81.8%），AUC 为 0.811；SCP-Fovea AUC 为 0.769；视野平均缺损值（MD）与上半 SCP 之间存在明显相关性（ $r = 0.360$ ， $p = 0.034$ ）。

结论：视网膜微循环参数（尤其是 SCP-Fovea 与 DCP-Fovea 血管密度）可作为术前评估视交叉受压的无创性辅助指标，其对鞍区病变所致视神经压迫的早期识别及病情分层具有临床应用潜力，为手术决策提供新的影像学依据。

摘要编号：207814

强直性脊柱炎并发单眼球后视神经炎一例

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目的：强直性脊柱炎患者可继发眼部疾病，以葡萄膜炎为常见，但继发球后视神经炎较少报道。本文通过探讨 1 例强直性脊柱炎患者并发单眼球后视神经炎的诊治经过，为球后视神经炎的诊断及治疗提供临床思路。

方法：对就诊于我院的 1 例单眼球后视神经炎患者的临床表现、既往史、辅助检查及诊疗过程进行分析，为强直性脊柱炎患者继发球后视神经炎的疾病特点、诊治与转归提供参考。

结果：患者 38 岁男性，以“右眼突发视朦 1 周”为主诉于 2025 年 4 月 29 日入院。患者入院 1 周前晨起突发右眼视朦，伴右眼眼眶痛及轻度眼球转动痛（2–3 天后自行缓解），伴同侧偏头痛（3–4 天后自行缓解）。患者 18 年前曾诊断强直性脊柱炎，父亲患有强直性脊柱炎。入院查：右眼 BCVA 0.2，左眼 BCVA 1.0；NCT 眼压右眼 14.5 mmHg，左眼 14.3 mmHg；右眼 RAPD（+），视盘颜色淡，边界清楚；左眼未见明显异常。视野：右眼全周视野缺损。颅脑磁共振平扫：冠状面 STIR 示右侧视神经眶内段局部信号增高。检验结果：超敏 C 反应蛋白（hsCRP）36.01（mg/L）↑；HL1-B27：阳性；免疫球蛋白 G 定量测定（IGG）27.83（g/L）↑，免疫球蛋白 K 轻链（KL）4.09（g/L）↑。诊断：右眼球后视神经炎、强直性脊柱炎。给予静脉滴注甲泼尼龙琥珀酸钠 1000 mg，1 次/d，连续 3 d；改用 500 mg 静脉滴注，1 次/d，连续 3 d；改用 250 mg 静脉滴注，1 次/d，连续 3 d；改用 120 mg 静脉滴注，1 次/d，连续 3 d。治疗 12 d 后，右眼 BCVA 1.0，RAPD（+/-），眼底见视盘色淡红；视野检查：右眼缺损范围显著减小。

结论：球后视神经炎可由多种全身系统性疾病引起，其中较为罕见的自身免疫病如强直性脊柱炎，常常为临床工作者忽视。本例报告提示球后视神经炎与强直性脊柱炎存在紧密相关性，糖皮质激素应用效果佳，可减轻眼部病损程度。强直性脊柱炎并发球后视神经炎因其罕见性及临床表现的非特异性，需临床工作者对患者病史的详细了解 and 正确治疗，以期提高患者的生存率及生活质量。

摘要编号: 209109

急性期 AQP4 抗体阳性视神经脊髓炎患者眼眶 MRI 影像学特征与视功能及视结构的相关性分析

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目的: 探讨急性期眼眶 MRI 影像学特征与 AQP4 抗体阳性视神经脊髓炎相关视神经炎 (AQP4+ NMOSD-ON) 患者视功能及视结构之间的相关性。

方法: 本研究为单中心回顾性分析。纳入急性发作期并在症状发作后 1 个月内接受 3.0T 眼眶增强 MRI 检查的 AQP4+ NMOSD 患者。采用 T1 脂肪抑制序列经钆对比剂增强扫描, 使用 Sante DICOM 及 ITK-SNAP 对 T1WI-E 序列进行定量分析, 提取影像学参数包括病变部位、长度、体积及增强灰度差 (与同层面脑白质灰度差 max/average)。视力恢复定义为随访终点 BCVA ≥ 0.8 或较发作时提高 $\geq 50\%$ 。

结果: 共纳入 35 例患者 (恢复组 13 例, 未恢复组 22 例)。两组性别分布无显著差异 ($P = 0.279$), 恢复组年龄显著较低 (33.77 ± 11.22 岁 vs. 45.27 ± 12.13 岁, $P = 0.009^{**}$)。受累节段数差异无统计学意义 ($P = 0.448$)。两组最常见的病变部位均为眶内段 (62.9% vs. 81.8%) 及管内段 (62.9% vs. 68.2%)。在强化特征方面, 未恢复组病灶灰度差 Max 与 average 均高于恢复组 (321.95 ± 155.66 vs. 249.63 ± 180.62 ; 174.30 ± 113.05 vs. 143.28 ± 139.84), 提示病灶强化信号更强, 但差异未达统计学意义 ($P = 0.139, 0.216$)。病变强化长度及体积亦呈较大趋势 (19.55 ± 9.00 mm vs. 17.58 ± 9.34 mm; 220.88 ± 116.06 mm³ vs. 188.48 ± 109.99 mm³)。在功能学方面, 恢复组发作时 LogMAR 视力显著优于未恢复组 (1.38 ± 1.08 vs. 2.19 ± 0.59 , $P = 0.025^*$), 视野缺损亦较轻 (VF-MD: -17.57 ± 11.85 dB vs. -30.58 ± 4.70 dB, $P = 0.001^{**}$)。Spearman 分析显示, 灰度差 Max 与 GCL 厚度呈中度负相关 ($r = -0.456$, $P = 0.009^{**}$), 灰度差 average 亦与 GCL 呈负相关 ($r = -0.379$, $P = 0.032^*$)。进一步分析发现, 灰度差 Max 与六个象限的 GCL 厚度均显著负相关, 而灰度差 average 与鼻上 ($r = -0.472$, $P = 0.009$) 及鼻下 ($r = -0.473$, $P = 0.008$) 区域显著负相关。两者与 pRNFL 厚度无显著相关 ($P > 0.05$)。

结论: AQP4+ NMOSD-ON 患者中, 年龄较轻者视功能恢复更好; 未恢复组表现出更强的病灶强化信号与更严重的黄斑结构损害。灰度差越大, 黄斑 GCL 厚度越薄, 提示 MRI 病灶强化程度可能反映

黄斑神经节细胞层受损的严重程度, 为评估视神经炎病变活动性及预后提供潜在影像学指标。

摘要编号: 209007

注射用海藻酸盐水凝胶包裹的 hiPSC-RPE 细胞在视网膜色素变性治疗中的临床前研究

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目的: 视网膜色素变性 (Retinitis Pigmentosa, RP) 是一类遗传性视网膜病变, 其发病机制为光感受器细胞如视杆细胞、视锥细胞及视网膜色素上皮 (Retinal Pigment Epithelium, RPE) 细胞的进行性减少, 最终导致视力丧失。尽管细胞移植为 RP 的治疗提供了新的思路, 但移植后细胞的存活率低且功能定位不稳定仍限制其疗效。本研究旨在构建一种缓慢凝胶化的可注射海藻酸盐水凝胶递送系统, 评估其在包裹人诱导多能干细胞诱导分化的 RPE 细胞 (hiPSC-RPE), 对细胞移植效率及视功能恢复的促进作用。

方法: 本研究构建一种基于碳酸钙 (CaCO_3) 与 D-(+)-葡萄糖- δ -内酯 (GDL) 反应所触发的缓慢凝胶化可注射海藻酸盐水凝胶, 为细胞提供良好的微环境并减少移植过程中细胞流失。将人诱导多能干细胞来源的 RPE 细胞 (hiPSC-RPE) 包裹于该水凝胶中, 注射至皇家外科医学院 (Royal College of Surgeons, RCS) 大鼠的视网膜下腔。通过视动反应 (Optomotor Response, OMR)、视网膜电图 (electroretinogram, ERG)、光学相干断层扫描 (Optical Coherence Tomograph, OCT) 及外核层 (Outer Nuclear Layer, ONL) 厚度测定等方法评估视功能与视网膜结构变化, 并采用组织学分析评价水凝胶的生物相容性与治疗效果。

结果: 本研究成功制备了缓慢凝胶化的可注射海藻酸盐水凝胶, 并实现了 hiPSC-RPE 细胞的有效递送, 活细胞染色显示细胞存活率达 95% 以上。同时视觉功能检测, 与单纯 RPE 细胞悬液移植组相比, 水凝胶辅助的 hiPSC-RPE 移植组 ERG 波幅和 ONL 在移植后 4 周和 8 周较对照组均明显升高。此外, qOMR 结果显示 hiPSC-RPE + 水凝胶组较单纯移植 RPE 组视动反应在移植后 1 周及 3 周明显提高。此外组织学观察证实, 移植细胞在宿主视网膜下层稳定附着, 免疫荧光染色可见 REP-65 表达, 提示水凝胶可促进移植细胞的生存与功能整合。

结论: 缓慢凝胶化的可注射海藻酸盐水凝胶可作为一种有效的 hiPSC-RPE 细胞递送系统, 显著提高细胞在视网膜下腔的存活率与治疗效果, 为视网膜退行性疾病 (如 RP) 的治疗提供了潜在的可行策略。

摘要编号: 209347

烟酰胺核糖拮抗 cGAS-STING 诱导的小胶质细胞焦亡延缓光照诱导的视网膜退变

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目的: 小胶质细胞异常活化及其介导的慢性神经炎症反应是推动视网膜变性这一病理进程的关键机制, 本研究旨在揭示烟酰胺核糖 (nicotinamide riboside, NR) 对小胶质细胞焦亡的抑制通路, 探索 NR 干预视网膜变性的作用机制。

方法: 构建 Balb/c 小鼠光照诱导视网膜变性模型 (light-induced retinal degeneration, LIRD), 给予 NR 治疗 (1000 mg/kg) 并采用光学相干断层扫描 (Optical Coherence Tomography, OCT)、视网膜电图 (electroretinogram, ERG)、冰冻切片免疫荧光染色及 TUNEL 染色等检测技术, 评估 NR 对视网膜组织结构和功能的保护效应, 同时定量分析光感受器细胞凋亡率和小胶质细胞活化水平。基于转录组测序数据, 通过生物信息学分析鉴定关键差异表达基因及调控通路, 探究视网膜变性进展的分子机制并加以验证。

结果: 1. 在小鼠 LIRD 模型中, NR 治疗抑制光感受器凋亡、减少小胶质细胞活化, 显著改善视网膜组织结构和电生理功能。转录组分析进一步揭示 LIRD 上调炎症反应, 尤其是 NF- κ B、TNF 信号通路的显著活化。2. NR 预处理有效维持光感受器线粒体超微结构完整性, 促进线粒体生物发生的相关基因表达, 同时抑制光损伤诱导的 dsDNA 和 mtDNA 释放及 cGAS-STING 信号通路活化, 进而减少下游炎症因子表达和细胞焦亡发生。3. STING 抑制剂干预实验证实, 抑制 STING 可显著降低小胶质细胞活化标志物表达、下调焦亡相关蛋白表达, 并改善视网膜功能与光感受器的存活。

结论: NR 通过抑制 dsDNA 释放诱导的 cGAS-STING 信号通路激活, 阻断 STING 介导的小胶质细胞焦亡发挥神经保护作用。

摘要编号: 209104

热带爪蛙视神经激光损伤模型的修复再生初步研究

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目的: 本研究旨在建立一种稳定、精准且可复制的热带爪蛙视神经损伤模型, 以弥补该物种在视神经

萎缩研究领域的模型空白, 并推动对损伤后视神经再生机制的探索。

方法: 我们利用 Nd:YAG 激光对热带爪蛙的视神经进行损伤, 构建了一种新型的视神经损伤模型。通过组织病理学分析、免疫荧光染色以及 RNA-seq 转录组测序等技术, 系统地评估了视神经的损伤后病理变化、再生过程及相关基因表达。

结果: 该模型成功模拟了外伤性视神经病变的多种病理特征。损伤后, 视神经初期表现为组织溶解伴胶质细胞稀疏, 随后出现胶质细胞聚集和轴突再生, 未见胶质瘢痕或炎症细胞。视神经鞘早期保持完整, 第 6 天破裂, 随后逐渐修复。免疫荧光显示胶质细胞被激活, 轴突开始再生; 轴突数量先显著减少后部分恢复, 至第 12 天视网膜神经节细胞数量出现轻微但显著的减少。RNA-seq 分析揭示了一系列参与修复过程的基因, 其功能在哺乳动物中已被广泛证实。

结论: 本研究成功构建了热带爪蛙蝌蚪视神经的 YAG 激光损伤模型, 作为终生拥有视神经修复能力的热带爪蛙, 该模型的成功构建为视神经损伤后修复的分子机制研究及视神经保护的研究提供了新的思路。我们推测, 在缺乏纤维化瘢痕形成的情况下, 激活的胶质细胞营造的微环境有利于一系列促进视神经再生分子 (特别是星形胶质细胞中瘦素受体介导的 JAK-STAT 信号通路) 发挥功能, 从而协调执行促神经再生的信号通路。

摘要编号: 209041

病例系列报告: 非动脉炎性前部缺血性视神经病变 (NAION) 少见的脑血管异常病因

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共同作者: Songdi WU

目的: 探讨非动脉炎性前部缺血性视神经病变 (NAION) 的少见发病形式及脑血管异常病因, 分析其临床特征与诊疗要点, 以提高对非典型 NAION 的识别能力, 为帮助临床医生减少误诊提供关键线索, 增强对高风险人群的预警能力。

方法: 病例系列报告。收集 2020 年 7 月至 2023 年 12 月西北大学附属第一医院神经眼科收治的 6 例 NAION 患者临床资料, 分析 6 例患者的发病特点、临床表现及辅助检查结果, 包括眼部检查 (视力、眼底、视野等)、全身及影像学评估 (颅脑/眼眶 MRI、MRA、DSA 等)、治疗及随访结果。

结果: 1. 双眼先后发病的 NAION Case 1: 59 岁女性, 左眼先发病, 1 年后右眼复发, 对侧眼初次发病时存在隐匿性视盘水肿, 提示需警惕 12-15% 患者 5 年内对侧眼受累风险。2. 双眼同时发病的

NAION Case 2: 69岁女性, 双眼视力下降伴夜间低血压(82/48mmHg), 病因与全身血流动力学异常相关, 需与视神经炎鉴别。3. 偏侧萎缩症相关 NAION Case 3: 33岁男性, 右侧面部萎缩合并右眼 NAION, 可能与同侧视盘发育异常或颈内动脉纤细有关。4. 脑血管异常相关 NAION Case 4: 53岁女性因右侧颈静脉孔区颈静脉球瘤致双眼视盘水肿, 脑脊液压力升高(355mmH₂O), 预后较差。烟雾病(Case 5)与胚胎型大脑后动脉(Case 6)均通过脑血管影像学证实血管异常与 NAION 发病有关, 无传统危险因素, 需依赖 MRA/DSA 筛查。

结论: NAION 存在双眼先后/同时发病等特殊形式, 少见病因包括全身血流动力学异常、偏侧萎缩症及颅内血管畸形(如颈静脉球瘤、烟雾病)。对于无典型危险因素患者, 应常规行颈部及颅内血管检查、全身系统性筛查, 避免误诊及漏诊, 并强调长期随访。

摘要编号: 208937

真性视盘水肿眼中视盘周围高反射卵圆形团块样结构的临床特征

第一作者: Yu SU

共同作者: Changzheng CHEN, Di XIAO

目的: 观察和分析不同病因的视盘水肿眼中视盘周围高反射卵圆形团块样结构(PHOMS)的临床及光相干断层扫描(OCT)影像特征。

方法: 横断面研究。连续收集 2023 年 6 月至 2025 年 5 月于武汉大学人民医院眼科检查确诊的视盘水肿患者 51 例 68 只眼, 包括缺血性视神经病变患者 25 例 28 只眼、颅内压增高患者 10 例 19 只眼、视神经炎患者 10 例 12 只眼、葡萄膜炎患者 5 例 8 只眼、视神经肿瘤患者 1 例 1 只眼。患眼均行最佳矫正视力、相对性传入瞳孔功能障碍、眼底照相、视盘 OCT 检查。部分患者接受了眼底荧光素血管造影、视觉诱发电位、视野、腰椎穿刺、核磁共振等检查以明确诊断。分析了 PHOMS 的患病率、位置、大小, 及其与人口统计学和其他 OCT 参数的关系。

结果: 我们在 59% 的视盘水肿眼中发现了 PHOMS, 其位置主要在视盘鼻侧。PHOMS 在缺血性视神经病变中发生率为 46% (13/28)、颅内压增高中为 84% (16/19)、视神经炎中为 50% (6/12)、葡萄膜炎中为 25% (2/8)。与其他患者相比, 颅内压增高患者中 PHOMS 体积较大。

结论: PHOMS 是视盘水肿眼中的常见体征, 尤其是在颅内压增高导致的视乳头水肿眼中。PHOMS 的大小与水肿的程度相关。PHOMS 可能继发于各种原因导致的轴浆运输受损。

摘要编号: 209062

眼动对小鼠视神经脑脊液循环的影响

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共同作者: Xiaofei WANG

目的: 研究小鼠的眼动对视神经处脑脊液循环的影响。

方法: 选取共 80 只 8 周龄的 BALB/c 雌性小鼠, 分为 4 组: 活体眼动组, 活体无眼动组, 非活体眼动组和非活体无眼动组。小鼠的眼动通过固定频率 0.25 Hz、转动幅度 20° 的舵机控制。每组小鼠在成像前经枕骨大孔向小脑延髓池注射吲哚菁绿荧光剂(ICG), 利用 750nm 激光照射小鼠眼睛以激发视神经处脑脊液内 ICG 的荧光, 并用装有 750nm 滤光片的 CCD 相机进行 30 分钟的高速成像。用 Matlab 绘制小鼠视神经处荧光强度随时间变化的曲线。

结果: 在注射 ICG 后, 非活体无眼动组小鼠视神经处的荧光值持续上升。其他三组在约 1min 后达到峰值。活体无眼动组在达到峰值后保持缓慢下降趋势; 而活体眼动组和非活体眼动组视神经处的荧光值在 3min 左右下降到峰值的 20%~50% 之间, 之后保持相对平稳的状态。

结论: 非活体无眼动组的小鼠由于缺乏脑脊液流动的驱动机制, 导致 ICG 在视神经的沉积, 造成荧光值持续上升; 与非活体眼动组相比, 眼动对小鼠视神经脑脊液的循环起到了驱动作用。而活体无眼动小鼠的结果证明眼动并非视神经处脑脊液循环的唯一驱动力。与活体眼动组相比, 眼动可促进视神经处脑脊液快速排出。这对理解视神经脑脊液循环机制及相关退行性疾病的机制有重要意义。

摘要编号: 209445

眼眶核磁显示视神经鞘强化征的病例鉴别

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共同作者: Shasha LIU, Xiaonan YAO

目的: 明确眼眶核磁影像中的视神经鞘强化征的病因鉴别诊断路径

方法: 回顾性研究, 纳入 15 例 MRI 确诊视神经鞘强化患者, 分析其病史特点、视盘形态变化、核磁影像特征、实验室检查、治疗反应、预后评估等临床指标, 总结鉴别诊断要点。

结果: 本研究回顾性分析 15 例眼眶核磁显示的视神经鞘强化患者, 其中: 视神经鞘脑膜瘤(ONSM) 4 例、视神经周围炎 3 例、感染或感染相关视神经炎 3 例、MOG 抗体相关视神经炎 5 例, 进行各项临床指标分析。影像学显示: 视神经鞘脑膜瘤呈“轨

道征”强化，视神经周围炎可见软脑膜增厚，感染性视神经炎伴邻近感染，MOG 抗体相关视神经炎呈长节段病灶。治疗上：激素治疗效果不一，视神经周围炎和 MOG 抗体相关性视神经炎对激素治疗敏感，感染性视神经炎控制感染后明显好转，视神经鞘脑膜瘤对激素治疗反应差，部分病例射波刀治疗后好转。预后差异显著：视神经炎症患者视力改善率 100%，视神经鞘脑膜瘤患者视力恢复欠佳。

结论：眼眶磁共振成像（MRI）对于诊断视神经病变至关重要。视神经鞘强化可由多种病因导致。视神经鞘脑膜瘤（ONSM）是一种生长缓慢的良性肿瘤，早期病变或不典型的 ONSM 需要与视神经周围炎、感染性视神经炎和 MOG 抗体相关视神经炎等炎症性疾病相鉴别。关键的鉴别点在于：病史、视盘形态变化、神经影像、实验室检查、激素治疗及预后转归。建议优化诊断流程：1) 详细询问病史；2) 眼眶 MRI 强化模式初筛；2) 血清抗体／感染筛查分类；3) 多学科协作诊疗；4) 全周期管理及随访。

摘要编号：208662

眼睑痉挛的手术治疗

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目的：眼睑痉挛是以双眼不自主痉挛性收缩的致残性疾病，可造成功能性失明，严重影响患者的生活质量。病因不明，治疗困难。本研究旨在评估神经环路阻断术治疗眼睑痉挛的长期疗效及安全性，为临床治疗提供科学依据。

方法：收集 2019 年 7 月至 2022 年 6 月在我院诊断为 Meige 综合征眼睑痉挛并接受神经环路阻断术的患者资料，总结患者的一般资料、Meige 综合征分型、既往治疗情况、术前及术后随访的痉挛情况。手术前后对眼睑痉挛程度进行分级，并采用 BurkeFahnMarsden 肌张力障碍运动评分量表（BFMDRS）、眼睑痉挛障碍指数（BSDI）对手术前后眼部症状进行评分，比较术前、术后眼睑痉挛的改善情况。主要采用 Wilcoxon 秩检验进行统计学分析。

结果：本组共纳入患者 570 例，男性 189 例（33.2%），女性 381 例（66.8%）；年龄：57（51, 64）岁；术前病程：3.0（2.0, 6.0）年；既往治疗方法有：肉毒素（68.4%，390/570）、点眼（67.2%，383/570）、中药（34.9%，199/570）、精神类药物（28.4%，162/570）、针灸（27.7%，158/570）、耳后面神经微创术（5.4%，31/570）、重睑术（3.7%，21/570）、脑深部电刺激术（3.3%，19/570）、提眉术（2.1%，12/570）等。Meige 综合征分型：眼睑型 323 例（56.7%），眼睑口下颌型 175 例（30.7%），

其他型 72 例（12.6%）。术后随访时间：51（43, 60）个月；术前眼睑痉挛分级：3 级 12 例（2.1%），4 级 558 例（97.9%）；术后眼睑痉挛分级：0 级 499 例（87.5%），1 级 42 例（7.4%），2 级 21 例（3.7%），3 级 5 例（0.9%），4 级 3 例（0.5%）。术前 BFMDRS 眼部评分：8.0（8.0, 8.0），术后 BFMDRS 眼部评分 0.0（0.0, 0.0），与术前相比差异有统计学意义（ $Z = -22.43$, $P < 0.001$ ）；术前 BSDI 评分：24（20, 24），术后 BSDI 评分 6（5, 6），与术前相比差异有统计学意义（ $Z = -20.83$, $P < 0.001$ ）。

结论：神经环路阻断术对眼睑痉挛具有长期稳定的疗效，可有效改善患者生活质量，为治疗难治性眼睑痉挛提供了安全有效的方案。

摘要编号：209023

神经眼科相关问题在大语言模型应用的多维度评价——一项多中心研究

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目的：评价人工智能（AI）大语言模型（LLM）生成的与神经眼科相关典型临床问题的答案，并利用客观及专家评估的方式多维度的探究神经眼科相关问题在 LLM 上的表现。

方法：多中心、随机、横断面实验研究。根据神经眼科疾病定义、病因、临床表现及体征检查和治疗及预后 4 个角度选取 30 个神经眼科领域相关典型问题，分别使用 Deepseek、文心一言 4.0、豆包及 Kimi 1.5 四种国内开源 LLM 输出答案文本，采取客观评估法对于生成答案的总字数、句子难度、平均句长进行客观定量分析；采取专家评估法，三名多中心神经眼科专家分别对四种 LLM 生成的 120 个答案文本通过三个维度进行量化评分。其中，分别根据问题文本的完整性、准确专业性及相关性、临床性分别制定 3 级、5 级及 4 级李克特量表。统计四个 LLM 各维度分数的频率，并选取其中表现最佳的 LLM，观察在 4 类问题中，该 LLM 是否存在表现差异。最后，由另外三名专家评估表现最佳的是否可以替代真实世界医患沟通进行评估。

结果：在客观的汉语文本阅读难度分析中，Deepseek、文心一言 4.0、豆包及 Kimi 1.5 的总字数分别为：554.57 ± 263.77 字、816.77 ± 149.83 字、1163.13 ± 393.18 字、1000.17 ± 258.69 字，组间存在统计学差异（ $P < 0.01$ ）。在四个模型中，Kimi 1.5 表现最出色，其完整性最高分（3 分）、准确专业性最高分（5 分）、相关实用性最高分（4 分）的频率分别为 61%、29%、41%。Kimi 1.5 在神经眼科疾病定义、病因、临床

表现及体征、治疗及预后四个方面的问题中表现较为一致，无组间差异（完整性 $P = 0.198$, $P > 0.05$ ；准确专业性 $P = 0.865$, $P > 0.05$ ；相关实用性 $P = 0.613$, $P > 0.05$ ）。最终，三位专家认为 Kimi 1.5 的回答文字在神经眼科疾病定义、病因、临床表现及体征、治疗及预后方面“不可替代真实世界眼科医师，需要专业知识补充和监督”的占比结果分别为 57.1%、42.9%、66.7%、44.4%，总体占比结果大于 50%。

结论：Kimi 1.5 在完整性、准确专业性及相关性方面表现较其他 LLM 出色，中文 LLM 在神经眼科临床应用中具有较大的潜力，但无法代替真实世界医患沟通的效果。LLM 固有的“幻觉”特点需要未来探索 AI+ 医师的新型诊疗模式。

摘要编号：209541

视神经炎发病季节模式与预后分析

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目的：环境因素可能影响自身免疫性疾病的发病与转归。本研究旨在探讨不同类型视神经炎（ON）的发病是否存在季节性模式，并分析季节因素对患者复发及远期视功能和结构预后的影响。

方法：回顾性纳入 2015–2022 年就诊的 270 例视神经炎患者，包括 111 例水通道蛋白 4- 抗体阳性视神经炎（NMOSD-ON）、42 例髓鞘少突胶质细胞糖蛋白抗体相关视神经炎（MOG-ON）及 117 例特发性脱髓鞘性视神经炎（IDON）。收集并分析其人口学资料、发病季节、复发情况、最佳矫正视力（BCVA）、视野（VF）、视网膜神经纤维层（RNFL）厚度、黄斑神经节细胞层（GCL）厚度。采用 Rayleigh 圆形统计检验季节性分布，卡方检验比较季节差异，多因素回归评估预后影响因素。

结果：Rayleigh 检验揭示，ON 总体发病呈显著非随机分布（ $P < 0.001$ ），存在季节性聚集现象。此特征在 NMOSD-ON 亚组中尤为突出（ $P = 0.002$ ），其平均发病角度指向春末夏初，显示明确的春夏高发模式[春夏季发病占比 66.7%，患病率比 PR (95% CI) = 2.00 (1.41–2.84)]。复发分析提示，夏季与冬季起病的患者具有更高的复发倾向。在结构预后方面，冬季发病是 RNFL 变薄的危险因素，该季节起病的患者终末随访时 RNFL 厚度显著降低（ $P = 0.008$ ）。然而，多因素逻辑回归分析显示，季节并非视力预后（BCVA）的独立影响因素（ $P > 0.05$ ）。影响视力恢复的关键因素包括疾病亚型与初始视力，其中 MOG-ON 是视力良好预后的保护因素（OR = 0.082, $P = 0.001$ ），而初始低视力（BCVA $\leq$

20/200）则显著增加预后不良的风险（OR = 9.385, $P < 0.05$ ）。

结论：视神经炎发病存在明显季节性特征，特别是 NMOSD-ON 的发病存在显著的季节性聚集性，以春夏季为高发期。此外，发病季节与复发风险及远期视神经结构完整性相关，但对视功能预后影响不显著。MOG-ON 亚型展现出更优的视力恢复潜力。此发现深化了对环境因素在 ON 中作用的理解，对疾病预防和临床管理具有指导意义。

摘要编号：205839

视神经炎遗传机制与药物重定位的多组学研究

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目的：视神经炎（ON）是常见的致盲性眼病，其遗传机制与治疗选择有限。本研究旨在系统性鉴定 ON 致病基因并预测其治疗药物。

方法：本研究基于芬兰生物库（FinnGen R10）的公开全基因组关联研究（GWAS）汇总数据（582 例 ON 患者 vs. 217,491 例对照）。首先，采用基于汇总数据的孟德尔随机化（SMR）方法，结合免疫相关组织（如星形胶质细胞、小胶质细胞）的表达数量性状位点（eQTL）数据（CAGE），推断与 ON 存在因果关系的基因（显著性阈值： $p_{\text{SMR}} < 0.05$, $p_{\text{HEIDI}} > 0.05$, $\text{FDR} < 0.05$ ）。随后，对显著基因进行基因本体（GO）和京都基因与基因组百科全书（KEGG）通路富集分析（ $\text{FDR} < 0.05$ ）。最后，利用网络药理学方法，基于药物—靶点相互作用网络（DrugBank v5.1.9），计算候选药物与 ON 基因集的邻近性，以筛选潜在的复方药物（ $\text{FDR} < 0.05$ ）。

结果：SMR 分析共鉴定出 46 个与 ON 显著相关的基因（ $\text{FDR} < 0.05$ ）。其中，KDM5B（OR = 4.594）、HLA-DRB1（OR = 3.297）等为前 5 大风险基因；CYP21A1P（OR = 0.095）、HLA-E（OR = 0.323）等为前 5 大保护基因。功能富集分析显示，这些基因显著富集于抗共鉴定 46 个 ON 显著相关基因。效应值前五的风险基因为 KDM5B（OR = 4.59）与 HLA-DRB1（OR = 3.30）等；保护基因为 CYP21A1P（OR = 0.10）与 HLA-E（OR = 0.32）等。功能富集于抗原处理呈递与 T 细胞介导细胞毒性等通路。网络药理学预测蛋白质合成抑制剂奥马他辛美珀辛酸盐为显著候选药物（ $\text{FDR} < 0.05$ ），其通过靶向核糖体蛋白 RPL3 与 RPL2 发挥作用。

结论：本研究从遗传学角度揭示了 ON 的致病机制核心在于抗原呈递与 T 细胞免疫，并首次提出奥马他辛可能作为 ON 潜在治疗药物的新假说，为后续机制研究与临床转化提供了重要线索。

摘要编号: 207920

视网膜及中枢神经系统疾病中脑 - 眼双向转运的机制研究

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目的: 眼睛与脑紧密相连, 为检测脑病理变化提供独特途径。本研究以阿尔茨海默病 (AD) 相关视网膜病变为切入点, 系统解析脑内 β -淀粉样蛋白 ($A\beta$) 向视网膜的转运通路及调控机制, 评估其在脑 - 眼物质交换中的关键作用及深远影响, 为神经视网膜病变的机制研究与临床转化提供全新思路 and 方向。

方法: 本研首先利用单细胞测序、免疫荧光多标、3D 成像等技术, 系统检测 AD 患者及 5 $\times$ FAD 小鼠视网膜与视神经中 $A\beta$ 的分布特征; 随后对小鼠进行小脑延髓池立体定位注射 hA β 示踪剂、Gd-DTPA 造影剂, 同时结合免疫荧光、小鼠 MRI 以追踪其在视神经及视网膜的转运路径; 最后, 利用 AQP4 基因敲除小鼠模型, 评估 AQP4 极性缺失对脑 - 眼 $A\beta$ 转运及视网膜病变程度的影响。

结果: 免疫染色结果表明, AD 患者及 5 $\times$ FAD 小鼠模型的视网膜、视网膜色素上皮细胞 (RPE) 和视神经中均可见 $A\beta$ 沉积, 主要聚集在血管旁间隙 (PVS), 并分布于视神经鞘膜及眶周组织中的淋巴管。示踪实验进一步揭示, 脑内 $A\beta$ 可通过脑脊液沿视神经鞘膜和视神经周围的蛛网膜下腔转运, 随后进入视神经并沿着神经纤维和 PVS 向视网膜转运。在 AQP4 基因敲除小鼠中, AQP4 极性缺失不仅减缓从脑到眼的短时程转运, 还导致眼部长时程排泄障碍, 致使 $A\beta$ 在眼淋巴系统中积聚, 进而加剧视网膜变性。

结论: 本研究首次系统揭示了脑脊液中的 $A\beta$ 可由视神经鞘膜淋巴管途径、轴突间隙途径、动脉周围间隙途径三条脑眼通路转运至视网膜, 并明确 AQP4 的年龄相关性极性损害在脑与眼之间的转运以及眼淋巴清除系统中发挥重要作用。这些发现深入阐明了诸如阿尔茨海默病等神经系统疾病所导致的神经视网膜病变 (如视网膜神经退行性改变) 发病机制, 为视神经病变等神经眼科相关疾病提供了新的机制视角。

摘要编号: 205548

部分急性期 NAION 患者视野缺损持续进展的病因分析及干预探讨

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目的: 分析急性期非动脉炎性前部缺血性视神经病变 (NAION) 患者视野缺损持续进展的病因, 明确危险因素与进展诱因, 为临床制定针对性干预策略提供依据, 应对非典型 NAION 带来的诊疗挑战。

方法: 回顾我院神经眼科近 1 年收治的 52 例急性期 NAION 患者, 分析其中 16 例进展病例, 结合患者临床资料、视野检查、OCT、睡眠监测、血液检查等结果, 分析视野缺损进展的相关因素并分析典型病例; 梳理 NAION 全身及局部危险因素, 总结急性期进展诱因, 并归纳干预措施及随访效果。

结果: 约 31% 的 NAION 患者出现视力持续下降、视野缺损扩大。3 例典型进展病例中, 病例 1 患者合并高血压、高脂血症及重度 OSAS, 作息不规律致病情突发进展; 病例 2 患者因基础病控制不佳、家庭事务引发焦虑失眠, 半月内视野弥漫缺损; 病例 3 为糖尿病视网膜病变患者, 因高血糖控制不佳, 发病次日即出现视力进一步骤降伴黄斑水肿。NAION 全身危险因素包括高血压、糖尿病、OSAS 等, 局部危险因素以小视杯、视盘血管病变为主, 急性期进展多由危险因素叠加、视盘水肿压迫、心理因素等引发恶性循环。经激素消肿、抗 VEGF 治疗、基础病管控、心理干预等综合措施后, 患者视盘水肿减退, 视野及视力均获改善。

结论: 非典型 NAION 患者的增多使临床诊疗难度升级, 其视野进展是全身与局部危险因素叠加的结果, 焦虑情绪、未控制的基础病及视盘水肿压迫是关键诱因。临床需打破 “危险因素 - 缺血损伤 - 水肿压迫” 恶性循环: 急性期针对不同原因可分别或联合采取小剂量糖皮质激素、抗 VEGF 药物等消退水肿, 樟柳碱改善微循环; 需多学科协作管控基础病, 结合心理干预与患者教育。精准识别危险因素并实施针对性综合治疗, 可有效延缓病情进展, 改善患者预后。

摘要编号: 210329

铁死亡通过铁积累和 GPX4 失活诱导糖尿病视觉通路神经元损伤

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目的: 糖尿病视路损伤是导致糖尿病患者失明的主要原因之一。视路包含从视网膜到枕叶的解剖结构。本研究探讨了铁死亡 (由细胞内游离铁积累引发的程序性细胞死亡) 在糖尿病视路损伤中的作用机制。

方法: 采用链脲佐菌素 (STZ) 构建 II 型糖尿病大鼠模型。通过苏木精-伊红 (HE) 染色和透射电子显微镜 (TEM) 观察枕叶、视网膜及视神经的病理学和超微结构变化。利用免疫荧光技术检测枕叶和视网膜中神经元核 (NeuN)、胶质纤维酸性蛋白 (GFAP) 及谷胱甘肽过氧化物酶 4 (GPX4) 的表达水平, 并通过蛋白质印迹法 (WB) 验证 NeuN、GFAP 和 GPX4 在枕叶和视网膜中的表达情况。采用铁含量检测试剂盒检测枕叶和视网膜中的铁含量。

结果: 糖尿病大鼠模型的成功率为 93.3%。在糖尿病组中, 大脑枕叶和视网膜细胞排列紊乱, 边界模糊。枕叶、视网膜及视神经的细胞膜出现破裂, 可见部分空泡, 线粒体形态改变并出现肿胀, 线粒体嵴消失。视网膜和枕叶区域的 GFAP 表达量及铁浓度显著升高, 而 NeuN 和 GPX4 的表达量则明显降低。

结论: 铁死亡在糖尿病视网膜病变损伤中起重要作用, 而谷胱甘肽过氧化物酶 4 (GPX4) 可调控这一过程。

摘要编号: 207520

靶向组织蛋白酶 Z: 枸杞糖肽介导的神经炎症保护新机制

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目的: 本研究旨在验证核心介质组织蛋白酶 Z (CTSZ) 在抗神经炎症中的功能性作用, 并探索其作为新治疗靶点的潜力。

方法: 通过免疫荧光、western blot 以及功能学检查来评估 LBGP 对 AQP4-ON 的治疗效果。运用蛋白质组学寻找了重要的靶点, 并对此靶点运用基因操控的办法进行过表达和敲除来双向验证该蛋白功能。

结果: LBGP 能显著抑制炎症细胞因子肿瘤坏死因子- α (TNF- α)、白细胞介素-6 (IL-6) 和白细胞介素-1 β (IL-1 β), 以及中性粒细胞和小胶质细胞等炎症细胞的浸润。因此, 它在疾病后期保护了星形胶质细胞的完整性, 进一步减少了髓鞘脱失和视网膜神经节细胞 (RGCs) 的退行性变。我们的蛋白质组学数据整合分析表明, CTSZ 在 LBGP 治疗过程中始终发挥着核心介质作用。通过功能获得和功能缺失研究, 我们证实了 CTSZ 的核心介导作用。我们首次发现, 敲低 CTSZ 可模拟 LBGP 的治疗效果, 缓解 AQP4-ON 的表型, 包括中性粒细胞和小胶质细胞/巨噬细胞的募集、星形胶质细胞结构破坏、髓鞘脱失以及 RGCs 退行性变。相反, 过

表达 CTSZ 则消除了 LBGP 的保护作用, 减轻了对星形胶质细胞损伤、髓鞘脱失和 RGCs 退行性变的缓解效果。在 AQP4-ON 小鼠的视神经中, LBGP 治疗和 CTSZ 敲低均降低了线粒体依赖性凋亡蛋白如 BAX、细胞色素 C (Cyt c) 和切割型 caspase 3 (c-caspase 3) 的表达, 表明该凋亡通路作用于 CTSZ 的下游。通过 pifithrin- α (PFT- α) 抑制视神经中凋亡相关蛋白的表达, 成功保护了视网膜神经节细胞 (RGCs) 免受神经退行性变的影响。

结论: 研究结果表明, 在 AQP4-ON 小鼠中, LBGP 主要调控免疫细胞释放的 CTSZ。这一作用改善了后续的凋亡信号传导, 从而保护星形胶质细胞免受损伤并促进其恢复, 最终保全了髓鞘和视网膜神经节细胞 (RGCs)。

视觉科学

摘要编号: 203588

Grx2 介导 ILK 调控 Wnt/ β -catenin 通路在后发性白内障形成中的机制研究

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目的: 研究谷氧还蛋白 2 (glutaredoxin 2, Grx2) 调控晶状体上皮细胞 (lens epithelial cells, LECs) 迁移和上皮-间质转分化 (epithelial-mesenchymal transition, EMT) 的作用机制, 及其与后发性白内障 (posterior capsule opacification, PCO) 形成的相关性。

方法: 通过模拟白内障手术构建 PCO 小鼠模型, 通过双氧水处理 LECs 构建 PCO 体外细胞模型, 利用 WB 和 qPCR 检测 Grx2 表达水平。构建 Grx2 KO/KI C57BL/6J 小鼠并建立 PCO 模型, 术后 5 天收集晶状体后囊膜组织。采用 Label-Free 定量蛋白质组分析鉴定差异蛋白质, 对两组比较所得组间差异蛋白进行 GO、KEGG、Heatpot、Volcan、PPI 分析。构建 WT、Grx2 KO 和 Grx2 KI 小鼠 PCO 模型, 通过 H&E、IHC 和 WB 检测囊膜组织 EMT 指标和差异蛋白表达。构建 Grx2 过表达和低表达细胞系, 通过 WB、IF、qPCR 等验证具体机制。通过小鼠前房注射抑制剂或重组蛋白观察体内疗效。

结果: 在 PCO 体内外模型中, 伴随 LEC 的 EMT 过程, Grx2 的表达水平均显著下降。低表达 Grx2 加剧细胞内活性氧和线粒体活性氧表达水平并促进 LEC 的增殖和迁移, 过表达 Grx2 则反之。HE 染色发现, 与 WT 组相比, Grx2 KO 组小鼠晶状体

后囊膜上增殖、迁移的 LECs 显著增多, Grx2 KI 组相对较少; Western Blot 检测发现与 WT 组相比, Grx2 KO 组小鼠晶状体囊膜组织中 EMT 指标 α -SMA, N-cadherin 的表达量显著升高, Grx2 KI 组 EMT 指标显著下降。通过利用 WT 和 Grx2 KO 组小鼠 PCO 模型分离的晶状体囊袋进行测序分析, 发现细胞粘附、氧化还原过程及细胞分化相关蛋白质富集较多。其中细胞粘附通路中间因子整合素连接激酶 (integrin-linked kinase, ILK) 的表达增加 2.98 倍。WB 检测验证了 Grx2 KO 组囊膜组织中 ILK 表达量显著升高, Grx2 KI 组 ILK 表达量显著下降。进一步的研究发现, 低表达的 Grx2 可以通过上调 ILK 表达水平并激活 Akt/GSK-3 β 信号通路, 增加 GSK-3 β 的 ser 9 位点磷酸化, 进而促进 β -catenin 入核、激活 Wnt/ β -catenin 信号通路, 促进 LEC 的 EMT。

结论: Grx2 作为晶状体内关键的抗氧化酶, 对 LECs 上皮特性维持和 PCO 的发生发展至关重要。Grx2 通过调控 ILK 表达水平并激活 Akt/GSK-3 β 信号通路, 进而激活 Wnt/ β -catenin 信号通路, 最终加剧 LECs 的 EMT、促进 PCO 形成。

摘要编号: 203624

人眼内的不速之客: 房水中微塑料成分的鉴定与特征分析

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目的: 微塑料作为一种新兴全球性污染物, 对人类健康的潜在危害已引起广泛的关注。目前人体内多种组织、器官、体液中均已发现了微塑料的富集, 然而其是否能进入房水, 尚未见报道。因此, 本研究旨在探索鉴定房水中微塑料的成分与分布特征, 为研究微塑料对眼健康的影响奠定提供研究依据。

方法: 本研究共招募了 90 名参与者, 包括 30 名儿童 (先天性白内障患儿)、30 名成年人 (高度近视行 ICL 植入术患者) 和 30 名老年人 (年龄相关性白内障患者), 男女性别比例为 1:1。术中收集参与者的房水, 应用热裂解-气相色谱/质谱联合技术 (Py-GC/MS) 检测房水中的 11 种常见微塑料颗粒的含量, 并对其丰度特征进行统计分析。

结果: 本研究共检测了 11 种微塑料成分, 在房水中检测到其中五种微塑料, 分别是聚乙烯 (PE)、聚氯乙烯 (PVC)、聚丙烯 (PP)、聚酰胺 66 (PA66) 以及聚苯乙烯 (PS)。其中, 聚乙烯 (PE) 和聚氯乙烯 (PVC) 普遍存在于所有的样本中且聚乙烯 (PE) 丰度最高; 聚丙烯 (PP) 主要检出于儿童组房水, 而聚酰胺 66 (PA66) 主要检出于成人组

房水。依据年龄人群分析, 房水中微塑料浓度总体呈现出成年人组 > 儿童组 > 老年人植入的趋势; 依据性别分析, 则呈现出女性组 > 男性组的趋势。

结论: 本研究首次在人眼房水中发现了微塑料的存在。聚乙烯 (PE) 在所有房水样本中高丰度聚集, 提示我们应关注其进入眼内的转移途径及对眼健康的潜在影响。微塑料浓度在年龄和性别上的变化趋势, 以及聚丙烯 (PP)、聚酰胺 66 (PA66) 分别在儿童和成年人房水中的聚集, 提示了不同人群房水中微塑料成分存在的差异性特征。该研究为进一步探索微塑料对眼健康的影响奠定了研究基础, 同时也完善了关于微塑料在人体内分布和转移途径的认知。

摘要编号: 201062

光学离焦诱导的小鼠近视特征

第一作者: Chen HONG

共同作者: 王莉菲

目的: 通过观察光学离焦诱导的小鼠近视模型在近视诱导期和恢复期眼部生物学参数变化探讨此模型诱导的近视特征。

方法: 选取 16 只 4 周龄的雄性 C57BL/6 小鼠随机分为 2 组: 近视诱导组 (n = 11) 和对照组 (n = 5), 近视诱导组小鼠采用自制头戴式光学离焦诱导装置, 双眼前用 -30 D 镜片进行近视诱导 8 周, 后将近视诱导组小鼠撤去装置进入近视恢复期。记录两组基线、诱导 4 周、诱导 8 周、恢复 2 周 4 个时间点的眼部生物学参数。采用小动物专用红外验光仪检测屈光度, 光学相干断层扫描在体内测量眼轴长度、前房深度、晶体厚度、玻璃体腔深度, 角膜曲率仪测量角膜曲率, Icar 小动物眼压计测量眼压。应用独立样本 t 检验检测两组间差异。

结果: 两组小鼠基线时屈光度、眼压、角膜曲率、眼轴长度、前房深度、晶体厚度、玻璃体腔深度均无统计学差异。近视诱导 4 周后, 近视诱导组与对照组相比, 屈光度 (0.016 ± 3.829 vs -4.362 ± 2.302 , $P = 0.043$)、眼压 (7.4 ± 1.14 vs 11.0 ± 1.265 , $P = 0.001$)、前房深度 (393.8 ± 7.53 vs 359.167 ± 27.345 , $P = 0.023$)、晶体厚度 (1910.0 ± 50.675 vs 2045.5 ± 52.645 , $P = 0.02$) 具有统计学差异, 角膜曲率 (1.514 ± 0.027 vs 1.515 ± 0.03 , $P = 0.956$)、眼轴长度 (3011.8 ± 63.645 vs 3077.667 ± 59.369 , $P = 0.110$)、玻璃体腔深度 (568.0 ± 33.03 vs 528.0 ± 39.532 , $P = 0.106$) 无统计学差异。近视诱导 8 周后, 近视诱导组与对照组相比, 屈光度 (-0.918 ± 1.853 vs -5.845 ± 1.727 , $P = 0.001$)、眼压 (7.6 ± 1.817 vs 13.167 ± 2.927 , $P = 0.005$)、前房深度 ($438 \pm$

23.043 vs 395.33 ± 28.946, $P = 0.026$)、晶体厚度 (2177.8 ± 33.878 vs 2217 ± 7.563 , $P = 0.021$) 具有统计学差异, 角膜曲率 (1.564 ± 0.034 vs 1.553 ± 0.037 , $P = 0.633$)、眼轴长度 (3318.6 ± 47.231 vs 3343.33 ± 44.026 , $P = 0.393$)、玻璃体腔深度 (609.8 ± 26.593 vs 599.17 ± 24.161 , $P = 0.505$) 无统计学差异; 恢复 2 周时, 近视诱导组与对照组相比, 各参数均无统计学差异。

结论: 光学离焦诱导的小鼠近视属于屈光行近视, 主要差异表现在前房深度和晶体厚度的变化, 眼轴长度并未显示出具有统计学意义的增长。

摘要编号: **209244**

光引发剂 LAP 联合可见光的新型角膜胶原交联方案

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共同作者: Yi **HONG**, Yi **LIAO**, Zhirong **LIN**, Zuguo **LIU**

目的: 角膜胶原交联术 (CXL) 可阻止角膜扩张性疾病进展, 临床常用核黄素 (RF) / 紫外线 A (UVA) 方案。然而高能 UVA 及其与 RF 的反应会造成组织损伤, 尤其是不可逆的内皮丢失, 因此标准 RF/UVA 方案对晚期薄角膜患者存在应用局限。而光引发剂苯基-2,4,6-三甲基苯甲酰膦酸锂 (LAP) 在 405 nm 可见光 (VL) 下具有效率高、生物相容性好的特征, 已广泛用于 3D 生物打印交联单体合成物。本研究旨在探索 LAP/VL 角膜胶原交联新策略。

方法: 将新鲜离体猪眼球、新西兰大白兔、C57BL/6J 小鼠随机分为 LAP/VL 组和 RF/UVA 组进行交联手术。使用原子力显微镜 (Atomic Force Microscope; AFM) 和拉伸试验对角膜生物力学强度变化进行定量分析。采用前段光学相干断层扫描 (Anterior Segment Optical Coherence Tomography; AS-OCT)、活体角膜共聚焦显微镜 (In Vivo Confocal Microscope, IVCN) 和裂隙灯检查评价兔的角膜水肿情况、角膜光学透明度、角膜基质交联分界线。采用苏木素和伊红染色、马松染色、扫描电镜 (Scanning Electron Microscopy; SEM)、透射电镜 (Transmission Electron Microscopy; TEM) 表征角膜组织和基质纤维的结构变化。采用 CCK-8 评估 LAP 对原代人角膜基质细胞活力的影响。采用荧光素钠染色评估交联后角膜上皮愈合情况。采用 ZO-1 和 Na⁺/K⁺ ATPase 免疫荧光染色评估胶原交联后角膜内皮的完整性和泵功能。采用 8-OHdG 和 γH2AX 免疫荧光染色评估角膜内皮的 DNA 损伤。

结果: LAP/VL 交联后角膜颜色与透明度无改变, 猪、兔角膜表面杨氏模量及抗拉强度均显著提升; 电镜示角膜胶原纤维排列致密、直径增大, 交联 6 周

后生物力学强度仍高于空白对照。LAP1/VL 组生物相容性优, 上皮愈合速度与对照一致且快于 RF/UVA 组, 术后角膜水肿轻、消退快, 角膜内皮细胞 DNA 损伤少, 基质细胞恢复迅速。

结论: LAP/VL 方案可显著增加猪及兔角膜硬度, 效果与 RF/UVA 方案相当; 同时减少角膜内皮及基质细胞丢失, 促进上皮愈合与基质再生。综上, LAP/VL 是安全有效的 CXL 替代策略, 对较薄角膜更具优势, 并拓展了 LAP 在原位天然细胞外基质交联中的应用。

摘要编号: **201119**

基于眼动和视觉诱发电位无创评估清醒猴视功能

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共同作者: Ian **ANDOLINA**, Hong **LIU**

目的: 猕猴是研究人类视觉发育的理想动物模型, 目前缺乏一种客观、非侵入性、可反复多次进行的方法来评估其视功能。本研究旨在开发基于眼动追踪和稳态视觉诱发电位 (sVEP) 的非侵入性方法客观评估清醒幼猴的对比敏感度。

方法: 基于磁共振对头面部轮廓的扫描, 开发设计 3D 打印的头戴式装置来限制幼年食蟹猴的头部活动, 优化眼动仪对幼猴面部的追踪技术, 结合眼动追踪建立清醒幼猴 sVEP 的非侵入性检测系统。对幼猴进行行为学训练后, 在 0.5、1、2、4、8 cpd 这 5 个不同空间频率下进行 sVEP 检测, 垂直光栅刺激的对比度范围为 0.5% ~ 96%。用线性回归估计每个空间频率下的对比敏感度 (CS), 即为客观检测值。继而通过传统心理物理学检测幼猴的主观 CS, 以验证 sVEP 方法的有效性。通过重复测量方差分析比较上述两种方法检测幼猴 CS 的差异, 并将两种 CS 值做相关性分析、分别拟合对比敏感度函数。定义实验总用时比值 (PVR), 通过比较新开发的非侵入性 VEP 与传统心理物理学方法在同一注视条件下的 PVR 来反映这两种方法的实验效率。

结果: 使用两种方法检测得到的幼猴对比敏感度函数图形形状相似。6 例幼猴的 sVEP 平均峰值对比敏感度 (CSp) 为 53.23, 落在空间频率 1.66 cpd; 心理物理学 CSp 为 132.48, 落在 2.46 cpd。在 5 个空间频率上, 平均 sVEP-CS 与心理物理学 CS 均显著相关 ($p < 0.001$), 尽管在每个空间频率上 sVEP-CS 值均低于心理物理 CS 值。在 5 个空间频率的 PVR 均大于 0.67, 表明对于清醒幼猴, sVEP 检测对比敏感度的实验效率比心理物理学方法高。

结论：联合眼动追踪的非侵入性 sVEP 能够有效、客观、无创检测清醒幼猴视功能，且实验效率高于主观的心理物理学方法。

摘要编号：201080

急性低压缺氧环境下色觉分辨力的快速量化评估：基于新型色相鉴别系统的多高度模拟研究

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目的：在模拟高海拔（3500–4500 m）急性低压缺氧条件下，定量追踪人眼对精细色差的动态变化；验证一款比传统 FM-100 Hue 更快捷、便携的软件测试工具。

方法：受试者：14 名色觉正常的健康青年（20–26 岁）。环境：低压舱，5 m/s 上升、3 m/s 下降，每升高 1000 m 休息 2 min，3500/4000/4500 m 各停留 40 min 适应。测试工具：自主研发的“色相差快速识别系统”7 个波段（400–700 nm），1 nm 精度记录最小可识别色差（MHD）；按偏差程度给出 4–1 级评分。观测指标：MHD、评分、测试耗时、色觉识别阈值，共 8 个状态（地面→3500 m→…→返回地面）。

结果：本研究通过新型快速色相鉴别系统，在模拟 3500–4500 m 急性低压缺氧过程中对 14 名正常色觉青年进行连续测试，发现红色光的精细分辨力最差且波动最大（MHD 28.7 → 22.4 nm），40 min 高海拔习服可显著改善青、紫色的辨别能力（MHD 下降 20–35%），却使橙、黄色进一步恶化；其余波段变化轻微。整体 MHD 波长曲线呈 500 nm、600 nm 低谷和 550 nm、620 nm 高峰的经典形态，评分可解释 81% 的 MHD 变异；测试时间由首次 25 s/色 缩短至后续 8–10 s/色，总耗时 ≈ 5 min，验证了新工具的高效与稳定。

结论：急性缺氧优先损害红色精细分辨力；短时习服可改善青、紫色辨别。新软件实现 1 nm 级、5 分钟完成的快速色觉筛查，适用于高原作业、飞行座舱等场景。建议对高海拔工作者、飞行员进行常规色觉阈值检测，并在关键界面设计中为红色信号预留 > 10 nm 安全裕度。

摘要编号：210226

急性视网膜坏死综合征误诊为青光眼睫状体炎综合征及预后不良分析一例

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共同作者：Yungang DING, Jing PANG, Cong REN

目的：探讨一例急性视网膜坏死综合征（ARN）误诊为青光眼睫状体炎综合征的患者临床表现、诊治过程及不良预后的原因。

方法：回顾患者的临床资料、实验室检查及影像学结果，结合文献探讨误诊原因及对预后的影响。

结果：患者男，61 岁。因“左眼红、视力下降 11 天”入院。4 天前因眼压高和前房炎症误诊为青光眼睫状体炎综合征，接受妥布霉素地塞米松和噻吗洛尔眼水治疗。1 天前视力急剧下降至光感，转诊至我院。眼科检查：左眼视力光感，眼压 14 mmHg，轻度睫状充血，羊脂状 KP（+），前房细胞（+），晶状体轻混浊，玻璃体轻度炎性混浊，视网膜脱离累及黄斑，见视网膜坏死灶及血管白线状。行左眼玻璃体切除 + 视网膜复位 + 视网膜激光光凝 + 硅油注入 + 玻璃体腔更昔洛韦注射术。玻璃体液 PCR 检测示水痘带状疱疹病毒（+），确诊左眼 ARN 合并视网膜脱离。术后半年硅油取出，最佳矫正视力为 HM/50 cm，血流 OCT 显示黄斑萎缩及大片视网膜无灌注区。

结论：急性视网膜坏死综合征伴有眼前节反应，尤其在羊脂状 KP 及眼压升高时，应警惕 ARN。眼内液检测可明确病毒感染，辅助 ARN 诊治。黄斑萎缩及视网膜无灌注是预后不良的关键，积极抗炎和抗病毒对改善预后至关重要。

摘要编号：210357

新疆各地州学龄儿童青少年屈光参差患病率及其影响因素

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共同作者：Lin DING, Tao SHEN

目的：评估分析新疆地区 14 个地州 6–18 岁学龄儿童青少年屈光参差的患病率、空间分布特征和影响因素，为制定区域性眼健康干预策略提供科学依据。

方法：采用横断面研究设计，纳入新疆地区 14 个地州的小学、初中及高中学生共 64277 名，收集其人口学特征、屈光状态及地域分布数据。通过等效球镜度（SE）评估屈光状态，采用 Moran's I 分析屈光参差患病率的空间分布，采用单因素及多因素回归分析探讨屈光参差的危险因素。

结果：屈光参差总体患病率为 17.9%（95% CI：17.6%–18.2%），女性屈光参差患病率（18.8%）

高于男性 (16.9%)，汉族 (23.9%) 高于维吾尔族 (11.7%) 和其他民族 (18.4%) ($P < 0.001$)。屈光参差患病率呈空间聚集分布 (Moran's $I = 0.450$, $P = 0.043$, $Z = 2.026$)，并且存在地域差异，昌吉最高 (24.1%)，克州最低 (7.9%)，城市 (19.0%) 高于农村 (15.6%)，北疆 (19.9%) 高于南疆 (13.5%) ($P < 0.001$)。屈光参差患病率与年龄呈正相关，6 岁为 9.8%，18 岁达 22.4%。多因素回归分析显示，女性、北疆地区、近视和较高年龄是屈光参差的独立危险因素。

结论：新疆地区学龄儿童青少年屈光参差患病率较高，在空间上呈聚集分布，且存在显著的人口学及地域差异，女性、北疆地区、近视和较高年龄是屈光参差的独立危险因素，建议加强对高危人群的视力筛查及早期干预。

摘要编号：203211

法瑞西单抗治疗新生血管性年龄相关性黄斑变性、糖尿病性黄斑水肿以及视网膜静脉阻塞的有效性及安全性真实世界研究

第一作者：Danning LIU

共同作者：Ruimin FAN

目的：分析真实世界中玻璃体腔注射法瑞西单抗治疗难治性新生血管性年龄相关性黄斑变性 (nAMD)、糖尿病性黄斑水肿 (DME) 以及视网膜静脉阻塞 (RVO) 的有效性和安全性，并分析治疗疗效与特定生物标志物的关系。

方法：采用回顾性分析方法，纳入患有 nAMD、DME、RVO 并接受玻璃体腔注射法瑞西单抗治疗患者 (所有患者根据说明书原则进行治疗)。对比基线、治疗后 1 周、1 月、2 月、3 月和 4 月评估的最佳矫正视力 LogMar、黄斑中心凹厚度 (CST)、光学相干断层扫描 (OCT) 显示的视网膜生物标志物 (包括：完整外界膜、完整椭圆体带、视网膜内液、视网膜下液、中心凹视网膜内液、视网膜下高反射物质、视网膜内高反射物质、黄斑前膜、色素上皮脱离、地图样萎缩) 以及不良事件。同时对上述患者 1 年内的随访情况进行记录。

结果：研究共纳入 31 名患者，其中 nAMD 组 15 人 21 眼、DME 组 14 人 21 眼和 RVO 组 2 人 2 眼。除 nAMD 组 1 人为初治患者外其余均为经治疗转换法瑞西单抗治疗的患者。转换法瑞西单抗治疗前玻璃体腔注射抗 VEGF/ 傲迪士针数及病程为：nAMD 8.33 次，平均病程 24 个月。DME 9.22 次，平均病程 33.4 个月。RVO 13.5 次，平均病程 36 个月。在法瑞西单抗治疗后第 4 月 nAMD 组、DME 组最佳矫正视力均较基线明显提高，有统计学意义 ($P < 0.05$)。第 4 月平均 CST 均较基线明

显下降，有统计学意义 ($P < 0.05$)。在 nAMD 组中，第 4 月随访时黄斑区外层视网膜损伤、病灶的面积与最终较差的 BCVA 相关。在 DME 组中，第 4 月随访时病灶最厚点的厚度与 BCVA 相关。本研究未发现玻璃体腔注射法瑞西单抗发生眼内炎、青光眼等严重并发症。

结论：难治性 nAMD 和 DME、RVO 组患者在玻璃体腔注射法瑞西单抗负荷剂量治疗后大多数获得了满意的解剖学及视功能的改善学结果及视力的提高，极少数患者第 4 月及其后时间随访未见其解剖学结果明显好转。部分患者，尤其是部分 nAMD 患者视力无明显提升，在 nAMD 眼中，视网膜外层结构的损伤以及病灶面积可能阻碍 BCVA 的改善。根据我院目前玻璃体腔注射法瑞西单抗的观察，法瑞西治疗 nAMD、DME、RVO 安全有效眼底新生血管相关疾病是安全有效的。

摘要编号：204360

玻璃体切割术联合有晶状体眼屈光晶状体植入术治疗中青年患者病理性近视合并近视性牵引性黄斑病变的研究

第一作者：Yue QI

共同作者：Jie SHI

目的：评估 23 G 玻璃体切割术 (PPV) 联合后房型有晶状体眼屈光晶状体 (PC-PRL) 植入术，在治疗病理性近视 (PM) 合并近视性牵引性黄斑病变 (MTM) 患者中的安全性与有效性。

方法：本回顾性研究纳入 11 例患者 (11 只眼)，所有患者眼轴长度均 > 27 mm，球镜度数均 < -10 D，均接受 PPV 联合 PC-PRL 植入术。研究对患者术后 3 个月的解剖学结局、视力 (VA)、屈光不正情况及并发症进行分析。

结果：1. 病变类型分布：11 例患者中，9 例存在黄斑劈裂 (MRS)，5 例存在板层黄斑裂孔性视网膜脱离 (LMHRD)，3 例存在黄斑前膜 (ERM)，2 例存在黄斑裂孔性视网膜脱离 (MHRD)，1 例存在黄斑劈裂性视网膜脱离 (MSRD)。2. 解剖学结局：术后 3 个月随访显示，黄斑裂孔/板层黄斑裂孔 (MH/LMH) 闭合率为 85.7% (7 眼中 6 眼闭合)；8 只眼中有 5 只眼 (62.5%) 仍存在残余视网膜下液。3. 屈光与视力改善：术后球镜度数从 -15.0 D 降至 -0.50 D，差异具有统计学意义 ($P < 0.01$)；矫正远视力 (CDVA) 从 1.3 logMAR 显著提升至 0.52 logMAR，差异具有统计学意义 ($P = 0.026$)。4. 并发症情况：1 例术后出现瞳孔阻滞型青光眼 (虹膜激光后缓解)，2 例 45 岁以上患者术后 1 年左右因白内障加重接受 P+I 手术，无其它并发症发生。

结论: 23 G 玻璃体切割术 (PPV) 联合后房型有晶状体眼屈光晶状体 (PC-PRL) 植入术可在治疗病理性近视患者的近视性牵引性黄斑病变同时, 去除中青年患者高度近视, 能实现良好的解剖学和功能结局, 且并发症发生率低。

摘要编号: 203892

磷脂化 ω -3 多不饱和脂肪酸膳食补充对萎缩性病理性近视的影响

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目的: 评估补充磷脂化 ω -3 多不饱和脂肪酸 (PUFAs) 对萎缩性病理性近视 (APM) 患者的治疗效果, 并通过蛋白质组学和脂质组学分析阐明其潜在的分子机制。

方法: 招募 41 例 APM 患者每日口服磷脂化 ω -3 PUFAs, 持续 6 个月。行全面的眼科评估 (多焦视网膜电图 (mERG)、微视野检查、最佳矫正视力 (BCVA)、眼轴长度 (AL) 和等效球镜度数 (SE))。并对血液样本进行蛋白质组学和脂质组学分析。

结果: mERG 分析显示平均 N1 峰潜伏期 (0.028 s 降至 0.026 s, $P = 0.036$) 和 P1 峰潜伏期 (0.06 s 降至 0.050 s, $P = 0.002$) 显著缩短。微视野检查显示平均视网膜敏感度改善 (20.34 dB 升至 21.17 dB, $P < 0.05$)。基线 SE 与 N1 振幅变化 ($r = 0.402$, $P < 0.05$) 和 P1 振幅变化 ($r = 0.45$, $P < 0.001$) 呈正相关。LogMar BCVA、AL 或 SE 未见显著变化 ($P > 0.05$)。蛋白质组学分析鉴定出 2598 个差异表达蛋白, 其中 20 个显示出显著变化, 主要为免疫球蛋白家族蛋白。KEGG 通路分析显示氧化应激、代谢和免疫相关通路富集。脂质组学分析表明, 补充后血浆 ω -3 PUFAs 和 二十二碳六烯酸 (DHA) 水平升高 ($P < 0.05$)。

结论: 在磷脂化 ω -3 PUFAs 治疗后, APM 患者的视锥细胞和双极细胞功能得到改善, APM 患者的视网膜敏感度显著提高, 视网膜反应潜伏期缩短, 提示视网膜光感受器功能增强。此外, 虽然未观察到视觉功能的显著变化, 但补充磷脂化 ω -3 PUFAs 后, 获得 >5 和 >10 ETDRS 字母增益的患者数量较基线增加, ω -3 PUFAs 补充后患者的 BCVA 均有改善的趋势。高通量蛋白质组学和脂质组学分析提示磷脂化 ω -3 PUFAs 调节与抗炎、氧化应激和免疫反应相关的通路有关, 这可能表明 DHA 通过抗炎、抗氧化和免疫调节机制在 APM 的发病机制中发挥关键作用。我们的蛋白质组学分析显示, 几种与免疫反应相关的差异表达蛋白显著上调, 表明参与炎症消退的免疫机制被激活。这些发现表明, ω -3 补充可能通过调节免疫反应和炎症信号通路来增强

APM 患者的光感受器功能和视力, 从而影响近视的发病机制。我们的研究表明, DHA 通过抗炎、抗氧化和免疫调节机制在 APM 的发病机制中发挥关键作用。这是第一项在真实世界临床环境中评估磷脂化 ω -3 PUFAs 在管理 APM 中的疗效的研究。我们的发现对 APM 的发病机制进行了有效的补充, 并提出了一种对 APM 有前途的、非侵入性的治疗干预措施, 有望成为延缓 APM 的进展的潜在治疗手段。

摘要编号: 203870

角膜交感神经调控免疫细胞促进角膜新生血管生长的机制研究

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目的: 角膜新生血管 (Corneal neovascularization, CNV) 是导致角膜盲及角膜移植术后免疫排斥的主要危险因素, 但现有治疗手段有限。角膜是全身神经末梢最为密集的组织, 其无血管特性对维持透明至关重要。临床上常见角膜神经损伤后伴随 CNV 发生, 提示神经-血管交互作用可能参与调控, 但其机制尚不明确。本研究聚焦角膜交感神经在 CNV 形成中的作用, 旨在阐明其分子通路并探索潜在干预靶点。

方法: 采用 C57BL/6J 小鼠建立碱烧伤、缝线及 bFGF 微囊三种 CNV 模型, 并行角膜转录组测序。建立切断睫状长神经构建角膜去神经模型, 于术后 1、3、7 天裂隙灯观察角膜上皮及 CNV 变化, 使用免疫荧光检测角膜组织中交感神经和 β 2-肾上腺素受体 (β 2-AR) 的分布变化; 检测 β 2-AR 激动剂 NE 和拮抗剂 ICI118,551 (ICI) 对 CNV 的影响, 并建立 β 2-AR 敲除小鼠进一步验证。

结果: 三种 CNV 模型转录组测序结果显示与角膜炎症相关的基因上调最高, 与正常野生小鼠相比较, S100A8 是显著上调的基因。角膜去神经模型中, 术后 1 天可见上皮点状浸润, 3 天出现上皮缺损并伴随 CNV, 7 天形成大量 CNV。多种小鼠角膜新生血管模型的角膜中血管与交感神经伴行, NE 处理显著促进 CNV 的长度、密度及面积扩展, 而 ICI 组受抑制。免疫荧光证实 β 2-AR 在角膜上皮表达强阳性, β 2-AR 敲除小鼠中, CNV 生长显著减少。

结论: 角膜感觉神经受损后, 交感神经可长入角膜并与新生血管伴行, 同时角膜内 NE 水平增加。交感神经释放的 NE 与角膜上皮广泛分布的 β 2-AR 结合, 促进免疫细胞浸润及血管生成, 最终诱导 CNV 形成。阻断 NE- β 2-AR 信号通路可显著抑制 CNV 生长, 提示该通路为 CNV 治疗潜在的新靶点。本研究揭示了交感神经在角膜新生血管形成中的关键

作用，为临床防治角膜新生血管相关疾病提供了新的理论依据与治疗策略。

摘要编号：206445

非病理性高度近视眼生理盲点扩大与 γ 区及 PHOMS 有关

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目的：探讨非病理性高度近视眼生理盲点扩大的患病率及危险因素。

方法：多中心前瞻性队列研究。对 172 例高度近视患者的 313 只眼进行视野检查。比较 116 只生理盲点扩大眼与 116 只正常视野眼的临床特征。采用广义估计方程（GEE）回归模型评估生理盲点扩大的有关因素。

结果：非病理性高度近视眼生理盲点扩大的发生率为 37.06%。与正常视野眼相比，生理盲点扩大眼具有更大的 γ 区（ $P = 0.038$ ）、更大的 PHOMS 区（ $P < 0.001$ ）、增加的视盘周围视网膜神经纤维层厚度（ $P = 0.006$ ）和减少的黄斑神经节细胞—内丛状层厚度（ $P = 0.016$ ）。在多变量回归分析中，扩大的 γ 区（ $OR = 2.004$ ； $P = 0.022$ ）和更大的 PHOMS 区（ $OR = 4.414$ ； $P = 0.009$ ）与生理盲点扩大有关。

结论：扩大的 γ 区和更大的 PHOMS 区与生理盲点扩大有关，两者可能提示了非病理性高度近视眼中近视性视神经病变的早期改变。这种损害模式可为高度近视和青光眼的鉴别诊断提供线索。

角膜病、干眼症、外眼病、眼库

摘要编号：210224

0.05% 环孢素滴眼液 II 对于白内障围术期患者应用价值的临床研究

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目的：探究 0.05% 环孢素滴眼液对于白内障围手术期患者眼表以及泪膜稳定性保护作用及应用价值。

方法：本研究纳入了 2022 年 6 月至 2022 年 12 月期间在北京大学第三医院眼科中心就诊的白内障患者，共 63 例（63 只眼）。在开始实验及随访前，均已充分告知患者本研究的实验目的、实验设计以及风险等，取得了所有患者的知情同意书。将所有

患者分为实验组 42 例（42 只眼）、21 例（21 只眼）。对照组患者在白内障术后仅使用抗生素、激素眼药水，而实验组还增加使用 0.05% 环孢素 II 滴眼液。收集手术患者术前及术后 1 周、术后 1 个月、术后 3 个月的视力、角膜荧光素染色评分、OSDI、BUT 并进行分析比较。

结果：实验组使用 0.05% 环孢素滴眼液的白内障术后患者干眼相关指标（OSDI、BUT、角膜荧光素染色评分）显著轻于对照组患者。在术前和术后 1 周时，两组患者的 OSDI、BUT 和角膜荧光素染色评分都没有显著差异；而在术后 1 个月和术后 3 个月时，实验组的 OSDI（1 个月：31.60 ± 6.7；3 个月：12.30 ± 4.1）和角膜荧光素染色评分（1 个月：1.2 ± 0.3；3 个月：0.5 ± 0.1）都显著低于对照组的 OSDI（1 个月：51.20 ± 10.3；3 个月：32.60 ± 4.7）和角膜荧光素染色评分（1 个月：5.2 ± 2.0；3 个月：3.4 ± 1.0），实验组的 BUT（1 个月：5.0 ± 2.3 s；3 个月：6.0 ± 2.6 s）显著高于对照组（1 个月：2.1 ± 0.7 s；3 个月：3.2 ± 0.9 s）。此外，实验组患者与对照组患者在术前、术后 1 周、术后 1 个月的矫正视力均无显著差异，而在术后 3 个月时，实验组患者的矫正视力（0.90 ± 0.14）显著优于对照组（0.80 ± 0.13， $P = 0.008$ ）。

结论：0.05% 环孢素的使用可以显著改善白内障术后患者 OSDI、BUT 和角膜荧光素染色评分。0.05% 环孢素滴眼液对白内障术后患者眼表与泪膜稳定性的保护有良好的应用价值。

摘要编号：210321

180° 小梁切开术治疗原发性开角型青光眼合并白内障的临床疗效与安全性

第一作者：耿琦

目的：比较超声乳化白内障摘除联合房角镜辅助下的 180° 小梁切开术（gonioscopy-assisted trabeculotomy, GT）与联合复合式小梁切除术（glaucoma filtration surgery, GFS）治疗合并白内障的原发性开角型青光眼的疗效和安全性。

方法：纳入 2024 年 6 月–2024 年 11 月陆军特色医学中心合并白内障的原发性开角型青光眼患者 53 例（77 只眼）。按手术方式分为 GT 组和 GFS 组。术后随访 1 年，对比两组眼压（intraocular pressure, IOP）、最佳矫正视力（best corrected visual acuity, BCVA）logMAR、使用抗青光眼药物种类、总有效率及并发症情况。

结果：共纳入 GT 组 27 例（43 只眼），GFS 组 26 例（34 只眼）。两组患者基线情况无统计学差异（ $P > 0.05$ ）。术后 1 年 GT 组 BCVA logMAR 低于 GFS 组，差异有统计学意义（ $P < 0.01$ ）。GT

组较 GFS 组术后 IOP 更低, 差异有统计学意义 ($P = 0.03$)。两组总有效率、使用抗青光眼药物种类和并发症发生率的差异无统计学意义 ($P > 0.05$)。

结论: 超声乳化白内障摘除联合 GT 治疗合并白内障的原发性开角型青光眼安全、有效, 具有良好的降压效果。

摘要编号: 207880

AAV 介导 CRISPR/Cas9 基因编辑 VEGFA 抑制角膜新生血管的研究

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目的: 角膜新生血管 (CNV) 是多种致盲性眼病的共同病理环节, 其核心驱动因子血管内皮生长因子 A (VEGFA), 目前依赖反复抗 VEGF 抗体注射, 存在感染、耐药及经济负担等局限。本研究首次探索利用 CRISPR/Cas9 基因编辑技术一次性“断电” VEGFA 表达, 实现长效、微创、非抗体依赖的抗血管生成治疗。

方法: 设计并筛选 3 条靶向人/小鼠 VEGFA 外显子 1 的 sgRNA, 通过 T7E1 与 NGS 验证切割效率后, 构建双 AAV2/9 载体 (AAVSpCas9 与 AAVsgRNA3)。体外转染 HUVEC, 检测 VEGFA 蛋白水平、PI3K/AKT 信号、增殖、迁移与管腔形成; 体内经结膜下注射双 AAV 至 C57BL/6 小鼠, 建立缝线诱导 CNV 模型, 比较血管面积、CD31/ α SMA 表达、视网膜 ERG 及多器官毒性。

结果: sgRNA3 诱导 indel $> 70\%$, VEGFA 蛋白下降约 72%, pPI3K/pAKT 同步下调, HUVEC 管腔形成与迁移分别减少 65% 和 50%, 无明显细胞毒性。小鼠角膜血管面积下降 72.3%, 优于康柏西普; CD31、 α SMA 及 VEGFA 表达显著降低。ERG 与组织学未见视网膜功能或结构损伤, 多器官无脱靶荧光及病理改变, Th17 免疫监视无激活。

结论: 单次结膜下递送 AAVCRISPR/Cas9VEGFA 系统可在角膜局部实现持久、高效、安全的基因“断电”, 阻断 VEGF/PI3K/AKT 轴, 显著抑制 CNV, 且优于传统蛋白中和策略, 为临床提供一次注射、长期受益的“基因编辑眼药水”新策略。

摘要编号: 203013

GWAS 优先级分析与单细胞转录组学联合鉴定 IL-18 受体介导的免疫网络在过敏性结膜炎中的分子机制

第一作者: Liangpin LI

共同作者: Liyun YUAN, Xiaoyong YUAN

目的: 过敏性结膜炎 (Allergic Conjunctivitis, AC) 是一种常见的眼表免疫性疾病, 传统的 Th2 免疫模型难以解释其临床表现与疗效差异。为了深入解析 AC 的遗传易感因素与分子机制, 本研究采用多组学整合策略, 发掘新的病理通路并为个体化治疗提供依据。

方法: 首先, 利用 FUSION、MAGMA 和 UTMOST 三种方法对大规模人群 GWAS 数据进行基因优先级分析, 筛选 AC 易感基因。随后, 基于 OVA 诱导的 AC 小鼠模型, 应用单细胞 RNA 测序 (scRNA-seq) 数据, 结合 CellChat 细胞通讯与 Monocle3 轨迹推断, 系统评估候选基因在不同免疫细胞中的表达及信号网络变化。最后, 通过 qRT-PCR 和 Western blot 在独立小鼠队列中验证关键基因及信号通路的表达与激活水平。

结果: 三种组学分析共鉴定出 9 个高可信 AC 易感基因 (包括 IL1RL1/2、IL18R1/IL18RAP、TLR6/10 等); 在 AC 小鼠结膜组织中, IL-18 受体亚基 Il18r1 与 Il18rap 在 NK 细胞和 T 细胞中显著上调, 并与 Ifng 表达呈正相关。细胞通讯分析显示, AC 状态下 IFN-II、CD80 与 MHC-II 通路的细胞间信号显著增强。轨迹分析揭示, NK/T 细胞中 NF- κ B 与 JAK-STAT 通路活性在伪时间进程中呈动态变化。体内验证进一步证实了 Il18r1/Il18rap 及 NF- κ B 信号的显著上调。

结论: 本研究首次通过“人群多组学—小鼠单细胞—细胞通讯—动物验证”一体化流程, 揭示了 IL-18 受体/IFN- γ 轴在 AC 发病中的核心作用, 拓展了对 AC 免疫病理的认识, 为靶向 IL-18R 及下游 NF- κ B/JAK-STAT 通路的诊疗策略开发提供了新的分子依据。

摘要编号: 205663

Mafb 通过维持角膜缘干细胞功能促进糖尿病角膜上皮修复

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共同作者: Shengqian DOU, Yujin LIN, Qingjun ZHOU

目的: 全球糖尿病患病率持续攀升, 已成为重大公共卫生问题。近半数糖尿病患者伴发原发性角膜病变, 可能会引起不可逆性视力损害, 然而其发病机制尚不明确。本研究旨在通过单细胞转录组测序技

术，系统解析糖尿病条件下角膜缘干细胞功能失调的分子机制，识别关键转录调控因子，为糖尿病角膜病变的防治提供理论依据与潜在治疗靶点。

方法：在本研究中，我们构建了正常与糖尿病小鼠模型在角膜稳态及上皮损伤修复过程中的单细胞图谱，系统解析了糖尿病角膜细胞类型特异性的转录改变，并鉴定了糖尿病角膜损伤修复过程中的差异转录因子。此外，我们还分析了糖尿病角膜缘干细胞微环境中异常的细胞间通讯。

结果：本研究揭示了糖尿病角膜中存在的干细胞异常分化与耗竭现象，并伴随显著的免疫细胞浸润及炎症信号增强，共同影响了角膜上皮的伤口愈合。此外，我们分析发现转录因子 *Mafk* 的表达随角膜上皮分化而降低，并在糖尿病角膜缘干细胞及基底细胞中显著下调，其可能是维持干细胞功能特性与修复能力的关键调控因子。通过体外实验，我们证实敲低 *Mafk* 会损害小鼠角膜缘干/祖细胞的增殖和迁移能力。体内实验则进一步证明，敲低 *Mafk* 的表达，影响了小鼠角膜缘干细胞的干性和增殖能力，并延缓了角膜上皮损伤修复，而过表达 *Mafk* 可恢复糖尿病小鼠角膜缘干细胞的功能，逆转其伤口修复延迟现象。

结论：本研究系统地揭示了糖尿病状态下角膜缘干细胞功能异常及眼表稳态失衡的分子机制，并鉴定了调控角膜缘干细胞功能的核心转录因子 *Mafk*，这些发现不仅为深入理解糖尿病角膜病变的发病机制提供了重要的依据，同时为开发新的临床干预靶点奠定了坚实的理论基础。

摘要编号：207517

Mihe 人工角膜植入术后的玻璃体视网膜并发症

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目的：描述接受 Mihe 人工角膜 (MIOK) 患者进行玻璃体视网膜手术的适应证及手术方式。

方法：回顾性分析我中心 2015 年至 2025 年间接受 Mihe 人工角膜植入术的所有患者。手术适应证及操作方法均依据 MIOF 方案中患者人口学资料所述。记录视网膜手术的适应证、手术结局以及术中及术后并发症。手术记录中回顾并总结操作方式，同时记录所有后续手术。

结果：共 35 例患者接受 Mihe 人工角膜植入，其中 13 例 (37.1%) 需要进行视网膜手术。4 眼 (11.4%) 存在残余皮质晶状体物质，需进一步前段玻璃体切除以去除；1 眼 (2.86%) 出现假体后膜形成，需行手术性膜切除；5 眼 (14.3%) 因黄斑水肿接受玻璃体腔内抗 VEGF 药物注射；3 眼

(8.57%) 发生眼内炎并行玻璃体切除。所有病例中，视网膜手术目标均在一次手术中实现。

结论：Mihe 人工角膜是治疗重度眼表疾病恢复视力的最后希望，而玻璃体视网膜科医生在这些患者的评估与管理中发挥关键作用。应用广角观察系统辅助的玻璃体切除术在此类复杂病例中是一项有价值的工具，可改善功能结局，同时不影响 Mihe 人工角膜的成功率。

摘要编号：209026

PEDF 在糖尿病眼表病变中的作用机制及治疗潜力

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目的：本研究旨在系统探究色素上皮衍生因子 (PEDF) 在糖尿病相关眼表病变中的保护作用及其分子机制，阐明 PEDF 缺失如何通过影响泪腺结构与功能导致糖尿病干眼，揭示 PEDF 通过调控内质网应激、细胞凋亡和神经营养因子表达维持眼表稳态的作用通路，验证 PEDF 类肽 (Ppx) 在改善糖尿病眼表病变中的疗效。

方法：采用 8 周龄雄性 C57BL/6J 小鼠，分为野生型对照组 (WT)，PEDF 基因敲除组 (*Pedf*^{-/-}) 和 *Pedf*^{-/-} 糖尿病模型组 (STZ 诱导，55 mg/kg × 5 天)。糖尿病造模成功后 10 周开始治疗，PEDF 类肽治疗组 (Ppx, 0.5 μg/μl，双眼点眼，每日 2 次)、人工泪液对照组 (羧甲基纤维素钠) 和未治疗对照组。眼表功能评估包括 Cochet-Bonnet 角膜知觉仪测量敏感性、Schirmer 试验检测泪液分泌量、角膜荧光素钠染色评分；组织学分析包括 H&E 染色观察泪腺和角膜结构，免疫荧光检测 α-SMA、calponin、keratin14 等标记物，TUNEL 法检测细胞凋亡，鬼笔环肽染色评估 F-肌动蛋白聚合；分子机制研究包括 RNA-seq 转录组分析差异表达基因，qRT-PCR 和 Western blot 检测关键基因表达，检测内质网应激标志物 (PERK、ATF6α、IRE1α 等)，分析 MAPK 信号通路 (P-38、JNK、ERK) 激活状态；细胞和组织功能学包括催产素刺激泪腺收缩实验、角膜铺片神经长度测量以及内皮细胞计数和形态分析。

结果：糖尿病病程对眼表功能的影响表现为进行性功能损害角膜知觉、泪液分泌量随病程加重而下降，角膜上皮损伤评分增加。泪腺病理改变表现为腺泡扩张、泪腺重量减轻、MECs 数量减少。PEDF 缺失导致凋亡通路激活，抗凋亡蛋白 Bcl-2 表达下降，TUNEL 阳性细胞增加；内质网应激反应异常激活，PERK-eIF2α-ATF4-CHOP 通路显著激活，GRP78

表达上调, XBP1 剪切异常; MAPK 通路 (P-38、JNK) 磷酸化水平升高, ERK 通路抑制泪液分泌; 水通道蛋白异常: AQP4 表达下调。外源性补充 PEDF 能够降低 ROS 水平, 上调 Sirt1 表达和 Akt 磷酸化。Ppx 治疗能够改善眼表功能, 恢复角膜知觉和泪液分泌, 减轻角膜上皮损伤, 减少 MECs 凋亡, 维持腺泡收缩功能, 改善 F-肌动蛋白聚合, 分子机制包括抑制内质网应激、下调炎症因子 (IL-1 β 、TNF- α) 表达和调节神经营养因子平衡。

结论: PEDF 是维持眼表稳态的关键调控因子, PEDF 类肽 (Ppx) 作为潜在治疗药物, 具有多重保护作用。

摘要编号: **210261**

ROS 响应性眼用微针负载新型抗 HSV 纳米酶治疗病毒性角膜炎

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目的: 探究负载新型抗 HSV 纳米酶的 ROS 响应性水凝胶微针在病毒性角膜炎中的治疗作用。

方法: 研究由铁离子、单宁酸 (TA) 和聚乙烯吡咯烷酮 (PVP) 合成了一种具有类过氧化物酶活性的纳米酶 (FeTAP), 可以在 HSV 感染的环境中产生具有氧化性的羟基 ($\cdot$ OH) 来杀死病毒从而治疗病毒性角膜炎。使用兼具生物相容性和 ROS 响应性水凝胶制作可分离的角膜微针贴片, 将纳米酶整合到微针尖端中, 并在炎症环境中可控地递送至角膜内。建立 HSV 感染的小鼠模型, 对比传统滴眼液的方法, 评估微针负载 FeTAP 对病毒性角膜炎的疗效。

结果: 微针机械强度测试及体内角膜插入试验表明, 硬度适宜的微针贴片可在拇指轻压下刺破小鼠角膜上皮, 细胞毒性实验 (CCK-8) 和人角膜上皮细胞 (HCEC) 活/死染色实验证实了 ROS 响应性水凝胶材料和纳米酶材料的生物相容性。定量 PCR (qPCR) 和噬斑实验证实 FeTAP 在体外显著抑制 HSV 复制, 透射电子显微镜和 Western Blot 实验表明 FeTAP 破坏病毒结构。最后在雄性 BALB/c 小鼠 (6 周龄) 中诱导 HSK 构建动物模型, 对比使用微针载 FeTAP 和 FeTAP 滴眼液治疗 2 周后的效果, 通过观察裂隙灯和泪液分泌, 发现微针治疗组具有更好的治疗效果, 并且角膜中的病毒载量更低 ($P < 0.05$)。

结论: 载有新型抗 HSV 纳米酶的 ROS 响应性微针贴片与传统治疗滴眼液方法相比治疗效果更好, 该方法为临床上治疗病毒性角膜炎提供了一种新的具有参考性的方法。

摘要编号: **204002**

Rubinstein-Taybi 综合征家系的分子遗传学诊断研究

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目的: 总结两例 Rubinstein-Taybi 综合征 (RSTS) 家系的临床表型特征及分子遗传学诊断结果。

方法: 对家系先证者进行详细眼科检查; 采集先证者及可获取亲属的外周血样本, 提取基因组 DNA。使用遗传性眼病基因诊断芯片 (HEDEP) 进行初筛, 并通过 Sanger 测序对候选致病变异进行验证及家系共分离分析。依据美国医学遗传学与基因组学学会 (ACMG/AMP) 标准与指南对变异进行致病性评估, 确定致病基因及突变位点。

结果: 两家系先证者分别为 7 岁女性、6 月龄男性患儿, 临床表现多样。女性患儿于孕 38 周出生 (体重 2.9 kg, 身高 50 cm), 出生时家属发现其左眼患先天性角膜混浊 (CCO), 7 月龄时接受穿透性角膜移植术; 2 月龄时其被诊断为家族性渗出性玻璃体视网膜病变 (FEVR); 9 月龄时家属发现患儿双眼角膜直径大、眼底照相示右眼视盘发育不良, 4 岁及 5 岁时分别接受左、右眼行小梁切开术和 Schlemm 管成形术以控制进展性青光眼; 7 岁时患儿因右眼眼内炎行玻璃体切割术联合晶状体切除及硅油填充术。男性患儿孕 38 周出生 (体重 3.2 kg, 身高 51 cm), 出生时家属即发现其右眼角膜白斑, 就医时发现其患有右眼 CCO、部分虹膜前粘连, 左眼瞳孔膜闭。除复杂眼疾外, 两患儿存在显著的全身表型: 发育迟缓 (语言及运动能力)、认知障碍、脑电图异常、自闭症倾向, 体格检查发现宽拇指及胎儿指垫残留。基因检测揭示两患儿均携带 CREBBP 基因杂合致病变异 (依据 ACMG 标准), 分别为 c.4244A>C (p.Gln1415Pro)、c.3837-2A>G, 家系分析显示两变异均为新发突变 (de novo), 前者已被文献报道可导致 RSTS, 后者为本研究首次报导。结合患儿复杂的多系统临床表现及基因检测结果, 最终确诊为 RSTS。

结论: 研究报告了两例临床表现复杂、初诊困难的 RSTS 病例, 其诊断得益于分子遗传学检测对 CREBBP 基因致病性新发变异的鉴定。该案例凸显了基因检测在明确具有复杂、多系统表型 (尤其是合并特征性眼部病变及发育异常) 患儿的最终诊断中的核心价值, 不仅为患者提供了确切的病因学解释, 也为家系遗传咨询及未来可能的基因治疗奠定了基础。

摘要编号: 209114

Steven-Johnson 综合征睑缘眼表重建手术思考

第一作者: Jie WU

目的: Stevens-Johnson 综合征慢性期是在几周后开始, 并持续终生(持续性或严重眼表炎症反应)。分阶段进行手术治疗(时机选择): 慎选手术; 需充分评估眼表; 前期抗炎治疗等。评价术后治疗效果。

方法: Steven-Johnson 综合征睑缘手术思考: 1. 分阶段进行: 第一期: 松解粘连(睑球粘连)+ 黏膜移植重建湿润眼表环境; 第二期(6 个月后): 矫正睑内翻/倒睫。2. 材料选择: 直系亲属口唇黏膜, 可联合羊膜移植。3. 手术选择: ① 睑球粘连分离+穹隆成形, 重建湿润眼表环境; ② 松解睑结膜瘢痕挛缩(睑板沟附近), 去除睑缘角化组织(挤压原睑板腺开口能否有睑脂); 切除异位乱生睫毛毛囊+/压垫法矫正睑内翻; 唇黏膜修补睑缘黏膜缺损区, 术毕戴绷带镜。注意: 唇黏膜修补——邮票式孔洞(横向, 纵向), 可减少移植片下方积血、积液, 减轻术后挛缩、瘢痕张力。4. 手术方式: ①, 或 ①+②(全身及眼表炎症控制平稳)注意是否合并继发干燥综合征。

结果: 术后 6 个月, 试验组较对照组显著改善, 睑球粘连术后有效改善, 泪液功能; 泪膜破裂时间延长至 7.2 ± 1.5 秒(对照组 3.8 ± 1.1 秒, $P < 0.001$), Schirmer I 试验值提升至 5.6 ± 2.3 mm(对照组 3.1 ± 1.8 mm, $P = 0.002$); 眼表修复: 结膜印迹细胞分级 I - II 级占比达 82.6%(对照组 35.5%, $P < 0.001$); 视功能: BCVA 提高 ≥ 2 行者占 71.0%(对照组 25.8%, $P = 0.001$), 平均 LogMAR 从 0.8 ± 0.3 降至 0.4 ± 0.2 (对照组 0.7 ± 0.3 至 0.6 ± 0.3 , $P = 0.003$)。

结论: Stevens-Johnson 综合征慢性期持续终生(持续性或严重眼表炎症反应)。其眼部并发症如干眼(重度, 最常见并发症), 眼表炎症, “干眼-瘢痕”恶性循环; 眼睑缘瘢痕化, 睑内翻/倒睫, 睑球粘连, 角膜新生血管形成等常常导致患者失去有用视力, 分阶段进行手术方案设计和治疗有助于提高手术成功率。

摘要编号: 206048

TRPV1⁺ 感觉神经介导角膜上皮损伤修复的作用及机制研究

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共同作者: Suxia LI, Ya LI

目的: 目前关于角膜神经退行导致角膜上皮损伤的机制尚未完全阐明。本课题建立 TRPV1⁺ 感觉神经退行模型, 探究角膜 TRPV1⁺ 感觉神经调控角膜上皮细胞谷胱甘肽代谢机制以及 Ferrostatin-1 促进角膜上皮损伤修复机制。为治疗角膜神经损伤类疾病的药物研发提供科学基础。

方法: 利用物理损伤三叉神经的方法建立去神经小鼠模型, 利用辣椒素建立 TRPV1⁺ 感觉神经退行模型; 利用免疫荧光、qPCR 等方法测定角膜上皮细胞谷胱甘肽代谢异常。通过结膜下注射辣椒素并刮除角膜中央 2.5 mm 角膜上皮建立 TRPV1⁺ 感觉神经退行角膜上皮损伤模型, 观察角膜上皮修复速度、角膜神经和角膜敏感度恢复。并利用转录组测序, 取对照组、利用物理损伤三叉神经的方法建立去神经小鼠模型, 利用辣椒素建立 TRPV1⁺ 感觉神经退行模型; 利用免疫荧光、qPCR 以及谷胱甘肽过氧化物酶活性的测定等方法测定角膜上皮细胞谷胱甘肽代谢异常。通过局部施用辣椒素并刮除角膜中央 2.5 mm 角膜上皮建立 TRPV1⁺ 感觉神经退行角膜上皮损伤模型, 观察角膜上皮修复速度、角膜神经和角膜敏感度的恢复。并利用转录组测序, 取对照组、TRPV1⁺ 感觉神经退行组以及 Ferrostatin-1 治疗组小鼠角膜上皮细胞进行转录组测序, 并对神经营养性角膜炎患者的角膜上皮进行免疫荧光染色, 并结合人角膜上皮细胞系研究 Ferrostatin-1 促进角膜上皮损伤修复的分子机制。

结果: 三叉神经损伤模型和 TRPV1⁺ 感觉神经退行模型小鼠角膜上皮损伤, 且角膜上皮细胞 GPX4、GSTM1 等基因表达降低, 谷胱甘肽过氧化物酶活性以及 GSH 表达降低。Ferrostatin-1 的应用能逆转 TRPV1⁺ 感觉神经退行引起的角膜上皮损伤修复延迟并促进神经末梢和角膜感觉恢复, 转录组测序结果显示细胞迁移、细胞增殖以及 p53 信号通路相关基因变化显著。体内、外结果显示 Ferrostatin-1 能够下调 p53 的表达并且激活 AKT/mTOR 信号通路, 而激活 P53 通过抑制角膜上皮细胞增殖和迁移影响角膜上皮修复, 同时抑制 AKT/mTOR 通路。免疫荧光染色结果表明, 在神经营养性角膜炎患者的角膜上皮细胞中 GPX4、GSTM1 表达水平降低、P53 表达上调、同时 AKT/mTOR 信号通路被抑制。

结论: Ferrostatin-1 通过调节 p53/AKT/mTOR 通路逆转 TRPV1⁺ 感觉神经退行引起的角膜上皮损伤修复延迟。

摘要编号: 206835

上海地区 63,196 名在校学生干眼症状流行特征及影响因素分析—基于 OSDI 问卷的横断面研究

第一作者: Xia CHEN

共同作者: Xinyue CHEN, Xiangui HE, Jingjing WANG

目的: 探讨上海地区中小学生干眼症状的流行特征及其相关影响因素, 为区域学生干眼防控策略提供循证依据。

方法: 采用整群抽样法, 于 2024 年对上海市 16 个区的幼儿园、小学、初中和高中学生进行 OSDI 干眼问卷调查, 共回收有效问卷 63,196 份。依据 OSDI 评分将受检者划分为正常 (53,109 例, 84.04%)、轻度 (5,572 例, 8.82%)、中度 (2,630 例, 4.16%) 及重度干眼 (1,885 例, 2.98%)。同时收集性别、学段、父母近视状况、日均屏幕与户外活动时间、戴镜与否、阿托品及红光治疗使用等暴露信息。采用 χ^2 检验、Kruskal-Wallis 检验及多因素 Logistic 回归模型分析干眼发生的关联因素。

结果: 干眼总体患病率为 15.96%, 且随学段升高呈递增趋势 (幼儿园 8.26%、小学 11.24%、初中 18.24%、高中 23.25%, $P < 0.001$)。多因素回归显示, 与初中相比, 小学和幼儿园学生干眼风险降低 ($OR = 0.695$, 95% $CI: 0.652-0.740$; $OR = 0.537$, 95% $CI: 0.483-0.596$), 而高中学生风险升高 ($OR = 1.156$, 95% $CI: 1.090-1.225$); 日均屏幕时间每增加 1 小时, 干眼风险增加 14.2% ($OR = 1.142$, 95% $CI: 1.126-1.157$); 日均户外时间每增加 1 小时, 风险降低 4.1% ($OR = 0.959$, 95% $CI: 0.939-0.978$); 父亲近视阳性 ($OR = 1.100$, 95% $CI: 1.052-1.151$) 及戴镜 ($OR = 1.623$, 95% $CI: 1.544-1.707$) 均与干眼独立相关; 性别、母亲近视等因素差异无统计学意义。模型 AUC 为 0.651, 提示预测能力中等。

结论: 上海地区学生干眼症状普遍, 高中及高屏幕暴露、低户外活动、父亲近视和戴镜人群是重点干预对象。应针对学龄阶段制定分级眼健康策略, 减少电子屏幕使用、增加日间户外活动, 并加强对近视家庭的干眼监测与宣教, 以遏制学生干眼流行趋势。

摘要编号: 210292

中国近亲家系两例胶滴状角膜营养不良合并神经性耳聋的病例分析

第一作者: Weining RONG

目的: 本研究旨在通过全基因组外显子测序 (Whole exome sequencing, WES) 技术, 识别胶滴状角膜营养不良 (Gelatinous Drop-Like Corneal Dystrophy, GDLD) 患者中的潜在致病基因变异, 以提高对这一罕见遗传性眼病的诊断准确性和理解其分子病理机制。

方法: 本研究收集了同一家系中两名胶滴状角膜营养不良 (GDLD) 患者及其家族成员的血液样本, 完善相关检查, 利用 WES 技术对样本进行基因分析, 并通过生物信息学工具筛选可能的致病变异。通过 Sanger 测序验证可疑变异, 并结合临床数据进行综合评估。

结果: 先证者自幼双眼视力下降伴眼痛、眼红和畏光, 在 11 岁和 13 岁时, 分别接受了右眼和左眼的板层角膜移植手术, 右眼在术后 3 年复发。先证者的妹妹自幼双眼视力下降伴眼红、磨痛和畏光, 8 岁和 10 岁时分别接受了左眼和右眼的板层角膜移植手术, 并于 2 岁时因先天性重度感音性耳聋接受了人工耳蜗植入术。通过 WES 和 Sanger 测序验证, 发现先证者及其妹妹携带 TACSTD2 基因一个纯合变异 c.588C > A; p.Tyr196, 导致第 196 位氨基酸由酪氨酸变为终止密码子, 生成截断蛋白, 该变异被分类为致病性变异。此外, 先证者的妹妹携带 MYO15A 基因纯合错义变异 c.6442T > A; p.Trp2148Arg, 听力正常的先证者及其父母都携带了相同的杂合变异, 该变异是导致感音性耳聋发生的原因。

结论: 本研究通过 WES 技术, 揭示了 TACSTD2 基因纯合变异与 GDLD 的关联。这一发现扩展了我们对 GDLD 遗传基础的认识, 并为受影响的患者提供了新的诊断依据。此外, 本研究强调了基因测序技术在罕见病诊断中的重要性, 为未来的遗传咨询和治疗策略的开发奠定了基础。

摘要编号: 201828

中药单体成分 punicalagin 在真菌性角膜炎中的治疗作用

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共同作者: Yun FENG

目的: 本研究旨在探讨 punicalagin (PUN) 在小鼠烟曲霉菌性角膜炎模型中的抗真菌作用及抗炎作用。

方法：体外实验：通过时间杀菌实验和菌丝染色实验，评估 PUN 对烟曲霉菌的直接抗真菌活性。体内实验：建立小鼠烟曲霉菌性角膜炎模型，将模型小鼠随机分为 PBS 对照组和 PUN 治疗组。于感染后第 1、3、5 天对小鼠角膜病变进行临床评分；采用逆转录-聚合酶链反应检测炎症因子的 mRNA 表达水平，蛋白质印迹法检测炎症因子的蛋白表达水平；流式细胞术和免疫荧光染色，分析角膜组织中巨噬细胞的数量及空间分布；同时，采用真菌平板计数法量化角膜组织中的真菌载量，以评估 PUN 的体内抗真菌效果；利用 DCFH-DA 荧光探针检测细胞内活性氧水平。

结果：体外实验结果：PUN 对烟曲霉菌具有显著抑制活性，其抑制 90% 真菌生长的最低抑菌浓度（MIC₉₀）为 250 μg/ml；且 PUN 能显著抑制烟曲霉菌生物膜的形成。体内实验结果：与 PBS 对照组相比，PUN 治疗组小鼠的角膜病变明显减轻，表现为更低的临床评分（ $p < 0.05$ ）、更少的巨噬细胞浸润（ $p < 0.001$ ）以及更低的角膜真菌载量（ $p < 0.001$ ）；同时，PUN 治疗可下调角膜组织中促炎因子的 mRNA 表达及蛋白水平。细胞水平结果：在 RAW264.7 小鼠巨噬细胞系中，PUN 能显著降低烟曲霉菌丝刺激引起的炎症因子 mRNA 表达升高及 ROS 生成增加（ $p < 0.001$ ）。

结论：Punicalagin 角膜给药对小鼠烟曲霉菌性角膜炎具有治疗作用，其机制具有多效性，包括通过细胞壁对真菌增殖和致病力的抑制作用、对细胞氧化应激因子和炎症因子的抑制作用。

摘要编号：209380

乳腺癌内分泌治疗患者干眼症临床特征与危险因素分析

第一作者：马雨花

共同作者：吕垚，张宸，张璐，潘俊杨，马楠

目的：探讨激素受体阳性乳腺癌（BC）患者在接受内分泌治疗（包括雌激素受体拮抗剂与芳香化酶抑制剂）后干眼（DE）的发生率、临床亚型及其危险因素，并通过泪液炎症因子分析明确 DE 的免疫分型，为临床针对性干预提供依据。

方法：采用横断面观察性研究，纳入 2015 年 12 月至 2023 年 12 月期间于我院接受内分泌治疗的 121 例 BC 患者。收集患者人口学资料，采用眼表疾病指数（OSDI）、睑板腺功能障碍-14（MGD-14）及眼表症状指数（IOSS）量表评估症状；使用眼表综合仪检测睑板腺缺失程度（MGL）及泪膜破裂时间（TBUT）；采用焦虑自评量表（SAS）和汉密尔顿焦虑量表（HAMA）评估心理状态。同时检测患者血脂及性激素水平，并对 DE 患者泪液进行细

胞因子分析。采用卡方检验、二元 logistic 回归及 Spearman 相关性分析进行统计学处理。

结果：1、DE 发生率为 66.16%（80/121），其中蒸发过强型占 58.75%（47/80），混合型 27.50%（22/80），水液缺乏型 13.75%（11/80）。2、单因素分析显示，仅 BMI 和内分泌治疗起始年龄与 DE 发生相关（ $P < 0.05$ ）。3、DE 组焦虑、抑郁及疼痛敏感性显著高于非 DE 组（ $P < 0.05$ ）。4、治疗起始年龄越小，DE 症状、焦虑抑郁程度越重，TBUT 越短，MGL 越严重（均 $P < 0.001$ ）。5、三种 DE 亚型泪液中 IL-4、IL-8、IL-13 水平存在显著差异（ $P < 0.05$ ）。

结论：接受内分泌治疗的乳腺癌患者 DE 发生率较高，且以蒸发过强型为主。DE 的发生与开始内分泌治疗的年龄密切相关，年龄越小，症状与体征越严重，心理负担也越重。不同 DE 亚型泪液炎症因子谱的差异提示可能存在特异性的免疫通路激活。因此，建议对年轻乳腺癌患者，在开始内分泌治疗初期即进行 DE 的早期筛查与干预，以提升其生活质量。

摘要编号：209127

人工角膜内皮膜片治疗大泡性角膜病变的临床观察

第一作者：Yan CHENG

目的：观察一种新型人工角膜内皮膜片（EndoArt）治疗因角膜移植术后内皮排斥所致角膜水肿的临床疗效。

方法：EndoArt®（EyeYon Medical, Israel）是一种眼内植入物，附着在角膜后表面，从而限制基质水合作用，减少角膜水肿。一项纳入 12 例患者的前瞻性、随机对照研究评估了 EndoArt® 的安全性和有效性。术中通过前房注气（10% C3F8）促进 EndoArt 膜片贴附于角膜后表面，利用缝线固定膜片防止其移位。观察术后最佳矫正视力（BCVA）、中央角膜厚度（CCT）、角膜透明度、植入物相关并发症等情况。

结果：收集西安市第一医院 2024 年 11 月至 2025 年 6 月的大泡性角膜病变患者 11 例，其中 2 例为人工晶体术后所致大泡性角膜病变，7 例为穿透角膜移植术后排斥所致角膜水肿，2 例既往青光眼手术病史。6 例患者接受了 EndoArt® 植入术，5 例患者使用角膜绷带镜作为对照组。术后 3 个月最佳矫正视力（BCVA）从 $1.62 \pm 0.32 \log\text{MAR}$ 提高到 $0.96 \pm 0.15 \log\text{MAR}$ （ $p < 0.05$ ）。术后 3 个月中央角膜厚度（CCT）从术前的 790 ± 76 微米降至随访时的 518 ± 36 微米。术后 3 眼因 EndoArt 膜片

未完全贴附进行了多次再注气复位；截至末次随访，6眼 EndoArt 膜片与角膜贴附良好。

结论：EndoArt 角膜内皮膜片在治疗多种因素导致的大泡性角膜病变方面表现出安全性和有效性，尤其在角膜移植术后排斥所致角膜水肿。EndoArt® 植入术减轻了水肿，并显著改善了视力，有望为角膜植片衰竭的患者提供持久的解决方案。

摘要编号：**210231**

低温粘弹剂致兔角膜内皮损伤的实验性研究

第一作者：Rong Yong **ZHANG**

共同作者：Zi Liang **CHEN**, Hui Ying **RAO**, Ying **XUE**, Xue Mei **ZHANG**

目的：探究低温状态下的粘弹剂对兔角膜内皮的损伤机制。

方法：取 12 只新西兰大白兔，24 眼，随机分为 A、B、C 三组，分别注入预置温度为 0°C、4°C 和 25°C (对照) 的粘弹剂，观察各组在注入前，后 24 小时及 1 周的角膜水肿情况、角膜内皮细胞计数、六边形细胞比率，术后 1 周角膜内皮活细胞率及内皮超微结构的变化进行统计学分析。

结果：A 组术后 24 小时角膜内皮计数和六边形细胞比率分别为 (803.13 ± 64.91) 个/ mm^2 ， $(36.0 \pm 1.51)\%$ ，术后 1 周 (1049.38 ± 27.55) 个/ mm^2 ， $(36.88 \pm 1.64)\%$ ，B 组术后 24 小时 (1314 ± 58.78) 个/ mm^2 ， $(45.25 \pm 2.71)\%$ ，术后 1 周 (2556.38 ± 44.88) 个/ mm^2 ， $(46.13 \pm 2.8)\%$ ，两组间及组内各时间点内皮计数差异均具有统计学意义 ($P < 0.05$)，六边形细胞比率组内差异无统计学意义。C 组各时间点差异无统计学意义。A 组内皮活细胞率 $(65.4 \pm 1.48)\%$ ，B 组 $(87.17 \pm 0.67)\%$ ，两组间差异具有统计学意义 ($P < 0.05$)。电镜下，A、B 两组内皮细胞变形，线粒体扩大呈空泡样，粗面内质网脱颗粒，核固缩。

结论：低温状态下的粘弹剂会对兔角膜内皮造成损伤。0°C 状态下的粘弹剂比 4°C 状态下的对角膜内皮损伤的程度更大。

摘要编号：**210192**

催产素通过抑制 NLRP3/caspases-1 / 白介素通路抑制干眼小鼠泪腺及眼表炎症浸润的机制研究

第一作者：Yiren **WANG**

共同作者：Xiaodan **JIANG**, Xuemin **LI**

目的：本研究旨在探究催产素 (oxytocin, OXT) 缓解干眼小鼠泪腺炎症浸润及相关眼表损伤的作用机制。

方法：本研究利用东莨菪碱 (scopolamine, SCOP) 腹腔注射构建干眼小鼠模型，并应用 OXT、OXT 受体拮抗剂 L-368,899 分组处理小鼠 ($n = 6-10$)，收集小鼠泪膜破裂时间 (breakup time, BUT)、Schirmer 试验、角膜荧光素染色评分数据，并进行苏木素-伊红染色 (Hematoxylin-Eosin staining, HE 染色)、免疫组化染色观察小鼠泪腺炎症浸润情况，使用 Western Blot、酶联免疫吸附反应、实时荧光定量 RNA 链式扩增反应技术测定小鼠泪腺、角膜组织中 NOD 样受体热蛋白结构域蛋白 3 (NOD-like receptor family pyrin domain containing 3, NLRP3)、核因子 κB (nuclear factor kappa-B, NF κB) 等炎症相关指标，利用转录组学技术探究 OXT 在抗炎作用中可能存在的信号通路，对 OXT 抑制泪腺炎症反应的机制进行探究。

结果：与对照组相比，SCOP 组小鼠 BUT、Schirmer 试验值均显著降低 ($t = 10.15$, $p < 0.0001$; $t = 3.22$, $p < 0.01$)、角膜荧光素染色评分显著升高 ($t = 13.17$, $p < 0.0001$)。Western Blot 结果显示，SCOP 可以诱导小鼠泪腺组织中 NLRP3 炎症小体剪切激活增加，诱导下游白介素-1 β (interleukin, IL) 表达增加。HE 染色及炎症细胞标志物免疫组化染色结果显示，SCOP 可以引起小鼠泪腺炎症浸润。酶联免疫吸附反应结果显示，SCOP 组小鼠表白介素等炎症因子表达水平升高。在使用 OXT 处理小鼠后，可以观察到小鼠 BUT、Schirmer 试验值显著升高，而角膜荧光素染色评分显著降低，且泪腺组织 HE 染色显示相比于 SCOP 组小鼠，OXT 处理组小鼠腺泡结构破坏减少，淋巴细胞浸润减少，炎症浸润评分降低。且 OXT 可以抑制 NLRP3 炎症小体的剪切激活。OXT 通过抑制炎症小体剪切激活下调 IL-1 β 水平，从而抑制丝裂原活化蛋白激酶 (mitogen-activated protein kinase, MAPK) 通路激活，降低 NF κB 表达水平，实现抑制泪腺炎症反应的作用。

结论：SCOP 可以有效诱导小鼠干眼表型。OXT 可能通过抑制 NLRP3 炎症小体剪切激活，下调 IL-1 β 水平，并进一步抑制 MAPK 信号通路的活化，抑制 NF κB 表达水平，减轻小鼠泪腺淋巴细胞浸润，改善小鼠角膜荧光素染色评分、促进泪液分泌，使得小鼠 BUT 及 Schirmer 试验值升高，从而缓解小鼠干眼。

摘要编号: 210194

催产素雾化通过减轻眼表炎症治疗干眼的有效性的临床研究

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共同作者: Xuemin LI, Yiren WANG

目的: 本研究旨在探究催产素 (oxytocin, OXT) 雾化通过减轻眼表炎症浸润对干眼患者的治疗效果。

方法: 本研究招募 30 名 (共 60 只眼) 2024 年 12 月至 2025 年 2 月期间在北京大学第三医院医院诊断为干眼的患者。将患者随机分为 2 组, 每组各 15 人, 一组为生理盐水 (saline, SAL) 雾化组和 OXT 雾化组。在雾化进行前后收集患者一般人口学资料、OSDI 评分、泪膜破裂时间 (tear breakup time)、Schirmer 试验、角膜荧光素染色评分以及泪液炎症因子检测, 对比治疗前后这些指标的变化。

结果: 纳入 30 名 (共 60 只眼) 患者。雾化前, SAL 组患者的 OSDI 评分、BUT、Schirmer 试验以及角膜染色评分分别为 (22.33 ± 11.24 ; 4.03 ± 1.6 ; 11.27 ± 3.32 ; 1.17 ± 1.05), OXT 组患者的 OSDI 评分、BUT、Schirmer 试验以及角膜染色评分分别为 (25.72 ± 9.99 ; 4.60 ± 1.65 ; 10.80 ± 3.53 ; 1.17 ± 1.15), 两组之间无显著差异 ($p > 0.05$)。雾化治疗后, SAL 组患者和 OXT 组患者的 OSDI 评分分别为 16.81 ± 6.11 和 11.83 ± 3.40 , SAL 治疗后的 OSDI 与治疗前无显著差异, OXT 治疗后的 OSDI 显著低于治疗前 ($t = 4.59$, $p < 0.001$), 而 OXT 雾化组和 SAL 雾化组治疗后 OSDI 评分无显著差异; SAL 组患者和 OXT 组患者的 BUT 分别为 5.63 ± 2.08 和 7.13 ± 2.79 , SAL 治疗后的 BUT 显著高于治疗前 ($t = 6.78$, $p < 0.0001$), OXT 治疗后的 BUT 显著高于治疗前 ($t = 4.70$, $p < 0.0001$), 而且 OXT 治疗后的 BUT 显著高于 SAL 治疗后 ($t = 2.79$, $p < 0.05$); SAL 组患者和 OXT 组患者的 Schirmer 试验分别为 18.80 ± 4.22 和 23.10 ± 5.73 , SAL 治疗后的 Schirmer 试验显著高于治疗前 ($t = 2.97$, $p < 0.05$), OXT 治疗后的 Schirmer 试验显著高于治疗前 ($t = 11.06$, $p < 0.05$), 且 OXT 治疗后的 Schirmer 试验显著高于 SAL 治疗后 ($t = 3.87$, $p < 0.01$); SAL 组患者和 OXT 组患者的角膜染色评分分别为 0.43 ± 0.63 和 0.10 ± 0.31 , SAL 治疗后的角膜荧光素染色显著低于治疗前 ($t = 3.33$, $p < 0.01$), OXT 治疗后的角膜荧光素染色显著低于治疗前 ($t = 4.84$, $p < 0.0001$), 而 OXT 雾化组和 SAL 雾化组治疗后角膜荧光素染色评分无显著差异。SAL 治疗后的干扰素 γ 、白介素等浓度均显

著低于 SAL 治疗前 (p 均 < 0.05), OXT 治疗后干扰素 γ 、白介素等浓度均显著低于 OXT 治疗前 (p 均 < 0.05), 且 OXT 治疗后的干扰素 γ 、白介素等浓度均显著低于 SAL 治疗后 (p 均 < 0.05)。

结论: OXT 雾化可以减轻眼表炎症, 改善干眼患者体征, 达到对干眼的治疗作用。

摘要编号: 208075

儿童过敏性结膜炎与腺样体肥大的相关性及泪液总 IgE 的中介作用

第一作者: Ling ZHANG

共同作者: Yingying GAO, Chaobing ZHOU

目的: 探讨儿童过敏性结膜炎与腺样体肥大的相关性, 并分析泪液总 IgE 在二者间的潜在中介作用, 为临床医生在诊断和治疗过敏性结膜炎患儿时提供更全面的视角。

方法: 本研究采用横断面研究设计, 纳入 2023 年 9 月至 2024 年 8 月期间在福建医科大学附属第二医院眼科确诊为过敏性结膜炎的 3~12 岁患儿。所有研究对象在就诊时均接受详细的病史采集及临床症状体征评估, 症状评估包括眼痒、畏光、流泪、异物感及烧灼感等, 体征评估项目涵盖球结膜充血、睑结膜充血、睑结膜水肿、乳头及滤泡等。每例患儿采集 0.2 ml 泪液, 采用 Aifeice 测试法测定泪液中总 IgE 抗体浓度。同时, 所有患儿 2 周内均接受电子鼻咽喉镜检查, 以评估腺样体肥大的程度 [8]。采用 Spearman 相关性分析变量关联, 多因素回归分析腺样体肥大的影响因素, 进一步通过中介效应分析验证泪液总 IgE 的中介作用 (图 1)。

结果: 本研究共纳入 54 例过敏性结膜炎患儿, 根据过敏性结膜炎症状总评分为轻度组 ($n = 18$)、中度组 ($n = 24$) 和重度组 ($n = 12$)。总体平均年龄 7.6 ± 2.4 岁, 男性占 36%, 不同严重程度过敏性结膜炎患儿的基线人口学特征无显著差异 ($P > 0.05$)。随过敏性结膜炎严重程度增加, 泪液总 IgE 浓度显著升高 (轻度: 3.1 ± 3.9 IU/ml, 中度: 16.7 ± 18.6 IU/ml, 重度: 35.7 ± 33.3 IU/ml, $P < 0.001$), 腺样体肥大程度亦逐渐加重 ($P < 0.05$)。相关性分析显示, 过敏性结膜炎严重程度与泪液总 IgE ($r = 0.610$, $P < 0.001$)、腺样体肥大 ($r = 0.496$, $P < 0.001$) 均呈正相关, 且泪液总 IgE 与腺样体肥大的相关性更强 ($r = 0.643$, $P < 0.001$)。多因素回归提示, 泪液总 IgE (OR = 1.040, 95% CI: 1.006–1.075, $P < 0.05$) 和过敏性结膜炎症状总分 (OR = 1.153, 95% CI: 1.005–1.324, $P < 0.05$) 是腺样体肥大的独立影响因素。中介效应分析显示, 泪液总 IgE 在过敏性结膜炎严重程度与腺样体肥大

间存在部分中介效应，占总效应的 31.90% (95% CI: 0.048-0.306)。

结论：过敏性结膜炎严重程度与泪液总 IgE 水平、腺样体肥大程度均呈正相关，泪液总 IgE 可能通过介导局部过敏炎症反应，部分介导过敏性结膜炎患儿腺样体肥大的发生发展。这一发现为临床诊治提供了新视角，建议对中重度过敏性结膜炎患儿常规监测泪液总 IgE 及腺样体状况，以优化综合管理策略。

摘要编号：208913

全角膜缘移植联合角膜移植术治疗重度角膜缘干细胞缺乏症合并角膜混浊的疗效观察

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目的：评估同期进行的同一供体来源的全角膜缘移植联合角膜移植术治疗重度角膜缘干细胞缺乏症 (LSCD) 合并角膜混浊的临床疗效及安全性。

方法：一项前瞻性、单中心的队列研究。本研究纳入 2021 年至 2015 年青岛眼科医院收治的 10 例化学伤或爆炸伤患者的 10 只 LSCD 伴角膜混浊的患眼。同一手术者为 10 名患者施行了 360 度的环状全角膜缘移植联合角膜移植手术，术中角膜植片和全角膜缘植片来自同一供眼。术后给予局部他克莫司、局部和全身类固醇激素治疗。记录患者基本信息、病程、手术情况，术前术后最佳矫正视力 (BCVA)、眼内压 (IOP)、眼表评分 (OSS)，术后角膜移植上皮修复情况、持续性上皮缺损 (PED)、免疫排斥反应、继发性青光眼等并发症发生情况及移植存活率。

结果：10 例患者中男性 8 例，女性 2 例 (4:1)，右眼 6 例，左眼 4 例 (3:2)，年龄 54.00 ± 12.89 岁 (36-79 岁)，病史 21.60 ± 18.80 年 (0.5-50 年)，随访 25.80 ± 11.92 (12-50 月)；既往曾行角膜移植手术 7 例；本次行 PKP 联合全角膜缘移植 8 例，LKP 联合全角膜缘移植 2 例。所有患者手术过程顺利。最佳矫正视力 (BCVA) 从术前的 2.28 ± 0.51 logMAR 改善至术后的 0.45 ± 0.21 logMAR ($P < 0.05$)，眼表评分 (OSS) 从术前的 7.20 ± 1.03 分改善至术后的 0.20 ± 0.42 分 ($P > 0.001$)。术后并发症的发生率依次为持续性上皮缺损 (4/10)、排斥 (2/10)、继发性青光眼 (3/10)，均可通过常规临床治疗方法处理，术后 2 年的植片透明率为 100%，脱盲率为 90%。

结论：使用同一供体同期进行的全角膜缘移植联合角膜移植术能安全有效的改善重度角膜缘干细胞缺乏症 (LSCD) 合并角膜混浊患者的眼表情况和视力状态。

摘要编号：208728

单纯疱疹病毒性角膜基质炎新生血管组织的单细胞转录组测序分析

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共同作者：Lijun ZHANG

目的：通过单细胞转录组测序技术探索单纯疱疹病毒性角膜基质炎 (herpes stromal keratitis, HSK) 新生血管组织的转录特点并探索疾病的关键分子机制。

方法：筛选明确反复感染的 3 例 HSK 患者入组并排除其他病因导致的角膜新生血管；获取角膜深板层移植手术中的病灶角膜并制备单细胞悬液；单细胞样本质检合格后构建基因文库；通过 Illumina Nova-Seq 6000 对构建的文库进行测序；转录组学数据通过 Cell Ranger 软件进行分析。

结果：(1) HSK 主要由 4 种细胞类型构成，即角膜上皮细胞、成纤维细胞、单核吞噬细胞系统以及免疫 T 细胞，血管内皮细胞在成纤维细胞亚群细分被鉴定，角膜成纤维细胞的数量减少在组间存在统计学差异；(2) 角膜上皮细胞富集到磷酸化代谢、紧密连接以及炎症调节等功能，成纤维细胞富集到细胞外基质调节、细胞粘附、凋亡和增殖以及炎症调节等生物过程，单核吞噬细胞系统富集到代谢、吞噬、细胞因子调节以及炎症等生物过程，免疫 T 细胞富集到 T 细胞的激活、分化免疫过程，吞噬、细胞因子调节、粘附分子机制和细胞死亡、免疫炎症等生物过程；(3) 成纤维细胞通过机械分群方式鉴定了 7 个亚群，亚群 3 细胞的数量占比增加在组间有统计学差异，组间显著性表达的差异基因主要参与调节细胞外基质成分调节，包括编码胶原蛋白和基质金属蛋白酶的基因，促血管生成因子以及促炎因子相关基因；(4) 在角膜成纤维细胞中预测出特异性高的转录因子 CCAAT / 增强子结合蛋白 D 在 HSK 组中呈现低表达状态，且调控炎症和血管形成相关的基因关联强度高；(5) 角膜成纤维细胞亚群在 HSK 中参与细胞外基质调节、炎症反应、血管形成、损伤修复、肌成纤维细胞和增殖性纤维细胞的功能评分较高，其中亚群 3 细胞共同参与上述过程。

结论：获得了人源 HSK 发病的细胞及分子图谱，发现了角膜成纤维细胞在 HSK 中调节炎症、血管生成以及纤维化的多个差异基因及信号通路，以及调节上述功能的关键亚群细胞和特异性转录因子，多种细胞间细胞通讯的配受体对失调。

摘要编号: 206256

口唇黏膜移植在 Stevens-Johnson 综合征眼睑边缘角化症治疗中的应用研究

第一作者: Yan CHENG

目的: 探讨口唇黏膜移植术在 Stevens-Johnson 综合征 (SJS) 眼睑边缘角化症治疗中的临床疗效, 评估其对眼表微环境、炎症调控及视功能恢复的作用。

方法: 本研究为前瞻性队列研究, 纳入 20 例 SJS 相关眼睑边缘角化症患者, 随机分为试验组 (10 例, 行口唇黏膜移植术) 和对照组 (10 例, 接受局部糖皮质激素 + 人工泪液治疗)。两组均于术前及术后 6 个月进行以下评估: 1) 泪液功能 (泪膜破裂时间、Schirmer I 试验); 2) 结膜印迹细胞学分级 (Nelson 分级); 3) 最佳矫正视力 (BCVA, LogMAR); 4) 激光共焦显微镜定量分析 (角膜上皮细胞密度、朗格汉斯细胞计数、上皮神经纤维密度及分支形态); 5) 睑缘角化程度评分 (0-4 级); 6) 泪液炎症因子 (IL-6、TNF- α 、IL-1 β) 浓度检测 (ELISA 法)。采用协方差分析调整年龄、病程等混杂因素。

结果: 术后 6 个月, 试验组较对照组显著改善: 泪液功能: 泪膜破裂时间延长至 7.2 ± 1.5 秒 (对照组 3.8 ± 1.1 秒, $P < 0.001$), Schirmer I 试验值提升至 5.6 ± 2.3 mm (对照组 3.1 ± 1.8 mm, $P = 0.002$); 眼表修复: 结膜印迹细胞分级 I - II 级占比达 82.6% (对照组 35.5%, $P < 0.001$); 视功能: BCVA 提高 ≥ 2 行者占 71.0% (对照组 25.8%, $P = 0.001$), 平均 LogMAR 从 0.8 ± 0.3 降至 0.4 ± 0.2 (对照组 0.7 ± 0.3 至 0.6 ± 0.3 , $P = 0.003$); 角膜激光共焦显微镜检查: 上皮细胞密度增加至 4185 ± 385 cells/mm² (对照组 2954 ± 402 cells/mm², $P < 0.001$), 神经纤维密度恢复至 28.6 ± 5.2 mm/mm² (对照组 18.3 ± 4.7 mm/mm², $P = 0.004$), 且神经分支规则性评分 (3.2 ± 0.6 vs. 1.8 ± 0.5 , $P < 0.001$); 炎症调控: IL-6 (12.3 ± 3.1 pg/mL vs. 28.5 ± 5.6 pg/mL)、TNF- α (9.8 ± 2.4 pg/mL vs. 19.2 ± 4.3 pg/mL) 均显著降低 (均 $P < 0.001$); 睑缘角化: 评分从 3.5 ± 0.6 降至 1.2 ± 0.4 (对照组 3.4 ± 0.7 至 2.9 ± 0.6 , $P < 0.001$)。

结论: 口唇黏膜移植术通过重建睑缘屏障功能、促进角膜神经再生及抑制 IL-6/TNF- α 炎症级联反应, 显著改善 SJS 患者眼表稳态。早期手术干预可有效逆转眼角膜上皮损伤, 提升视力预后, 为重度眼睑角化症提供根治性治疗方案。

摘要编号: 206513

后弹力层角膜内皮移植术 (DMEK) 在虹膜角膜内皮综合征 (ICE 综合征) 中应用的系列研究

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共同作者: Xiaojuan DONG, Chen OUYANG, Jing WU

目的: 通过系列研究评估 DMEK 治疗 ICE 综合征的临床效果: 1. 对比 ICE 综合征与 Fuchs 内皮营养不良 (FED) 患者 DMEK 术后临床效果; 2. 观察通过改良 DMEK 技术, 降低 DMEK 术后角膜内皮细胞丢失率的疗效; 3. 观察针对合并青光眼引流管 (GDD) 患者, 进一步改良 DMEK 手术技术, 提高术后植片存活率的临床效果。

方法: 纳入 96 例 ICE 综合征患者, 分别进行以下研究: 研究 1: 24 例 ICE 综合征患者与 39 例 FED 患者 DMEK 术后疗效对比; 研究 2: 48 例 ICE 综合征患者随机分为完整剥除组 (去除全部受体眼 Descemet 膜及内皮细胞) 与标准组 (仅去除中央 8.0 或 8.25 mm 直径范围的 Descemet 膜及内皮细胞), 对比两组疗效; 研究 3: 24 例 ICE 综合征合并 GDD 患者行改良 DMEK (去除全部受体眼周边 Descemet 膜及内皮细胞的同时, 联合行虹膜前粘连分离术、修剪引流管、下方虹膜周切术或前房注入 C3F8) 术后疗效观察。观察指标: 最佳矫正视力 (CDVA)、内皮细胞丢失率 (ECL)、眼压 (IOP)、植片存活率及并发症。

结果: 研究 1: 术后 1 年 Kaplan-Meier 分析显示 ICE 综合征组与 FED 组植片存活率分别为 85.7% 与 100% ($P = 0.017$); 术后 12 个月内两组 CDVA 相当, 之后 FED 组优于 ICE 组 ($P < 0.001$); ICE 组 ECL 显著高于 FED 组 ($P < 0.001$); ICE 组中有 2 例 (8.3%) 前房角结构异常加重, 两组并发症发生率差异无统计学意义。研究 2: 术后 9 月, 完整剥除组 ECL 显著低于标准组; 术后 2 年, 完整剥除组与标准组 ECL 分别为 $66 \pm 5\%$ 与 $74 \pm 4\%$ (95% CI: $-0.04 \sim 0.01$; $P = 0.040$); 植片存活率分别为 83% 与 67% (95% CI: $-0.07 \sim 0.39$; $P = 0.318$); 两组 CDVA 及并发症差异无统计学意义。研究 3: ICE 综合征合并 GDD 患者行改良 DMEK 术后 CDVA 显著提高: 术后 1 年及 2 年分别有 10 例及 7 例 CDVA $\geq 20/32$; Kaplan-Meier 分析显示 1 年与 2 年植片存活率分别为 89% 与 67%, 对应 ECL 为 (59 ± 10) % 与 (71 ± 7) %。随访期内, 7 例 (29%) 出现 IOP 升高, 5 例 (21%) 发生周边前粘连进展。

结论: 1. DMEK 治疗 ICE 综合征难不难? DMEK 治疗 ICE 综合征的难度取决于患者的眼部条件, 对于不伴有严重眼前节异常、眼压正常且无青光眼手

术史的患者，DMEK 手术操作并不困难，且可获得与 FED 相似的术后视力效果。2. DMEK 治疗 ICE 综合征 疗效如何？不能根治的原因？虽然轻中度的 ICE 综合征患者行 DMEK 手术并不困难，但我们仍发现患者术后 ECL 高于 FED，ICE 综合征不能根治的原因考虑与其病理机制有关，DMEK 术后残留的 ICE 细胞异常增殖导致复发。3. 针对 ICE 综合征 的病理机制，是否有更佳的手术方案？改良 DMEK 技术通过去除受体全部 Descemet 膜及内皮细胞，可延缓 ICE 综合征 的病理进展，进而降低 DMEK 术后 ECL，延长植片存活率。4. 对于复杂病情（如合并 GDD），DMEK 的疗效如何？合并特殊技术改良（去除全部受体眼周边 Descemet 膜及内皮细胞的同时，联合行虹膜前粘连分离术、修剪引流管、下方虹膜周切术或前房注入 C3F8）的 DMEK 并未增加 ICE 综合征合并 GDD 眼的术后并发症风险，其临床效果与未合并 GDD 的 ICE 综合征者相当。

摘要编号：210114

圆锥角膜交联术后巩膜镜验配效果分享

第一作者：Jing ZHANG

目的：探讨圆锥角膜角膜交联术后，通过验配巩膜镜提升视觉质量的安全性及有效性。

方法：18 位圆锥角膜患者（26 只眼）进行角膜交联手术（包括去上皮角膜交联及角膜透镜植入联合交联）后验配巩膜镜，分别于配镜前，配镜后 3 个月，6 个月及 1 年分别检查裸眼视力，显然验光，角膜地形图，干眼分析及角膜内皮数量等。

结果：验配巩膜镜 1 年后所有患者裸眼视力变化与戴镜前比较（LogMAR 1.36 ± 0.46 VS 1.21 ± 0.48 ）无显著统计学差异（ $P = 0.48$ ），戴镜视力（LogMAR 0.097 ± 0.04 ）与戴镜前矫正视力（LogMAR 0.223 ± 0.15 ）比较明显提高（ $P < 0.02$ ）。戴镜后，角膜地形图相关参数如：平 K（ 47.26 ± 5.68 ）、陡 K（ 49.35 ± 4.91 ）及散光量（ 3.57 ± 1.73 ）与戴镜前（ 46.95 ± 6.72 ）（ 48.87 ± 5.12 ）（ 3.79 ± 2.21 ）比较无明显变化（ P 均 > 0.05 ）。角膜中央最薄点厚度（ 486.15 ± 25.87 ）um 与戴镜前（ 479.82 ± 32.61 ）um 相比，无显著性差异（ $P = 0.74$ ）。角膜内皮细胞计数（ 2984.39 ± 38.26 ）个/mm²与戴镜前（ 2876 ± 25.91 ）个/mm²比较无明显差异（ $P = 0.59$ ）。

结论：圆锥角膜交联手术后，验配巩膜镜可以明显提升视觉质量；同时验配巩膜镜后，角膜形态，角膜厚度，角膜内皮数量稳定。巩膜镜提升圆锥角膜角膜交联术后视觉质量是安全有效的。

摘要编号：209092

基于人工智能的角膜内皮疾病自动诊断系统

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共同作者：Jing HONG

目的：利用人工智能建立角膜内皮疾病自动诊断系统。

方法：我们开发了一种自动检测多种常见角膜内皮疾病的系统，该系统基于一种增强型紧凑卷积变换器（ECCT）；具体而言，我们在标准自注意力模块中引入了一种跨头相对位置编码机制，以捕捉不同区域之间的上下文信息，并采用一种令牌注意力前馈网络，使系统更关注有价值的异常区域。

结果：2723 张角膜内皮疾病患者活体激光角膜共聚焦显微镜内皮图像来训练该系统。多中心图像验证的准确率为 89.53%，受试者工作特征曲线下面积（AUC）为 0.958（95% 置信区间：0.943–0.971）。

结论：该系统是全球首个基于人工智能的角膜内皮疾病诊断系统，用户可将图像上传至指定网站，系统自动给出诊断结果。

摘要编号：209236

基于探针捕获的靶向二代宏基因组测序技术在感染性角膜炎诊断中的应用价值研究

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共同作者：周舟，徐帆，李苑华，蒋莉，陈国庆，陈炳华，陈琦，黄慧，黄瑜俊

目的：评估 pc-tNGS 技术在感染性角膜炎病原体快速识别中的临床应用价值，并与传统微生物学方法进行比较。

方法：回顾性收集 2024 年 4 月至 2025 年 7 月在我院就诊的疑似感染性角膜炎患者 512 例，采集角膜刮片标本同时进行常规微生物培养和 pc-tNGS 分析，比较两种方法在病原体检出率、检测时间和指导临床治疗方面的差异。

结果：最终纳入研究的 512 例患者中，诊断明确的感染性角膜炎（细菌、真菌、病毒、棘阿米巴）的患者 476 例，pc-tNGS 的总体阳性率为 86.6%（412/476），显著高于传统培养方法的 60.1%（286/476）（ $P < 0.01$ ）。pc-tNGS 可在 24 ~ 48 小时内提供结果，而培养方法平均需要 3 ~ 7 天。特别是在抗生素使用后的患者群体中，pc-tNGS 的优势更为明显。真菌感染的检出率两种方法差异不显著，但在混合感染和非典型病原体感染的检测中，pc-tNGS 表现出明显优势。

结论：基于探针捕获的靶向二代宏基因组测序技术在感染性角膜炎病原体诊断中具有明显优势，尤其

体现在检出率高、诊断时间短、能识别混合感染和非典型病原体等方面。

摘要编号: 202506

基于新型非接触式荧光成像技术的干眼结膜杯状细胞影像评价研究

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共同作者: Zengyu DUAN, Zeyu MENG, Jin YUAN, Mengyun ZHOU

目的: 设计研发在体、非接触式结膜杯状细胞 (Conjunctival Goblet Cells, CGCs) 宽视场荧光显微成像系统 (Wildfield Fluorescence Microscopy, WFFM), 实现大视野、高分辨率 CGCs 特异性成像, 并探索干眼发生发展及转归的 CGCs 时空变化规律。

方法: 基于莫西沙星荧光标记, 集成中心波长为 405 nm 的发光二极管、电可调液态变焦透镜及高帧率 CMOS 相机构建 WFFM 成像系统, 设计全自动多焦点融合算法, 获取结膜曲面 CGCs 全聚焦影像。通过 0.2% 苯扎氯铵 (Benzalkonium Chloride, BAC) 诱导及 10% 和 5% 香烟烟雾提取物 (Cigarette Smoke Extract, CSE) 诱导干眼小鼠模型以探索 CGCs 的时空变化规律。同步行泪液酚红棉线测试评估泪液分泌量, 角膜荧光素钠和丽丝胺绿染色观察眼表损伤程度。在体 WFFM 成像联合 PAS 染色评估 CGCs 密度及细胞形态变化, 实时荧光定量聚合酶链反应和免疫荧光染色检测黏蛋白 (MUC1、MUC4、MUC5AC) 表达水平。

结果: WFFM 系统可实现 1 μm 细胞级高分辨率与 1.4 mm $\times$ 1.4 mm 成像视野, 成像速度约 30 帧/s。在体 WFFM 成像可清晰分辨单个细胞并量化, 重复性实验组内相关系数为 0.964。BAC 诱导干眼小鼠模型在第 3 天及第 7 天 GCD 和面积比显著下降 (均 $p < 0.001$), 停药 1 周后恢复至基线水平 (均 $p > 0.05$)。CSE 诱导干眼模型中, 与对照组相比, 10% CSE 处理组第 3 天角膜荧光素钠和丽丝胺绿染色评分明显升高 (均 $p < 0.001$), GCD 显著降低 ($p < 0.001$), 同时 CGCs 面积减小及边界模糊, 5% CSE 处理组 GCD 于第 3 天同步下降 ($p < 0.001$), 但角膜损伤延迟至第 7 天出现 (均 $p < 0.001$)。干预 7 天后 10% CSE 处理组 MUC5AC 表达水平下调 ($p < 0.01$), MUC1 表达上调 ($p < 0.001$), MUC4 表达未发生明显改变 ($p = 0.72$)。5% CSE 处理组各黏蛋白表达未发生明显改变 ($p = 0.07, 0.58, 0.08$)。泪液分泌量干预前后无显著改变 ($p > 0.05$)。

结论: 本研究成功构建了可实现在体非接触式、高分辨率 CGCs 成像系统, 并通过 BAC 与 CSE 诱导

干眼模型验证了 WFFM 在疾病状态下持续定量可视化监测 CGCs 损伤及修复变化的可行性, 为干眼等眼表疾病的机制研究与临床评估提供了创新型影像学工具。

摘要编号: 205775

大鼠角膜缘基质微环境细胞可支持大鼠口腔黏膜上皮细胞的生长并改变其生物学性状

第一作者: Duan CHAOYE

目的: 自体口腔黏膜上皮细胞移植 (Autologous cultivated oral mucosal epithelial transplantation, COMET) 是治疗角膜缘干细胞缺乏的重要方法, 但是 COMET 术后周边部角膜新生血管的出现阻碍了其广泛地应用于临床。本研究将同种异体角膜缘基质微环境细胞 (Limbal niche cells, LNCs) 代替传统的小鼠源性的 3T3 细胞作为滋养细胞来培养口腔黏膜上皮细胞, 从而降低口腔黏膜上皮细胞诱导新生血管生成的可能性。

方法: 将大鼠口腔黏膜上皮细胞与 LNCs 或 3T3 细胞共培养。对体外培养得到的口腔黏膜上皮细胞进行 H&E 染色及细胞免疫化学检测。通过 RT-qPCR 和 Western Blotting 分别在转录和翻译水平检测并比较各组口腔黏膜上皮细胞中血管生成相关因子的表达量。随后提取不同培养体系中上皮细胞培养基上清 (条件培养基) 对人脐静脉内皮细胞 (Human umbilical vein endothelial cells, HUVECs) 进行刺激, 通过检测接受了不同刺激的 HUVECs 的细胞活性及管腔形成情况, 进而再次比较不同培养体系所得到的口腔黏膜上皮细胞诱导新生血管产生的潜能。

结果: 无论选择 LNCs 还是 3T3 细胞作为滋养层, 均可成功地在体外扩增培养出口腔黏膜上皮细胞。细胞免疫化学结果显示体外扩增得到的各组口腔黏膜上皮细胞中 p63 α , ABCG2, Ki67 和 CK3 阳性细胞比例无明显差异。RT-qPCR 和 Western Blotting 结果分别从基因和蛋白水平证明, 与 3T3 组相比, LNC 组所得到的口腔黏膜上皮细胞表达较少的 bFGF 和较多的 PEDF 和 sFlt-1。此外, 与 3T3 组相比, LNC 组的口腔黏膜上皮细胞可降低 HUVECs 的细胞活性和形成管腔的能力。

结论: LNCs 可以代替 3T3 细胞作为体外扩增口腔黏膜上皮细胞的滋养细胞。以 LNCs 作为滋养细胞培养的口腔黏膜上皮细胞比传统方法培养的口腔黏膜上皮细胞具有较小的诱发新生血管的可能性。本研究为口腔黏膜上皮细胞培养体系的优化和 COMET 的更广泛的应用提供了实验基础。

摘要编号: 209328

巯基功能化角膜基质透镜负载左氧氟沙星与纳米银用于细菌性角膜溃疡的治疗

第一作者: Rao JING

共同作者: Zhou QIZHI

目的: 本研究旨在探讨经巯基功能化修饰的脱细胞角膜基质透镜 (DLs-SH) 负载纳米银 (Ag) 及左氧氟沙星 (Lev) 的能力, 评估其抗菌活性及对人角膜上皮细胞 (HCE) 的毒性, 为细菌性角膜溃疡的治疗提供新型药物递送系统。

方法: 采用小切口角膜基质透镜取出术获取的角膜基质透镜, 经脱细胞处理后, 利用 EDC/NHS 活化胶原羧基并进行巯基功能化修饰。分别制备负载纳米银 (DLs-SH@Ag)、负载左氧氟沙星 (DLs-SH@Lev) 及复合载药 (DLs-SH@Lev@Ag) 的透镜, 并以未修饰透镜负载纳米银 (DLs@Ag) 作为对照。通过扫描电镜 (SEM) 观察纳米银负载情况, 体外共培养评估其对耐甲氧西林金黄色葡萄球菌 (MRSA) 的抑菌效果, 并分析其与 HCE 共培养后的细胞毒性及生物相容性。

结果: SEM 显示 DLs-SH@Ag 组纳米银负载量显著高于对照组 (DLs@Ag)。抑菌实验结果显示, DLs@Ag、DLs-SH@Ag、DLs-SH@Lev 及 DLs-SH@Lev@Ag 对 MRSA 的抑菌率分别为 46.98%、64%、52.31% 及 99.99%, 组间差异具有统计学意义 ($P < 0.001$)。CCK8 和 Calcein-AM/PI 实验表明, DLs@Ag、DLs-SH@Ag 及 DLs-SH@Lev@Ag 与 HCE 共培养 24、48 及 72 小时后, 均未表现明显细胞毒性, 与阴性对照组相比无统计学差异 ($P > 0.05$)。

结论: 巯基功能化修饰可有效提高角膜基质透镜对纳米银的负载能力。复合载药系统 DLs-SH@Lev@Ag 具备优异的抗菌活性和良好的生物相容性, 在细菌性角膜溃疡的局部治疗中具有潜在应用前景。

摘要编号: 210283

干燥综合征患者白内障手术的临床结局及角膜并发症

第一作者: Xiaochen WANG

目的: 评估干燥综合征 (Sjögren's Syndrome, SS) 患者白内障手术后的临床结局及角膜并发症, 重点关注术前干眼严重程度的影响及术后非甾体抗炎药 (nonsteroidal anti-inflammatory drugs, NSAIDs) 的安全性。

方法: 本研究回顾性纳入 2020 年至 2025 年间于我院接受超声乳化白内障吸除术的 90 例 SS 患者 (共 129 眼); 依据《中国干眼诊断与治疗共识》, 根

据术前干眼严重程度将患者分为三组, 其中轻度组 45 眼、中度组 68 眼、重度组 16 眼。研究分析了患者的视觉结局、眼表症状 (干涩、上皮粗糙、丝状角膜炎、溃疡) 及并发症情况, 并记录轻度组与中度组患者术后非甾体抗炎药 (溴芬酸钠) 的使用情况。

结果: 术后所有组别的未矫正远视力 (uncorrected distance visual acuity, UDVA) 均显著改善 ($p < 0.05$)。但最终视觉结局与术前干眼严重程度密切相关, 重度组术后 1 个月的 UDVA (0.62 ± 0.31 LogMAR) 显著差于轻度组 (0.28 ± 0.35 LogMAR) 与中度组 (0.31 ± 0.26 LogMAR) ($p < 0.001$)。非甾体抗炎药的使用与中度组眼表疾病的显著加重相关: 该组患者眼部干涩比例从术前的 1.5% (68 眼中 1 眼) 升至术后的 17.6% (68 眼中 12 眼) ($p = 0.002$), 上皮粗糙比例从术前的 4.4% (68 眼中 3 眼) 升至术后的 14.7% (68 眼中 10 眼) ($p = 0.041$)。重度组患者术前已存在丝状角膜炎 (9 眼) 或角膜溃疡 (7 眼), 其中 25% (16 眼中 4 眼) 需接受额外手术干预 (睑缘缝合术、羊膜移植术), 31.3% (16 眼中 5 眼) 出现复发性丝状角膜炎, 需通过药物治疗控制。

结论: 干燥综合征患者的白内障手术需进行精细的围手术期管理。术前干眼严重程度是决定视觉恢复效果及术后角膜完整性的关键因素。由于局部使用非甾体抗炎药存在加重眼表损伤的风险, 应谨慎使用或避免用于干燥综合征患者。对于术前存在重度角膜病变的患者, 术前实现眼表稳定是预防致盲性并发症的关键。

摘要编号: 208992

微塑料在干眼发病机制中的相关性研究

第一作者: Jingyi WANG

共同作者: Ying JIE

目的: 探究不同年龄段人群泪液和睑脂中不同种类微塑料含量的差异及与各眼表参数间的相关性, 以及微塑料在干眼发病机制中潜在的作用。

方法: 纳入 45 名 20 至 80 周岁的干眼受试者, 将其分为 < 40 周岁、40-60 周岁、60-80 周岁三组, 每组 15 名受试者。所有受试者均完成 OSDI 问卷、Schirmer 试验、泪膜稳定性及睑板腺相关的一系列检查获得眼表相关参数后, 将其浸有泪液的 Schirmer 试纸条及挤压采集的睑脂进行激光红外成像 (LDIR) 以及电子扫描 (SEM), 以观察泪液及睑脂中微塑料的形态。同时, 使用热解-气相色谱-质谱法 (Py-GC-MS) 对泪液和睑脂中的微塑料进行定量分析, 并将其与眼表参数进行相关性

分析。此外，通过体内和体外模型验证不同浓度微塑料对眼表的损伤情况以及其中潜在的机制。

结果：在泪液中检测到五种 MPs，检测量由高到低依次为 PE、PVC、PS、PP、PC。年龄与 PE 和 PVC 含量呈线性关系，PE 和 PVC 浓度与泪液分泌量呈负相关（PE 为 $r = -0.728$ ， $P = 0.026$ ；PVC 为 $r = -0.723$ ， $P = 0.028$ ），PE 和 PVC 均与泪膜破裂时间呈负相关（PE 为 $r = -0.737$ ， $P = 0.023$ ；PVC 为 $r = -0.696$ ， $P = 0.037$ ）。在睑酯中检测到两种不同的 MPs，即 PE 和 PVC，其水平与睑板腺残余面积百分比呈正相关（PE 为 $r = 0.884$ ， $P = 0.002$ ；PVC 为 $r = 0.705$ ， $P = 0.034$ ）。此外，每单位残余睑板腺面积中 PE 的含量与脂质层厚度呈负相关（ $r = -0.761$ ， $P = 0.017$ ），每单位残余睑板腺面积中 PVC 的含量与部分眨眼率呈正相关（ $r = 0.716$ ， $P = 0.030$ ）。通过不同浓度微塑料处理小鼠眼表，发现泪液分泌量随 PE 暴露的浓度和时长增加而增加，且小鼠结膜处出现明显的病理角化和间质水肿，并伴有炎症变化；结膜组织 IFN- γ 表达水平显著升高；结膜上皮细胞凋亡也明显增加。同时使用不同浓度的微塑料对人角膜上皮细胞和人结膜上皮细胞进行处理，发现处理后的角膜上皮细胞的界模糊，出现明显的空泡化和核固缩，结膜上皮细胞密度显著降低，形状更小、更圆以及突触更小；处理后的两种细胞形态学改变及细胞活力下降的程度均与微塑料的浓度存在相关性。

结论：本研究首次在人体泪液和睑酯发现微塑料的存在，并对其诱导干眼发病的机制进行探索。

摘要编号：208862

新型抗菌肽滴眼液：一种潜在的真菌性角膜炎治疗候选药物

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共同作者：Jing HONG, Rongmei PENG, Guoguo TANG

目的：探讨新型抗菌肽滴眼液在大鼠真菌性角膜炎模型中的治疗效果及其潜在作用机制，为真菌性角膜炎的临床治疗提供新的候选药物。

方法：建立大鼠真菌性角膜炎模型后，随机分为三组：对照组、Pep 治疗组和 FLU 阳性对照组。各组分别于造模后第 1、3、7、12 天进行裂隙灯观察，评估角膜混浊、溃疡及血管生成情况，并进行炎症临床评分。第 12 天取角膜组织进行组织研磨真菌培养、HE 染色观察组织病理学变化、免疫组化检测炎症因子表达，并对角膜组织进行转录组测序分析炎症及免疫相关基因的差异表达。

结果：Pep 组大鼠角膜混浊程度及炎症评分较对照组显著降低，炎症吸收及角膜透明度恢复优于 FLU 组。第 12 天菌落计数显示，Pep 组角膜组织内无

真菌残留。HE 染色结果显示 Pep 组角膜组织修复良好，炎性细胞浸润显著减轻。免疫组化显示 IL-6 表达在 Pep 组显著下调。转录组分析提示 Pep 可调控多条与炎症反应和免疫调节相关的信号通路。

结论：抗菌肽 Pep 滴眼液对真菌性角膜炎具有显著的治疗效果，能够有效抑制真菌性角膜炎的炎症反应，促进角膜组织修复。Pep 可能通过调控炎症因子及免疫相关基因表达发挥抗感染和促修复作用，具有成为真菌性角膜炎新型治疗药物的潜力。

摘要编号：209739

术后眼压升高对无青光眼病史患者 DMEK 术后角膜内皮植片的影响：一项队列研究

第一作者：Zijun XIE

共同作者：Jing HONG

目的：角膜后弹力层内皮移植术（DMEK）已成为主流的角膜移植方式。然而，在无青光眼病史的患者中，术后高血压对 DMEK 预后的影响尚不明确。本研究旨在研究术后眼压升高对无青光眼病史患者 DMEK 术后角膜内皮植片的影响。

方法：本研究为回顾性队列研究，纳入 2017 年 7 月至 2023 年 3 月期间在北京大学第三医院接受 DMEK 手术、无青光眼病史且随访时间超过 6 个月的患者。根据术后眼压（IOP）变化，将患者分为三组：A 组为术后眼压正常；B 组为术后早期眼压升高（术后 3 天内眼压 ≥ 30 mmHg 或较基线升高超过 10 mmHg）；C 组为术后中期眼压升高（术后 14 天后眼压 > 21 mmHg 或较基线升高超过 10 mmHg）。比较三组患者术后眼压、角膜内皮细胞密度（ECD）、中央角膜厚度（CCT）、最佳矫正视力（BCVA）及角膜移植失败率。

结果：共纳入 47 例患者（47 只眼），其中 37 只眼为大泡性角膜病变，10 只眼为 Fuchs 角膜内皮营养不良。A 组 25 只眼，B 组 6 只眼，C 组 16 只眼。B 组平均峰值眼压为 49.00 ± 4.99 mmHg，C 组为 31.89 ± 11.75 mmHg。术后 BCVA 较术前显著提高（ $P < 0.001$ ）。术后 3 个月，C 组 ECD 显著低于 A 组（ $P = 0.032$ ）。C 组中有 4 只眼发生角膜移植失败（ $P = 0.001$ ）。

结论：DMEK 术后中期眼压升高可能降低角膜内皮细胞密度，并在术后 6 个月内导致角膜移植失败；而术后早期眼压升高对预后无明显影响。因此，术后应密切监测眼压，尤其重视中期眼压管理，以保护角膜移植片。

摘要编号: 209941

机械拉伸对角膜细胞功能的影响及其与圆锥角膜发病机制的关联

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目的: 圆锥角膜 (Keratoconus, KC) 是一种以角膜进行性变薄和前突为特征的退行性眼病, 其早期机制尚未明确。临床研究提示, 揉眼等慢性机械刺激是其重要危险因素, 机械应力在疾病发生发展中可能起关键作用。然而, 现有研究多基于二维细胞培养, 难以模拟角膜在生理环境下的动态应力反应。本研究旨在利用一种三维生理相关的离体模型, 结合新型影像技术, 实时、无标记、高分辨率地评估机械拉伸如何影响角膜各层的结构和功能。

方法: 本研究使用新鲜离体猪角膜, 利用可控灌注系统在维持角膜透明和营养供应的条件下, 施加不同机械拉伸强度 (0、10、15、20、30 mmHg) 和持续时间 (急性 30 分钟、持续 24 小时), 并结合双模态全视场光学相干断层成像技术 (Full-Field Optical Coherence Tomography, FFOCT), 实现对角膜结构与功能状态的实时、无标记、高分辨率监测。

结果: 持续 24 小时的机械拉伸导致角膜基底细胞密度随压力梯度增加而显著降低 ($p < 0.05$)。功能参数分析显示, 急性拉伸 (30 分钟) 引起上皮细胞内运动速率 (f_{mean}) 与运动幅值 (Amp) 显著下降 ($p < 0.001$)。相比之下, 持续拉伸 24 小时则诱导上皮细胞内运动速率显著升高 ($p < 0.001$), 而高强度拉伸条件下运动幅值仍显著下降 ($p < 0.05$)。此外, 结构成像结果显示, 在机械拉伸作用下, 角膜翼状细胞及基底细胞中均可观察到细胞核可见性增强和亮反射物质沉积等形态改变。

结论: 本研究中观察到的角膜结构性改变, 与临床圆锥角膜报告的影像特征相吻合。研究证实, 机械牵张能够诱导角膜上皮细胞产生类似于 KC 的病理特征响应。本研究为力学生物学因素在圆锥角膜早期病程中的作用提供了直接实验证据, 同时验证了全视场光学相干成像在圆锥角膜早期检测与机制研究中的应用潜力。

摘要编号: 209315

桑菊饮加味方治疗春季角结膜炎的临床疗效观察

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目的: 观察基于中医整体辨证、以疏风清热、宣肺止痒为主要治则的桑菊饮加味方对“时复目痒” (春季角结膜炎, vernal keratoconjunctivitis, VKC) 的临床疗效及安全性。

方法: 将符合诊断标准的 5 ~ 12 岁春季角结膜炎患儿随机分为治疗组和对照组。治疗组 36 例, 采用中医辨证施治法则, 给予桑菊饮加味方水煎服, 早晚各 100 mL, 每日 1 剂; 对照组 30 例, 予 0.1% 盐酸奥洛他定滴眼液, 每日 2 次。以 7 天为 1 个疗程, 共治疗 2 个疗程。治疗结束后, 根据症状改善程度及体征变化评定疗效, 并观察不良反应。

结果: 治疗组总有效率为 91.66% (33/36), 对照组为 66.67% (20/30), 两组差异具有统计学意义 ($P < 0.05$)。治疗组患儿未见明显不良反应, 对照组有 1 例出现轻度眼刺痛及结膜充血反应, 停药后自行缓解。

结论: 基于中医“从肺肝论治”理论, 运用疏风清热、宣肺止痒法的桑菊饮加味方治疗春季角结膜炎, 临床疗效确切, 安全性良好。该方为中医药防治春季角结膜炎提供了新的循证依据和治疗思路, 值得进一步研究与推广。

摘要编号: 203598

炎症响应型聚合物纳米粒子重编程巨噬细胞治疗角膜碱烧伤

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共同作者: Lingxi JIANG, Yi SHI, Xinyu WANG, Luhan ZHANG

目的: 本研究旨在解决角膜碱烧伤这一严重眼科急诊治疗中的难题。角膜碱烧伤具有进行性炎症、上皮再生受损和病理性新生血管形成等特点, 传统局部疗法受限于角膜前快速清除和有限的角膜穿透性。

方法: 通过地塞米松 (Dex) 与透明质酸 (HA) 经酸敏感胺键分子自组装, 开发了靶向巨噬细胞的聚合物纳米粒子 HDNPs。局部给药后, HA 介导的 CD44 受体识别使 PDNPs 能够选择性锚定到角膜基质中浸润的巨噬细胞上, 增强了眼表滞留和药物穿透。炎症部位的酸性微环境触发胺键裂解, 实现地塞米松的可控释放和炎症的精确调节。

结果：在小鼠碱损伤模型中，HDNPs 显著延长了眼表滞留时间，改善了角膜穿透性，提高了治疗效率并降低了给药频率。机制上，HDNPs 有效降低促炎细胞因子和趋化因子的表达，通过促进 M2 巨噬细胞抗炎表型转化来调节炎症微环境。治疗效果上，HDNPs 加速了角膜再上皮化，恢复了基质透明度，减轻了角膜水肿并抑制了新生血管形成，从而打破恶性循环，缓解角膜损伤。

结论：HDNPs 展现出优异的生物相容性和耐受性，有望作为一种新型治疗平台，应用于涉及炎症微环境调节的眼表疾病治疗。

摘要编号：209549

生物工程角膜行板层角膜移植术后植片角膜上皮厚度变化及相关因素分析

第一作者：He DONG

目的：探讨生物工程角膜行板层角膜移植术后植片角膜上皮厚度的动态变化，对比分析生物工程角膜与人供体角膜行板层角膜移植术后植片角膜上皮厚度的差异性，分析植片角膜上皮厚度与角膜透明度、新生血管植入和角膜刺激症状的相关性。

方法：选择 2020 年 9 月 -2022 年 6 月于我院行板层角膜移植术的病人 35 例（35 眼）进行前瞻性研究，非随机分为两组，即生物工程角膜组 20 例（20 眼），人供体角膜组 15 例（15 眼）。在术后 6 个月内观察并记录两组病人通过眼前节光学相干断层扫描测得的植片角膜上皮厚度及裂隙灯下观察到的角膜透明度、新生血管植入和角膜刺激症状，对记录的数据进行分析比较。采用 IBM SPSS 26.0 软件进行统计学分析，应用两因素重复测量方差分析对两组病人术后植片角膜上皮厚度进行总体分析、组间比较、组内比较；应用配对样本 t 检验将两组病人术后植片角膜上皮厚度分别与对侧眼（健眼）比较；应用 spearman 直线相关分析证实植片角膜上皮厚度与角膜透明度、新生血管植入和角膜刺激症状的相关性。结果均以 $P < 0.05$ 为差异具有统计学意义。

结果：1、植片角膜上皮厚度：组间比较（同一时间点下组间比较）、组内比较（组内各时间点比较）均存在统计学意义（ $P = 0.038$ 、 0.002 ， P 值均 < 0.05 ）。组间比较：仅术后 2 周生物工程角膜组植片角膜上皮厚度大于人供体角膜组（ $P < 0.001$ ），术后 1、3、6 个月两组植片角膜上皮厚度无统计学差异（ $P = 0.381$ 、 0.668 、 0.621 ， P 值均 > 0.05 ）。2、植片角膜上皮厚度的相关因素：植片角膜上皮厚度与角膜透明度、新生血管植入情况、角膜刺激症状均无相关性（ $P > 0.05$ ）。

结论：生物工程角膜可作为供体角膜的良好替代材料。

摘要编号：208107

用于干眼症治疗的负载环孢素的 ROS 响应型阳离子纳米颗粒研究

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目的：为克服传统环孢素 A 制剂水溶性差、眼表清除快及非靶向释放等方面的局限性，本研究开发设计了一种活性氧（ROS）响应型阳离子纳米颗粒 CsA@P (MS-a-EG)，促进 CsA 的负载与靶向递送，为干眼症治疗提供了一种靶向性强、安全性高的新策略。

方法：我们系统评估了该制剂的理化性质，在体外试验中检测了其 ROS 清除能力及黏膜黏附特性。利用活体成像技术定量分析了其在小鼠眼表的滞留时间。最后，通过建立干眼症小鼠模型，结合 Schirmer 试验、角膜荧光素钠染色及组织病理学（H&E 染色）分析，综合评价其治疗效果，同时开展初步毒理学实验以评估其全身生物安全性。

结果：CsA@P (MS-a-EG) 纳米颗粒展现出高载药量（0.181%）、缓释特性（24 小时释放 42.3%）及强大的 ROS 清除能力（清除 47.5% H_2O_2 ）。该纳米颗粒通过眼表静电相互作用增强黏膜黏附，从而延长滞留时间（20 分钟时荧光强度保持 90.3%）。在干眼症小鼠模型中，CsA@P (MS-a-EG) 能恢复泪液分泌并改善泪膜稳定性。H&E 染色证实角膜上皮修复，厚度恢复正常。该纳米颗粒表现出优异的生物安全性，未观察到全身毒性。

结论：该双功能纳米颗粒药物通过整合 ROS 响应性药物释放、提高生物利用度及抗氧化活性，打破了氧化 - 炎症循环，为干眼症治疗提供了一种靶向性强、安全性高的新策略。

摘要编号：209819

移植物抗宿主病继发干眼的临床特征与预测模型：以血液病患者干眼及单纯干眼患者为对照的研究

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目的：移植物抗宿主病继发干眼症是移植物抗宿主病（Graft versus host disease, GVHD）中眼部 GVHD 的最常见表现，但缺乏特异性诊断标志，易与普通干眼混淆。本研究旨在系统比较 GVHD 继发干眼、血液病患者干眼及普通患者干眼的临床特

征，识别关键鉴别指标，并构建 GVHD 干眼的早期预测模型。

方法：采用横断面研究设计，纳入 GVHD 干眼（20 例／40 眼）、血液病干眼（16 例／32 眼）及普通干眼（20 例／40 眼）患者。收集全身资料及眼表参数，包括 OSDI 评分、泪河高度、泪膜破裂时间（FBUT）、角膜染色评分、睑板腺萎缩面积及结膜充血指数（CHI）等。采用方差分析与 Logistic 回归筛选独立影响因素，并绘制 ROC 曲线评估模型效能。

结果：GVHD 干眼组原发病以急性白血病为主（AML 8 例，ALL 7 例），HLA 半相合占 60%。GVHD 组与普通干眼组 OSDI 评分无显著差异，但 GVHD 组 FBUT 更短（ 4.03 ± 1.98 s vs 6.26 ± 1.56 s），角膜染色评分更高（ 4.68 ± 4.07 ， $P = 0.004$ ），下睑板腺丢失率更高（ 1.33 ± 0.76 ， $P < 0.001$ ），CHI 更高（ 1.15 ± 0.47 ， $P = 0.005$ ）。与血液病干眼组相比，GVHD 组上睑板腺萎缩面积率更大（ 1.33 ± 0.76 ， $P < 0.001$ ），球结膜及鼻侧睫状充血更显著（均 $P < 0.05$ ）。视觉质量参数显示 GVHD 组 SR 值更低（ 0.17 ± 0.06 ），OSI 值更高（ 2.74 ± 2.58 ）。多因素分析显示，泪河高度（OR = 0， $P = 0.013$ ）和上睑板腺萎缩面积率（OR = 0， $P = 0.013$ ）是 GVHD 干眼的独立影响因素。二者构建的预测模型 AUC 分别为 0.817（95% CI: 0.697–0.937）和 0.94（95% CI: 0.883–0.996）。

结论：GVHD 继发干眼在睑板腺萎缩、眼表炎症及角膜损伤方面均显著重于普通患者及血液病患者的干眼。基于泪河高度与上睑板腺萎缩面积率的预测模型具有良好的鉴别效能，可为 GVHD 干眼的早期识别与干预提供依据。

摘要编号：207615

粘脂贮积症 IV 型患者一例

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目的：总结一例粘脂贮积症 IV 型患者的临床表型特征及分子遗传学诊断结果。

方法：对患者进行详细眼科检查；采集先证者及可获取亲属的外周血样本，提取基因组 DNA。使用遗传性眼病基因诊断芯片（HEDEP）进行初筛，并通过 Sanger 测序对候选致病变异进行验证及家系共分离分析。依据美国医学遗传学与基因组学学会（ACMG/AMP）标准与指南对变异进行致病性评估，确定致病基因及突变位点。

结果：患者为一名 9 岁的男性患儿，临床治疗显示其患有双眼角膜上皮营养不良、双眼视网膜色素

素变性及夜盲症。患儿父母为近亲结婚，父母未患病，基因检测患儿携带 MCOLN1 基因纯合变异 c.362C>T（p.Thr121Met），变异分别遗传自父母，患儿姐姐正常，不携带该突变。既往文献结果显示 MCOLN1 基因的致病变异可导致粘脂贮积症 IV 型，该病临床表型包括角膜混浊、视网膜变性、智力障碍及神经发育异常等，该突变 c.362C>T 已被报道可导致口下颌肌张力障碍与帕金森综合征，被判定为可能致病（likely pathogenic）。依据 ACMG 标准，该变异被判定为可能致病。

结论：本研究报告了一例临床表现复杂、初诊困难的粘脂贮积症 IV 型病例，其诊断得益于分子遗传学检测对 MCOLN1 基因致病性变异的鉴定，为该疾病的病因诊断、生育预防等奠定坚实基础。

摘要编号：204016

脱细胞角膜基质透镜的制备及作为药物缓释载体在真菌性角膜溃疡中的应用研究

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目的：对飞秒激光小切口角膜基质透镜取出术（SMILE）所得透镜进行脱细胞处理后负载抗真菌药物—伏立康唑后的药物缓释情况进行研究。

方法：采用透射电子显微镜（TEM）、扫描电子显微镜（SEM）对脱细胞角膜基质透镜的肿胀程度、透光率、生物力学性能和稳定性进行测定和表征。将脱细胞透镜（DLs）浸泡在不同浓度的伏立康唑溶液中 24 h，测定药物释放浓度。

结果：脱细胞角膜基质透镜的溶胀率与未脱细胞比较无统计学意义（ $P > 0.05$ ），脱细胞角膜基质透镜的透光率在 555 nm 处的透光率大于 90%，与未脱细胞组角膜基质透镜具有相似的透光率且能保持稳定，其体外降解时间为 108–120 h，与未脱细胞组角膜基质透镜（96–108 h）相比类似，生物力学间比较无统计学意义（ $P > 0.05$ ），扫描电镜显示交联脱细胞角膜基质透镜的横截面能看到呈丝状的胶原纤维，表面可见胶原纤维呈网孔状构型，TEM 结果显示脱细胞角膜基质透镜胶原结构排列整齐且较完整，未见基质细胞存在。药物释放试验结果显示，伏立康唑浓度为 2 mg/mL 时，药物累积释放量最高，为（ 1.334 ± 0.400 ）mg/ml，随浸泡浓度的增加而增加。

结论：脱细胞能增加了透镜胶原纤维之间的空隙，增加载药量。脱细胞透镜可作抗真菌药物伏立康唑药物缓释载体。

摘要编号: 209194

角膜 OCTA 定量角膜新生血管分析与角膜移植排斥反应的相关性研究

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目的: 探讨利用光学相干断层扫描血管成像 (OCTA) 技术定量分析角膜新生血管参数与角膜移植排斥反应发生之间的相关性, 寻找可用于临床风险评估的定量指标与阈值。

方法: 采用回顾性队列研究设计, 收集 2024 年 6 月至 2024 年 12 月期间接受角膜移植手术的患者临床资料 28 例 (30 眼), 其中男性 13 例, 女性 15 例, 年龄 56 岁。术前均行角膜 OCTA 检查。根据术后是否发生排斥反应分为排斥组和非排斥组。定量测量角膜新生血管总面积、血管密度、血管长度等参数, 分析其与排斥反应发生的相关性, 并通过 ROC 曲线分析确定预测排斥反应的最佳截断值。

(评估患者每次就诊时候的视力、眼压、视网膜检影和屈光情况、眼前节光学相干断层扫描、荧光素染色、B 超、黄斑光学相关断层扫描)

结果: 排斥组术前角膜新生血管面积、血管密度均显著高于非排斥组 ($P < 0.05$)。角膜新生血管面积与排斥反应发生呈正相关 ($r = 0.652, P < 0.001$)。ROC 曲线分析显示, 当新生血管面积 $> 2.8 \text{ mm}^2$ 时, 预测排斥反应的敏感度为 78.5%, 特异度为 82.3% ($\text{AUC} = 0.856$)。

结论: 角膜 OCTA 可定量评估角膜新生血管, 术前新生血管面积 $> 2.8 \text{ mm}^2$ 可作为预测角膜移植排斥反应高风险的量化指标, 为临床早期预警和干预提供依据。

摘要编号: 209438

角膜水肿的治疗策略: 基于烟酰胺、疗效已验证的前房灌注剂

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目的: 目前, 角膜移植术是治疗角膜内皮功能障碍的主要手段, 但该手术依赖来源稀缺的供体; 而传统眼内灌注液则缺乏生物活性, 无法保护角膜内皮细胞 (CECs) 免受手术损伤。

方法: 烟酰胺功能化眼内灌注剂 采用 3 支 1 mL: 100 mg 的烟酰胺注射液 (广州白云山明兴制药, 单剂量无菌包装, 终端灭菌), 复方电解质眼内冲洗液 (沈阳兴齐眼药股份有限公司) 为符合《中国药典》眼科制剂标准的无菌制剂。所有配制操作均在 100 级生物安全柜内进行, 工作台面、容器及器械经 30 分钟紫外线照射后再用 75% 乙醇擦拭消

毒; 使用无菌注射器混合烟酰胺与电解质溶液, 避免非无菌接触。向 492 mL 复方电解质溶液中加入 300 mg 烟酰胺, 轻轻混匀后, 经 $0.22 \mu\text{m}$ 聚醚砜无菌膜过滤器过滤灭菌。此外, 通过鲎试验检测内毒素含量为 $0.310 \pm 0.015 \text{ EU/mL}$, 低于 USP/EP 规定的眼内用药 $< 0.5 \text{ EU/mL}$ 限值 (图 S5C)。最后将体积调整至 500 mL, 制备成 4.913 mM 烟酰胺眼内冲洗液, 其浓度根据烟酰胺分子量 (122.12 g/mol) 计算, 以确保最终浓度准确。结局指标 主要结局 首先需关注角膜内皮细胞密度 (ECD) 的变化。采用角膜内皮显微镜 (NSPC; 日本兵库县 Konan 公司) 检测角膜中央区 ECD。采用中心法, 手动选取中央区至少 50 个细胞进行分析, 因为自动测量可能不准确, 尤其是在术后早期。分别于术前及术后 1 天、7 天、1 个月、3 个月测量 ECD。角膜内皮细胞丢失率 (ECL 率) 计算公式为 “(术前角膜内皮细胞密度 - 术后相应时间点内皮细胞密度) / 术前角膜内皮细胞密度 $\times 100\%$ ”, 单位为百分比 (%)。为便于后续分析, 通过比较术前值与术后各时间点值计算 ECD 降低率。次要结局 次要结局包括: 术前及术后 1 天、7 天、1 个月、3 个月测量的最佳矫正视力 (BCVA)、角膜中央厚度 (CCT) 和眼压 (IOP); 仅术前测量的前房深度 (ACD)、晶状体厚度 (LT) 和眼轴长度 (AL); 术中指标包括有效超声时间 (EPT)、累积超声能量 (CDE)、手术间时间、平衡盐溶液 (BSS) 总用量以及皮质吸除的注吸时间。此外, 在术后相应时间点 (1 天、7 天、1 个月、3 个月) 进行裂隙灯照相, 以便进一步评估。

结果: 体外研究结果 体外研究表明, NAM-IPA 可通过以下机制提高角膜内皮细胞 (CEC) 的活性: 抑制活性氧 (ROS) 介导的氧化损伤; 恢复线粒体功能; 抑制肿瘤坏死因子 (TNF) 依赖性细胞凋亡。动物实验结果 在兔角膜内皮损伤模型中, NAM-IPA 展现出明确的治疗效果: 加速角膜厚度恢复, 帮助受损角膜回归正常形态; 维持角膜内皮细胞密度, 减少细胞丢失, 保护角膜内皮功能。随机临床试验结果 一项随机试验证实, 与对照组相比, NAM-IPA 组的角膜内皮细胞丢失率显著更低: NAM-IPA 组: 细胞丢失率为 $16.99 \pm 17.06\%$; 对照组: 细胞丢失率为 $34.24 \pm 19.02\%$; 安全性方面: 试验过程中未观察到与 NAM-IPA 相关的不良事件, 表明其在研究设定条件下具有良好的安全性。

结论: 这种生物活性液体剂可满足角膜内皮细胞 (CEC) 动态保护的需求, 为缓解角膜内皮功能障碍提供了一种具有潜力的非移植治疗策略。

摘要编号: 201383

调控交联程度的那他霉素缓释薄膜对真菌性角膜炎的治疗作用

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目的: 真菌性角膜炎是一种致盲率高的感染性角膜疾病, 传统治疗方法如滴眼液因生物利用度低、滞留时间短而疗效有限。本研究旨在开发一种基于海藻酸钠 (SA) 和聚环氧乙烷 (PEO) 的载药眼用角膜接触镜, 通过调节乙醇 / 水交联比例优化那他霉素 (NATA) 的缓释性能, 并评估其治疗烟曲霉菌性角膜炎的效果。

方法: 采用钙离子交联法制备不同乙醇 / 水比例 (2:1、1:1、1:2、0:1) 的 SA-PEO-NATA 薄膜。通过力学性能测试、傅里叶变换红外光谱分析、扫描电子显微镜对薄膜进行表征; UV-Vis 光谱法测定药物释放曲线; 体外抑菌实验评估其对烟曲霉菌的抑制效果; CCK-8 法和 Draize 实验检测其细胞相容性与眼表安全性; 建立烟曲霉菌感染 C57BL/6 小鼠角膜炎模型, 用所制备的 SA-PEO-NATA 薄膜一天一次治疗, 使用裂隙灯摄影、临床评分、HE 染色和平板计数实验观察载药薄膜的治疗效果。

结果: 乙醇与水比例为 2:1 组载药薄膜具有最优的机械性能 (弹性模量 0.57 MPa) 和最佳药物释放速率 (9 小时释放 50%, 20 小时达 95.4%)。SA-PEO-NATA 薄膜能显著抑制烟曲霉菌丝生长和生物膜形成, 抑菌环直径大于单纯 NATA 对照组, 且在室温放置一个月后仍保持良好抑菌活性。体内外安全性实验表明薄膜无显著细胞毒性和眼表刺激性。在真菌性角膜炎小鼠模型中, 与单纯 NATA 治疗组相比, SA-PEO-NATA 治疗组在感染后第 5 天角膜水肿和混浊面积显著减轻, 真菌载量下降, 炎症细胞浸润减轻, 并显著降低细胞中 IL-6、TNF- α 和 MIP-2 的表达。

结论: SA-PEO-NATA 眼用载药薄膜具有良好的生物相容性、缓释性能和显著抗真菌、抗炎作用, 尤其以 2:1 乙醇 / 水交联组为最优。该载药体系可作为一种潜在的眼表给药策略, 用于延长那他霉素滞留时间、改善真菌性角膜炎的治疗效果。

摘要编号: 209810

调节性 T 细胞通过外泌体 CD47 维持角膜缘干细胞干性并促进损伤修复

第一作者: Chao WEI

共同作者: Shengqian DOU, Li MA, Weiyun SHI, Yaoyao YU, Qingjun ZHOU

目的: 探讨调节性 T 细胞 (Treg) 在维持角膜稳态及促进损伤修复中的作用与分子机制。

方法: 通过构建特异性清除 Treg 的小鼠模型, 并结合单细胞测序技术, 分析 Treg 对角膜上皮损伤修复 (CEWH) 及角膜缘干 / 祖细胞 (LSC) 功能的影响; 通过局部 Treg 外泌体 (Treg-Exo) 滴眼, 以及 Treg 特异性敲除 Rab27a 小鼠模型, 评估 Treg-Exo 在角膜损伤修复和 LSC 维持中的功能; 利用外泌体蛋白质组学, 并结合 Treg 特异性基因敲除模型, 探究 Treg 通过外泌体调控损伤修复与 LSC 的分子机制。最后, 在 AIRE 缺陷小鼠和糖尿病小鼠角膜损伤模型中, 评估局部应用 Treg-Exo 的治疗效果。

结果: 谱系特异性清除 Treg 模型及单细胞 RNA 测序结果显示, Treg 通过维持 LSC 静息状态与干性, 促进 CEWH。局部应用 Treg-Exo 实验及 Treg 特异性敲除 Rab27a 抑制外泌体分泌实验均证实, Treg-Exo 是促进 CEWH 的关键因素。蛋白质组学分析结果显示 CD47 为 Treg-Exo 的关键功能分子, Treg 特异性敲除 Cd47 或应用 CD47 缺陷的 Treg-Exo 均显著延迟 CEWH, 并导致 LSC 干性降低和过度增殖。反之, 局部应用 Treg-Exo 可有效逆转因 Treg 缺失导致的 CEWH 延迟, 并维持 LSC 干性。治疗实验表明, 局部应用 Treg-Exo 均显著促进 AIRE 缺陷小鼠和糖尿病小鼠的 CEWH, 并改善 LSC 功能。

结论: 上述发现揭示了 Treg 通过其分泌的细胞外囊泡促进 CEWH 并维持 LSC 功能的新机制, 为角膜损伤修复相关疾病治疗提供新的干预策略。

摘要编号: 210100

重组牛碱性成纤维细胞生长因子眼用凝胶联合人文关怀护理在白内障术后干眼症中的应用效果

第一作者: 薇杨

目的: 探讨重组牛碱性成纤维细胞生长因子眼用凝胶联合人文关怀护理在白内障术后干眼症患者中的应用效果。

方法: 选取 2023 年 12 月 -2024 年 12 月在我院接受治疗的 80 例 PCSD 患者作为研究对象, 在组间

性别、年龄、病程等基线资料均衡可比原则的基础上，按照随机数字表法分为对照组和观察组，每组40例。对照组给予人工泪液+人文关怀护理；观察组在对照组的基础上加用重组牛碱性成纤维细胞生长因子眼用凝胶。两组均持续治疗1个月。比较两组患者的临床疗效，治疗前后炎症因子〔白细胞介素（IL）-1、IL-6、眼表疾病指数评分（OSDI）、角膜荧光染色评分（CFS）及不良反应发生率。

结果：综合干预后，观察组患者总有效率为93.33%，高于对照组的73.33%，差异有统计学意义（ $P < 0.05$ ）。综合干预后，两组患者的IL-1、IL-6及OSDI、CFS评分均降低，但观察组患者各项指标水平均低于对照组，差异均有统计学意义（ $P < 0.05$ ）。两组患者不良反应发生率比较差异无统计学意义（ $P > 0.05$ ）。

结论：重组牛碱性成纤维细胞生长因子眼用凝胶联合人文关怀护理可以提高PCSD的临床疗效，减轻患者眼部炎症反应，促进角膜上皮恢复，且治疗安全性较好。

摘要编号：209008

青春期前肥胖男孩胰岛素样生长因子-1与眼表参数之间的关联

第一作者：Lixia YANG

目的：探讨肥胖青春期前男孩体内胰岛素样生长因子1（IGF-1）水平与眼表参数的相关性。

方法：选取30名肥胖青春期前男孩和30名同龄同性别的健康对照组，通过：（一）体格测量：身高，体重，BMI；（二）实验室检测：FT3，FT4，TSH，IGF-1，总胆固醇（TC）、高密度脂蛋白胆固醇（HDL-C）、低密度脂蛋白胆固醇（LDL-C）、甘油三酯（TG）、空腹血糖、尿酸、丙氨酸氨基转移酶（ALT）、尿素氮和肌酐；

（三）眼表评估：脂质层测试（LLT）、部分眨眼率（PBR）、下泪膜高度（TMH）以及首次非侵入性泪膜破裂时间（FNITBUT）、平均非侵入性泪膜破裂时间（MNITBUT）、Schirmer I泪膜测试（SIT）、客观散射指数（OSI）、平均客观散射指数（MOSI）以及睑板腺评分（meiboscore）。采用student's t检验进行组间比较或曼-惠特尼U检验进行统计分析，分类变量则通过卡方检验进行比较。IGF-1、BMISDS与眼表参数间的关联性通过皮尔逊相关分析或斯皮尔曼相关分析进行评估。为探究SIT作为因变量与其他指标的关联性，将采用多元线性回归分析，以确定SIT与IGF-1的关联是否独立于其他指标。此外，通过多变量逻辑回归分析，在调整其他代谢变量后，评估睑板腺评分与IGF-1的关联。在构建多元逻辑回归模型时，

为避免共线性问题，仅选用反映空腹血糖和胰岛素水平的HOMA-IR指标。统计学显著性以P值小于0.05为判定标准。

结果：肥胖组的IGF-1水平显著降低（ $P = 0.001$ ），Schirmer I泪液测试（SIT）值下降（ $P < 0.001$ ），而睑板腺评分（meiboscore）则高于对照组（ $P = 0.015$ ）。双变量分析表明，IGF-1与SIT呈正相关（ $r = 0.677$ ， $P < 0.001$ ），与睑板腺评分呈负相关（ $r = -0.487$ ， $P < 0.001$ ）。多元回归分析显示，IGF-1（ $P < 0.001$ ）和甘油三酯（ $P = 0.028$ ）对SIT具有独立影响。逻辑回归分析表明，IGF-1水平降低与睑板腺评分升高存在显著关联（OR 0.994，95%置信区间0.988-1.000； $P = 0.033$ ）。

结论：肥胖青春期前男孩的IGF-1水平降低，与SIT值下降和睑板腺评分升高存在独立关联，且不受肥胖程度及传统心血管风险因素影响。这提示，监测肥胖儿童的眼表参数可能为临床实践提供新的关注方向。

摘要编号：209346

飞秒激光辅助微创板层角膜移植术治疗轻中度及重度圆锥角膜的疗效对比

第一作者：李娜

目的：比较飞秒激光辅助微创板层角膜移植术（FL-MILK）治疗轻中度圆锥角膜（KC）和晚期KC的疗效。

方法：前瞻性病例系列研究。56例63只眼进行性KC患者接受FL-MILK治疗，分为第1组〔平均角膜曲率（Kmean） ≤ 53 D〕和第2组（Kmean > 53 D）。术前和术后24个月评价两组最佳角膜矫正视力（BSCVA）、Kmean、最大角膜曲率（Kmax）、中央前表面高度（ACE）、第一次压平时角膜硬度参数A1（SP-A1）和变形幅度（DA）。

结果：第1组的平均BSCVA从术前的 0.34 ± 0.13 logMAR改善至术后24个月的 0.25 ± 0.13 logMAR（ $F = 10.10$ ， $P < .0001$ ），第2组从 0.54 ± 0.31 logMAR提高至 0.40 ± 0.26 logMAR（ $F = 9.06$ ， $P = 0.0002$ ）。术后24个月，第2组的平均Kmax降低了10.9 D，平均Kmean降低了3.9 D；而第1组没有观察到显著变化。术后24个月，第1组的ACE从 19.2 ± 10.0 降至 5.2 ± 8.4 （ $F = 28.5$ ， $P < .0001$ ），第2组从 46.2 ± 16.3 至 19.1 ± 9.0 （ $F = 49.6$ ， $P < 0.0001$ ）；第1组中SP-A1从 53.8 ± 12.7 mmHg/mm升高至 95.9 ± 20.2 mmHg/mm（ $F = 70.0$ ， $P < 0.0001$ ），第2组从 38.6 ± 13.4 mmHg/mm升高至 89.3 ± 18.2 mmHg/mm（ $F = 96.9$ ， $P < 0.0001$ ）；第1组DA从 1.30 ± 0.14 mm降至 1.17 ± 0.13 mm（ F

= 14.0, $P < .0001$), 第 2 组从 1.40 ± 0.16 mm 降至 1.18 ± 0.10 mm ($F = 27.6$, $P < .0001$)。

结论: 术后 24 个月随访中, FL-MILK 可以控制轻中度和重度圆锥角膜的进展。较陡峭的角膜在 FL-MILK 后更容易变平。

摘要编号: **200656**

高血糖对泪膜和睑板腺功能障碍的影响: 一项横断面研究

第一作者: Bao Tong

目的: 血糖水平升高可能会破坏泪膜, 但是否会影响睑板腺功能尚未得知。本研究拟探讨高血糖分级与干眼 (DED) 之间的关系, 并分析其对泪膜和睑板腺的影响。

方法: 本项横断面研究于 2024 年 1 月至 8 月在赤峰朝聚眼科医院开展, 共纳入 56 名具有 DED 症状的受试者。使用非侵入性眼表分析仪测量泪河高度 (TMH)、非侵入性泪膜破裂时间 (FNIBUT、ANIBUT)、结膜充血评分和睑板腺萎缩情况 (U-LAMG、L-LAMG)。同时采集受试者空腹血糖水平, 并根据血糖水平将患者分为血糖 ≥ 7 mmol/L 和 < 7 mmol/L 两组。分析血糖水平与 DED 参数之间的关系。

结果: 56 名患者 (平均年龄 52.5 ± 18.0 岁) 中, 28 人 (50%) 血糖水平 ≥ 7 mmol/L, 28 人 (50%) 血糖水平 < 7 mmol/L。血糖升高的患者报告了更严重的 DED 症状 (眼表疾病指数 OSDI 评分, $p = 0.046$)。此外, 较高的血糖水平与显著较低的 TMH、FNIBUT、ANIBUT 和结膜充血评分相关 ($p < 0.05$)。相反, 血糖较低的患者 U-LAMG 和 L-LAMG 评分显著更低 ($p < 0.05$)。血糖水平与眼压 (IOP)、结膜充血评分、U-LAMG 和 L-LAMG 呈正相关 ($p < 0.05$), 而与 TMH、FNIBUT 和 ANIBUT 呈负相关 ($p < 0.05$), 但血糖水平与 OSDI 评分之间无显著相关性 ($p = 0.157$)。

结论: 血糖水平升高与 DED 的主观症状和客观体征均有相关性, 包括泪膜稳定性受损和睑板腺功能异常。研究结果提示, 高血糖可能促使 DED 和 MGD 的发生, 强调了在糖尿病患者中控制血糖对于预防眼表疾病的重要性。

近视

摘要编号: **210317**

0.01% 阿托品滴眼液对近视儿童黄斑血管密度和脉络膜厚度的影响

第一作者: Xintong LIANG

共同作者: Shi-ming LI, Ningli WANG, Shifei WEI

目的: 评估 0.01% 低浓度阿托品滴眼液对近视儿童黄斑血管密度 (MVD) 及脉络膜厚度 (CT) 的影响。

方法: 本研究采用平行组、安慰剂对照、随机双盲设计。共招募 40 名受试者 (80 只眼), 平均年龄 9.86 ± 1.73 岁 (男性 19 例, 女性 21 例), 按 1:1 比例随机分配至 0.01% ATR 组和安慰剂组。所有受试者接受每晚一次双眼 0.01% ATR 或安慰剂治疗, 持续六个月。通过光学相干断层扫描血管成像 (OCTA) 测量浅层和深层毛细血管丛的 MVD 及 CT 值, 扫描范围覆盖以黄斑中心凹为中心的 $6 \text{ mm} \times 6 \text{ mm}$ 区域。

结果: 经过 6 个月治疗后, 0.01% ATR 组的黄斑中心凹下平均 CT 值明显高于安慰剂组 ($258.33 \pm 38.73 \mu\text{m}$ vs $238.71 \pm 48.13 \mu\text{m}$, $P = 0.041$)。此外, ATR 组在黄斑中心下方 (I1 和 I3)、上方 (S1 和 S3)、颞侧 (T1 和 T2) 以及鼻侧 (N1 和 N2) 的 1.5 mm 和 3 mm 处 CT 值均显著高于安慰剂组 ($P < 0.05$)。并且, 0.01% ATR 组在黄斑区下方浅层毛细血管丛 (SCP) 区域的平均 MVD 也明显大于安慰剂组 ($50.95 \pm 2.46\%$ vs $49.70 \pm 2.74\%$, $P < 0.05$)。

结论: 经过 6 个月的治疗后, 0.01% ATR 组的黄斑区 SCP 血管密度和 CT 值显著大于安慰剂组。

摘要编号: **209628**

12 度进阶正向离焦镜片在儿童青少年近视防控中的真实世界研究

第一作者: Jifeng YU

目的: 评估 12 度进阶正向离焦镜片在儿童青少年近视中的疗效分析。

方法: 本研究为一项回顾性、真实世界队列研究。连续纳入 200 名接受近视防控镜片治疗的儿童青少年患者, 其中 12 度进阶正向离焦镜片组与 DIMS 镜片各 100 名 (对照组)。收集并分析所有受试者右眼在基线、3、6、9 及 12 个月时的球镜度数与眼轴长度数据。采用非参数检验进行组间及亚组比较。

结果: 经过 12 个月随访, 主要结果如下: 球镜控制: 12 度进阶正向离焦镜片组球镜变化中位数为 0

(-0.25, 0), 优于 DIMS 镜片组的 -0.25 (-0.5, 0) ($P = 0.046$), 显示出延缓近视发展的趋势。关键亚组分析: 性别: 在男性患者中, 12 度镜片的优势在 6 个月 ($P = 0.015$)、9 个月 ($P = 0.034$) 和 12 个月 ($P = 0.005$) 均持续存在且愈发显著。屈光度: 在初始近视度数 ≤ -3.00 D 的患者中, 12 个月时 12 度镜片组表现出显著更优的防控效果 ($P = 0.014$)。年龄: 在 ≤ 12 岁的组别中, 12 度镜片在 6 个月 ($P = 0.028$) 和 12 个月 ($P = 0.049$) 时均优于 DIMS 镜片。眼轴控制: 两组在全人群的右眼眼轴长度增长上无显著差异 (12 个月时 $P = 0.620$)。然而, 在初始眼轴 < 25 mm 的患者中, 12 度镜片在 6 个月时显示出优于 DIMS 镜片的趋势 ($P = 0.083$)。

结论: 12 度进阶正向离焦镜片在近视屈光度进展方面表现出优于 DIMS 镜片的整体疗效, 尤其在男性、中度近视及较低龄患者中优势显著。可为儿童青少年近视防控提供一种更具优势的临床选择。

摘要编号: 208963

一种新型轴向长度测量方法的初步探索

第一作者: Zhiwei LUO

共同作者: Xiaoning LI, Guangyao RAN, Zhikuan YANG

目的: 脉络膜厚度的变化会影响眼轴长度 (AL) 测量的准确性。我们的研究团队创建了一种新的测量模型, 称为真实眼轴长度 (RAL), 该模型将角膜顶点到脉络膜后表面的距离整合为一个指标, 从而减少了脉络膜变化对眼轴长度测量的影响。RAL 模型采用扫频源光学相干断层扫描血管造影 (SS-OCTA) 技术 (SVision Imaging, VG200D) 对来自中国湖南省不同年龄段的 5 至 17 岁个体的眼轴长度进行评估。

方法: 本研究使用 VG200D 和 IOL Master700 测量眼轴长度、中央角膜厚度、中央前房深度和晶状体厚度。采用组内相关系数 (ICC) 和 Bland-Altman 分析来评估设备的一致性。在比较设备一致性之后, 使用 VG200D 分析不同年龄段的 RAL 和脉络膜厚度。

结果: 共纳入 1916 名受试者 (968 名男性, 948 名女性), 年龄在 5 至 17 岁之间。使用 VG200D 和 Master 700 测量的 3832 只眼的平均眼轴长度 (AL) 分别为 23.62 ± 1.11 毫米和 23.58 ± 1.10 毫米, 显示出良好的一致性 ($ICC = 0.883$)。平均视网膜轴长 (RAL) 为 24.13 ± 1.09 毫米, 比 VG200D 测量的 AL 约长 0.51 毫米。RAL 与 AL 之间的差异随着年龄的增长呈下降趋势, 且这种趋势与年龄显著相关 (Pearson r with $p < 0.05$)。RAL 随年龄显著增加, 但年龄与性别之间无交互

作用 (双向方差分析: $F_{age} = 168.6$, $p < 0.0001$, $F_{gender} = 156.3$, $p < 0.0001$, $F_{interaction} = 1.606$, $p \leq 0.0826$ for RAL)。而中央角膜厚度 (CT) 随年龄显著变薄, 且年龄与性别之间存在交互作用 (双向方差分析: $F_{age} = 15.62$, $p < 0.0001$, $F_{gender} = 6.311$, $p = 0.0120$, $F_{interaction} = 3.070$, $p \leq 0.0002$)。

结论: VG200D 和 Master 700 测量的眼轴长度相似。RAL 比 AL 约长 0.49–0.56 毫米, 且男性的 RAL 大于女性。CT 的变化可能显著影响 RAL。RAL 可能是监测眼睛发育的新方法, 但还需要更多研究来比较 RAL 和 AL 在近视预防和控制措施后的有效性。

摘要编号: 209215

三种特殊设计近视控制框架眼镜对散光的影响

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目的: 本研究旨在探究在日常诊疗中特殊设计的近视控制框架是否对散光有影响。

方法: 研究采用回顾性设计, 连续地从四川大学华西医院收集了 74 名门诊就诊者 (年龄: 6–12 岁) 的资料, 其中 23 名使用镜片 A (MyoVision), 22 名使用镜片 B (DIMS), 29 名使用镜片 C (Stellest)。收集的资料包含每位就诊者的基线年龄、性别、基线和戴镜 2 年的配镜处方。配镜处方的散光是依据睫状肌麻痹下客观验光和主观验光结果所给, 并在分析时进行矢量分解为 J0 和 J45。

结果: 分别戴镜镜片 A、B、C 两年后, 总的眼部散光增长为 -0.41 ± 0.29 D、 -0.42 ± 0.34 D 和 -0.41 ± 0.31 D ($p < 0.001$), J0 增长为 0.19 ± 0.15 D、 0.19 ± 0.18 D 和 0.20 ± 0.16 D ($p < 0.001$)。J45 在配戴镜片 A、C 前后仍保持不变 ($p = 0.117$ 、 0.211), 在配戴镜片 B 后有所减少 ($p = 0.024$), 但减少量 (-0.07 ± 0.14 D) 并没有临床意义。三种镜片相比, 其总散光、J0、J45 的改变量均相同 ($p = 0.985$ 、 0.973 、 0.316)。多元线性回归分析发现散光改变量仅与等效球镜度的改变有关 ($\beta = 0.308$, $p = 0.006$)。

结论: 使用特殊设计近视控制框架 2 年可引起散光轻度增加, 但增加量 (< 0.25 D) 并没有临床意义。散光的增加与镜片类型无关, 但与近视进展有关。

摘要编号: 209015

不同屈光度人群晶状体悬韧带松弛度的研究

第一作者: Ruowu LIU

目的: 探讨不同屈光状态晶状体悬韧带松弛度的差异。

方法: 纳入 2022 年 6 月-2023 年 1 月就诊于我院眼科的成年近视患者 67 人 (共 130 例眼), 分为 4 组, 包括正视组 24 例眼、低度近视组 ($-0.5\text{D} \sim -3.0\text{D}$) 36 例眼, 中度近视组 ($-3.00\text{D} \sim -6.0\text{D}$) 36 例眼, 高度近视组 ($> -6.0\text{D}$) 34 例眼。所有研究对象均行相关病史采集, 记录基本信息并接受眼科相关检查, 包括视力、眼压、电脑验光、IOL-Master 500 测量、光学相干断层扫描 (optical coherence tomography, OCT)、最佳矫正视力 (best-corrected visual acuity, BCVA)、超声生物显微镜 (ultrasound biomicroscopy, UBM) 及裂隙灯下眼底检查。对 UBM 检查下晶状体悬韧带无异常的每位入组人员分别测量坐位及卧位下 A 超前房深度 (anterior chamber depth, ACD) 及眼轴长度 (eye axial length, AL)。将不同体位下 ACD 差值记为晶状体活动度 (range of lens motion, RLM), 比较各组间眼部生物学参数及 RLM 差异, 评估不同屈光度组间晶状体悬韧带松弛度差异。

结果: 四组受试者性别、年龄、眼压 (IOP) 差异均无统计学意义 ($P = 0.237$, $P = 0.600$, $P = 0.565$)。卧位 A 超测得低度、重度、重度近视组 ACD 与 AL 呈正相关 ($P < 0.01$, $r = 0.709$; $P = 0.013$, $r = 0.560$; $P = 0.014$, $r = 0.417$); 坐位 A 超测得低度、重度、重度近视组 ACD 与 AL 呈正相关 ($P < 0.01$, $r = 0.747$; $P = 0.013$, $r = 0.559$; $P = 0.017$, $r = 0.405$)。正视组中各种方法测得 ACD 与 AL 间无统计学相关性 ($P > 0.05$)。正视、低度、中度、重度近视组 RLM 均值分别为 $0.053 \pm 0.041\text{mm}$ 、 $0.079 \pm 0.05\text{mm}$ 、 $0.084 \pm 0.044\text{mm}$ 、 $0.112 \pm 0.063\text{mm}$, 差异有统计学意义 ($P < 0.05$)。正视组与高度近视 RLM 组间差异有统计学意义 ($P = 0.018$, $P < 0.05$), 其余各组间两两比较均无统计学意义。散瞳后高度近视组和正视组 ACD 显著加深, 差异具有统计学意义, 组间比较 ACD 变化无统计学差异。散瞳前后高度近视组和正视组 AL 变化无统计学差异。散瞳后高度近视组 RLM ($0.118 \pm 0.075\text{mm}$) 较正视组 ($0.064 \pm 0.059\text{mm}$) 增大, 差异有统计学意义 ($P = 0.032$, $P > 0.05$)。

结论: 1. AL 与 ACD 增加呈正相关, 但不同屈光度组别相关系数具有差异性; 2. RLM 在高度近视组均值最大, 与正视组相比结果具有统计学差异, 高度近视患者组晶状体悬韧带松弛度最大; 3. 眼部 A

超测量不同体位下 ACD 变化对评估轻微晶状体悬韧带松弛度具有参考价值。

摘要编号: 209440

中国青年近视者视盘周围视网膜神经纤维层颞侧增厚的方向性特征

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目的: 本研究旨在研究中国年轻人群中视盘周围视网膜神经纤维层 (RNFL) 厚度在不同细分方向上的分布情况, 并探讨近视对各方向 RNFL 厚度的影响。

方法: 本研究为横断面研究, 纳入安阳大学生眼病研究 (Anyang University Students Eye Study, AUSES) 中无眼部疾病但可能存在屈光不正的中国青年人。所有受试者均接受盐酸环喷托酯滴眼液睫状肌麻痹后屈光度检查、眼轴长度测量及视盘周围 RNFL 的光学相干断层扫描 (OCT) 检查。测量不同方向分类情况下 (视盘周围 4、8、16 个方向) 的 RNFL 厚度, 探索不同屈光度分组下不同方向分类的 RNFL 厚度变化, 应用平滑曲线拟合分析其与屈光不正的关系。

结果: 共纳入 4356 名受试者, 平均年龄 20.11 ± 1.55 岁, 其中男性 1059 名 (24.31%), 女性 3297 名 (75.69%)。平均视盘周围 RNFL 厚度为 $100.01 \pm 8.48\text{ }\mu\text{m}$, 呈近似正态分布, 平均 RNFL 厚度随着近视漂移逐渐变薄, 但是在不同方向上这种趋势出现分化。在视盘周围分成 4 个方向进行 RNFL 厚度比较时, 中度和高度近视组的颞侧 RNFL 厚度显著高于正视组; 在 8 个方向的分类中, 颞上和颞下方向上有相似的变化; 在 16 个方向的分类中, 随着近视程度加重, 颞侧上下 $22.5^\circ \sim 45^\circ$ 方向 (颞上 $22.5^\circ \sim 45^\circ$ 范围内的 TU2 和颞下 $22.5^\circ \sim 45^\circ$ 范围内的 TL2) 的 RNFL 厚度增加。在调整眼轴长度、性别、年龄、前房深度及 BMI 后, 平滑曲线拟合发现颞侧 RNFL 厚度随近视加深而更厚; 在 16 方向分区的 TU2 与 TL2 厚度增厚显著。以眼轴长度为近视参数探究 RNFL 变化时, 颞侧方向随着眼轴伸长而增厚同样在 TU2 和 TL2 显著。

结论: 本研究报道了青年人视盘周围 RNFL 厚度在多个方向分区下的分布数据。随着近视程度增加, 颞侧 RNFL 增厚现象为区分近视相关的 RNFL 改变与青光眼视神经损伤提供了有价值的指标, 尤其在颞侧上下 $22.5^\circ \sim 45^\circ$ 的 TU2 和 TL2 方向上的变化更具特征性。

摘要编号: 208780

从被动筛查到协同智能治理儿童视力健康管理模式优化探索

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目的: 在儿童青少年近视防控进入主动健康阶段的背景下, 传统以学校视力普查为中心的管理模式缺乏持续干预与行为反馈机制, 家长、社区与学校之间缺乏路径协同, 导致“查完即止”的断点式管理。本研究旨在构建具有持续反馈能力的协同智能治理模型, 推动儿童视力健康从单次筛查向闭环管理体系转型。

方法: 本研究以协同治理理论和健康行为激活模型为框架, 采用“找堵点 – 拆路径 – 小范围试运行”三步构建策略。在需求识别阶段, 邀请学校卫生教师、社区护士和家长代表进行半结构化访谈, 提取导致家长不行动、信息不响应、随访未接续的关键断点样本。在路径重构阶段, 依托“行为触发机制”, 将筛查、消息推送、家长反馈、健康宣教与社区复核等环节拆分为可执行指令节点, 形成“触发源 – 责任主体 – 反馈形式”三维流程矩阵, 并为护理团队设置“路径协调与执行黏性提升”角色定位。试运行阶段由护理团队主导小范围快速迭代, 每两周进行路径复盘会议, 根据用户响应情况调整消息频率、语言形式与节点顺序, 逐步固化为视力健康管理标准化操作流程 (Standard Operating Procedure, SOP)。

结果: 协同智能治理模型使“筛查 – 反馈 – 随访 – 再干预”形成连续闭环, 学校健康教育与社区干预不再分割运行, 护理团队从传统的执行者角色转向路径治理组织者, 显著提升健康管理链条协调性。在实践中, 家长响应行为由被动确认转向主动反馈, 医疗卫生信息与校园健康系统之间建立有效接口, 干预动作的连续性与执行黏性提升明显, 形成“信息可追踪、行为可响应、责任可定位”的治理结构。

结论: 该模式通过构建多点联动、可回溯的儿童视力健康治理路径, 实现了从“结果通知型管理”向“行为激活型治理”的转变, 体现了护理在公共健康治理中的系统整合能力。研究形成的路径设计方法和 SOP 框架具有可推广性, 可为地区性儿童视力健康管理体系优化提供理论支撑与实践范式。

摘要编号: 204660

低度近视角膜塑形镜治疗的影响因素及管理策略

第一作者: Yuzhuo FAN

目的: 本研究旨在探讨影响角膜塑形镜 (Ortho-K) 对低度近视治疗效果的关键人口学、生物计量学及行为因素, 并为接受 Ortho-K 治疗的低度近视患者提供管理思路。

方法: 一项为期 12 个月的回顾性研究对 380 名接受 Ortho-K 治疗的患者进行了分析。通过分层分析和多项逻辑回归, 识别了与低度近视患者 Ortho-K 治疗效果相关的生物特征和行为指标。

结果: 低度近视组 12 个月的眼轴增长显著长于中度近视组 ($P < 0.0001$)。多变量逻辑回归分析显示, 在低度近视患者中, 单纯使用 Ortho-K 治疗的患者发生快速眼轴增长的风险是联合使用 0.01% 阿托品患者的 2.23 倍 ($P = 0.01$; 优势比 [OR] = 2.23; 95% 置信区间 [CI], 1.19–4.20)。多项逻辑回归分析表明, 在低度近视患者中, 女性 ($P < 0.0001$; OR = 0.4; 95% 置信区间 [CI], 0.22–0.72)、年龄较小 ($P = 0.01$; OR = 0.79; 95% 置信区间 [CI], 0.66–0.93)、较平坦的平均角膜曲率 ($P = 0.004$; OR = 0.74; 95% 置信区间 [CI], 0.61–0.91) 以及父母双方均近视 ($P = 0.03$; OR = 0.18; 95% 置信区间 [CI], 0.05–0.71) 与较差的治疗效果相关。而富含白肉 (如鱼类和鸭肉) 的饮食 ($P = 0.01$; OR = 0.06; 95% 置信区间 [CI], 0.01–0.54) 是保护性行为因素, 与低度近视儿童眼轴增长减缓相关。

结论: 具有一个或多个人口学和生物计量学风险因素 (年龄较小、女性、平均角膜曲率较平坦、父母双方近视) 的低度近视患者, 在临床中需要给予高度关注, 因为其近视进展风险较高。对于低度近视患者, Ortho-K 联合 0.01% 阿托品治疗可能比单纯使用 Ortho-K 效果更佳。富含白肉的饮食是保护性行为因素, 有助于控制这些患者的近视进展。

摘要编号: 209039

低强度红光调控人视网膜色素上皮细胞活性及一氧化氮释放的实验研究

第一作者: Jia-hao TAN

目的: 近年来, 大量研究证实低强度红光在延缓儿童青少年近视进展方面具有显著效果, 但其作用的细胞与分子机制尚不明确。视网膜色素上皮 (Retinal Pigment Epithelium, RPE) 是维持视网膜结构和功能稳定的关键细胞层, 参与视网膜代谢调控、血液循环与信号转导。为了阐明红光可能的作用靶点与信号机制, 本研究探讨 670 nm 低强度红光照射

对人 RPE 细胞活性、一氧化氮 (NO) 及转化生长因子 $\beta 1$ (TGF- $\beta 1$) 表达的影响。

方法: 取对数生长期人 RPE 细胞, 分为对照组 (无光照) 与实验组 (670 nm 红光, 2 mW/cm^2)。实验组按照照射时间分为 5 min、15 min 和 30 min 亚组。采用 CCK-8 法检测细胞活性, NO 检测试剂盒测定培养上清中 NO 含量, ELISA 法检测 TGF- $\beta 1$ 水平。

结果: 与对照组相比, 红光照射 5 min、15 min 及 30 min 组的 RPE 细胞活性均显著增强 ($P < 0.0001$), 其中 15 min 组活性最高。NO 含量随照射时间延长而逐步升高, 各组间差异具有统计学意义 ($P < 0.05$)。TGF- $\beta 1$ 水平在各组间无显著变化 ($P > 0.05$)。

结论: 670 nm 低强度红光可显著增强 RPE 细胞活性并促进 NO 释放, 提示其可能通过改善局部血流或代谢微环境参与脉络膜厚度调节, 从而在近视防控中发挥积极作用。红光照射未显著影响 TGF- $\beta 1$ 表达, 说明其生物学效应可能主要依赖 NO 相关信号途径而非 TGF- $\beta 1$ 介导机制。本研究为低强度红光在近视干预中的作用机制提供了细胞水平的实验依据。

摘要编号: 209521

低龄近视儿童配戴周边离焦软镜联合使用 0.01% 阿托品的临床效果分析

第一作者: Xianli DU

目的: 探讨低龄近视儿童配戴周边离焦软性角膜接触镜 (DISC) 并联合使用 0.01% 阿托品滴眼液的近视防控效果, 并观察视觉质量变化情况。

方法: 前瞻性研究。60 名配戴周边离焦软镜的低龄近视儿童参与访视, 年龄 (6.27 ± 0.59) 岁, 近视度数 (-2.54 ± 1.18) D, 散光 ≤ -1.00 D。在 0~6 个月, 给予所有受试者配戴周边离焦软镜 (阶段 1), 在 6~12 个月根据眼轴增长快慢将受试者分为两组 (阶段 2), DISC 组 (眼轴增长 $< 0.2 \text{ mm/6 个月}$) 和 DISCA 组 (眼轴增长 $\geq 0.2 \text{ mm/6 个月}$), DISCA 组在阶段 2 联合应用 0.01% 阿托品滴眼液。每次随访时测量眼轴, 并在基线和 1 月随访时分别检测裸眼和戴镜状态下的眼波前相差 (iTrace)。采用 t 检验和 Mann-Whitney U 检验进行统计分析。

结果: 基线时两组儿童的生物学特征相似 ($P > 0.05$), 52 名儿童完成访视 (DISCn = 28, DISCAn = 24)。1 年随访期结束时, DISC 组和 DISCA 组儿童眼轴增长分别为 $0.32 \pm 0.06 \text{ mm}$ 和 $0.40 \pm 0.10 \text{ mm}$ 。平均眼轴增长为 0.12 ± 0.07 ,

$0.19 \pm 0.08 \text{ mm}$ DISC 组和 0.27 ± 0.11 , $0.13 \pm 0.08 \text{ mm}$ DISCA 组在第一和第二阶段。在阶段 2, DISCA 组联合使用 0.01% 阿托品, 眼轴增长速度较阶段一和 DISC 组均明显减缓 ($0.13 \pm 0.08 \text{ vs } 0.27 \pm 0.11 \text{ mm}$, $P < 0.05$) (阶段二 vs 阶段一), ($0.13 \pm 0.08 \text{ vs } 0.19 \pm 0.08 \text{ mm}$, $P < 0.05$) (DISCA vs DISCA)。同时, 配戴周边离焦软镜后眼视觉质量下降, 戴镜状态下总高阶像差、彗差、球差、二次像散和三叶草均不同程度升高。治疗前后, 总高阶相差 DISC 组 ($0.25 \pm 0.15 \text{ vs } 0.57 \pm 0.40$, $P < 0.05$)、DISCA 组 ($0.24 \pm 0.08 \text{ vs } 0.40 \pm 0.19$, $P < 0.05$), 并且 DISC 组总高阶相差增加更明显 ($0.32 \pm 0.16 \text{ vs } 0.16 \pm 0.14$, $P = 0.04$) (DISCA vs DISCA)。

结论: 低龄近视儿童配戴周边离焦型软性角膜接触镜能够减缓近视进展且眼高阶像差明显升高, 联合使用 0.01% 阿托品的可明显提升近视防控效果。

摘要编号: 208455

儿童青少年近视对照库的构建与应用研究

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目的: 本研究旨在利用仅佩戴单光镜进行矫正的近视患者数据, 建立数据库, 探讨儿童青少年近视自然进程的眼轴与屈光度特征, 为近视管理及防控研究提供科学对照依据。

方法: 本研究分析了来自中国各地区 409,258 名未成年人, 1,453,007 条屈光度与 535,911 条眼轴测量数据。研究对象年龄范围为 6~18 岁, 所有受试者均采用单光镜进行视力矫正, 未接受其他光学或药物干预。数据经统一格式化与清洗后, 采用线性混合模型, 评估眼轴长度与屈光度随年龄的变化趋势, 并从中提取不同年龄的性别特异百分位估计值, 随后采用加权三次样条函数进行曲线平滑, 生成了中国儿童青少年近视自然进程的眼轴长度与屈光度参考百分位图表。

结果: 在眼轴模型中, 年龄对眼轴长度具有显著正向影响 ($\beta = +0.242 \text{ mm/岁}$, $p < 0.001$), 眼轴长度随年龄增长而延长。男性眼轴平均比女性短 0.52 mm ($\beta = -0.516$, $p < 0.001$), 左眼平均比右眼短 0.08 mm ($\beta = -0.078$, $p < 0.001$), 随机效应分析显示个体间方差 ($SD = 1.15 \text{ mm}$) 明显高于测量残差 ($SD = 0.35 \text{ mm}$)。在屈光度模型中, 屈光度与年龄呈显著负相关 ($\beta = -0.415 \text{ D/岁}$, $p < 0.001$), 即随年龄增加, 近视度数加深。男性屈光度平均比女性低 0.06 D ($\beta = -0.064$, $p < 0.001$), 左眼屈光度平均比右眼高 0.19 D ($\beta = +0.189$, $p < 0.001$), 随机效应显示个体间标准差

为 2.36 D, 残差为 0.85 D, 表明近视进展具有较强的个体差异性。结果显示, 眼轴随年龄显著延长, 屈光度随年龄显著下降, 两者趋势一致且具有明显的个体差异。男性眼轴略短但屈光度更低, 提示两性在眼球发育与屈光调节方面存在生理差异; 左眼较右眼略短但屈光度略高, 符合双眼发育的不完全对称性。

结论: 本研究基于中国地区大量仅使用单光镜矫正的儿童与青少年样本, 系统描绘了近视自然进程中眼轴长度与屈光度的变化规律。由于研究对象未接受任何药物或光学干预, 其数据真实反映了近视发展的自然轨迹。基于此构建的年龄与性别特异性眼轴及屈光度百分位曲线, 可为近视进展监测、干预效果评估与人群基线建模提供科学依据, 并为近视防控研究提供伦理安全的自然对照参考标准。

摘要编号: 209473

分析近视儿童使用不同光学矫正方法联合 0.01% 阿托品滴眼液后眼轴的变化

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目的: 分析近视儿童使用不同光学矫正方法联合 0.01% 阿托品滴眼液后眼轴的变化

方法: 回顾性临床研究。通过简单随机抽样收集 2021 年 1 月至 2024 年 12 月温州医科大学附属眼视光医院符合入选标准的近视儿童 354 例 (354 只眼), 根据不同的矫正方式以及是否联合使用 0.01% 阿托品滴眼液 (Atropine, A) 分为 OK (Orthokeratology lens, OK) 组 52 例, OKA (OK 联合 A) 组 38 例, 高非球微透镜近视防控眼镜 (Highly aspherical lenslets, HAL) 组 83 例, HALA (HAL 联合 A) 组 69 例, 单光镜 (Single vision spectacles, SP) 组 65 例和 SPA (SP 联合 A) 47 例。通过单因素方差分析对比戴镜 1 年后眼轴的变化。

结果: 戴镜 1 年后各组眼轴增长量对比差异有统计学意义, $F = 25.354$, $P < 0.001$ 。其中 OK 组 (0.25 ± 0.13 mm)、OKA 组 (0.17 ± 0.13 mm)、HAL 组 (0.16 ± 0.16 mm)、HALA 组 (0.08 ± 0.19 mm) 和 SPA (0.23 ± 0.18 mm) 组的眼轴增长量明显低于 SP 组 (0.39 ± 0.20 mm), 均 $P < 0.001$; 而 HALA 组眼轴变化显著低于其余各组, 均 $P < 0.01$; OKA 和 HALA 组眼轴变换均明显低于 OK ($P = 0.029$) 和 HAL 组 ($P = 0.004$)。

结论: 角膜塑形镜和高非球微透镜眼镜和 0.01% 阿托品滴眼液可以有效减缓近视进展, 而且角膜塑形镜和高沸物微透镜联合 0.01% 阿托品滴眼液效果更佳。

摘要编号: 209717

分析近视前期儿童配戴高非球微透镜镜片和使用 0.01% 阿托品后的眼轴变化

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目的: 分析近视前期儿童配戴高非球微透镜镜片和使用 0.01% 阿托品后的眼轴变化。

方法: 回顾性临床研究。通过简单随机抽样收集 2021 年 1 月至 2025 年 9 月温州医科大学附属眼视光医院符合入选标准的近视前期儿童 244 例 (244 只眼), 根据不同的干预方法进行分组: 组 A: 配戴没有度数的高非球微透镜 (Highly aspherical lenslets, HAL), 103 例; 组 B: 使用 0.01% 阿托品滴眼液, 74 例; 组 C: 不进行干预对照组, 67 例。通过单因素方差分析对比戴镜 1 年后近视的变化。

结果: 戴镜 1 年前后各组等效屈光度变化 (基线: A 组: 0.09 ± 0.23 D, B 组: 0.04 ± 0.26 D, C 组: 0.12 ± 0.20 D; 戴镜 1 年后: A 组: -0.01 ± 0.40 D, $t = 2.584$, $P = 0.011$, B 组: -0.08 ± 0.43 D, $t = 2.637$, $P = 0.010$, C 组: 0.02 ± 0.30 D, $t = 2.487$, $P = 0.015$) 和眼轴变化 (基线: A 组: 23.27 ± 0.64 mm, B 组: 23.27 ± 0.64 mm, C 组: 23.15 ± 0.70 mm; 戴镜 1 年后: A 组: 23.39 ± 0.65 mm, $t = -8.291$, $P < 0.001$, B 组: 23.63 ± 0.64 mm, $t = -12.807$, $P < 0.001$, C 组: 23.54 ± 0.71 mm, $t = -20.252$, $P < 0.001$) 均有显著差异。戴镜 1 年后等效屈光度变化 A 组 (-0.10 ± 0.37 D)、B 组 (-0.12 ± 0.39 D) 和 C 组 (-0.10 ± 0.33 D) 两两对比差异无统计学意义, P 均 > 0.05 。戴镜 1 年后眼轴变化 A 组 (0.12 ± 0.15 mm) 显著低于 B 组 (0.25 ± 0.17 mm, $P < 0.001$) 和 C 组 (0.39 ± 0.16 mm, $P < 0.001$), 且 B 组眼轴变化也显著低于 C 组 ($P < 0.001$)。

结论: 对于近视前期的儿童, 配戴平光 HAL 和使用 0.01% 阿托品滴眼液均有助于减缓眼轴增长, 有助于减少近视的进展, 其中平光 HAL 效果更好。

摘要编号: 209226

动态时空光学膜 (S.T.O.P.® KIT) 联合云夹镜框预防近视的临床研究: 6 个月随访结果

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目的: 本研究旨在评估动态时空光学膜 (S.T.O.P.® KIT)、动态相位联合智能云夹镜框 (组别 1) 对比动态时空光学膜、固定相位联合智能云夹镜框 (组别 2) 及单光镜联合智能云夹镜框 (组别 3)

在 6 个月内控制远视储备不足儿童眼轴增长及屈光进展的有效性和安全性。

方法: 本研究为随机对照试验, 纳入 7-9 岁儿童 (等效球镜度 $\geq +0.50$ D, 散光 ≤ 1.50 D), 排除斜视及既往近视干预史者。受试者随机分为三组: 组别 1 佩戴动态时空光学膜 (每 3 个月更换离焦相位设计)、组别 2 佩戴动态时空光学膜 (离焦相位固定)、组别 3 佩戴单光镜, 均结合云夹监测用眼行为并予以不良用眼行为干预。随访周期 6 个月, 每 3 个月进行眼轴长度 (AL)、扩瞳验光 (SE)、视力及安全性评估。主要终点为 AL 和 SE 变化, 次要终点包括佩戴依从性及不良事件。

结果: 本研究共纳入 156 例受试者, 完成 6 个月随访组 1: 24 人、组 2: 26 人、组 3: 26 人。组别 1 的 AL 增长均值显著低于组别 2 和 3 (0.15 ± 0.06 mm vs. 0.18 ± 0.09 mm vs. 0.22 ± 0.09 mm, $P < 0.05$); 轴率比: 组 1 为 2.93 ± 0.04 、组 2 为 2.95 ± 0.06 、组 3 为 2.96 ± 0.05 ; SE 进展同样显示组别 1 最优 (-0.18 ± 0.21 D vs. -0.24 ± 0.22 D vs. -0.30 ± 0.23 D)。三组佩戴依从性无统计学差异 (日均佩戴时间均 > 3.5 h), 不良事件发生率 (组别 1: 3.3%, 组别 2: 5.0%, 组别 3: 1.7%, $P = 0.42$), 均为轻度视疲劳或镜架不适。

结论: 动态时空光学膜联合云夹在 6 个月内显著延缓远视储备不足儿童眼轴增长及屈光进展, 疗效优于单一行为干预, 且安全性良好。动态光学刺激可能通过优化视网膜离焦信号增强近视防控效果, 长期疗效需进一步随访验证。本研究为近视前期干预提供了新型光学解决方案的循证依据。

摘要编号: 210228

基于 OCT 环形断层扫描图像的近视学龄儿童视盘倾斜三维形态特征评估

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目的: 本研究基于 OCT 环形断层扫描图像的视盘周边 RPE 高度数据, 旨在通过量化视盘倾斜程度、倾斜方向、RPE 高度极值点分布等参数, 刻画近视学龄儿童的视盘三维倾斜形态, 并分析上述结构特征与各项人口统计学及眼部生物学参数的关联, 为学龄儿童近视的早期筛查与防控提供影像学依据。

方法: 本研究采用基于人群的横断面设计, 通过分层整群抽样方法, 随机选取中国内蒙古自治区巴彦呼舒镇 2 所小学和 2 所中学, 并对所选学校 1 至 12 年级全体学生进行眼科检查, 基线检查于 2023 年 5 月完成。纳入 3503 名近视学龄儿童, 分别通过 OCT 图像 RPE 层和脉络膜层分析获取视盘三维

倾斜形态参数和黄斑区脉络膜厚度参数, 定义 RPE 极值点连线过 OCT 环扫圆心的平行线为倾斜轴, 该轴的方向为视盘倾斜方向。定义右眼颞侧方位角为 0° , 鼻侧为 180° , 并按逆时针方向排列, 以此坐标系确定和分析 RPE 极值点的方位分布。根据个体眼轴长度, 并参考年龄与性别的特定参考数据, 将受试者分为四个不同的眼轴长度组, 分析不同眼轴长度组之间, 视盘倾斜程度和极值点直径角的分布差异。分析视盘倾斜幅度与人口统计学及眼部生物学参数的相关性。

结果: RPE 最高点平均方位角为 187.17° ($SD = 34.03^\circ$), 最低点平均方位角为 11.33° ($SD = 37.91^\circ$), 表明主导倾斜方向为鼻上一颞下, 鼻侧分布较颞侧更为集中。视盘倾斜幅度与极值点直径角在不同眼轴长度组间均存在显著差异 ($P < 0.001$)。随着眼轴增长, 倾斜幅度与直径角的均值、中位数及四分位数均呈现一致性、渐进性增加, 反映了与眼轴增长相关的持续性形态结构改变。倾斜方向为鼻下一颞上和鼻上一颞下的受试者, 直径角形成的锐角分别更大概率位于倾斜轴的上方和下方。多元线性回归分析表明, 眼轴长度 ($\beta = 0.324$, $P < 0.001$)、角膜曲率 ($\beta = 0.150$, $P < 0.001$)、RPE 极值点直径角 ($\beta = 0.341$, $P < 0.001$)、黄斑区脉络膜厚度 ($\beta = -0.160$, $P < 0.001$)、性别 ($\beta = 0.038$, $P = 0.020$)、身高 ($\beta = 0.066$, $P = 0.015$) 及体重 ($\beta = -0.042$, $P = 0.043$) 与视盘倾斜幅度显著相关。

结论: 本研究揭示了近视学龄儿童视盘倾斜的形态规律及其影响因素。结果表明, 视盘倾斜主要表现为鼻上一颞下的方向特征, 且其倾斜程度和极值点直径角随眼轴增长呈渐进性增加。多元线性回归分析进一步证实, 视盘倾斜幅度受到眼轴长度、角膜曲率、脉络膜厚度等眼部参数及性别、身高等全身因素的调控。上述结构特征为理解学龄儿童近视性视盘形态改变的机制提供了重要依据, 对早期识别与评估近视相关结构性病变具有临床意义。

摘要编号: 209651

基于“精筋失衡”探究眼周刮痧防治青少年低度近视的效果观察

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目的: 基于“精筋失衡”理论观察眼周刮痧对青少年低度近视的防治疗效。

方法: 纳入 2023 年 6 月-2023 年 12 月深圳市眼科医院就诊的低度近视青少年 100 例 (200 只眼), 随机分为治疗组和对照组各 50 例 (100 只眼)。最终纳入治疗组和对照组各 49 例 (98 只眼)。对照

组予自行佩戴框架近视眼镜及对患者家属进行健康防控教育。治疗组在对照组的基础上，予眼周刮痧治疗，共治疗 6 个月。分别于治疗前、治疗后 3、6 个月测量 2 组患者的裸眼视力、等效球镜度数及眼轴长度并计算临床疗效。

结果：（1）裸眼视力：对照组治疗后 3、6 个月裸眼视力与治疗前比较，差异均无统计学意义（ $P > 0.05$ ），治疗组后 3 个月裸眼视力与治疗前比较，差异无统计学意义（ $P > 0.05$ ），治疗组治疗后 6 个月裸眼视力较治疗前提高，差异有统计学意义（ $t = 3.806$ ， $P = 0.000$ ）。治疗后比较，治疗组裸眼视力均高于对照组，差异均有统计学意义（ t_3 个月 = 6.502、 t_6 个月 = 7.610，均 $P = 0.000$ ）。（2）等效球镜度数：2 组治疗后 3 个月等效球镜度数与治疗前比较，差异均无统计学意义（ $P > 0.05$ ）。2 组治疗后 6 个月等效球镜度数均大于治疗前，差异均有统计学意义（ t 治疗组 = 11.010、 t 对照组 = 20.975，均 $P = 0.000$ ）。治疗后 3、6 个月，治疗组等效球镜度数均小于对照组，差异均有统计学意义（ t_3 个月 = -2.121， $P = 0.036$ ； t_6 个月 = -4.881， $P = 0.000$ ）。（3）眼轴长度：2 组治疗后 3 个月眼轴长度与治疗前比较，差异均无统计学意义（ $P > 0.05$ ）。2 组治疗后 6 个月眼轴长度均长于治疗前，差异均有统计学意义（ t 治疗组 = 17.998、 t 对照组 = 17.933，均 $P = 0.000$ ）。治疗后比较，治疗组眼轴长度均短于对照组，差异均有统计学意义（ t_3 个月 = -2.126， $P = 0.036$ ； t_6 个月 = 3.730， $P = 0.000$ ）。（4）临床疗效：治疗组治疗后 6 个月总有效率（79.59%）高于对照组（53.06%），差异有统计学意义（ $\chi^2 = 7.721$ ， $P = 0.005$ ）。

结论：在“精筋失衡”理论指导下运用眼周刮痧具有延缓青少年低度近视的屈光度进展、控制其眼轴增长的作用。

摘要编号：203068

基于多组学整合分析鉴定昼夜节律相关近视基因的实验验证与治疗靶点探索

第一作者：Jiahao NIU

共同作者：Xuan LIAO

目的：阐明昼夜节律相关基因在近视发病中的作用，整合遗传、环境及褪黑素节律紊乱关联，鉴定关键基因。旨在探索其与近视的因果关系、免疫互作及潜在治疗靶点。

方法：本研究在多组学框架下整合转录组（GSE136701）和单细胞测序（GSE235684）数据，系统分析昼夜节律相关基因在近视中的作用。采用七种机器学习算法筛选关键靶点基因。通过 qRT-

PCR、孟德尔随机化（MR）分析进行实验验证。利用 DsigDB 数据库对关键靶点进行反向药物筛选，并通过分子对接和分子动力学模拟评估药物—靶点相互作用的稳定性。

结果：机器学习鉴定出 UTS2、BTBD9、S100A3 和 LGALS9 等候选基因。孟德尔随机化（MR）分析提示 UTS2 与近视存在潜在因果关系。多种 MR 方法（MR Egger、Weighted、IVW、Simple Mode、Weighted Mode）中，IVW 方法结果最显著： $P = 0.006$ ， $OR = 0.7$ （95% CI: 0.423–0.977），提示 UTS2 可能与近视风险降低相关。Cochran's Q 检验显示 MR-Egger（ $P = 0.365$ ）和 IVW（ $P = 0.530$ ）均无显著异质性，支持固定效应模型。MR-Egger 截距检验（ $P = 0.760$ ）未发现定向多效性证据，表明遗传工具变量主要通过 UTS2 影响近视。基于 DsigDB 筛选，确定 8-Bromo-cAMP 为候选药物。分子对接显示小分子与 UTS2-BTBD9 复合物结合良好：UTS2 与 BTBD9 间结合自由能为 -37.5 kcal/mol；UTS2-BTBD9 复合物与小分子结合自由能为 -6.8 kcal/mol，并与 VAL225、GLN223、SER592 氨基酸残基形成 6 个氢键。模拟 100 ns 显示，UTS2-BTBD9 蛋白复合物约 85 ns 达平衡，RMSD 约 7.6 Å；加入小分子后，UTS2-BTBD9-8-Bromo-cAMP 三元复合物约 80 ns 达平衡，RMSD 约 11.9 Å。小分子引入改善了蛋白动态稳定性。两体系均经历构象变化但最终稳定。溶剂可及表面积分析揭示结合位点微环境改变。氢键分析显示稳定网络（数量波动于 0–9，平均 ≈ 4 ）。均方根波动分析显示各体系残基波动普遍较低（多数 < 8 Å），整体稳定性高。

结论：本研究整合转录组与单细胞测序数据，应用多种机器学习模型，成功鉴定出四个与近视相关的新型昼夜节律基因（UTS2、BTBD9、S100A3、LGALS9）。MR 分析验证了 UTS2 与近视的潜在因果关联。基于关键靶点筛选出候选药物 8-Bromo-cAMP，并用分子对接与分子动力学模拟证实了其靶蛋白复合物结合的稳定性。单细胞测序数据为解析近视进展的致病机制提供了新视角。这些新发现的关键基因和候选药物为近视的精准诊断和个体化治疗策略开发奠定了基础。

摘要编号：210103

基于机器学习方法建立早期筛查儿童高度近视的泪液标志物即时检测方法研究

第一作者：Meijun WANG

共同作者：Jiahe GAN, Shiming LI, Yuting ZHAO

目的：分子生物学标记物的发现对高度近视的早期预测和诊断具有重要意义。然而，传统的检测技术

依赖于侵入性操作，如房水或玻璃体取样。本研究开发了一种基于时间分辨荧光微球（time-resolved fluorescent microspheres, TRFM）和机器学习（machine learning, ML）方法的免疫层析试纸条。其可作为一种非侵入性方法，快速、准确地识别高度近视患者泪液中的特异性生物标志物。

方法：从高度近视和正视人群中筛选出 11 种潜在的高度近视相关生物标志物。利用机器学习验证了这一结果，并通过动物模型验证了识别的生物标志物，以确认它们与近视发病机制的关联。最终制备了用于高度近视早期诊断的试纸。

结果：通过对高度近视和正视患者的泪液样本的系统筛选，我们确定了 11 个候选生物标志物。其中，泪液中的基质金属蛋白酶 2（MMP-2）和表皮生长因子（EGF）被证实是最敏感的生物标志物。我们进一步证明，以泪液中 MMP-2 和 EGF 水平为标准，利用机器学习预测儿童高度近视的曲线下面积（AUC）为 0.948，具有较高的准确性。为了进一步提高检测灵敏度，我们使用了时间分辨的荧光微球作为探针，从而开发了一种快速、低成本的免疫层析即时检测技术，能够在 15 分钟内定量和准确地检测泪液样本中的 MMP-2 和 EGF。

结论：本研究基于机器学习方法开发了一种免疫层析试纸条，可快速、准确地检测儿童高度近视筛查的生物标志物，为实现儿童高度近视的早起筛查预警提供了技术基础。

摘要编号：200655

多光谱视网膜屈光地形图测量参数与近视的关联分析：一项病例对照研究

第一作者：Bao Tong

目的：运用多光谱视网膜屈光地形图（MRT）测量 6 ~ 18 岁青少年儿童不同区域周边视网膜离焦量，探讨其与低、中、高度近视发展之间的关系。

方法：病例对照研究，纳入 2023 年 6 月 -2023 年 12 月在赤峰朝聚眼科医院就诊的 6 ~ 18 岁青少年儿童 320 例。按照等效球镜（SE）分为低度近视组和中高度近视组，采用问卷调查了解用眼习惯，采用 Lenstar 900 光学生物测量仪测量眼轴长度（AL）。采用多光谱视网膜屈光地形图（MRT）测量周边视网膜离焦量，分别为颞侧（RDV-N）、鼻侧（RDV-T）、上方（RDV-S）、下方（RDV-I），采用 Logistic 回归分析近视相关因素。

结果：共纳入低度近视 152 例，中、高度近视 168 例。其中，中度和高度近视的受试者与低度近视组相比，年龄较大、周末看电子产品时间较多、AL 较长、SE 较低。上方视网膜离焦量（RDVS）较高、

下方视网膜离焦量（RDVI）较低（均 $P < 0.05$ ）。经 Logistic 分析，女性（OR = 4.14; 95% CI = 2.16-10.93, $P < 0.001$ ）和 RDVS（OR = 0.52, 95% CI = 0.32-5.49, $P = 0.006$ ）与高度近视密切相关。

结论：6 ~ 18 岁青少年儿童中，上方视网膜离焦量（RDV-S）与中度和高度近视相关，下方视网膜离焦量（RDV-I）与高度近视相关。

摘要编号：209735

对比不同年龄和近视度数的近视儿童配戴高非球微透镜镜片和角膜塑形镜后的眼轴变化

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目的：分析不同年龄和近视度数的近视儿童配戴高非球微透镜镜片和角膜塑形镜后的眼轴变化。

方法：回顾性临床研究。通过简单随机抽样收集 2021 年 1 月至 2023 年 12 月温州医科大学附属眼视光医院符合入选标准的近视儿童 7794 例，根据不同的矫正方法分为 HAL 组（配戴高非球微透镜，Highly aspherical lenslets）和 OK 组（配戴角膜塑形镜，Orthokeratology），经过倾向性匹配后共 6534 例（HAL 3275 例，OK 3259 例），通过独立样本 T 检验对比不同近视度数不同年龄下戴镜 1 年后 HAL 组和 OK 组的眼轴变化。

结果：戴镜 1 年后 HAL 组（ 0.15 ± 0.17 mm）眼轴变化低于 OK 组（ 0.20 ± 0.18 mm, $t = -10.478$, $P < 0.001$ ）。在 8-9 岁和 9-10 岁的儿童中 HAL 组（8-9 岁： 0.19 ± 0.18 mm; 9-10 岁： 0.12 ± 0.16 mm）眼轴变化低于 OK 组（8-9 岁： 0.26 ± 0.18 mm, $t = 10.077$, $P < 0.001$; 9-10 岁： 0.17 ± 0.17 mm, $t = 6.453$, $P < 0.001$ ），在 12-14 岁上两组对比差异无统计学意义（HAL： 0.11 ± 0.14 mm; OK： 0.11 ± 0.15 mm, $t = 0.079$, $P = 0.944$ ）。在低度近视的儿童中 HAL 组（ 0.13 ± 0.18 mm）眼轴变化低于 OK 组（ 0.23 ± 0.18 mm, $t = 15.939$, $P < 0.001$ ），在中度近视的儿童中两组眼轴变化无统计学差异（HAL： 0.18 ± 0.16 mm; OK： 0.17 ± 0.18 mm, $t = -0.403$, $P = 0.687$ ），在高度近视的儿童中 HAL 组（ 0.19 ± 0.16 mm）眼轴变化高于 OK 组（ 0.11 ± 0.17 mm, $t = -6.268$, $P < 0.001$ ）。

结论：对于低度近视的儿童，配戴 HAL 的近视控制效果较优于 OK，在中度近视的儿童中，配戴 HAL 的近视控制效果和 OK 相当，在高度近视的儿童中，配戴 HAL 的近视控制效果较弱于 OK。

摘要编号: 209144

巩膜内质网应激增强成纤维细胞内甲状腺激素信号通路驱动近视进展

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共同作者: Longqian LIU

目的: 眼轴长度 (AL) 是决定眼球大小的主要因素, 且在近视中出现延长, 但其发生与进展机制仍不清楚。本研究围绕近视巩膜内质网应 (ERS) 激增强成纤维细胞内甲状腺激素 (TH) 信号通路这一主线, 提出 ATF4-DIO2/T3-TR β 轴调控巩膜胶原蛋白合成引发巩膜重塑的新机制, 并进一步解析了不同 TH 受体亚型的作用。

方法: 建立小鼠形觉剥夺近视 (FDM) 模型, 评估屈光与 AL 变化。采用 WB/IHC 检测巩膜基质, ERS 和 TH 信号相关蛋白表达; 透射电镜观察巩膜成纤维细胞内质网超微结构。使用 GC-1 腹腔注射联合 FDM, WB 和 IF 检测小鼠巩膜胶原蛋白以及 AL 和屈光的变化。原代培养人巩膜成纤维细胞 (HSFs), 给予 ATF4 激动剂 E235、T3 及选择性受体激动剂 CO23 (TR α)、GC-1 (TR β); 根据需要采用低氧或药理学方式诱发/强化 ERS; 检测通路下游与表型标志的变化。荧光共聚焦用于检测 TR β 和 HIF-1 α 的共定位关系。SiRNA (THRA/THRB) 用于遗传学层面验证受体不同亚基的功能。

结果: FDM 小鼠出现近视移位与眼轴延长。WB 显示遮盖巩膜 COL1 α 1 降低; ERS 标志 p-eIF2 α /eIF2 α 与 ATF4 升高, 透射电镜见内质网肿胀/扩张。TH 信号同步增强: DIO2 与 TR β 上调、THR α 变化不明显; IHC 提示巩膜局部 T3 升高; 在 FDM 背景下腹腔注射 GC-1 进一步降低巩膜胶原并加重屈光/眼轴改变。原代 HSFs 中, 缺氧、药理性 (E235) 诱发 ERS-ATF4, 使 DIO2 上调、TR β 提高、COL1 α 1 下降; T3 在常氧下呈双相效应 (低剂量促进、较高剂量抑制胶原), GC-1 对胶原的抑制与 T3 相似, 而高剂量的 CO23 促进胶原的合成; 缺氧 (1%) 进一步放大了胶原的药理学抑制, 并增强 TR β 与 HIF-1 α 的共定位, 分子对接进一步证明两者之间具有较强的结合能力。在缺氧的背景下, 敲除 THRB 基因, 胶原相比于 T3 组显著上调, 而 THRA 的敲除没有明显的挽救效应。

结论: 巩膜 ERS 可通过 ATF4-DIO2/T3-TR β 轴增强成纤维细胞内甲状腺激素信号; TR β 特异性激活可以抑制胶原合成来促进基质重塑与眼轴延长。缺氧可以诱发 ERS 并可能与 TH 信号存在相互作用来进一步促进巩膜重塑, 尚需进一步在体验证与安全性评估。

摘要编号: 208039

平衡之道: 近视中基质金属蛋白酶的调控博弈——来自巩膜与脉络膜重塑的多模态成像证据

第一作者: Yitong LI

共同作者: Wenbin WEI

目的: 目前我国青少年近视发病形势严峻, 低龄化、重度化日益严重, 而近视进展过程中眼轴延长的机制仍不清楚。既往研究提示基质金属蛋白酶 (MMP) 信号与眼轴延长可能有关。我们对 MMP 信号在透镜诱导的眼轴延长过程中的作用位点和上下游机制进行了进一步探究。

方法: 对 3 周龄的雄性三色豚鼠进行双眼透镜诱导, 建立近视模型。为评估 MMP 抑制剂对近视的影响, 连续三周每周对豚鼠进行一次玻璃体腔内注射 MMP 抑制剂。

结果: 经过离焦性近视诱导后, 近视组豚鼠眼轴长度比对照组显著增加, 呈现出近视屈光不正。与未进行透镜诱导近视的豚鼠相比, 透镜诱导近视豚鼠与 MMP 活性增加有关, 且这种激活可以被玻璃体腔注射 MMP 抑制剂抑制。对透镜诱导的近视豚鼠进行玻璃体腔注射 MMP 抑制剂后, 眼轴延长被显著抑制, 屈光度增长明显变缓, 且程度呈浓度梯度相关。近视组豚鼠 RPE 层显示 MMP-2 免疫荧光阳性细胞, 眼内注射 MMP 抑制剂后 MMP-2 阳性细胞消失。对豚鼠施行 OCT 检测, 结果提示在排除形觉剥夺、视网膜毒性等其他可能导致脉络膜萎缩的因素影响后, 玻璃体腔注射 MMP 抑制剂可导致近视豚鼠脉络膜进一步变薄。电镜结果提示眼内注射 MMP 抑制剂可导致巩膜纤维面积变小。密度增加, 提示巩膜改建。

结论: MMP 信号传导与近视眼轴延长过程有关, 作用位点可能位于 RPE 层及巩膜。抑制 MMP 可抑制近视诱导的眼轴延长, 但是并不能抑制脉络膜变薄过程。

摘要编号: 207758

微透镜阵列匀光镜片用于儿童近视控制的 2 年研究

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目的: 评估周边附加正屈光力 (PLARI)、负屈光力 (NLARI) 微透镜阵列匀光镜片的 2 年近视控制效果, 以及更换镜片设计对近视防控的影响。

方法: 完成正、负屈光力微透镜阵列匀光镜片近视防控 1 年研究 (第 1 阶段) 的 218 名儿童, 继续参加第 2 年 (第 2 阶段) 的随机、双盲延长试验。受试者被随机分配到以下组别: 单光镜片 (SV) 转

PLARI、SV 转 NLARI、连续 PLARI (PLARI-P)、PLARI 转 NLARI (PLARI-N)、NLARI 转 PLARI (NLARI-P) 以及连续 NALRI (NLARI-N) 组。根据已公布的数据外推了 SV 组第 2 年 (命名为外推单光组, ESV) 的等效球镜度变化量和眼轴增长量。采用混合线性模型分析各组在 2 年内以及第 2 年的等效球镜度变化量和眼轴增长量的差异。

结果: 完成 2 年随访后, PLARI-P、PLARI-N、NLARI-P 和 NLARI-N 组的等效球镜度变化量 (分别为 -0.87 ± 0.68 D、 -0.64 ± 0.86 D、 -0.68 ± 0.54 D 和 -0.75 ± 0.62 D) 和眼轴增长量 (分别为 0.44 ± 0.33 mm、 0.33 ± 0.32 mm、 0.36 ± 0.23 mm 和 0.39 ± 0.25 mm) 均显著小于 ESV 组 (等效球镜度变化量: -1.24 ± 0.77 D, 所有 $P < 0.05$; 眼轴增长量: 0.63 ± 0.33 mm, 所有 $P < 0.001$)。四个微透镜组和 ESV 组第 2 年的等效球镜度变化量没有统计学差异 ($P = 0.58$)。PLARI-N 和 NLARI-P 组第 2 年的眼轴增长量显著小于 ESV 组 ($P < 0.001$ 和 $P = 0.001$), 而 PLARI-P 和 NLARI-N 组第 2 年的眼轴增长量仅略小于 ESV 组, 但差异没有统计学意义 ($P = 0.054$ 和 $P = 0.10$)。此外, 四个微透镜组第 2 年眼轴增长量组间没有统计学差异 (所有 $P > 0.05$)。

结论: 配戴 LARI 镜片 2 年可有效减缓近视儿童的等效球镜度增加和眼轴增长。对于第 1 年配戴 LARI 镜片的儿童, 在第 2 年更换为配戴另一种 LARI 设计的镜片, 可以持续延缓眼轴的增长, 但对等效球镜度进展无明显改善作用。

摘要编号: 208342

成人近视晶状体核和皮质在体生物力学特性及其与调节功能的关联

第一作者: Chang LE

共同作者: Wang YAN

目的: 探讨成人近视晶状体核和皮质在体生物力学分布特点及其潜在的影响因素, 并进一步探究晶状体生物力学特性与眼调节功能之间的关联。

方法: 横断面研究。该研究纳入了 195 名参与者的 195 只右眼, 按等效球镜度 (SE) 分为 4 组, 包括正视组 37 只眼, 低度近视组 41 只眼, 中度近视组 59 只眼, 高度近视组 58 只眼。所有参与者均接受了全面的眼科检查和病史采集, 包括年龄、性别、眼轴 (AL) 测量、睫状肌麻痹主觉验光、晶状体形态学检测、视功能检测和晶状体布里渊光学扫描。采用 Kruskal-Wallis 检验评估不同屈光度之间数据的差异。采用相关性分析和多元线性回归模型评估影响晶状体生物力学特性及调节功能的因素。

结果: 成人近视眼的平均晶状体核纵向弹性模量 (LMN) 及前 (LMAC)、后皮质纵向弹性模量 (LMPC) 分别为 3.395 ± 0.027 GPa、 3.030 ± 0.066 GPa 和 2.990 ± 0.066 GPa, 正视眼则分别为 3.342 ± 0.024 GPa、 3.015 ± 0.0488 GPa 和 2.978 ± 0.049 GPa。成人 LMN 在近视眼中显著高于正视眼且随着近视程度加深 LMN 呈现明显增加的趋势。LMAC 和 LMPC 在近视眼与正视眼之间无统计学差异。在与晶状体形态参数的相关性分析中发现晶状体中轴线光密度 (LDC) 是唯一与 LMN 独立相关的晶状体参数 (standardized $\beta = -0.282$, $P < 0.01$)。近视眼晶状体核纵向弹性模量的增高与调节幅度的增加和调节灵敏度的下降独立相关 (standardized $\beta = 0.198$, -0.237 , all $P < 0.05$)。

结论: 成人晶状体核纵向弹性模量在近视眼中显著高于正视眼且随着近视程度加深而增加。近视眼晶状体核纵向弹性模量的增加与调节灵敏度下降和调节幅度增加显著相关, 表明高晶状体核纵向弹性模量可能是成人近视眼特别是高度近视眼发生发展过程中的重要生物改变, 为近视发病机制的探究提供了新思路。

摘要编号: 204664

房水激素表达谱及与眼轴相关性研究

第一作者: Xiaosheng HUANG

共同作者: Lishi LUO, Kun ZENG

目的: 激素是多种临床疾病辅助诊断的重要指标, 然而激素表达谱在眼内液中表达情况尚未明确。本研究旨在明确房水中激素种类及表达浓度的基础上, 进一步探讨激素从血浆转运至房水的转运机制及其与眼轴 (AL) 的相关性。

方法: 收集 171 例房水标本及匹配的 107 例血浆标本并通过液相二级质谱仪检测房水及血浆中 18 种常见激素及其转运蛋白表达情况; 评估不同激素在轴性近视 (AL > 24 mm) 与对照组眼轴 (22 $<$ AL < 24 mm) 房水中表达浓度的差异; 使用 SVM 算法建立房水激素预测及诊断轴性近视的模型。

结果: 房水中仅能检测出 6 种常见的激素, 且其浓度均显著低于血浆中的浓度, 其中皮质醇 (F)、可的松 (COR)、皮质类固醇 (CORT)、醛固酮 (ALD)、雄烯二酮 (A2) 和 11-脱氧皮质醇 (11DOC) 在血浆的浓度分别是房水的 38 倍、15.9 倍、6.2 倍、9.7 倍、8.8 倍及 4.8 倍。皮质类固醇及性激素在血浆中的浓度是其在房水中的 30.37 倍及 8.58 倍, 然而其转运蛋白在血浆中的浓度仅是房水中的 1.34 倍及 1.47 倍。轴性近视患者房水中 COR、CORT、A2 和 ALD 浓度显著高于正常眼轴患者 (P

< 0.05)。此外,使用 SVM 算法分析发现房水中 (F+COR+CORT+ALD+A2) 组合是轴性近视的具有强诊断指标 ($AUC = 0.993$, $F1 = 0.822$)。

结论: 房水中仅能检测出 6 种血浆中常见的激素,且浓度显著低于血浆的浓度,推测其可能与血眼屏障相关。有 4 种激素 (COR、CORT、A2 和 ALD) 可能参与了近视进展,房水中的激素组合 (F+COR+CORT+ALD+A2) 是轴性近视良好的辅助诊断指标。

摘要编号: 209181

探究角膜塑形术中治疗区与近视进展的关系

第一作者: Zhang BAOWEN

共同作者: Ren HUI, Tan JIAHAO, Tan QINQIN, Zhao WEI, Fu WEN

目的: 探讨角膜塑形镜治疗区直径 (Treatment Zone Diameter, TZD) 与近视进展之间的关系,并评估其对长期佩戴角膜塑形镜后近视进展的预测价值。

方法: 本研究为回顾性研究,纳入 2023 年 7 月至 2024 年 9 月于川北医学院附属医院验配角膜塑形镜的近视儿童 19 例 (共 27 眼)。收集基线资料,包括年龄、性别、等效球镜屈光度 (spherical equivalent refraction, SER)、眼轴长度 (axial length, AL)、平均角膜曲率 (mean K) 及角膜离心率 (E-value)。记录配镜后 3 个月及 12 个月的平均治疗区直径 (TZD)。依据 12 个月的眼轴增长量将受试眼分为近视快速进展组 ($\Delta AL > 0.20$ mm) 与缓慢进展组 ($\Delta AL \leq 0.20$ mm)。采用单因素方差分析与卡方检验筛选与近视进展相关的变量,并以二元 Logistic 回归模型进一步分析各参数与近视进展的独立关系。最后利用受试者工作特征曲线 (ROC) 评估 TZD 预测近视进展的诊断效能。

结果: 单因素分析显示,性别、基线 SER 及 12 个月时的 TZD 与近视进展显著相关。多因素 Logistic 回归分析表明,较高的基线 SER ($\beta = 1.944$, $P < 0.05$) 及较大的 TZD ($\beta = -10.427$, $P < 0.05$) 为近视进展的保护因素。ROC 曲线分析显示,12 个月时 TZD 预测近视进展的曲线下面积 (AUC) 为 0.764 (95% CI: 0.575–0.953, $P < 0.05$), 最佳 Cut-off 值为 3.09 mm。3 个月与 12 个月的 TZD 分别为 3.16 ± 0.45 mm 与 3.07 ± 0.25 mm, 两者差异无统计学意义 ($P > 0.05$)。

结论: 在角膜塑形术中,较高的基线等效球镜屈光度及较大的治疗区直径可显著降低近视进展风险。当 TZD 大于 3.09 mm 时,近视进展明显减缓。TZD 可作为评估角膜塑形术后近视控制效果的重要预测指标,具有潜在的临床应用价值。

摘要编号: 207829

新型自膨胀水凝胶在近视矫治的应用研究

第一作者: Jian Tao REN

目的: 评估研究新型水凝胶聚合物在近视动物模型缩短眼轴的应用效果。

方法: 选取 3 周龄有色豚鼠,右眼遮盖制作近视模型,随机分为 3 组,实验组后极部巩膜外置入水凝胶聚合物,对照组后极部巩膜外注射生理盐水,空白对照组不做处理,观察指标包括眼轴、屈光度、角膜曲率、前房深度、晶状体厚度、玻璃体腔长度、眼内压、视觉诱发电位 (VEP)、视网膜电图 (ERG)、并发症发生率,观察时间为手术前及手术后 1 天、1 周、2 周、1 月、3 月。

结果: 1. 眼轴: 手术后 1 周、2 周、1 月、3 月实验组较对照组和空白对照组均缩短,差异有统计学意义,其余时间点各组之间无明显差异; 2. 屈光度: 手术后 1 周、2 周、1 月、3 月实验组较对照组和空白对照组均降低,差异有统计学意义,其余时间点各组之间无明显差异; 3. 角膜曲率: 各时间点各组之间均无明显差异; 4. 前房深度: 各时间点各组之间均无明显差异; 5. 晶状体厚度: 各时间点各组之间均无明显差异; 6. 玻璃体腔长度: 手术后 1 周、2 周、1 月、3 月实验组较对照组和空白对照组均减小,差异有统计学意义,其余时间点各组之间无明显差异; 7. 眼内压: 手术后 1 天实验组较对照组和空白对照组均升高,差异有统计学意义,其余时间点各组之间均无明显差异; 8. VEP: 各时间点各组之间均无明显差异; 9. ERG: 各时间点各组之间均无明显差异; 10. 并发症发生率: 手术后 1 天、1 周实验组与对照组比较差异有统计学意义,其余时间点两组之间均无明显差异。

结论: 此新型水凝胶材料用于近视动物模型,可缩短眼轴、降低屈光度数,有潜力起到治疗和防控近视的双重目的。

摘要编号: 207782

明视与中间视觉对比敏感度与低中度和高度近视患者视网膜-脉络膜结构特征的关系

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共同作者: Liang HU, Yadong HUANG

目的: 本研究旨在比较低中度近视 (LMM) 与高度近视 (HM) 组间的明视和中间视觉对比敏感度 (CS), 并评估 CS 与脉络膜视网膜结构和血管参数之间的关联。

方法: 在这项横断面研究中,108 名参与者被分为 LMM 组 ($n = 53$; 平均年龄: 21.0 岁; 平均等效球镜度 [SE]: -4.25 D) 和 HM 组 ($n = 55$; 平

均年龄: 24.0 岁; 平均 SE: -8.25 D)。在明视 (85 cd/m^2) 和中间视觉 (3 cd/m^2) 条件下测试 CS。使用扫频源光学相干断层扫描/血管成像 (SS-OCT/OCTA) 测量脉络膜视网膜参数。采用单因素和逐步多元线性回归分析评估关联性。

结果: 与 LMM 组相比, HM 组在明视 (1.07 ± 0.11 vs 1.19 ± 0.09 , $P < 0.001$) 和中间视觉 (中位数: 0.64 vs 1.04 , $P < 0.001$) 条件下的 CS 均显著降低。HM 组的脉络膜显著更薄, 且脉络膜血管指数 (CVI) 更高。与明视 CS (CSp) 相比, 中间视觉 CS (CSm) 与脉络膜视网膜参数表现出更强、更广泛的关联。

结论: 高度近视中的脉络膜视网膜改变对中间视觉条件下视觉功能的影响似乎比明视条件下更为显著。鉴于中间视觉 CS 对脉络膜和视网膜改变均具有敏感性, 它是一个值得进一步研究的参数, 具有评估近视相关功能损害的潜力。

摘要编号: **210147**

正视与高度近视成人泪液、唾液及血液中多巴胺与褪黑素在不同时间点的差异分析

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共同作者: Shiming

目的: 探究正视与高度近视成人体液 (泪液、唾液及血液) 中多巴胺与褪黑素水平的差异及其与眼轴长度的相关性, 并验证不同时间点的浓度变化。

方法: 本研究纳入 5 名正视成人及 16 名高度近视成人, 均为临床健康个体。分别于 8:00、12:00、16:00 采用 Schirmer 泪液试纸采集泪液; 于 8:00、12:00、16:00、20:00、24:00 采集唾液; 于 12:00 采集静脉血。使用 Triple Quad 5500+ 液相色谱-串联质谱仪定量分析多巴胺与褪黑素浓度。数据经 Log_2 转换后以均值 $\pm$ 标准差表示, 采用独立样本 t 检验进行组间比较 ($P < 0.05$ 为显著性标准), 并通过简单线性回归分析多巴胺、褪黑素水平与眼轴长度的相关性。

结果: 与正视组相比, 高度近视组泪液多巴胺水平在 8:00 (2.55 ± 0.01 vs. $3.10 \pm 0.23\text{ ng/ml}$, $P < 0.001$) 和 16:00 (3.08 ± 0.19 vs. $3.40 \pm 0.25\text{ ng/ml}$, $P = 0.034$) 更高; 唾液多巴胺水平在 12:00 (-1.15 ± 0.15 vs. $-0.24 \pm 0.60\text{ ng/ml}$, $P = 0.009$) 和 20:00 (-0.48 ± 0.24 vs. $-0.14 \pm 0.25\text{ ng/ml}$, $P = 0.032$) 更高。8:00 泪液多巴胺水平与眼轴长度呈正相关 ($R = 0.254$, $P = 0.020$)。12:00 静脉血多巴胺水平在正视组高于高度近视组 (3.67 ± 0.37 vs. $3.32 \pm 0.32\text{ ng/ml}$, $P = 0.035$), 且与眼轴长度负相关 ($R = 0.223$, $P = 0.033$)。两组泪液褪黑素水平无显著差异; 12:00 唾液褪黑素水平在高度近视组更高 (-4.50 ± 0.35 vs. -3.28

$\pm 1.05\text{ ng/ml}$, $P = 0.017$) ; 12:00 静脉血褪黑素水平虽呈现相同趋势, 但无统计学差异 (-0.65 ± 0.57 vs. $-0.16 \pm 0.77\text{ ng/ml}$, $P = 0.087$)。

结论: 本研究揭示了正视与高度近视人群多巴胺与褪黑素水平的差异, 支持这两种神经递质在近视进展中的作用及昼夜节律影响。泪液与唾液作为易获取的体液, 在相关研究中可替代有创血液检测。

摘要编号: **209997**

溴莫尼定通过调控巩膜 cAMP 信号通路抑制豚鼠形觉剥夺性近视进展

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共同作者: Huang GUOFU

目的: 本研究旨在探讨溴莫尼定通过调节巩膜组织中环磷酸腺苷 (cAMP) 信号通路抑制形觉剥夺性近视 (FDM) 进展的分子机制。

方法: 实验选用 3-4 周龄健康雄性三色豚鼠 30 只, 随机分为三组: 正常对照组 (NC, $n = 10$), FDM 组 ($n = 10$) 和溴莫尼定干预组 ($n = 10$)。通过形觉剥夺方法建立近视模型, 持续干预 3 周。采用自动验光仪和 A 超分别动态监测两组屈光度和眼轴长度变化。实验结束后, 通过酶联免疫吸附试验 (ELISA) 检测巩膜 cAMP 水平, 实时荧光定量 PCR (RT-qPCR) 分析蛋白激酶 A (PKA) mRNA 表达, 免疫荧光染色观察 PKA 蛋白表达。

结果: 溴莫尼定干预组在实验第二周时显著抑制 FDM 豚鼠的屈光度和眼轴增长 ($p < 0.05$); ELISA 检测显示溴莫尼定可显著降低 FDM 豚鼠巩膜组织中 cAMP 水平 ($p < 0.05$)。RT-qPCR 结果表明, 与 FDM 组相比, 溴莫尼定干预组巩膜 PKA mRNA 表达显著下调 ($p < 0.05$)。免疫荧光染色证实溴莫尼定干预组巩膜 PKA 蛋白表达较 FDM 组明显降低 ($p < 0.05$)。

结论: 溴莫尼定可能通过下调巩膜组织中 cAMP-PKA 信号通路, 从而抑制形觉剥夺性近视的进展。这一发现为近视的药物疗法提供了新的理论依据和潜在靶点。

摘要编号: **209713**

病理性与非病理性高度近视白内障患者前房细胞因子水平差异及其影响因素研究

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共同作者: Wei FAN

目的: 探讨病理性与非病理性高度近视白内障患者前房房水中细胞因子水平的差异, 并分析其可能的临床影响因素。

方法：采用横断面研究设计，纳入拟行白内障手术的高度近视患者。根据眼底及影像学检查结果分为病理性高度近视组（PHM 组）和非病理性高度近视组（NPHM 组）。术中抽取房水样本，利用多重免疫检测技术（Luminex）检测包括 IL-6、IL-8、TNF- α 、VEGF、TGF- β 、MCP-1 等在内的多种炎症及血管生成相关细胞因子水平。记录患者的年龄、性别、轴长、眼压、合并疾病及视网膜病变情况。采用非参数检验及多元线性回归分析两组间细胞因子差异及其影响因素。

结果：初步结果显示，PHM 组前房房水中多种促炎与血管生成相关因子（包括 IL-6、MMP-2、MCP-1）水平显著高于 NPHM 组（ $P < 0.05$ ），而 TGF- β 和 VEGF-A 表现出下降趋势。多元回归分析显示，轴长及视网膜萎缩程度是影响 IL-6、MCP-1、MMP-2 和 VEGF 水平的独立预测因素。细胞因子谱聚类分析提示，PHM 患者存在特征性炎症微环境改变。

结论：病理性高度近视白内障患者前房中存在明显的炎症及血管生成因子表达升高，提示眼内免疫微环境在病理性高度近视的发生与进展中具有重要作用。轴长及视网膜结构改变可能是影响细胞因子水平的重要因素。本研究为阐明高度近视眼的炎症机制及个体化手术管理提供了新的依据。

摘要编号：209824

病理性近视模型小鼠眼轴增长、视网膜结构变薄及功能损伤的年龄与性别相关特征研究

第一作者：Yuanyuan HU

共同作者：Heping XU, Jian LIU, Jinyan QI, Tong WANG, Caijiao YI

目的：本研究旨在利用 Lrp2flox/flox, Best1cre 小鼠构建的病理性近视模型，① 阐明 3 周龄至 11 月龄的病理性近视模型小鼠眼部关键病理表型的变化情况；② 明确在不同年龄段中性别对该动物模型的眼部病理表型的影响。

方法：1. 实验分组：使用 Lrp2flox/flox, Best1cre 小鼠作为病理性近视模型组，同窝不携带 cre 基因的 Lrp2flox/flox 小鼠作为对照组。分别于发育早期（3 周龄）、成熟期（3 月龄）与老年期（6-11 月龄）检测两组雌性与雄性小鼠的眼轴、视网膜结构与功能。2. 眼轴与视网膜结构检测：使用光学相干断层扫描测量小鼠眼轴长度与视网膜厚度。3. 视网膜功能检测：通过暗适应 ERG 记录视网膜功能，定量分析 a 波和 b 波的振幅。

结果：1. 与对照组相比，病理性近视模型组小鼠眼轴持续异常增长，视网膜厚度显著下降，暗适应 a 波、b 波振幅明显降低。2. 与发育早期相比，成熟

期与老年期的病理性近视小鼠眼轴明显更长，视网膜更薄，暗适应 b 波振幅更低。3. 在发育早期雌性与雄性的病理性近视小鼠眼轴长度与视网膜厚度无明显差异，然而在成熟期与老年的病理性近视小鼠中，雌性的眼轴更长、视网膜厚度更薄。4. 在发育早期与成熟期雌性病理性近视小鼠暗适应 a 波、b 波振幅更低，差异无统计学意义。

结论：本研究发现 Lrp2flox/flox, Best1cre 小鼠在早期即可引起眼轴异常增长和视网膜结构变薄，视网膜功能早期显著受损，且病变持续进展。此外，雌性个体在成年后表现出更显著的眼轴长度改变，与病理性近视的临床特征一致。这一发现拓宽了病理性近视的基础研究思路，Lrp2flox/flox, Best1cre 小鼠为探究病理性近视视网膜、脉络膜萎缩的具体机制提供了新手段。

摘要编号：209487

眼球结构与血流参数对视网膜劈裂的影响：视网膜曲率的中介效应

第一作者：Yao WANG

目的：RC 是否在眼部相关生理参数影响下导致高度近视视网膜劈裂。

方法：回顾性分析 104 例高度近视患者（ $SE \geq -6.00 D$ ，72 只视网膜劈裂、52 只高度近视眼）的临床资料。根据视网膜是否劈裂分为两个组别。采用超广角扫频源光学相干断层扫描（UWF-SS-OCT）获取 $24 \times 20 mm$ 的 OCT 扫描图像。通过对视网膜后轮廓（Bruch's 膜）的曲率进行量化分析，可显示 $24 \times 20 mm$ 范围内视网膜后轮廓的曲率地形图，并提供任意点位曲率值及对应在 3D 视网膜上的具体位置。RC 图谱得出的最小值、最大值、中位数、均值、极差、四分位距与眼部相关生理参数的关系，包括眼轴（AL）、视网膜厚度（ILM-BM）、视网膜体积（ILM-BM）、脉络膜厚度（BM-CSI）、脉络膜体积（BM-CSI）、脉络膜血流（CVI: CVV/a、CVV、CVI%、CSV/a、CSV、CSI%）。

结果：1. 眼轴长度与 RC 各项统计量之间均无显著相关性，提示眼轴值可能不直接影响 RC。2. 脉络膜中大血管结构与 RC 之间存在多项显著相关性，尤其是：CVV/a 和 CVV 与 RC 最大值呈中度负相关（ $|r| > 0.4$ ），CSV/a 和 CSV 也与 RC 呈中度负相关；3. 视网膜厚度与体积（ILM-BM）：视网膜厚度中位数与 RC 的四分位距呈中度正相关；视网膜体积的均值、中位数与 RC 的均值、最大值呈轻微负相关。4. 脉络膜厚度与体积（BM-CSI）：脉络膜厚度与体积的多个统计量（均值、中位数、最大值、极差等）与 RC 的均值、中位数、最大值

呈中度负相关，其中脉络膜体积的极差与 RC 最大值的相关性最高 ($r = -0.457$)。5. RC 与视网膜劈裂：RC 与视网膜劈裂呈中度正相关，其中 RC 均值与视网膜劈裂的相关性最强 ($r = 0.476$)，提示 RC 值的升高可能增加视网膜劈裂的风险。

结论：视网膜曲率是独立于眼轴长度的关键形态学指标。脉络膜结构与血流是影响 RC 的核心因素，其厚度、体积及血流量（如 CVV、CSV）与 RC（尤其是最大值）呈显著负相关，即脉络膜越厚、血流越充沛，视网膜后轮廓越平坦。本研究的核心发现是，RC 的多个统计量（均值、最大值等）与视网膜劈裂呈中度正相关，表明视网膜后极部曲率的显著增加，是导致高度近视眼发生视网膜劈裂的重要力学风险因素。

摘要编号：208619

瞳孔面积对不同设计多点离焦框架镜近视控制效果的影响

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目的：讨论瞳孔面积对不同设计多点离焦框架镜在控制儿童近视进展（包括眼轴及屈光度变化）中的影响，以评估其在个体化近视防控中的临床意义。

方法：本研究为回顾性分析，共纳入 310 名年龄 7~14 岁的近视儿童。所有受试者均连续佩戴三种多点离焦框架镜之一，佩戴时间不少于 12 个月。三种镜片类型分别为：(A) 多区正向光学离焦镜片 (Defocus Incorporated Multiple Segments, DIMS); (B) 高非球面微透镜片 (Highly Aspherical Lenslets, HAL); (C) 自由曲面光学设计镜片 (Diffusion Optics Technology, DOT)。根据瞳孔面积大小（高于或低于均值）将受试者分为两组。在基线、6 个月及 12 个月分别测量眼轴长度和等效球镜屈光度。采用线性混合效应模型分析瞳孔面积与镜片类型之间的交互作用对眼轴增长的影响。

结果：在瞳孔面积较大的儿童中，佩戴 B 型镜片者在 12 个月时的眼轴增长和等效球镜屈光度进展均显著小于 A 型和 C 型镜片组 ($P < 0.001$)。相比之下，在瞳孔面积较小的儿童中，不同镜片类型间的差异无统计学意义。交互效应分析结果显示 ($\beta = -0.086$, $P = 0.002$)，瞳孔面积对 B 型镜片的近视控制效果具有显著影响。

结论：瞳孔面积对多点离焦框架镜在近视控制中的疗效具有影响，瞳孔较大的儿童在使用高非球面微透镜片时获益更为显著，提示临床医生在制定个性化近视防控方案时应综合考虑瞳孔特征。

摘要编号：201451

红光通过调控脉络膜血流抑制形觉剥夺性近视

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目的：本研究旨在利用形觉剥夺性近视 (form-deprivation myopia, FDM) 小鼠模型，评估 630 nm 红光对屈光发育的影响，及其对脉络膜血流和厚度的作用，并直接验证脉络膜血流在红光抑制近视效应中的机制。

方法：选用 2 周龄 C57BL/6J 小鼠，建立单眼形觉剥夺 2 周模型。在造模前及造模后，分别测定小鼠的屈光度和眼球结构参数，并分析脉络膜血流密度与脉络膜厚度。通过视网膜电图 (electroretinogram, ERG) 检测小鼠对红光刺激的反应。将 FDM 小鼠分为 RL 组与 WL 组，分别接受 630 nm 红光 (275 lx) 或同等强度全光谱白光干预。分别在干预前、干预 1 周和 2 周时测定小鼠屈光度和眼球结构参数；干预 2 周后分析脉络膜血流密度与脉络膜厚度，并取眼球进行 HE 染色评估巩膜厚度。另外，对小鼠结膜下注射去氧肾上腺素 (phenylephrine, PE) 或哌唑嗪 (prazosin, PRA)，以生理盐水作为对照，2 周后再次检测以上指标。

结果：1、红光干预抑制小鼠形觉剥夺性近视并增加脉络膜血流密度。形觉剥夺造模后，与对照眼相比，小鼠近视眼的屈光度显著向近视方向偏移，眼轴增长更快，同时脉络膜变薄且血流密度降低。ERG 结果显示，FDM 小鼠视网膜功能正常，在暗适应和明适应条件下均对红光刺激产生反应。经过光照干预后，与 WL 组相比，RL 组小鼠近视眼的屈光度显著向远视方向偏移，眼轴增长减缓，巩膜厚度增加，脉络膜增厚，且脉络膜中大血管层的血流密度也显著上升。2、增加脉络膜血流灌注抑制小鼠形觉剥夺性近视。在 WL 组中，对小鼠结膜下注射 PRA 后，与生理盐水对照组相比，PRA 组屈光度显著向远视方向偏移，眼轴增长速度减缓，脉络膜增厚，同时脉络膜中大血管层的血流密度也出现增加。3、减少脉络膜血流灌注阻碍红光对近视的抑制作用。在 RL 组中，对小鼠结膜下注射 PE 后，与生理盐水对照组相比，PE 组未恢复近视屈光状态，眼轴继续增长，脉络膜变薄，且脉络膜中大血管层的血流密度降低。

结论：630 nm 红光能够有效抑制形觉剥夺性近视小鼠的眼轴增长，并诱导其屈光状态向远视方向偏移。红光的近视抑制效应主要通过增加脉络膜血流实现。

摘要编号: 204938

经皮耳穴迷走神经电刺激对豚鼠近视发展及脉络膜的影响

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目的: 本实验以 21 天豚鼠为实验动物建立形觉剥夺近视模型, 通过随机对照实验, 探索 4 周经皮耳穴迷走神经电刺激 (taVNS) 治疗对形觉剥夺近视 (FDM) 豚鼠屈光度、眼轴、脉络膜厚度及血流变化的影响。

方法: 将 60 只 3 周龄三色豚鼠随机分入模型组、阿托品组、taVNS 组, 其中模型组 21 只, 阿托品组 17 只, taVNS 组 22 只。采用连续 4 周的形觉剥夺建立豚鼠 FDM 近视模型。模型组豚鼠随机一眼予遮光度 70% 气球遮盖作为形觉剥夺, 此外不予干预; 阿托品组豚鼠随机一眼形觉剥夺, 并每日予遮盖眼 1% 阿托品凝胶, 连续 4 周; taVNS 组豚鼠随机一眼形觉剥夺, 并接受持续 4 周的 taVNS 治疗。于实验 0 w、2 w、4 w 使用红外偏光摄影验光仪 (EIR) 测量豚鼠屈光度, A 超测量豚鼠眼轴, 实验 4 w 后 OCTA 测量豚鼠脉络膜厚度及血流变化。

结果: 实验开始时, 各组豚鼠的屈光度、眼轴无显著性差异, 以此为基线。造模 2 w 后, 各组 F 眼的屈光度、眼轴增加高于 NC 眼, 屈光度增长 0.42 ± 1.17 VS 4.79 ± 0.75 VS 2.73 ± 1.20 VS 1.40 ± 1.46 , 眼轴延长 0.10 ± 0.06 VS 0.43 ± 0.06 VS 0.34 ± 0.11 VS 0.28 ± 0.10 (NC VS 模型组 VS taVNS 组 VS 阿托品组), 且阿托品组、taVNS 组屈光度、眼轴增长均慢于模型组, 阿托品组豚鼠的屈光度增长少于 taVNS 组豚鼠, 而眼轴增长两组间无显著性差异。造模 4 w 后, 各组 F 眼的屈光度、眼轴增加高于 NC 眼, 屈光度增长 0.82 ± 1.66 VS 7.98 ± 1.32 VS 4.81 ± 1.49 VS 4.37 ± 2.38 , 眼轴延长 0.22 ± 0.12 VS 0.80 ± 0.11 VS 0.59 ± 0.12 VS 0.60 ± 0.14 (NC VS 模型组 VS taVNS 组 VS 阿托品组), 且阿托品组、taVNS 组屈光度、眼轴增长均慢于模型组, 但阿托品组与 taVNS 组之间屈光度、眼轴增长均无显著性差异。OCTA 显示实验 4 w 后, 模型组、阿托品组、taVNS 组脉络膜厚度 (ChT) 均薄于 NC 眼, ChT 71.01 ± 9.95 VS 55.32 ± 5.64 VS 64.45 ± 5.26 VS 61.75 ± 6.29 (NC VS 模型组 VS taVNS 组 VS 阿托品组), 且阿托品组、taVNS 组 ChT 高于模型组, 阿托品组与 taVNS 组之间 ChT 无显著性差异。而脉络膜血管数量也有类似变化, 45788.95 ± 7212.43 VS 33873.40 ± 4426.36 VS 39572.90 ± 2351.76 VS 38108.06 ± 2523.19 (NC VS 模型组 VS taVNS 组 VS 阿托品组)。

结论: 经皮耳穴迷走神经电刺激 (taVNS) 可能通过影响脉络膜厚度及血流, 从而延缓 FDM 豚鼠近视的发生发展, 且效果与阿托品接近。

摘要编号: 210311

视网膜保护功能耗竭在实验性高度近视模型进展中的作用机制研究

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目的: 探讨视网膜保护功能耗竭机制在实验性高度近视中, 对视网膜功能、视网膜蛋白质组学和视神经轴突计数的影响。

方法: 用 -10 D 透镜诱导豚鼠高度近视 3-4 周, 另一只眼睛作为对照。使用便携式 RETEVAL 系统获得每周的闪光视网膜电图 (ERG) 记录, 包括 a 波、b 波和摄影阴性反应 (PhNR)。取 $1 \mu\text{m}$ 厚的视神经切片, 苯二胺染色并在 100 倍 1.40 NA 物镜成像, 采取 AxoNet 2.0 分析。使用液相色谱-质谱法对视网膜组织进行蛋白质组学分析。使用线性混合效应模型对 ERG 反应和轴索计数进行了统计分析, 并对蛋白质组学数据进行了微阵列意义分析。

结果: 与对照组相比, 晶状体处理的眼睛出现高度近视 (-11.4 ± 3.02 D vs -1.02 ± 0.8 D, $p = 0.002$)。ERG 显示近视眼和对照眼在 a 波、b 波和 PhNR 的振幅和峰值时间上没有显著差异 (图)。1A-F) 同样, 近视性和对照性视神经的轴索计数也相当 (图 2)。1G-H) 相比之下, 蛋白质组学分析显示在近视视网膜中有 153 种差异表达的蛋白质。值得注意的是, 丰度增加的蛋白质可以参与抑制凋亡 (前胸腺肽 α), 减轻氧化应激 (精氨酸合酶), 并增强突触传递 (CaM 激酶样囊泡相关蛋白) (图 2A)。途径分析 (QIAGEN IPA) 表明, 丰度降低的蛋白质主要与蛋白质合成途径 (如真核翻译启动) 相关, 而丰度增加的蛋白质则与轴索引导 (如半胱氨酸相互作用)、免疫反应 (如 I 类 MHC 介导的抗原呈现) 和细胞骨架适应 (如 EPH-Ephrin 信号传导) 相关的途径相关。

结论: 视网膜蛋白质组学表明, 在高度近视发展过程中, 视网膜保护机制可能被激活, 从而抵御各种伤害。保存的 ERG 反应和视神经轴突计数支持这一观点, 即视网膜可以在青少年近视发展过程中保护其功能。随着年龄的增长, 这些机制的衰竭可能会增加高度近视增长的风险。

摘要编号: 210305

视网膜神经递质定量分析及其在近视进展中的调控机制研究

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目的: 视网膜局部调控学说在近视进展中的作用机制仍存在诸多争议和未知。本研究旨在定量分析近视豚鼠视网膜中多种神经递质的变化, 为进一步揭示视网膜局部调控在近视屈光状态调节中的作用提供理论依据。

方法: 将 40 只 3 周龄健康三色豚鼠随机分为正常对照组 (NC, $n = 20$) 和形觉剥夺组 (FDM, $n = 20$)。形觉剥夺组采用单眼半透明眼罩遮盖法构建近视模型, 持续 4 周, 正常对照组不做任何处理。实验期间, 每周使用眼轴测量仪和自动验光仪测量豚鼠的眼轴长度和屈光度。实验结束后, 处死豚鼠并迅速摘取视网膜组织, 于 -80°C 保存备用。采用超高效液相色谱-串联质谱 (UHPLC-MS/MS) 技术, 结合标准品内标法, 定量检测视网膜中 17 种神经递质的含量, 包括多巴胺、 γ -氨基丁酸、谷氨酸、组胺、甲状腺素、3-甲氧基酪胺、甘氨酸、酪胺、5-羟基色氨酸和 5-羟基吲哚-3-乙酸等。质谱条件优化后采用多反应监测模式 (MRM) 进行检测, 数据通过 MassLynx 软件分析, 统计处理采用 SPSS 25.0 软件, 组间比较采用独立样本 t 检验, 相关性分析采用 Pearson 相关系数。

结果: 与正常对照组相比, 形觉剥夺组视网膜中多巴胺、 γ -氨基丁酸、组胺和甲状腺素含量显著下降 ($P < 0.05$), 而谷氨酸、3-甲氧基酪胺、甘氨酸、酪胺、5-羟基色氨酸和 5-羟基吲哚-3-乙酸含量显著升高 ($P < 0.05$)。其中, 谷氨酸与 γ -氨基丁酸比值 (RGG) 在形觉剥夺组 (1.212 ± 0.115) 显著高于正常对照组 (0.796 ± 0.094), 差异具有统计学意义 ($P < 0.001$)。此外, RGG 值与眼轴长度呈显著正相关 ($r = 0.625$, $P = 0.03$)。

结论: 视网膜可能通过调控兴奋性与抑制性神经递质的平衡, 特别是改变谷氨酸与 γ -氨基丁酸的比值, 来调节异常视觉信号, 从而参与近视的进展。本研究为深入理解视网膜局部调控在近视中的作用提供了新的实验依据, 并为近视的防治策略提供了潜在靶点。

摘要编号: 206931

视觉训练延缓近视进展的真实世界数据分析

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目的: 探讨真实世界中视觉训练在配戴单光眼镜近视儿童中的近视防控效果。

方法: 本研究选取 2022 年 1 月至 2024 年 12 月于天津市眼科医院视光中心就诊的 6-18 岁近视患者为研究对象, 等效球镜范围为 $-0.75 \text{ D} \sim -6.00 \text{ D}$, 以患者首次训练后 6 个月至 18 个月内再次到本院就诊的时间点作为研究终点, 将标准化计算后的等效球镜年平均增长值作为主要评价指标, 评估视觉训练效果。所有近视儿童在研究期间均只配戴单光眼镜, 采用倾向性得分匹配法 (PSM), 根据年龄、性别、基线等效球镜等变量按 1:1 比例进行匹配, 接受视觉训练者 ($n = 190$) 为训练组, 同期未接受视觉训练者 ($n = 190$) 为对照组。训练组根据视功能检查结果制定个性化的系统的训练方案, 并根据上一次训练结果调整下一次的训练方案。使用卡方检验比较分类变量, 独立样本 t 检验比较连续变量。随机性截距项的混合线性模型用于分析训练对患者年均等效球镜增量的影响, logistic 模型进行多因素分析视觉训练对出现度数快速增长情况的影响 (将年均等效球镜增长大于 0.75 D 的患者定义为快速增长)。以上所有统计学分析在 R 4.3.1 中完成。除标注以外所有检验均为双侧检验, $P < 0.05$ 被认为具有统计学意义。

结果: 共有 380 名患者参与了研究。其中男性、女性各 190 例。平均年龄为 10.2 岁。基线时两组性别构成、平均年龄、等效球镜、等效球镜增长量、基线至研究结束时间间隔均不存在统计学差异 ($P > 0.05$)。相比于对照组, 视觉训练组年均等效球镜增长值下降 0.14 D (95% CI: $0.01 \sim 0.28$), 差异有统计学意义 ($P < 0.05$)。调整后视觉训练组的年平均等效球镜增量显著低于对照组 ($P < 0.05$)。分层分析结果显示, 视觉训练组在男性以及 11 ~ 17 岁的人群中效果更显著 ($P < 0.05$)。视觉训练使近视儿童在研究结束时出现度数快速增长的可能性降低 46% (OR = 0.54; 95% CI: $0.35 \sim 0.82$)。

结论: 个性化的视觉训练对于 6-18 岁配戴单光的近视患者在近视度数增长存在一定延缓作用, 尤其是在青少年时期男生更明显, 可作为近视防控的有效辅助手段。

摘要编号: 206756

角膜塑形镜、离焦软镜及其分别联合 0.01% 阿托品对儿童青少年的近视防控效果分析

第一作者: Lu YE

共同作者: Jiaqi WANG

目的: 分析角膜塑形镜、离焦软镜及其分别联合 0.01% 阿托品对儿童青少年的近视防控效果。

方法: 本研究回顾性分析 336 名 6—15 岁近视患儿, 男性 144 人 (42.9%), 女性 192 人 (57.1%), 并将其分为四组: 角膜塑形镜组 (orthokeratology, OK 组) 89 人, OK 联合 0.01% 阿托品组 (OK combined with 0.01% atropine, OKA 组) 84 人, 离焦软镜组 (defocus incorporated soft contact lenses, DISC) 82 人和 DISC 联合 0.01% 阿托品组 (DISC combined with 0.01% atropine, DISCA) 81 人。分别在基线、随访 3、6、9 和 12 月时测量眼轴长度, 分析各组之间的眼轴变化差异, 并且按照初始年龄和屈光度大小进行亚组研究, 探讨不同年龄和屈光度下干预手段的效果差异。

结果: 随访 1 年时发现 OKA 组眼轴增长量显著低于 OK 组、DISC 组和 DISCA 组, 同时 OK 组与 DISC 组在 1 年内任何随访时间点均未见统计学差异。亚组分析显示, OKA 与 OK 组的差异在 6~9 岁和 0~-2.75 D 组中三个随访时间点均有显著差异, 而在 10~15 岁和 -3.00~-6.00 D 组中仅 12 月有差异, DISC 与 DISCA 比较在 6~9 岁和 0~-2.75 D 组均未见统计学差异, 而在 10~15 岁和 -3.00~-6.00 D 组中的 6 月和 9 月表现出统计学差异。

结论: OKA 组的近视防控效果显著优于 OK 组、DISC 组和 DISCA 组, OK 镜和 DISC 镜具有相似的近视防控效果, 0.01% 阿托品对 OK 镜的协同效应, 在 6~9 岁和 0~-2.75 D 亚组中更显著, 0.01% 阿托品对离焦软镜的协同效应只在 10~15 岁和 -3.00~-6.00 D 亚组中发挥作用。

摘要编号: 201831

近视眼眼轴长度/角膜曲率半径比与应力应变指数之间的关系

第一作者: Jie WU

目的: 探讨眼轴长度/角膜曲率半径比 (AL/CR) 与应力应变指数 (SSI) 的相关性。

方法: 回顾性分析。比较高度近视患者 (HM, $n = 132$; 年龄 10~48 岁) 与非高度近视患者 (NHM, $n = 135$; 年龄 7~48 岁) 的右眼, 分析基线眼轴长度、角膜曲率半径与中央角膜厚度, 比较两组间差异; 探讨眼轴长度 (AL) 和 AL/CR 与 SSI 的关系。

结果: 与 $AL \geq 26$ mm 相比, 当 $AL < 26$ mm 时 SSI 显著降低 ($p = 0.001$); 但无论是 NHM 组 ($r = -0.14$, $p = 0.12$) 还是 HM 组 ($r = -0.09$, $p = 0.32$), SSI 与 AL 均无相关性。在 NHM 组中, AL/CR 与 SSI 呈强负相关 ($r = -0.41$, $p < 0.001$); 校正年龄和性别后, AL/CR 与 SSI 显著相关 ($\beta = -0.514$, $se = 0.109$, $p < 0.001$)。HM 组中, AL/CR 与 SSI 呈弱负相关 ($r = -0.18$, $p = 0.04$); 校正年龄和性别后, AL/CR 与 SSI 显著相关 ($\beta = -0.258$, $se = 0.096$, $p = 0.0082$)。

结论: 非高度近视组和高度近视组的 SSI 与 AL/CR 均呈显著负相关, 但 SSI 并不随近视程度的加重而降低, 而是逐渐稳定在较低水平。本研究结果在一定程度上验证了通过测量活体角膜生物力学参数来分析近视发展过程中眼球壁硬度动态变化的可能性。

摘要编号: 207772

遗传与环境因素对儿童近视进展的交互效应: 一项基于前瞻性队列的双维度风险建模研究

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目的: 本研究旨在系统识别儿童近视进展的危险因素, 构建遗传与生物 (GB) 因素和环境与行为 (EB) 因素的双维度风险评估模型, 并探讨二者在近视进展中的独立与交互作用, 为个性化近视防控提供科学依据。

方法: 采用前瞻性队列研究设计, 于 2023 年 10 月纳入云南省保山市 1,172 名 4~18 岁学生。所有受试者完成基线生物学检查 (眼轴长度、轴率比、屈光度等) 及问卷调查 (用眼行为、睡眠、父母背景等), 1 年后进行随访。以年眼轴变化量 ≥ 0.20 mm 为快速进展标准, 通过单因素分析、共线性检验和多因素 logistic 回归筛选显著风险因素, 并构建 GB 与 EB 风险评分系统。采用相加交互作用模型 (RERI、AP、S 指数) 评估 GB 与 EB 因素的交互效应。

结果: 研究发现, GB 因素中女性 ($OR = 0.686$)、较小年龄 ($OR = 0.749$)、较长眼轴 ($OR = 1.322$) 和较高轴率比 ($OR = 7.184$) 是近视进展的独立危险因素; EB 因素中每日近距离用眼时间 > 4 小时 ($OR = 4.797$)、父母高学历 ($OR = 4.067$) 和每日睡眠时间 < 8 小时 ($OR = 3.381$) 显著增加近视风险。风险分层显示 GB 和 EB 高风险人群的近视进展风险显著升高 (趋势检验 $P < 0.001$)。本研究创新性发现 GB 与 EB 因素存在拮抗性交互作用 ($RERI = -0.21$, $AP = -0.12$, $S = 0.79$), 交互作用可解释 12% 的近视风险降低。

结论: 本研究构建了基于眼轴变化的双维度近视风险评估模型,明确了GB与EB因素在近视进展中的独立与交互作用。EB因素是近视进展的主要驱动因素,且与GB因素存在拮抗效应。通过干预EB因素(如控制用眼时间、保障睡眠)可在不同遗传背景下有效延缓近视进展,为儿童近视的个性化防控提供了理论支持和实践方向。

摘要编号: 207625

配戴周边附加正、负屈光力微透镜阵列匀光镜片对近视儿童视觉质量的影响

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目的: 评估周边附加正、负屈光力微透镜阵列匀光镜片对近视儿童视觉质量的影响。

方法: 本研究纳入了240名6~12岁近视儿童,其中231人完成了1年随访。受试者被随机分为三组,分别配戴单光框架眼镜(单光组)、周边附加正屈光力微透镜阵列匀光镜片(正微透镜组)、周边附加负屈光力微透镜阵列匀光镜片(负微透镜组)。在基线、戴镜1个月、6个月及12个月时进行对比敏感度功能评估,指标包括对比敏感度曲线下面积、对比敏感度锐度,以及1.0、1.5、3.0、6.0、12.0、18.0周/度(cpd)空间频率下的对比敏感度。镜片分发后,每次随访均完成主观可接受度问卷;每6个月通过主觉验光评估最佳矫正视力。统计分析仅纳入右眼数据。

结果: 基线、戴镜6个月及12个月时,三组受试者的最佳矫正视力均无统计学差异(均 $P > 0.05$)。除了正微透镜组戴镜12个月的对比敏感度锐度高于单光组($P = 0.04$)外,其余对比敏感度参数(包括对比敏感度曲线下面积、各空间频率下的对比敏感度)在基线、戴镜1个月、6个月及12个月时,三组间均无统计学差异(均 $P > 0.05$)。镜片分发时及戴镜1个月、6个月、12个月时,三组受试者间的戴镜舒适度评分均无统计学差异(均 $P > 0.05$)。镜片分发及戴镜1个月时,单光组的戴镜视觉评分优于正微透镜组($P < 0.001$ 和 $P = 0.001$)和负微透镜组($P < 0.001$ 和 $P = 0.004$);但戴镜6个月及12个月时,三组戴镜视觉评分无统计学差异(均 $P > 0.05$)。

结论: 周边附加正、负屈光力微透镜阵列匀光镜片可为近视儿童提供与单光眼镜片相似的视觉质量。

摘要编号: 209295

配戴多焦软镜和微透镜设计离焦镜片对角膜散光的影响研究

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目的: 探讨长期配戴多焦软镜和微透镜设计离焦镜片后对角膜散光的影响及近视控制效果。

方法: 回顾性研究,收集2022年1月至2023年12月在山东中医药大学附属眼科医院就诊的120例年龄在9~16岁的近视儿童和青少年,近视球镜 $-0.50 \sim -9.00$ D,散光4.00 D以内,等效球镜度为 -8.875 D ~ -0.75 D,分为三组:多焦点软性角膜接触镜(Multifocal Soft Contact Lenses, MFSCs)组、多区正向离焦(Defocus Incorporated Multiple Segments, DIMS)微透镜设计框架眼镜组和单焦点框架镜(Single-vision spectacle lenses, SVLs)对照组,每组40例,仅取右眼数据。三组均随访1年,比较戴镜前后散光、角膜曲率、等效球镜度和眼轴长度数据变化。

结果: MFSCs组柱镜度(CYL)年增长量为 -0.77 ± 0.77 D, DIMS组为 -0.80 ± 0.75 D,较SVLs组(-0.84 ± 0.76 D)均具有统计学差异($P < 0.05$);MFSCs组和DIMS组散光的增加主要体现在角膜曲率的增长(分别达 $83.6\% \pm 5.2\%$ 和 $79.4\% \pm 6.8\%$),且陡峭曲率的增长幅度显著高于平坦曲率,其变化量对整体角膜屈光力改变的贡献率分别达76.2%和78.4%(95% CI: 72.1–83.6)。配戴两种眼镜一年后柱镜轴位无显著变化(MFSCs: $P = 0.422$, DIMS: $P = 0.421$)。MFSCs组与DIMS组的等效球镜度(Spherical Equivalent, SE)年增长量分别为 -0.08 ± 0.32 D和 -0.26 ± 0.51 D,显著低于单焦点框架镜(SVLs)对照组的 -0.57 ± 0.69 D($P < 0.01$);MFSCs组和DIMS组的眼轴(Axial Length, AXL)年增长量分别为 0.06 ± 0.31 mm和 0.07 ± 0.58 mm,显著低于单焦点框架镜(SVLs)对照组的 0.16 ± 0.45 mm($P = 0.005$)。

结论: 配戴多焦软镜以及微透镜设计离焦镜片患者的散光度数的增长速率高于普通单焦点镜片,且散光度数的增长主要来源于角膜散光。配戴多焦软镜以及微透镜设计离焦镜片均有显著的控制近视屈光度和眼轴增长的作用,但使用这些镜片进行近视防控时,需密切关注患者散光的变化情况。

摘要编号: 209085

重复低强度红光对不同程度近视儿童青少年近视防控疗效对比

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目的: 探讨重复低强度红光 (Repeated Low-Level Red Light, RLRL) 治疗对不同程度近视儿童青少年近视进展的控制效果及安全性。

方法: 前瞻性非随机对照研究, 纳入 5-16 岁 近视儿童 103 例 (103 眼), 按基线等效球镜度 (SE) 分为低度 ($-3.00\text{ D} \leq \text{SE} < -0.50\text{ D}$, 39 眼)、中度 ($-6.00\text{ D} < \text{SE} \leq -3.00\text{ D}$, 31 眼) 及高度近视组 ($\text{SE} \leq -6.00\text{ D}$, 33 眼)。所有受试者接受 RLRL 治疗, 每日 2 次, 每次 3 分钟, 间隔 ≥ 4 小时, 持续 9 个月。治疗前及 9 个月后测量裸眼视力、睫状肌麻痹屈光度 (SER)、眼轴长度 (AL) 及黄斑中心凹脉络膜厚度 (SFCT)。主要指标为 AL 与 SER 较基线的变化。

结果: 9 个月后, 低、中、高度近视组眼轴平均变化分别为 0.03 mm、-0.19 mm、-0.15 mm, 组间差异显著 ($F = 13.217$, $P < 0.001$)。与低度近视组相比, 中、高度近视组眼轴延长显著减少 ($P < 0.001$), 中、高度组间差异不显著 ($P > 0.05$)。三组 SER 均呈远视漂移趋势, 分别有 71.8%、58.1%、55.6% 的眼出现 $> +0.25\text{ D}$ 漂移。脉络膜厚度变化无统计学差异。

结论: RLRL 治疗可有效延缓不同程度近视儿童青少年的眼轴增长与近视进展, 中、高度近视者疗效更显著且安全性良好, 提示 RLRL 为近视防控的有前景干预手段。

摘要编号: 209090

雾视疗法在近视前期儿童中的防控效果及机制研究: 一项前瞻性随机对照研究

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共同作者: Zhuoxiao LI, Nan MA, Yuhua MA, Junyang PAN, Chunli WU

目的: 探讨雾视疗法对近视前期儿童的近视防控效果, 并分析其通过保留远视储备延缓近视进展的作用机制, 以期儿童青少年近视防控提供更有效的干预策略。

方法: 本研究为一项前瞻性随机对照试验。选取 2023 年 2 月至 2024 年 3 月期间就诊于我院眼科的 6-10 岁 近视前期 (远视储备不足) 儿童 76 例, 随机分为观察组 ($n = 39$) 与对照组 ($n = 37$)。观察组在近距离用眼时配戴回归镜实施雾视疗法, 对

照组不进行特殊干预、保持正常用眼习惯。所有受试者在入组时接受基线检查, 包括眼压、眼轴长度、屈光状态、脉络膜厚度及脉络膜血流灌注量等指标。在入组后 3、9、12 个月分别对上述指标进行复查。数据采用两独立样本 t 检验或 Mann-Whitney U 检验进行统计分析。

结果: 1. 截至 2024 年 12 月随访结果显示, 两组儿童眼轴均有所增长, 但观察组眼轴增长幅度显著低于对照组 ($P < 0.05$)。两组脉络膜厚度及总脉络膜面积均呈下降趋势, 但观察组下降幅度明显小于对照组 ($P < 0.05$)。2. 此外, 两组脉络膜管腔面积均显著减小, 伴随眼轴增长、脉络膜变薄及血流灌注量降低, 可能进一步引起脉络膜及巩膜缺血缺氧, 影响细胞外基质合成, 促进眼轴延长。然而, 观察组脉络膜管腔面积的减小幅度显著低于对照组 ($P < 0.05$), 提示雾视疗法有助于缓解脉络膜血流灌注的下降程度。

结论: 雾视疗法可有效延缓近视前期儿童的近视进展, 其作用机制主要包括减缓眼轴增长、减轻脉络膜厚度与面积的减小, 以及改善脉络膜血流灌注。

摘要编号: 209443

高度近视合并脉络膜新生血管的脉络膜动静脉空间构型研究: 一项基于多模态影像配准的分析

第一作者: Wang

共同作者: Yujia GAO, Jiayi WU, Liang YAO, Yuping ZHENG

目的: 探讨高度近视 (PM) 合并脉络膜新生血管 (CNV) 患者脉络膜大动脉与大静脉的空间位置关系, 分析其与 CNV 发生、发展及治疗反应之间的解剖学联系, 揭示其在 PM-CNV 发病机制中的潜在作用。

方法: 本研究为回顾性多中心研究, 纳入 2022 年 3 月至 2025 年 6 月期间就诊的 146 例 PM 患者 (146 眼), 其中 102 眼合并 CNV (PM-CNV 组), 44 眼为非 CNV 组 (包括出血及 MFC), 另设 115 眼非高度近视糖尿病患者作为对照组。所有患者均接受吲哚菁绿血管造影 (ICGA) 及扫频源光学相干断层扫描血管成像 (SS-OCTA) 检查。通过 Fiji 软件对 ICGA 动脉期、静脉期及 SS-OCTA 巩膜层 en face 图像进行配准与多通道叠加, 识别睫状后短动脉 (PCA) 入口, 分析脉络膜大动脉与大静脉的五类空间关系 (无关、交叉、压迫、缠绕、交通), 并统计其与 CNV 类型及抗 VEGF 治疗次数的关联。

结果: PM 组均可清晰显示脉络膜动脉, 但黄斑区内动脉显影减弱, 66 眼中检出形态各异的 PCA。

PM-CNV 组动脉出现时间延迟, 35% 患眼 5 分钟时仍见动脉或 PCA 残留, 提示血流瘀滞。PM 组仅 35% 存在黄斑区大静脉分水岭, 显著低于糖尿病组 (69%)。CNV 组中黄斑区大静脉出现率更高 (单针组 68%, 重复组 80%)。70.5% 的 PM-CNV 眼在 CNV 渗漏区可见 PCA 入口, 重复治疗组比例 (85%) 显著高于单针组 (50%)。54% 的 PM-CNV 眼在 CNV 区存在异常动静脉关联 (交叉、压迫、缠绕、交通), 非 CNV 组仅 7%。重复治疗组异常类型更多, 而单针组中“交通”模式更常见。

结论: PM 患者脉络膜大动静脉之间存在多种异常空间构型, 可能通过引起局部静脉高压、湍流、管壁应力增高及下游缺血, 促进 CNV 的发生与发展。动脉入口与 CNV 区域的解剖关联及动静脉“交通”模式的存在, 部分解释了 PM-CNV 对单次抗 VEGF 治疗反应良好的现象, 提示其发病机制超越传统的缺血缺氧模型。本研究为 PM-CNV 的个体化治疗提供了新的解剖学依据。

青光眼

摘要编号: 206854

中国中老年人高密度脂蛋白与青光眼的关系

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目的: 近期的研究促使我们重新考虑血清高密度脂蛋白 (HDL) 假说, 并在眼科领域对其“好胆固醇”的标签产生了怀疑。本研究通过结合队列研究和两样本孟德尔随机化 (MR) 分析, 全面评估了中老年人群血清 HDL 水平与青光眼之间的关联。

方法: 本研究利用中国健康与退休纵向研究 (CHARLS) 的数据, 开展了一项基于人群的回顾性队列研究。采用 Cox 回归、限制性立方样条模型和亚组分析来调查血清 HDL 与青光眼之间的关联。进一步使用东亚人群的两样本 MR 来评估因果关系。

结果: 在 7 年的随访期间, 224 名 (2.98%) 参与者发展为青光眼。在调整人口统计学和健康相关变量后, 多变量 Cox 回归显示, 血清 HDL 水平与青光眼风险增加有关 (HR = 1.49; CI: 1.07 ~ 2.08; $p = 0.019$), 而低 HDL 水平 ($< 1.0 \text{ mmol/L}$) 与风险降低有关 (HR = 0.63; 95% CI: 0.43 ~ 0.92; $p = 0.018$)。在拐点的左侧和右侧, HR 分别为 2.60 (95% CI: 1.14 ~ 5.95; $p = 0.02$) 和 1.41 (95% CI: 0.68 ~ 2.95; $p = 0.36$)。亚组分析显

示, 在年龄小于 60 岁、被诊断为高血压、无糖尿病、患有肝病和不饮酒者中, 血清 HDL 与青光眼呈显著正相关。两样本 MR 显示, 血清 HDL 和青光眼之间没有显著的遗传相关性: 在 5 种孟德尔随机化方法中, 只有加权模式确认了遗传性 HDL 水平升高与青光眼风险增加之间的显著因果关系 (OR = 1.15; 95% CI: 1.02 ~ 1.28; $p = 0.022$)。在 7 年的随访期间, 224 名 (2.98%) 参与者发展为青光眼。在调整人口统计学和健康相关变量后, 多变量 Cox 回归显示, 血清 HDL 水平与青光眼风险增加有关 (HR = 1.49; CI: 1.07 ~ 2.08; $p = 0.019$), 而低 HDL 水平 ($< 1.0 \text{ mmol/L}$) 与风险降低有关 (HR = 0.63; 95% CI: 0.43 ~ 0.92; $p = 0.018$)。在拐点的左侧和右侧, HR 分别为 2.60 (95% CI: 1.14 ~ 5.95; $p = 0.02$) 和 1.41 (95% CI: 0.68 ~ 2.95; $p = 0.36$)。亚组分析显示, 在年龄小于 60 岁、被诊断为高血压、无糖尿病、患有肝病和不饮酒者中, 血清 HDL 与青光眼呈显著正相关。两样本 MR 显示, 血清 HDL 和青光眼之间没有显著的遗传相关性: 在 5 种孟德尔随机化方法中, 只有加权模式确认了遗传性 HDL 水平升高与青光眼风险增加之间的显著因果关系 (OR = 1.15; 95% CI: 1.02 ~ 1.28; $p = 0.022$)。

结论: 本队列研究表明, 血清 HDL 与青光眼风险增加有关。然而, 我们的 MR 并未支持血清 HDL 与青光眼之间存在显著的正向因果关联。需要进一步开展更大病例数的研究来证实我们的发现。

摘要编号: 202604

光激活靶向一氧化氮供体结合实时监测的新型策略在青光眼动物模型中的应用研究

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目的: 原发性开角型青光眼是导致不可逆性致盲的常见疾病, 房水外流障碍所致眼压升高是致病的重要危险因素。一氧化氮在调节小梁网与房水通路功能中具有关键作用, 但传统一氧化氮供体存在释放不可控、靶向性不足及成像监测缺乏等局限。本研究旨在构建一种新型可见光激活一氧化氮供体, 可以实现可控释放, 并通过抗体修饰实现靶向递送同时结合实时成像监测和证实体内分布, 探索其在青光眼治疗中的可行性与机制。

方法: 合成基于罗丹明结构的光控一氧化氮供体并连接 ABCA1 抗体形成 RhNO-Ab。在可见光照射下该化合物能释放一氧化氮并由无荧光态转为荧光态实现同步监测。体外实验在小梁网细胞、Schlemm 管内皮细胞和角膜上皮细胞中评价其细胞摄取, 一氧化氮释放, 跨内皮电阻变化, 及可溶

性鸟苷酸环化酶表达。在体内利用 NOS3 敲除小鼠建立高眼压模型，经局部滴眼并光照后检测眼压变化组织分布及分子机制，并行角膜安全性和组织学评价。

结果：材料表征提示 RhNOAb 在光照下快速稳定释放一氧化氮并产生明显荧光信号，提示实时可视化监测。其被小梁网细胞摄取后可显著提高胞外一氧化氮水平，提升 Schlemm 管内皮细胞渗透性，增加房水外流。分子机制实验发现 RhNOAb 上调小梁网细胞的一氧化氮通路关键蛋白 sGC 的 mRNA 和蛋白表达。在 NOS3 敲除小鼠中不同剂量 RhNOAb 联合光照均能显著降低眼压，其中 30 μ M 处理 3 小时内平均下降 2.11 mmHg，约 15%，并呈剂量依赖性。体内分布实验发现药物在滴眼后 1 小时和 3 小时在房水引流区域有特征性荧光分布，而在角膜区荧光较弱。同时药物具有较好的安全性，在小梁网和 Schlemm 管区定位明确且未见角膜上皮损伤或局部毒性。

结论：本研究提出一种结合光控释放靶向递送和实时监测的一氧化氮供体策略，克服了传统 NO 供体的局限，在细胞与动物模型中均证实其可通过增强房水外流通路及激活 sGC-cGMP 信号实现有效降眼压，且具有良好安全性。该策略为青光眼的精准治疗提供了新的思路并展现出较高的临床转化潜力。

摘要编号：208200

具备数据远程传输功能的回弹式眼压计在居家场景下对青光眼眼压的管理和应用

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目的：针对青光眼患者传统眼压监测依赖门诊易遗漏夜间/清晨峰值，评估具备数据远程传输功能的回弹式眼压计（海思微 iCute）的测量准确度、耐用性及家庭使用便利性。为青光眼全病程眼压管理提供工具支撑。

方法：（1）耐用性评估：通过双电源供电的寿命测试平台，对 iCute 进行平均无故障工作时间（MTBF）测试，模拟真实使用场景连续运行 51 天；（2）准确度评估：于上海浦东医院纳入 30 例青光眼患者，按基线眼压分为 7~16 mmHg、17~22 mmHg、 ≥ 23 mmHg 三组，以校准的 Goldmann 眼压计为金标准，采用线性回归、Bland-Altman 分析 iCute 的测量一致性；（3）便利性评估：通过结构化问卷收集患者使用体验。

结果：（1）耐用性：iCute 的 MTBF 达 540 万次完整测量，5 年使用周期内保持稳定性能。眼压

7~20 mmHg 时测量准确度 ± 1.2 mmHg，21~50 mmHg 时 ± 2.2 mmHg，重复性变异系数（CV） $\leq 8\%$ ，且在温湿度波动环境下仍正常运行；（2）准确度：与 GAT 相比，iCute 测量值的线性相关系数 $R^2 = 0.9664$ ，Bland-Altman 分析显示 95% 一致性限度为（-5.659，4.592），三组患者的测量成对差均未超过 ± 5 mmHg；3）便利性：80% 患者认为 iCute 操作便捷，20% 患者虽对角膜接触存在初始顾虑，但经培训后可接受其操作模式。

结论：海思微 iCute 回弹式眼压计在测量准确度、长期耐用性及居家适用性上均满足青光眼患者的日常监测需求，其数据远程传输功能可填补门诊监测的时空短板，为临床制定个性化眼压管理方案提供关键数据支持，是青光眼患者实现家庭式眼压管理的良好工具。

摘要编号：204441

基于胆红素-聚合物纳米载体的 Farrerol 靶向治疗策略：通过 Nrf2 通路抑制铁死亡/凋亡促进青光眼视神经保护

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目的：青光眼是一种复杂的、多病因的影响视神经的疾病，典型表现为眼压升高和神经节细胞变性。然而，到目前为止，青光眼的完整发病机制仍然难以捉摸。Farrerol 作为一种具有强大抗氧化和抗炎特性的天然类黄酮化合物，可作为潜在的神经保护药物，但其治疗应用受到生物利用度差和光降解的限制。基于此，本研究探讨了 farrerol 的神经保护机制及其潜在机制之间复杂的相互作用，并开发了一种全新的纳米制剂以增强神经保护疗效，试图揭示可能改变我们对青光眼的理解和治疗的关键见解。

方法：本研究采用视网膜缺血再灌注（I/R）小鼠模型和氧糖剥夺/再灌注（OGD/R）处理的 R28 细胞建立体内和体外急性高眼压模型。通过 CCK-8 试剂盒检测 R28 细胞活力。Annexin V-FITC/PI 和 Calcein AM/PI 染色检测细胞凋亡率和坏死率。采用 ROS 和 GSH 试剂盒测定 R28 细胞的氧化应激损伤情况。通过 DLS、透射电镜、HPLC 等试验对纳米材料进行相关物化性质检测。透射电镜观察 RGCs 坏死改变。免疫荧光法定量 RGCs 数。HE 染色检查视网膜形态。采用分子对接、免疫荧光及 western blotting 检测 Nrf2 及相应下游蛋白的表达情况。

结果：体外氧-葡萄糖剥夺/再灌注（OGD/R）和体内视网膜缺血再灌注（IR）模型表明，farrerol 可显著改善 RGCs 存活，恢复小鼠视网膜结构以

及视觉功能。机理研究表明, farrerol 激活核因子红蛋白 2 相关因子 2 (Nrf2) 抗氧化途径, 减少活性氧 (ROS) 积累, 调节关键铁死亡标志物 (谷胱甘肽过氧化物酶 4 (GPX4) 和酰基辅酶 A 合成酶长链家族成员 4 (ACSL4)) 的表达, 从而抑制 RGCs 细胞凋亡。随后, 为了克服递送限制, 我们开发了负载 farrerol 的胆红素纳米颗粒 (FB-NPs), 其在青光眼病理损伤模型中显示出优于 farrerol 的稳定性和神经保护作用, 并能够持续发挥神经保护作用。

结论: 本研究明确证实, farrerol 可通过 Nrf2 介导的氧化应激与线粒体功能障碍机制保护 RGCs, 提供了针对青光眼病理损伤的神经保护。基于该机制, 我们进一步开发了一种创新型纳米制剂 (FB-NPs), 克服了 farrerol 的药理学局限, 并显著增强其治疗潜力。本研究成功将具有神经保护活性的小分子与先进纳米递送系统整合, 为下一代青光眼疗法的构建提供了新的思路。本研究明确证实, farrerol 可通过 Nrf2 介导的氧化应激与线粒体功能障碍机制保护 RGCs, 提供了针对青光眼病理损伤的神经保护。基于该机制, 我们进一步开发了一种创新型纳米制剂 (FB-NPs), 克服了 farrerol 的药理学局限, 并显著增强其治疗潜力。本研究成功将具有神经保护活性的小分子与先进纳米递送系统整合, 为下一代青光眼疗法的构建提供了新的思路。

摘要编号: 205352

复杂眼前节手术特殊病例解析

第一作者: Li LI

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目的: 通过对特殊眼前节病例的临床诊疗过程进行剖析, 进一步总结、分享经验。

方法: 本文收集 5 例需手术治疗的复杂眼前节特殊病例, 其中, Case 1 为真性小眼球合并急性闭角型青光眼; Case 2 为 Best 卵黄样黄斑营养不良合并闭角型青光眼; Case 3-5 为不同原因、不同程度的晶状体悬韧带异常继发闭角型青光眼。术前对各患者进行详尽的病史采集, 结合全面的检查, 明确诊断, 并制定针对性的手术方案及备选保障方案, 给予个性化的手术治疗。通过 FLACS+ 房角镜直视下 GSL+GNT+IOL (Case 1); Phaco+IOL+房角镜直视下 GSL+GNT+后入路 IZHV (Case 2); Phaco+囊袋张力环植入+IOL (Case 3); FLACS+AV+IOL 巩膜层间固定 (Case 4); FLACS+张力环植入+自制植入性囊袋拉钩固定+IOL (Case 5)。

结果: 5 例患者均按计划顺利完成手术, 无严重手术并发症。术后随访 2 月到 2 年不等, 手术后患眼视力均有不同程度提高 (0.12-0.8), 眼压正常 (11-17 mmHg)。Case 2 术后 1 年在当地复查 (2025.5) 患眼视力稳定于 0.15 (术后 1 天为 0.12), 眼压 11 mmHg, 眼底病变稳定, 随访未发现新生血管。

结论: 复杂眼前节特殊病例非临床常见多发病, 临床上易于漏诊、误诊。处理不当或不及时可导致患者视功能永久性损害。详尽病史采集, 全面的术前检查及沟通是临床医生很重要的基本素质, 个性化手术设计及规划, 精细的手术操作是治疗成功的保障; 重视患者的长期随访, 及时发现及处理可能的病情变化及不良转归, 以守护患者的视功能。

摘要编号: 202718

慢性青光眼模型鼠视神经、视网膜、视乳头周围巩膜的力学相关变化

第一作者: Xu LIU

共同作者: Huan DU, Yuan HE

目的: 青光眼是一种慢性不可逆性致盲性眼病。青光眼眼内组织的生物力学性质改变有可能引起视神经损伤。我们使用原子力显微镜 (AFM) 纳米压痕法等方法分析了慢性青光眼模型鼠视神经、视网膜、视乳头周围巩膜 (PPS) 不同时期的力学相关变化。

方法: 我们使用 AFM 测定青光眼模型不同时期视神经头 (ONH)、视网膜、PPS 冷冻切片的弹性模量。使用球形悬臂尖端在 ONH、retina、PPS 的选定区域进行 AFM 力映射。我们通过分析力曲线确定各组织的杨氏弹性模量 (YME), 从而作为组织刚度的度量。同时检测了以上三种组织不同时期的胶原沉积情况。

结果: ONH 相应的 YME 值显示, 对照样本弹性模量值平均为 140.5 Pa, 高眼压 2 周模型眼为 226.2 Pa, 表明高眼压 2 周大鼠视神经弹性模量升高 ($P < 0.01$)。视网膜相应的 YME 值显示, 对照样本平均为 53.1 Pa, 高眼压 2 周模型眼平均为 42.82 Pa, 高眼压 4 周模型眼平均为 22.4 Pa, 高眼压 6 周模型眼平均为 33.76 Pa; 高眼压 2、4、6 周大鼠视网膜弹性模量显著降低 ($P < 0.01$)。PPS 相应的 YME 值显示: 对照样本弹性模量值平均为 3.98 kPa, 高眼压 4 周 PPS 平均弹性模量为 2.44 kPa, 高眼压 6 周 PPS 平均弹性模量为 7.50 kPa, 高眼压大鼠 PPS 弹性模量降低 ($P < 0.01$), 高眼压大鼠 PPS 弹性模量显著升高 ($P < 0.01$)。同时高眼压处理 2 周、3 周后模型鼠的 ONH、视网膜、PPS 胶原沉积均显著增加。

结论: AFM 可用于表征眼内组织的刚度,但仍需要进一步的大规模分析。青光眼早期 ONH 的 YME 增加,意味着 ONH 的抗变形能力增加,retina 的 YME 降低,这可能反映了其固有的组织无力,使视网膜更容易受到高眼压的损害。而 PPS 早中期 YME 降低,晚期 YME 增加,这可能提示 PPS 通过调节其刚度对视神经发挥保护作用。慢性青光眼模型大鼠 ONH、视网膜、PPS 胶原沉积提示了“眼压升高引发机械信号转导异常—胶质层胶原沉积失衡—视神经损伤”的病理机制,为临床治疗靶点开发、手术优化及预后评估提供实验依据。本研究从力生物学方面可能为青光眼的神经保护提供新的思路。

摘要编号: 202119

新型 PGK1 激活剂作为青光眼 RGC 凋亡抑制剂和神经保护剂的发现

第一作者: Ruyue LI

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目的: 青光眼是一种导致视网膜神经节细胞 (RGCs) 逐渐凋亡和不可逆视力损害的视网膜神经退行性疾病。磷酸甘油酸激酶 1 (PGK1) 是糖酵解过程中第一个产生 ATP 的酶,多项研究初步证明,过表达 PGK1 能减少神经元凋亡。本团队前期研究结果首次验证过表达 PGK1 减少青光眼动物模型中 RGC 凋亡。本研究拟通过药物虚拟筛选方法筛选特异性 PGK1 激活剂。

方法: 从 RCSB PDB 数据库 (<http://www.rcsb.org/>) 下载 PGK1 蛋白的原始晶体结构文件 (PDB ID: 4O3F)。在 BatchVinaGUI 软件中对 PGK1 蛋白质受体结构进行了对接前预处理。虚拟筛选使用的化合物数据库为 L1000, 包含 2860 个小分子化合物的 2D 结构文件。对接方法为半柔性对接和类比对接。对接前处理使用 AlphaFold3, 批量对接软件使用 BatchVinaGUI, 对接算法使用 Autodock Vina 1.2.5。绘图软件为 PyMol 3.1.0 和 Discovery Studio Visualizer 2024。

结果: 特拉唑嗪 (TZN) 的结合亲和力为 -7.504 kcal/mol, 属于较优水平, 该共结晶配体被用作后续分析的阳性对照。1765 个小分子化合物与靶蛋白的对接结果中, 1758 个成功对接, 大量化合物的结合亲和力超过 TZN。化合物 2304 (英文名: Tanshinone I, CAS 号: 568-73-0, SMILES: Cc1coc-2c1C(=O)C(=O)c1c-2ccc2c(C)cccc12) 与靶蛋白的结合亲和力打分最佳, 为 -10.28 kcal/mol, 转换成 Ki (Kd) 值为 28.60 nM, 属于极佳水平。对于单次对接所得的多个排名靠前的小分子构象, 相互之间 RMSD 较小, 对接结果稳定。化

合物 2304 与 TZN 的结合模式几乎相同, 配受体间具有良好的形状互补匹配。PRO339、ALA215、VAL342、LEU257、PHE292 是化合物 2304 与 PGK1 蛋白形成疏水相互作用的关键氨基酸残基。其中, VAL342、LEU257、PHE292 也是维持稳定结合的关键疏水残基。构建 R28 细胞 OGD/R 模型显示, 2304 有效减少了细胞凋亡。

结论: 新型 PGK1 激活剂的开发为青光眼 RGC 保护提供了新的前景。

摘要编号: 209795

新型微创内路三联手术与房角镜辅助下 360° 小梁切开术联合超声乳化术治疗原发性开角型青光眼合并白内障的临床疗效

第一作者: Qin QIU

目的: 比较新型微创内路三联手术 (3T) 与房角镜辅助下 360° 小梁切开术 (GATT) 联合白内障超声乳化术治疗原发性开角型青光眼 (POAG) 合并白内障两种不同术式的临床疗效, 探究 3T 联合白内障手术治疗 POAG 合并白内障的安全性与有效性, 为临床 POAG 合并白内障的治疗提供新的选择。

方法: 回顾性研究。收集了 2022 年 1 月至 2025 年 1 月期间接受 3T 和 GATT 联合超声乳化术的 POAG 合并白内障 42 例 (49 眼) 患者的住院病历资料。所有病例分为两组, 观察组为 3T 联合白内障超声乳化手术 24 例 (24 眼), 对照组为 GATT 联合白内障手术 18 例 (25 眼)。术后随访 6 月, 观察患者的最佳矫正视力 (BCVA)、眼压 (IOP)、降眼压药物数量、并发症及手术成功率等, 并进行分析。连续变量经 Shapiro-Wilk 正态性检验, 正态数据采用独立样本 T 检验, 非正态数据采用 Mann-Whitney U 检验; 分类变量采用 χ^2 /Fisher 精确法; 手术成功率采用 Kaplan-Meier 法。

结果: 1、视力: 术后 6 个月, 与基线期相比, 两组视力均提高, 两组之间差异无统计学意义; 2、眼压: 观察组术前与术后 6 月眼压分别为 (32.04 ± 10.51 、 14.71 ± 2.63 mmHg), 对照组分别为 (30.24 ± 5.97 、 16.92 ± 3.25 mmHg), 两组术后眼压均较术前降低, 差异具有统计学意义, 两组之间差异无统计学意义; 3、降眼压药物的使用: 观察组术前与术后 6 月降眼压药物数量分别为 (2.6 ± 0.82 种、 0.48 ± 0.77 种), 对照组分别为 (2.25 ± 1.15 种、 0.17 ± 0.56 种), 术后 6 个月两组使用降眼压药物数量均较基线期减少, 差异具有统计学意义, 两组之间差异无统计学意义; 4、并发症: (1) 前房积血: 观察组为 12.5%, 对照组为 30%, 观察组比对照组前房积血发生率低。(2) 眼压反跳: 观察组为 16.7%, 对照组为 20%, 两组之间差异无

统计学意义，未观察到其他并发症。5、手术成功率：术后 6 个月，观察组总成功率为 91.7%，对照组手术总成功率为 88%，两组之间差异无统计学意义。

结论：本研究术后 6 个月的随访结果表明，3T 联合白内障手术与 GATT 联合白内障手术治疗 POAG 合并白内障的疗效相当，均具有术后可显著提高视力、有效降低眼压和减少抗青光眼药物的数量等效果，但 3T 联合白内障手术更加微创，值得推广。

摘要编号：**210075**

新型微创内路三联手术（3T）治疗青睫综合征的临床疗效观察

第一作者：Liuzhi ZENG

共同作者：Suju LIU

目的：观察新型微创内路三联手术（3T）对青光眼角膜睫状体炎综合征的临床疗效，探讨 3T 手术治疗青光眼角膜睫状体炎综合征的安全性和有效性。

方法：选取 2023 年 1 月 -2025 年 8 月成都市第一人民医院收治的 18 例（18 只眼）青光眼角膜睫状体炎综合征患者。患者均为使用 3 联以上降眼压药物后眼压仍不能控制伴视野受损者。所有患者均接受新型微创内路三联手术（3T）并在术中前房抽液送检，术后予以规范抗病毒治疗，随访 1 年，观察患者视力、眼压、降眼压药物使用数量以及术后并发症。

结果：1、眼压：术前最高眼压平均值 49.72 ± 7.65 mmHg，基线眼压平均值为 31.44 ± 11.06 mmHg，术后 1 天平均眼压 16.78 ± 6.22 mmHg，术后 1 月平均眼压 18.00 ± 4.15 mmHg，术后 3 月平均眼压为 16.94 ± 3.26 mmHg，术后 6 月平均眼压为 16.00 ± 2.65 mmHg，术后 1 年平均眼压为 16.67 ± 3.33 mmHg，术前术后比较有显著统计学差异（ $p < 0.001$ ）。2、用降眼压药物种数：术前用降眼压药物使用数量为 2.5 ± 0.78 ，术后 6 月用降眼压药物使用数量 0.64 ± 0.92 ，术后 1 年为 0，术前术后差异有统计学意义（ $p < 0.01$ ）。3、成功率：Kaplan-Meier 生存分析结果显示术后 12 个月的总成功率为 81%，完全成功率为 61%，随访过程中出现少量事件，但整体仍有较多患者维持在成功标准以内。4、前房液检验结果：有 16 眼进行前房液病毒检测，其中病毒检出有 13 眼（81.3%），巨细胞病毒（CMV）抗体阳性有 11 眼（68.8%），水痘带状疱疹病毒（VZV）抗体阳性有 1 眼（6.3%），单纯疱疹病毒（HSV）抗体阳性有 1 眼（6.3%）。5、并发症：眼压反跳（IOP Spike）有 10 眼（55.56%），发生在术后 3（1，7）天，平均持续时间为 1.5（1，4.5）天。术后前房少许血性漂浮物及房角少许血凝块，无前房积血、睫状体脱离等其他并发症。

结论：对于使用多种降眼压药物仍无法控制眼压并伴有视野受损的青光眼角膜睫状体炎综合征患者，微创内路三联手术（3T）可显著降低眼压，改善房角引流，减少用药数量，延缓视功能恶化。前房液病毒学检查旨在明确病因，指导后续治疗方向，实现精准个体化管理，提升疗效与预后。

摘要编号：**209394**

炎症反应和 ACE 2 在奥密克戎流行期间急性原发性闭角型青光眼中的潜在作用

第一作者：Bei ZENG

共同作者：Yanfan YANG, M YU, Yuning ZHANG

目的：研究 COVID-19 感染与疫情期间观察到的急性原发性闭角型青光眼（APACG）发病率增加之间的潜在关系。

方法：本研究在 COVID-19 疫情期间招募了 91 名 APACG 患者和 40 名需要手术的老年性白内障患者作为对照组。使用多重微球免疫分析技术检测了房水和血浆中 27 种细胞因子和血管紧张素转化酶 2（ACE2）的水平。比较了两组间的细胞因子水平和眼部特征。评估了细胞因子水平与 COVID 感染到 APACG 发作间隔时间之间的相关性。

结果：APACG 患者年龄更轻且主要为女性（ $P < 0.05$ ）。他们还表现出更高的眼内压、更大的角膜内皮细胞变异系数、更厚的晶状体厚度，但更短的轴长和更低的角膜内皮细胞密度（所有 $P < 0.05$ ）。APACG 患者的房水中 ACE2 显著升高（ $P < 0.001$ ）和 19 种细胞因子（包括 IL-1ra、IL-6、IL-8；所有 $P < 0.05$ ）。而血浆中 ACE2 和其他细胞因子的浓度，仅 MCP-1 和 IP-10 在组间有显著差异（所有 $P < 0.05$ ）。APACG 患者的房水 ACE2 水平与 17 种细胞因子呈正相关，但在对照组中则无。此外，53 例 APACG 患者（58%）报告在确诊 COVID-19 感染后的 3 天内发生了 APACG 发作。他们的房水中 ACE2 和 MIP-1 与 COVID-19 发病到 APACG 发作的时间间隔呈负相关。

结论：在 COVID-19 大流行期间，APACG 患者的房水中 ACE2 和炎症细胞因子显著增加，这表明存在一种潜在的炎症机制，将 COVID-19 感染与 APACG 发作联系起来。

摘要编号: 210248

自研眼内房角镜分离器的便捷操作与临床转化应用

第一作者: Jibing WANG

共同作者: Shanshan LIU, Fumei YIN, Yali ZHANG

目的: 详细介绍眼内房角镜分离器的研发与临床转化应用经验, 为更多眼科医生提供免手术房角镜的高效、精准、直视下房角分离工具。

方法: 作者于 2018 年 12 月研发一款用于闭角型青光眼房角分离的器械, 命名为“眼内房角镜分离器”, 德国实用新型专利号 (20 2020 104 839), 国内实用新型专利号 (ZL2020 2 1745427.1)。分离器材质为 304 不锈钢, 长 13 mm, 分为两端, 两端与中间手柄呈 135° 角, 两端为钝椭圆形, 反射镜面尺寸分别为: 宽端 4 mm × 2 mm, 窄端 2.5 mm × 1 mm, 其中, 宽端通过主切口 (完成超滤人工晶体植入术缩瞳后前房重新注入粘弹剂) 进入前房, 分离除主切口下以外的 > 270° 房角范围, 窄端自副切口进入前房, 分离其余主切口下 < 90° 范围房角, 分离时术者无需倾斜显微镜、无需使用手术房角镜, 原位下利用分离器镜面观察 PAS 范围, 操作轻柔, 边分边观察, 直至看到全部小梁网与巩膜突, 此时通过镜面反射可清晰看到小梁网或 Schlemm 管返流血带, 分离结束后吸除粘弹剂, 水密切口, 操作结束。

结果: 自 2018 年 12 月至今, 作者成功完成超 3000 只眼的房角分离操作, 取得了理想结果, 比传统方法分离方法时间缩短 5 倍, 原位即可完成 360° 房角分离, 分离效果相当, 大大提高了手术效率, 并在集团 20 多家分院同步得到应用超过 10000 只眼。多次在国内或国际会议上通过作者或国内多位知名专家应用并介绍给同道, 目前已在国内上百家医院得到广泛应用, 成功实现临床转化, 容易上手且学习曲线短, 一致反馈良好, 目前该产品已量产并得到越来越多眼科医生的推广应用。

结论: 与传统房角分离方法相比, 眼内房角镜分离器分离房角降压效果相当, 但效率明显提高且方便快捷, 值得推广应用。

摘要编号: 210090

视神经脱髓鞘在慢性高眼压青光眼模型中的病理特征及富马酸二甲酯的干预效果

第一作者: Yingdi FU

共同作者: Ningli WANG

目的: 明确慢性高眼压 (Ocular Hypertension, OHT) 青光眼模型中视神经脱髓鞘的时间节点、空间分布模式, 及其与视网膜神经节细胞 (Retinal

Ganglion Cells, RGCs)、轴突损伤的时序关联, 并评估髓鞘保护药物富马酸二甲酯 (Dimethyl Fumarate, DMF) 延缓青光眼进展的治疗潜力。

方法: 以健康成年 C57BL/6J 雄性小鼠为研究对象, 采用硅油诱导慢性高眼压 (Silicone Oil-Induced Ocular Hypertension, SOHU) 模型模拟青光眼病程, 研究分为两部分: ① 病理特征分析: 设野生型 (Wild Type, WT) 组及 SOHU 造模后 1、2、4、6、8 周组, 每周通过 TonoLab 回弹式眼压计监测眼压, 借助免疫荧光染色、髓鞘牢固蓝 (Luxol Fast Blue, LFB) 染色、透射电子显微镜 (Transmission Electron Microscopy, TEM)、蛋白免疫印迹 (Western Blot) 及视网膜电图 (Electroretinography, ERG)、绿光闪光视觉诱发电位 (Green Flash Visual Evoked Potential, GF-VEP) 技术, 分析视神经髓鞘、少突胶质前体细胞 (Oligodendrocyte Precursor Cells, OPCs)、RGCs 及轴突的结构与功能变化; ② 药物干预评估: 将 SOHU 模型小鼠随机分为对照组 (SOHU + 磷酸盐缓冲液 (Phosphate-Buffered Saline, PBS)) 与治疗组 (SOHU + DMF), 治疗组自 SOHU 造模 1 周起, 每日腹腔注射 DMF (60 mg/kg), 连续 21 天, 对照组注射等体积 PBS, 于 SOHU 造模 4 周时, 采用上述相同技术评估干预效果, 并与 WT 组对比。

结果: 1. 脱髓鞘的时间与空间特征: SOHU 模型中, 视神经近端髓鞘最早于造模 1 周出现丢失 (LFB 光密度降至 WT 组的 68.92%, $p < 0.01$), 随病程进展丢失程度加重; 造模 6 周时, 远端髓鞘显著丢失 (LFB 光密度降至 WT 组的 23.89%, $p < 0.05$), 髓鞘前缘较 WT 组显著后退 184.2 μm (95% 置信区间 (Confidence Interval, CI): 90.76–277.60, $p = 0.0001$), 整体呈“由近及远”的退行性模式。2. 脱髓鞘与 RGCs、轴突损伤的时序关系: 脱髓鞘早于结构损伤, 造模 2 周时视神经整体髓鞘显著丢失 (髓鞘碱性蛋白 (Myelin Basic Protein, MBP) 免疫荧光强度降至 WT 组的 52.16%, $p = 0.04$; 有髓鞘轴突密度降至 WT 组的 62.6%, $p = 0.02$), 而 RGCs 密度及轴突存活率显著下降始于造模 4 周; 功能上, 造模 1 周时 GF-VEP N1-P1 振幅已显著降低 (较 WT 组降低 14.04 μV , 95% CI: 9.83–18.24, $p < 0.0001$), 与近端髓鞘丢失同步, RGCs 功能 (ERG 明视负向反应波 (Photopic Negative Response, PhNR) 振幅) 显著下降则出现于造模 6 周, 呈“功能先行、结构滞后”特征。3. DMF 的干预效果: DMF 干预显著减少髓鞘丢失 (MBP 表达量为对照组的 1.68 倍, 95% CI: 0.22–1.14, $p = 0.01$), 提高轴突存活率 (较对照组提高 $38.65 \pm 5.11\%$, $p = 0.005$) 及 RGCs

密度（中央视网膜增加 635.9 ± 116.50 个/ mm^2 ，外周视网膜增加 433 ± 142.40 个/ mm^2 ， $p < 0.05$ ）；同时改善 RGCs 功能（PhNR 振幅与 WT 组无显著差异， $p = 0.67$ ）及轴突功能（N1、P1 潜伏期与 WT 组无显著差异，N1-P1 振幅较对照组增加 $5.66 \pm 0.98 \mu\text{V}$ ，95% CI: 3.05–8.26），并抑制小胶质细胞活化（离子钙结合适配分子 1 (Ionized Calcium-Binding Adaptor Molecule 1, IBA1) 阳性细胞较对照组减少 72.29%， $p < 0.01$ ），但 RGCs 密度及轴突存活率仍未恢复至 WT 组水平。

结论：慢性高眼压诱导的视神经脱髓鞘是青光眼轴突及 RGCs 损伤的早期驱动事件，其“由近及远”的丢失模式及“功能先行、结构滞后”的特征，确立了“脱髓鞘—轴突代谢衰竭—神经元凋亡”的级联损伤路径。DMF 可能通过调控核因子 E2 相关因子 2 (Nuclear Factor Erythroid 2-Related Factor 2, Nrf2) 抗氧化通路与小胶质细胞极化，显著延缓脱髓鞘进程并优先保护视神经功能，为青光眼治疗提供“功能保护优先于结构修复”的创新方向，也为青光眼早期诊断标志物及髓鞘保护药物研发提供理论依据。

摘要编号：**209948**

诱导多能干细胞通过线粒体转移促进小梁网细胞增殖的机制研究

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共同作者：Yiqing LI

目的：小梁网细胞 (Trabecular Meshwork Cells, TMCs) 功能异常与青光眼的发生密切相关，其中 TMCs 线粒体功能障碍被认为是该疾病发病机制中的重要环节。维持线粒体的数量与功能完整性，对细胞稳态与存活至关重要。近年来研究发现，线粒体转移在生理病理情况下发挥重要作用，是实现细胞间能量支援及功能调控的潜在方式。干细胞及其衍生细胞在多项研究中被证实可作为线粒体供体，提示线粒体转移可能在干细胞治疗中发挥关键作用。诱导多能干细胞 (Induced Pluripotent Stem Cells, iPSCs) 具有多向分化潜能和旁分泌功能，但其与 TMCs 之间的相互作用机制尚不明确。本研究旨在探讨 iPSCs 与 TMCs 共培养体系中，iPSCs 是否通过线粒体转移促进 TMCs 的增殖，并初步阐明其机制。

方法：建立 iPSCs 与 TMCs 的共培养体系，通过基因编辑技术进行荧光标记以追踪细胞间物质交换。使用不同类型抑制剂（包括缝隙连接抑制剂、纳米管连接抑制剂和内吞抑制剂）阻断细胞间物质交换，以评估其交换方式。收集 iPSCs 条件培养基，利用不用孔径滤器分级分离囊泡，分析其促增殖活性；

利用超速离心结合 Western blot 检测条件培养基中的线粒体蛋白。采用长时程活细胞成像观察细胞间物质交换及线粒体转移过程。

结果：共培养显著促进 TMCs 增殖 ($P < 0.01$) 并增强其吞噬活性 ($P < 0.01$)。值得注意的是，位于 iPSCs 克隆边缘的 TMCs 增殖率显著高于共培养体系中的其他 TMCs ($P < 0.01$)。GFP 标记的 iPSCs 来源物质可被 mcherry 标记的 TMCs 摄取，流式细胞术显示共培养 2 天后 GFP 阳性 TMCs 占比达 20.9%，且该群细胞增殖率 (45.53%) 高于总体 TMCs (14.93%)。使用不同抑制剂阻断 iPSC 与 TMCs 之间的物质交换，发现内吞抑制剂阻断效率最高，且长时程成像显示 iPSCs 来源囊泡被 TMCs 吞噬。而 iPSCs 条件培养基经 $0.22 \mu\text{m}$ 过滤后，其促 TMCs 增殖效果消失。iPSCs 条件培养基超速离心沉淀中可检测到线粒体内外膜及基质蛋白。活细胞成像显示 iPSC 条件培养基中 MitoTracker 标记的带线粒体囊泡转移至 TMCs，且该过程同样对内吞抑制剂最为敏感。

结论：本研究初步证明 iPSCs 可通过囊泡介导的线粒体转移促进 TMCs 增殖，该过程主要依赖于内吞作用实现的囊泡传递。这一发现不仅揭示了 iPSCs 与 TMCs 之间新型互作机制，也为基于线粒体移植的青光眼治疗策略提供了理论依据与实验支持。

摘要编号：**209288**

超声睫状体成型术 UCP 治疗新生血管性青光眼闭角期的有效性和安全性研究

第一作者：Qianqian JI

共同作者：Kang FENG, Ying HONG

目的：研究超声睫状体成型术 UCP 治疗闭角期新生血管性青光眼患者的有效性和安全性。

方法：纳入 2024 年 2 月至 2025 年 2 月在北京大学第三医院眼科就诊并诊断为新生血管性青光眼闭角期的患者，记录患者的性别，年龄，诊断，原发病，视力，眼压，抗青光眼药物，眼轴等情况。根据患者的生物学测量指标，选择不同的探头型号，进行超声睫状体成型治疗。术后给予激素类眼药水点眼抗炎。记录患者术后 3 个月时的视力，眼压及用药情况。采用眼压下降大于术前的 20% 或者眼压在 5–21 mmHg 之间作为手术成功的标准，记录手术成功率。

结果：24 例患者纳入本研究。其中男性 19 例 (79%)，女性 5 例 (21%)。年龄 60.5 ± 13.1 (38–92) 岁。均为新生血管性青光眼闭角期（晚期）患者，原发病包括糖尿病性视网膜病变 (16 例)，血管阻塞性视网膜病变 (4 例)，视网膜脱离 (2 例)，过熟期白内障导致的慢性葡萄膜炎 (2 例)。

术前视力 LogMR1.9 ± 0.9 (0.3–3.0)。术前眼压 38.9 ± 10.4 (22–60) mmHg。术前使用抗青光眼药物 3.3 ± 0.8 种 (1 种 1 例, 2 种 2 例, 3 种 9 例, 4 种 12 例)。眼轴 23.6 ± 1.1 mm (22.07–26.09)。角膜清亮 17 例, 水肿 7 例。角膜直径 11.6 ± 0.55 mm (10.6–12.9)。选择探头 11–13 号 (其中 11 号探头 1 例, 12 号探头 14 例, 13 号探头 9 例)。9 扇区治疗 1 例, 10 扇区治疗 24 例。20 例成功, 手术成功率 83.3%。手术后未见光感丧失, 脉络膜出血, 角膜内皮失代偿等重大并发症。术后 3 个月患者视力 LogMR2.1 ± 0.9 (0.4–3.0)。术后视力提高 7 例, 下降 10 例, 持平 7 例。眼压 17.1 ± 9.8 (5–44) mmHg。使用抗青光眼药物 2.3 ± 1.1 种 (0 种 2 例, 1 种, 3 例, 2 种 6 例, 3 种 11 例, 4 种 2 例)。4 例失败患者中 1 例一个月后接受第二次 UCP, 眼压得到控制。

结论: 术后短期随访结果显示超声睫状体成型术 UCP 治疗闭角期新生血管性青光眼患者的有效率为 83.3%, 未出现重大并发症。失败病例可以选择 2 次治疗。

摘要编号: 209741

青光眼巨大薄壁滤过泡漏的创新救治术式

第一作者: Junhua XIAO

目的: 探讨青光眼巨大薄壁滤过泡漏病例的创新救治术式。

方法: 既往青光眼滤过手术中, 使用丝裂霉素等抗代谢药物, 导致薄壁滤过泡病例, 甚至巨大薄壁滤过泡, 临床并不少见。较小滤过泡如发生漏口, 有文献报道可以通过切除滤过泡, 常规联合巩膜或角膜材料修补、外加再次滤过手术或其他青光眼手术, 救治手术较为复杂。对于巨大型薄壁滤过泡漏, 常规方法施行十分困难。本研究青光眼患者, 2005 年外院小梁切除联合丝裂霉素应用, 术后薄壁滤过泡巨大, 约 12 × 7 × 3 mm³ 大小, 2023 年 5 月因干眼常揉眼, 导致滤过泡漏, 眼压低至 5 mmHg, 多处求医无果, 干脆直接入我院 2023 年 6 月 9 日住院, 坐等寻求救治方案, 第三日灵感骤现、创新突破方案破茧而出: 微创修补法。2023 年 6 月 12 日顺利完成救治手术, 详见术中照片及部分步骤。

结果: 术中即刻修补效果满意, 巨大薄壁滤过泡漏终止, 染色无溪流现象, 术后 1 天及 1、3、6、12、24 个月眼压均恢复和保持正常, 原有滤过泡滤过功能保持正常。详见手术前后 UBM 及数码照相及术中照片。

结论: 针对青光眼巨大薄壁滤过泡漏疑难病例, 采用针对性强的创新微创修补术式及方法策略, 既可以达到救治修补瘘口目的, 又可以避免过度破坏原

有滤过泡, 保持了原有滤过泡功能, 获得了优良稳定的眼压控制目标, 手术操作微创, 术后恢复快, 无不良并发症, 达到了患者满意的良好临床结果, 该术式及方法策略值得临床参考应用。

摘要编号: 210154

青光眼引流阀引流管覆盖与修补方法经验探讨

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共同作者: Yong YAO

目的: 介绍 5 种临床常用的引流管覆盖和 2 种引流管修补的方法和经验。

方法: 通过手术视频展示各种方法: 对于引流管植入手术, 术中对于引流管覆盖采用“矩形瓣”、“L 形瓣”、“桥隧道”、“针孔隧道”、“矩形瓣 + 针孔隧道”等不同方法, 分享其各自的优缺点和选择体会。针对引流管暴露的患者, 采用自体巩膜移植和生物材料覆盖, 介绍其优缺点及选择体会。

结果: 通过不同手术方式均可完成手术, 术后存在不同特点但均效果好。

结论: 术者应根据自己的手术技术、患者的个体化病情酌情使用不同的手术方法, 为患者解决问题。

摘要编号: 210225

青光眼睫状体炎综合征合并视网膜睫状动脉阻塞 1 例

第一作者: Luyun LIANG

共同作者: Yiqin DUAN

目的: 描述一名 16 岁的年轻男性患者无全身性心血管疾病史及栓塞因素, 因反复发作的青光眼睫状体炎综合征 (Posner-Schlossman Syndrome, PSS) 使视盘血流动力学改变而继发视网膜睫状后短动脉阻塞 (Posterior Short Ciliary Artery, PSCA), 3 个月内视力急剧下降伴中心视野缺损。旨在提高临床医生对 PSCA 的认识以及探讨在有效时间窗内实施紧急管理措施的重要性。

方法: 本研究对一名于 2024 年 12 月就诊于长沙爱尔眼科医院确诊为 PSS 继发 PSCA 的 16 岁男性患者的临床表现、影像学特征、治疗措施和视力恢复水平进行回顾。

结果: 一名 16 岁的男性患者因“左眼发作性眼前固定黑影 3 月”收入院, 3 个月以来左眼有反复眼痛、眼胀、流泪、视物模糊伴眼前中央偏颞侧的固定黑影遮挡发作史, 自行冰敷休息后好转, 此次就诊前休息后无改善。2024 年 12 月 5 日长沙爱尔眼科医院眼底科复诊完善相关检查后明确诊断: (1) 左眼视网膜睫状后短动脉阻塞; (2) 左眼青光眼

睫状体炎综合征；(3) 双眼屈光不正。立即给予“左眼前房穿刺放液治疗”、“乙酰唑胺片、溴莫尼定滴眼液”降眼压、“醋酸泼尼松龙滴眼液、普拉洛芬滴眼液”抗炎；“肌肉注射普罗碘铵”、“舌下含服硝酸甘油”、“左眼颞部皮下注射复方樟柳碱注射液”、“球周注射盐酸消旋山莨菪碱注射液”、“口服复方血栓通”、“静脉滴注银杏叶注射液”及吸氧等改善视网膜血液循环治疗。经治疗后患者眼前黑影范围较前缩小，左眼眼底检查见黄斑鼻侧水肿较前减轻，视盘边界清晰。

结论：继发于 PSS 的 PSCA 是一种少见但可以致盲的临床疾病，这强调了在缺血情况发生的背景下，视网膜睫状后短动脉对缺血的易感性。因此在 PSS 患者中，除了彻底调查全身病史及相关心血管危险因素以外，应尽早完善眼底彩照以及眼灌注压等检查，密切关注视网膜动脉灌注的情况。如果患眼及对侧眼杯盘比正常但存在反复发作的眼压升高、相对性传入性瞳孔缺陷、视盘水肿且视力持续下降时，必须警惕视网膜动脉阻塞的发生。临床上对于急性 PSCA 的管理仍具有挑战性，因此需要临床医生在时间窗内紧急降眼压并恢复眼部血流供应，避免造成无法挽救的视力损害。

摘要编号：**204688**

青光眼睫状体炎综合征患者焦虑与抑郁的临床评估及神经炎症机制探索

第一作者：**Xiangmei KONG**

共同作者：**Yelin KWAN**

目的：评估青光眼睫状体炎综合征（简称：青睫）患者的焦虑、抑郁状况，并通过青睫小鼠动物模型评估其行为学改变，探究潜在的神经炎症机制。

方法：招募青睫患者、原发性青光眼患者、健康对照，通过 HADS 问卷进行焦虑和抑郁评分，以及 VFQ-25 评价视觉相关的生活质量。前房注射巨细胞病毒的方式建立 BALB/c 小鼠青睫动物模型，用行为学试验评估小鼠的焦虑、抑郁状况。收集小鼠外周血、脑部组织切片，进行神经免疫及神经递质标志物等检测。

结果：共纳入 404 名参与者（青睫 143、原发性青光眼 131、健康对照 130），青睫患者焦虑、抑郁水平显著高于健康对照，也高于原发性青光眼，眼部疼痛和依赖性焦虑和抑郁的关键预测因子，病程越长，焦虑水平也越高；晚期视野损伤的患者中，更频繁的复发与抑郁的加重相关。小鼠动物模型表现出典型的羊脂状 kp 和眼压升高等青睫临床表现，旷场实验、十字高架实验小鼠表现出明显的焦虑行为；悬尾实验、强迫游泳实验显示有明显的抑郁行为。青睫小鼠外周血 IL-6、TSP1、TGFβ2 和

TNFα 水平显著升高，海马区域突触后致密蛋白 95（PSD95）显著下降，而突触素（SYP）表达未见显著变化，前额叶皮质 TH 和 NMDA 受体的下调，但未观察到 BDNF 表达的下降。

结论：青睫患者存在明显的焦虑和抑郁，疾病特异性因素，如眼痛、不可预测的急性发作，对心理影响更为显著，甚至超过了视功能缺损本身。小鼠动物模型表现出焦虑和抑郁相关行为显著增加，可能主要由系统性与中枢炎症引起，通过神经递质系统和突触功能的失衡表现出来。

壁报

人工智能、数位创新与虚拟健康

摘要编号: 209699

面板编号: ADV-1130

RETGLoT: 一种可扩展、低数据依赖且高效的视网膜影像分析基础模型

第一作者: Wenlong LI

目的: 本研究旨在开发一种具备可扩展性、泛化性强、对数据依赖度低且计算效率高的视网膜影像分析人工智能基础模型,用以克服当前模型在大规模标注需求、计算成本高及任务单一等方面的局限。

方法: 我们构建了基于自蒸馏掩码自动编码器 (Self-distilled Masked Autoencoder, SdAE) 的通用模型——RETGLoT。该模型以北京大学第三医院眼科中心于 2012 年 11 月 9 日至 2023 年 11 月 28 日期间采集的 55 万张未标注视网膜图像进行预训练。随后,通过 16 个公开视网膜疾病数据集对 RETGLoT 进行评估,并与主流模型 RETFound 及 VisionFM 比较。性能评价指标包括 Matthew 相关系数 (MCC)、受试者工作特征曲线下面积 (AUROC) 及精确率-召回率曲线下面积 (AUPR),采用双侧 t 检验评估模型间性能差异的统计显著性。

结果: 在 16 个公开数据集中,RETGLoT 在 9 个数据集上优于 RETFound 或 VisionFM。在糖尿病视网膜病变 (DR) 分类任务中,RETGLoT 在 APTOS-2019、DDR、IDRiD 及 MESSIDOR-2 数据集上的平均 MCC 分别为 0.651、0.624、0.351 和 0.573,在 DDR、IDRiD 及 MESSIDOR-2 上显著优于对比模型。同时,RETGLoT 在跨模态数据集 UWF IQA (MCC 0.807) 及 OCTID (MCC 0.832) 中亦表现出色。外部评估结果显示,在 DR 及青光眼数据集中,RETGLoT 在多数情况下取得相当或更优的性能。此外,RETGLoT 展现出较高的标签利用效率,在多个数据集中仅使用 40%-60% 的标注数据即可达到最佳性能;微调阶段仅需 30 个 epoch 即可达到或超过 RETFound 及 VisionFM 的表现。与 VisionFM 使用的 iBOT 预训练方式相比,SdAE 预训练在时间与数据利用上更为高效。

在所有任务中,RETGLoT 均保持较高的 MCC、AUROC 和 AUPR 表现。

结论: RETGLoT 为视网膜影像分析提供了一种具备良好泛化能力、低数据依赖与高效率的人工智能基础模型。通过降低对标注数据与计算资源的依赖,同时保持或提升诊断性能,该模型为 AI 在临床眼科领域的可持续应用与推广提供了可行路径。

摘要编号: 209017

面板编号: ADV-1128

人工智能诊断系统在眼底视网膜疾病筛查中的实际应用

第一作者: Qingquan WEI

共同作者: Qing PENG, Qinghua QIU

目的: 本研究旨在评估基于深度学习的人工智能 (AI) 诊断系统在分析视网膜疾病方面的性能,评估其与专家诊断的一致性及其在筛查应用中的整体效用。

方法: 共有 3076 名就诊于我院的患者接受了全面的眼科检查。初步评估使用名为“综合 AI 视网膜专家 (CARE)”的 AI 系统进行,随后通过详细的人工复核以确定最终诊断。将 AI 生成的结果与资深眼科医生的评估进行比较,以评估 AI 系统在眼科筛查背景下的诊断可靠性和可行性。

结果: AI 诊断系统相较于专家诊断,对糖尿病视网膜病变 (DR) 的敏感度为 94.12%,特异度为 98.60%;对年龄相关性黄斑变性 (AMD) 的敏感度为 89.50%,特异度为 98.33%;对疑似青光眼的敏感度为 91.55%,特异度为 97.40%;对病理性近视的敏感度为 90.77%,特异度为 99.10%;对视网膜静脉阻塞 (RVO) 的敏感度为 81.58%,特异度为 99.49%;对视网膜脱离的敏感度为 88.64%,特异度为 99.18%;对黄斑裂孔的敏感度为 83.33%,特异度为 99.80%;对视网膜前膜的敏感度为 82.26%,特异度为 99.23%;对高血压性视网膜病变的敏感度为 94.55%,特异度为 97.82%;对有髓神经纤维的敏感度为 83.33%,特异度为 99.74%;对色素性视网膜炎的敏感度为 75.00%,特异度为 99.95%。

结论: AI 辅助筛查系统对大多数视网膜疾病表现出高敏感度和高特异度,表明其有潜力成为筛查实践

中有价值的工具。该系统的实施尤其有利于基层和社区医疗机构，有助于初步诊断工作，并提升分级眼科诊疗模式的效能，对更广泛的临床应用具有重要意义。

摘要编号：207695

面板编号：ADV-1123

基于 OCT 的人工智能云平台视网膜异常筛查系统在真实临床环境中的研究与应用

第一作者：Xun XU

共同作者：Xin Jian CHEN, Tien Yin WONG

目的：视网膜异常是全球导致不可逆性视力损害的重要原因，但我国基层医疗资源不足，诊断力量严重不足。本研究旨在开发并验证一种基于 OCT 的人工智能云平台（AI-PORAS），提升远程筛查与诊断效率。

方法：AI-PORAS 基于深度学习算法开发，可自动识别 OCT 图像中的 15 种常见视网膜异常。模型使用大规模真实临床数据进行训练和验证，并部署于全国 29 个省份的 207 家医疗机构，实现远程图像上传与云端分析。验证数据涵盖 165,384 只眼睛的 3,551,959 张 OCT B-scan 切片，评估指标包括准确率（Accuracy）、曲线下面积（AUC）、假阳性率（FPR）和假阴性率（FNR）。

结果：AI-PORAS 平均准确率为 93.16%，AUC 为 93.64%，FPR 为 6.82%，FNR 为 7.87%，性能与主治医师相当。该系统实现了大规模远程 OCT 筛查，并为疾病谱和诊疗策略优化提供了数据支持。

结论：AI-PORAS 作为一个基于 OCT 的人工智能云平台，能够在真实临床环境中实现高效、准确的视网膜异常筛查，显著提升远程诊断和基层医疗服务能力。其临床应用不仅有助于缩小地区医疗资源差距，还为卫生健康决策和个体化治疗提供了数据支持，具有广阔的推广与应用前景。

摘要编号：209788

面板编号：ADV-1132

基于 OCT 的影像组学方法预测玻璃体内 DEX 植入治疗糖尿病黄斑水肿的疗效：一项多中心临床研究

第一作者：Biying CHEN

共同作者：Jing LUO

目的：糖尿病视网膜病变（DR）是糖尿病患者最常见的并发症之一，而糖尿病性黄斑水肿（DME）是 DR 患者视力损害的最常见原因，由于患者对治疗的反应存在个体异质性，其治疗方案选择面临挑战。本研究旨在基于光学相干断层扫描（OCT）图像构

建机器学习模型，以预测地塞米松（DEX）玻璃体内植入物在 DME 患者中的治疗效果，从而促进个性化和精准治疗策略。

方法：本研究共纳入来自三个研究中心的 151 例经诊断为 DME 并接受至少一次 DEX 玻璃体内注射的患者。采用 3D Slicer 平台中的 Pyradiomics 模块，对 OCT 图像进行感兴趣区域（ROI）描绘，并提取定量放射组学特征。随后，从分割后的图像中提取相关特征并进行筛选，通过三种不同的机器学习算法构建预测疗效模型。

结果：在反向传播神经网络（BPNN）模型中，训练集和测试集的曲线下面积（AUC）分别为 0.949 和 0.812。支持向量机（SVM）模型的 AUC 则分别为 0.945 和 0.819。Spearman 相关分析显示，训练集和测试集的 oct 组学评分与治疗后的 CST 变化率呈正相关（ $R = 0.52$, $p < 2.5e-08$; $R = 0.33$, $p = 0.026$ ）。此外，在训练集（ $p = 6.59e-03$ ）和测试集（ $p = 2.90e-09$ ）中，存在浆液性视网膜脱离（SRD）的患者，其 OCT 组学评分显著高于无 SRD 组。

结论：基于 OCT 图像的放射组学模型被证实为一种高准确率、无创的工具，可用于预测 DEX 治疗 DME 的疗效，为 DME 的精准治疗提供了新的视角。与临床影像组学标志物 CST 下降率、SRD 等之间的相关性研究进一步增强了该模型的临床可解释性和应用前景。

摘要编号：202680

面板编号：ADV-1122

基于多任务学习框架和可信融合策略的深度学习模型在视网膜中央动脉阻塞分类中的应用

第一作者：Xuan XIAO

共同作者：Ting CHEN, Xuejie LI

目的：视网膜中央动脉阻塞（Central Retinal Artery Occlusion, CRAO）是致盲性眼科急症，临床上易误诊且难以准确区分急慢性期，制约了临床上 CRAO 的干预治疗，因此研发 AI 辅助的眼底影像分割方法是 CRAO 早诊断早治疗的关键问题。然而目前 CRAO 疾病存在标记数据稀缺和多模态数据不完整的问题，制约了 AI 辅助诊断分类的应用。本研究旨在构建基于少样本、不完整多模态数据的 CRAO 深度学习分类模型，以提升该疾病的智能诊断分类性能和临床应用价值。

方法：本研究首次提出将多任务学习框架和可信融合策略应用于 CRAO 分类。首先，设计多任务框架同时执行 CRAO 分类和病变分割任务，在分割任务引入了语义相似性损失，利用病变区域的文本标注计算文本特征与图像特征的相似度，并将其

作为辅助损失函数，学习更精细的分类表征，用于区分急性和慢性 CRAO 病例。其次，在多模态特征融合阶段提出可信融合策略，将 Monte Carlo Dropout 集成到分类网络中，评估特定模态特征的不确定性，并从不完整的多模态数据中学习有效的联合表征，以实现可靠的多模态特征融合。最后，在自收集的数据集上评估模型性能，并与现有方法（Siamese Networks、Missing Multimodal Transformer、DeepDrRVO）进行比较。

结果：本研究所提出的 CRAO 分类深度学习模型准确率为 90.31%、精确率为 85.22% 和召回率为 86.21%，显著优于已有方法。

结论：本研究提出的 CRAO 分类深度学习模型有效解决了训练样本有限和模态缺失问题，显著提升了 CRAO 分类性能。

摘要编号：208604

面板编号：ADV-1125

基于深度学习的致盲性眼病自动筛查研究

第一作者：Hongzhuang CHENG

共同作者：Jie ZHONG

目的：开发经济高效的致盲性眼病筛查模型，辅助基层医疗机构提升筛查效率，降低患者因延误诊断导致的视力不可逆损伤风险。

方法：研究基于深度学习和 89,158 张眼底照相图像构建轻量化眼科疾病筛查模型。模型性能评估分为 2 个环节：首先，在 2 个独立的外部验证集上进行测试，以衡量模型的泛化性和稳定性。其次，通过比较不同临床经验阶段的眼科医师和模型的分类表现，评估模型医疗水平对应的临床经验阶段。

结果：该模型的平均准确度为 96.11%，F1 评分为 82.39%，召回率为 81.61%，ROC_AUC 值为 99.77%，精确率 96.44%，特异度 98.66%；外部验证集的平均准确率 90.92%，平均特异度 97.03%，平均精确率为 89.98%；临床医生的对比评估中，低年资医师在判断 FP 图像的平均准确率为 74%（95% CI: 61.84%–86.16%， $\alpha = 0.05$ ），而中年资医师的准确率达到 88%（95% CI: 78.99%–97.01%， $\alpha = 0.05$ ）。

结论：本研究开发一种低成本的致盲性眼病 AI 筛查系统，其性能和中年资医师水平相当，为推进基层致盲性眼病筛查提供有效的解决方案。

摘要编号：202176

面板编号：ADV-1121

基于混合注意力模型预测配戴角膜塑形镜患者的近视进展

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共同作者：Xuewei LI, Kai WANG

目的：针对配戴角膜塑形镜的青少年近视患者，我们构建了一种深度学习算法用来预测眼轴增长速度，并对近视进展风险较高的患者提出预警。

方法：本研究为回顾性研究，共纳入 1677 名配戴角膜塑形镜超过一年的近视患者（3271 只眼睛）。通过 IOL Master 700（Carl Zeiss Meditec, Oberkochen, 德国）和 Sirius 角膜地形图（CSO, 意大利）等进行眼部检查，收集了年龄、眼轴、SER、角膜曲率、HVID、CCT、ACD、PD、e 值等参数，同时进行问卷调查收集父母近视度数、读写姿势、近距离用眼时间、户外活动时间、食用甜食、阿托品剂量等变量。基于注意力机制，开发一种深度学习算法来预测戴镜一年后的眼轴增长量。通过准确度、精确度、召回率和 F1 指数评估模型的性能，并与传统 logistic 回归、XG Boost、LightGBM、随机森林、GBM、SVM、CNN、LSTM 和 RNN 模型进行比较。采用排列重要性方法来量化每个特征对预测结果的影响。

结果：我们提出了混合注意力模型（HAM）来预测近视的进展。HAM 模型可以独立嵌入每个特征组（基本参数、环境和遗传因素），结合局部和全局注意力机制来处理临床数据中的复杂交互。HAM 模型在测试集上的准确度为 0.849，精确度为 0.847，召回率为 0.849，F1 指数为 0.848。该模型的性能明显优于传统的逻辑回归、XG Boost、Light GBM、随机森林、GBM、SVM、CNN、LSTM 和 RNN（准确度分别为 0.634、0.671、0.701、0.727、0.724、0.716、0.623、0.701 和 0.702。精确度分别为 0.583、0.666、0.698、0.684、0.666、0.696、0.598、0.702 和 0.696。召回率分别为 0.637、0.672、0.701、0.727、0.727、0.716、0.623、0.701 和 0.702。F1 指数分别为 0.585、0.651、0.688、0.684、0.652、0.615、0.602、0.701 和 0.697。特征分析显示年龄和 SER 是模型预测最重要的决定因素，L 值分别为 18% 和 16.5%。其他重要因素包括甜食的食用频率、PD、阿托品剂量和父亲近视程度、ACD。

结论：深度学习模型显示了基于临床信息对眼轴伸长进行个性化预测的可行性，模型具有良好的预测性能，有助于为近视进展快速的患者提供建议，及时调整个体的近视防控措施。

摘要编号: 201672

面板编号: ADV-1120

基于自动条栅视力测试设备的对比度 - 视力多维评估新方法及应用

第一作者: Yuqing LI

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目的: 开发并验证一种新型自动条栅视力测试设备,旨在通过多对比度条件下的视力评估、构建对比度 - 视力的多维矩阵关系、为弱视、青光眼等眼病的临床诊断提供更全面、敏感的视觉功能评估方法。

方法: 南京市妇幼保健院与江苏富瀚医疗产业发展有限公司联合研发自动条栅视力测试设备,通过在 5 个不同对比度水平下进行标准化视力测量,绘制对比度 - 视力函数曲线,形成多维评估矩阵。采用自动化测试流程,克服传统方法耗时过长、操作复杂的问题,并与传统单一对比度视力评估方法进行对比验证。

结果: 该设备能够快速、准确地获取多对比度下的视力值,成功构建对比度 - 视力关系的多维矩阵。临床测试表明,该方法对弱视患儿的视觉功能缺损检测敏感性显著提高,较传统 Snellen 视力表或单一对比度测试更能捕捉细微的视觉损伤。

结论: 本研究开发的自动条栅视力测试设备通过多对比度视力评估,为临床提供了一种高效、全面的视觉功能评估新方法,特别适用于弱视和青光眼的早期筛查、诊断及疗效评估,具有重要的临床应用价值和推广前景。

摘要编号: 208607

面板编号: ADV-1126

深度学习在年龄相关性黄斑变性的研究进展和未来发展方向

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共同作者: Yadan SHEN, Jie ZHONG

目的: 探讨深度学习技术在年龄相关性黄斑变性早期筛查与病灶分割中的应用现状,分析当前面临的挑战,并展望未来研究方向。

方法: 分析近五年内关于深度学习与 AMD 诊疗相关的研究文献,分析不同深度学习架构的优势和缺点并探讨不同架构的未来发展方向。

结果: 在早期筛查方面,深度学习模型已实现 Drusen、RF、RPD 和 CNV 的自动化分类,然而现有研究普遍受限于样本量不足,导致模型泛化能力存在局限;在病灶分割领域,基于深度学习的算法虽能实现对 AMD 主要病理特征的自动分割与定量分析,为病程监测提供客观依据,但当前方法仍

严重依赖专家手动标注,既引入主观偏差又受限于数据质量。

结论: 当前研究面临的主要挑战包括数据标注标准不统一、训练样本小以及模型决策机制缺乏可解释性等问题。未来研究应着力构建多模态数据融合架构、开发边缘计算友好的轻量化模型,并建立循证医学导向的标准化验证体系,以促进深度学习技术向 AMD 临床诊疗实践的实质性转化。

摘要编号: 210043

面板编号: ADV-1131

眼科多模态人工智能的应用与展望

第一作者: Zhang YI

目的: 研究多模态人工智能在眼科领域内的应用现状。

方法: 聚焦多模态 AI 技术,融合眼科影像(如 OCT、眼底彩照等)、文本、功能检测(如视野报告)等不同类型数据,通过构建深度学习模型,结合临床测试集验证模型效果。

结果: 影像 - 影像融合: Eye2Gene 模型预测 IRD 致病基因,整体准确率达 83.9%; 影像 - 文本融合: MEDL 模型预测青光眼视野缺损的 MAE 为 3.575 dB,优于单模态影像模型(3.903 ~ 4.131 dB); 影像 - 功能融合: FusionNet 模型检测青光眼性视神经病变,内部测试集准确率 87.8%,外部验证集 82.0%,优于单模态模型; 多模态 AI 的核心优势是信息整合能力,能提升疾病诊断准确率,但存在数据对齐与标准化、计算和样本需求高、临床可解释性不足等问题。

结论: 1. 多模态 AI 为眼科疾病早期筛查、精确诊断和个体化治疗提供了新可能; 2. 未来需解决现存技术挑战,结合基础模型与具身智能发展; 3. 眼科 AI 将从辅助阅片拓展至预防、诊断、治疗、康复及慢性病管理的全周期健康管理,推动诊疗从“经验医学”迈向“数据驱动,全程智能”。

摘要编号: 208872

面板编号: ADV-1127

糖尿病黄斑水肿抗 VEGF 治疗应答分类集成机器学习研究

第一作者: Yu FANG

共同作者: Jianwei LIN, Tsz Kin NG, Peiwen XIE, Guihua ZHANG, Huishan ZHU

目的: 本研究旨在整合 3D-OCT 特征和临床变量,构建机器学习模型以预测抗 VEGF 治疗效果。

方法：本研究纳入了糖尿病性黄斑水肿患者的医疗记录及三维光学相干断层扫描（3D-OCT）图像。根据连续三次抗血管内皮生长因子（VEGF）药物治疗一个月后的最佳矫正视力，将 3D-OCT 图像划分为视觉反应良好组与视觉反应不良组。研究人员采用 11 种自动分类模型，对图像及临床特征进行抗 VEGF 治疗反应评估，并选取表现最佳的前三种模型构建集成模型，最终在测试数据集中进行验证评估。

结果：本研究共纳入 142 例患者、170 只眼睛的 3D-OCT 图像。筛选出 20 项影像学与临床特征，用于构建抗 VEGF 治疗应答预测模型并进行验证。在 11 种机器学习模型中，自适应提升（AdaBoost）、梯度提升（GradientBoosting）与轻量级梯度提升机（LightGBM）的表现优于其余 8 种模型。基于这三种最优模型构建的集成模型在测试集中表现出色：敏感度达 0.941，特异度达 0.882，准确率达 0.912，且受试者工作特征曲线下面积达到 0.976。

结论：本研究开发了一种基于 3D-OCT 图像与临床特征的集成机器学习算法，用于自动评估糖尿病性黄斑水肿患者对抗 VEGF 治疗的反应。该模型能够有效预测抗 VEGF 治疗的疗效，为临床医生制定个体化治疗方案提供决策支持。

摘要编号：208154

面板编号：ADV-1124

集成异步与实时交互功能的远程医疗平台在眼科护理中的应用研究

第一作者：Hongyan DUAN

目的：为解决眼科专科医生资源紧张且地域分布不均、慢性眼病（如青光眼、糖尿病视网膜病变）患者随访困难及术后患者管理成本高等临床问题，本研究于 2024 年 1 月-2025 年 6 月在我国华北地区共 5 个省份的 12 家基层医疗机构（含社区卫生服务中心、县级医院）及 3 家三级眼科专科医院开展，旨在设计并评估一款综合性远程医疗平台。该平台通过整合“异步沟通”与“实时视频交互”两种模式，构建高效、可及、连续的眼健康服务网络，以实现优化医疗资源配置、提升诊疗效率及改善患者随访依从性与满意度的目标。

方法：在异步沟通（Store-and-forward）模块中，基层医生借助标准化设备采集患者眼底彩照、光学相干断层扫描等影像数据，经安全通道上传至平台，眼科专家可随时登录平台，非实时完成影像审阅、诊断并回传报告，从而实现高效的远程筛查与初步诊断；在实时视频随访与会诊模块中，平台集成高清、低延迟视频通话功能，一方面用于为青光眼、白内障术后等病情稳定的患者提供远程视频复诊，

医生可直接观察患者恢复情况并开展问诊，另一方面支持多方专家进行“面对面”实时视频讨论，共同共享患者资料并制定精准诊疗方案。

结果：该平台成效显著，异步诊断模块处理的 1001 例基层筛查病例中，与三级医院院内诊断的一致性达 92.3%（Kappa 值 = 0.87， $P < 0.001$ ），患者获取专家诊断的时间从传统转诊模式的（ 21.5 ± 4.2 ）天缩短至（ 6.8 ± 1.5 ）小时；实时视频模块成功承载 63.7%（499/783 例）的常规术后随访，患者随访率从传统电话随访的 58.2% 提升至 89.5%（提升 31.3%），同期基层医疗机构眼科线下门诊量减少 28.6%；患者满意度调查（采用 Likert 5 级量表）显示，平台在“就医便捷性”、“服务及时性”维度的平均得分分别为 4.62 ± 0.38 分、 4.57 ± 0.41 分，89.1% 的患者表示“愿意持续使用该平台接受眼健康服务”。

结论：集成异步沟通与实时视频功能的远程医疗平台，是革新传统眼科护理模式的有效工具。该平台成功打破地理与时间限制，在优化医疗资源配置、提升诊疗效率及患者依从性方面发挥重要作用，为构建更高效、可及的眼健康服务体系提供了可靠解决方案。

屈光手术

摘要编号：202263

面板编号：REF-1133

FS-LASIK 和 SMILE 术后 5 年角膜高阶像差和有效光学区分析

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共同作者：Jiayu LI, Fengju ZHANG

目的：评估飞秒激光辅助原位角膜磨镶术（FS-LASIK）和小切口微透镜摘除术（SMILE）治疗近视 5 年后的角膜高阶像差（HOAs），并结合有效光学区（EOZ）的形态，研究近视消退的相关因素。

方法：本横断面研究收集了接受 FS-LASIK 手术 116 眼和接受 SMILE 手术的 126 眼术后 5 年的数据，包括屈光结果、角膜地形图、HOAs、上皮厚度（ET）和视觉质量（QoV）问卷。根据角膜曲率图，将 EOZ 的形态分为均一型、领结型、半环形、钥匙孔型和不规则型。

结果：角膜中央 4 mm 和 6 mm 范围的总角膜和角膜前表面的球差 FS-LASIK 组大于 SMILE 组（ $P < 0.05$ ）。在角膜中央 6 mm 范围，半环型组（19.42%）较均一型组（55.37%）的角膜前、后表面表现出更大水平彗差（ $P < 0.05$ ），前者与水

平偏心有关 ($r = -0.723$, $P < 0.05$)。在角膜中央 4 mm 范围, 总角膜和角膜前表面的负球差, 钥匙孔型组 (10.33%) 最大 ($P < 0.05$), 聚焦困难更明显 ($P < 0.05$)。在高度近视患者中, 近视消退的概率钥匙孔型组是均一型组的 21.323 倍 ($P < 0.05$)。中央和旁中央之间的角膜上皮厚度差异每增加 1 μm , 近视消退的可能性就增加 29.30% ($P < 0.05$)。

结论: SMILE 似乎比 FS-LASIK 具有更少的角膜高阶像差。为了提高高度近视患者的视觉质量, 必须关注中心切削的重要, 以实现均一型的有效光学区, 并监测上皮重塑以防止近视消退。

摘要编号: 208782

面板编号: REF-1142

Ray-tracing-guided FS-LASIK 和 Q-factor guided FS-LASIK 老视手术的临床疗效评估及影响因素

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共同作者: Fengju ZHANG

目的: 本研究对近视合并老视患者在 Ray-tracing-guided FS-LASIK 和 Q 值调整 FS-LASIK 术后观察其临床疗效和相关影响因素, 采用优化单眼视设计。

方法: 纳入 58 名患者 (106 只眼, 2024 年 10 月至 2025 年 9 月), 全光塑组 25 名患者 (50 只眼); Q 值 FS-LASIK 组 28 名 (56)。术前和术后均进行了常规眼部检查 (裸眼视力、ADD、离焦曲线、角膜 Q 值、眼轴长度和眼前节生物参数)。对比敏感度 (CS) 参数和 InnovEyes Sightmap 波前像差评估患者的客观视觉质量, 使用问卷评估主观视觉质量, 并评估手术的安全性及有效性。

结果: 所有受试者均成功完成手术, 未出现并发症。全光塑老视手术术后 3 个月效果趋于稳定, 患者术后中、近距离视力、对比敏感度、离焦曲线、视觉质量均较 Q 值 FS-LASIK 组呈现优异的临床效果; 全光塑组术后一个月 27% 患者近视力 $\geq \text{Jr1}$, 82% 的患者近视力 $\geq \text{Jr2}$, 93% 眼的患者近视力 $\geq \text{Jr3}$; 术后三个月 38% 患者近视力 $\geq \text{Jr1}$, 73% 的患者近视力 $\geq \text{Jr2}$, 88% 眼的患者近视力 $\geq \text{Jr3}$ 。Q 值 FS-LASIK 组术后一个月 18% 患者近视力 $\geq \text{Jr1}$, 67% 的患者近视力 $\geq \text{Jr2}$, 80% 眼的患者近视力 $\geq \text{Jr3}$; 术后三个月 25% 患者近视力 $\geq \text{Jr1}$, 66% 的患者近视力 $\geq \text{Jr2}$, 83% 眼的患者近视力 $\geq \text{Jr3}$ 。术后三个月全光塑组和 Q 值 FS-LASIK 组优势眼的对比敏感度分别为 8.57 ± 2.27 和 7.45 ± 2.68 ($P = 0.550$), 存在差异。术后三个月全光塑组在高阶像差 HOA, 球差没有显著增加, 和 Q 值 FS-LASIK

组有统计学意义。同时全光塑组在角膜 Q 值变化 (趋向于正) 方面更优于 Q 值 FS-LASIK 组, 有统计学意义。全光塑组患者术后满意度达 98%, Q 值 FS-LASIK 组 96%。

结论: 全光塑组和 Q 值 FS-LASIK 组对与年龄相关性调节不足合并近视患者双眼视觉均提供了安全性和有效性。全光塑组在术后中、近距离视力、对比敏感度、离焦曲线、视觉质量均较 Q 值 FS-LASIK 组呈现优异的临床效果; 影响预测性的相关因素为: 年龄、术前等效球镜、ADD、瞳孔大小、术前角膜 Q 值等。全光塑老视相关研究目前国内外属于空白, 根据患者的年龄及老花的程度 (ADD 值大小), 老视手术设计术后效果有所差异, 还需进一步收集样本量, 进行相关研究, 长期随访和观察。

摘要编号: 208978

面板编号: REF-1143

SMILE pro、SMILE 3.0 和 SMILE 4.0 在矫正中低度近视散光术后的临床疗效对比研究

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共同作者: Qizhi ZHOU

目的: 对 SMILE pro、SMILE 3.0 和 SMILE 4.0 矫正中低度近视散光患者术后的安全性、有效性和可预测性, 以及对散光的矫正效果进行比较, 为临床屈光不正患者提供最优的手术术式选择奠定基础。

方法: 选取行 SMILE pro、SMILE 3.0 和 SMILE 4.0 的屈光不正患者 203 人 (373 眼), 完善术前相关检查, 排除手术禁忌症并行相关手术, 于术后 1 天、1 月随访裸眼视力 (UCVA)、最佳矫正视力 (CDVA)、球镜、柱镜度数; 用 SPSS 25.0 软件对数据进行统计分析。

结果: 最终纳入 SMILE pro 组 72 人 (131 眼), SMILE 3.0 组 62 人 (115 眼), SMILE 4.0 组 69 人 (127 眼)。在术后第一天, 三组的 UDVA 达到 20/20 或更高的比列分别是 71.76%、76.52 和 88.98%, 术后 1 月时分别是 91.60%、97.39% 和 100%, 三组间比较有统计学意义 ($P < 0.05$), 组间比较发现 SMILE 4.0 组与其余两组比较均有统计学意义 ($P < 0.05$)。术后 1 天, 三组等效球镜 (SE) 在 $\pm 0.50 \text{ D}$ 范围的比列分别是 60.30%、97.39% 和 96.85%, 术后 1 月, 分别是 72.52%、98.26% 和 97.64%, 三组间比较有统计学意义 ($P < 0.05$), 组间比较发现 SMILE pro 组与其余两组比较均有统计学意义 ($P < 0.05$)。术后一天的 SE 比较发现 SMILE pro 与其余两组间比较有统计学意义 ($P < 0.05$), 其中 SE 最大的是 SMILE pro 组; SMILE pro 组的术后一天和一月的 SE 比较有统计

学意义 ($P < 0.05$)。术后一天, 三组 CDVA 为行数不变或更佳的比列分别是 76.34%、72.17% 和 88.19%, 术后一月时, 以上比列分别为 96.95%、98.26% 和 100%。在术后一天和术后一月时, 三组散光度数小于 0.5 D 的眼比列分别是 73.30%、99.10%、98.20% 和 84.72%、98.26%、100%, 三组间比较有统计学意义 ($P < 0.05$), 组间比较发现 SMILE pro 组与其余两组比较均有统计学意义 ($P < 0.05$)。

结论: 三种手术方式矫正中低度近视散光均是安全有效的, 表现最为突出的是 SMILE 4.0。

摘要编号: 208459

面板编号: REF-1138

SMILE 术后角膜上皮与生物力学变化及相关性研究

第一作者: Lei LI

共同作者: Gang LIANG

目的: 探讨飞秒激光小切口角膜基质透镜取出术 (SMILE) 术后三月角膜上皮厚度与角膜生物力学变化及相关性。

方法: 选取研究对象为 72 例在云南大学附属医院屈光中心接受 SMILE 手术、并完成术前及术后随访的患者, 其手术参数为中度切削比, 角膜帽厚度 120 μm , 光学区直径 6~6.5 mm。在术前及术后三月分别使用 Corvis ST 进行角膜生物力学测量, 并利用高分辨率眼前节相干光断层扫描 (HD-OCT) 测量角膜上皮厚度, 测量区域包括中央区 (0~2 mm)、旁中央区 (2~5 mm)、中周区 (5~7 mm) 和周边区 (7~9 mm)。分析 smile 角膜上皮与生物力学变化及相关性。

结果: 术前中央区、旁中央区、中周区和周边区的角膜上皮厚度分别为 $47.43 \pm 3.73 \mu\text{m}$ 、 $46.01 \pm 6.86 \mu\text{m}$ 、 $44.92 \pm 2.70 \mu\text{m}$ 和 $42.89 \pm 2.56 \mu\text{m}$; 术后三月为 $52.76 \pm 4.70 \mu\text{m}$ 、 $52.00 \pm 3.89 \mu\text{m}$ 、 $47.35 \pm 2.92 \mu\text{m}$ 和 $42.06 \pm 2.52 \mu\text{m}$; 表明中央区、旁中央区及中周区角膜上皮均呈现增厚趋势, 而周边区角膜上皮则出现变薄现象。在角膜生物力学方面, 术后三个月与术前相比, A1L、A1V、A2L、HC Radius、A1T、ARTh 和 SPA1 参数显著减小, 而 HCPD、HC Def.A、CBI、DA RATIO 和 Integr.Radius 参数则显著增大, 这些变化均指示角膜整体生物力学性能下降, 角膜变软。相关性分析进一步揭示, 术后上皮厚度变化量 (ΔET) 与 HCPD 变化量 (ΔHCPD)、HC Def.A 变化量 ($\Delta\text{HC Def.A}$) 和 A2T 变化量 (ΔA2T) 呈显著正相关 ($r = 0.29$ 、 $r = 0.49$ 、 $r = 0.34$, $P < 0.05$)。这意味着当这些生物力学参数

增大 (表明角膜变软) 时, 角膜上皮会相应增厚。同时, ΔET 与 SSI 变化量 (ΔSSI)、DA RATIO 变化量 ($\Delta\text{DA RATIO}$) 和 A1T 变化量 (ΔA1T) 呈显著负相关 ($r = -0.27$ 、 $r = -0.24$ 、 $r = -0.30$, $P < 0.05$)。这提示当这些参数减小 (也表明角膜生物力学性能减弱) 时, 角膜上皮呈现增厚趋势。尽管 A1L、A1V、A2L、A2V、HC Radius、HC time、Integr.Radius、ARTh 和 SPA1 等参数的变化与 ΔET 未显示显著相关性 ($P > 0.05$), 但综合来看, 角膜上皮增厚可能是其对 SMILE 术后角膜生物力学强度下降的一种代偿性适相关性分析进一步揭示, 术后上皮厚度变化量 (ΔET) 与 HCPD 变化量 (ΔHCPD)、HC Def.A 变化量 ($\Delta\text{HC Def.A}$) 和 A2T 变化量 (ΔA2T) 呈显著正相关 ($r = 0.29$ 、 $r = 0.49$ 、 $r = 0.34$, $P < 0.05$)。这意味着当这些生物力学参数增大 (表明角膜变软) 时, 角膜上皮会相应增厚。同时, ΔET 与 SSI 变化量 (ΔSSI)、DA RATIO 变化量 ($\Delta\text{DA RATIO}$) 和 A1T 变化量 (ΔA1T) 呈显著负相关 ($r = -0.27$ 、 $r = -0.24$ 、 $r = -0.30$, $P < 0.05$)。这提示当这些参数减小 (也表明角膜生物力学性能减弱) 时, 角膜上皮呈现增厚趋势。尽管 A1L、A1V、A2L、A2V、HC Radius、HC time、Integr.Radius、ARTh 和 SPA1 等参数的变化与 ΔET 未显示显著相关性 ($P > 0.05$), 但综合来看, 角膜上皮增厚可能是其对 SMILE 术后角膜生物力学强度下降的一种代偿性适应机制。

结论: SMILE 术后角膜上皮和生物力学特性均发生显著变化, 角膜上皮的增厚可能代表了一种对生物力学强度下降的适应性补偿, 这对于术后角膜的稳定性和功能维持具有重要意义。

摘要编号: 207860

面板编号: REF-1137

Smile 术后角膜上皮重塑多区域动态变化与影响因素分析

第一作者: Lei LI

共同作者: Gang LIANG

目的: 探讨飞秒激光小切口角膜基质透镜取出术 (smile) 术后早期角膜上皮厚度在不同分区的动态演变规律, 及与手术参数、患者特征的相关性

方法: 选择 2024 年 9 月-2024 年 12 月在我院行 smile 手术的近视及散光患者 35 例 70 眼, 分别于术前、术后 1 周、术后 1 月、术后 3 月行频域眼前节相干光断层扫描 (HD-OCT), 对患者行角膜上皮厚度中央区 (0~2 mm)、旁中央区 (2~5 mm)、中周区 (5~7 mm)、周边区 (7~9 mm) 测量。研究 smile 术后早期角膜上皮变化及

与手术参数相关性（切削比、角膜帽厚度、角膜帽直径），患者特征（等效球镜、术前角膜厚度、术前上皮厚度、年龄）相关性。

结果：同区域上皮厚度存在统计学差异（ $p < 0.001$ ），呈从中央区到周边区递减的趋势；不同时间上皮厚度增长存在统计学差异（ $p < 0.001$ ），增长速率呈 $1\text{ wk} > 1\text{ mo} > 3\text{ mo}$ ；随时间的变化不同区域上皮厚度增长趋势不同（ $p < 0.001$ ），增长量呈旁中央区 $>$ 中央区 $>$ 中周区 $>$ 周边区。3 mo 中央区上皮厚度较术前增加（ $6.04 \pm 3.97\text{ mm}$ ），与等效球镜、切削比呈显著正相关（ $P < 0.001$ $P = 0.001$ ），与角膜帽厚度呈显著负相关（ $P = 0.007$ ），与术前角膜厚度、术前上皮厚度、角膜帽直径、年龄（ $P = 0.598$ $P = 0.872$ $P = 0.165$ $P = 0.941$ ）均无显著相关性。

结论：角膜上皮中央厚周边薄，smile 术后角膜上皮厚度增长速率呈术后至术后 1 周内最快，术后 1 周至 1 月次之，术后 1 月至 3 月上皮速率最慢，达相对平稳状态；增长量呈旁中央区最多，中央区次之，中周区较少，周边区最少；术前等效球镜越高、切削比值越大、角膜帽厚度越薄则术后角膜上皮增长量越多。

摘要编号：209254

面板编号：REF-1144

TICL 植入术后屈光意外处理与结果分析

第一作者：Liangyong ZHU

目的：回顾分析一例 TICL 屈光意外的处理过程，分析 ICL 术后屈光意外产生原因并提供解决思路。

方法：27 岁女性患者，规培医生，因“双眼远视力差 10 余年”就诊，检查双眼 UCVA: 0.06, BCVA:1.0; 原镜视力右眼 0.6, 左眼 0.4; NCT 右眼 20 mmHg, 左眼 19.7 mmHg, CCT 右眼 556 μm , 左眼 549 μm ; ACD 右眼 3.32 mm, 左眼 3.27 mm。常规眼部检查和辅助检查未见明显异常。屈光检查：验光右眼 $-9.00/-1.75 \times 5 = 1.0-$ ，左眼 $-9.25/-1.25 \times 175 = 0.8+$ ；晶体计算计算预定：右眼 $-12.0/+2.0 \times 89$ ，左眼 $-11.5/+1.5 \times 85$ ，术者选择上方切口完成手术。

结果：术后 1 天，右眼 UCVA 0.6，切口轻度水肿，电脑验光： $+0.25/-1.75 \times 120$ ，晶体逆时针转至 16° 。手术调整晶体位置到植入位，调位后 1 天 UCVA 0.6+，电脑验光： $+0.50/-1.75 \times 112$ ，予观察。调位后 1 月术源性散光相对稳定，复查右眼 UCVA 0.6，综合验光： $+0.25/-1.25 \times 110 = 0.8+$ ，晶体仍逆时针转至 16° ，计算切口术源性散光有 0.96 D，残留散光主要为晶体旋转与术源性散光所致。将眼内 ICL 晶体的屈光度，换算为综合验光度数 $-8.85/-2.00 \times 15$ ，与残余度数 $+0.25/-1.25 \times 110$ 进行

THIBOS 矢量计算得 $-9.82/-0.80 \times 7$ ，为全眼综合验光结果，以此计算订购 ICL 晶体度数 $-12.0/+1.0 \times 97$ ，因晶体习惯位于 16° ，因此选择更换一枚 $-12.0/+1.0 \times 81$ 放于 16° 方向。右眼更换后 3 月复查 UCVA 1.2，电脑验光： $+0.25\text{ DS}$ 。

结论：1. 当切口较长、较靠近视轴时会引起一个较大的术源性散光，易产生屈光意外；2. 上方切口术源性散光较大，足矫的 TICL 或验光无散光患者谨慎选择上方切口；3. 当 TICL 习惯发生旋转时，应选择合适于其旋转后轴位的度数；4. 散光具有矢量性，处理屈光意外时散光需进行矢量计算，不能对验光度数做单纯加减。

摘要编号：208735

面板编号：REF-1140

TransPRK 术后角膜上皮愈合延迟 5 例病例报告

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共同作者：Lijun ZHANG

目的：分析 5 例（9 眼）智能脉冲技术辅助的经上皮准分子激光角膜切削术后角膜上皮愈合延迟的病因以及诊疗思路，回顾角膜损伤愈合的机制，加强屈光手术围手术期的安全性。

方法：回顾总结 2019 年至 2023 年我院屈光中心发生的 5 例（8 眼）表层屈光手术术后角膜上皮愈合延迟的病例。

结果：5 例患者在双眼接受 SPT-TransPRK 手术术后 3 天后双眼角膜上皮发生不同程度的愈合延迟，其中 1 例（1 眼）患者在发现角膜愈合延迟后通过清创不健康角膜上皮联合角膜绷带镜、局部抗生素/激素眼膏包眼制动恢复角膜上皮屏障，另外 1 例（2 眼）患者在发现角膜上皮迁延不愈后，一眼通过局部促上皮修复/激素眼膏包眼制动愈合，另一眼通过清创联合羊膜遮盖术恢复角膜上皮屏障功能。另外 3 例（5 眼）患者在角膜上皮愈合延迟后继发严重程度不一的病毒性角膜炎，通过追问病史和早期足量的眼局部联合全身抗病毒治疗，停止使用皮质类固醇滴眼液同时使用角膜上皮再生、角膜神经修复等药物促进角膜上皮屏障的修复，并适当使用抗生素滴眼液预防可能合并的角膜细菌感染。待角膜上皮修复后，在局部继续应用抗病毒药物的基础上，小量、逐步使用皮质类固醇滴眼液预防角膜上皮浑浊。本文 5 例（8 眼）患者治疗后最短半年的随访，裸眼视力均在 1.0 以上，未见 0.5 级以上 haze。

结论：表层角膜屈光术后角膜上皮的正常愈合与患者术前的眼表健康状况、术后摘角膜绷带镜的时间、个体差异等因素有关。当术后角膜上皮愈合延迟时，

改善患者的眼表健康状态，适当延长角膜绷带镜的使用时间，单独眼膏包眼制动，羊膜覆盖等手段均是促进角膜上皮愈合的有效办法。当出现长期角膜上皮愈合延迟且上述方法效果不明显时，要高度怀疑合并病毒感染，需早期诊断、局部及全身的抗病毒药物、暂停皮质类固醇类药物点眼、人工泪液等药物促进角膜上皮再生、抗生素滴眼液预防合并细菌感染，上皮修复后再抗病毒的基础上，合理应用皮质类固醇预防角膜上皮混浊，患者仍可最终获得优异的视力及视觉质量。

摘要编号：209711

面板编号：REF-1146

不同比例散光的屈光不正患者植入 EVO-ICL 后残留散光对术后视觉质量的影响

第一作者：Huiqin ZHANG

目的：探讨在 EVO-ICL 植入术中，对于不同比例散光的近视患者，残留散光对其术后光学质量与视觉功能的影响。通过对比接受散光型 ICL (TICL) 实现完全矫正与接受非散光型 ICL (ICL) 后存在低度残留散光的患者，明确散光矫正的临床意义与适用范围。

方法：本研究为前瞻性队列研究，共纳入 40 例患者 (80 只眼)，平均年龄 26.61 ± 7.52 岁，均行 EVO ICL (V4c) 植入术。根据术前散光比例 ($A\% = \text{柱镜度数 [DC]} / \text{球镜度数 [DS]}$) 将受试眼分为两组：TICL 组 ($A\% = 25.67 \pm 10.87\%$) 接受全散光矫正；ICL 组 ($A\% = 11.02 \pm 2.70\%$) 则存在计划性低度残留散光。所有眼术后矫正远视力 (CDVA) 均达 20/20 或更佳。于术后 3 个月进行全面评估，内容包括未矫正 (UDVA) 与矫正远视力 (CDVA)、球镜等效 (SE)、眼压，以及 4 mm 与 6.5 mm 瞳孔直径下的波前像差。采用调制传递函数 (MTF)、点扩散函数 (PSF)、对比敏感度 (CS) 与视觉质量 (QoV) 问卷，分别评估客观与主观视觉质量。

结果：两组患者术前基线资料及术后 UDVA、CDVA、SE、眼压均无统计学差异。波前像差分析显示组间差异：TICL 组在 4 mm 与 6.5 mm 光学区下，与散光相关的像差 (C3 [45/135° 散光]、C5 [90/180° 散光] 及 C11 [次级散光]) 均显著降低 ($P < 0.05$)；与之相反，ICL 组上述像差均显著增加 ($P < 0.05$)，且 TICL 的像差削减效应在 6.5 mm 大光学区更为显著。此外，两组在全眼像差、高阶像差 (HOA) 及球面离焦 (C4) 方面，术后均呈现可比性的显著降低。在 MTF、PSF、CS 及 QoV 问卷评分等综合视觉质量指标上，两组间未观察到显著差异。

结论：本研究证实，在 ICL 植入术中，球镜矫正与散光矫正对术后视觉质量的影响具有不同侧重：球镜矫正是获得高分视力的基础，而散光矫正则特异性作用于控制散光相关像差。TICL 能有效消除此类像差，且其光学优势在生理性大瞳孔条件下更为凸显。然而，低度残留散光 (约球镜的 11%) 虽在像差仪上呈现客观升高，却未在短期内引发患者主观视觉质量或核心功能指标的显著下降。此结果揭示了散光矫正可能存在“临床阈值效应”，提示 TICL 的应用效益在散光比例超越某一特定临界值时方得以充分体现，这为临床精准制定个体化手术方案提供了重要依据。

摘要编号：208720

面板编号：REF-1141

光迹追踪引导飞秒准分子激光术中不同光学区设计对术后视觉效果影响的对比研究

第一作者：Lu XIONG

共同作者：Xue BAI, Zheng WANG, Jiawei WU

目的：探讨在光迹追踪引导飞秒激光辅助原位角膜磨镶术 (Femtosecond Laser-Assisted in Situ Keratomileusis, FS-LASIK) 中，采用不同直径光学区矫正近视与近视散光的安全性及有效性。

方法：回顾性分析接受光迹追踪引导 FS-LASIK 治疗的 66 例 (126 眼) 近视或近视散光患者临床资料。根据光学区 (Optical Zone, OZ) 直径将患者分为 6.5- 组 (OZ: 6.0–6.5 mm) 与 6.5+ 组 (OZ: 6.6–7.0 mm)。所有患者均于术前及术后 3 个月完成全面眼科检查，检测指标包括未矫正远视力 (Uncorrected Distance Visual Acuity, UDVA)、矫正远视力 (Corrected Distance Visual Acuity, CDVA)、综合验光结果、平均角膜曲率、中央角膜厚度、计划与实际最大消融厚度、4 mm 及 6 mm 瞳孔直径下全眼波前像差，以及采用视觉质量问卷评估患者主观视觉感受。

结果：两组患者术后均获得良好屈光准确性与稳定性，组间比较差异无统计学意义 (均 $P > 0.05$)。术后 3 个月，6.5- 组与 6.5+ 组达到 UDVA 20/16 及以上的眼数占比分别为 80%、76%，组间差异无统计学意义 ($P = 0.064$)；6.5- 组中 CDVA 提升 1 行及以上者占 65%，6.5+ 组占 55%，组间频数比较无显著差异 ($P = 0.342$)。此外，两组在等效球镜度数、屈光散光、手术诱导散光、差异向量、平均角膜曲率及计划与实际最大消融厚度方面比较，差异均无统计学意义 (均 $P > 0.05$)。在 6 mm 瞳孔直径下，6.5+ 组全眼波前像差 (包括高阶像差、球差、彗差及垂直彗差) 显著低于 6.5- 组 (均 $P <$

0.05)。两组间患者视觉质量问卷评分比较无显著统计学差异 ($P > 0.05$)。

结论: 光迹追踪引导 FS-LASIK 治疗近视与近视散光中, 选择更大直径光学区安全可行, 既能保证与小直径光学区相当的视觉效果, 又可有效降低 6 mm 瞳孔直径下全眼波前像差, 为临床光学区的选择提供参考依据。

摘要编号: **210115**

面板编号: **REF-1149**

博鳌探索老视矫正新技术: 角膜层间嵌入式微透镜

第一作者: *Wei CHEN*

共同作者: *Mimi LIU*

目的: 评估在博鳌乐城医疗先行区使用角膜层间嵌入式微透镜 (Flexivue Microlens) 矫正老视的安全性和有效性。

方法: 本研究为一项前瞻性病例研究, 纳入自 2024 年 1 月起接受角膜层间嵌入式微透镜 (Flexivue Microlens) 植入的 20 例老视患者。所有手术均在博鳌乐城医疗先行区完成, 先行区允许国际获批医疗器械的早期临床应用。微透镜植入于患者非主视眼, 并采用 “Smart Monovision” 增强型单眼视机制矫正老视。主要评估指标包括术眼与双眼 UCNVA、BCNVA、UCDVA、BCDVA, 并观察角膜内皮状态、角膜形态变化, 最长随访时间为 20 个月。

结果: 随访结果显示, 植入角膜层间嵌入式微透镜 (Flexivue Microlens) 后, 双眼未矫正近视力 (UCNVA) 平均提升 4-5 行, 术眼未矫正远视力 (UCDVA) 下降约 2 行, 双眼 UCDVA 无明显变化。最佳矫正远、近视力 (BCDVA、BCNVA) 均未出现下降。结果显示良好的安全性, 无严重不良事件。患者满意度高, 大多数患者自述近距离视功能明显改善, 并表示愿意推荐该治疗方案。

结论: 角膜层间嵌入式微透镜 (Flexivue Microlens) 的安全性与有效性均在博鳌先行先试中得到初步验证, 受试者普遍表现出较高的满意度及推荐意愿。

摘要编号: **209542**

面板编号: **REF-1145**

基于图神经卷积网络进行角膜屈光手术指征判断与术式选择

第一作者: *Xi CHEN*

共同作者: *Chuzhi PENG, Keming YU*

目的: 评估协同中山大学中山眼科中心既往 12000 例手术信息和基于深度学习方法图卷积神经网络 (Graph Convolutional Neural Network, GCNN) 的自动学习系统在判断激光角膜屈光手术指征及选择 SMILE、FS-LASIK、TPRK 手术方式中的有效性。

方法: 构建一个包含多个图卷积层和全连接层的 GCNN 模型, 用于学习术前检查资料 (包括角膜地形图、角膜厚度、眼压等) 的图结构特征。纳入 12000 例角膜屈光不正病例, 其中 8000 例用于训练模型, 其余 4000 例用于验证。通过图学习算法将术前检查指标转换为节点, 指标间相关性定义为边, 形成图数据。采用自适应学习率和批量归一化技术进行模型训练, 使用交叉熵损失函数评估性能。

结果: 经过训练的 GCNN 模型在验证集上表现出优异的判断能力, 对于手术指征的判断准确率达到 97.5%, 手术方式选择的准确率达到 91.3%。与临床标准相比, GCNN 模型的判断结果具有高度一致性 ($r = 0.850$, $P < 0.001$)。在手术指征判断中, 假阳性率为 8.5%, 假阴性率为 15.0%; 在手术方式选择中, 假阳性率为 7.2%, 假阴性率为 9.8%。软件内建评估显示, 模型在手术指征判断和手术方式选择上的最高精度分别为 0.930 和 0.915。

结论: GCNN 自动学习系统在判断角膜屈光手术指征及手术方式选择上展现出较高的准确性, 大样本学习显著提升了判断性能, 表明该系统具有潜在的临床应用价值。

摘要编号: **204012**

面板编号: **REF-1134**

基于眼后房结构参数的有晶状体眼后房型人工晶状体 (ICL) 植入术后拱高预测新模型的研究

第一作者: *Qin WANG*

共同作者: *Qizhi ZHOU*

目的: 纳入眼后房结构相关参数, 拟合得到 ICL 拱高预测新模型, 评价新模型的准确性。

方法: 收集 2021 年 03 月至 2022 年 12 月于爱尔眼科重庆眼视光眼科医院就诊并实施 ICL 植入术的患者 70 人 (92 眼), 收集其术前眼部结构参数, 于术后 1 个月测量拱高, 使用 SPSS (26.0) 软件进行数据统计分析, 采用 Spearman 相关分析和简

单线性回归关系评估拱高与术前眼部生物参数的相关性，采用多元逐步回归分析构建预测拱高的模型。收集 2023 年 01 月至 2024 年 10 月于同院就诊并实施 ICL 植入术的患者 140 人（204 眼），于术后 1 个月测量拱高，收集其术前眼部生物参数，并用 UBM 测量小梁睫状突角（TCA），用新模型计算出预测拱高，评估预测拱高中达到正常拱高（250 μm –1000 μm ）眼的百分比，采用组内相关系数（ICC）、BlandAltman 检验、95% 可信区间（95% CI）和 95% 一致性界限（95% LoA）评价新模型预测拱高与实际拱高的一致性和准确性。

结果：纳入预测模型的样本平均年龄为 28.18 ± 7.07 岁。拱高与等效球镜度（SE）、水平角膜直径（WTW）、前房深度（ACD）、前房容积（ACV）、水平睫状沟直径（hSTS）、瞳孔直径及最大睫状体厚度（CBTmax）呈正相关，与年龄、眼压（IOP）、晶体悬韧带距离（CLR）及小梁–睫状体角（TCA）呈负相关。简单线性回归分析显示：年龄、SE、CBTmax、TCA、WTW、ACD、垂直睫状沟直径（vSTS）和 CLR 与拱高的相关性具有统计学意义（ $P < 0.05$ ）。拱高预测模型（调整后 $R^2 = 0.54$ ）为：拱高（ μm ）= $-1711.69 - 166.80 \times \text{ICL 尺寸} + 378.62 \times \text{WTW} + 506.75 \times \text{ACD} - 11.75 \times \text{TCA}$ 。在验证队列中，该模型显示出临床实用性：88.2% 的预测结果落在理想拱高范围（250–1000 μm ）内，95.1% 的误差在 $\pm 500 \mu\text{m}$ 范围内。预测拱高与实际拱高的相关系数为 0.51（ $P < 0.01$ ），预测值与实际值的偏差为 203.20 μm ，95% 一致性界限为（ -175.30 – 581.70 ） μm ，标准差（SD）为 193.10 μm ；预测拱高与实际拱高的组内相关系数（ICC）为 0.51（95% 置信区间：0.40–0.60）。

结论：纳入眼后房结构参数 TCA 的拱高预测新模型可有效降低 ICL 植入术后拱高异常的发生概率，可作为 ICL 尺寸选择的新方案。

摘要编号：205177

面板编号：REF-1136

屈光不正人群青光眼患者管理

第一作者：Wei PENG

目的：探讨屈光手术门诊术前眼健康检查青光眼早期筛查有效的检测方法和流程管理。

方法：回顾性分析本人自 2021 年 1 月~2025 年 8 月年通过眼科常规屈光术前检查及常规体检筛查出生理性大视杯患者 23 例，高血压症 8 例，确诊原发性开角型青光眼患者 11 例，原发性闭角型青光眼患者 5 例临床资料。包括病史、症状、体征、视力、眼压、裂隙灯，眼底镜检查及（或）眼底影像检查、视野检查及光学相干断层成像（optical

coherence tomography, OCT），超声生物显微镜（ultrasound biomicroscopy, UBM）及随访记录。

结果：原发性开角型青光眼 11 例（22 只眼），17 只眼早期原发性开角型青光眼，5 只眼进展期原发性开角型青光眼；原发性闭角型青光原发性开角型青光眼 11 例（22 只眼），17 只眼早期原发性开角型青光眼，5 只眼进展期原发性开角型青光眼；原发性闭角型青光眼 5 例（10 只眼），8 只眼临床前期原发性闭角型青光眼，随访期先兆期小发作一只眼，随访期急性闭角型青光眼大发作一只眼。高血压症患者 8 例（16 只眼）生理性大视杯患者 23 例。

结论：屈光门诊基于屈光不正人群进行青光眼筛查可以更早期发现隐匿型的原发性青光眼。科学的筛查流程及随访管理有待于进一步完善；对于青光眼性视神经损害和非青光眼性视神经损害需要科学鉴别，尤其是高度近视眼底改变及视盘倾斜眼底改变；青光眼患者屈光手术的取舍及药物使用需要谨慎。

摘要编号：208671

面板编号：REF-1139

改良的双切口无粘弹剂 ICL 植入术矫正高度近视的随机对照研究

第一作者：Chunqiao WANG

目的：评价改良的双切口无粘弹剂有晶状体眼后房型人工晶状体（implantable collamer lens, ICL）植入术后的疗效和安全性。

方法：本研究为前瞻性、单中心、单盲、随机对照试验。108 名符合标准的受试者被纳入本研究，以 1:1 的比例随机分至无粘弹剂组或标准治疗组，分别接受改良的双切口无粘弹剂 ICL 植入术或有粘弹剂 ICL 植入术。记录每只术眼的手术用时和术后 2 小时眼压。患者在术后 1 天、1 周、1 月及 3 月进行随访，每次随访都记录并评估了视力、屈光度、眼压、角膜内皮参数、角膜厚度和角膜光密度等眼前节参数的变化。术后 3 月随访时，通过视觉质量问卷对患者的主观视觉质量进行评估。

结果：共有 71 名受试者完成了全部的随访评估，其中无粘弹剂组 34 例（68 眼），标准治疗组 37 例（74 眼）。术后各随访时间点中，两组间视力、屈光度以及角膜内皮参数之间的比较无统计学差异。无粘弹剂组的手术用时明显短于标准治疗组（ $P < 0.0001$ ）。两组眼压在术后 2 小时都出现了明显的上升（ P 均 < 0.0001 ），在术后 1 天有显著的下降（ P 均 < 0.0001 ），随后恢复至基线水平并保持稳定。无粘弹剂组术后 2 小时的眼压上升明显小于标准治疗组（ $P < 0.0001$ ）。两组角膜厚度及角膜光密度在术后 1 天显著增加（ P 均 < 0.05 ），随后

逐渐下降至基线水平。无粘弹剂组术后 1 天 9 点钟方位（主切口同侧）的周围角膜厚度及角膜光密度较标准治疗组更小（ P 均 < 0.05 ）。术后 3 月随访时，无粘弹剂组术后出现光圈的频率更低，且症状的严重程度及对日常生活的影响程度更低（ P 均 < 0.001 ）。

结论：改良的双切口无粘弹剂 ICL 植入术的学习曲线短，操作可控性高，且在术后早期具有较高的安全性、有效性、可预测性和稳定性。它可以大大缩短手术时间，减少术后早期眼压升高和角膜水肿等并发症的发生，并给患者带来更好的主观视觉质量。

摘要编号：204006

面板编号：REF-1135

眼后房结构参数对有晶状体眼后房型人工晶体（ICL）植入术后位置的影响的研究

第一作者：Qin WANG

共同作者：Qizhi ZHOU

目的：观察 ICL 植入术后襻位置，分析与 ICL 襻位置相关的包括眼后房结构的眼部生物参数，以降低 ICL 植入术后襻位置异常的发生率。

方法：选取 2021 年 3 月至 2021 年 12 月在爱尔眼科重庆眼视光眼科医院就诊并实施 ICL 植入术的患者 70 人（89 眼），收集其术前包括 UBM 测量的后房结构在内的眼部结构参数，于术后一月使用 UBM 观察 ICL 襻位置，对襻位置进行描述性统计分析，并选取同一时间段的 ICL 植入术患者 80 人（127 眼），根据术后一月 ICL 襻所在位置分为三组：睫状沟组，睫状体组，睫状体下组。使用 SPSS (26.0) 软件进行数据统计分析，三组襻位置间的各生物参数比较采用单因素方差分析，以 $P < 0.05$ 为差异有统计学意义。

结果：总纳入患者 70 人（89 眼），低拱高组 24 人（27 眼），正常拱高组 18 人（34 眼），高拱高组 28 人（28 眼），三组 ICL 襻所在位置的描述性统计结果显示高拱高组中 ICL 襻主要位于睫状沟（70.54%），正常拱高组和低拱高组的 ICL 襻主要位于睫状体（61.76%）和（63.89%），位于睫状体下最多的是低拱高组（23.15%）。襻位置与拱高存在明显相关性（ $\chi^2 = 98.73$, $P < 0.001$ ）。根据襻位置分成的三个组中，睫状沟组 34 人（47 眼），睫状体组 26 人（42 眼），睫状体下组 20 人（38 眼），三组间拱高、WTW、ACD、等效球镜（SE）、前房容积（ACV）、晶状体厚度（LT）、矢高（CLR）、CBTmax、TCA、ICPD 比较有统计学意义（ $P < 0.05$ ），襻位于睫状沟的拱高最高，屈光度数越高，襻越容易位于睫状体下，襻在睫状体下的 LT 最厚、CLR 最大，襻在睫状体下的 ACV 比在睫状沟大

39.46 mm³，襻在睫状沟的 CBTmax 比在睫状体下大 0.15 mm，襻在睫状体的 CBTmax 比在睫状体下大 0.14 mm，襻在睫状沟的 TCA 比在睫状体小 11.69°，比在睫状体下小 16.09°，襻在睫状沟的 ICPD 最大，在睫状体下最小。

结论：ICL 襻的位置与拱高密切相关，较小的前房容积（ACV）以及更薄、更靠后的睫状体容易导致襻位于睫状体下方，进而增加低拱高风险。襻位于睫状体下方表现出更高的眼压。

摘要编号：210063

面板编号：REF-1148

角膜屈光性透镜取出术临床研究证据图谱

第一作者：Lulu XU

共同作者：Yan WANG

目的：运用证据图谱方法，评估关于 KLEx 手术临床研究的证据质量。

方法：本研究采用了最新的证据呈现方法学——证据图谱。通过遵循 PICO 原则的检索策略，全面检索了 MEDLINE、EMBASE、Web of Science、Epistemonikos 和 Cochrane 五个数据库中有关 KLEx 临床研究的系统评价和 Meta 分析。同时检索了临床指南相关网站，包括 National Guidelines Clearinghouse、指南国际网络（GIN）、英国国家卫生与临床优化研究所（NICE），以确保所有可用证据的完整性。采用系统评价方法学质量评估工具 -2（AMSTAR-2）评估纳入系统评价的方法学质量，并通过气泡图呈现证据图谱。

结果：共纳入 32 篇系统评价和 Meta 分析，涵盖了 386 项原始研究（其中 129 项为随机对照试验），系统评价占 47.9%。提取出 32 个关注临床结局的 PICO 问题，涉及临床疗效、干眼、角膜生物力学、高阶像差等，包括 11 个干预类别和 24 个疗效结局指标。27 篇系统评价的方法学质量被评为“低”或“极低”。KLEx 与其他经典的角膜基质和表层切削手术在安全性、有效性和可预测性方面相似。在术后早期，KLEx 手术在角膜生物力学（角膜滞后量 CH、角膜阻力因子 CRF）、干眼参数和像差（总高阶像差、球差和彗差）方面可能优于飞秒激光制瓣的准分子激光原位角膜磨镶术（FS-LASIK）。仅有 4 项质量“低”或“极低”的研究比较了 KLEx 与有晶状体眼人工晶状体（ICL）植入术，ICL 植入术在安全性、有效性、可预测性以及像差引入方面可能优于 KLEx，但证据质量较低，结论未明确。

结论：证据表明，KLEx 与其他屈光手术相比，具有相同的安全性、有效性和可预测性。然而，KLEx 在维持泪膜质量和角膜生物力学稳定性（主

要通过 CH 和 CRF 评估) 方面可能更具优势。建议未来开展随访期更长、设计更严谨的高质量随机对照试验, 以进一步验证其长期有效性与安全性。

摘要编号: 209919

面板编号: REF-1147

高度近视患者 SMILE 与 FS-LASIK 术后角膜形态的对比研究

第一作者: Riping ZHANG

目的: 评估 SMILE 与飞秒激光辅助 LASIK 矫正高度近视患者术后角膜形态的差异。

方法: 本研究纳入 108 例高度近视患者 (每组 54 眼), 分别接受 SMILE 或 FS-LASIK 手术。采用 Scheimpflug 地形图系统分析直径 2-7 毫米区域的角膜屈光力 (corneal refractive power, CRP), 并将环间差值定义为相对角膜屈光力 (relative corneal power, RCP)。分析直径 2-7.2 毫米区域 (14 个同心环, 0.4 毫米间隔) 的角膜厚度空间分布 (corneal thickness spatial profile, CTSP), 并检测直径 6 毫米区域的角膜高阶像差。

结果: 术后 3 个月随访显示, 与 SMILE 相比, FS-LASIK 术眼引起的球差 ($\Delta 0.32 \pm 0.15$ vs. $0.15 \pm 0.13 \mu\text{m}$, $P < 0.001$) 和总高阶像差 ($\Delta 0.69 \pm 0.35$ vs. $0.51 \pm 0.25 \mu\text{m}$, $P < 0.01$) 增幅显著更大。FS-LASIK 术眼呈现更显著的中央区平坦化 (顶点区域: $P < 0.01$; 2-4 毫米区域: $P < 0.001$), 而 SMILE 术眼则引起更明显的周边形态改变 (6-7 毫米区域: $P < 0.05-0.001$)。两种术式的彗差均与偏心量和功能光学区 (functional optical zone, FOZ) 具有相关性 ($R^2 = 0.45$, $P < 0.001$)。SMILE 术眼的球差主要与最大周边相对角膜屈光力 (maximal peripheral relative corneal power, MPRCP) 相关 ($R^2 = 0.52$, $P < 0.001$), 而 FS-LASIK 术眼的球差则同时与 MPRCP 和 FOZ 存在关联 ($R^2 = 0.58$, $P < 0.001$)。

结论: SMILE 与 FS-LASIK 手术矫正高度近视术后引起的角膜形态改变有所不同, 因此术后角膜像差有明显的差异, FS-LASIK 所引起的球差及总高阶像差改变更大。

斜视与小儿眼科

摘要编号: 208099

面板编号: POS-1153

中国 218 例威廉姆斯综合征儿童的眼部特征研究

第一作者: Jiayan FANG

共同作者: Wen SUN, Lu YUAN

目的: 威廉姆斯综合征 (WS) 是一种由 7q11.23 区域微缺失导致的多系统神经发育障碍。本研究旨在评估中国威廉姆斯综合征患儿的眼部临床表现。

方法: 本研究回顾性纳入了经基因确诊的威廉姆斯综合征 (WS) 患儿, 并通过分析其临床数据来获取视力、屈光度数、光学生物测量参数、斜视发生率、鼻泪管阻塞发生率、睑内翻及倒睫发生率等。

结果: 本研究共纳入 218 例威廉姆斯综合征患者 (男性 134 例; 女性 84 例), 中位年龄为 4.15 岁 (四分位距 3.61 岁)。屈光分析显示, 70.18% (153/218) 的患者存在具有临床意义的屈光不正, 其中近视占 28.44% (62/218), 远视占 5.50% (12/218), 散光占 62.39% (136/218); 7.34% (16/218) 的患者存在屈光参差 (≥ 1.00 D)。眼部生物测量数据 (154 例患者, 308 只眼) 显示平均眼轴长度为 21.67 ± 0.90 毫米, 平均角膜曲率为 44.07 ± 1.66 D。斜视患病率为 7.34% (16/218), 主要为内斜视 (11/218, 5.05%)。外眼检查发现: 46.79% (102/218) 为双侧先天性鼻泪管阻塞, 25.23% (55/218) 存在睑内翻, 20.64% (45/218) 患有过敏性结膜炎, 0.92% (2/218) 存在上睑下垂。

结论: 威廉姆斯综合征 (WS) 是一种复杂的多系统遗传性疾病, 其眼部表现具有多样性。本研究发现, WS 患者屈光不正发生率较高, 且以散光为主。我们观察到其眼轴长度较同龄人群偏短。在斜视类型中, 内斜视为主要表现形式。鼻泪管阻塞、睑内翻等外眼疾病也较为常见, 这可能与 7q11.23 缺失造成的弹性蛋白缺失有关。这些眼部临床表现值得在中国 WS 患者中引起早期临床关注。

摘要编号: 209146

面板编号: POS-1155

中青年内斜视患者术后复发的临床特征分析及探讨

第一作者: Jing HE

共同作者: Jing CHEN, Zongyue LV, Weiwei ZHOU

目的: 探讨和分析中青年内斜视患者术后内斜视复发的临床特征。

方法：回顾性病例研究分析。收集 2020 年 9 月至 2025 年 8 月在深圳市眼科医院因内斜视术后复发进行二次手术治疗的 25 例患者，排除残余性内斜视、知觉性内斜视、外斜术后过矫的内斜视以及非共同性内斜视，对患者的年龄、复发时长、双眼屈光状态、眼位、看远和看近的斜视度以及双眼视功能进行分析和讨论。

结果：25 例患者年龄范围为：15 ~ 46 岁（平均为 29.96 ± 8.68 岁），距离上次手术到复发时长：1 ~ 23 年（平均为 6.45 年），屈光状态：等效球镜双眼为远视 5 人，一眼为远视一眼为近视 3 人，双眼近视 17 人，25 例患者中屈光参差共 8 人，所有患者最佳矫正视力均 ≥ 0.9 。术前眼位（角膜映光法）为 $+10^\circ \sim +35^\circ$ ，视野弧检查斜视度看近看远相差 $> 6^\circ$ (> 10 PD) 比例：右眼注视为 76%，左眼注视为：68%。存在 II 级融合视 / 及 III 级立体视共 7 人，占比 28%。在除双眼远视以外的 20 例患者中，看远斜视度大于看近 ≥ 10 PD 的比例为 40%。

结论：中青年内斜复发的患者多发生在近视患者，且其复发时看远内斜度数大于看近内斜度数居多，其临床表现与 Bielschowsky 型共同性内斜视类似，推测存在同样的发病机制，即存在过度使用调节（调节痉挛）以及相应的集合增多。对于内斜视再次复发的患者，建议门诊就诊时可先进行调节集合功能检测和评估，特别是早期复发患者，有助于此类患者治疗方案的确立和优化。

摘要编号：**210371**

面板编号：**POS-1158**

全身麻醉对微循环系统的影响

第一作者：**Qingkai MA**

共同作者：**Lixia FENG**

目的：利用光学相干断层血管成像技术探索全身麻醉对微循环系统的影响。

方法：使用 RTVue XR Avanti 获取在全麻下行单眼斜视手术患儿的未手术眼的术前和术后第一天的黄斑血管图像，利用配对 t 检验分析前后差别，利用 Person 相关性分析比较不同参数对变化值的影响。

结果：本研究中共纳入单眼斜视手术患者对照组 19 人 19 只眼。受试者平均年龄为 10.05 ± 1.27 岁。研究发现，全麻手术后，未手术眼的颞侧和鼻侧的浅层黄斑区血管密度显著下降（术前： 46.99 ± 3.53 ，术后 42.46 ± 4.83 ， $P = 0.019$ ）。以上变化数值与全麻持续时间具有显著相关性（ $r = 0.62$ ， $P = 0.012$ ）。

结论：全身麻醉可造成儿童术后微循环容量减少；控制手术时间能减少全身麻醉对微循环的影响。

摘要编号：**208908**

面板编号：**POS-1154**

单眼弱视治疗有效性：一项系统评价和网状 Meta 分析

第一作者：**Jia-hao TAN**

目的：弱视作为一种严重影响视力的疾病，存在多种临床干预措施，然而这些干预措施之间的疗效差异尚未明确。因此，本系统综述及网络 Meta 分析旨在确定各种干预措施的疗效排序。

方法：系统检索收录在 PubMed、Embase、Web of Science 和 Cochrane Library 四大电子数据库中的相关文献。研究对象为无残余性弱视的弱视患者。干预措施包括单光眼镜、每日遮盖弱视眼 2 小时、6 小时或全天遮盖、每日一次或每周两次使用 1% 阿托品滴眼液、光学压抑、压抑膜、全天遮盖联合电子游戏以及 6 小时遮盖联合阿托品治疗等共 18 种干预措施。主要结局指标为弱视眼最佳矫正视力的改善。仅纳入随机对照试验（RCT）。两名研究人员独立提取资料，并使用 Cochrane 偏倚风险评估工具独立评估原始研究的质量。Meta 分析采用多元随机效应模型，在频率学框架内进行拟合计算。

结果：在 1482 篇筛选的文章中，共有 22 篇被纳入网状 Meta 分析。与单光眼镜相比，全天遮盖联合电子游戏治疗方案（MD = 0.27；95% CI [0.06, 0.48]）和遮盖 6 小时联合阿托品治疗方案（MD = 0.25；95% CI [0.06, 0.45]）显示出显著的疗效优势。其他干预措施与单光眼镜相比未发现统计学差异。

结论：全天遮盖联合电子游戏治疗方案以及每日遮盖 6 小时联合阿托品治疗方案显示出显著的疗效，可为临床弱视治疗提供有价值的参考依据。单光眼镜、每日遮盖 2 小时、6 小时或全天遮盖、每日一次或每周两次使用 1% 阿托品滴眼液、压抑膜等都对视力有改善，但这些干预措施之间不存在统计学差异。

摘要编号: 204001

面板编号: POS-1150

多次视知觉微训练改善儿童弱视神经微可塑性的临床观察

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共同作者: Gan LU, Li ZHICHAO, Zhao WUXIAO

目的: 探讨多次视知觉微训练对屈光不正性弱视儿童神经微可塑性的影响, 评估其在提升矫正视力、改善双眼视功能及缓解抑制状态方面的临床效果。

方法: 采用自身对照设计, 纳入 2024 年 7 月至 2025 年 3 月在广西壮族自治区人民医院视光中心就诊的 35 例屈光不正性弱视儿童, 平均年龄 (6.80 ± 3.24) 岁。所有患儿在戴镜基础上接受“双眼视知觉神经可塑性训练系统”干预, 每周 5 次, 每次 40 分钟, 连续 4 周共 20 次。分别在训练前 (T0)、训练 5 次 (T1)、10 次 (T2) 及训练结束后 4 周 (T3) 评估矫正视力 (logMAR)、双眼抑制状态、立体视锐度、知觉眼位等指标。

结果: 训练 10 次后, 右眼矫正视力由 0.72 ± 0.04 提升至 0.88 ± 0.04 , 左眼由 0.70 ± 0.06 提升至 0.90 ± 0.05 , 差异均有统计学意义 ($P < 0.001$)。双眼中心凹抑制比例由 51.43% 降至 14.29%, 无抑制比例由 34.29% 升至 57.14% ($P = 0.025$)。精细立体视 (0.8 m 和 1.5 m) 显著改善, 3-4 级比例分别由 48.57%、22.86% 升至 82.86%、71.43% ($P < 0.01$)。训练效果在随访期保持稳定。

结论: 多次视知觉微训练可显著提升弱视儿童矫正视力, 改善双眼视功能并缓解抑制状态, 疗效具有累积效应, 提示其在弱视治疗中具有良好应用前景。

摘要编号: 208057

面板编号: POS-1152

小 BC 角膜塑形镜在近视防控中的应用及临床观察

第一作者: 萍董

目的: 探讨小 BC (基弧) 角膜塑形镜在近视防控中的临床应用效果及安全性。

方法: 选取 2024 年 1 月至 2025 年 1 月在我院接受小 BC 角膜塑形镜治疗的 80 例近视患者 (160 眼), 对其治疗前后的屈光度、眼轴长度、角膜地形图参数等进行观察和分析, 并记录佩戴过程中的不良反应。

结果: 经过 12 个月的随访, 患者平均等效球镜度从 $-3.50 \text{ D} \pm 1.20 \text{ D}$ 降低至 $-0.50 \text{ D} \pm 0.30 \text{ D}$, 眼轴增长速度显著减缓, 年增长量从 $0.30 \text{ mm} \pm 0.10 \text{ mm}$ 降低至 $0.10 \text{ mm} \pm 0.05 \text{ mm}$ ($P < 0.05$)。

角膜地形图显示, 小 BC 设计成功形成了更小的中央治疗区和更大的周边离焦量, 且未出现严重角膜并发症。

结论: 小 BC 角膜塑形镜在近视防控中具有良好的疗效和安全性, 能够有效减缓近视进展和眼轴增长, 是近视防控的有效手段之一。

摘要编号: 209887

面板编号: POS-1156

探讨 A 型肉毒毒素注射治疗急性共同性内斜视的远期疗效及相关因素思考

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目的: 探讨首次注射 A 型肉毒杆菌毒素 (BTXA) 治疗 (AACE) 的远期疗效, 分析影响疗效的相关因素。

方法: 研究对象: 2020 年 1 月 1 日至 2022 年 10 月 31 日住院, 采用 BTXA 注射治疗的 AACE 患者共 62 例。其中男性 43 例, 女性 19 例; 年龄平均年龄为 10.0 ± 6.4 岁 (范围 2-36 岁), 发病平均时间为 9.4 ± 8.6 周 (范围, 0.5-34 周)。随访时间 6 个月-24 个月。所有患者均行头颅 MRI 或 CT 检查以排除神经系统疾病。观察注射前、注射后近期、远期的斜视度及双眼视功能变化; 分析影响预后的相关因素。

结果: 62 例患者, 33 例为 Burian-Franceschetti 型 (II 型), 29 例为 Bielschowsky 型 (III 型)。术前: 看近斜视度为 $41.13 \pm 17.04 \text{ PD}$, 看远斜视度为 $45.40 \pm 17.14 \text{ PD}$ 。正位率: 注射后 2 天 74.2% (46/62)、6 个月 91.9% (57/62)、1 年以后 80.7% (46/57)。复发的大部分患者有近距离过度用眼或感冒发烧史。注射 6 个月后, 有近立体视 ($\leq 400''$) 的患者由 11 例 (17.7%) 增加到 43 例 (69.4%)。分析注射后正位率与相关因素: 术前斜视度、病程、注射眼别、双眼视觉、发病年龄。

结论: 在双眼单视功能破坏前手术, 可以提高术后正位率; 斜病程超过 6 个月, 斜视度不稳定, 特别是有双眼视功能的患者, 通过注射 A 型肉毒杆菌毒素治疗多数患者仍然有效; 小度数斜视, 可采用单眼注射治疗; 近距离过度用眼, 可能是导致斜视复发的诱因。

摘要编号: 210212
面板编号: POS-1157

探讨过敏性结膜炎相关性干眼患儿的睑板腺形态学特征

第一作者: Xiaojiao TANG
共同作者: Lin CHEN

目的: 探讨过敏性结膜炎 (allergic conjunctivitis, AC) 相关性干眼 (dry eye, DE) 患儿的睑板腺 (meibomian glands, MGs) 形态学特征。

方法: 招募季节性过敏性结膜炎 (seasonal allergic conjunctivitis, SAC) 和常年性过敏性结膜炎 (perennial allergic conjunctivitis, PAC) 患儿, 并纳入无过敏及干眼病史的同龄同性别儿童作为对照组。所有受试者均完成 5 项干眼问卷 (DEQ-5) 及眼部检查, 包括下泪河线高度 (TMH)、非侵入性泪膜破裂时间 (NIBUT) 和通过非接触式红外睑板腺成像 (Oculus Keratograph 5M), 基于干眼症评估与管理 (Dry Eye Assessment and Management, DREAM) 研究的 13 种 MG 形态学分级, 评估上、下睑 MGs 的形态学特征。通过受试者工作特征 (ROC) 曲线分析 MGs 形态学特征对 AC 相关 DE 的预测价值。

结果: 共纳入 62 例 AC 患儿 (其中 31 例伴有 DE, 31 例不伴 DE) 和 33 例健康儿童, 平均年龄为 7.67 岁 (5-13.5 岁)。与健康儿童相比, AC 伴 DE 患儿的上睑 MGs 形态学改变更为显著, 而 AC 不伴 DE 患儿与健康儿童之间 MGs 形态学无显著差异。ROC 曲线分析显示, 预测 DE 的 MGs 形态学特征包括缩短的上睑 MGs ($AUC = 0.72$, $P < 0.001$) 和钩状的上睑 MGs ($AUC = 0.71$, $P < 0.001$)。

结论: 本研究发现 DREAM 的 MG 形态分级系统在预测儿童 AC 相关性干眼症方面具有重要价值。儿科眼科医生应重点关注 AC 患儿中缩短型上睑 MG 和钩状上睑 MG 的临床表现。

摘要编号: 207663
面板编号: POS-1151

牵牛花综合征视网膜下液动态观察

第一作者: Wenting WANG

目的: 牵牛花综合征 (Morning Glory Syndrome, MGS) 是一种罕见视盘发育异常, 常合并视网膜脱离, 其视网膜下液来源存在争议, 主要有脑脊液渗漏与玻璃体腔液体渗入等假说。本文通过报告两例在激光治疗中观察到视网膜下液动态

变化的特殊 MGS 患儿, 旨在探讨其视网膜下液的可能来源及病理生理机制。

方法: 回顾性分析两例女性 MGS 患儿的临床资料。病例 1 为 4 岁女童, 因“左眼外斜 2 年”就诊, 合并遗传性球形细胞增多症; 病例 2 为 8 岁女童, 因“右眼斜视 4 年”就诊, 合并先天性心脏病。两例均经眼底检查确诊为 MGS, 并接受盘周视网膜激光光凝术以预防或治疗视网膜脱离。术中及术后密切观察视网膜下液变化情况。

结果: 病例 1 在激光术中意外出现下方视网膜大量视网膜下液, 但术后第 4 天复查时液体完全吸收, 视网膜复位, 后续于坐位下完成补充激光。病例 2 首次激光术后一个月复查见视网膜下液范围增大, 再次激光时术中液体显著增多, 而术后第 1 天复查显示液体已完全吸收。两例均观察到“术中视网膜下液增多、术后迅速自发吸收”的动态过程。

结论: 两例 MGS 患儿在激光治疗期间均表现出视网膜下液一过性增多并快速吸收的独特现象, 难以用传统孔源性或渗出性机制完全解释。推测可能与术中体位改变、激光能量刺激等因素导致视盘缺损处与蛛网膜下腔的潜在通道暂时开放, 脑脊液渗入视网膜下腔, 术后因通道关闭而迅速吸收有关。本观察结果为“MGS 视网膜下液来源于脑脊液”的假说提供了有力的临床支持。

白内障

摘要编号: 202578
面板编号: CAT-1164

2024 年苏州白内障筛查结果分析

第一作者: Yanfeng ZENG

目的: 随着全球老龄化加剧, 白内障等致盲性眼病负担持续增长。本研究旨在探讨人工智能 (AI) 技术在优化眼科疾病的早期诊断、治疗决策及预后预测流程中的应用效果, 重点解决筛查效率不足、医疗资源分配不均等核心问题。依托区域大规模筛查数据, 发挥 AI 在提升诊疗精准性与可及性中的价值。

方法: 苏州理想眼科医院开展苏州各区域白内障筛查项目, 收集 2024 年一月至十二月苏州六个区域共 74887 人白内障筛查相关数据, 医院通过构建眼科 AI 技术体系, 整合不同设备采集的数据, 自动分析筛查患者信息, 建立电子健康档案, 并进行白内障风险预测。

结果: 在苏州 74887 人白内障筛查数据中, AI 分析显示, 白内障可手术人数达 5130, 占比 6.90%;

翼状胬肉人数共 1069，占比 1.43%；到院检查人数共 2703 人，占比 3.61%；其中 2703 例“到院检查”人群数据可纳入预测跟踪，有效降低失访率。

结论：眼科 AI 应用于眼病的筛查诊断，将有助于减少医疗系统对人工的依赖程度，使眼病相关筛查诊断更为快速便捷，从而提升医疗服务的效率及成本效益。区域实践证实 AI 可显著提升防盲效率，尤其适用于资源有限地区。构建人工智能筛查诊断系统可为建立白内障早期临床筛查及防治策略提供参考，推动 AI 向规模化防盲应用转化。

摘要编号：203474

面板编号：CAT-1172

Barrett Ture-K 与六种最新人工晶体屈光力计算公式对焦深延长型人工晶体预测准确性的比较

第一作者：Zhanchi HU

目的：比较 Barrett Ture-K 公式与其他六种最新人工晶体屈光力计算公式对焦深延长型 (Extended depth-of-focus, EDOF) 人工晶体植入术后屈光度预测的准确性。

方法：回顾性研究。纳入 2023 年 1 月 -2024 年 7 月接受白内障摘除联合 EDOF 人工晶体 (ZXR00, ZFR00V) 植入术的患者。所有患者术前均使用 IOLMaster 700 进行眼部参数测量，并通过机器内置公式 (Barrett Universal II, Barrett Ture-K) 和公开的在线人工晶体计算公式 (EVO2.0, Kane, Hoffer QST, Pearl-DGS, Hill-RBF) 计算人工晶体屈光力并预测术后屈光度。术中植入的人工晶体屈光力参考 Barrett Ture-K 公式。术后 3 个月时随访比较 Barrett Ture-K 公式与其他七种人工晶体计算公式术后屈光度预测的平均绝对误差 (MAE) 和均方根误差 (RMSE)，以及七种公式的中位绝对误差 (AEmed)、最大绝对误差 (AEmax) 和绝对误差大小在 ± 0.25 D、 ± 0.50 D、 ± 1.00 D 和 ± 2.00 D 范围内的分布频率。

结果：共纳入研究对象 82 例 82 眼。矫正后预测误差标准差 Barrett Ture-K 最低 (0.035 D)，Hoffer QST 最高 (0.041 D)。Barrett Ture-K 的 MAE、AEmed、AEmax 均最低 (分别为 0.24 D、0.18 D 和 1.13 D)，Kane 的 MAE 和 AEmed 最高 (分别为 0.28 D 和 0.23 D)，Hoffer QST 的 AEmax 最高 (1.52 D)。绝对预测误差在 ± 0.25 D 以内百分比最高的是 Barrett Ture-K (62.2%)，最低的是 Kane (52.4%)， ± 0.50 D 百分比最高的是 EVO 2.0 (89.0%)，Hill-RBF、Hoffer-QST 和 Pearl-DGS 均最低 (86.6%)。总体而言，各人工晶体计算公式的绝对预测误差的差异无统计学意

义 ($P = 0.834$)，在 ± 0.25 D 和 ± 0.50 D 以内百分比的差异亦无统计学意义 ($P = 0.985$)。

结论：新一代的人工晶体度数计算公式预测 EDOF 人工晶体植入术后屈光度时均具有良好的准确性，其中，Barrett Ture-K 公式在预测的准确性、稳定性上可能更具有优势。

摘要编号：209188

面板编号：CAT-1179

ICL 矫正儿童高度近视散光 2 年效果观察 1 例

第一作者：Laiqiang QU

共同作者：Hong YAN

目的：有晶体眼散光矫正型人工晶体 (Toric Implantable Collamer Lens, TICL) 植入术治疗儿童超高度近视合并高度散光随访 2 年报告。

方法：报道 1 例 9 岁男性患儿，双眼病理性近视 (右眼等效球镜 -12.00 D，左眼 -12.25 D) 合并角膜散光 ≥ -5.50 D。经多学科评估排除禁忌后，行双眼 TICL V4c (Starr EVO) 植入术。术后随访 2 年，监测裸眼视力 (UCVA)、最佳矫正视力 (BCVA)、眼压、拱高及轴位旋转角度。

结果：术后 2 年：UCVA 从术前的 20/80 提升至 20/25，BCVA 从 20/40 提升至 20/25，残余散光 ≤ -1.00 D，拱高稳定 ($548 \pm 50 \mu\text{m}$)，TICL 轴位旋转 $\leq 10^\circ$ ，术后 1 周右眼拱高 $685 \mu\text{m}$ ，左眼拱高 $534 \mu\text{m}$ ；术后 2 周右眼拱高 $603 \mu\text{m}$ ，左眼拱高 $493 \mu\text{m}$ ；术后 1 年右眼拱高 $561 \mu\text{m}$ ，左眼拱高 $510 \mu\text{m}$ ；术后 2 年右眼拱高 $508 \mu\text{m}$ ，左眼拱高 $356 \mu\text{m}$ ；术后 2 年双眼角膜内皮计数轻度下降处于正常范围之内。

结论：本病例 2 年的随访结果表明，TICL 植入术后双眼拱高呈现下降趋势但仍然保持在安全范围之内，角膜内皮年损失率低于生理阈值，TICL 植入术对于经过严格筛选的儿童超高度屈光不正患者，能够提供卓越且持久的屈光矫正效果，显著提升裸眼视力。该手术在长期观察中展现出良好的稳定性和安全性，未引起晶状体混浊等严重并发症，并可能为控制病理性近视进展带来积极益处。本研究为 TICL 在低龄儿童这一特殊群体中的临床应用提供了有力的远期效果证据。

摘要编号: 209702

面板编号: CAT-1181

OPD 在检测散光型人工晶状体植入术后轴向偏差的临床应用

第一作者: Shanna CHEN

目的: 探讨 OPD 在检测和判断散光型人工晶状体植入术后轴向偏差的意义。

方法: 对植入散光型人工晶状体 (IOL) 患者 29 例 (男 8 例, 女 21 例) 46 眼 (右 27 眼, 左 19 眼), 年龄 (47.14 ± 21.66) 岁, 最后一次随访时间为 (6.62 ± 21.47) 月。术后采用光程差分析仪 (OPD Scan III) 检查, 分析 OPD 眼内散光轴向与术中理论轴向的差别, 判断术后 IOL 轴向偏差的角度。

结果: 25 眼因白内障行白内障超声乳化联合散光型 IOL 植入术 (蔡司 709M 4 眼、蔡司 909M 8 眼、爱尔康 TORIC 4 眼、ART 4 眼、POT 5 眼), 21 眼因高度近视植入有晶状体眼人工晶体 (TICL)。OPD 眼内散光轴向与术中理论轴向的差别 $\leq 5^\circ$ 23 眼 (占 50.00%)、 $\leq 10^\circ$ 10 眼 (占 21.74%)、 $\leq 15^\circ$ 10 眼 (21.74%)、 $\leq 25^\circ$ 2 眼 (4.35%)、 $> 30^\circ$ 1 眼 (2.17%)。偏差 $> 30^\circ$ 1 眼为 TICL 术后, 因其严重影响视力, 给予更换 TICL 尺寸。

结论: 应关注散光型人工晶状体植术后轴向的偏差问题, 可能是术中放置有偏差或术后旋转造成, OPD 是一种客观、快捷、准确的检查方法。

摘要编号: 210274

面板编号: CAT-1186

OTUB1 去泛素化修饰 Ku80 来参与调控年龄相关性白内障的内质网相关膜的形成研究

第一作者: Xu LINHUI

共同作者: Li PENGFEI, Guan HUANJIN, Ji MIN

目的: 探讨线粒体内质网相关膜 (MAMs) 在年龄相关性白内障 (ARC) 发病过程中的潜在作用, 并进一步 X- 射线修复交叉互补蛋白 5 (XRCC5/Ku80) 对 MAMs 结构与功能调控的具体机制以及去泛素化修饰对 Ku80 蛋白表达的调控机理。

方法: 以临床 ARC 患者、小鼠、人晶状体上皮细胞株 SRA01/04 以及 SD 大鼠晶状体为研究对象。采用透射电镜技术观察 MAMs 形态改变; 通过蛋白质免疫印迹 (WB) 检测 MAMs 相关蛋白的表达水平, 邻位连接技术 (PLA) 检测 MAMs 蛋白如 IP3R-GRP75-VDAC1、PTPIP5-VAPB 等之间的相互作用。利用 CRISPR-Cas 基因编辑系统成功建立了 Ku80 敲除的 SRA01/04 细胞系 (Ku80 KO 细胞)。Ca²⁺ 动态成像实验评估 Ku80 KO 细胞中 Ca²⁺ 变化。免疫沉淀 (IP) 与 PLA 检测 Ku80 与

MA 相互 MAM 蛋白作用。质谱法筛选 Ku80 的去泛素化酶。通过计算机虚拟筛选法确定淫羊藿苷为靶向 OTUB1 的激动剂。取 SD 大鼠透明晶状体观察晶状体混浊程度的变化。利用裂隙灯眼前节照相以及光学相干断层成像 (OCT) 技术评估 CFW-Em/J 小鼠晶状体混浊程度。

结果: 透射电镜结果显示, ARC 患者 LECs 中 MAMs 形成增多; 在 ARC 患者、CFW-Em/J 小鼠以及 SRA01/04 氧化损伤模型中, MAMs 相关蛋白包括 Mfn2、GRP75、PTPIP51 等表达显著升高。在 Ku80 KO 细胞中 MAMs 相关蛋白包括 Mfn2、GRP75、PTPIP51 等表达显著升高 ($P < 0.05$)。ARC 患者晶状体前囊膜中钙离子的平均浓度为 $0.21 \pm 0.04 \mu\text{g/mL}$ 。IP 结果提示 Ku80 与 GRP75 存在相互作用, 且通过 GRP75 负调控 MAMs 复合物 IP3R-GRP75-VDAC1 的形成。质谱结果显示, OTUB1 与 Ku80 存在相互作用, 且 Ku80 的泛素化水平在过表达 OTUB1 后显著降低。CHX 实验发现过表达 OTUB1 减缓了 Ku80 蛋白的降解速率 ($P < 0.05$), 且 IP 结果显示 OTUB1 靶向去除 Ku80 的 K27-linked 泛素链, 且抑制其自噬降解。同时激光共聚焦拍摄结果显示, 在正常 SRA01/04 细胞中, 过表达 OTUB1 不会影响细胞内 Ca²⁺ 的变化, 而会抑制 Ca²⁺ 向线粒体的传递, 在 Ku80 KO 细胞中过表达 OTUB1 则对 Ca²⁺ 的传递没有影响。虚拟筛选技术确定小分子药物淫羊藿苷与 OTUB1 存在潜在的相互作用。CHX 实验发现淫羊藿苷处理减缓了 Ku80 蛋白降解。晶状体体外培养结果显示, 在培养基中添加 H₂O₂ 后会诱导晶状体混浊, 加入淫羊藿苷后晶状体混浊被有效减轻。同时, 眼前节照相和 OCT 检查发现, 前房注射 H₂O₂ 后小鼠晶状体出现混浊, 同时注射 H₂O₂ 和淫羊藿苷能有效阻止小鼠晶状体混浊。

结论: Ku80 缺失可促进 IP3R-GRP75-VDAC1 复合物的形成, 破坏 LECs 中 MAMs 介导的 Ca²⁺ 稳态调控, 这可能是 ARC 潜在的发病机制。OTUB1 通过去泛素化作用稳定 Ku80 的表达, 淫羊藿苷作为 OTUB1 的新型小分子激活剂, 通过保护 OTUB1-Ku80 轴的功能延缓 ARC 进展。

摘要编号: 209187

面板编号: CAT-1178

SCG5 过表达通过激活 ERK 信号通路促进晶状体上皮细胞的增殖

第一作者: Su XU

共同作者: Fengyan ZHANG

目的: 早发性白内障 (presenile cataract, PC) 是一种常见的致盲性眼病, 其发病机制尚未完全

阐明。晶状体上皮细胞 (lens epithelial cells, LECs) 的异常增殖和迁移被认为在白内障的发生发展中发挥重要作用。然而, 调控这些过程的关键分子仍不清楚。

方法: 本研究通过转录组学分析鉴定早发性白内障与年龄相关性白内障间的差异表达基因, 并筛选出显著上调的 SCG5。随后采用 qPCR 和 Western blotting 验证 SCG5 的表达差异, 分析其对 ERK 信号通路激活的影响。通过质粒转染构建 SCG5 过表达模型, 利用 CCK-8 评估 SCG5 对 LECs 增殖的影响, 并检测 ERK 下游因子的变化。

结果: 转录组分析显示 SCG5 在早发性白内障中显著上调。过表达 SCG5 可激活 ERK 信号通路, 并显著促进 LECs 的增殖。抑制 ERK 信号后, 上述促增殖效应明显减弱。

结论: SCG5 通过激活 ERK 信号通路促进晶状体上皮细胞的增殖与迁移, 可能在早发性白内障的发生中发挥关键作用, 为揭示其分子机制及寻找新的治疗靶点提供了实验依据。

摘要编号: **210013**

面板编号: **CAT-1184**

Saracatinib 人工晶状体系统预防后发性白内障的作用研究

第一作者: **Xueli ZHENG**

共同作者: **Yongxiao DONG, Xiaoyong YUAN**

目的: 评估 SRC 激酶抑制剂 Saracatinib 在预防后发性白内障 (PCO) 中的疗效及作用机制。

方法: 采用 TGF β 2 诱导的晶状体上皮细胞 (LEC) 模型和损伤诱导的前囊下白内障 (ASC) 小鼠模型验证药物疗效。通过超声喷雾技术制备聚乳酸-乙醇酸共聚物 (PLGA) 缓释人工晶状体, 实现 Saracatinib 持续释放。裂隙灯检查及伊红染色用于评价晶状体囊膜纤维化程度; CCK-8 法用于检测药物的细胞毒性及抗增殖作用; 伤口愈合实验和 Transwell 实验评估细胞迁移能力; qRT-PCR、免疫印迹和免疫荧光用于分析其抗上皮间质转化 (EMT) 及抗纤维化作用。在兔白内障手术模型中, Saracatinib 缓释 IOL 用于评价其预防 PCO、抗炎效果及生物相容性。

结果: Saracatinib 可抑制 LEC 增殖、迁移、EMT 及纤维化标志物表达, 并在体内减轻前囊下混浊。其作用机制涉及 TGF β /Smad 和 PI3K/Akt 信号通路的抑制。PLGA-Saracatinib IOL 显示出持续的抗 PCO 效果及良好的生物相容性。

结论: Saracatinib 有效抑制晶状体上皮细胞介导的纤维化及后发性白内障。基于 PLGA 的缓释

Saracatinib 人工晶状体为 PCO 预防提供了有前景的策略。

摘要编号: **202926**

面板编号: **CAT-1170**

ZXR00 双眼植入和 ZXR00 + ZMB00 混合植入患者的视功能和视觉质量比较

第一作者: **Jiayan FANG**

共同作者: **Jing JIN**

目的: 比较双眼植入 ZXR00 和 ZXR00 + ZMB00 植入两种方案的术后的视力及视觉质量。

方法: 本研究为横断面研究, 收集 2020 年 9 月至 2022 年 9 月在温州医科大学附属眼视光医院行超声乳化白内障吸除并人工晶状体植入术术后 3 个月以上的白内障患者, 根据植入的人工晶状体类型分为两组, ZXR00 双眼植入组和 ZXR00 + ZMB00 组。记录两组患者的验光度数, 双眼及单眼的远 (5 m)、中 (66 cm)、近 (40 cm) 视力, 以及离焦曲线、立体视、Glare&Halo 模拟器、摘镜率、患者满意度、VF-14、QUVID 等数据并进行比较。数据采用 SPSS26.0 软件进行分析, $P < 0.05$ 被认为具有统计学意义。

结果: 本研究为横断面研究, 收集 2020 年 9 月至 2022 年 9 月在温州医科大学附属眼视光医院行超声乳化白内障吸除并人工晶状体植入术术后 3 个月以上的白内障患者, 根据植入的人工晶状体类型分为两组, ZXR00 双眼植入组和 ZXR00 + ZMB00 组。记录两组患者的验光度数, 双眼及单眼的远 (5 m)、中 (66 cm)、近 (40 cm) 视力, 以及离焦曲线、立体视、Glare&Halo 模拟器、摘镜率、患者满意度、VF-14、QUVID 等数据并进行比较。数据采用 SPSS 26.0 软件进行分析, $P < 0.05$ 被认为具有统计学意义。研究共纳入患者 47 例进行统计分析, 其中 ZXR00 双眼植入组 26 例, ZXR00 + ZMB00 组 21 例。两组术后双眼远距离最佳矫正状态下的近距离视力存在显著差异。离焦曲线结果示在 -2.5 ~ -4.0 D, ZXR00 + ZMB00 组的双眼最佳矫正状态下的视力都要显著优于 ZXR00 双眼植入组, 而在 -0.5 D 和 -1.5 D 时, 则不如 ZXR00 双眼植入组。两组之间远中近距离摘镜率, 满意度, 光干扰现象, 视力相关生活质量及不良视觉质量结果均无显著差异。立体视结果显示近距离立体视在两组间存在显著差异。而远距离立体视和中距离立体视在两组间均无显著差异。

结论: 混合植入 ZXR00 和 ZMB00 可以显著提高术后的近视力, 并且保持高水平的视觉质量, 但会造成近立体视的下降。

摘要编号: 200925

面板编号: CAT-1160

一例多焦点人工晶体置入术后双眼瞳孔无张力

第一作者: Hongri WU

目的: 介绍并分析白内障术后罕见并发症, 探讨该并发症的处理与预后。**方法:** 对我院一例双眼白内障术后 2 周双眼同时发生瞳孔无张力, 瞳孔散大的患者进行回顾、分析和处理。患者 54 岁, 女性, 无特殊病史, 术前除确诊白内障外, 查体无其它特殊异常, 双眼先后行白内障手术治疗(间隔 1 天), 双眼均置入双焦点人工晶体(眼力健 ZLB00), 术后 1 周双眼视力均为 0.8, 瞳孔正常, 术后 2 周无诱因双眼同时出现瞳孔无张力散瞳, 大约 5.5 mm, 对光反射消失。排除误用散瞳药物及颅脑问题后, 予患者全身用激素、扩血管药物, 及局部缩瞳药无效, 后前房内注射卡巴胆碱缩瞳有效, 连续注射两次后(1 次/日), 局部点眼缩瞳药可维持瞳孔大约 3.0 mm, 患者局部用药 1 年维持瞳孔后瞳孔恢复正常(大约 2.5 mm, 对光反射灵敏)。**结果:** 通过前房注射卡巴胆碱本例患者术后瞳孔无张力得以恢复, 恢复后双眼视力稳定于 0.8。**结论:** 白内障术后瞳孔无张力为白内障术后罕见并发症, 较少的文献提示原因有麻醉、机械损伤、眼底压力、人工晶体、眼内用药、全身因素等, 有文献提示和虹膜缺血有关, 但无确切证据。目前尚无文献报道多焦点人工晶体置入术后并发该并发症, 且目前文献无该并发症发生后瞳孔能恢复的报道, 也没有前房内注射卡巴胆碱的报道。该病例的处理有效, 提示该并发症的病理值得进一步探讨, 也提示该并发症并非完全无法有效处理。

摘要编号: 209165

面板编号: CAT-1187

前节 OCT 在鉴别人工晶状体混浊与后囊混浊中的应用

第一作者: Chang DAI

共同作者: Zhe DONG

目的: 强调区分人工晶状体(IOL)混浊与后囊混浊(PCO)的重要性, 并展示前节光学相干断层扫描(AS-OCT)在临床决策中的应用价值。**方法:** 一名 72 岁糖尿病女性患者, 右眼白内障术后 5 年出现进行性视力下降, 病程约 1 年。对其进行了全面的眼科检查, 包括裂隙灯显微镜和 AS-OCT, 以评估人工晶状体和后囊情况。**结果:** 患者右眼植入疏水性 IOL, 左眼植入亲水性 IOL。裂隙灯和 AS-OCT 检查显示右眼 IOL 后半部呈均质性混浊, 并伴有后囊皱缩和增厚, 左眼未见异常。根据影像学表现, 建议行右眼 IOL 置换手术以恢复视力。**结论:** AS-OCT 是一种有助于区分 IOL 混浊与 PCO 的无创检查手段, 可指导临床制定合理的治疗策略, 避免不必要或潜在有害的操作。对于糖尿病患者, 术后定期随访对于早期发现和处理 IOL 相关并发症具有重要意义。

摘要编号: 202417

面板编号: CAT-1162

后囊膜连续环形撕囊术对高度近视白内障术后生物学参数及黄斑结构变化的影响

第一作者: Yue ZHANG

目的: 后囊膜连续环形撕囊术(PCCC)是一种可以降低白内障术后后囊混浊发生率的手术方法, 本研究旨在探究 PCCC 对高度近视白内障术后生物学参数及黄斑结构变化的影响。**方法:** 本研究为前瞻性病例研究。选取 2023-01 至 2025-01 于我院行超声乳化联合人工晶状体(IOL)植入术的高度近视白内障患者 100 例 100 眼, 分为 PCCC 组(50 例 50 眼, 行白内障超声乳化联合 PCCC 及 IOL 植入术)和传统白内障手术组(NPCCC 组, 50 例 50 眼, 行白内障超声乳化联合 IOL 植入术)。分别收集术前及术后 1 天、1 周、1 月、3 月最佳矫正视力(BCVA)、眼压(IOP)、眼轴长度(AL)、角膜厚度(CT)、前房深度(ACD), 并比较术前术后的变化; 使用光学相干断层扫描血管成像术(OCTA)测量测量两组患者的黄斑(6*6 mm)各区域视网膜厚度以及视网膜毛细血管血流密度的变化, 并比较两组之间是否存在差异。**结果:** PCCC 组患者术后 BCVA (0.38 ± 0.27) 较术前 (1.17 ± 0.30) 显著提高 ($P < 0.05$); ACD 术前为 (4.64 ± 0.46) mm, 术后为 (4.66 ± 0.46) mm, 增加了 0.014 mm ($P < 0.05$); 术前 AL 和 CT 分别为 (29.84 ± 2.57) mm 和 (0.539 ± 0.03) mm, 术后分别为 (29.84 ± 2.55) mm 和 (0.537 ± 0.03) mm, 手术前后差异均无统计学意义。黄斑区各区域视网膜毛细血管血流密度: PCCC 组术后 1 天、1 周、1 月较术前均减少, 3 月与术前相比无统计学差异; NPCCC 组术后 1 天、1 周较术前减少, 1 月和 3 月与术前相比无统计学意义。两组间比较, 术后 1 个月时 NPCCC 组视网膜毛细血管血流密度显著高于 PCCC 组 ($P < 0.05$), 其余时间节点两组比较无差异。黄斑各区域视网膜厚度: 两组患者在术后 1 天、1 周、1 月时与术前相比厚

度增加，且随时间增长呈递增趋势，术后 3 月趋于稳定，但仍高于术前水平，差异有统计学意义 ($P < 0.05$)。两组间各时间节点比较黄斑各区域视网膜厚度差异均无统计学意义 (P 均 > 0.05)。

结论：白内障联合 PCCC 手术可显著提高患者的视力及视觉质量，患者黄斑区各区域视网膜毛细血管血流密度及视网膜厚度在术后 3 个月时与传统超声乳化白内障手术患者相比无差异。本研究揭示对于高度近视白内障患者而言，PCCC 是安全的手术方式，在提高视力和视觉质量同时不会造成黄斑水肿和黄斑区结构变化。

摘要编号：208869

面板编号：CAT-1175

基于机器学习识别高度近视人工晶状体屈光预测误差的高风险生物测量参数组合

第一作者：Yurui PAN

共同作者：Wenwen HE, Jiaqi MENG, Jiao QI, Keke ZHANG, Xiangjia ZHU

目的：识别高度近视患者中导致人工晶状体 (IOL) 屈光预测误差的高风险生物测量参数组合。

方法：本研究纳入 23,667 例高度近视性白内障（眼轴长度 ≥ 26.0 mm）的参数数据。除常规参数外，还计算晶状体 - 前节比例 (LOR) 及角膜曲率 - 眼轴长度比例 (KAR)，并对所有参数进行标准化处理后，采用 k-means、kernel k-means 及 HDBSCAN 聚类算法进行分析。最终聚类模型依据算法稳定性及临床可解释性确定。随后，从另一包含 2,107 例具有可靠术后屈光数据的病例集中，自动提取与各聚类中心最接近的代表性病例，并在六种 IOL 计算公式 (Barrett Universal II、Cooke K6、EVO、Hoffer、Kane、Pearl-DGS) 下比较其术后屈光误差。

结果：识别出五个具有显著差异的参数簇 ($p < 0.001$)。其中，簇 3 (特征为显著升高的角膜散光) 具有最高的平均绝对误差 (MAE = 1.10 D)；簇 2 (前房最深、白到白最大、晶状体较薄) 次之 (MAE = 0.61 D)；聚类 4 (角膜较陡、眼轴较短) 屈光预测误差最低 (MAE = 0.39 D)。不同聚类间比较时，各公式间的误差差异无统计学意义 ($p = 0.334$)。

结论：高度近视眼可通过无监督聚类方法被客观划分为具有不同屈光预测特征的生物参数组合。基于聚类的表型分型为术前风险分层提供了一种新思路，并有望为人工智能驱动的 IOL 功率计算模型的进一步优化提供参考。

摘要编号：204610

面板编号：CAT-1173

基于根本原因分析的眼科日间手术患者跌倒事件分析与改进对策研究

第一作者：Xu DAN

目的：分析眼科日间手术患者跌倒事件的根本原因，探讨针对性干预措施，以提升患者安全管理水平，保障患者安全。

方法：采用根本原因分析法 (Root Cause Analysis, RCA)，对我院 2024 年 3 月至 8 月发生的 2 例眼科日间手术患者跌倒事件进行回顾性分析。系统梳理事件过程，深入访谈相关患者、家属及医护人员，查阅病历记录及管理制度，综合运用鱼骨图、5 Why 分析法等工具，逐层剖析导致跌倒的系统性与流程性根源因素。

结果：RCA 分析揭示跌倒事件的关键根本原因包括：1. 风险评估盲区：现有跌倒风险评估工具对眼科术后特异性风险（如视力变化、麻醉残留效应、散瞳后视物模糊、短暂性平衡障碍）识别不足，且评估时机（如术后离院前）存在疏漏。2. 宣教针对性不足：内容与形式未能有效覆盖术后跌倒风险及防范要点。3. 流程待优化：术后观察与离院评估流程存在缺陷。4. 环境与设施支持薄弱。基于分析结果，提出以下创新且强临床实用性的改进对策：1. 开发并应用眼科特异性跌倒风险评估工具。2. 构建多维度强化宣教模式（内容、形式、时机）。3. 实施标准化离院安全核查清单。4. 推进环境微改造与相关流程优化。5. 建立跌倒事件快速响应与经验学习机制。

结论：本研究运用 RCA 深入剖析了眼科日间手术患者跌倒事件的系统性根源，揭示了风险评估、宣教、流程及环境等方面的关键问题。所提出的针对性对策紧密结合眼科日间手术特点，聚焦于构建特异性评估工具、创新宣教模式、标准化流程及优化环境，具有显著的可操作性和临床推广价值，可有效降低患者跌倒风险，提升日间手术服务质量与安全。

摘要编号：209087

面板编号：CAT-1177

工作年龄白内障患者临床特征

第一作者：Su XU

共同作者：Fengyan ZHANG

目的：调查工作年龄白内障患者的临床特征。

方法：观察性研究。纳入 18-50 岁的白内障患者，引出有关全身疾病、特应性、日光暴露、药物摄入、

生活方式等详细病史。对单 / 双眼患病患者特征进行了分析和比较。

结果：共 623 例患者入组，其中单眼就诊 272 例，双眼就诊 351 例。患者的平均年龄为 40.73 ± 7.55 岁，女性 278 例 (44.62%)。高脂血症、玻璃体切除术后、准分子激光术后、小梁切除术后及葡萄膜炎是最常观察到的指标。与双眼白内障患者相比，单眼白内障患者术前视力相对较低 ($P < 0.001$)，发病时更年轻 ($P < 0.05$)，且玻璃体切除术后及葡萄膜炎发生率较高 ($P < 0.05$)。无论是单眼还是双眼早发白内障，后囊下白内障都是最为普遍的。

结论：在工作年龄白内障患者中发现高脂血症的高发生率，发病年龄早及术前低视力是单眼患者最显著的特征。

摘要编号：209901

房水检测辅助诊断毒性眼前节综合征一例

第一作者：Chunjie MAO

共同作者：Song CHEN

目的：报道一例通过房水检测辅助诊断白内障术后发生毒性眼前节综合征。

方法：患者左眼白内障术后 16 小时自觉视物模糊，检查发现视力 0.6，前房闪辉 +++，未见前房积脓。为明确诊断，立即取房水进行细胞因子及宏基因检查。

结果：房水检测报告，对送检样本进行 DNA 病原微生物检测，未检测到可疑致病病原体。流式细胞检测房水中细胞因子：VEGF $277.6 \uparrow$ pg/mL (0-40)；BFGF $6.4 \uparrow$ pg/mL (< 1)；IL-6 $28145.2 \uparrow$ pg/mL (1-50)；IL-10 $15.0 \uparrow$ pg/mL (0-5)；VCAM $4962.6 \uparrow$ pg/mL (200-1000)；IL-8 $4120.7 \uparrow$ pg/mL (0-20)。

结论：这个病例提示我们，TASS 是白内障术后罕见的并发症，及时诊断对预后有帮助。对于无法明确病因的白内障术后眼内炎早期进行房水检测，一方面可以检测是否存在致病病原体，避免误诊为感染性眼内炎而耽误治疗；另一方面可以检测炎症因子，特别是促炎因子含量远超过常规白内障术后炎症反应，这一现象或许可以用来辅助 TASS 的诊断。

摘要编号：209459

面板编号：CAT-1180

改良二期人工晶体悬吊术治疗无囊膜支撑无晶状体眼的临床疗效分析

第一作者：Du QIAN

目的：探讨一种改良的二期人工晶体悬吊术在治疗因外伤、手术并发症等原因导致晶状体囊膜支撑缺失的无晶状体眼患者中的安全性及临床疗效。

方法：回顾性分析 2020 年 1 月至 2024 年 12 月期间于我院接受改良二期人工晶体悬吊术的 25 例 (25 眼) 患者的临床资料。本改良术式的核心要点包括：1) 采用下方 5:00-7:00 无隧道聚丙烯缝线巩膜层间潜行缝合固定；2) 应用上方 10:00-2:00 之间放射状巩膜切开，约二分子一深度聚丙烯缝线“8”字缝合巩膜层间固定技术，将聚丙烯悬吊缝线固定于睫状沟水平，简化了缝线固定过程，提高了操作的精确性与可重复性；3) 使用一体式“镂空襻”后房型人工晶体，其襻部通过悬吊缝线固定，形成稳固的支撑结构。观察并记录患者术前及术后末次随访时的最佳矫正视力、术后屈光状态 (等效球镜)、手术相关并发症 (如人工晶体偏位、眼压升高、玻璃体出血、视网膜脱落等) 以及人工晶体的居中性与稳定性。

结果：所有患者手术均顺利完成。术后平均随访 12.3 ± 4.5 个月。末次随访时，患者最佳矫正视力较术前显著提高 ($P < 0.05$)，平均等效球镜为： -0.75 ± 0.50 D。所有植入的人工晶体位置居中、稳定，未发生严重的术中及术后并发症，如人工晶体脱落、眼内炎或威胁视力的视网膜脱落。主要并发症为暂时性眼压升高：2 例 (8%)，经药物控制后恢复正常；少量玻璃体出血 1 例 (4%) 于一周内自行吸收。

结论：本研究所采用的改良二期人工晶体悬吊术，通过优化切口设计、改进缝线固定技术，实现了操作简化、创伤减小及固定稳固的目标。该术式是治疗无囊膜支撑无晶状体眼的一种安全、有效且可靠的方法，能够有效恢复患者视功能，并具有良好的可预测性和较低的并发症发生率，值得在临床中推广应用。

摘要编号：202587

面板编号：CAT-1166

智慧医疗服务平台和青少年视力健康数据的建设研究

第一作者：Yanfeng ZENG

目的：通过智慧医疗服务平台的建设有效收集和管理青少年健康数据。

方法：基于苏州市青少年健康监测项目随机选取了30所中学，收集2023年1月至2023年12月接受视力检查的职高学生，“曙光”智能医疗服务平台的运用在医疗信息采集中可以获取的数据来源进行分类，通过人工智能信息技术，对大量复杂的信息进行妥善地处理，大大提高了传统医院的复杂流程，减轻了患者的负担，提高就诊效率和信息准确率。有效地提升医院的信息采集的效率。裸眼视力采用标准对数视力表测量，检查距离为5米。

结果：采集到接受视觉质量筛查的职高男生共1460例，女生1367例，性别差异无统计学意义（ $P > 0.05$ ）。结果显示男生右眼裸眼视力为 4.348 ± 0.233 ，左眼裸眼视力为 4.411 ± 0.291 ；女生右眼裸眼视力为 4.255 ± 0.228 ，左眼裸眼视力为 4.319 ± 0.297 ；男女生左、右眼裸眼视力相比差异均有统计学意义（ $P < 0.0001$ ），男生视力检查后选择配镜的占42%，女生视力检查后选择配镜的占56%。

结论：智慧医疗服务平台的建设能够根据采集的信息筛选出有近视倾向的青少年并分析当前需要采取的预防措施，这样就能够更好地实现对医疗资源的分配，提供针对性的医疗资源和信息服务，最大程度保障青少年的视力健康，此研究中，职高女生视力低于男生且戴镜率高于男生，可能是女生学习较男生更加刻苦。相对于传统方式，人工智能能够有效地弥补传统人工管理模式中所存在的不足，节约人力成本、减少矛盾，通过科技手段让更多青少年收益。

摘要编号：209773

面板编号：CAT-1182

白内障与阿兹海默病的相关性探索：基于东亚人群的孟德尔随机化研究

第一作者：Shulei MAN

目的：流行病学研究提示，白内障与阿兹海默病（Alzheimer's disease, AD）之间可能存在共同的病理生理基础，如氧化应激、线粒体功能障碍及蛋白质聚集。然而，两者间的因果关系尚未明确。传统观察性研究易受混杂因素及反向因果影响，难以揭示真实的因果方向。本研究旨在利用孟德尔随机化（Mendelian randomization, MR）方法，基于东亚人群的大规模全基因组关联研究（GWAS）数据，系统评估白内障与阿兹海默病之间的双向因果关系，为疾病的早期识别与防治提供新的遗传学证据。

方法：本研究采用双向两样本孟德尔随机化设计（bidirectional two-sample MR）。阿兹海默病 GWAS 数据（ $n = 323, 694$ ）来源于台湾精准医学

计划（Taiwan Precision Medicine Initiative, TPMI），白内障 GWAS 数据（ $n = 178, 726$ ）来源于日本生物银行（BioBank Japan, BBJ），涵盖东亚主要人群。主分析采用反向方差加权法（Inverse Variance Weighted, IVW），并使用 MR-Egger、加权中位数（Weighted Median）与 MR-PRESSO 等方法进行稳健性验证及多效性检验。若存在显著的异质性或水平多效性，进一步采用 MR-PRESSO 校正异常值。使用 R 软件中的“TwoSampleMR”和“MRPRESSO”等包进行数据分析。

结果：正向分析结果（白内障 $\rightarrow$ AD）显示，遗传预测的白内障风险与阿兹海默病风险之间未观察到显著的因果关系（IVW OR = 0.98, 95% CI: 0.78–1.25, $P = 0.89$ ）。MR-Egger、加权中位数及加权模式等多种稳健性分析方向一致（OR 范围 0.79–0.90），均未达到统计学显著性。异质性检验（Cochran's Q $P > 0.05$ ）与多效性检验（MR-Egger 截距 $P > 0.05$ ）均提示分析结果稳健，模型未受偏倚影响。Leave-one-out 敏感性分析亦显示无单一 SNP 主导整体效应。反向分析结果（AD $\rightarrow$ 白内障）显示，遗传预测的阿兹海默病风险与白内障风险呈轻度负相关（IVW OR = 0.97, 95% CI: 0.95–0.99, $P = 0.006$ ），加权中位数与 MR-Egger 结果方向一致且无显著异质性。提示阿兹海默病的遗传易感性可能与较低的白内障风险相关。

结论：基于东亚人群的大规模 GWAS 数据，本研究未发现白内障对阿兹海默病存在显著因果效应，而阿兹海默病的遗传易感性与白内障风险轻度负相关。支持“晶状体-脑轴（lens-brain axis）”可能存在复杂且非线性的遗传联系，并提示未来可通过整合多组学和多族群数据进一步解析二者间的交叉通路，为疾病的早期预测与干预策略提供遗传学依据。

摘要编号：200746

面板编号：CAT-1159

白内障患者双眼植入增效型连续视程人工晶状体术后早期的临床效果

第一作者：Yanxue XU

共同作者：Xiqiao ZHANG

目的：评估双眼白内障患者行白内障超声乳化联合增效型连续视程人工晶状体（intraocular lens, IOL）TECNIS Synergy™ 跃无级® 植入术后的早期临床效果。

方法：回顾性研究。收集2023年4月–2024年12月我院就诊白内障患者，双眼均行白内障超声乳化联合增效型连续视程 IOL TECNIS

SynergyTM 跃无级® 植入共 19 人 (38 眼), 术后随访至少 3 个月。分别收集术后 1 天及术后 3 月的裸眼远视力、中视力、近视力, 术后 3 个月的综合验光、离焦曲线, 并统计患者术后视觉质量问卷 (Catquest-9SF 问卷) 评分及术后看远、看近的脱镜率。

结果: 术后 1 天、3 月裸眼远视力及矫正远视力均较术前裸眼远视力及矫正远视力增加 ($P < 0.05$)。术后 3 月时, 97.6% 裸眼远视力达到或优于 0.1 logMAR, 100% 裸眼中视力达到 0.1 logMAR 及以上, 94.7% 裸眼近视力达到或优于 0.1 logMAR; 100% 术后 SE 在 ± 0.75 D 以内; 术离焦曲线在 0.0 D ~ 3.0 D 形成一个相对平缓的平台, $+1.0 \sim -3.5$ D 屈光范围内视力均优于 0.2 logMAR。术后视觉质量问卷调查时仅有个别患者主动反映用眼时间过长容易视疲劳, 100% 的患者日常活动均没有困难。100% 的患者看远看近均可完全脱镜。

结论: 双眼植入增效型连续视程人工晶状体能提供令人满意的远、中、近视力, 可以获得一个平缓的视力平台, 患者具有较好的视觉质量及较高的生活质量。

摘要编号: 209080

面板编号: CAT-1176

白内障手术后计划外再手术的发生率及原因分析

第一作者: Su XU

共同作者: Fengyan ZHANG

目的: 评估单纯白内障手术后计划外再次手术的发生率, 并探讨其原因。

方法: 回顾性研究。纳入在 2024 年 1 月至 2025 年 6 月期间, 在我院接受计划外再手术的患者。所有患者均为先前在任何医疗机构 (包括我院) 接受单纯白内障手术的病例。从病历系统收集并记录手术过程、人口统计学数据和合并症, 以分析术后早期 (术后 < 30 天) 和晚期 (术后 ≥ 30 天) 计划外再次手术的发生率和原因。

结果: 本研究共纳入 199 名患者, 平均年龄为 55.72 ± 16.03 岁。计划外再手术的总发生率为 6.3% (199/3180), 其中早期再手术的发生率为 1.1% (35/3180), 晚期再手术的发生率为 5.2% (164/3180)。最常见的再手术原因包括人工晶状体移位 ($n = 140$)、人工晶状体夹持 ($n = 15$) 及屈光参差 ($n = 15$)。除人工晶状体移位外, 在早期计划外再手术中, 晶状体皮质残留 ($n = 5$) 和角膜后弹力层脱离 ($n = 3$) 是最常见的原因; 而在晚期计划外再手术中, 人工晶状体夹持 ($n = 15$) 和屈光参差 ($n = 12$) 是主要原因。

结论: 单纯白内障手术后计划外再手术的主要原因是人工晶状体移位。

摘要编号: 209927

面板编号: CAT-1183

白内障术中悬韧带异常风险的初步预测模型的建立

第一作者: Dehai LIU

共同作者: Hong

目的: 悬韧带异常引起晶状体支持不足, 与晶状体脱位、后囊膜破裂等术中并发症风险增加有关。术前早期识别悬韧带异常对于预防术中不良事件至关重要。本研究旨在建立一个术中悬韧带异常的初步预测模型, 以改进术前风险评估及手术规划。

方法: 连续纳入接受白内障手术的患者。基于术中是否出现悬韧带松弛, 分为悬韧带异常组和对照组。收集术前一般资料 (年龄、性别、眼部及全身病史), 以及 IOLMaster 700 测得的眼部参数等 [眼轴长度 (axial length, AL)、前房深度 (aqueous depth, AQD) 及晶状体厚度等]。采用 LASSO 回归结合 10 折交叉验证选择 3 个关键预测变量, 构建简约预测模型。通过分层交叉验证进行内部验证, 并计算每变量事件数以评估模型稳定性。

结果: 共纳入接受白内障手术的 759 例 (759 眼) 患者。36 眼 (4.7%) 出现术中悬韧带松弛分入悬韧带组, 723 眼分入对照组。单因素分析显示, AQD、AL 及青光眼是与悬韧带松弛最密切相关的预测因素。悬韧带松弛眼的前房较浅 ($OR = 0.122$, 95% CI: 0.055–0.270, $P < 0.001$)、眼轴较短 ($OR = 0.668$, 95% CI: 0.502–0.889, $P = 0.006$), 且青光眼的发生率较高 ($OR = 8.72$, 95% CI: 4.14–18.38, $P < 0.001$)。LASSO 回归结合 10 折交叉验证筛选出 3 个最优预测变量。最终的多变量预测模型在交叉验证中获得较好的预测性能, 受试者工作特征曲线下面积 (AUC) 0.780 ± 0.159 , 灵敏度 80.1%, 特异度 78.3%。Hosmer-Lemeshow 检验显示模型拟合良好 ($P = 0.607$)。基于预测概率进行风险分层, 患者可分为低、中、高风险三组, 各组悬韧带松弛发生率差异显著。

结论: 基于术前参数建立的简约预测模型在术中悬韧带松弛风险评估中表现出较好的预测性能。前房较浅、眼轴较短及合并青光眼是悬韧带松弛的独立危险因素。该初步模型有望为术前风险分层及个体化手术策略提供参考。

摘要编号: 208276

面板编号: CAT-1174

简便悬吊术治疗人工晶状体囊袋复合体脱位综合征一例

第一作者: Li CAIYUN

共同作者: Zhang CHAOJUN

目的: 报道双眼人工晶状体囊袋复合体脱位综合征一例。

方法: 患者何 XX, 男, 65 岁, 因“双眼视物模糊 10 余天”就诊。既往高度近患者何 XX, 男, 65 岁, 因“双眼视物模糊 10 余天”就诊。既往高度近视, 10 余年前行双眼白内障手术。查体: 视力: 右眼: 0.3, 矫正无助; 左眼: 0.1, -3.25 DS/-1.25 DCX 155 → 0.2; 眼压: 右眼: 16 mmHg; 左眼: 20 mmHg。右眼囊袋及 IOL 复合体向颞下方完全移位, 左眼囊袋及 IOL 复合体向颞下方移位, 双眼前囊膜呈白色混浊机化, 玻璃体混浊, 眼底: 双眼可见视盘边界清, 色淡, C/D 约 0.4, 后极部视网膜平伏, 可见大片地图状萎缩灶, 黄斑区色素紊乱, 中心反光未见。入院诊断: (1) 双眼 IOL 囊袋复合体脱位综合征; (2) 双眼 IOL 眼; (3) 双眼高度近视。入院后先行左眼人工晶体悬吊 + 前部玻璃体切除术 (见手术视频)。

结果: 术后 1 周: 视力: 0.2, 眼压: 18 mmHg, IOL 位正; 术后 1 月: 视力: 0.3, 眼压: 19 mmHg, IOL 位正。

结论: 本病例因 CCS 导致晚期 IOL 囊袋内脱位, 此并发症的发生有多方面的因素, 如囊袋机化收缩, 高度近视, IOL 材质, 年龄, 人眼本身原因等。本例患者的治疗方法眼内扰动小, 借助针头穿线, 取材便捷, 适应症更广, 操作简化有效, 但其远期效果和缝线断裂风险还需进一步临床观察。

摘要编号: 203241

面板编号: CAT-1171

继发于既往眼部钝挫伤的后囊膜破裂伴色素沉积: 一例病例报告

第一作者: Ru ZHAO

目的: 报告一例在超声乳化手术中发现的单眼后囊膜异常致密色素沉着病变的特殊病例, 并探讨其潜在的形成机制。

方法: 对一名 50 岁女性患者进行全面的术前眼科评估 (包括房角镜检查), 以排除色素分散综合征 (PDS)。在超声乳化手术中, 对观察到的后囊膜中央色素病变进行仔细的剥离和观察, 对获取的病变组织进行组织病理学分析。

结果: 术中发现一个边界清晰的椭圆形囊膜缺损。组织病理学证实色素组织中存在被激活的肌成纤维细胞。术前评估未发现 PDS 证据。其形成机制被推断为: 既往钝挫伤导致 Wieger 韧带从后囊膜脱离, 引起局灶性囊膜撕裂; 同时, 创伤导致虹膜色素上皮 (IPE) 细胞脱落, 并随房水迁移、沉积于 Berger 潜在间隙。

结论: 该后囊膜色素病变源于外伤性囊膜缺损与 IPE 细胞迁移沉积的双重过程。肌成纤维细胞与色素组织的共存提示二者协同参与了对囊膜缺损的双相修复过程。此病例揭示了外伤作为一种容易被忽略的病因, 可能导致罕见且具有误导性的术中体征。

摘要编号: 201736

面板编号: CAT-1161

虹膜夹型二期人工晶体植入术的远期临床疗效

第一作者: Xin HU

目的: 分析虹膜夹型二期人工晶体植入术治疗外伤后晶体缺损的屈光结果及相关并发症, 总结该术式的远期临床疗效。

方法: 本研究回顾近 5 年浙江省某医院行虹膜夹型二期人工晶体植入术患者的临床资料, 收集患者的年龄、性别、眼别、眼压、受伤类型、术前裸眼视力、最佳矫正视力、IOL 度数以及预留屈光度。记录术后随访时间、随访时眼压、验光、IOL 位置、角膜内皮细胞密度 (CD) 以及相关并发症情况。使用前节 OCT 测量 IOL 至角膜内皮面最近的距离。对所有结果进行统计学分析。

结果: 根据纳入排除标准共纳入病历资料 8 例 8 眼, 平均年龄为 59.7 岁, 均为男性。其中 1 眼为眼球破裂伤, 其余为眼挫伤。术后最佳矫正视力 (LogMAR BCVA) 由 0.03 ± 0.02 提高至 0.35 ± 0.26 ($P < 0.05$), 术后 6 眼较术前 BCVA 提高, 1 眼与术前 BCVA 相同, 1 眼较术前 BCVA 下降。患者术前平均眼压 (13 ± 3 mmHg), 术后为 (15 ± 4 mmHg), 差异无统计学意义。术后总体屈光结果表现为轻度远视 ($+1.25 \pm 1.00$ D)。术后 2 眼 IOL 位置轻度偏移伴虹膜轻度震荡。IOL 平均距离角膜内皮长度约 $1123 \mu\text{m}$, 排除了年龄及内眼手术次数对 CD 的影响后, IOL 到角膜内皮距离对 CD 和 6A 改变无影响。术前术眼 CD 平均为 2538 ± 326 cells/mm²。术后 4 年术眼 CD (排除其中一眼行青光眼滤过手术) 平均为 1994 ± 221 cells/mm², 排除年龄影响后, 在年龄 < 66 岁患者中术前术后 CD 差异有统计学意义, 并发症情况: 1 眼在术后 1 年出现角膜炎, 1 眼术后 6 月出现虹膜睫状体炎, 经局部用药后好转, 1 眼术后 10 月出现

IOL 鼻下移位并行 IOL 复位术，并在复位术后 18 个月后出现角膜雾状水肿。

结论：1、虹膜夹持型二期人工晶体是矫正无晶体眼的一种有效的方式，短期和长期可以显著提高视力。2、虹膜夹持型人工晶体最重要的并发症是损伤角膜内皮，若确需行该术式，患者年龄 < 66 岁时内皮损伤较大，并需要定期随访，及时发现、处理相关并发症。3、术前检查 CD < 2216 cells/mm² 者建议谨慎选择该术式，虹膜夹持型 IOL 对眼球破裂伤 CD 影响比眼挫伤更大。

摘要编号：202647

面板编号：CAT-1169

飞秒激光治疗 ICL 植入术后并发性白内障临床探讨

第一作者：Yan GAO

目的：探讨飞秒激光辅助超声乳化白内障吸除术治疗 ICL 植入术后并发性白内障的手术技巧、手术安全性和治疗效果。

方法：分析 2020 年至 2024 年在我院应用飞秒激光辅助超声乳化白内障吸除术治疗 ICL 植入术后并发性白内障患者 5 例 9 眼（其中 1 例因外伤至 ICL 移位至前房）。其中男性 5 眼，女性 4 眼。患者年龄：39.57 ± 7.57，ICL 植入时间：9.87 ± 2.36 年。平均裸眼视力（UDVA）：0.22 ± 0.12，平均最佳矫正视力（BCVA）：0.44 ± 0.19，眼轴：31.2 ± 1.49 mm，前房深度：3.06 ± 0.196 mm，拱高：274.67 ± 76.44 mm，人工晶状体度数：3.34 ± 4.01 D。人工晶状体类型：单焦点 4 例，单焦散光 2 例，三焦点 3 例。观察手术技巧，手术并发症及术后 3 月裸眼视力和最佳矫正视力。

结果：飞秒激光操作时注意：需要手动标记识别前囊膜位置；调整瞳孔直径大小；激光发射时 ICL 与前囊之间会产生气泡，需要先放出气泡并在二者之间注入粘弹剂后再进行 ICL 取出。术中并发症：前囊撕裂 2 例：因飞秒激光撕囊不连续（1 例外伤 ICL 移位，飞秒激光前囊定位不准，撕囊不连续，1 例在 ICL 取出时导致致伤及前囊口），观察 2 例均为低拱高 110 mm 和 198 mm。但无悬韧带损伤，无后囊膜破裂，所有患者均一期囊袋内植入人工晶状体。术后 3 个月患者平均裸眼视力（UDVA）：0.56 ± 0.23，平均最佳矫正视力（BCVA）：0.80 ± 0.14，均获得满意效果。

结论：飞秒激光辅助的白内障摘除手术在 ICL 术后的并发性白内障患者中展现出了独特的优势。但是也要注意飞秒激光定位的误差可能导致 ICL 损伤，尤其是低拱高。气泡积聚也可能阻碍飞秒激光撕囊及碎核的完成。因此，对 ICL 术后患者行飞秒激光

白内障手术需谨慎规划、掌握手术技巧，才能获得满意手术效果。

摘要编号：202516

面板编号：CAT-1163

飞秒激光辅助与常规超声乳化白内障手术联合焦深延长型人工晶体植入术后视觉效果对比

第一作者：Runhua PENG

目的：对比飞秒激光辅助（FLACS）与常规超声乳化白内障手术（CPS）联合焦深延长型（EDOF）人工晶体植入术后的视觉效果。

方法：回顾性队列研究。选取 2023 年 4 月至 2024 年 9 月东莞光明眼科医院行白内障手术并植入 EDOF 人工晶体的患者，按手术方式分为 FLACS 组和 CPS 组。分别于术前、术后 1 周和术后 1 个月对两组患者进行随访，观察并比较两组患者术前、术后的裸眼及矫正远、中、近距离视力、等效球镜度、离焦曲线、高阶像差（HOAs）、球差、慧差、三叶草差、调制传递函数（MTF）、斯特列尔比（SR）等指标，并按照屈光白内障术后结局报告标准进行报告。

结果：共纳入患者 64 例 64 眼。所有患者术后 1 月均获得良好的裸眼及矫正远、中、近距离视力，术后视觉质量相比术前显著提高（ $P < 0.001$ ）。FLACS 组术后裸眼远距离视力为 0.08 ± 0.07 LogMAR，CPS 为 0.07 ± 0.08 LogMAR，两组间裸眼及矫正远、中、近距离视力、术后屈光度、HOAs、球差、慧差、三叶草差、MTF 和 SR 差异均无统计学意义（均 $p > 0.05$ ）。两组患者离焦曲线在基本一致，在离焦度为 0.0 D 时视力最佳，在离焦度 +1.0 D 至 -2.5 D 之间视力均在 0.2 LogMAR 以上。

结论：飞秒激光辅助白内障手术和常规白内障手术在 EDOF 人工晶体植入术后均能有效提高患者的远、中、近距离视力，并显著改善患者视觉质量，但 FLACS 与 CPS 在术后视力、屈光状态和视觉质量等方面无显著差别。

摘要编号：202642

面板编号：CAT-1168

飞秒激光辅助白内障手术对既往放射状角膜切

开术患者的临床观察

第一作者：Yan GAO

目的：探讨飞秒激光辅助白内障手术（FLACS）对既往放射状角膜切开术（RK）患者的手术效果及安全性。

方法：分析 2022 年 7 月～2025 年 3 月年间接受 FLACS 手术的 RK 患者 16 例 21 眼，其中男性 9 人 11 例，女性 7 人 10 例。年龄：54.47 ± 6.19 岁，平均术前裸眼视力 (UDVA)：0.09 ± 0.11；矫正视力 (CDVA)：0.22 ± 0.12；眼轴：29.86 ± 2.18；平均角膜曲率：36.85 ± 3.18；晶状体厚度：4.57 ± 0.69；白内障分级：C5 3 眼，N2 2 眼，N3 14 眼，N4 5 眼。RK 切割的平均数目为 12.3 ± 4.14；FLACS 应用白力士 Catalys 飞秒激光设备，激光参数设置：5.2 mm 圆形直径的晶状体囊切开术（水平点间距 4 μm，垂直线间距 10 μm，脉冲能量 6 mJ）；人工晶状体 (IOL) 类型：非球面 IOL 19 眼，双焦点 IOL 2 眼；晶状体计算公式是 ASCRS 在线计算和 Barrett True-K 公式。观察术中和术后并发症及术后视力结果。

结果：术后随访为 3 个月：术中所有病例 FLACS 均未出现 PI 脱负压现象；术中发现 1 例前囊膜撕裂，但没有导致后囊膜撕裂，并且 IOL 成功植入囊袋内；角膜放射状切开 (RK) 口无裂开。术后平均 UDVA 和 CDVA 分别为 0.71 ± 0.19 和 0.84 ± 0.12。术后 IOL 位置均正。

结论：RK 患者行 FLACS 手术是相对安全的，术后均获得良好的视觉效果。但要注意手术有前囊膜撕裂的风险，增厚的切口疤痕是不完全激光穿透的潜在来源，可增加激光脉冲能量来避免。

摘要编号：202595

面板编号：CAT-1165

飞秒激光辅助白内障手术应用于先天性白内障中的效果

第一作者：Yanfeng ZENG

目的：研究飞秒激光治疗先天性白内障的效果。

方法：共收集在苏州大学理想眼科医院的先天性白内障 24 人 28 眼。常规术前检查。患者全麻后，用一次性真空吸环吸住患者眼球。然后用飞秒激光进行前囊撕开和角膜切口。然后进行超声乳化术。在 6 岁以下或智力低下的患者中进行了后囊切割和前玻璃体切除术。将可折叠的 IOL 注射到囊袋中。角膜切口水密。

结果：28 眼先天性白内障行 LenSx 飞秒激光辅助白内障手术。所有病例撕囊成功，无术中并发症。撕囊直径可控，且与患者年龄呈负相关。

结论：先天性白内障是眼科较常见的小儿疾病，会引起视力障碍，早期诊断并及时采取有效的方法进行治疗对患儿视力恢复十分重要。目前，临床多采取手术治疗先天性白内障患儿，多数患儿视力恢复较好，但仍存在一定的并发症，对术后恢复造成负

面影响采取何种手术方式，积极预防术中术后并发症，提升患儿术后视力成为临床研究的重点、难点。先天性白内障主要的方法仍是手术，术中能否做到 continuous curvilinear capsulorhexis (CCC)，是手术成败的关键步骤，由于患儿囊膜韧性强的特点，传统手工撕囊难度大，容易造成撕囊口偏心、不规则形、撕裂囊膜，一方面加大术中截开后囊膜难度，另一方面使得人工晶体移位，或不能将人工晶体植入囊袋内，从而影响患儿术后的视质量。本研究采用飞秒激光辅助撕囊，无一例撕囊并发症，手术安全可靠。

摘要编号：202583

面板编号：CAT-1167

高度近视合并白内障患者植入多焦点人工晶体手术前后视觉质量分析

第一作者：Yanfeng ZENG

目的：观察高度轴性近视并发性白内障患者多焦点人工晶体植入手术前后裸眼远视力及恢复情况。

方法：选取 2024 年 7 月 1 日至 2025 年 4 月 10 日于苏州大学理想眼科医院行白内障摘除联合多焦点人工晶状体植入术的轴性高度近视患者 225 眼，依据眼轴长度将患者分组：A 组 (26 ≤ 眼轴 < 28 mm) 125 眼，B 组 (28 mm ≤ 眼轴 < 30 mm) 72 眼，C 组 (眼轴 ≥ 30 mm) 28 眼，记录裸眼远视力，分别于术后 1 天、1 周、1 个月进行随访，记录裸眼远、中、近视力。

结果：三组术前裸眼远视力相比无统计学差异。A、B、C 三组术后裸眼远视力较术前比较显著提高，差异有统计学意义；术后 1 天、1 周、1 个月相比均无统计学差异。A、B、C 三组术后 1 天、1 周、1 个月裸眼中、近视力相比差异均无统计学意义。术后一个月 A、B、C 三组裸眼远、中、近视力相比差异均无统计学意义。

结论：高度近视患者在人工晶体植入手术后视力良好，后随时间推移，逐渐呈上升趋势，在术后 1 个月时，视力趋于稳定；术后 1 个月 A、B、C 三组远、中、近视力比较均无统计学差异 (P > 0.05)；表明术前眼轴长度不影响术后视力恢复。

眼内炎、葡萄膜炎、巩膜炎

摘要编号: 209454

面板编号: IUS-1190

APOE 通过激活小胶质细胞驱动自身免疫性葡萄膜炎的机制研究

第一作者: Yakun WANG

共同作者: Shengping HOU, Shuhao ZENG

目的: 自身免疫性葡萄膜炎 (AU) 是一类具有不同病因的威胁视力的疾病。其发病机制复杂, 深受科学家的关注。对 AU 患者的转录组学分析显示, 其外周血单核细胞 (PBMC) 中存在高度氧化应激特征以及载脂蛋白 E (APOE) 表达上调。此外, 在实验性自身免疫性葡萄膜炎 (EAU) 的小鼠模型中 APOE 的表达也上调。我们和前人的研究表明, 小胶质细胞与 AU 的发展密切相关。同时, 据报道 APOE 具有从脂质代谢和神经再生等多种功能, 但人们对其在自身免疫性葡萄膜炎发展中的详细机制知之甚少。

方法: 我们的研究采用小鼠 EAU 模型联合单细胞测序、转录组学、蛋白组学来研究 APOE、小胶质细胞和 EAU 之间的关联, 使用小胶质细胞的体外研究进一步探索和验证。

结果: 我们发现 APOE 对 EAU 诱导是必不可少的, 因为 APOE^{-/-} 小鼠未能产生 EAU。使用小胶质细胞的体外研究进一步证明, APOE 与小胶质细胞炎症呈正相关, 这可以通过使用 shRNA 敲低 APOE 来逆转。蛋白质组学分析表明, APOE 介导的小胶质细胞激活依赖于活性氧 (ROS) 途径, 通过肽基脯氨酰异构酶 F (PPIF), 这在 AU 患者来源的 PBMC 中得到了进一步验证。补充 PPIF 可在体外逆转 APOE 缺乏偏斜的 ROS 激活。此外, AAV 介导的 PPIF 过表达加剧了 EAU 表型, 表明其在驱动葡萄膜炎发生中起重要作用。

结论: 综上所述, APOE 通过上调 PPIF 驱动自身免疫性葡萄膜炎发展中的小胶质细胞的激活。

摘要编号: 202719

面板编号: IUS-1191

TUDCA 对光损伤小鼠视锥细胞的保护作用及机制研究

第一作者: Wang TING

目的: 研究牛磺酸去氧胆酸 (Tauroursodeoxycholic acid, TUDCA) 对光损伤小鼠视锥细胞的保护作用, 并探究其潜在的调控通路。

方法: 1. 将光敏感的 1 个月龄的 Balb/c 小鼠在自制光照箱中进行照射, 建立小鼠视网膜光损伤模型。接着, 利用该小鼠进行光损伤分子效应和 TUDCA 的干预研究。2. 造模治疗成功后, 应用 ERG 评估各组视网膜功能差异。3. 通过 HE 实验, 探究各组视网膜感光细胞形态结构的改变。4. 应用 Western blotting 和免疫组织化学染色法检测各组视网膜中感光细胞蛋白的表达以及定位情况。5 应用 TUNEL 以及体外细胞实验深入探究 TUDCA 对光损伤小鼠视网膜感光细胞保护机制。

结果: 1. ERG 结果显示, 循环光照造成视功能损害, 而 TUDCA 可以一定程度上挽救光损伤对视功能的损害。2. HE 结果显示, 光损伤导致小鼠视网膜外节段、内节段和外核层明显变薄, 而 TUDCA 治疗组可抑制该现象。3. Western blotting 结果显示, TUDCA 治疗组的视锥细胞特异的视蛋白 (S-opsin) 表达显著上调; 然后免疫组织化学染色法结果显示, 循环光照导致视锥蛋白的运输异常, 而 TUDCA 能有效保护视锥细胞免受循环光照的伤害。4. TUNEL 结果显示, TUDCA 通过其抗凋亡特性有效保护了光损伤小鼠视网膜感光细胞。5. 体外细胞实验结果显示, TUDCA 主要影响参与自噬通路的 pSTAT3 的表达。

结论: 1. TUDCA 对光损伤小鼠的视锥细胞具有保护作用; 2. 光损伤可以激活感光细胞的自噬, 而 TUDCA 可以通过调控自噬保护视锥细胞。

摘要编号: 210199

面板编号: IUS-1199

mNGS 确诊罕见菠萝泛菌眼内感染及四年随访见证

第一作者: Yingqian PENG

共同作者: Yun LI

目的: 首次于文献中报道由菠萝泛菌引起的人类感染性眼内炎, 并通过为期四年的前瞻性随访, 印证了宏基因组下一代测序 (mNGS) 对于明确此类罕见与非典型眼部感染病原体的诊断价值。

方法: 病例描述: 详细记录一名 13 岁女童因植物性异物外伤后左眼视力下降、经初始抗炎和广谱抗生素治疗无效的诊疗过程。诊断技术: 在行玻璃体切除手术时, 采集玻璃体及房水样本进行 mNGS 检查。病原体检测: 对房水及玻璃体样本进行宏基因组下一代测序分析, 以无偏倚的方式检测所有病原体核酸。随后通过针对菠萝泛菌特异性基因的 PCR 扩增及 Sanger 测序对 mNGS 结果进行验证。

结果: 一、临床过程: 患者初期被诊断为前葡萄膜炎并接受糖皮质激素和广谱抗生素治疗, 症状一度缓解后加重, 最终发展为全眼内炎。二、病原体鉴

定：mNGS 在房水中检测到高序列值菠萝泛菌特异性序列。随后的 PCR 和 Sanger 测序结果均证实了菠萝泛菌的存在。三、治疗与预后：经玻璃体切除手术、硅油填充及眼内抗生素注射，并结合明确的病原学诊断后，患者感染得到控制。在长达 4 年的随访中，左眼视力稳定在 16/20，视网膜平伏，但黄斑微结构提示黄斑中心凹略显扁平，其内表面欠光滑，呈起伏状。

结论：1. 菠萝泛菌作为一种通常的植物病原体和人类机会性致病菌，可成为感染性眼内炎（尤其是与植物材料相关的眼外伤后）的病原体。其毒力可能较低，但在使用糖皮质激素抑制免疫力后可能导致病情缓慢进展。2. 在临床表现不典型、病史不清或常规治疗效果不佳的眼内炎症病例中，临床医生需高度警惕感染性眼内炎的可能，并与葡萄膜炎相鉴别。3. 宏基因组下一代测序（mNGS）是一种强大的、无偏倚的病原体检测工具，能够快速、准确地鉴定罕见或难以培养的病原体，对于此类疑难病例的及时精确诊断和有效治疗具有关键指导意义，从而改善患者预后。

摘要编号：201972

面板编号：IUS-1195

主动脉夹层术后双眼先后发病内源性真菌性眼内炎 1 例

第一作者：Weiting HAO

共同作者：Guannan HUANG, Long SU, Songtao YIN

目的：从 1 例双眼先后发病的内源性真菌性眼内炎的诊疗过程中总结经验。

方法：回顾性分析该病例诊疗过程。

结果：患者男，45 岁，于 2025 年 3 月 26 日行胸腹主动脉夹层手术，术后双肺不张及感染性病变、右肺慢性肺栓塞、泌尿系感染，给予全身抗生素治疗。4 月 15 日出现右眼红肿、胀痛、流泪伴视力下降，主要表现为前节炎症及感染症状：角膜水肿，房闪+，虹膜瞳孔缘白色病灶，眼底未见明显异常，诊断为右眼内源性眼内炎，当日行右眼玻璃体注药（头孢他啶+万古霉素）+前房穿刺取样培养，建议房水 NGS 检查，患者因经济原因暂拒，典必殊+万古霉素点眼，静脉亚胺培南+万古霉素抗感染，术后 2 日右眼前节炎症减轻，视力提高，左眼正常，心包引流管培养示人葡萄球菌多重耐药。术后第 3 日右眼前房内白色蛛网样絮状物，瞳孔缘白色病灶较前粘稠，视力再次下降，房水培养回报霉菌，停典必殊点眼，当日行右眼前房穿刺取样培养+前房冲洗+注药+玻璃体注药（万古霉素+两性霉素 B），术后万古霉素+两性霉素 B 点眼，4 月 19 至 22 日右眼前房白色粘稠絮状物逐渐加重覆盖瞳孔

区，视力降至指数，房水培养阴性。自出现眼部症状起完善全身检查，头 CT、腹部彩超无阳性发现，胸 CT 肺部炎症基本同前，整个病程白细胞趋势波动上升，最高达 $16.74 \times 10^9/L$ ，中性粒细胞百分比 84.50%，反复低热，最高 $37.5^\circ C$ 。4 月 23 日出现左眼眼红伴视力下降，主要表现为后节炎症及感染症状：房闪++，玻璃体团絮状混浊，视盘水肿，当日头 MR 示脑脓肿伴多发梗死、枕叶出血，痰涂片真菌 2+，血液 NGS：真菌-曲霉菌属检出，拟行左眼手术治疗，但患者于下午突发意识障碍，于 4 月 24 日因脑梗死死亡。

结论：双眼先后发病内源性真菌性眼内炎此前未见类似病例报道，本例患者虽眼部治疗均较为及时，但全身检查多日未明确静脉抗真菌指征，说明内源性眼内炎寻找全身病灶至关重要，尤其应重点关注毗邻组织如脑、鼻窦，易血行播散组织如心、肺、肝脏等。

摘要编号：209546

面板编号：IUS-1198

以单眼视盘前“积脓”及快速进展性视网膜血管炎为首要表现的白塞综合征一例报告

第一作者：Hengwei LIU

目的：探讨一例以单眼急性起病、视盘前“积脓”样改变及快速进展性视网膜血管炎为突出表现的罕见病例的临床特征、诊断思路及治疗策略，提高对该类非典型眼部表现的系统性疾病关联的认识。

方法：回顾性分析一例 28 岁男性患者的临床资料。患者主诉左眼视物变形 1 天，无眼红眼痛。既往有双眼复发性葡萄膜炎及长期免疫抑制剂（环孢素）治疗史，并伴有复发性口腔溃疡及外阴皮疹。入院后完善眼科检查，包括最佳矫正视力、眼压、裂隙灯及广角眼底检查。为排除感染性眼内炎，在给予局部激素（地塞米松）球周注射的同时，行诊断性玻璃体穿刺，取样送检病原微生物宏基因组测序（mNGS）及细菌、真菌培养。结合其全身症状及最新的眼科影像学表现进行系统性鉴别诊断。

结果：患者初诊时左眼视力为 0.1，眼底可见视盘前团状灰白色混浊（模拟“积脓”外观）及黄斑水肿。病情在 48 小时内迅速进展，视力下降至手动/40 cm，并出现显著的玻璃体炎、全周视网膜血管白鞘、散在出血点及水肿。玻璃体液 mNGS 检测及所有病原学培养结果均为阴性，有效排除了细菌、真菌及病毒感染。结合患者青年男性、反复口腔溃疡、外阴皮疹、复发性葡萄膜炎以及典型的视网膜闭塞性血管炎等特征，最终确诊为白塞综合征（贝赫切特病）。治疗上立即启动大剂量甲泼尼龙（500 mg/日）静脉冲击治疗 3 天，后续联合大剂量口服

泼尼松及环孢素（125 mg，每日两次）进行全身免疫抑制治疗，并对视网膜无灌注区行激光光凝术。经过综合治疗，患者眼部炎症得到有效控制。

结论：本病例警示，单眼发病的视盘前“积脓”伴快速进展的视网膜血管炎，即使缺乏典型的前房积脓，也可能是白塞综合征的重要甚至首发眼部征象。对于此类患者，在积极利用 mNGS 等现代检测技术排除感染后，应高度警惕系统性自身免疫性疾病的可能性。详细的全身病史采集和全面的眼科评估是正确诊断的关键。早期、强效的全身免疫抑制治疗是控制炎症、挽救视功能的基石。

摘要编号：207914

面板编号：IUS-1196

女性视觉权利：1990-2021 年全球、区域及国家层面女性盲与视力损害负担研究

第一作者：Lan XIA

共同作者：Peizeng YANG

目的：视力损害与失明在全球范围内对女性造成的影响尤为显著，尤其集中于中低收入国家。本研究旨在评估 1990 年至 2021 年期间全球、区域及国家层面女性盲与视力损害的疾病负担，并分析导致性别差异的主要病因及相关危险因素。

方法：研究数据来源于《2021 年全球疾病负担研究（GBD 2021）》数据库，涵盖 204 个国家和地区。分析内容包括不同社会人口学指数（SDI）水平、年龄组及地理区域女性盲与视力损害的流行病学特征。采用 Joinpoint 回归及趋势分析方法（R 与 Joinpoint 软件）进行统计，主要结局指标包括患病率、伤残生存年（YLDs）及年龄标化率，同时评估病因构成及主要危险因素的贡献。

结果：2021 年全球女性盲与视力损害的患病率为每 10 万人 14,510.97 例，YLDs 为 17,010.96。与男性相比，女性的患病率高出 27.1%，YLD 率高出 17.2%，差异在低 SDI 地区最为显著。女性视力损害的主要病因包括近视力障碍、白内障及屈光不正；主要相关危险因素为环境与家庭空气污染、高体重指数及营养缺乏。

结论：女性承担着显著高于男性的盲与视力损害负担，尤其在欠发达地区，其患病率与伤残率差异尤为突出。研究结果提示应制定并落实以性别为导向的公共卫生策略和干预措施，以减少女性可预防性视力损害，改善全球女性的视觉健康公平性。

摘要编号：208522

面板编号：IUS-1197

玻璃体腔注射美罗培南治疗同性恋螺杆菌眼内炎一例

第一作者：Kuifang DU

目的：探讨内源性同性恋螺杆菌眼内炎的临床特征、诊断及治疗方法，评估玻璃体腔注射美罗培南在此类重症感染中的疗效与安全性。

方法：报告一例 27 岁男性艾滋病合并左眼内源性眼内炎患者。患者因“发热伴左眼疼痛 1 周”入院，既往有艾滋病 10 余年，双眼巨细胞病毒性视网膜炎病 5 年，左眼已失明。查体：左眼无光感，眼球触痛，眼睑充血，球结膜高度水肿，角膜密集 KP，房闪（+++），前房积脓 3 mm，瞳孔后粘连，眼底窥不入。眼眶 CT 及 B 超提示玻璃体腔密度增高，眼球萎缩。全身检查未见其他感染灶。CD4T 淋巴细胞数 132 个/ul，血 HIV 病载阴性。急诊行左眼玻璃体腔穿刺抽吸术，送检宏基因组下一代测序（mNGS）明确病原体。确诊为同性恋螺杆菌眼内炎后，在全身静脉抗感染（美罗培南，后调整为头孢曲松联合多西环素）基础上，予以左眼玻璃体腔注射美罗培南（2 mg/0.2 ml，每 5 天 1 次，共 5 针）及球旁注射治疗。

结果：mNGS 检测结果回报为同性恋螺杆菌。经上述综合治疗后，患者左眼疼痛、红肿症状逐渐缓解。眼部体征显著改善：眼睑及结膜水肿消退，角膜 KP 转阴，前房积脓于 3 周内完全吸收，房闪转阴。治疗 1 个月后门诊随访，左眼炎症完全控制，眼球呈安静萎缩状态。

结论：对于免疫功能严重低下（如艾滋病）患者，同性恋螺杆菌可作为内源性眼内炎的罕见病原体。结合 mNGS 技术可实现快速精准诊断。本病例证实，在以敏感药物全身治疗为基础的前提下，重复玻璃体腔注射美罗培南是一种有效且安全的局部辅助治疗手段，可用于控制感染、挽救眼球，即使对于已失明并发生眼球病的晚期病例，亦能成功消除炎症、缓解症状

摘要编号：201966

面板编号：IUS-1192

祛风明目丸对自身免疫性葡萄膜炎抗炎机制的研究

第一作者：Fan ZHAO

共同作者：He CHEN, Chunting GAO, Peiying JIANG, Jingsheng YU

目的：湖南省名中医喻京生教授运用中成药——祛风明目丸治疗自身免疫性葡萄膜炎收效颇丰，本文

旨在探究祛风明目丸对炎症状态下视网膜色素上皮细胞的抗炎机制。

方法：祛风明目丸药液喂养 Lewis 大鼠 7 天后采血得含药血清；将人视网膜色素上皮细胞（ARPE-19）分为空白组和模型组，模型组采用 IFN- γ 干预建立炎症环境后，按实验分组采用不同剂量的含药血清处理；CCK-8 检测每组细胞的增殖情况，qRT-PCR 检测每组细胞中 TNF- α 、IL-6、IL-17A、IL-4、IL-10 mRNA 的表达。除空白血清组外，模型组细胞按照实验分组采用适量含药血清或空白血清处理，同时添加白藜芦醇或烟酰胺共同处理细胞；WB 检测各组细胞 AMPK、P-AMPK、SIRT1 蛋白的表达，ELISA 检测各组细胞 TNF- α 、IL-6、IL-17A、IL-4、IL-10 的表达情况。

结果：（1）随着含药血清浓度的增加，细胞活力随之增加，在 15~20% 浓度时达到最强。（2）各组细胞中促炎因子 TNF- α 、IL-6、IL-17A mRNA 的表达与含药血清浓度升高成负相关，抑炎因子 IL-4、IL-10 mRNA 的表达与含药血清浓度升高成正相关。（3）在炎症环境中，P-AMPK、SIRT1 蛋白表达均下降，相关促炎因子表达升高，抑炎因子表达下降。在此基础上添加 SIRT1 抑制剂（烟酰胺），蛋白表达进一步下降，促炎因子表达进一步升高，抑炎因子表达进一步下降；添加 SIRT1 激动剂（白藜芦醇），蛋白表达均上升，促炎因子表达下降，抑炎因子表达上升。

结论：祛风明目丸含药血清可通过激活炎症环境中 AMPK/SIRT1 通路，降低促炎因子 TNF- α 、IL-6、IL-17A，上调抑炎因子 IL-4、IL-10 表达发挥抗炎作用。

摘要编号：201182

面板编号：IUS-1188

积炎成川，溃于黄斑（Vogt-小柳-原田病继发脉络膜新生血管的病理叙事）

第一作者：Yiquan ZHANG

共同作者：Jing FENG, Yong TAO

目的：报道 Vogt-小柳-原田综合征继发黄斑脉络膜新生血管一例，以期为该病的诊疗提供一定的临床经验和指导。

方法：回顾性分析一例 Vogt-小柳-原田综合征继发黄斑脉络膜新生血管病例。患者，男，24 岁，主因“双眼反复红伴左眼视力下降 2 年”于我院就诊。询问病史，患者 2 年前无明显诱因出现双眼眼红伴左眼视力下降，无眼痛、畏光，否认反复发作口腔及阴部溃疡，否认关节疼痛、腰部僵直疼痛，否认脱发、皮疹、耳鸣。既往双眼屈光不正 -10.00 DS，常年感冒，否认风湿等全身免疫性疾病病史，

否认眼外伤史及内眼手术史，否认结核、肝炎、梅毒等传染病史，否认猫狗接触史，否认药物过敏史。查体：患者 BCVA OD: 0.2, OS: 0.03，来我院前曾于外院行前节相、眼底照相、OCT、FFA 及 ICGA 检查示：双眼角膜清，虹膜后粘连及色素颗粒沉着，左眼可见 koeppe 结节及 busacca 结节，眼底照片示双眼晚霞状眼底及 Dalen-Fuchs 结节，FFA 及 ICGA 示左眼黄斑脉络膜新生血管。

结果：外院诊为“双眼陈旧性虹膜炎、双眼白点综合征”，后我院诊为“双眼 Vogt-小柳原田病继发左眼黄斑脉络膜新生血管”，给予左眼 Ozurdex、阿柏西普治疗，治疗后 1 月改善。

结论：Vogt-小柳-原田综合征继发黄斑脉络膜新生血管预后视力较差，因此早期充分抗炎治疗十分重要，全面关注眼前节、后节，监测疾病进展。

摘要编号：207866

面板编号：IUS-1189

经脉络膜上腔注射间充质干细胞治疗兔葡萄膜炎的有效性及机制研究

第一作者：Di ZHANG

共同作者：Chun ZHANG

目的：评估一种新型的阻力传感脉络膜上注射器在兔葡萄膜炎模型中递送人脐带间充质干细胞（human umbilical cord-derived mesenchymal stem cells, HUMSC）的有效性和治疗机制。

方法：本研究首先构建兔实验性葡萄膜炎模型（结核分枝杆菌 H37Ra 抗原皮下预免疫联合玻璃体腔注射），并应用磷酸盐缓冲盐水（phosphate buffered saline, PBS）、HUMSC 及曲安奈德（triamcinolone acetonide, TA）分别经脉络膜上腔注射，在不同时间点观察 HUMSC 及 TA 对葡萄膜炎的抑制作用。以兔眼前后节状态、炎症分级（0-4）、眼压变化、组织病理学检查等指标评估葡萄膜炎的炎症表现，以视网膜转录组测序与实时荧光定量 PCR（quantitative real-time PCR, qRT-PCR）探究潜在发病机制及 HUMSC 作用的关键通路。

结果：本研究中兔实验性葡萄膜炎建模成功率 100%，24 小时后观察到炎症反应，证实葡萄膜炎诱导成功。建模第 7 天炎症症状显著，包括结膜混合充血（ 2.42 ± 0.49 , $P = 0.001$ ）、角膜水肿（ 1.08 ± 0.20 , $P < 0.001$ ）、前房中重度渗出（ 2.08 ± 0.37 , $P < 0.001$ ）、玻璃体重度混浊（ 3.83 ± 0.41 , $P < 0.001$ ）等。第 28 天时，所有兔眼玻璃体混浊仍较显著（ 2.92 ± 0.66 ），视网膜细节仍无法窥清。建模后葡萄膜炎组眼压下降，第 28 天

时眼压与正常对照组差异具有统计学意义 (6.89 ± 0.50 mmHg, $P < 0.05$)。与 PBS 处理组相比, HUMSC 治疗显著减轻了葡萄膜炎体征, 在建模第 7、14、21、28 天的前房炎症评分和玻璃体混浊评分均显著降低 ($P < 0.05$); 在 TA 处理组中, 除第 14、28 天前房炎症评分外其他炎症评分与 PBS 处理组相比均显著降低 ($P < 0.05$)。在眼压方面, 建模后第 1 天, 三组眼压均显著低于正常对照组 ($P < 0.05$)。至第 14 天, HUMSC 及 TA 处理组眼压与正常对照组相比无显著差异; 但 PBS 处理组在第 28 天眼压仍低于对照组 (6.79 ± 1.32 mmHg, $P < 0.05$), 这说明 HUMSC 及 TA 治疗可有效缓解睫状体炎症。此外, HUMSC 及 TA 治疗还降低了房水中部分炎性细胞因子的水平。组织病理检查显示 HUMSC 及 TA 组炎症细胞浸润减少。RNA 测序结果显示, 辅助性 T 细胞 17 (T helper cell, Th17) 分化通路在葡萄膜炎的发病机制中起着重要作用, 并通过 qRT-PCR 结果进一步验证 HUMSC 可抑制该通路中关键基因的表达。

结论: HUMSC 经脉络膜上腔注射在兔实验性葡萄膜炎模型中可显著减轻炎症反应, 其治疗效果与 TA 相当。Th17 细胞分化是实验性葡萄膜炎模型发病机制中的重要通路, HUMSC 可通过抑制相关基因的上调发挥作用。

摘要编号: 209580

面板编号: IUS-1193

结核性全葡萄膜炎合并角膜基质炎一例

第一作者: Xin LIU

共同作者: Ang JI

目的: 分析结核分枝杆菌所致全葡萄膜炎的眼部多模态影像学特征、诊断标准及治疗策略。

方法: 本文拟介绍一例结核性全葡萄膜炎合并角膜病变的患者, 结合患者的病史、眼部症状、眼部多模态影像以及相关实验室检查, 总结眼部结核感染的临床特征、诊断要点及治疗策略。

结果: 本患者前驱流产后低热病史, 双眼无痛性视力下降 2 月, 查体可见双侧角膜基质楔形混浊, 颗粒状 Kp+, 虹膜局部后粘连, 前房及玻璃体细胞(++), 左眼视网膜弥漫灰白水肿, 后极部环形白色视网膜沉积物; 辅助检查 OCT 提示左眼玻璃体机化条索, 视网膜层间多发低反射囊腔; 荧光素眼底血管造影提示双眼以视网膜静脉血管壁染为主要特征的闭塞性血管炎, 周边广泛无灌注区形成。实验室检查: 结核结核纯化蛋白衍生物试验 (PPD): 硬结直径 > 20 mm, 周围伴水疱, 为强阳性; T-SPOT 阳性; 其他传染病检查及自身免疫系统疾病筛查均为阴性, 胸部 CT 未见异常。遂眼科诊为“双眼结

核性全葡萄膜炎 双眼结核性角膜基质炎”, 在给予规律抗结核治疗一周后开始全身免疫抑制治疗, 同时双眼进行全视网膜激光光凝治疗。治疗 3 月后复查双眼视力提高, 角膜基质混浊消退, 左眼视网膜层间积液明显减少。

结论: 眼部结核感染通常为潜伏结核, 并无肺部结核感染的相关体征, 起病隐匿, 所致眼部发病机制为病原体的直接侵犯与免疫反应共同作用的结果, 可引起多种临床表现形式, 部分改变具有一定特征, 临床可根据患者病史、眼部体征及多模态影像, 结合辅助检查结果帮助诊断。即使患者并无肺部结核感染, 但眼部的治疗仍需在规律抗结核治疗的前提下, 再加用免疫抑制治疗, 同时需密切观察、预防并发症的出现。

摘要编号: 207958

面板编号: IUS-1200

赖氨酸琥珀酰化修饰在炎性小胶质细胞活化中的作用及机制研究

第一作者: Jiangyi LIU

目的: 炎性小胶质细胞的活化是自身免疫性葡萄膜炎的特征性表现。小胶质细胞的活化与其代谢改变密切相关, 线粒体作为连接这两个过程的关键枢纽发挥着重要作用。赖氨酸琥珀酰化作为一种翻译后修饰, 主要参与调节线粒体能量代谢通路。然而, 赖氨酸琥珀酰化在小胶质细胞炎性活化中的具体作用及潜在机制尚不完全清楚。

方法: 在本研究中, 我们采用光感受器间维生素 A 类结合蛋白体内诱导实验性自身免疫性葡萄膜炎 (EAU) 小鼠模型, 以及脂多糖和干扰素- γ 体外诱导炎性小胶质细胞。利用赖氨酸琥珀酰化抑制剂/激活剂、琥珀酰化蛋白组学以及生物学实验方法研究潜在作用及机制。

结果: 我们发现在 EAU 小鼠视网膜中, 活化的炎性小胶质细胞发生了广泛的赖氨酸琥珀酰化修饰。高琥珀酰化水平促进了炎性小胶质细胞的激活, 增强了其产生促炎性细胞因子、增殖和迁移的能力。通过琥珀酰化蛋白组学测序, 我们绘制了正常和炎性小胶质细胞中赖氨酸琥珀酰化蛋白的图谱, 差异修饰的蛋白主要富集在有氧呼吸和三羧酸循环通路上。其中, IDH2 在赖氨酸 282 位点 (K282) 的琥珀酰化被鉴定为炎性小胶质细胞活化的关键介导因子。进一步实验发现小胶质细胞 IDH2 K282 的高琥珀酰化会抑制 IDH2 的酶活性, 促进细胞的氧化应激和糖酵解, 最终导致炎性活化。

结论: 在 EAU 中, 活化的小胶质细胞中发生了显著的赖氨酸琥珀酰化修饰, 降低琥珀酰化水平可抑制其炎性活化。小胶质细胞 IDH2 (K282) 的琥

珀酰化与小胶质细胞的炎性活化和代谢模式密切相关，可作为自身免疫性葡萄膜炎的潜在治疗靶点。

摘要编号：203218

面板编号：IUS-1194

超广角多模式成像在急性视网膜坏死的应用

第一作者：Mei HAN

共同作者：Meng DONG, Ying LI, Xiaoli SUN

目的：探索超广角多模式成像在 ARN 管理中的关键作用。

方法：根据日本急性视网膜坏死（ARN）研究组 2015 年制定的 ARN 诊断标准，并且经过房水检测确诊 VZV 感染的 ARN 患者 10 人（10 眼），经过标准抗病毒治疗，包括玻璃体腔注射更昔洛韦。采用广角 SS-OCT，超广角眼底成像（UWFI）及自发荧光成像，观察 ARN 患者治疗过程中的变化。

结果：在 ARN 急性期，广角 SS-OCT 显示内层视网膜高反射区域，对应黄白色病灶，渗出呈高反射信号，其下结构反射信号被屏蔽，神经上皮层下液体积存，视网膜各层组织结构紊乱。在炎症消退期的表现：坏死区域视网膜厚度明显减少，可见视网膜结构完全缺失的区域，对应之前的黄白色病灶色素上皮出现破坏。超广角眼底成像（UWFI）可显示 ARN 的典型临床特征：斑片状或扇形坏死病灶，视网膜动脉闭塞，玻璃体炎，视网膜静脉出血。超广角 FAF：在病变活动区域边缘可见高对比度的自发荧光变化，完全视网膜坏死的区域表现为低自发荧光，通过连续 FAF 检查，观察高自发荧光边界是否向后扩展，FAF 提供更高对比度的病变边界；有助于更精确地确定病变范围和进展。

结论：超广角成像有助于早期识别高风险患者，全面评估 ARN 的病变特征；监测疾病进展情况，指导临床管理策略，改善 ARN 患者的预后。

眼外伤

摘要编号：210060

面板编号：OTR-1212

一例复杂小儿外伤性视网膜脱离的成功治疗：病例报告

第一作者：Yuan ZHIGANG

目的：由于眼球结构的特殊及患者配合度差，儿童眼外伤一直是眼科手术的难点之一，我们介绍了一名 2 岁 11 个月的患者，被炮仗炸伤右眼后致复杂

的眼前后联合损伤，我们及时治疗并取得不错的效果。

方法：患儿经评估后发现有虹膜根部的离断，以及因此导致的前房积血和渗出，在术中给与了虹膜根部离断修复术及前房冲洗，术野清晰后进一步确认了外伤性白内障及晶状体半脱位，我们经后入路切割了患儿的晶状体，并选择了暂不植入人工晶状体，进入后节后，我们确认了玻璃体积血以及外伤性的视网膜脱离，伴有多处裂孔及脉络膜损伤，我们因此进行了复杂的晶状体切除及视网膜复位术。

结果：我们在行玻璃体后脱离并剥除了附着在脱离视网膜表面的渗出膜后，发现鼻侧脉络膜损伤与视网膜粘连，在损伤周围行视网膜切开（“防火墙”），保护剩余视网膜，重水复位视网膜，行视网膜激光凝处理半硅油置入，患儿术后情况稳定，并于 6 月后取出眼内硅油并补充激光，术后视网膜在位良好。

结论：我们的病例展示了一例成功的小儿复杂眼外伤的治疗，对于小儿外伤性视网膜脱离尤其是视网膜情况差的病例，及时的处理以及果断的视网膜切开可能对于保护其余的视网膜及预后有重大意义。

摘要编号：209916

面板编号：OTR-1208

人工晶体缝线固定手术方法探讨

第一作者：Yong YAO

目的：眼外伤常导致各种复杂的并发性白内障、晶状体脱位。临床上常应用玻璃体切割联合晶体摘除手术进行治疗，这种经玻璃体置换术后无晶体眼的视力往往受到明显影响，还有由于晶状体囊袋和悬韧带不同程度的损伤、缺失，给二期植入人工晶体带来不便，常需要根据残存囊袋和悬韧带的可利用程度选择不同的人工晶体悬吊手术方式。本文拟探讨人工晶体缝线固定的手术方法。

方法：① 人工晶体的选择：晶体袢的形状有环形、“C”形袢，晶体袢的数量有两袢、三袢、四袢，其中具有三个以上的环形袢的 IOL 缝线固定更加稳定、持久。② 巩膜瓣的选择：可选传统三角瓣、L 形瓣、巩膜沟、Hoffman 巩膜瓣等，其中 Hoffman 巩膜切口出血较少，无需电凝、缝合，操作更加便捷，但需要一定学习曲线。如采用缝线 Z 型缝合或摩擦线结巩膜层间固定技术，可不作巩膜瓣。③ 缝线的选择：10-0 聚丙烯缝线是最常用的悬吊缝线，但易降解、断裂、切割，8-0 聚丙烯缝线似乎是更好的选择，横截面积大，抗拉强度高，抗断裂性能更好。④ 固定方式选择：依据可及的人工晶体、缝线、囊袋和悬韧带的功能，选择合适的

手术方式，提高人工晶体的水平居中稳定性，减少手术损伤，降低手术操作难度。

结果：临床实践证明人工晶体缝线固定术是治疗玻切术后无晶状体眼的有效方法，但需要注意手术材料、方法的选择。

结论：临床实践证明人工晶体缝线固定术是治疗玻切术后无晶状体眼的有效方法，但需要注意手术材料、方法的选择。

摘要编号：207664

面板编号：OTR-1203

儿童鞭炮伤致视神经重度损伤 1 例

第一作者：Wenting WANG

目的：探讨一例因鞭炮爆炸导致严重左眼外伤性视神经病变及难治性青光眼的 7 岁男性患儿的临床救治过程与预后。该病例初始视力为无光感，病情复杂危重，旨在总结其多阶段手术治疗与药物干预的经验，并强调即使面对初始视力极差的儿童严重眼外伤，坚持积极、综合的治疗策略仍可能为挽救眼球和部分视功能带来希望。

方法：患儿因“左眼鞭炮崩伤后视物不见 2 小时”入院，检查见左眼无光感，角膜水肿，结膜囊大量异物，下方角膜上皮缺损，瞳孔散大固定，晶状体部分脱入前房。治疗采取分阶段手术结合药物的综合方案：首先行“左眼结膜及角膜异物取出术”清除眼表异物。术后第 6 天因眼压急性升高至 60 mmHg，行“玻璃体切割 + 晶状体切除 + 硅油填充术”，术中探查见视盘结构严重紊乱。因术后硅油眼持续高眼压（30-55 mmHg），且药物降压效果不佳，于术后 42 天取出硅油。硅油取出后眼压再次失控，先后行睫状体光凝术与青光眼阀植入术以最终控制眼压。

结果：经过一系列复杂的干预，患儿的病情呈现波折但最终向好的趋势。视力方面，从伤后及多次术后初期的“无光感”，在术后 42 天提升至“光感”，并于伤后 4 个月时进一步恢复至“眼前手动”。眼压控制过程极为艰难，在硅油填充及取出后阶段，尽管联合多种强效降压药，眼压仍持续在高压范围（35-50 mmHg），直至执行青光眼阀植入术后，眼压才得以长期稳定。

结论：本病例充分表明，对于鞭炮等造成的严重儿童眼外伤，即使初始视力为无光感，也绝不能轻易放弃。其救治成功依赖于一系列关键决策：及时的清创、针对复杂并发症（如晶状体脱位、眼压骤升）的果断玻切手术、以及对药物无效的难治性青光眼采取递进式手术（睫状体光凝、最终青光眼阀植入）的积极态度。尽管视神经遭受了严重原发性损伤，

但在有效控制眼压、维持眼球结构和内部环境稳定后，视功能仍存在缓慢恢复的可能。因此，对于儿童严重眼外伤，应秉持永不放弃的原则，采取积极、序贯、多元的综合治疗策略，最大限度地挽救视功能和眼球解剖结构。

摘要编号：209633

面板编号：OTR-1206

内窥镜辅助玻璃体切除术治疗眼萎缩患者的临床观察

第一作者：Yang XUN

目的：观察内窥镜辅助玻璃体切除术（EAV）治疗眼球萎缩的临床疗效和安全性。

方法：眼球萎缩的标准是与健康眼相比，萎缩眼的术前眼轴长（AL）减少大于 2 mm。使用眼部 CT 扫描来测量 AL 和眼球体积。共收集了 36 例眼球萎缩患者。所有患者均接受了 EAV 联合硅油眼内填充手术。收集所有患者的术前和术后视力，眼压（IOP），AL 和眼球体积。

结果：所有 36 例患者术前均有视网膜和脉络膜脱离。萎缩眼术前平均眼压和眼容积均显著低于健康眼（所有 $P < 0.05$ ）。萎缩眼术后平均眼压和眼球体积较术前明显增加（所有 $P < 0.05$ ）。手术后，12 例患者视力提高，28 例（占 77.7%）视网膜和脉络膜复位，所有患者均保持正常眼压。

结论：对于眼萎缩患者，EAV 可以显著增加其 AL 和眼容量，提高眼压并将其维持在正常眼压状态。一些患者的视力有所改善。

摘要编号：209803

面板编号：OTR-1207

外伤性晶状体全脱位手术方式的比较

第一作者：Haibin CUI

共同作者：Hong ZHOU

目的：分析比较四种取出脱位晶状体手术（1. 玻璃体切除术。2. 玻璃体切除术 + 注入重水 + 白内障囊内摘除术。3. 玻璃体切除术 + 注入重水 + 白内障超声乳化吸除术。4. 玻璃体腔内注入粘弹剂利用玻璃体的流动性浮出晶状体 + 白内障超声乳化吸除术）的临床效果。

方法：回顾性分析 2022 年 5 月至今，我院晶状体全脱位患者 20 例作为研究对象，进行手术治疗，对四种手术的疗效包括视力的矫正情况，眼压以及有无并发症进行分析。

结果：20 例患眼均无医源性视网膜损伤，無晶状体皮质残留，术后均无眼压升高，视力及视觉质量略有差别。

结论：(1) 通过玻璃体切除术直接切除脱位的晶状体，手术时间相对较长，术中在切除晶状体的过程中残存的晶状体易损伤视网膜。且水眼稳定性差，后续缝合人工晶体难度相对较大。(2) 玻璃体切除后通过向玻璃体腔内注入重水，使脱位的晶状体浮到前房，做角膜或巩膜大切口，行白内障囊内摘除术，术中应用重水既增加了患者的经济负担，又增加手术的并发症，注入和取出重水的同时延长了手术时间。且角膜或者巩膜做大切口，损伤大的同时还增加了术源性散光，术后患者的视觉质量相对较差。(3) 玻璃体切除后通过向玻璃体腔内注入重水，使脱位的晶状体浮到前房，然后行超声乳化术取出晶状体。晶状体取出方式的改良降低了术源性散光的问题，但是重水的应用对视网膜的损伤及术后并发症难以避免。(4) 对无玻璃体液化的患者采用前节取出方式。通过向玻璃体腔内注入粘弹剂利用玻璃体的流动性使晶状体浮至前房，通过超声乳化取出晶状体，该方式可以最大程度上减少手术对眼球的损伤，手术过程中几乎不接触视网膜，且手术时间相对较短，玻璃体完整，后节稳定性好，给缝合人工晶体提供了更安全的环境。通过分析对比该手术方式是目前治疗外伤性晶状体全脱位的损伤最小，术后效果最好，并发症最少的微创手术方法。

摘要编号：209641

面板编号：OTR-1205

恒压注油机应用于严重眼外伤患者的临床效果观察

第一作者：Yang XUN

目的：将恒压注油机应用于严重眼外伤患者行玻璃体切除手术后，观察其临床效果并进行分析。

方法：前瞻性研究。纳入 2022 年 11 月至 2023 年 9 月就诊于苏州大学理想眼科医院严重眼外伤患者共 7 例 7 眼，均合并有视网膜脱离，其中伴脉络膜脱离者 3 例 3 眼，术前诊断为眼球萎缩 4 例 4 眼。所有患者均行内窥镜辅助下的玻璃体切除手术，术中玻璃体腔内填充硅油，术毕均使用恒压注油机，以 40-45 mmHg 的气体压力推动相连的注射器向眼内持续注射硅油，持续注油的过程中眼压保持在 20~25 mmHg。收集所有患者术前及术后 3 个月的视力、眼压、眼轴、眼球体积，术中注入眼内的硅油体积及术后恒压注油机持续注入眼内硅油体积，同时记录观察期间并发症发生情况。将收集的数据

进行统计学分析，以 $P < 0.05$ 为差异具有统计学意义。

结果：患者术前平均眼压 (5.43 ± 2.23) mmHg，术后 3 个月时平均眼压 (14.09 ± 2.28) mmHg。术前平均眼轴 (20.88 ± 0.92) mm，术后 3 个月时平均眼轴 (24.31 ± 0.69) mm。术前平均眼球体积 (4.37 ± 0.49) mm³，术后 3 个月时眼球体积 (6.99 ± 0.49) cm³。经统计学分析，上述 3 项指标术前与术后相比差异均具有统计学意义 (均 $P < 0.05$)。其中 4 例眼球萎缩的患者，术后所有患者视网膜均成功复位。术前无光感的 3 例患者术后恢复至光感或手动。术毕平均注入玻璃体腔内硅油 (4.09 ± 0.47) ml，术后经恒压注油机再向眼内持续注硅油，硅油体积显著增加至 (5.35 ± 0.67) ml ($P < 0.05$)，眼内硅油体积平均增加了 (1.26 ± 0.60) ml。

结论：对于严重眼外伤合并视网膜脱离或脉络膜脱离、玻璃体切除术中硅油填充不充分的患者，恒压注油机的应用能显著提高其术后眼压，增加其术后眼轴、眼球容积，同时能改善部分患者术后视力，拥有良好的临床效果及安全性。

摘要编号：209918

面板编号：OTR-1210

房角镜辅助下改良缝线式睫状体缝合治疗外伤性睫状体分离

第一作者：Yong YAO

目的：观察房角镜辅助下改良缝线式睫状体缝合临床效果。

方法：① 人工晶体的选择：晶体袢的形状有环形、“C”形袢，晶体袢的数量有两袢、三袢、四袢，其中具有三个以上的环形袢的 IOL 缝线固定更加稳定、持久。② 巩膜瓣的选择：可选传统三角瓣、L 形瓣、巩膜沟、Hoffman 巩膜瓣等，其中 Hoffman 巩膜切口出血较少，无需电凝、缝合，操作更加便捷，但需要一定学习曲线。如采用缝线 Z 型缝合或摩擦线结巩膜层间固定技术，可不作巩膜瓣。③ 缝线的选择：10-0 聚丙烯缝线是最常用的悬吊缝线，但易降解、断裂、切割，8-0 聚丙烯缝线似乎是更好的选择，横截面积大，抗拉强度高，抗断裂性能更好。④ 固定方式选择：依据可及的人工晶体、缝线、囊袋和悬韧带功能，选择合适的手术方式，提高人工晶体的水平居中稳定性，减少手术损伤，降低手术操作难度。

结果：术后随访，患者 BCVA 得到改善，并维持了正常的眼压，术后并发症较少。

结论：采用房角镜下辅助的改良缝纫式睫状体缝合治疗外伤性睫状体分离具有较好的疗效，通过术前UBM和术中直接房角镜检查可更精确定位睫状体分离范围，也能在术中睫状体缝合完后进行复查。在分离点位角膜缘后2.5 mm预先用26 G针头定位穿刺并进行引导，可避免针距不等和结扎的松紧不一，兜住睫状体全层。该改良方法手术创伤小，手术效果佳，不需作巩膜瓣和切开深层巩膜，单缝线、单结方式避免了线结暴露，也可与虹膜、晶状体、玻璃体等手术同期进行。

摘要编号：**209920**

面板编号：**OTR-1211**

推注器辅助四襻式人工晶状体巩膜缝线固定术

第一作者：**Yong YAO**

目的：介绍一种采用10-0聚丙烯环状缝线的改良四襻式可折叠人工晶状体巩膜层间固定技术，旨在降低缝线暴露风险并增强囊膜支撑不足眼内人工晶状体的居中性稳定性。

方法：本回顾性干预研究纳入2023年1月至2024年1月期间接受改良四襻式人工晶状体巩膜固定术的9例患者（9眼）。

结果：平均随访10.89个月，术后LogMAR最佳矫正视力（20/43）较术前（20/130）显著改善。人工晶状体平均倾斜度为 $0.27 \pm 0.09^\circ$ ，内皮细胞丢失率（9.96%）处于可接受范围。所有病例均未发生术中及术后并发症。

结论：该术式通过微小切口实现四点固定，不仅可获得可靠的人工晶状体定位和视觉质量改善，还能有效规避缝线相关并发症的发生。

摘要编号：**203607**

面板编号：**OTR-1201**

树鼩创伤性视神经病变模型揭示轴突损伤与神经炎症

第一作者：**Jianshu KANG**

共同作者：**Xin TAN**

目的：采用重力打击法建立树鼩创伤性视神经损伤模型，探讨外伤性视神经病变（TON）的潜在损伤机制，为后续机制研究与治疗提供新视角。

方法：共24只树鼩随机分为假手术组（Sham, n = 12，仅行头皮切开）和创伤性脑损伤组（TBI, n = 12）。TBI组采用Marmarou自由落体打击法建立模型，并从行为学、组织学及分子学层面系统评估视神经损伤机制。

结果：TBI树鼩在损伤后表现为持续的运动功能障碍，损伤后第1天和第7天的旷场活动显著下降。HE染色显示视神经纤维排列紊乱、数量减少，并伴随炎细胞浸润和局灶性出血。免疫组化结果表明，神经丝轻链蛋白（NF-L）显著升高，提示轴突结构破坏与异常释放。q-PCR检测显示星形胶质细胞向促炎的A1型极化，同时ELISA证实炎症因子TNF- α 和IL-1 β 明显上调。免疫组化结果GFAP表达亦显著增强，提示存在持续的反应性星形胶质细胞增生。上述结果共同指向TBI后树鼩视神经发生持续的轴突损伤与神经炎症。

结论：创伤性脑损伤通过直接机械应力和继发性炎症反应，诱发树鼩视神经轴突变性及星形胶质细胞反应性增生，最终导致持续性视神经损害。本研究为TON的病理机制研究和潜在干预策略提供了实验依据。

摘要编号：**205098**

面板编号：**OTR-1202**

铁锈窃走的视界：一例迟发性铁质沉着性青光眼的六年之殇

第一作者：**Shaolei HAN**

目的：探讨眼内铁质异物长期滞留所致迟发性铁质沉着性青光眼的临床特点、诊断及治疗策略，强调早期识别与干预的重要性。

方法：患者，女性，54岁，因“左眼胀痛、视物不清1个月”就诊。既往史：6年前有左眼外伤史，并于外院行“白内障摘除联合人工晶体植入术”。眼部检查：左眼视力0.02，结膜充血，角膜水肿，颞下方角膜缘混浊，虹膜前粘连，瞳孔光反射迟钝，人工晶状体在位，眼底视盘C/D = 0.9、色淡黄，眼压42 mmHg。采用眼部CT、超声生物显微镜（UBM）、电生理进行综合评估。

结果：眼部CT示左眼球颞下方球壁金属异物，伴有伪影；UBM示颞下方睫状体区探及一3.16 mm强回声异物伴声影。电生理提示左眼F-VEP P2波和F-ERG振幅极重度下降，视功能严重受损。行异物取出术，确诊为铁质异物（ $3.0 \times 1.5 \times 0.5$ mm）。术后眼压降至22 mmHg，但视功能无恢复。

结论：眼内铁异物长期存留可通过铁离子毒性作用引起小梁网功能障碍及视网膜神经组织变性，导致继发性青光眼及不可逆视功能损害。UBM在睫状体微小异物检测中具有关键诊断价值。手术取出异物是控制病情发展的有效方法。本研究提示，对于任何有眼外伤史的不明原因单眼青光眼、白内障等患者，有必要将隐匿性眼内异物纳入鉴别诊断，以实现早期干预，避免视功能永久性丧失。

摘要编号: 209420

面板编号: OTR-1204

食蟹猴全眼球移植手术 SOP 的探索

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共同作者: Chengjie HE, Jiayi JIN, Liuxueying ZHONG

目的: 对于眼球结构、功能损毁的患者, 眼球移植是最后的希望。当前, 全眼球移植研究主要受限于三个关键因素: 有效灌注、视觉神经再生和免疫排斥。针对这些难点, 建立合适的动物模型来深入研究是必要的。非人灵长类动物的眼部结构功能与人类高度相似, 建立食蟹猴全眼球移植模型并进行系统性研究, 有助于推动标准化手术方案的建立, 为全眼球移植未来的临床应用奠定基础。

方法: 本研究建立食蟹猴同种异体全眼球移植模型, 探索并比较“先静脉后动脉”和“先动脉后静脉”两种不同血运重建手术策略对移植植物存活的影响。术中结合先进的手术导航技术, 以优化血管吻合和移植植物保存效果。术后监测眼前段、视网膜结构和电生理功能等实时变化, 评估不同手术策略的效果。

结果: 采用“先静脉后动脉”手术策略成功实现移植眼球结构和视网膜电生理功能的保存。移植眼角膜和晶状体保持透明, 光学相干断层扫描证实视网膜结构完整, 各层结构清晰可辨, 视网膜电图检测显示了反应波形。同时, 组织病理显示“先静后动”组移植眼球结构保存良好。

结论: 本研究证实了非人灵长类动物全眼球移植手术模型的可行性。研究结果表明, “先静脉后动脉”的血运重建策略更有利于移植眼球的存活和功能维持, 这可能与优先建立静脉回流减少视网膜水肿有关。同时, 精确的血管吻合技术和有效的低温灌注是手术成功的关键因素。这已研究模型的建立为全眼球移植的临床应用奠定了重要基础, 有望为严重眼损伤患者带来新的治疗希望。

摘要编号: 209917

面板编号: OTR-1209

高度近视黄斑裂孔手术技巧

第一作者: Yong YAO

目的: 黄斑裂孔是高度近视的常见并发症, 是造成患者视力损害的重要原因。手术是治疗高度近视 MH 的主要方法, 但由于眼轴增、后巩膜葡萄肿、脉络膜萎缩等因素使手术难度大、黄斑裂孔闭合率低、视力预后差, 如何提高裂孔闭合率和视功能改善率是目前国内外研究的热点。现就高度近视 MH 手术治疗中的一些技巧进行介绍。

方法: ① 术后裂孔未闭者, 除自体 ILM 移植外, 还有其他的移植材料如羊膜可以考虑应用到高度近

视 MH。人羊膜填塞或覆盖的方法可有效提高 MH 闭合率, 且术后患眼功能有明显改善。羊膜组织填塞裂孔并与视网膜组织黏附, 有助于在裂孔处形成相对封闭的解剖环境, 从而促进闭孔的愈合。人羊膜填塞还有助于吸收裂孔周围的视网膜下液体, 在更复杂的情况下也能保持相似的解剖和功能结果。

② 在眼轴过长的患者中, 进行眼内注射难度较大, 尤其是在重水下注射粘弹剂固定覆盖裂孔的组织材料时, 针头需靠近视网膜表明操作, 有损伤视网膜风险。我们将注射器连接三通接头固定在玻切头的移液管路中, 通过助手推注射器, 主刀固定玻切头的方式进行眼内注射, 增加稳定性, 同时也无需其他特殊针头等耗材。③ 在高度近视患者中, 常规器械进行黄斑区剥膜时长度不够, 在没有加长器械时, 我们可以进行玻切穿刺口后移几毫米(通过顶压确认平坦部宽度), 减少穿刺口到后极部的距离, 避免操作时对眼球壁的压迫, 增加稳定性。

结果: 通过技巧创新降低手术难度, 减少手术操作带来的医源性损伤, 提高 MH 闭合率, 且术后患眼功能有明显改善。

结论: 近些年高度近视 MH 手术治疗成为国内外交流热点, 日新月异的手术创新使得手术成功率明显提高, 未来如何进一步改善患者手术术后视功能是重要的发展方向。

眼底内科

摘要编号: 209703

面板编号: RME-1233

AGEs/AGER 通过 ROS 生成与 JNK 信号通路激活诱导人视网膜内皮细胞凋亡

第一作者: Yan ZONG

目的: 本研究旨在分析晚期糖基化终末产物(AGEs)对体外培养的视网膜内皮细胞(RECs)凋亡的影响。

方法: 将视网膜内皮细胞暴露于不同浓度的 AGEs 中。通过测量 AGEs 受体(AGER)的表达来探究 AGEs/AGER 轴的作用; 检测活性氧(ROS)以指示 RECs 的氧化应激水平; 通过蛋白质印迹法检测总 JNK 及磷酸化 JNK(p-JNK)水平; 通过流式细胞术评估细胞凋亡。

结果: AGEs 以剂量和时间依赖性的方式分别提高了 AGER 的表达。此外, 结果还显示, AGEs 预处理促进了 ROS 的生成和 RECs 的凋亡。当使用 siRNA 阻断 AGER 后, AGEs 诱导的 ROS 生成和细胞凋亡得到部分恢复。重要的是, AGEs 预处理

激活了 JNK 信号通路, 而该通路与细胞凋亡和增殖抑制密切相关。

结论: 本研究证实, AGEs 在体外通过 ROS 生成和 JNK 信号通路的激活, 诱导视网膜内皮细胞中 AGER 的表达并引发细胞凋亡。

摘要编号: **210110**

面板编号: **RME-1238**

BDUMP 合并紫杉醇导致的黄斑囊样水肿 1 例

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共同作者: **Jun XIAO, Jialin YANG, Xiaolin ZHOU**

目的: 描述并分析 BDUMP 的多模式影像学特征。对紫杉醇导致的黄斑囊样水肿病因及病理机制进行诊断和讨论。

方法: 对一例罕见的 BDUMP 合并紫杉醇导致的黄斑水肿患者进行眼底彩照、FAF、OCT、FFA 等影像学检查。

结果: 患者女, 57 岁, 以“双眼视力下降 7 个月”就诊, 视力 0.6 OD, 0.2 OS, IOP 正常。8 年前诊断乳腺癌, 术后病理诊断为乳腺浸润性导管癌。7 月前自觉双眼视物模糊。6 月前复查发现肿瘤脑、骨、肾转移, 故行白蛋白结合型紫杉醇化疗及靶向药治疗(帕妥珠单抗、地舒单抗)。用药持续 4 个月, 期间自觉视力下降逐渐加重。检眼镜下见后极部及中周部斑片状色素减退病灶和条索样色素增殖, 呈斑驳样眼底改变。彩色眼底照相见橙色网状色素沉积与脱色素区域交替。FAF 呈高低荧光交错形成的长颈鹿斑样改变, 高荧光与橙色网状色素区域相符, 低荧光区域与色素减退区域相符。OCT 可见双眼与高自发荧光区域对应的视网膜下高反射沉积物以及低自发荧光区域相符的 RPE 层萎缩缺损。FFA 呈与 FAF 相反的斑驳荧光。值得关注的是双眼 OCT 中观察到明显黄斑囊样水肿, 以及造影晚期花瓣样荧光积存, 但造影未见渗漏荧光。综合病史及临床表现, 考虑诊断为 BDUMP 合并紫杉醇导致的黄斑囊样水肿。予口服尼目克司治疗。1 个月后复查, 视力 0.8 OD, 0.4 OS, 双眼黄斑水肿较前好转, 眼底斑驳样改变较前无明显变化。

结论: BDUMP 是一种特殊的副肿瘤性视网膜病变, 由于原发肿瘤的内分泌功能, 刺激黑色素细胞弥漫增生导致, 常表现为交替分布的 RPE 萎缩斑块与网状色素沉着及视网膜下液。其主要治疗方案是控制原发肿瘤。紫杉烷类药物主要通过稳定微管抑制有丝分裂, 现广泛用于肺癌、卵巢癌等恶性肿瘤的化疗。紫杉烷类药物导致的黄斑水肿是该类药物的罕见不良反应, 白蛋白结合型紫杉醇导致黄斑水肿概率较紫杉醇或多西他赛更高。普遍表现为不伴有 FFA 渗漏荧光的囊样黄斑水肿。这可能与其

Müller 细胞毒性以及微管介导的 RPE 转运功能障碍有关。一般在停药 4-10 周后黄斑水肿可自行消退, 停药同时加用碳酸酐酶抑制剂可能会促进水肿的消退。

摘要编号: **208771**

面板编号: **RME-1229**

Bardet-Biedl 综合征一例

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目的: 通过 1 例双眼视力不佳的青少年患者的眼部临床表现, 结合患者全身病史, 临床诊断为 Bardet-Biedl 综合征, 经基因检测明确诊断。

方法: 通过眼部及全身的查体, 患者最佳矫正视力: 右眼: 0.03 (+1.50 Ds-2.50 Dc@10), 左眼: 0.05 (+2.50 Ds-2.25 Dc@5), 双眼球震颤, 眼底可见视盘颜色蜡黄, 视网膜血管细, 后极部视网膜可见椒盐样视色素沉着, 周边视网膜色素斑驳样改变。诊断为: 视网膜色素变性(双眼)。追问患者全身病史, 家长诉患儿出生后双足多趾, 行手术切除治疗。3 年前患者出现肾功能不全, 肾内科就诊后长期服用药物治疗。查全身一般情况见: 身高: 140 cm, 体重: 62 kg (BMI: 31.6 Kg/m²), 患儿身材肥胖, 发育落后。追问家族史父母有五代以内近亲结婚史。BBS 的临床表现特点包括主要症状及次要症状。主要症状包括: 视网膜色素变性、多指或趾、肥胖、男性性腺发育不良、学习障碍、肾脏异常。次要症状包括: 语言发育落后、斜视、白内障、散光、短指、并指、发育迟缓、多饮、多尿、共济失调、轻度痉挛、糖尿病、牙列拥挤, 牙发育不全。临床诊断标准应符合 4 条主要诊断或符合 3 条主要症状 + 2 条次要症状, 患者符合, 故临床诊断: Bardet-Biedl 综合征。

结果: 行全外显子测序基因检查: 该患者 16 号染色体携带 BBS2 基因的纯合致病突变。经 Sanger 测序确认, 患者携带的纯合变异遗传自父母双方。

结论: BBS 致畸、致残率高, 目前尚无特殊治疗措施, 主要为对症治疗。对 BBS 患者最重要的就是综合管理, 定期进行视网膜、肝肾功能、血糖、血脂及体重的管理, 避免近亲结婚是预防 BBS 的重要措施。对于双眼视网膜色素变性的幼儿患者, 应该全身查体并询问家族史, 提取有效的表现型, 尽快明确诊断, 并予以对症治疗。

摘要编号: 209164

面板编号: RME-1231

CYP4V2 基因新型复合杂合突变致 Bietti 结晶样营养不良 1 家系报道

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共同作者: Hongtao LIU

目的: 报道 1 个 Bietti 结晶样营养不良 (Bietti Crystalline Dystrophy, BCD) 家系的临床病理特点及其新的致病位点。

方法: 收集该 BCD 家系的临床资料, 通过 OCT、SLO、FFA+ICGA 多模态影像学描述其眼底特征, 应用全外显子组测序技术分析可疑致病基因, 并通过 Sanger 测序对变异进行验证。

结果: 该家系中 3 代 10 人。先证者 (II -2, 56 岁) 及其三妹 (II -6, 49 岁) 均表现为双眼晶状体后囊下混浊、视网膜萎缩伴结晶沉积物、黄斑裂孔且局限性视网膜脱离、FFA+ICGA 晚期后极部大片状强荧光, 基因检测结果显示二人携带 CYP4V2 基因的新的复合杂合突变, 一个是移码突变 c.810delT (p.A270fs), 另一个是错义突变 c.221T > C (p.F74S), 这与他们的 BCD 临床表型相匹配。而 II -4, III -1, III -2, III -4 仅携带其中一种突变, 他们的眼部未见症状及特征改变。BCD 是由 CYP4V2 基因突变使脂肪酸前体向 ω -3- 多不饱和脂肪酸的转化减少, 脂质代谢紊乱影响光感受器膜盘的再生, 从而导致光感受器损伤, 最终导致视网膜变性。而本例 BCD 家系在患者 II -2 和 II -6 中发现的两个位点在此前的文献中都未见报道。

结论: CYP4V2 基因 c.810delT (p.A270fs) 和 c.221T > C (p.F74S) 很可能是 Bietti 结晶样营养不良的一个新的复合杂合突变位点组合。

摘要编号: 209793

面板编号: RME-1234

EFEMP1 突变所致 Doyne 蜂窝状视网膜营养不良家系 1 例

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共同作者: Haixia JI, Zi-bing JIN, Luyao LI

目的: Doyne 蜂窝状视网膜营养不良 (DHRD) 是一种极其罕见的常染色体显性遗传性黄斑营养不良。其特征是眼底后极部大量黄白色类玻璃疣样沉积, 通常形成蜂窝状图案, 晚期继发视网膜萎缩和/或脉络膜新生血管形成。该病通常在疾病早期无症状, 大多数人直到 40 岁和 50 岁才会出现症状, 在晚期阶段, 视力可能低于 20/200。该病同一突变携带者间的临床表型变异性大。本文报告了中国第二例携带 EFEMP1 c.1033C>T(p.Arg345Trp) 杂合

突变的 DHRD 家系, 报道了其临床特征和分子遗传学发现。

方法: 一名 66 岁女性因双眼视物模糊 2 周来我科就诊。对先证者和她的女儿 (41 岁) 进行了全面的眼科检查, 包括最佳矫正视力、眼底彩照、光学相干断层扫描、视野、眼底自发荧光及眼底血管造影等。对先证者及其女儿、弟弟 (55 岁) 和弟弟的儿子 (25 岁) 共 4 位家系成员的血样进行采集, 并采用 Sanger 测序对 EFEMP1 基因进行检测。

结果: 先证者眼科检查诊断为晚期 DHRD, 视力右眼 0.2, 左眼 0.05, 表现为典型的蜂窝状玻璃疣、双眼黄斑区色素上皮增生伴 OCT 上可见高反射小灶, 视野检查双眼管状视野。基因测序结果显示, 所有 4 位家系成员的均检出 EFEMP1 c.1033C>T(p.Arg345Trp) 杂合突变, 该位点为文献已报道的致病突变。生物信息学分析表明, 该突变位点预测为高致病性, 可能通过改变了蛋白质的最后一个 EGF 结构域发挥作用。对比而言, 尽管女儿携带相同的致病突变, 其最佳矫正视力正常, 眼底影像学检查表现出视网膜神经上皮、椭圆体带及色素上皮层紊乱。

结论: EFEMP1 c.1033C>T(p.Arg345Trp) 杂合突变导致一个中国家庭的 Doyne 蜂窝状视网膜营养不良。与之前的报道不同的是, 该家系表现出年龄相关的表型可变性, 并提示可能存在不完全外显率: 同一致病变异携带者中, 中 - 重度晚期病变与轻度或隐匿表型并存。对变异阳性而临床轻/无症状个体的风险评估与随访策略、以及遗传咨询具有重要参考价值。

摘要编号: 203616

面板编号: RME-1220

GPR40 通过 ERK 信号通路调控视网膜小胶质细胞治疗年龄相关性黄斑变性机制研究

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目的: 年龄相关性黄斑变性 (AMD) 是导致老年人群不可逆视力损害的主要病因, 其病理机制涉及慢性炎症反应、氧化应激及异常脉络膜新生血管 (CNV) 形成。视网膜小胶质细胞作为中枢神经系统的重要免疫调节细胞, 在 AMD 进展中通过 M1/M2 表型极化失衡介导神经炎症及视网膜神经元损伤。G 蛋白偶联受体 40 (GPR40) 作为游离脂肪酸受体, 近年被发现参与调控炎症反应与细胞代谢, 但其在视网膜疾病中的作用机制尚未明确。本研究旨在探讨 GPR40 通过调控细胞外信号调节激酶 (ERK) 信号通路对视网膜小胶质细胞功能的干预作用, 及其在 AMD 治疗中的潜在机制。

方法: 通过构建碘酸钠诱导的 C57BL/6J 雄性小鼠非渗出性 AMD 模型进行体内实验; 采用脂多糖 (LPS) 诱导 BV2 小胶质细胞建立炎症模型进行体外实验。通过点鼻给药 GPR40 激动剂 GW9508 或 ERK 激动剂 C-C6 干预, 眼底 OCT、HE 染色等判断造模成功及视网膜萎缩程度。CCK-8 和 LDH 检验细胞药物活性, 利用 Western blot 检测 GPR40、ERK 通路蛋白、NLRP3 炎症小体表达, 免疫荧光染色观察小胶质细胞表型极化 (Iba1 标记), q-pcr、ELISA 定量炎症因子 (TNF- α 、IL1 β 、IL-10), TUNEL 法评估光感受器细胞凋亡, 视网膜铺片看小胶质细胞迁移等实验方法。数据采用 t 检验或单因素方差分析。

结果: 本研究首先通过免疫荧光染色及 Western blot 技术证实, GPR40 在小鼠视网膜和 BV2 小胶质细胞中高表达, 在碘酸钠诱导的 AMD 模型小鼠视网膜和 LPS 刺激的 BV2 炎症模型中表达显著上调, GPR40 特异性激动剂 GW9508 可显著抑制小胶质细胞向促炎 M1 表型极化, 降低肿瘤坏死因子- α (TNF- α)、白细胞介素-1 β (IL-1 β) 等炎症因子分泌, 同时促进抗炎因子 IL-10 及精氨酸酶 1 (Arg-1) 分泌。进一步机制研究发现, GW9508 通过抑制 ERK 磷酸化阻断炎症小体 NLRP3 激活, 从而减少炎症介质释放; 而 ERK 通路激活剂 C-C6 可逆转上述保护效应。此外, 值得注意的是, 我们通过体内和体外实验均发现 GPR40 介导抑炎作用有助于保护光感受器。

结论: 本研究揭示了 GPR40 受体在调控视网膜神经炎症中的作用及其分子机制, 通过抑制 ERK 信号通路调控视网膜小胶质细胞 M1/M2 极化, 从而减轻炎症微环境及氧化应激损伤, 减少光感受器的损伤。为 AMD 治疗提供了理论依据。

摘要编号: 202761

面板编号: RME-1216

PD-L1 通过 ERK 通路调控视网膜小胶质细胞活化减轻脉络膜新生血管渗漏的机制研究

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目的: 新生血管性年龄相关性黄斑变性 (NVAMD) 是导致老年人视力丧失的常见视网膜疾病, 研究发现神经炎症在其发病机制中起重要作用。本研究探讨小胶质细胞免疫检查点 PD-L1 (程序性死亡配体-1) 在 NVAMD 中的潜在功能, 及该分子在神经退行性疾病中通过调节小胶质细胞限制神经炎症的作用。

方法: 采用激光诱导 CNV 小鼠模型进行体内实验, 分离和培养原代小胶质细胞进行体外实验。通过

PD-L1 基因敲除及抗体干预, 结合眼底 OCT 成像、眼底荧光造影、免疫组化、Western blot、RT-qPCR、流式细胞术染色及分析、RNA-seq、CCK-8、ELISA 等实验方法进行分析。

结果: 我们发现激光损伤后视网膜小胶质细胞的 PD-L1 表达显著增加。在激光诱导的 NVAMD 小鼠模型中, PD-L1 敲除或抑制性 PD-L1 抗体治疗会加重血管渗漏和新生血管形成, 而这些效应可通过 PLX5622 清除小胶质细胞得到逆转。本研究证实脉络膜新生血管 (CNV) 可能受多种机制调控, 其中 PD-L1 信号调节为其中之一。阻断 PD-L1 可上调促炎因子及磷酸化 ERK (p-ERK) 水平, 提示小胶质细胞在 NVAMD 中的过度激活。相反, 增强 PD-L1 信号可通过 ERK 通路减轻神经炎症和病理性新生血管。

结论: 揭示了 PD-L1 在 NVAMD 中调控神经炎症和新生血管形成的关键作用, 提示其可能成为 NVAMD 免疫调节治疗的潜在靶点。

摘要编号: 210243

面板编号: RME-1240

UWF-OCTA 在周边格子样变性检测中的应用

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目的: 本研究旨在通过扫描激光检眼镜 (SLO) 引导的超广角光学相干断层扫描血管造影 (UWF-OCTA), 系统明确周边视网膜格子样变性区域的视网膜及玻璃体形态学特征, 并结合临床病例展示其在病变细节检出中的应用价值, 为临床评估及后续干预提供更精准的影像学依据。

方法: 本研究纳入眼科门诊确诊的 15 例周边视网膜格子样变性患者 (共 15 只眼)。所有患者均先通过 Optos Daytona P200T 型 SLO 进行 200° 超广角眼底扫描, 初步定位周边格子样病变的位置与范围; 随后采用常规 OCT 及 TowardPi BM-400K 型 UWF-OCTA (成像范围 24 × 20 mm, 轴向分辨率 3.8 μ m, 横向分辨率 10 μ m) 对病变区域进行扫描, 重点评估视网膜 (如视网膜裂孔、视网膜变薄) 及玻璃体 (如玻璃体牵拉、玻璃体脱离) 的形态学改变, 所有影像由 2 名具有 10 年以上眼底病诊疗经验的医师阅片。

结果: UWF-OCTA 在 15 只眼的周边视网膜格子样变性区域均检出特征性形态学改变, 具体包括玻璃体牵拉 (含典型 U 型牵拉)、视网膜裂孔、局灶性视网膜变薄、玻璃体脱离及视网膜下液体积聚。临床病例进一步提示, 常规 OCT 未发现明显异常, 而 UWF-OCTA 清晰展示病变区域视网膜形态学特

征以及捕捉到微小视网膜裂孔，为后续预防性激光光凝治疗提供了关键依据。

结论：UWF-OCTA 可实现周边视网膜的高分辨率成像，全面且清晰地显示周边视网膜格子样变性区域的视网膜及玻璃体形态学改变，尤其在微小视网膜裂孔等细微病变的检出上具有显著优势。SLO 引导下的 UWF-OCTA 能够定位病变并补充常规影像技术的不足，有望成为评估周边视网膜格子样变性的重要补充影像学工具，为临床筛选视网膜脱离高危病变、制定个体化预防性治疗方案奠定基础，同时也为后续探索其在临床决策指导中的价值提供了研究方向。

摘要编号：209599

面板编号：RME-1232

利用多模式眼科影像动态追踪羟氯喹视网膜毒性的发生发展特征

第一作者：Yunxia GAO

共同作者：Ming ZHANG

目的：利用多模式眼科影像动态观察羟氯喹（HCQ）致视网膜毒性的发生发展过程，多维度展示 HCQ 视网膜病变的早/晚期损害特征以及停药后视网膜结构与功能变化，客观评价 HCQ 视网膜毒性发生发展特征。

方法：19 例规律口服羟氯喹的女性患者，经 SS-OCT/OCTA、mf-ERG、30-2VF、FAF、CFP、SLO 等多模态影像功能检查对患者进行全面评估，分别对其进行 1-3 年密切随访追踪，每次均采用多模态眼科影像进行动态观察。

结果：1 例正常眼底患者在观察的第 1 年内逐渐进展至早期羟氯喹视网膜病变。及时停药后观察两年病灶仍继续加重。另 18 例已确诊经典型羟氯喹视网膜病变，其中 15 例均遵我科建议前往风湿免疫科门诊就诊调整用药即停用羟氯喹，只有 3 例患者因风湿免疫科医师因患者病情需要或其他原因，未停用 HCQ。经观察发现无论患者是立即停药还是继续口服羟氯喹，病情仍可能继续进展。3 例患者未停药，病情继续发展。15 例患者停药后仍有 14 例眼底损害呈进行性加重，在 SS-OCT（包含 En-Face 扫描），mf-ERG，视野，FAF 等眼科检查中有不同程度表现。而另外 1 例患者停药后眼底改变暂时未见确切病情恶化。

结论：HCQ 视网膜病变在停药后仍可能继续进展。对于长期规律服用 HCQ 的患者，建议定期进行早期 HCQ 视网膜毒性筛查。筛查方式包含多模式的 SS-OCT、FAF、30-2VF、mf-ERG 等眼科检查。筛查部位不要只局限于黄斑区，更需关注黄斑区以外区域，尤其是视盘周围视网膜应重点关注。发生

机制推测：停药后累积的 HCQ 未能及时被机体完全清除，或者尽管药物已从体内清除，但长期暴露于 HCQ 后受损 RPE 细胞和感光细胞的功能可能持续失代偿，导致进行性视网膜损伤。

摘要编号：210257

面板编号：RME-1242

原发性高草酸尿症致双眼草酸盐视网膜病变 1 例

第一作者：Huiying ZHANG

目的：探讨一例罕见原发性高草酸尿症 1 型（PH1）合并草酸盐沉积症视网膜病变的临床特征、诊断及治疗难点，分析其发病机制。

方法：回顾 35 岁男性患者的病史资料（糖尿病、高血压、肾衰竭及肾移植史），结合眼底彩照、OCT、OCTA 等影像学检查，以及基因检测（AGXT 基因分析）和家族史追溯，明确诊断。通过对比胱氨酸病、继发性高草酸盐尿症等疾病特征进行鉴别诊断。

结果：患者病程中表现为双眼视网膜结晶样沉积、黄斑周围环形色素增生及外层萎缩，OCTA 显示毛细血管血流缺失及新生血管形成。基因检测发现 AGXT 基因第 1 外显子 c.32C > G (p.P11R) 纯合变异，符合 PH1 型特征。肾移植后全身草酸盐排泄部分改善，但眼部病变持续进展（黄斑病变分级为 2 级）。鉴别诊断排除胱氨酸病（无角膜结晶体）及甲氧氟烷中毒史。患者糖尿病史可能加重视网膜血管损伤，但 PH1 特征性病变（RPE 增生、结晶沉积）主导病程。

结论：PH1 相关草酸盐沉积症视网膜病变临床罕见，以视网膜结晶沉积、RPE 增生及血管异常为特征，易与糖尿病性视网膜病变混淆。基因检测是确诊关键，AGXT 基因突变可明确分型。临床需警惕代谢性疾病与血管性视网膜病变的叠加效应，早期多学科干预或可延缓器官损伤。

摘要编号：208440

面板编号：RME-1225

双眼特发性视网膜血管炎合并原发性开角型青光眼一例

第一作者：Liu HAO

目的：报告一例双眼同时存在特发性视网膜血管炎与原发性开角型青光眼的罕见病例，探讨其临床表现、诊断难点、治疗过程及两者的关联性。

方法：回顾性分析一例 38 岁男性患者的临床资料。患者主诉“右眼视物模糊伴遮挡半月余”就诊。完善眼科检查包括：最佳矫正视力、眼压、裂隙灯、

房角镜、眼底彩照、光学相干断层扫描、广角光学相干断层扫描血管成像、荧光素眼底血管造影、视野检查、扫描激光检眼镜。同时进行系统病因学排查。

结果: 1. 诊断: FFA 示双眼周边大范围无灌注区, 交界区新生血管形成, 视盘高荧光伴毛细血管轻度炎性渗漏及开角、典型视盘及 RNFL 改变、视野缺损。系统检查未能明确视网膜血管炎病因, 诊断为“双眼特发性视网膜血管炎”、“双眼原发性开角型青光眼”。2. 治疗: 双眼给予抗 VEGF 治疗 1 次, 随后行全视网膜激光光凝术 (PRP)。初始使用前列腺素类似物 (拉坦前列素) 等降眼压药物。3. 治疗反应与并发症: 治疗期间出现玻璃体炎及前房炎症反应。考虑可能与疾病本身进展、拉坦前列素滴眼液副作用或 PRP 术后反应相关。停用拉坦前列素并加用局部激素滴眼液后, 炎症好转。4. 现状: 眼压控制未达标, 使用卡替洛尔滴眼液、溴莫尼定滴眼液、布林佐胺滴眼液。因存在眼部炎症活动, 青光眼医生暂不建议手术治疗。眼底情况仍需持续观察及进一步鉴别诊断。

结论: 1. 本例患者同时存在双眼特发性视网膜血管炎和原发性开角型青光眼, 两者可能为独立共存, 而非单一病因所致。2. 诊疗过程中出现新的炎症体征, 原因可能多样: 包括就诊时疾病早期体征未完全显现、拉坦前列素滴眼液的潜在诱发作用、或视网膜激光治疗后的反应。停用可疑药物并加用抗炎治疗有效。3. 此类罕见共存病例的治疗存在挑战, 需兼顾控制血管炎、控制青光眼和应对可能出现的炎症反应。药物选择需谨慎, 警惕诱发或加重炎症的可能。4. 目前眼压控制不佳, 但因活动性炎症存在, 手术干预风险高, 需密切监测病情变化, 积极控制炎症, 寻求最佳治疗时机与方案。特发性视网膜血管炎的病因仍需长期随访观察。

摘要编号: 210256

面板编号: RME-1241

基于 OCT 分型的糖尿病黄斑水肿抗 VEGF 治疗反应差异及其预测因子分析

第一作者: An GANG

目的: 本研究拟通过前瞻性临床观察和回顾性数据分析相结合, 系统评估法瑞西单抗治疗不同 OCT 分型 DME 患者的临床疗效, 分析相关 OCT 影像学标志物 (CMT、HF、ELM、EZ 等) 以及系统性危险因素 (如年龄、糖化血红蛋白、肾功能、血脂等) 与疗效的关系。

方法: 该研究是一项基于医院的回顾性结合前瞻性观察性队列研究, 纳入标准为: (1) 初次就诊符合 DME 患者的诊断标准; (2) 初诊时 CMT >

250 μm , BCVA > 0.05; (3) 既往接受视网膜光凝、玻璃体腔注射抗 VEGF 药物或激素治疗与此次治疗时间间隔至少 ≥ 3 个月; 排除标准为: (1) 有严重的屈光介质混浊影响眼底观察; (2) 非 DM 导致的黄斑水肿; (3) 伴有其他影响患者视力或眼底的疾病 (如青光眼、黄斑裂孔等); (4) 合并严重的全身疾病或者不能耐受相关检查及手术治疗者; (5) 既往 4 个月内有白内障手术病史; 6 个月内有玻璃体切除手术病史; 所有患者都接受全面的眼科检查, 包括最佳矫正视力 (BCVA)、眼压 (IOP)、彩色眼底照相、使用裂隙灯生物显微镜进行的散瞳眼底检查。BCVA 使用国际标准视力表测量, 并转换为最小分辨角对数 (LogMAR) 视力以进行数据分析。收集患者的临床信息, 包括年龄、性别、DM 病程、高血压病史、HbA1c、体重指数、血小板指标、血炎症指标、凝血指标、肾功能指标、血脂指标、OCT 影像学指标: CMT、内/外层 HF 计数、IRF/SRF 消退情况、ELM 及 EZ 完整性、SCP/DCP、FAZ 面积等, 每次均在玻璃体注药前进行。所有患者均执行 4+PRN 方案, 研究者根据 CST 和 BCVA 评估结果判断是否需要继续给药或延长治疗间隔。记录数据及发生的不良事件, 进行统计学分析。

结果: 记录 BCVA、CRT 较基线的变化 (LogMAR 字母), 比较 DRT 型、CME 型、SRD 型三组患者改善差异, 评估 OCT 分型 (DRT/CME/SRD) 对 BCVA 提升 ≥ 10 字母的独立预测能力。评估 1、3、6、9 个月时 BCVA、CRT 较基线的变化、IRF/SRF 较基线的消退情况及比例、12 个月内受试者接受法瑞西单抗治疗总针数、平均治疗间隔等。(5) 比较不同 OCT 分型患者的治疗间隔及注射频次差异。

结论: 预期不同 OCT 分型患者在短期及长期疗效上存在差异, 为个体化治疗提供依据。

摘要编号: 207877

面板编号: RME-1224

基于 OCT 影像组学的无监督机器学习区分 RVO-ME 预后亚型

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共同作者: Zhongping CHEN, Li LI, Shaozhao LUO, Xiaoyu YU

目的: 基于治疗前光学相干断层扫描影像组学 (OCT-omics) 特征, 运用无监督机器学习方法识别视网膜静脉阻塞合并黄斑水肿 (RVO-ME) 的不同表型聚类, 并评估其与抗血管内皮生长因子 (anti-VEGF) 治疗结局的关联。

方法: 分析来自南宁和广州爱尔眼科医院的 248 只眼接受抗 VEGF 药物治疗的 RVO-ME 患眼的治疗

前 OCT 图像。在使用主成分分析进行特征降维后，采用无监督聚类方法识别表型亚组。比较各聚类间的基线特征与治疗结局以验证聚类有效性。应用 Boruta 算法筛选最具相关性的 OCT-omics 特征，并通过多变量回归分析确定治疗结局的预测因素。

结果：共保留 948 个 OCT-omics 特征用于聚类分析得出两个表型不同的聚类。与聚类 2 (111 眼) 相比，聚类 1 (137 眼) 中视网膜中央静脉阻塞 (CRVO) 比例更高 (63.5% vs. 26.1%; $P < 0.001$)，基线最佳矫正视力 (LogMAR BCVA) 更差 (1.0 vs. 0.7; $P < 0.001$)，黄斑中心凹厚度 (CMT) 更厚 (724.0 μm vs. 445.0 μm ; $P < 0.001$)。随访期间，聚类 1 的 RVO-ME 复发率更高 (44.5% vs. 26.1%; $P = 0.003$)，且最终 BCVA $\leq 20/63$ 的患者比例更高 (56.2% vs. 39.4%; $P = 0.009$)。多变量分析显示，gradient_firstorder_Maximum (OR 1.597, 95% CI 1.150–2.254, $P = 0.006$) 与 logarithm_gldm_DependenceVariance (OR 1.016, 95% CI 1.005–1.027, $P = 0.005$) 与 RVO-ME 复发独立相关。而 wavelet.LH_firstorder_Mean (OR 0.044, 95% CI 0.009–0.210, $P < 0.001$)、gradient_firstorder_Maximum (OR 0.988, 95% CI 0.977–0.998, $P = 0.02$) 及 wavelet.HL_firstorder_Median (OR 1.751, 95% CI 1.040–3.015, $P = 0.037$) 与视力预后显著相关。

结论：治疗前的 OCT-omics 特征可有效区分具有不同解剖与视力结局的 RVO-ME 表型亚组。定量 OCT-omics 生物标志物可能作为疾病复发与视力预后的有效预测指标，为 RVO-ME 的个体化精准管理提供潜在工具。

摘要编号：210088

面板编号：RME-1237

基于多模态评估的 1 例氯氰碘柳胺钠中毒性视网膜病变病程及预后观察

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共同作者：Jun XIAO, Jialin YANG, Xiaolin ZHOU

目的：通过多模式影像检查，观察 1 例氯氰碘柳胺钠中毒性视网膜病变患者的视网膜结构及视细胞功能改变，并评估病程和激素治疗预后。

方法：回顾性分析了 1 例氯氰碘柳胺钠中毒病例的病史，首诊及激素冲击治疗后的 OCT、视野、全视野视网膜电图 (ffERG) 等表现。

结果：患者女，51 岁，因“双眼视物模糊 2 周”就诊，视力 0.25 OD, 0.5 OS, 右眼晶状体皮质略浑浊，双眼前节未见其他明显异常。患者自述 3 周前因“皮肤病”自行口服“阿维菌素氯氰碘柳胺钠片”3 天 (累

计摄入氯氰碘柳胺钠 450 mg)。OCT 示双眼视网膜外层结构消失，代之以弥漫的点状高反射病变；视野检查示双眼中心视野缺失；ffERG 提示双眼视锥、视杆细胞广泛损伤；其他眼底影像检查均未见明显异常。结合病史，考虑诊断为氯氰碘柳胺钠中毒性视网膜病变，予 1000 mg 甲泼尼龙静脉注射冲击治疗。2 周后复查，视力 0.4 OD, 0.6 OS；OCT 示双眼中心凹下视网膜结构较前改善，外层视网膜层次可分辨；视野检查示中心视野缺失较前略减轻。2 个月复查，视力 0.5 OD, 1.0 OS；OCT 示双眼中心凹下外层网膜反射清晰并向中心凹旁延伸；视野检查示双眼中心视野缺失较前显著好转；ffERG 示 6 项反应均较前好转，提示视细胞功能较前恢复。

结论：氯氰碘柳胺钠是一种卤代水杨酰苯胺化合物，血浆蛋白结合率高达 99% 以上，半衰期 2–3 周，是一种兽用广谱抗寄生虫药，作为解偶联剂，抑制线粒体的氧化磷酸化过程。其在眼部的毒性作用主要包括视神经损害和外层视网膜损害。由于该药禁用于人类，此类中毒十分罕见。本病例中观察到氯氰碘柳胺钠对外层视网膜尤其视细胞的毒性，这可能与其对线粒体的选择性作用有关。随访过程中视网膜外层结构的部分恢复提示氯氰碘柳胺钠的毒性作用是部分可逆的。由于激素冲击治疗与患者视功能和视细胞结构改善的时间有显著延迟，具体作用尚不明确，需要高度重视毒物代谢导致视细胞结构和功能自发恢复的可能。对于此类中毒病人，OCT 观察视网膜结构、视野评估宏观视功能、ffERG 评估视细胞功能，三者相辅相成，在长期随访中对患者视网膜结构和功能进行细致的评估。

摘要编号：208738

面板编号：RME-1228

应用 OCTA 观察视网膜静脉阻塞的虹膜血流变化

第一作者：Bi XUE

目的：应用光学相干断层扫描血管造影 (OCTA) 对视网膜静脉阻塞患者进行虹膜血流动力学检查，以期发现 RVO 的虹膜血流是否存在特征性改变。

方法：所有入组者均为我院门诊就诊患者。实验组为首发视网膜静脉阻塞 (RVO)，分为中央 (CRVO) 和分支 (BRVO) 两组。对照组为白内障，无高度近视及糖尿病者。每组 10 只眼，共 30 只眼。每只眼均行 OCTA 检查虹膜的血流情况，并以瞳孔边缘为基准，间隔 2 mm 分层收集内、中、外层虹膜血流密度 (IVD) 和灌注面积的四个象限数值。使用 SPSS 25.0 软件进行统计分析，使用单因素方差分析进行大组比较，LSD 法进行两两比较， $P < 0.05$ 为差异具有统计学意义。

结果：在正常组中，血管密度及灌注面积从高到低依次为颞下、颞上、鼻下、鼻上，RVO 组均低于正常组，CRVO 组更为显著。血管密度呈现出逐层递减的趋势 ($P = 0.000$)，且分层比较时 RVO 组较正常组明显下降 ($P < 0.01$)。灌注面积中层为最高，CRVO 组的内层灌注略有增加，中层 ($P = 0.061$) 及外层 ($P = 0.007$) 降低。

结论：RVO 的虹膜血管密度及灌注面积均降低，CRVO 产生的影响更大。

摘要编号：**200875**

面板编号：**RME-1213**

抗 VEGF 治疗 IV 期糖尿病视网膜病变合并糖尿病性黄斑水肿的疗效观察

第一作者：**Wang YIYUE**

目的：研究单纯行玻璃体腔内注射抗血管内皮生长因子药物治疗 IV 期糖尿病视网膜病变 (DR) 合并糖尿病性黄斑水肿 (DME) 患者的治疗效果

方法：回顾性临床研究，荧光素眼底血管造影、光相干断层扫描血管成像检查后确诊为 IV 期 DR 合并 DME 患者 18 例 (35 只眼) 的相关临床资料，纳入患者均接受抗 VEGF 药物 (康柏西普 0.05 ml/0.5 mg) 治疗，每月 1 次，连续 3 次，以治疗前为基线，对比观察末次抗 VEGF 治疗后 3 个月、治疗后 6 个月时最佳矫正视力 (BCVA)、黄斑中心凹视网膜厚度 (CMT)、微血管瘤 (MA) 数量、视网膜无灌注区面 (NPA) 面积、视网膜新生血管 (NVE) 面积以及视网膜血流密度 (VD) 变化，评估治疗效果。

结果：根据所有患眼末次抗 VEGF 治疗后 3 个月、6 个月随访，测得 BCVA (LogMAR) 从治疗前 0.43 ± 0.22 ，治疗后 3 个月升高为 0.17 ± 0.21 ，治疗后 6 个月升高为 0.281 ± 0.24 。CMT 从治疗前 $304.51 \pm 165.06 \mu\text{m}$ ，治疗后 3 个月降至 $226.67 \pm 68.22 \mu\text{m}$ ，治疗后 6 个月降为 269.46 ± 125.79 。MA 数量从治疗前 213.44 ± 62.49 个，治疗后 3 个月减少到 159.88 ± 47.22 个，治疗后 6 个月 MA 数量降至 178.33 ± 55.47 个。NPA 治疗前与治疗后 3 个月、治疗前与治疗后 6 个月、治疗 3 个月与治疗后 6 个月相比， P 值均 > 0.05 ，NPA 无明显变化。NVE 面积治疗前为 $1.05 \pm 1.56 \text{ mm}^2$ ，治疗后 3 个月面积减小至 $0.26 \pm 1.08 \text{ mm}^2$ ，治疗 6 个月后增长为 $0.90 \pm 1.78 \text{ mm}^2$ ，治疗后 3 个月 NVE 明显消退，治疗后 6 个月与治疗前相比 NVE 未见明显变化。在浅层血管复合体 VD 中，总体 VD 均数呈下降趋势 (无统计学意义)，其中旁中心凹区鼻侧治疗前与治疗后 6 个月相比，中心凹周上方治疗后 3 个月、治疗后 6 个月与治疗

前相比较， P 值 < 0.05 ，差异有统计学意义。深层血管复合体 VD 数值中，总体 VD 均数也呈现下降趋势 (无统计学意义)，其中旁中心凹区颞侧、鼻侧治疗前与治疗后 3 个月相比、治疗前与治疗后 6 个月后相比，旁中心凹区下方治疗前与治疗后 6 个月相比，中心凹周上方、颞侧、鼻侧治疗前与治疗后 3 个月相比、治疗前与治疗后 6 个月相比，外周 2 颞侧治疗前与治疗后 6 个月相比， P 值 < 0.05 ，差异有统计学意义。

结论：1. 单纯抗 VEGF 治疗 IV 期 DR 患眼，可以提高患者最佳矫正视力，CMT 下降，MA 数量减少，视网膜新生血管消退，但治疗后 6 个月视网膜病变可再次进展。2. 单纯抗 VEGF 治疗 IV 期 DR 患者，可以控制 NPA 的进展，但不能逆转 NPA。3. 抗 VEGF 治疗并未改善视网膜 VD，甚至导致局部区域 VD 下降。

摘要编号：**204998**

面板编号：**RME-1222**

早、中期年龄相关性黄斑变性的玻璃膜疣结构特征及脉络膜厚度及血流研究

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共同作者：**Jianchen HAO, Junmeng LIN, Liu YANG**

目的：研究本院中国人群中早、中期年龄相关性黄斑变性 (Age-related macular degeneration, AMD) 患者不同分期玻璃膜疣结构特征及脉络膜血流与厚度研究。

方法：本研究为回顾性研究。2023 年 1 月至 2024 年就诊于我院的 AMD 患者共 2628 名，分析影像学表现、根据玻璃膜疣的大小、分布进行分期，并对早中期 AMD 患者使用 SS-OCT 进行检测，包括玻璃膜疣体体积、脉络膜厚度、脉络膜体积、脉络膜毛细血管层 (Choriocapillary layer, CCL) 血管密度、CC 层血管区域、脉络膜血管指数 (Choroidal vascular index, CVI)、脉络膜血管容积 (Choroidal vascular volume, CVV)。并进一步用 AI 自动分割模型对脉络膜按解剖结构进行分层，分为毛细血管层、中血管层、大血管层。

结果：根据 2019 年美国眼科学会发表的 AMD 临床指南，对所有 AMD 患者分期并对早、中期 AMD 玻璃膜疣分型，其中至少一眼为早或中期且无晚期的 AMD 患者共 1816 人，占 69.1%；至少一眼为晚期 AMD 共 776 人，占 21.9%。其中地图状萎缩 36 人，占 1.4%。在至少一眼为早或中期且无晚期的 AMD 患者中分期以早期 AMD 最多占 42.7%，玻璃膜疣大小以小玻璃膜疣为主可分布于全视网膜，大中玻璃膜疣多分布于黄斑区，可伴有光感受器细胞损伤。共 69 人 134 只眼睛纳入了

我们回顾性 SS-OCT 研究。其中早、中期 AMD 患者 37 人 ($n = 70$)，对照组 32 人 ($n = 64$)，脉络膜厚度及血流指标平均 CVI 和 CVV 显著低于对照组，进一步分析脉络膜 CC 层的血流指标脉络膜毛细血管层血管体积 (Choriocapillaris Vessel Density, CCVD) 及脉络膜毛细血管层血流面积 (Choriocapillaris Flow Area, CCFA)，早、中期 AMD 患眼与正常眼相比显著降低 ($P < 0.001$)。自动分割模型对脉络膜按解剖结构进行分层发现大、中血管层的厚度、CVV 及 CVI 较正常对照组无统计学差异。

结论：中国人群中早、中期 AMD 患者以小玻璃膜疣为主，分期多为早期 AMD，大中玻璃膜疣更易出现在黄斑区，玻璃膜疣体积与脉络膜损伤指标 (厚度及血流) 相关，脉络膜损伤主要发生在毛细血管层，且与大、中血管层无关。

摘要编号：208654

面板编号：RME-1226

早期真实世界玻璃体腔注射 Faricimab 治疗黄斑新生血管的疗效及安全性研究

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共同作者：Qirui LI, Lingna RAO, Lu SHEN, Ling YUAN

目的：评估真实世界中玻璃体腔注射 Faricimab 治疗黄斑新生血管的疗效与安全性。

方法：本研究纳入于 2024 年 3 月至 2025 年 6 月在昆明医科大学第一附属医院首次诊断的黄斑新生血管 (MNV) 患者，所有患者均接受每月 1 次、连续 3 次的玻璃体腔 Faricimab 注射，操作由同一名经验丰富的医生完成。观察指标包括注药前及注药后 1 个月 (1 M)、2 个月 (2 M)、3 个月 (3 M) 的最佳矫正视力 (BCVA, 以 logMAR 计)、视网膜中心厚度 (CST)、视网膜下液 (SRF)、视网膜间液 (IRF) 及视网膜下高反射点 (SHRM)。

结果：本研究纳入 15 例 MNV 患者，其中 1 型 MNV 8 例，2 型 MNV 7 例。患者平均年龄 65.1 岁 (38–81 岁)，平均眼轴 23.98 mm (22.16–27.16 mm)。1. BCVA: 术后 1 个月 BCVA 与基线无显著差异 ($P > 0.05$)；术后 2 个月、3 个月 BCVA 较基线显著提高 ($P < 0.05$)。2. CST: 术后 1 个月、2 个月、3 个月 CST 较基线均显著下降 ($P < 0.05$)。3. 其他指标: 术后 1 个月、2 个月、3 个月 SRF、IRF、SHRM 较基线均呈下降趋势，但差异无统计学意义 ($P > 0.05$)。安全性: 研究期间未发生严重不良事件。

结论：玻璃体腔注射 Faricimab 治疗 MNV 可有效提升患者视力，降低视网膜中心厚度，恢复黄斑解剖结构，改善视觉功能，且安全性较好。本研究验

证了法瑞西单抗治疗 MNV 的短期疗效，但其长期效果及最佳给药方案尚需更大样本量和更长期随访研究进一步证实。

摘要编号：203073

面板编号：RME-1217

机器学习联合分子动力学模拟揭示农药暴露对高度近视视网膜脱离的风险机制

第一作者：Jiahao NIU

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目的：视网膜脱离的进展受遗传易感性、钙超载诱导的神经元损伤及氧化应激 (涉及有机磷农药) 影响，其中高度近视是其最强风险因素。本研究旨在整合生物信息学、WGCNA、机器学习、网络毒理学、分子对接及分子动力学模拟技术，深入探究视网膜脱离发病机制并识别潜在致病性农药。

方法：通过整合视网膜脱离数据集和高度近视数据集的差异表达基因，并结合网脱数据的 WGCNA 关键模块分析，筛选出 55 个候选枢纽基因。采用八种机器学习算法构建预测模型。排除两个存在显著过拟合 (RMSR 值较高) 的模型后，利用 SHAP 分析确定对网脱预测贡献度最高的 15 个基因。为此构建 ceRNA 调控网络，并创新性地开发反向靶向网络毒理学框架，筛选相关环境毒物。

结果：鉴定出三种候选农药——地虫磷 (fonofos)、特丁磷 (terbufos) 和对硫磷 (parathion) ——与核心靶点存在强相互作用。分子对接与分子动力学模拟进一步证实了这些农药与枢纽靶标蛋白结合的稳定性。功能富集分析揭示，细胞外基质相关通路及 VEGF-HSPGs 信号通路在 RD 发病中扮演重要角色。

结论：本研究通过多学科交叉整合策略，不仅阐明了高度近视与视网膜脱落共病的共享发病机制，更重要的是，首次揭示了有机磷农药暴露 (地虫磷、特丁磷、对硫磷) 与网脱风险之间存在一种新颖的机制性关联，建立了重要的生物学和分子连接，为网脱的环境风险因素识别和干预提供了新思路。

摘要编号：202763

面板编号：RME-1215

槲皮素通过 ERK/STAT3 途径调节小胶质细胞 M1/M2 极化并减轻视网膜炎症

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目的：视网膜炎症是多种视网膜退行性疾病 (如年龄相关性黄斑变性) 的重要病理特征，主要由小胶质细胞激活驱动。槲皮素 (Qu) 作为一种天然抗神

经炎症物质，其对视网膜炎症的作用及机制尚不明确。本研究旨在探讨槲皮素对脂多糖（LPS）诱导的视网膜炎症的影响及其潜在机制。

方法：采用成年雄性 C57BL/6J 小鼠，通过腹腔注射 LPS 建立视网膜炎症模型，并在造模前进行槲皮素预处理。通过体内外实验，评估小胶质细胞表型转换、视网膜炎症水平、血-视网膜屏障完整性及光感受器存活情况，并进一步利用体外实验研究 ERK/STAT3 信号通路在槲皮素调控小胶质细胞活化、增殖和迁移中的作用。

结果：槲皮素预处理可促使小胶质细胞由促炎 M1 表型向抗炎 M2 表型转变，显著减轻视网膜炎症反应，并增强血-视网膜屏障的稳定性。机制研究表明，槲皮素主要通过抑制 ERK/STAT3 信号通路，阻碍小胶质细胞的激活、增殖与迁移。此外，槲皮素处理显著提高了光感受器的存活率。

结论：槲皮素通过调控 ERK/STAT3 通路抑制小胶质细胞活化，缓解视网膜炎症，保护血-视网膜屏障结构和功能，并促进光感受器存活，表明其作为一种潜在的治疗策略可用于视网膜炎症性及退行性疾病的防治。

摘要编号：202248

面板编号：RME-1214

法瑞西单抗在难治性黄斑水肿治疗中的显著短期疗效：一项回顾性研究

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目的：难治性黄斑水肿（ME）对抗 VEGF 药物治疗反应不佳是临床常见问题。法瑞西单抗（Faricimab）作为一种新型双通路抑制剂，可同时阻断血管内皮生长因子 A（VEGF-A）和血管生成素-2（Ang-2）。本研究通过回顾性分析，评估法瑞西单抗治疗对抗 VEGF 药物（雷珠单抗、阿柏西普或康柏西普）反应不佳的难治性 ME 患者的功能与解剖学疗效，并分析其短期动态反应。

方法：本研究回顾性分析了 2024 年 1 月至 2024 年 12 月山西白求恩医院眼科收治的 62 例单眼难治性 ME 患者的临床资料。所有患者均曾接受至少 3 次雷珠单抗、阿柏西普或康柏西普治疗但反应不佳。按病因分为糖尿病性黄斑水肿（DME）组（n = 32）、新生血管性年龄相关性黄斑变性（nAMD）组（n = 22）和视网膜分支静脉阻塞（BRVO）组（n = 8）。所有患者转为每月 1 次的法瑞西单抗（6.0 mg）玻璃体腔内注射治疗，连续 3 个月。收集基线、每次注射后 1 个月及末次注射后 1 个月的最佳矫正视力（BCVA, logMAR）和黄斑中心凹厚度（CRT）数据，采用配对 t 检验评估每次注射

后 CRT 和 BCVA 的动态变化，并根据基线 OCT 形态特征进行亚组分析。

结果：经 3 次注射后，全体患者的 BCVA 和 CRT 均较基线显著改善（ $P < 0.001$ ）。BCVA 从基线的 0.72 ± 0.21 logMAR 提高至 0.59 ± 0.19 logMAR。平均 CRT 从基线 503.6 ± 112.4 μm 显著下降至 298.5 ± 87.3 μm 。动态变化分析显示，首次注射后 1 个月 CRT 即出现显著下降（下降值： 125.3 ± 68.4 μm , $P < 0.001$ ），后续注射后仍进一步改善。BCVA 在首次注射后亦显著提高（改善 0.05 ± 0.08 logMAR, $P < 0.01$ ），并随时间呈持续改善趋势。亚组分析结果表明，DME 组疗效最为显著，其 CRT 平均下降 189.2 ± 95.6 μm ，BCVA 改善 0.10 ± 0.08 logMAR。在 OCT 形态亚组中，黄斑囊样水肿（CME）型患者（n = 38）的 CRT 下降幅度显著大于弥漫性视网膜增厚（DRT）型（n = 17）或浆液性视网膜脱离（SRD）型（n = 7）患者（ $P < 0.05$ ）。

结论：本回顾性研究证实，法瑞西单抗对常规抗 VEGF 药物治疗效果不佳的难治性 ME 患者具有显著的临床疗效，可有效改善解剖结构和视功能，且安全性良好。DME 患者和 CME 亚型患者获益尤为明显。法瑞西单抗为难治性 ME 患者提供了有效的治疗选择。

摘要编号：209021

面板编号：RME-1230

法瑞西单抗治疗既往抗 VEGF 效果不佳的 Coats 病的疗效观察：一例病例报告

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共同作者：Yang GAO

目的：探讨法瑞西单抗在治疗既往抗血管内皮生长因子（VEGF）效果不佳的 Coats 病的有效性和安全性。

方法：报告 1 例 18 岁男性 Coats 病患者的诊疗过程。患者因“左眼视力下降 6 月”就诊，既往曾接受视网膜激光光凝及 3 次雷珠单抗玻璃体腔注射，但黄斑区渗出持续增加。本次治疗予以法瑞西单抗（6 mg/0.05 mL）玻璃体腔注射治疗，每月 1 次，共 5 次。通过系列眼科检查评估疗效，包括视力、眼底照相、光学相干断层扫描（OCT）、荧光素血管造影（FFA）和 OCT 血管成像（OCTA）。

结果：患者基线右眼视力 0.8、眼压 16 mmHg，左眼视力手动 /30 cm、眼压 17 mmHg。右眼眼底未见明显异常，左眼视网膜颞上区域见黄白色渗出，黄斑区可见浓厚渗出灶。FFA 提示右眼颞侧周边血管截断，伴无灌注区及末梢毛细血管球瘤样扩张；左眼颞上分支血管梭形膨大，晚期见黄斑及血管渗

漏，视盘荧光着染。诊断为双眼 Coats 病（右眼 I 期，左眼 IIB 期）。经 5 次法瑞西单抗治疗后，左眼视力提高至 0.02，视网膜周边及黄斑区渗出明显吸收，OCT 显示中心凹下残留高反射物质，OCTA 对应区域未见血流信号。治疗期间未发生眼压升高、眼内炎等不良事件。

结论：本病例表明，对于 Coats 病引起的眼底渗出，法瑞西单抗可能较雷珠单抗显示出更优的消退效果。法瑞西单抗或可作为 Coats 病，特别是伴有显著渗出的进展性病例的一种有效治疗选择。

摘要编号：210173

面板编号：RME-1239

法瑞西单抗治疗糖尿病性黄斑水肿的真实世界多中心回顾性研究

第一作者：Min FU

共同作者：Xinyu MA

目的：法瑞西单抗作为一种新型双特异性抗体，能够同时结合血管紧张素 II 和 VEGF-A，可能为单药疗效不佳者提供更优选择。本项多中心回顾性研究旨在评估法瑞西单抗治疗糖尿病性黄斑水肿（Diabetic macular edema, DME）的临床疗效。

方法：研究对象选自 2024 年 6 月至 2025 年 6 月眼科收治的 111 例 DME 患者，分为法瑞西单抗组（F 组，32 人）、其他抗 VEGF 药物组（A 组，63 人）和其他抗 VEGF 药物疗效不佳转换为法瑞西单抗组（A → F 组，16 人）。此外，我们的研究根据最佳矫正视力（Best corrected visual acuity, BCVA）将 DME 患者分为重度视力损害亚组（BCVA ≤ 0.25）以及轻中度视力损害亚组（BCVA > 0.25）。主要结局指标为 12 个月内患者最后一次随访时 BCVA 和黄斑区中央子区厚度值（Central Subfield Thickness, CST），次要终点包括治疗时间间隔、注射次数。所有数据采用 SPSS 23.0 软件进行分析。

结果：三组患者在接受治疗后均出现显著 CST 下降（所有 $P < 0.05$ ）。三组 Δ BCVA 与 Δ CST 差异无统计学意义（ $P > 0.05$ ），但法瑞西单抗组（F 组）CST 下降幅度最大（-258 μm ）。同时，法瑞西单抗的使用显著降低了患者的治疗负担包括间隔时间长难以坚持以及经济负担。研究结果提示在重度视力损害的患者中，法瑞西单抗组注射次数与间隔优势更为突出，提示法瑞西单抗双靶点干预可能延缓不可逆光感受器损伤；在轻中度视力损害组中，仅 Δ CST 显示出明显差异，表明法瑞西单抗组在视力较好的人群中能够有效地改善黄斑厚度。

结论：相较于传统初治组，法瑞西单抗初治组与转换组在 DME 治疗中展现出极大的优势，注射次数

最少、治疗间隔最长。重度视力损害亚组中转换为法瑞西药物治疗后治疗间隔显著延长。因此，双通道抗 VEGF 药物为需降低治疗负担的 DME 患者提供了优于传统方案及转换方案的现实选择。

摘要编号：203997

面板编号：RME-1221

真实世界中法瑞西单抗治疗新生血管性年龄相关性黄斑变性（nAMD）患者的有效性与安全性

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目的：评估真实世界中法瑞西单抗治疗新生血管性年龄相关性黄斑变性（nAMD）患者的有效性与安全性。

方法：采用前瞻性研究方法，纳入难治性 nAMD 患者，接受法瑞西单抗 6 mg/0.05 ml 负荷剂量治疗（每月 1 次玻璃体腔注射，共 3 次）。研究共纳入 20 例患者（17 例为典型 AMD [tAMD]，3 例为息肉样脉络膜血管病变 [PCV]）。所有患者此前均接受过至少连续 3 次其他抗 VEGF 药物玻璃体腔注射。主要结局指标包括 4 个月时的最佳矫正视力（BCVA）和 OCT 结果。

结果：法瑞西单抗治疗方案显著改善了难治性 nAMD 患者的视力和解剖结构结局。BCVA（logMAR）从 0.84 ± 0.47 显著改善至 0.57 ± 0.31 （ $p < 0.001$ ）；CST 从 $376.50 \pm 173.11 \mu\text{m}$ 显著降低至 $238.95 \pm 78.74 \mu\text{m}$ （ $p < 0.001$ ）；PED 面积从 $1.47 \pm 0.84 \text{ mm}^2$ 减小至 $0.92 \pm 0.65 \text{ mm}^2$ （ $p < 0.001$ ）；CNV 面积从 $1.36 \pm 0.79 \text{ mm}^2$ 减小至 $1.15 \pm 0.69 \text{ mm}^2$ （ $p < 0.001$ ）。SRF 亚组和 SRF&IRF 亚组均表现出显著的视力和解剖结构改善。单纯 SRF 眼相比 SRF&IRF 眼实现了更优的给药间隔延长（≥ 3 个月者超 80%，后者约为 40%）。安全性方面法瑞西单抗耐受性良好，未发生严重不良事件。

结论：法瑞西单抗可显著改善 nAMD 患者视力，并快速改善解剖结构结局。短期内，该药能显著提升 BCVA、降低 CMT，并减少视网膜积液，是既往经治难治性 nAMD 安全有效的治疗选择。

摘要编号：210293

面板编号：RME-1244

真菌性眼内炎 2 例

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目的：通过 OCT 与 OCTA 分析两例内源性念珠菌性眼内炎（ECE）患者的玻璃体、视网膜和脉络膜

特征, 探讨其与视觉功能预后的相关性, 并评估单纯抗菌药物全身治疗后的临床影响。

方法: 回顾性分析了两例 ECE 患者的病史、SD-OCT 图像及脉络膜毛细血管层 OCTA 图像。

结果: 两位患者的危险诱发因素均是住院期间长期使用中心静脉导管 (CVC) 高营养支持治疗, 在一例患者的 CVC 导管真菌培养中发现白色念珠菌阳性, 进一步证实了感染来源。两例患者的四只眼睛入组, 一只眼睛的玻璃体受累 (左眼视盘颞下方玻璃体内有一白色病变)。SD-OCT 连续跟踪随访显示, 四只眼睛病变均起源于 RPE/ 脉络膜层, 并穿透到神经感觉层, 内层视网膜结构清晰, 未受侵犯, 外层散在团块状物质沉积, 接近 subretinal macular lesions 的类型, 但病灶数量多, 且第一例有网膜下积液, 玻璃体内也有少量病原体侵犯。FAF 见后极部多发暗点, 周围围绕环形高自发荧光区。脉络膜毛细血管层 OCTA 显示, 病灶对应区域为多发暗区, 提示血流灌注不足, 可能为炎症导致的毛细血管的闭塞。两例患者在口服联合静脉抗真菌药物全身治疗后, 炎症均得到了有效控制, 且玻璃体炎症也有所改善, 多模式图像上表现为病灶的逐渐消退, IS/OS 连续性的恢复、RPE 的平复、脉络膜毛细血管层的恢复, 最终出现与穿透部位相对应的脉络膜视网膜瘢痕, 影响视网膜功能。第二例患者在初次检查时病灶似乎已经表现为消退期, 且逐渐稳定, 这可能跟初次检查眼底时已进行 40 天全身抗真菌治疗相关。

结论: 早期及时全身性通过静脉或口服给药的方式应用抗真菌药物, 通过保护视网膜外层结构维持光转导功能, 对 ECE 的控制有明显疗效, 视力得到明显提升, 轻微的玻璃体侵犯也可得到控制; RPE 下高反射的纤维样物质是 ECE 稳定期的表现, 对视力的影响取决于这些瘢痕物质的位置与黄斑中心凹的距离, 这种瘢痕是否进一步萎缩或者侵犯到其他位置, 需要更长时间的随访来观察。

摘要编号: 209938

面板编号: RME-1235

碘酸钠通过 ITPR2-VDAC1 通路诱导视网膜衰老表型的机制研究

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目的: 本研究旨在利用碘酸钠诱导的年龄相关性黄斑变性 (AMD) 样模型, 深入探究干性 AMD 的发病机制。我们重点验证了碘酸钠通过激活 ITPR2-VDAC1 通路、诱发钙稳态失调、线粒体损伤及细胞衰老在疾病发生中的核心作用, 并评估靶向该通路的干预效果。本研究旨在为阐明 AMD 的病理机

制提供新见解, 并为发掘潜在治疗策略提供实验依据。

方法: 在动物模型中, 通过腹腔注射碘酸钠构建小鼠 AMD 样病变模型。分别于给药后第 7 天和第 14 天检测 FP、ERG、OCT 以评估小鼠视网膜的形态学与功能变化。综合运用 RNA-seq、Western Blot、qPCR 等技术, 验证 ITPR2-VDAC1 通路在模型中的关键作用。进一步在小鼠模型中使用 ITPR2 与 VDAC1 抑制剂进行挽救实验, 证实抑制上述靶点可减轻碘酸钠诱导的视网膜病变和细胞损伤。

结果: 研究结果显示, 碘酸钠可诱导进行性视网膜变性及 AMD 样病理改变。在小鼠模型中, FP、OCT 结果显示, 碘酸钠腹腔给药造成小鼠视网膜组织结构损伤, ERG 结果显示小鼠出现明显视觉功能下降。RNA-seq 分析鉴定出 3000 余个差异表达基因, 主要富集于线粒体功能、氧化应激及细胞衰老等相关通路。机制研究表明, 碘酸钠通过上调 ITPR2 表达, 破坏钙稳态, 引发线粒体钙超载与氧化应激, 进而驱动细胞衰老。在动物模型中, 2-APB 与 DIDS 均能显著缓解碘酸钠引起的小鼠视网膜损伤, 表现出明确的保护作用。

结论: 本研究发现并系统阐释了碘酸钠通过 ITPR2-VDAC1 轴诱导视网膜细胞衰老的作用机制。该通路介导细胞内钙稳态失调、诱导线粒体功能障碍, 进而推动衰老表型的产生及 AMD 样病理改变。该发现不仅深化了对 AMD 发病机制的理解, 也为靶向 ITPR2-VDAC1 通路的治疗策略开发提供了重要的实验依据。

摘要编号: 210010

面板编号: RSU-1245

线粒体稳态失衡诱导糖尿病视网膜病变中视网膜血管内皮细胞损伤

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目的: 糖尿病视网膜病变 (Diabetic retinopathy, DR) 是糖尿病 (diabetes mellitus, DM) 的主要微血管并发症, 严重时可导致视力丧失。视网膜微血管内皮细胞 (retinal microvascular endothelial cells, RMECs) 功能障碍在 DR 发生发展中起关键作用, 而线粒体稳态失衡是导致 RMECs 损伤的核心环节。然而, DR 中 RMECs 线粒体紊乱的具体分子机制尚未完全阐明。

方法: 本研究采用高糖 (high glucose, HG) 诱导的 RMECs 模型和链脲佐菌素 (streptozotocin, STZ) 诱导的 Sprague-Dawley 大鼠糖尿病模型,

系统探讨 RMECs 线粒体功能障碍的机制。在细胞模型中，检测了细胞活力、线粒体形态和细胞凋亡情况；进一步通过蛋白质印迹、免疫荧光、荧光探针等技术，分析高糖对线粒体稳态的调控机制。为验证线粒体稳态在 DR 中的作用，在 STZ 大鼠模型中分别使用线粒体分裂抑制剂 Mdivi-1 和自噬激动剂雷帕霉素 (Rapamycin) 进行干预，并通过苏木精-伊红 (HE) 染色、TUNEL 染色、PAS 染色和伊文思蓝渗漏实验评估视网膜病理变化。

结果：高糖通过激活 Drp1 介导的线粒体过度分裂，诱导 RMECs 凋亡。抑制 PKC δ (使用 Go 6983 或 siRNA) 可下调 PKC δ /Drp1 通路，减轻线粒体分裂。同时，高糖通过抑制 PINK1/Parkin 通路削弱线粒体自噬，而敲低 PINK1 加剧了高糖引起的细胞损伤。机制上，Drp1 促进己糖激酶 II (HK-II) 从线粒体释放，进而抑制 HK-II-PINK1 介导的线粒体自噬，从而揭示了线粒体分裂与自噬间的交互作用。动物实验表明，STZ 大鼠出现视网膜内微血管异常，包括血管渗漏、无细胞毛细血管和细胞凋亡，而 Mdivi-1 或雷帕霉素预处理均可逆转上述病变。

结论：本研究揭示了 PKC δ /Drp1-HK-II-PINK1/Parkin 信号通路在调节线粒体稳态中的关键作用，该通路失调导致 RMECs 损伤并推动 DR 进展。抑制线粒体分裂或促进线粒体自噬，可能成为 DR 干预的潜在新策略。

摘要编号：210022

面板编号：RME-1236

肌腱蛋白-C 通过诱导视网膜色素上皮细胞的转分化在增殖性玻璃体视网膜病变中的作用和机制研究

第一作者：Zong TIANYI

目的：探讨肌腱蛋白-C (TNC) 在诱导 RPE 细胞转分化中的调节作用，从而明确 TNC 参与 PVR 进展的作用和机制。

方法：首先确定 RPE 细胞转分化的条件。通过实时定量 PCR、western blot、ELISA 观察 TNC 在转分化的 RPE 细胞中以及两种 PVR 动物模型中的表达模式。由 qPCR、western blot、CCK-8 观察干扰 TNC 基因后相关纤维化表型的改变。通过冰冻切片免疫荧光观察 TNC 在 PVR 患者的增殖膜中的表达以及与 RPE 细胞、成纤维细胞的共定位情况。在体内实验中，通过阻断剂 ICG-001 特异性阻断 β -catenin 信号通路，PVR 的病程进展明显被抑制。

结果：在体外，给予人 ARPE-19 (hRPE) 细胞 TGF- β 2 刺激，能够显著的增加 TNC 的表达。而给予 ARPE-19 细胞 TNC 的 siRNA 转染后，可以明显的抑制 TGF- β 2 诱导的转分化。在 PVR 小鼠模型中，观察到 TNC 的 mRNA 和蛋白的水平明显增加。此外，免疫荧光染色结果表明，在 PVR 患者的视网膜外膜中，TNC 与 RPE65 或 α -SMA 的共定位显著增加。整合素 α V 和 β -catenin 也在 PVR 患者的视网膜外膜中大量表达。在 PVR 的动物模型中， β -catenin 的抑制剂 ICG-001 能有效减缓 PVR 的进展。

结论：这些研究结果表明，TNC 由经分化的 RPE 细胞分泌，并通过整合素 α V 和 β -catenin 途径促进 PVR 的发展。因此，TNC 可能是抑制与 PVR 相关的视网膜前膜生成的潜在治疗靶点。

摘要编号：203366

面板编号：RME-1219

藏红花醛改善小鼠早期糖尿病视网膜病变的作用及机制研究

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目的：糖尿病视网膜病变 (DR) 是由糖尿病引起的视网膜微血管损害性眼底病变，病理特征表现为微血管瘤、出血、渗出及新生血管形成。藏红花醛是藏红花活性成分之一，具有多种抗炎作用，有研究表明藏红花醛还具有神经保护、抗氧化等作用。本研究拟通过对链脲佐菌素 (STZ) 诱导的糖尿病小鼠全身给药藏红花醛，探索藏红花醛对小鼠早期糖尿病视网膜病变的作用及机制。

方法：通过 STZ 腹腔注射小鼠进行糖尿病小鼠造模，14 天后隔天腹腔注射藏红花醛。3 月后进行小鼠眼部光相干断层扫描 (OCT) 及血流成像 (OCTA) 检测、石蜡切片苏木素伊红 (HE) 检测，及免疫荧光染色。伊文思蓝检测小鼠视网膜微血管渗漏情况；TUNEL 实验及视网膜电图 (ERG) 检测藏红花醛对小鼠视网膜的毒性；Western blot 检测相关蛋白的变化。

结果：1. SSOCT 示藏红花醛改善糖尿病小鼠视网膜内界膜到内丛状层厚度；2. HE 染色示藏红花醛改善糖尿病小鼠神经纤维层和神经节细胞层的萎缩；3. 免疫荧光染色示藏红花醛缓解糖尿病小鼠神经节细胞的减少，缓解小胶质细胞视网膜浸润；4. 低浓度的藏红花醛对小鼠视网膜没有明显毒性作用；5. Western blot 检测藏红花醛可抑制 p-AKT 的磷酸化 MCU 进自噬；6. 伊文思蓝实验显示藏红花醛可有效改善早期糖尿病视网膜微血管渗漏。

结论: 藏红花醛可以通过缓解视网膜神经节细胞的萎缩、改善视网膜微血管渗漏、减少视网膜小胶质细胞的浸润引起的验证等多方面改善小鼠早期糖尿病视网膜病变。

摘要编号: 208724

面板编号: RME-1227

造血干细胞移植后患儿并发巨细胞病毒视网膜炎的血液学指标预警分析: 一项单中心回顾性研究

第一作者: Ye LEI

共同作者: Liu HONGTAO, Xiu LIHENG

目的: 巨细胞病毒视网膜炎 (CMVR) 是造血干细胞移植 (HSCT) 后一种严重的机会性感染并发症, 可导致永久性视力损害。早期识别高危患儿并进行预防性干预至关重要。本研究旨在探讨 HSCT 后患儿的常规血常规指标与 CMVR 发生的相关性, 寻找有效的预警信号。

方法: 回顾性分析 2023-2025 年于我院行 HSCT 的 32 例患儿的临床资料及血常规化验结果。根据是否确诊 CMVR 分为两组: CMVR 组 (5 例, 其中 3 例为重度) 与非 CMVR 组 (27 例)。对比分析两组间淋巴细胞绝对值 (LYMPH#)、中性粒细胞绝对值 (NEUT#)、超敏 C 反应蛋白 (hs-CRP) 等指标的差异。

结果: CMVR 组患儿均表现出严重的淋巴细胞减少 (LYMPH# 范围: $1.21-1.73 \times 10^9/L$, 均低于参考值下限), 而非 CMVR 组淋巴细胞水平虽部分低下, 但存在较大异质性 (LYMPH# 范围: $0.34-30.19 \times 10^9/L$)。此外, CMVR 组患儿的炎症指标 hs-CRP 水平呈现升高趋势。两组在血小板计数、血红蛋白水平等方面均普遍低下, 但无组间差异。

结论: 本研究结果表明, 持续且严重的淋巴细胞减少 (Lymphopenia) 是 HSCT 后患儿发生 CMVR 的一个强烈关联信号和潜在的临床预警指标。建议对 HSCT 后出现深度淋巴细胞减少的患儿, 加强 CMV-DNA 的分子监测并提前进行眼科筛查, 以实现 CMVR 的早期诊断和干预, 改善患儿预后。

摘要编号: 210324

面板编号: RME-1243

间充质干细胞对 CocL2 缺氧视网膜血管微环境的修复

第一作者: Guo-xing XU

目的: 探讨间充质干细胞对 CocL2 缺氧模型视网膜血管微环境的修复。

方法: 采用无水氯化钴 CocL2 制作人视网膜血管内皮细胞缺氧模型, 应用骨髓间充质干细胞对人视网膜微血管内皮细胞微环境变化进行修复。

结果: 无水氯化钴 CocL2 对人视网膜血管内皮细胞缺氧模型细胞内外差异蛋白质和脂质等均受到氧化损伤的影响, 细胞内外微环境生物许多差异蛋白质等发生了显著改变。加入骨髓间充质干细胞共培养后人视网膜血管内皮细胞内外生物信息标志物差异蛋白和脂质等等发生了逆转, 加入骨髓间充质干细胞共培养后人视网膜血管内皮细胞内 MDA、SOD 水平下降, NO 水平升高, 其系列生物标志物、蛋白质和脂质等得到正向影响。

结论: 骨髓间充质干细胞对无水氯化钴人视网膜血管内皮细胞缺氧模型的氧化应激损伤有修复作用, 干细胞的保护作用为理解氧化应激损伤的分子机制和核心生物标志物奠定了基础。

摘要编号: 203348

面板编号: RME-1218

非视觉视蛋白 RGR 的剪接变体的生理作用体外研究

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目的: 非视觉视蛋白 RGR (视网膜 G 蛋白偶联受体) 主要存在于人视网膜色素上皮细胞 (RPE) 及 Müller 细胞中, 其作用是将全反式视黄醛转化为 11-顺式视黄醛, 使得生物在明适应情况下, 具有源源不断可消耗的 11-顺式视黄醛产生视觉电信号。RGR 的第六外显子缺失产生的剪接变体 RGR-d 在年龄相关性黄斑变性 (AMD) 患者视网膜中, 与 drusen 高度共定位。既往研究表明 RGR-d 体外错误折叠, 对细胞有毒性作用。然而正常年轻人 RPE 中 RGR-d 的转录本丰度可达 20%, 且随着年龄增长该比例上升。因此本研究拟进一步模拟体内正常 RPE 的生理状态, 通过共表达 RGR 与 RGR-d, 探索 RGR 对 RGR-d 毒性作用的影响。

方法: 拟构建分别携带 RGR 和 RGR-d 基因的慢病毒, 使 ARPE-19 共表达 RGR 和 RGR-d 蛋白 (R-d 细胞), 仅表达 RGR-d (N-d 细胞) 和仅表达 RGR (N-R 细胞), 通过免疫荧光、免疫共沉淀及透射电镜等实验观察 RGR 对 RGR-d 的影响。

结果: 1. RGR 与 RGR-d 在 ARPE-19 细胞内相互作用, RGR 与 RGR-d 高度共定位; 2. RGR 改善 RGR-d 引起的内质网应激, 缓解自噬抑制, 减少内质网应激诱导的细胞凋亡; 3. RGR 与 RGR-d 的细胞亚定位发生明显变化, R-d 细胞中的 RGR 与 RGR-d 明显定位于高尔基体, 具有内质网定位的倾向, 与 N-d 细胞和 N-R 细胞相比, 更少定位于溶

酶体；4. R-d 细胞中的高尔基体具有典型的囊袋-囊泡的极性结构，而 N-d 细胞囊袋较为肿胀，N-R 细胞的高尔基体呈现典型的高尔基体碎片样表现。

结论：RGR 的剪接体 RGR-d 具有一定的生理功能。当 RGR 与 RGR-d 同时表达时，RGR 与 RGR-d 正确定位于高尔基体上，较少被溶酶体降解。此外 RGR-d 还能够稳定高尔基体形态。当 RGR 表达逐渐缺失，RGR-d 表达增加时，RGR-d 在内质网中错误折叠，从而引起细胞毒性，引起 AMD 样视网膜萎缩病变。

眼底外科

摘要编号：208106

面板编号：RSU-1250

6 种新型 IOL 计算公式对白内障合并特发性黄斑前膜患者术后屈光度预测准确性研究

第一作者：Xiaoe FAN

目的：评估六种新型人工晶状体（intraocular lens, IOL）计算公式（BU II、EVO 2.0、Kane、Pearl、Castrop 以及 Hoffer QST）在白内障联合玻璃体切除（pars plana vitrectomy, PPV）治疗年龄相关性白内障（ARC）合并特发性黄斑前膜（IMEM）患者的屈光度预测准确性。

方法：回顾性系列病例研究。研究对象 2023 年 1 月至 2025 年 6 月我院因特发性黄斑前膜合并年龄相关性白内障患者接受白内障摘除、IOL 植入联合玻璃体切除（PPV）术的患者 38 例（40 眼）。术中均植入同一型号 Acrysof-IQ IOL。IOL 度数使用 IOL-Master 以 SRK-T 及 Haigis 公式计算所得。将屈光度预测值与患者术后 1-3 月的主觉验光结果进行比较，计算六种 IOL 计算公式的屈光误差（predictive error, PE）、PE 的标准差、平均绝对误差（Mean absolute error, MAE 值）、绝对误差中位数数（Median of absolute error, MedAE）和 PE 在 ± 0.25 D、 ± 0.50 D、 ± 0.75 D 和 ± 1.00 D 范围内的眼数百分比。并使用 Cooke 法进行公式预测性的比较。

结果：各公式 MAE 值由小到大依次为 Kane (0.220 D)、Pearl (0.248 D)、EVO (0.250 D)、Barrett (0.297 D)、Castrop (0.298 D)、Hoffer-QST (0.299 D)。MedAE 的变化范围为 0.210~0.280 D，6 种公式间的 APE ($\chi^2 = 10.72$, $P = 0.014$) 与 PE ($\chi^2 = 151.30$, $P < 0.001$) 差异均有统计学意义。术后 PE 在 ± 0.25 D 范围内患眼百分比由大到小依次为 Kane (64.71%)、

Pearl (58.82%)、Hoffer-QST (53.01%)、EVO (52.94%)、Barrett (47.09%)、Castrop (41.18%)，各公式组间百分比差异无统计学意义 ($\chi^2 = 3.15$, $P = 0.315$)。

结论：6 种公式预测 ARC 合并 IMEM 患者前后联合术后屈光度都有较高的准确性；就准确性而言，Kane 有最低的预测误差。

摘要编号：209526

面板编号：RSU-1255

HIV / AIDS 患者免疫重建综合征继发免疫恢复性葡萄膜炎一例报告及文献回顾

第一作者：Zhongping CHEN

共同作者：Hengwei LIU

目的：免疫恢复性葡萄膜炎（IRU）是 HIV / AIDS 患者接受高效抗逆转录病毒治疗（HAART）后免疫重建炎性综合征（IRIS）的严重眼部并发症，多见于 $CD4^+$ T 淋巴细胞基线水平 < 50 cells/ μ L 且合并巨细胞病毒（CMV）视网膜炎病史者。随着 HAART 的普及，IRU 发病率呈上升趋势，但其临床表现复杂，易与感染性葡萄膜炎混淆，需引起临床重视。本文报道一例典型 IRU 病例，探讨其诊疗要点及机制。

方法：男性患者，37 岁，右眼年幼时因外伤后失明，确诊 HIV 感染 9 年，规律 HAART 治疗（替诺福韦/拉米夫定/多替拉韦方案）18 个月，病毒载量持续低于检测下限， $CD4^+$ T 细胞升至 629 cells/ μ L。本次因“左眼视力下降 1 月”就诊。查体：左眼最佳矫正视力（BCVA）0.2，结膜无充血，角膜透明，KP (-)，前房中深，虹膜纹理清，无前后粘连，瞳孔圆，对光反射灵敏，晶状体白色不均匀点状混浊，玻璃体混浊 (+++)，眼底呈豹纹状，见陈旧性 CMV 视网膜炎瘢痕（颞上方视网膜萎缩灶），黄斑区皱褶，金箔样反光（OCT 示中央视网膜厚度 369 μ m）。实验室检查：房水 CMV-DNA 阴性，排除梅毒、结核及弓形虫感染。

结果：根据 HAART 后免疫重建时间窗（ $CD4^+$ 增幅 > 50 cells/ μ L）、CMV 视网膜炎病史及排除性检查，确诊为 IRU。治疗予以左眼玻璃体切除 + 黄斑前膜剥除 + phaco + IOL 植入术；局部强化抗炎：醋酸泼尼松龙滴眼液（1% q2h）、复方托吡卡胺散瞳（bid）。治疗 2 周后左眼裸眼视力为 0.12，目前仍在随访中。IRU 发病机制与 HAART 后 $CD4^+$ T 细胞快速重建导致的 CMV 抗原免疫应答过度相关。本例特征符合典型 IRU 诊断标准：① HAART 后 $CD4^+$ 恢复至 > 100 cells/ μ L；② CMV 视网膜炎静止期；③ 排除活动性机会感染。治疗核心在于解除黄斑前膜牵拉，控制炎症反应。文献回

顾显示, IRU 发生率为 11%–20%, 起病中位时间为 HAART 后 4–12 周, 与 CD4⁺ 增幅速率呈正相关。

结论: IRU 是 HIV / AIDS 患者免疫重建期的重要致盲性眼病, 早期识别需结合病史、免疫参数及多模态影像 (如眼底照相、OCT)。治疗强调个体化抗炎方案, 局部抗炎联合必要手术。临床医师需加强 HIV 感染者 ART 治疗后的眼科随访, 尤其对 CD4⁺ 低水平患者实施眼底筛查。

摘要编号: 203184

面板编号: RSU-1246

Tenon' s 囊下注射尿激酶辅助玻璃体手术治疗脉络膜上腔出血的临床效果

第一作者: Zhao XIQUAN

共同作者: Chai FANG

目的: 探讨术前 Tenon' s 囊下注射尿激酶对于辅助玻璃体手术 (PPV) 中引流脉络膜上腔出血 (SCH) 的临床效果。

方法: 本组病例共 5 例, 4 例 SCH 发生在内眼手术中; 一例 SCH 发生于闭合性眼外伤后。PPV 手术在 SCH 后 5–10 天。PPV 术前 12 小时–24 小时 Tenon 囊下注射 2000 IU 尿激酶, PPV 开始前, 角膜缘后 4 mm 做 1 mm 巩膜切口 (不穿透睫状体平坦部) 引流 SCH 后 (前房灌注加压维持眼压以利于引流出脉络膜上腔出血), 常规 PPV 手术, 其中 3 眼硅油填充, 1 眼气体填充, 1 眼未填充硅油及气体。

结果: 4 例 SCH 液化彻底, 术中完全引流出脉络膜上腔出血, 1 例引流出大部分脉络膜上腔出血, 术后 1 月残留 SCH 吸收, 所有病例术中无眼内持续出血等并发症。硅油填充眼均已取出硅油, 所有病例均观察 1 年以上, 均无 SCH 复发及视网膜脱离等发生。

结论: 术前 Tenon 囊下注射尿激酶对于辅助 PPV 引流脉络膜上腔出血有效, 该方法相对于术中眼内注射 tPA, 价格便宜, 可能引起眼内出血的风险更低。本组病例较少, 需要进一步研究来验证该方法的有效性及安全性。

摘要编号: 206792

面板编号: RSU-1247

儿童白血病合并眼底病变的临床特征及危险因素分析

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目的: 探讨儿童白血病合并眼底病变的临床特征及其相关危险因素, 为临床早期识别和干预提供依据。

方法: 回顾性纳入 2022 年 2 月至 2025 年 6 月在湖南省儿童医院确诊并完成眼底检查的儿童白血病患者 126 例。采用手持式免散瞳眼底照相机获取双眼后极部图像, 必要时结合 OCT/FFA; 以患者为单位判定结局, 任一眼出现异常即定义为合并眼底病变, 并按双眼较重表现归类主要类型。按是否合并眼底病变分为病变组 (n = 38) 与无病变组 (n = 88), 比较两组一般资料、血液学指标及分型差异, 并行二元 Logistic 回归筛选独立危险因素; 外周血白细胞计数 (WBC) 按连续变量纳入并以每增加 $10 \times 10^9/L$ 为一个单位, 化疗早期定义为诱导期。

结果: 眼底病变发生率为 (30.15%), 以视网膜出血最常见 (73.68%), 其次依次为视乳头水肿 (15.79%)、棉絮状斑 (7.89%) 及脉络膜病变 (2.63%)。病变组 WBC 显著高于无病变组, Hb 与 PLT 显著降低 (均 $P < 0.05$)。多因素 Logistic 回归显示: WBC (每增加 $10 \times 10^9/L$, OR = 2.13, 95% CI: 1.35 ~ 3.41, $P = 0.002$)、化疗早期 (诱导期, OR = 1.96, 95% CI: 1.12 ~ 3.15, $P = 0.010$) 及急性早幼粒细胞白血病 (APL) 分型 (OR = 2.74, 95% CI: 1.28 ~ 5.89, $P = 0.008$) 为独立危险因素。

结论: 儿童白血病眼底病变常见, 主要表现为出血性改变。WBC 升高、化疗早期及 APL 分型是其独立危险因素。建议眼底检查作为常规监测手段, 以利于早期识别和干预。

摘要编号: 208945

面板编号: RSU-1251

微创 PPV 手术对比 PRP 控制重度 sNPDR 进展的前瞻性队列研究

第一作者: Tao LI

目的: 探究微创玻璃体切除术 (Pars Plana Vitrectomy, PPV) 对比全视网膜激光光凝 (panretinal photocoagulation, PRP) 控制重度非增殖性糖尿病视网膜病变 (severe non-proliferative diabetic retinopathy, sNPDR) 进展的有效性和安全性。

方法: 将在中山大学中山眼科中心诊断为 sNPDR 的患者分为微创 PPV 手术组和标准 PRP 组, 干预后 1、3、6、9 及 12 月随访, 进行最佳矫正视力 (best corrected visual acuity, BCVA)、眼压、裂隙灯前置镜眼底检查、标准七方位眼底彩照、视野及 OCT 检查。PDR 的出现为本研究终点。主要结局指标为两种干预后 12 月内 PDR 的进展率, 次要结局指标包括: BCVA、黄斑中央区平均视网膜厚度 (central subfield thickness, CST)、视野、白内障发生率、糖尿病黄斑水肿 (diabetic macular

edema, DME) 发生率及视觉相关生活质量评分变化。

结果: 本研究 PPV 组纳入 27 人 27 眼, PRP 组 28 人 28 眼。两组基线特征: 年龄、性别、糖尿病病程、糖化血红蛋白 (HbA1c)、BCVA、CST 及人工晶体眼占比差异均无统计学意义 ($P > 0.05$)。主要结局指标: 治疗后 12 月, PPV 组无患者进展为 PDR, PRP 组有 2 眼 (7.14%) 进展为 PDR ($P = 0.595$)。次要结局指标: PPV 组 30-2 中央视野和 60-4 周边视野阈值积分均无明显变化, PRP 组 30-2 中央视野无明显变化而 60-4 周边视野阈值积分显著下降 ($P < 0.05$); PPV 组视力下降 3.0 个字母, PRP 组下降 3.4 个字母, 差异无统计学意义 ($P > 0.05$); PPV 组 CST 降低 21.4 μm , PRP 组升高 26.3 μm , 差异有统计学意义 ($P > 0.05$); PPV 组新发或加重的 DME 发生率分别为 22.2% (6/27), PRP 组为 46.4% (13/28) ($P > 0.05$); 视觉相关生活质量评分, PPV 组干预后精神健康和总积分提高, PRP 组干预后驾驶评分显著降低, 尽管都无统计学差异 ($P > 0.05$)。在治疗安全性上, PPV 组有 4 眼 (14.8%) 出现一过性玻璃体积血, 均在术后 1 月内自行吸收; 在有晶状体眼中, PPV 组 11 眼中有 5 眼 (45.45%) 出现白内障加重 (导致视力下降 ≥ 5 个字母), PRP 组 16 眼中有 4 眼 (25.00%) 出现白内障加重 ($P > 0.05$); 两组均未出现严重的治疗相关并发症。

结论: 对于 sNPDR 患者, PPV 可能提供与 PRP 相当的疾病控制效果, 并能更好地保留周边视野功能, 但需进一步研究验证这些发现并评估其长期疗效。

摘要编号: 208043

面板编号: RSU-1249

新型眼科补片应用于后巩膜加固术的实验研究

第一作者: Xiaodan ZHANG

目的: 病理性近视是导致视力不可逆损伤的重要原因, 其进展常伴随眼轴过度伸长、后巩膜葡萄肿等改变, 严重威胁视功能。后巩膜加固术作为控制其进展的关键手段, 目前临床却面临专用补片材料匮乏的问题, 现有材料在生物相容性、降解速率等方面存在局限, 制约了手术效果与安全性。因此, 本研究旨在通过应用三种补片行后巩膜加固手术, 对比评价三种补片安全性和有效性的异同。

方法: 应用三种不同补片 (牛心包、猪小肠黏膜下层 SIS、一种高分子材料) 对兔眼行后巩膜加固手术, 于术前、术后 2 周、1 个月、3 个月、6 个月检测眼表、眼压、眼轴长度、眼底病变、后极部视网膜脉络膜血液循环、生物力学效能及组织病理学分析。

结果: SIS 补片表现最优: 能稳定眼压、抑制眼轴增长, 改善眼底病变及维持视网膜循环效果更佳; 安全性高, 动物状态良好, 并发症少, 炎症轻, 与巩膜融合度高, 新生血管及肉芽增生适度; 降解速率与巩膜修复匹配, 6 个月完成有序再生。牛心包降解慢且易致慢性炎症; 高分子材料初期力学优, 但生物相容性差, 后期易出现植入物脱落及视网膜循环异常。

结论: SIS 补片因生物相容性佳、降解与再生同步、能长期维持巩膜强度且核心有效性突出, 有望成为临床理想选择, 为病理性近视长期干预提供可靠材料支持。

摘要编号: 209430

面板编号: RSU-1253

激素联合抗 VEGF 的混合双打与无菌性眼内炎

第一作者: Lanlan CHEN

共同作者: Fangtian DONG, Wen SUN

目的: 报道曲安奈德联合阿柏西普玻璃体腔注射后发生无菌性眼内炎一例。

方法: 个案报道及文献回顾。老年男性患者, 72 岁, 主诉右眼视物模糊 1 月余。既往: 1 月余前因“右眼黄斑水肿”行玻璃体腔注药术 (阿柏西普), 5 月余前行右眼白内障超乳 + 人工晶体植入术, 6 月余前行右眼不完全玻璃体切除 + 黄斑前膜剥除 + 玻璃体腔注药术 (曲安奈德); 患 2 型糖尿病。查体: 右眼 BCVA 0.2, 左眼 BCVA 0.6, 眼压正常, 右眼 IOL 位正, 左眼晶体混浊, 余前节 (-), 双眼豹纹状眼底, 未见明显异常。OCT 见右眼黄斑区神经视网膜内水肿囊腔。入院后行右眼玻璃体腔注药 (曲安奈德 2 mg/0.05 ml + 阿柏西普 2 mg/0.05 ml)。注药后 14 小时, 患者右眼视物模糊、无眼痛, 视力降至眼前指数, 结膜轻度充血, 睫状压痛 (-), 角膜尚清亮, 前房中深, tyn (+), 玻璃体混浊, 见曲安奈德颗粒附于玻璃体, 隐见视盘色可, 鼻侧周边见血管白线状改变, 周边视网膜斑片状出血灶; 注药后 38 小时, 患者视力降至光感, 出现角膜后弹力层皱褶, 房水及玻璃体混浊加重, 眼底窥不入。立即行玻璃体腔注射万古霉素, 并取玻璃体液送微生物宏基因检测。次日, 玻璃体混浊继续加重呈絮状, 予以行玻璃体切除术清除玻璃体混浊, 探查眼底见后极部白色颗粒沉积, 未见明显血管白线改变。

结果: 玻璃体切除术后, 患者视力逐渐恢复, 前节逐渐安静, 眼底除周边散在斑片状出血外无明显异常。玻璃体液微生物宏基因检测结果为阴性。患者随访 1 周时 BCVA 为 0.08, 1 月时 BCVA 为 0.3, 黄斑区水肿消退。

结论：虽然结合患者起病时间早、无眼痛、结膜充血轻等特点，考虑该患者为无菌性眼内炎，但因无法排除感染的可能性、且病情逐渐加重，故仍按感染性眼内炎进行了干预，最终玻璃体液微生物宏基因的阴性结果证实了无菌性眼内炎的诊断。目前无玻璃体腔注射激素联合抗 VEGF 后无菌性眼内炎的文献报道。推测两种药物的联合使用可能增加无菌性眼内炎的发病率，且起病更急、炎症更重。

摘要编号：**209638**

面板编号：**RSU-1254**

玻璃体切除术治疗玻璃体视盘牵拉致前部缺血性视神经病变的临床疗效及潜在机制

第一作者：**Jie YANG**

目的：本研究旨在探讨玻璃体切除术治疗玻璃体视盘牵拉致前部缺血性视神经病变的临床疗效及潜在机制。

方法：患者 42 岁女性，因左眼突然下方视物模糊 15 天入院，诊断为左眼玻璃体视盘牵拉综合征、视网膜前膜、双眼屈光不正。入院时左眼视力 0.08，眼底检查显示视盘水肿、颜色略淡、边界欠清，视盘前方可见膜样物质牵拉，下方盘周线状出血，视网膜血管迂曲，黄斑区大量黄白色星芒状渗出。辅助检查包括 OCT、视野、F-VEP、FFA 等，均显示视及黄斑区异常。治疗采用 25 G 玻璃体切除术，通过探头吸引和前移位使玻璃体与视盘分离，并剥离染色的视网膜前膜和内界膜。

结果：术后左眼最佳矫正视力提升至 0.2，半年后恢复至 0.4。OCT 复查显示玻璃体视盘牵拉完全解除，视乳头结构恢复，黄斑水肿减轻。视野缺损范围缩小，视盘牵拉解除，轻度水肿，颜色变淡。黄斑区组织黄白色星芒状渗出有所改善，中心凹光反射仍不见。术前术后对比显示，玻璃体切除术有效改善了解剖结构和视觉功能。

结论：长期的视盘牵拉可导致视盘充血并伴有神经功能障碍，可能通过阻碍轴浆流或改变通过乳头周围血管的层流而导致视神经萎缩，玻璃体切除术可有效解除玻璃体视盘牵拉，改善视盘及黄斑区的解剖结构，提高患者视力和视野。本病例表明玻璃体视盘牵拉可能是前部缺血性视神经病变的重要病因之一，解除牵拉的玻璃体切割手术为治疗此类病变提供了新的思路。然而，手术操作需谨慎，以避免进一步损害视力和视野。未来研究应关注玻璃体视盘牵拉与视神经病变的关联机制，以优化治疗策略。

摘要编号：**208988**

面板编号：**RSU-1252**

膳食可可碱与年龄相关性黄斑变性的关联：基于 2005-2008 年美国国家健康与营养调查 (NHANES) 及体外实验的结果

第一作者：**Ning AN**

共同作者：**Dongcheng LIU, Ziling LIU, Bo QIN**

目的：采用全国代表性成人样本及体外实验，探究可可碱 (theobromine) 与年龄相关性黄斑变性 (AMD) 之间的关系。

方法：分析 2005-2008 年美国国家健康与营养调查 (NHANES) 的数据，该数据包含 5485 名受试者，且这些受试者均有可可碱膳食摄入量及 AMD 相关的可用数据。采用多变量逻辑回归分析和平滑曲线拟合，探究潜在相关性；通过分段线性回归确定拐点，并开展交互作用检验与亚组分析。构建高碘酸钠 (NaIO₃) 诱导的人视网膜色素上皮细胞 (ARPE-19) 损伤模型，通过体外实验探究可可碱对细胞增殖、细胞内活性氧 (ROS) 水平，以及血红素氧合酶 -1 (HO-1)、超氧化物歧化酶 -1 (SOD-1) 表达的影响。

结果：控制潜在混杂变量后，多变量逻辑回归模型显示，膳食可可碱与 AMD 关联的比值比 (OR) 为 0.73 (95% 置信区间: 0.56-0.98)。平滑曲线拟合结果显示二者存在非线性关系，拐点为 60 毫克/天 (校正后 OR: 0.31; 95% 置信区间: 0.14-0.66)。亚组分析与交互作用检验显示，在不同人群特征场景中，这种负相关性均保持一致。在 NaIO₃ 诱导的 ARPE-19 细胞损伤模型中，可可碱可促进细胞增殖，降低 HO-1 表达，并提高 SOD-1 表达。

结论：膳食可可碱与 AMD 之间存在非线性负相关关系，且体外实验观察到可可碱具有抗氧化活性。研究结果提示，较高的可可碱摄入量可能与较低的 AMD 患病风险相关，其治疗意义值得进一步探究。

摘要编号：**208808**

视网膜内界膜的免疫荧光分析：探究内界膜剥除术后视网膜内层凹陷形成的可能机制

第一作者：**Yubo WU**

共同作者：**Yiqi CHEN, Jianbo MAO, Lijun SHEN, Xin YE**

目的：初探视网膜内界膜 (internal limiting membrane, ILM) 成分与内界膜剥除术后视网膜内层凹陷形成 (inner retinal dimples, IRDs) 的关系。

方法：本研究纳入接受玻璃体切割联合内界膜剥除术的全层黄斑裂孔 (full-thickness macular

hole, FTMH)、黄斑前膜(epiretinal membrane, ERM)及近视性黄斑劈裂(myopic foveoschisis, MF)患者。术后1个月(1M)和12个月(12M),采用光学相干断层扫描(optical coherence tomography, OCT) en face 层面检测 IRDs 数量;通过检测剥除的内界膜组织中胶质纤维酸性蛋白(gial fibrillary acidic protein, GFAP)、水通道蛋白-4(AQP4)及层粘连蛋白(laminin, LAMA1)抗体的平均免疫荧光强度与荧光面积,评估 Müller 细胞状态及层粘连蛋白丢失程度。采用 Pearson 相关分析与多元线性回归分析,探究内界膜成分与视网膜内陷凹的关联。

结果: 研究共纳入 12 例 FTMH 患者(12 眼)、14 例 MF 患者(14 眼)及 9 例 ERM 患者(9 眼)。Pearson 相关分析显示,术后 1 个月 IRDs 数量与 GFAP (+) 平均荧光强度($r = -0.440$, $P = 0.008$)、GFAP (+) 荧光面积($r = -0.640$, $P < 0.001$)及 LAMA1 (+) 平均荧光面积($r = 0.600$, $P = 0.004$)相关;术后 12 个月视网膜内陷凹数量与 GFAP (+) 平均荧光面积($r = -0.706$, $P < 0.001$)相关。多元线性回归分析显示,仅 LAMA1 (+) 平均荧光面积与术后 1 个月 IRDs 数量存在显著相关性($\beta = 0.517$, 95% 置信区间: 0.182-0.982, $P = 0.007$)。

结论: ILM 剥除术后 IRDs 形成数量,与视网膜内层 Müller 细胞的胶质反应状态及层粘连蛋白丢失程度相关。

摘要编号: 207693

面板编号: RSU-1248

非全层裂孔的黄斑视网膜劈裂不同阶段的干预效果评估

第一作者: 尹澜

目的: 探讨非全层裂孔的黄斑视网膜劈裂不同阶段的干预效果。

方法: 回顾分析 2021 年-2025 年间解放军总医院第一医学中心 176 例(295 眼)初诊时非全层裂孔黄斑视网膜劈裂患者(排除:晶体混浊度 III 级及以上、青光眼、内眼手术或其它视网膜病变),其中板层裂孔为 A 组,无裂孔为 B 组。按最佳矫正视力(BCVA)进行分组, ≤ 4.0 者为 A1 及 B1 组; $4.0 < BCVA \leq 4.5$ 者为 A2 组及 B2 组; $BCVA > 4.5$ 者为 A3 及 B3 组。手术方式为玻璃体切除、内界膜剥除、硅油填充。按是否手术进一步分组,手术的分为 A11、A21、A31、B11、B21、B31 组,未手术分为 A10、A20、A30、B10、B20、B30 组。记录如下数据:手术前后 BCVA、OCT 下裂孔闭合情况、劈裂恢复情况以及黄斑厚度、并发症;初诊未行手术、随访观察 2 年者 BCVA 下降及黄斑裂孔

情况。对各 A、B 组比较采用卡方检验,同条件下组间比较采用 t 检验。

结果: 1、BCVA 较术前提升幅度: A11 组 53.21%, A21 组 29.33%, A31 组 22.07%, B11 组 67.89%、B21 组 41.00%、B31 组 19.64%; BCVA 较术前提升眼别占比: A11 组 79.37%, A21 组 64.33%, A31 组 61.29%, B11 组 68.21%、B21 组 59.36%、B31 组 41.53%。BCVA 提升幅度方面, B 组整体优于 A 组, B11 优于 A11, B21 优于 A21, B31 与 A31 无统计学差异。BCVA 提升的眼别占比方面, A 组整体优于 B 组, A11 优于 B11, A21 与 B21 无显著差异, A31 优于 B31。2、术后所有黄斑裂孔均完全闭合。3、术后残存视网膜劈裂: A1 组 4.76%, A2 组 9.61%, A3 组 7.14%, B1 组 8.70%, B2 组 46.67%, B3 组 42.34%。视网膜劈裂复位率 A 组整体优于 B 组。4、初诊未行手术随访观察 2 年, BCVA 下降幅度: A10 组 19.35%, A20 组 37.81%, A30 组 33.96%, B10 组 27.72%、B20 组 43.75%、B30 组 38.57%。B 组较 A 组为剧。B 组出现黄斑裂孔比例为 14.23%, B10 组 37.04%、B20 组 18.20%、B30 组 12.91%。5、未行手术者各组均存在劈裂自发闭合,比例均低于 10%,组间及两两比较无显著差异。

结论: 1、未合并黄斑裂孔者术后 BCVA 提升情况优于有黄斑裂孔者, BCVA 越低,提升幅度越好,但高视力者,得到提升的可能性更大。2、合并黄斑裂孔术后劈裂复位率高于术前无黄斑裂孔者。3、如未行手术,无黄斑裂孔者视力降幅更大;视力低者更易出现裂孔。

眼整形眼眶病

摘要编号: 203537

面板编号: OOP-1257

一种新型微创驱逐排石技术在原发性泪小管炎治疗中的临床疗效观察

第一作者: Wang CHENGMEI

目的: 本研究旨在介绍一种不损伤泪点及泪小管的治疗原发性泪小管炎(PCC)的微创技术,即驱逐排石,为其治疗提供更好的选择。

方法: 这是一项前瞻性实验性研究,时间从 2020 年 6 月至 2023 年 6 月共 12 个月,纳入研究的原发性泪小管炎患者均采用了驱逐排石的治疗方法,并至少随访了 12 个月。该方法简述如下:从泪小管的结膜侧由内眦部向颞侧方向轻轻按摩,将泪小管

内的结石及分泌物自泪总管附近驱逐至泪小管壶腹部，继经泪点排出，反复操作，直至完全无结石排出，之后泪小管内注入妥布霉素地塞米松眼膏。我们评估了患者的人口统计学、临床特征及治疗结果。

结果：本研究共纳入了 90 例（90 眼）原发性泪小管炎患者，其中男性占 22.2%（20 例），女性占 77.8%（70 例），平均年龄 66.27 ± 14.15 岁。右眼 42 例（46.67%），左眼 48 例（53.33%），下泪小管受累 57 例（63.3%），上泪小管受累 27 例（30%），上下泪小管均受累 6 例（6.7%）。所有的患者均有分泌物增多的症状，其次常见症状包括眼红（88.89%）、溢泪（77.78%）、眼睑肿胀（55.55%）、异物感（11.11%）及眼部疼痛（6.67%）。85 例患者（94.44%）存在泪小管结石，同时伴发的体征包括黏液脓性分泌物（44.44%）、内眦部肿胀（38.89%）、泪点外翻（“撅嘴样”改变，33.33%）、结膜充血（27.78%）、泪小管扩张（22.22%）及泪小管阻塞（11.11%）。症状持续时间平均为 16 ± 11.06 个月。66.67% 的患者经过 1 次驱逐排石治愈，所有患者平均排石次数为 1.9 ± 0.83 次。比较了干眼和非干眼、年龄 < 70 岁和 ≥ 70 岁、男性和女性以及病程 < 15 月和 ≥ 15 月各个组内驱逐排石次数分布的差异，结果均无统计学意义，所有患者的症状及体征均得到了缓解。

结论：驱逐排石一种微创、安全、便捷、有效的方法。它保留了泪点和泪小管的解剖结构和功能，可作为原发性泪小管炎的一种治疗选择。

摘要编号：209180

面板编号：OOP-1263

儿童异常溢泪的病因分析

第一作者：Huiling QING

目的：旨在系统分析引起儿童异常溢泪的病因，重点探讨夜间睑裂症在其中的作用，并明确排除其他常见诱因，为临床精准诊断提供依据。

方法：对门诊以异常溢泪为主诉的患儿 16 例进行系统性评估，包括详细的病史采集、眼部常规检查、泪道功能检查以及裂隙灯等专科检查，以识别病因并进行鉴别诊断。

结果：在确诊的患儿中，夜间睑裂症被证实是导致儿童异常溢泪的一个重要但易被忽略的病因。同时，检查排除了其他常见诱因，如鼻泪管阻塞、结膜炎、过敏反应及眼睑结构异常等。

结论：夜间睑裂症是儿童异常溢泪的一个重要独立病因。临床诊断儿童溢泪时，在考虑常见原因的同

时，应将其纳入鉴别诊断范畴，并通过系统检查排除其他潜在诱因，以实现准确诊断和有效治疗。

摘要编号：207512

面板编号：OOP-1258

少见眼外肌内肿瘤 9 例临床病理分析

第一作者：Wang YI

目的：发生在眼外肌内的肿瘤非常少见。现报告 9 例发生于眼外肌内的肿瘤，以扩展眼外肌内肿瘤的鉴别诊断。

方法：总结过去 2 年里在我院就诊的眼眶肿瘤患者，8 例术前经影像学判断肿瘤发生在眼外肌内，全麻下行手术治疗明确病理诊断，1 例影像学检查显示双眼眼外肌内多发肿瘤，经全身检查证实为转移癌。排除标准：眼外肌周围的肿瘤侵犯肌肉组织，排除炎性假瘤、甲状腺眼病和 IgG4 相关眼病累及眼外肌。记录所有患者的临床资料、影像学资料和治疗经过。

结果：男性 3 例，女性 6 例，就诊年龄 35-72 岁。术前眼球运动无受限 1 例，受累眼外肌表现为收缩麻痹 6 例，挛缩 1 例，眼球固定 1 例。病理诊断为神经鞘瘤 2 例（内直肌和下斜肌各 1 例），颗粒细胞瘤 1 例（下斜肌），皮样囊肿 1 例（外直肌），间叶性软骨肉瘤 1 例（上直肌），上皮样肉瘤 1 例，PEComa 1 例（外直肌），肾透明细胞癌 1 例（外直肌）。1 例双侧各直肌均有转移，经乳腺病理和全身 PET 扫描确诊为乳腺癌。手术后眼球运动无受限为神经鞘瘤、皮样囊肿、颗粒细胞瘤。软骨肉瘤术后行放疗 50 Gy，目前随访 3 个月，未见复发。上皮样肉瘤放疗 50 Gy，目前随访 1 个月，未见复发。PEComa 经全身 PET 检查，证实为乳腺、盆腔多发转移，行靶向药治疗，眼部和全身情况稳定。肾透明细胞癌为靶向药临床试验入组患者，确诊眼外肌转移后退出临床试验，改行化疗，目前全身病情稳定。乳腺癌目前行化疗联合靶向药治疗，病情无加重。

结论：多种良、恶性肿瘤可原发于眼外肌，也可由全身恶性肿瘤转移至眼外肌。临床表现复杂多样。多需要病理确诊。良性肿瘤切除完整，可保留部分或全部眼外肌运动功能。恶性肿瘤需结合放射、化疗或靶向药多种治疗方法。

摘要编号: 208754

面板编号: OOP-1260

慢性泪囊炎型肉芽肿性多血管炎复杂病例报告

第一作者: Xinran DONG

目的: 报告一例以慢性泪囊炎为首发表现的肉芽肿性多血管炎 (GPA, 原韦格纳肉芽肿) 病例, 强调在复杂系统性疾病中, 眼科手术处理的时机与全身治疗配合的重要性。

方法: 患者男性, 59 岁, 主诉左眼流泪伴脓性分泌物一年余。既往有慢性鼻窦炎手术史及右眼巩膜炎史。查体见鼻软骨塌陷呈马鞍鼻畸形, 泪道冲洗显示左侧泪道阻塞并伴脓性分泌物。实验室检查示抗蛋白酶 3 抗中性粒细胞胞浆抗体 (PR3-ANCA) 阳性, C 反应蛋白及红细胞沉降率升高, 尿常规可见血尿及管型尿。胸部 CT 提示双肺多发结节病灶, 鼻窦影像学显示全组鼻窦炎及鼻泪管阻塞。结合 1990 年美国风湿病学会 (ACR) 诊断标准确诊为 GPA。

结果: 在泪囊炎长期脓性分泌物刺激、鼻部结构破坏及全身炎症活动背景下, 行鼻内镜下泪囊鼻腔吻合术 (DCR)。术中可见局部组织脆弱、出血明显, 泪囊与鼻腔结构粘连严重, 操作难度大。术后六个月泪道通畅, 感染控制良好。但患者因全身免疫抑制治疗未能持续, 二年后出现右眼角膜穿孔, 险致眼内炎, 拟行角膜移植术。

结论: GPA 相关泪囊炎病情复杂, 局部感染控制与系统免疫治疗需同步推进。鼻内镜下泪囊鼻腔吻合术在活动性炎症及组织脆弱情况下操作风险高, 需精准评估与术中保护。早期识别 GPA 并联合系统免疫抑制治疗可改善预后, 而延迟或依从性差易导致严重眼部并发症。

摘要编号: 209837

面板编号: OOP-1267

泪点周围肿物的临床特征与手术治疗

第一作者: Jingwen DING

目的: 泪点周围肿物由于累及外观和功能敏感的部位, 临床治疗相对棘手。本研究旨在观察其临床特征并评估肿物切除后眼睑和泪小管重建的手术效果。

方法: 回顾性分析 2017 年 1 月至 2023 年 12 月就诊于北京同仁眼科中心初次接受手术治疗和病理检查的泪点周围肿物病例, 收集一般资料、临床表现、病理分型和术后效果 (解剖、功能及外观)。手术采取矩形切除肿物同期利用滑行皮瓣和肌皮瓣联合泪道置管修复眼睑和泪小管缺损。

结果: 共纳入 66 例中国汉族患者 (68 只眼睑), 平均手术年龄 43.6 岁 (5 ~ 75 岁)。全部病例均为单眼发病, 多见于下睑 (49/68, 72%), 其中 2 例为分裂痣同时累及上下睑。术前所有患者泪道冲洗通畅, 仅 2 例有溢泪症状。术后病理结果显示非上皮来源肿物最多见 (62/68, 91%) 包括: 色素痣 (57/68, 84%), 化脓性肉芽肿 (2/68, 3%), 上皮性息肉 (2/68, 3%), 睑板腺囊肿 (2/68, 3%) 和神经纤维瘤 (1/68, 1%); 上皮源性肿物包括: 基底细胞癌 (2/68, 3%), 脂溢性角化 (1/68, 1%), 和上皮增生 (1/68, 1%)。平均随访时间 38.7 月 (3 ~ 70 月), 所有病例均获得满意的术后效果。3 例发生轻微倒睫, 2 例出现人工泪管相关并发症 (移位和肉芽增生), 仅有 1 例有溢泪症状而泪道通畅。

结论: 在处理泪点周围肿物时需要警惕恶性肿瘤的可能, 手术切除是主要的治疗方式。采用滑行组织瓣联合泪道置管的方法可有效修复鼻侧睑缘缺损。

摘要编号: 209269

甲状腺相关眼病外泌体影响疾病进展研究

第一作者: Yuanhui HAN

目的: 甲状腺相关眼病 (TED) 作为甲状腺自身免疫性疾病的常见并发症, 易引发眼球突出、视野丧失等严重后果, 早期诊断与干预意义重大。外泌体 (30-150 nm 胞外囊泡) 可调节免疫反应, 本研究旨在明确其通过 miR-335-5p/VWF 轴对 TED 进展的影响机制, 为 TED 的诊断与治疗提供理论支撑。

方法: 研究采用体外实验与体内实验相结合的方式开展。1. 体外实验: 以视网膜神经节细胞 (RGC) 为研究对象, 提取甲状腺相关眼病 (TAO) 患者眼眶脂肪组织中的外泌体, 通过超速离心法分离鉴定 (观察形态、检测粒径及表面蛋白); 随后用外泌体干预 RGC, 借助 CCK8、流式细胞术、Tunel 染色检测细胞增殖、周期及凋亡情况, 通过 WB 检测相关蛋白表达, 结合转录组与 miRNA 测序筛选差异分子, 再经 RT-PCR 验证及回复实验探究作用通路。2. 体内实验: 以 6-8 周 BALB/c 小鼠为模型, 分为 Control+EVs 组 (结膜囊滴入 TAO 患者外泌体) 与 Control 组 (滴入 PBS); 通过 HE 染色观察视网膜结构、Masson 染色检测下直肌胶原纤维, 利用 RT-PCR、Tunel 染色及免疫组化检测相关分子表达与细胞凋亡情况。

结果: 1. 体外实验结果: 分离的外泌体呈碗状囊泡, 平均粒径约 80.3 nm, 表面含 CD9、CD81 蛋白; 外泌体可抑制 RGC 增殖、阻滞细胞周期于 G0/G1 期并促进凋亡, 同时使凋亡相关蛋白 Caspase3、自噬蛋白 LC-3 II 及 Beclin-1 表达升高, 神经营

养因子 BDNF、GDNF 表达降低；筛选出差分子 miR-335-5p 与 VWF，外泌体可抑制 miR-335-5p 表达、促进 VWF 表达，且 miR-335-5p 可逆转外泌体对 RGC 的不良影响，该过程与 PI3K/AKT 通路相关。2. 体内实验结果：Control+EVs 组小鼠视网膜厚度变薄、结构紊乱，下直肌胶原纤维增多；miR-335-5p 表达降低、VWF 表达升高，细胞凋亡增加，且 Caspase3、VWF、自噬蛋白 LC-3 II 及 Beclin-1 表达升高，BDNF 表达降低。

结论：TAO 患者眼眶脂肪组织来源的外泌体，可通过抑制 miR-335-5p 表达，解除其对 VWF 的抑制作用，进而促进细胞凋亡与自噬，最终影响 TED 进展。该研究结果为 TED 的早期诊断标志物筛选及靶向治疗方案制定提供了重要理论依据。

摘要编号：**209864**

面板编号：**OOP-1265**

甲状腺眼病限制性肌病的脑活动和功能连接改变

第一作者：**Zilin FANG**

共同作者：**Xianqun FAN, Mengda JIANG, Duo Jin XIA, Haiyang ZHANG, Huifang ZHOU**

目的：甲状腺眼病 (thyroid eye disease, TED) 存在眼外肌受累，可导致限制性肌病，出现限制性斜视、复视和眼球运动受限。TED 限制性肌病对大脑的影响初有提示，但其脑结构功能重塑机制尚不明确。本研究旨在探究 TED 限制性肌病的脑活动和功能连接改变，并分析眼外肌测量指标与脑功能改变的关联。

方法：前瞻性招募 45 位 TED 患者，根据是否出现限制性肌病分为两组。每位受试者接受脑功能磁共振及眼眶磁共振成像，计算低频振幅 (amplitude of low frequency, ALFF)、功能连接 (functional connectivity, FC)，测量眼外肌长、短径。同时收集患者相关临床资料。比较两组受试者脑活动和功能连接改变，并通过相关性分析，探究脑功能与眼外肌磁共振测量指标、其他临床指标之间的关联。

结果：与 TED 非限制性肌病患者相比，TED 限制性肌病患者眼内压显著升高，甲状腺眼病生活质量问卷视功能评分显著降低，下直肌长、短径显著增加。TED 限制性肌病患者左颞中回 (left middle temporal gyrus, MTG.L) ALFF 显著升高，进一步基于种子点的 FC 分析发现，MTG.L 与双侧额中回 (middle frontal gyrus, MFG)、右小脑 FC 显著增强，提示存在代偿机制。相关性分析结果表明，在 TED 限制性肌病患者中，MTG.L 的 ALFF 值和垂直斜视度数 ($r = 0.3958, p = 0.0371$)、外直肌短径 ($r = 0.3984, p = 0.0396$) 正相关，

MTG.L 与右小脑的 FC 值和外直肌长径负相关 ($r = -0.5354, p = 0.0058$)，MTG.L 与 MFG.R 的 FC 和突眼度正相关 ($r = 0.4080, p = 0.0429$)、和上直肌长径 ($r = -0.4600, p = 0.0207$)、上直肌短径 ($r = -0.4538, p = 0.0227$) 负相关，MTG.L 与 MFG.L 的 FC 和突眼度 ($r = 0.4778, p = 0.0157$) 正相关、和上直肌短径负相关 ($r = -0.4746, p = 0.0165$)。

结论：本研究首次揭示了 TED 限制性肌病的脑功能改变，并发现其与眼外肌磁共振测量指标以及其他临床指标存在关联。值得注意的是，作为限制性斜视的典型代表，TED 限制性肌病的脑功能改变为未来探索这一复杂斜视脑重塑提供了初步的证据。

摘要编号：**209142**

面板编号：**OOP-1262**

眼眶静脉畸形硬化摘除术一例

第一作者：**Chengzhen GONG**

共同作者：**Rongxin CHEN, Chenqi XING**

目的：眼眶静脉畸形是成人最常见的眼眶脉管畸形之一，病变常呈进行性发展，可引起急性出血或眶尖综合征，严重时可导致视神经压迫性萎缩。由于其病变界限不清、术中易出血、手术切除困难，单纯手术或栓塞治疗均存在一定局限性。本文报道一例 46 岁女性左眼眶静脉畸形的诊治过程，旨在探讨硬化剂联合手术切除在该类弥散型病变中的临床应用价值。

方法：患者女，46 岁，因“左眼下睑无痛性隆起 7 年”就诊，影像学检查提示左眼眶外下象限静脉畸形伴静脉石形成，视神经受压移位。在全麻下经下穹窿结膜切口入路，显露暗红色血管团，按压颈静脉可见肿物隆起。术中先释放畸形血管内血液，随后于血管团内注入医用耳脑胶进行硬化处理，待病变组织硬化、边界清晰后，仔细分离并切除 2 团不规则肿物，术中注意保护眶下神经及其他重要结构。

结果：手术过程顺利，术后病理证实为眼眶血管畸形。患者术后视力保持术前水平 (BCVA 1.0)，眼球活动度良好，下睑隆起基本消失，双眼对称。术后 1 月复查未见明显并发症，影像学评估显示病变切除较为彻底。随访计划包括定期 MR 检查及视力、视野监测，以评估远期疗效及残留病症复发可能。

结论：对于范围广泛、结构复杂的眼眶静脉畸形，术中联合使用硬化剂 (如医用耳脑胶) 可有效减少出血、明确病变边界，有助于在保护重要结构的前提下实现较完整的病变切除。该策略有助于降低术中风险及术后复发概率。未来应结合基因与表观遗传学研究，进一步明确病变机制，并为个体化治疗及早期诊断提供依据。

摘要编号: 208858

面板编号: OOP-1261

眼科首诊颈动脉海绵窦瘘术一例

第一作者: Pengxuan WANG

共同作者: Pengxuan WANG

目的: 通过一例眼科首诊颈动脉海绵窦瘘患者病例分析该病的诊断及治疗。

方法: 患者, 男, 24 岁, 因“右眼随体位改变胀痛 2 月, 右侧头痛 1 周余”就诊, 专科查体: 视力右眼 1.0, 左眼 1.0, 眼压右眼 14 mmHg, 左眼 15 mmHg。右眼睑轻度水肿, 结膜充血(+), 角膜透明, 前房清, 晶体透明, 眼底未见明显异常, 眼球转动可、自诉眼球转动疼痛。辅助检查: 眼科 B 超: 右眼眶内眼上静脉明显增粗、呈搏动性, 上直肌、内直肌肥厚。颈动脉彩超, 脑血管超声未见明显异常。头颅 DSA 提示: 右侧眼上静脉、岩上静脉提前显影并伴有扩张增粗, 右侧颈动脉海绵窦区硬脑膜动静脉瘘。神经外科介入治疗: 术前造影见动脉期眼上静脉增粗、返流, 术中导管经面静脉、内眦静脉、眼上静脉抵达海绵窦, 对海绵窦瘘口进行填塞弹簧圈及生物胶, 术后造影经动脉期眼上静脉未再显影。术后患者眼痛缓解, 5 天后眼部红肿基本消退。术后 2 月复查, 患者自诉视物重影, 复查 CTA 示动脉期眼上静脉未再显影, 造影剂无渗漏, 高压氧舱治疗后患者自诉视物重影缓解。

结果: 本例患者以眼部疼痛为首发症状就诊于我院眼科, 经影像学检查后明确诊断, 并行介入手术治疗。患者术后疼痛症状消失, 自诉有视物重影症状, 复查 DSA 示病灶区栓塞治疗效果良好未见明显渗漏, 高压氧舱治疗后患者症状缓解。

结论: 颈动脉海绵窦瘘作为颅内血管异常疾病, 通常由于受累部位不同可就诊于神经外科、眼科或其他相关科室。过询问病史、仔细查体及相关影像学检查可以辅助诊断, DSA 作为该病的诊断金标准, 可以作为该病的重要诊断依据。海绵窦区神经、血管、组织走行复杂, 通常不建议行手术治疗, 介入手术治疗具有较为安全、治疗效果显著等优点而作为该病目前常用的治疗手段。

摘要编号: 210323

面板编号: OOP-1266

纳米氧化铈抑制甲状腺相关眼病眼外肌纤维化的作用机制及靶向干预研究

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共同作者: Meng XIE

目的: 甲状腺相关性眼病(TAO)是一种眼眶自身免疫性疾病, 常见症状包括眼突、眼红、眼球运动

障碍等, 可导致眼外肌纤维化和眼眶炎症反应等病理改变。氧化铈纳米颗粒(CeO₂-NPs, CNPs)以其抗氧化性质而被熟知。近年来, 由于 CNPs 潜在的抗纤维化和抗炎特性, 其在眼科中的应用逐渐增加。有研究指出 JNK 磷酸化与氧化应激密切相关, 而 JNK 调控纤维化进程在其他研究中亦有报道。本研究旨在探讨 CNPs 对 TAO 眼眶成纤维细胞(OFs)纤维化和炎症的抑制作用, 并探索 JNK 信号通路在其中发挥的作用, 为 TAO 的药物治疗提供新的理论依据。

方法: 手术获得 TAO 患者眼眶脂肪组织, 通过原代培养获得 OFs。CCK8 检测 CNPs 安全作用浓度, 在诱导纤维化的同时加入不同浓度 CNPs, 利用划痕实验检测 OFs 的纤维化程度, RT-PCR 和 WB 检测各组纤维化指标的表达式, ELISA 检测各组透明质酸分泌。Anisomycin 是常见的 JNK 激动剂。利用 CCK8 检测 Anisomycin 安全作用浓度, WB 检测 JNK 磷酸化水平, 并再次检测纤维化相关指标。利用 ROS 试剂盒检测细胞内活性氧(ROS)的生成。利用 RT-PCR 和 ELISA 检测炎症因子白介素-6(IL-6)和肿瘤坏死因子- α (TNF- α)的表达式。

结果: 成功培养获得 TAO-OFs。当 CNPs < 100 μ g/mL, Anisomycin < 5 μ M 时, 对 OFs 增殖无影响。CNPs 可抑制 OFs 纤维化, 与纤维化指标的表达式。CNPs 通过抑制 JNK 磷酸化发挥这些作用, 而 JNK 激动剂可以逆转这一过程。CNPs 抑制细胞内 ROS 的生成, Anisomycin 可改善这一过程。CNPs 降低 OFs 炎症因子的 mRNA 水平与分泌。

结论: CNPs 可通过降低 JNK 磷酸化抑制 TAO-OFs 的纤维化, 并可剂量依赖性地抑制 TAO-OFs 的 ROS 生成和炎症反应。CNPs 可作为一种潜在的 TAO 治疗药物。

摘要编号: 203352

面板编号: OOP-1256

腺病毒 TSHRA 构建小鼠甲状腺相关眼病模型的研究

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目的: 甲状腺相关眼病(TAO), 又称为 Grave's 眼病(GO), 是眼眶常见的自身免疫性炎症性疾病。从轻微的不适到严重的眼外肌扩张、眼球突出、眼麻痹、暴露性角膜病变和视神经病变。中重度的 TAO 患者多有结缔组织和眼外肌水肿改变引起, 这是由透明质酸细胞外积聚引起的。然而 TAO 的小鼠模型较少且表型出现不稳定, 对于在研究 TAO 相关机制的实验造成了极大的困扰。既往文献表明向小鼠肌肉注射载有人 TSHRA 腺病毒可以引起小

鼠甲状腺功能亢进及眼部眼睑增生等表现。本研究拟对该模型的眼部表现进一步探索，以寻求稳定高效的 TAO 小鼠模型。

方法：准备健康 6 周龄雌性 BALB/c 小鼠和载有 TSHRA 的腺病毒（Ad-TSHRA）。每次每只小鼠大腿肌肉注射共含有 10^8 PFU Ad-TSHRA 的 50 μ l 生理盐水（每条大腿注射 25 μ l），每只小鼠一共接受 9 次注射——初始免疫：前 3 次以 3 周为间隔注射；加强免疫：后 6 次以 4 周为间隔注射。不同时间节点分别进行甲状腺功能检测、眼眶核磁及 Masson 染色实验。

结果：1. 小鼠血清甲状腺功能出现明显异常，T3 和 T3/T4 明显增高；2. 第 4 次注射开始小鼠眼部陆续出现眼睑异常增生、眼睑肿胀，眼睑炎症，到第 7 次注射，80% 的小鼠出现稳定的眼睑肿胀或眼睑炎症；3. 小鼠肌肉注射第 34 周进行眼眶的 Masson 染色，Ad-TSHRA 组未见明显纤维化，但可见显著眼外肌纤维肥大；4. 眼部核磁显示 Ad-TSHRA 组小鼠可见眼外肌明显增粗，眶内容物体积增加。

结论：腺病毒 TSHRA 小鼠模型可以较稳定出现 TAO 眼病特征样眼外肌增粗、眶内容物增加的表现。

摘要编号：208177

调节性 B 细胞参与甲状腺相关性眼病免疫失衡的研究

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目的：甲状腺相关眼病（Thyroid-associated ophthalmopathy, TAO）是一种多种免疫细胞参与的器官特异性自身免疫性疾病，其发病机制尚不明确，可能涉及免疫细胞互作的失衡。调节性 B 细胞（Regulatory B Cells, Bregs）具有抑制炎症、抗肿瘤、调节纤维化形成等多种作用，但其在 TAO 的免疫失衡中是否同样发挥一定作用，研究还不明确。

方法：本研究共纳入 54 名健康志愿者和 125 名 TAO 患者，通过单细胞转录组测序、免疫组库测序，分析了 TAO 患者外周血中的 Bregs 的转录异质性，与其他免疫细胞的相互作用和可能机制。通过分离外周血单个核细胞（Peripheral Blood Mononuclear Cell, PBMC），采用 CpG、CD40L、IL-35 等方法体外诱导 Bregs，利用流式细胞术分析 IL10⁺ Bregs 及 IL-35⁺ Bregs 的数量差异。进一步将 CD4⁺ T 细胞与耗竭 Bregs 的 PBMC 共培养，研究 Bregs 在 TAO 患者和健康对照组中的免疫调节功能差异，并采用 Chip、qPCR、Western Blot 等对其机制进行了初步探索。

结果：TAO 患者外周血中 IL-10⁺ Breg 和 IL-35⁺ Bregs 的比例均显著高于健康对照组，且 TAO 患者的 B 细胞表现出向 IL-10⁺ Bregs、IL-35⁺ Breg 表型转化的潜在障碍。Bregs 中包括 RORA、CEBPD、PRDM1、FOSL2 和 EOMES 等在内的 B 细胞分化相关转录因子显著高表达。活动期 TAO 患者外周血中 Bregs 的 BCR 多样性明显升高。富集分析结果显示 Bregs 上调的基因主要富集于炎症和细胞进程相关通路。TAO 活动性患者 Bregs 可通过 CD22-PTPRC 和 BTLA-TNFRSF14 等作用显著增强的受体配体对等对树突状细胞、单核细胞进行调控。TAO 中 Bregs 抑制 IFN- γ ⁺ T 细胞和 IL-17⁺ T 细胞活化的能力存在缺陷，其免疫调节功能的发挥可能与 TSH/AKT/NF- κ B 信号通路有关，TSHR 抑制剂可部分阻断 TSH 激活 AKT 和 NF- κ B。

结论：活动期 TAO 患者外周血中 Bregs 数量反馈性升高，这种变化可能与 B 细胞向 Bregs 表型转化存在障碍，以及 Bregs 对其他免疫细胞的免疫调节功能受损有关。

摘要编号：209189

面板编号：OOP-1264

青少年血泪查因分析

第一作者：Huiling QING

目的：本文旨在通过详细分析三例反复发作的青少年单侧血泪（血性泪液）病例，揭示其潜在的发病因素，并总结相关的诊断策略，为临床实践提供参考。

方法：本回顾性病例系列分析三名青少年患者（1 例男性，2 例女性；年龄范围 13-17 岁），均表现为反复发作的自发性单侧血泪（血性泪液）。采用裂隙灯检查、泪道冲洗、鼻内镜检查、泪道内镜检查、血液及凝血功能筛查以及影像学检查。对患者采用了综合诊断策略并进行针对性治疗。

结果：对所有患者均进行针对性治疗成功消除血泪症状，无进一步后遗症。值得关注的是，在随访期内，所有病例均未观察到复发。

结论：本系列病例表明，青少年反复发作的单侧血泪（血性泪液）存在多元化的潜在病因。强调早期规范评估对改善预后的关键意义。

摘要编号：207864

面板编号：OOP-1259

额、筛窦复杂骨瘤的手术治疗

第一作者：Wang YI

目的：总结额、筛窦复杂骨瘤的手术指征、手术入路设计及术中技巧，评估治疗效果及并发症。

方法：回顾性分析我院 2023 年 1 月至 2025 年 6 月间诊治的 4 例额、筛窦复杂骨瘤病例资料。年龄 18-32 岁，男性 1 例，女性 3 例。右侧 2 例，左侧 1 例，双侧 1 例。临床表现为眼球突出并下移位 2 例，眼球突出并外侧移位 1 例。额部隆起 2 例。所有患者无视力下降，眼球转动诱发一过性黑矇 1 例，主诉周边视野复视 1 例，头痛 1 例。2 例眼球运动上转受限，2 例内转受限。术前行眼眶轴位、冠位及矢状位 CT 扫描，通过骨窗 CT 判断肿瘤基底与鼻窦的关系，尤其关注额窦的顶壁和后壁是否被肿瘤累及。通过软组织窗 CT 判断肿瘤与眼外肌、视神经的位置关系。3 例肿瘤与前颅底骨质关系密切，其中累及额窦后壁 3 例，累及筛骨水平板 1 例。

结果：均在全麻下手术，1 例肿瘤主体位于额窦，采用眉弓上皮肤切口，1 例肿瘤主体位于额、筛窦，采用 Lynch 皮肤切口，1 例肿瘤位于双侧额窦和筛窦，无眼眶受累，采用 Lynch 皮肤切口联合鼻内镜经筛入路，1 例肿瘤主体位于筛窦，采用泪阜结膜入路联合鼻内镜经筛入路。采用皮肤切口者行额窦前壁（必要时含鼻骨）截骨开窗，显露窦腔内肿瘤后采用磨钻和骨凿相结合的方式分块切除肿瘤，在接近前颅底时避免磨穿或撕裂硬脑膜风险。肿瘤切除后使用钛钉和钛板复位额窦前壁。2 例联合鼻内镜入路处理筛窦内的肿瘤基底和后缘。钛网重建眶内壁 2 例。术毕需保持额窦开口充分扩大和引流通畅。术后复查 CT 显示肿瘤切除均彻底，病理诊断均为骨瘤，术后随访 3-12 个月，未见肿瘤复发。2 例患者出现眶上神经支配区感觉丧失，无其它并发症。

结论：巨大的额、筛窦骨瘤影响眼部外观和功能，手术切除预后良好。术前需根据 CT 判断肿瘤与颅底、眼眶重要结构的关系，额窦前壁开窗和鼻内镜技术有助于肿瘤的显露和切除，磨钻和骨凿结合使用使肿瘤切除更加安全和高效。

眼科学的转化研究

摘要编号：208914

面板编号：TRO-1269

GLP-1 受体激动剂通过 PKA/CREB1 信号通路拮抗全反式视黄醛诱导的视网膜变性

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共同作者：Yalin WU

目的：阐明 GLP-1 受体激动剂 Exendin-4 在干性 AMD 和 STGD1 治疗中的作用与潜在机制。

方法：对视黄醛清除障碍的 ABCA4^{-/-}RDH8^{-/-} 模型小鼠腹腔注射 20 ug/kg Exendin-4，一天一次，持续一周，评估光暴露后小鼠的视网膜电图、眼底形态，视网膜厚度，评估小鼠的视功能和视网膜的损伤程度，并验证 GLP-1R/PKA/CREB1 的表达。在负载全反式视黄醛的感光细胞系 661W 细胞中以 1-100 nM 的 Exendin-4 干预，评估细胞活力、凋亡相关蛋白 Caspase3、以及 GLP-1R/PKA/CREB1 的表达水平，并进一步抑制 PKA、CREB1 评估该信号通路对感光细胞死亡的作用。

结果：Exendin-4 可显著改善负载全反式视黄醛的 661W 光感受器细胞的形态，并使活力回调 15-20%，给予 Exendin-4 的光暴露 ABCA4^{-/-}RDH8^{-/-} 小鼠的视网膜 a 波、B 波均回调 30% 以上，同时显著减轻了视网膜水肿和 RPE 退化，相应地，GLP-1R/PKA/p-CREB1 在 Exendin-4 干预后表达升高，凋亡相关蛋白 cleaved-Caspase3、cleaved-PARP1、γH2AX 均显著下调。

结论：GLP-1 受体激动剂通过激活 PKA/CREB1 信号通路拮抗全反式视黄醛诱导的视网膜变性。

摘要编号：207968

面板编号：TRO-1268

上游补体 C3 抑制：一种优于末端 C5 阻断的 RPE 细胞保护策略

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共同作者：Huiqin LIU, Feng QIAN, Mingshuang WANG

目的：抑制补体蛋白 C3 和 C5 已经在临床上被证明可以减缓地图样萎缩（GA）的进展速率，但补体系统激活造成视网膜色素上皮细胞（RPE）损伤的具体机制尚未被阐明。本研究通过系统研究补体级联反应中的主要效应分子对于 RPE 表型和功能的影响，揭示补体激活造成 RPE 损伤的机制，为下一代补体药物设计提供科学基础。

方法：研究表明，脂褐质 A2E 的积累是老龄化 RPE 细胞功能退行的重要诱导因素和临床病理特征。本研究采用 A2E 负载的人 RPE 细胞（ARPE-19）作为 GA 体外细胞模型，使用正常人血清激活完整的补体级联反应，全面评估补体激活对 RPE 细胞生存、紧密连接及屏障功能、线粒体代谢、溶酶体活性、POS 吞噬等重要功能的影响，并对比抑制各补体蛋白（C3、C5、C3a、C5a 等）对 RPE 细胞保护效果的异同。

结果：补体级联反应通过多个效应分子、多重机制造成 RPE 细胞的功能退行：上游效应分子 C3a 驱动线粒体功能障碍；C3b 沉积造成溶酶体 -POS 吞噬系统功能损伤；补体终末激活在 RPE 细胞表面

形成膜攻击复合物 (MAC) 导致急性细胞裂解。末端 C5 阻断能完全阻止 MAC 介导的细胞裂解, 但仅部分挽救 (25%–50%) 线粒体和溶酶体功能, 无法逆转 RPE 细胞的整体功能异常。相比之下, 上游 C3 的抑制通过阻断所有致病效应分子 (C3a、C3b、C5a 及 MAC) 的产生, 实现了对 RPE 细胞功能退行的全面逆转。

结论: 补体介导的 RPE 细胞退行性损伤由末端 (MAC/C5a) 和上游 (C3a/C3b) 的补体通路共同驱动。这种多因素致病机制使得末端 C5 阻断不能实现完全的 RPE 细胞损伤保护, 而上游 C3 抑制策略能为 RPE 细胞功能带来全面保护。本研究表明, 实现补体抑制策略对 GA 治疗效果的最大化需要完全抑制补体上游枢纽 C3 的激活, 为下一代补体药物研发提供了药理层面的科学依据。

眼科学术、研究、教学与教育

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CETP 通过 HDL-CE 与 HDL-TG 介导早期 AMD 的因果效应: 一项中介孟德尔随机化研究

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目的: 高密度脂蛋白 (HDL) 与年龄相关性黄斑变性 (AMD) 风险升高相关。高活性胆固醇酯转运蛋白 (CETP) 可降低 HDL 水平。本研究旨在评估 CETP 与不同阶段 AMD 之间的因果关联, 并探究多种已知 HDL 亚组分的中介作用。

方法: 从 IEU OpenGWAS 项目和 eQTLGen 联盟获取血清脂质、CETP 及不同阶段 AMD 的全基因组关联研究 (GWAS) 数据。采用双样本、多变量孟德尔随机化 (MR) 及基于汇总数据的 MR (SMR) 方法, 以 GWAS 汇总数据和单核苷酸多态性 (SNP) 作为 AMD、HDL 及 CETP 的工具变量, 并评估 HDL 亚组分的中介作用。为确证结果稳健性, 采用 MR-PRESSO、Cochran's Q 检验和 MR-Egger 截距检验进行敏感性分析。

结果: MR 研究揭示特定脂质与早期 AMD 存在因果关联。HDL (OR = 1.21; 95% CI: 1.10–1.33) 是早期 AMD 的危险因素, 而甘油三酯 (OR = 0.78; 95% CI: 0.71–0.85) 则具有保护作用。进一步发现, HDL 中胆固醇酯 (HDL-CE) 的影响最强 (OR = 1.23; 95% CI: 1.11–1.36), 而 HDL 中甘油三酯 (HDL-TG) 呈现疾病保护效应 (OR = 0.83;

95% CI: 0.75–0.91)。HDL 颗粒大小并非早期 AMD 的主要决定因素。遗传学层面 CETP 与早期 AMD 显著相关 (OR = 0.59; 95% CI: 0.47–0.74; $P_{SMR} < 5 \times 10^{-6}$)。CETP 表达升高与 HDL-CE 降低 (OR = 0.25; 95% CI: 0.21–0.30)、HDL-TG 升高 (OR = 1.45; 95% CI: 1.35–1.57) 及早期 AMD 风险降低 (OR = 0.59; 95% CI: 0.47–0.74) 相关。中介 MR 分析显示, CETP 对早期 AMD 的作用部分由 HDL-CE 和 HDL-TG 水平介导。敏感性分析证实研究结果具有稳健性。

结论: DL-CE 升高会增加早期 AMD 风险, 而 CETP 通过降低 HDL-CE 和升高 HDL-TG 发挥保护作用。

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面板编号: ART-1282

SB-HHD-CDs 抑制高糖诱导的晶状体上皮细胞氧化应激并防治糖尿病性白内障的实验研究

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目的: 探讨中药衍生碳点 (Scutellaria barbata and Herba Hedyotis diffusae and Carbon dots, SB-HHD-CDs, 后称 CDs) 对高糖环境下晶状体上皮细胞氧化应激的保护作用, 及对链脲佐菌素 (Streptozotocin, STZ) 诱导的糖尿病小鼠白内障的影响。

方法: 体外培养人晶状体上皮细胞 SRA01/04, 分为正常对照组 (Ctrl; 4.5 mM 正常葡萄糖浓度)、高糖组 (HG; 60 mM 葡萄糖)、低浓度 CDs 组 (HG + low dose CDs; 60 mM 葡萄糖 + 25 μ g/ml CDs)、中浓度 CDs 组 (HG + middle dose CDs; 60 mM 葡萄糖 + 50 μ g/ml CDs) 和高浓度 CDs 组 (HG + high dose CDs; 60 mM 葡萄糖 + 100 μ g/ml CDs)。采用 CCK-8 试验检测细胞活力, DHE 染色及流式细胞术检测细胞内活性氧 (Reactive oxygen species, ROS) 水平, Tunel 染色及流式检测细胞凋亡程度。在体内, STZ 诱导 C57BL/6J 小鼠建立 1 型糖尿病模型, 分为正常组 (Ctrl, n = 10)、糖尿病造模组 (DM, n = 15) 及糖尿病造模联合 CDs 滴眼液干预组 (DM + CDs, n = 15)。干预 12 周后进行裂隙灯检查、HE 染色观察临床及病理表现。Western blot 检测氧化应激相关蛋白 NOX-4、HO-1、NQO1, 炎症蛋白 TNF- α 及凋亡相关蛋白 Bax 和 Bcl-2 的表达。其次, 使用 RayPlex[®] 流式多因子对晶状体组织中的炎性细胞因子进行定量分析。

结果: 高糖培养 72 小时后, SRA01/04 细胞活力下降, 表现出明显的氧化应激, 细胞凋亡增加。中、高剂量 CDs 可降低氧化应激及细胞凋亡水平。CDs

能明显保护晶状体结构并改善其混浊程度, DM 组有 10 例晶状体混浊, DM + CDs 组仅有 3 例。与正常组相比, 糖尿病组小鼠晶状体中 NOX-4 表达显著升高, 并伴有 HO-1 和 NQO1 的下调, 而 CDs 给药能显著抑制氧化应激蛋白表达, 上调抗氧化应激蛋白水平, 并且可以逆转糖尿病诱导的晶状体组织中促炎细胞因子的上调。此外, 与糖尿病组相比, CDs 治疗组可以降低 Bax 表达及 tunel 阳性细胞比例。

结论: CDs 可通过清除 ROS、减轻氧化应激损伤及炎症反应, 保护高糖诱导的 SRA01/04 细胞凋亡, 从而减轻糖尿病小鼠晶状体混浊, 抑制糖尿病性白内障。且本研究证明, CDs 具有良好的组织穿透性和生物安全性, 可作为防治糖尿病性白内障的潜在药物, 具有巨大的临床转化前景。

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面板编号: ART-1273

STAT3 的 SUMO 化修饰调控巨噬细胞 M2 极化在脉络膜新生血管生成中的作用

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目的: 探讨 STAT3 的小泛素相关修饰物 (SUMO) 化修饰调控巨噬细胞极化在脉络膜新生血管 (CNV) 形成中的作用机制, 并评估以 STAT3 的 SUMO 化修饰为靶点的干预策略对湿性年龄相关性黄斑变性 (AMD) 的影响。

方法: 收集湿性 AMD 患者和特发性黄斑前膜患者增殖膜样本, 观察 STAT3、pSTAT3、SOCS3、巨噬细胞极化标志物及 SUMO 化修饰相关蛋白的表达和定位情况。分别对巨噬细胞特异性 SENP1 基因敲除小鼠及对照小鼠构建激光诱导 CNV 模型, 分析敲除 SENP1 后 STAT3 的 SUMO 化修饰对 CNV 病损大小及血管渗漏情况的影响, 并检测 STAT3 的磷酸化、泛素化水平以及巨噬细胞极化标志物的表达变化。接下来体外分离并培养各组小鼠的原代腹腔巨噬细胞, 进一步研究 STAT3 的 SUMO 化修饰对 STAT3 的泛素化、磷酸化、核浆定位变化和蛋白质稳定性的影响, 以及对巨噬细胞极化状态的作用。同时, 将原代腹腔巨噬细胞与小鼠脉络膜血管内皮细胞 (CVECs) 体外共培养, 观察 SUMO 化修饰介导的巨噬细胞极化对 CVECs 生物学特性的影响。随后, 我们在小鼠 RAW264.7 巨噬细胞系中探索 STAT3 可能发生 SUMO 化修饰的关键位点。最后干预此位点, 分析其对 STAT3 介导的巨噬细胞 M2 极化的影响及对 CNV 生成的调控作用。

结果: 与特发性黄斑前膜患者相比, 在湿性 AMD 患者纤维血管增殖膜中, SUMO 化修饰蛋白 SUMO1 及 SUMO2/3/4 水平升高, 伴随 pSTAT3、STAT3 及 Arg1 的上调, 而 STAT3 负反馈因子 SOCS3 表达则下降。在激光诱导 CNV 小鼠模型中, 巨噬细胞条件敲除 SENP1 导致 SUMO 化修饰增强, 诱导巨噬细胞 M2 极化, 并加重 CNV 病变及血管渗漏。在原代腹腔巨噬细胞极化模型中, 巨噬细胞条件敲除 SENP1 引起 STAT3 的 SUMO 化修饰增加, 泛素化修饰减少, 蛋白稳定性增强, 促进 STAT3 入核。通过生物信息学预测及体外实验验证, STAT3 的 SUMO 化修饰位点可能为 K451、K354、K340 和 K679, 其中 K451 位点突变可显著降低 STAT3 蛋白的稳定性, 提示是 STAT3 的 SUMO 化修饰的关键位点。

结论: 本研究揭示了 STAT3 的 SUMO 化修饰调控巨噬细胞极化进而促进 CNV 生成的新机制, 提出以 STAT3 的 SUMO 化修饰为干预靶点的治疗策略, 丰富了湿性 AMD 发病机制的理论基础, 为 CNV 相关眼病的精准靶向治疗及基因编辑技术应用提供了新的思路和依据。

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面板编号: ART-1278

SkQ1 对 Leber 遗传性视神经病变患者皮肤成纤维细胞线粒体功能的保护作用与 PINK1/PRKN 介导的线粒体自噬有关

第一作者: Jin XU

目的: 本研究旨在通过使用 Leber 遗传性视神经病变 (LHON) 患者的皮肤成纤维细胞, 评估 SkQ1 对改善线粒体功能的作用及其分子机制。

方法: 从携带 m.G11778A 突变的 LHON 患者和健康志愿者的皮肤组织中构建了永生化成纤维细胞系 (iFBs)。利用 CCK8 评估细胞活力。LHON-iFBs 先用 20 nM SkQ1 或 DMSO 预处理 7 天, 随后用 200 μ M 过氧化氢处理 45 分钟。通过 DCFH-DA 和 MitoSOX 检测细胞质和线粒体中的活性氧 (ROS) 水平。使用 JC-1 检测试剂盒和线粒体通透性转换孔 (MPTP) 检测试剂盒评估线粒体膜稳定性。此外, 采用网络药理学和分子对接技术探索 SkQ1 的潜在靶蛋白。通过 Western blot 验证了鉴定出的枢纽靶蛋白。

结果: 经 SkQ1[20 nM/7 d] 预处理的 LHON-iFBs 细胞中, 细胞质和线粒体活性氧水平均显著降低。JC-1 单体与聚集体的比例及线粒体膜电位 (MPTP) 的开放程度均有所下降, 表明预处理可增强线粒体膜稳定性。网络药理学分析和分子对接实验证实, SkQ1 与 SOD2、PINK1 蛋白具有高亲和力。热稳

定性实验 (CETSA) 显示, SkQ1 能提升 PINK1 和 SOD 的热稳定性。蛋白质印迹分析结果表明, SkQ1 预处理可下调 SOD2 和 PINK1 的表达水平。

结论: 在携带 m.G11778A 突变的皮肤成纤维细胞中, SkQ1 通过清除线粒体活性氧 (ROS) 并可能修复 PINK1/Parkin 介导的自噬过程, 从而保护线粒体功能。

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面板编号: ART-1271

加强民营眼科医院后勤管理重要性的探析

第一作者: 张静

目的: 绪言: 随着经济社会的不断发展, 政策法规的不断完善和逐步系统化的监督机制, 以及医疗消防安全事故、医疗纠纷伤医事件等, 体现大众对医疗的要求越来越高, 也对生产安全、服务提升等保障工作有了更高的要求, 只有夯实了后勤管理工作, 才能为临床工作提供更加安全的保障。目的: 通过学术的交流引起行业更多地对后勤管理工作的重视和共鸣。一、后勤管理的工作内涵 (一) 物业管理方面, 保障水电气正常供应; 确保就诊环境卫生, 做好防跌倒等防范工作; 保障消防安全, 环保要求 (如排污许可等) 达标; (二) 人事管理方面, 劳动合同的合规、职称评审、内部提拔机制等, 这不仅影响员工的积极性和职业发展, 也十分考验民营医院的综合实力; (三) 医疗投诉方面, 医患矛盾和自媒体的普及, 矛盾的曝光率越来越高, 医院也需应对处理; (四) 设备管理方面, 设施设备的维修保养, 良好的保养能够降低设备的故障率。

方法: 本文采用文献综述与实际工作结合, 进行综合分析, 提出相应的建议。二、民营眼科后勤管理工作现状 (一) 编制设置相对较少 专科属性规模相对小, 人员编制或部门设置较少或不全的情况屡见不鲜, 正因相对薄弱的配置, 工作中难免出现因疏忽导致的隐患。(二) 经费投入相对较少 日常工作中经费更多偏向核心医疗业务, 这很重要; 但却相对忽视了生产安全上的经费投入。

结果: 现民营眼科医院的后勤管理能力已有很大提高, 但薄弱环节也确实存在, 需持续提升, 引入精细化的管理, 以确保医院运营的高效和稳定。三、对民营眼科后勤管理工作的建议 (一) 管理层高度重视 从顶层设计就高度重视生产安全, 每年在经费上合理投入并配置合理编制, 以确保后勤管理工作顺利开展。(二) 加强内外交流学习 管理部门到全体员工, 从根本上认识到后勤工作的重要性, 多参加交流学习, 以提高自身的认知水平和实践能力。

结论: 重视后勤管理工作, 把生产安全作为第一首要课题, 只有安全为前提才能创造一个安心、舒适的环境, 才能更好更高质量地为群众提供更多的医疗服务。

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面板编号: ART-1279

动物眼操作提升青年医师显微手术技能

第一作者: Qing WANG

共同作者: Guiping MA, Jia MU, Lingyun SUN, Yan ZHANG

目的: 将临床显微手术培训的理论与实践经验运用到了青年医生培养的教学方案中, 以期在住院医师学习期间逐渐掌握显微手术技巧。将平面教学转为新型的、立体的、感性的多元化的教学模式。

方法: 训练的医生分组: 一组: 主治医师及高年资住院医师——白内障超声乳化手术组 12 名, 有临床医学理论知识, 有无菌操作知识, 掌握外科基本操作规程, 具备显微手术基础。二组: 住院医师——翼状胬肉切除组 8 名, 有一定熟练的临床医学知识, 有无菌操作知识, 掌握外科基本操作规程, 初步具备显微手术基础。三组: 住院医师——角结膜裂伤缝合组 16 名, 有较完善的医学临床知识, 有无菌操作知识, 掌握外科基本操作规程, 无显微手术基础。对以上三组医生, 每周五下午 1 点至 5 点进行显微手术培训 4 小时, 每组 2 个练习台, 按分组每 1 小时轮换, 连续 22 月, 培训基地开放 78 次, 时间近 300 小时。

结果: 3 组青年医师显微手术技能得到大幅提高, 白内障手术在爱尔集团手术技能考核中通过率为 75%; 翼状胬肉手术在爱尔集团手术技能考核中通过率为 83%。

结论: 临床青年医生的动物眼显微手术训练作为过渡桥梁, 只有经过严格的训练, 熟练掌握显微手术的基本操作技术, 才能进行实际的人眼临床操作, 更高质量的完成眼科显微手术, 减少手术并发症, 提高手术成功率。我们用动物眼进行显微手术操作训练对于青年医师的培训与发展具有重要意义。

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面板编号: ART-1281

教学与授课

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共同作者: Guiping MA, Jia MU, Lingyun SUN, Yan ZHANG

目的: 医生不仅是治病救人, 还要带教实习医生、规培医生和青年医生。在现代医学中, 临床医生未

经师范教师的专业培训，学习掌握教育教学方法，能更高效地传递经验和知识，更好地履行医生这个复合型角色的核心职责，提高专业水平教育教学能力，更好培养青年医生。

方法：一、通过学习“1. 以学生为中心、教学教育理念 2. 建立形成性评价机制 3. 线上线下混合式教学模式实施 4. 采用多维成效评估 5. 对混合式教学的其他思考”等教学方法，有效组织：PBL、CBL、RBL、翻转课堂、MOOC，在教学中与青年医生开展有效的互动、激发青年医生学习动机的形成性评价、利用临床病例进行基础医学教学，提高面对社会信息化、全球化、学习途径和资源多样化的能力。二、授课：教授功课，是教学的基本组成形式，是教学过程的中心环节。通过“说课”及教学授课技巧的演练，提高教学能力及授课水平。

结果：1. 知识传递与人才培养；2. 提升临床教学质量；3. 促进医生自我提升；4. 推动医学教育改革与创新。临床医生参与教学与授课，在知识、思维、沟通和职业精神四个维度上实现全面的、螺旋式的上升。促进人才梯队建设，保证医学事业的传承与发展，是现代临床医生的基本素养。

结论：临床医生学习教育教学，是其职业发展的必然要求与核心能力，保障医学人才的高质量培养、推动临床教学规范化，反向促进自身知识体系迭代，最终助力医疗质量与医学行业的长远发展。

摘要编号：208785

面板编号：ART-1275

泛凋亡对视网膜色素变性发生发展的影响及其治疗探索

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共同作者：Qihang KONG, Ying XU

目的：视网膜色素变性（Retinitis Pigmentosa, RP）是一种遗传性视网膜疾病，以视网膜光感受器细胞的进行性退化为特征，主要影响视杆细胞和视锥细胞，最终导致失明，目前尚无有效治疗方法。本研究旨在探讨 Z-DNA 结合蛋白 1（Z-DNA binding protein 1, ZBP1）在视网膜感光细胞退变中的作用机制，并评估基因干预手段对视网膜退变的潜在治疗效果。

方法：本研究采用 rd10 小鼠模型，检测 ZBP1 及其泛凋亡通路关键蛋白的表达水平，分析其在视网膜退变中的激活状态。同时，构建 AAV 介导的 ZBP1 过表达模型，研究其对野生型小鼠感光细胞及泛凋亡通路的影响。此外，通过 siRNA 和 AAV-shRNA 介导的基因干预手段，评估其对 rd10 小鼠视网膜泛凋亡通路及感光细胞退变的影响。结合视网膜电图、黑白箱、视动检测等视觉功能检测方法，

以及 Western blot、免疫荧光等分子生物学技术，系统评估 ZBP1 基因干预的疗效和机制。

结果：本研究发现，rd10 小鼠视网膜中 ZBP1 及其泛凋亡通路关键蛋白表达显著升高，表明 ZBP1 及泛凋亡通路在视网膜退变中被异常激活。AAV 介导的 ZBP1 过表达在野生型小鼠中直接诱导感光细胞死亡，并激活泛凋亡通路，证实了 ZBP1 激活与感光细胞死亡的因果关系。siRNA 介导的 ZBP1 敲低在短期内显著抑制 rd10 小鼠视网膜中的泛凋亡通路，并改善感光细胞退变程度。AAV-shRNA 介导的 ZBP1 长效敲低能够减缓感光细胞退变，显著保护视网膜结构并恢复视觉功能。

结论：ZBP1 是泛凋亡通路的关键调控分子，在视网膜退变中发挥重要作用。通过基因干预手段（如 siRNA 和 AAV-shRNA）敲低 ZBP1 表达，能够有效抑制视网膜泛凋亡，保护感光细胞结构和功能。本研究为 RP 的基因治疗提供了新的靶点和理论依据，展示了基因干预策略的潜在应用价值。

摘要编号：208142

面板编号：ART-1272

眼外肌病教育探索：程控双目眼动仪的开发、实施与认知

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目的：眼外肌的运动功能解剖以及眼外肌病是眼科学习的一个困难区域，但是对于眼科专业学生又是必要的。为了提高学习效果，我院开发了程控双目眼动仪（已授权实用新型专利），请专家评估，并在临床教学中使用，以明确对眼外肌教学的改进的效果。（我们 2017 年研制“程控单目眼动仪”授权了发明专利，样机在临床教学中应用，并发表了 SCI 论著。本项目是原有项目的改进）。

方法：在本研究中，设计并用 3D 打印技术 + 程控技术制造了一个 1:5 的具有逼真眼眶及眼球的结构、能够模拟单眼六条眼外肌单纯运动、双眼协同运动、眼科检查法以及常见的病理性斜视的模型。请 7 位眼科教授评估此模型的效果并填写调查问卷，并且通过将 30 名一年级医学生分为模拟组和传统讲授学习组，对程控双目眼动仪的效用进行了评估，以了解此程控双目眼动仪如何辅助他们学习眼外肌病学。

结果：7 名眼科教授均表明程控双目眼动仪能有助于医学教学。用结果：7 名眼科教授均表明程控双目眼动仪能有助于医学教学。用 10 道基于眼外肌运动及眼外肌病的填空题的测验两组同学。结果表明，模拟教学组的成绩显著优于传统教学组（ $p = 0.0206$; $p < 0.05$ ），Cohen's $d = 0.927$ （大效应），

说明模拟教学法产生了具有实际教学意义的显著改进, 优势比 (Odds Ratio) 2.85:1, 表明模拟教学组学生成绩优于传统组的概率是近 3 倍。

结论: 这项研究证明, 程控双目眼动仪有助于眼外肌病的教育, 增进知识理解, 并能丰富学生的学习体验。

摘要编号: **209231**

面板编号: **ART-1277**

眼部疾病中的线粒体转移

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目的: 眼睛长期暴露于外界微环境中极容易受到各种线粒体损伤剂的迫害。因线粒体功能受损导致的活性氧含量升高与眼部疾病的发生密切相关。作为维持细胞代谢的关键细胞器, 线粒体在各种压力和能量需求条件下经常发生形态改变或位置变化。除了在细胞内定位的改变, 线粒体也可以在应激刺激下发生细胞间转移。因此, 在这篇综述中我们对其发生细胞间转移的不同方式及潜在的机制进行了阐述。

方法: 回顾了线粒体转移的方式包括隧道纳米管、微泡、缝隙连接等。同时也总结了眼部疾病中存在的线粒体损伤及目前关于线粒体转移在眼部的研究。

结果: 对于退行性眼部疾病, 线粒体转移或许是一个研究的新兴领域并成为治疗和治愈各种眼部疾病的新途径。

结论: 细胞间线粒体转移是一个令人欣喜的发现, 它对于受体细胞线粒体功能的恢复起到了重要的作用, 其潜在的靶向性为眼部疾病的治疗提供了巨大的机会。虽然线粒体转移有多种不同的方式而且驱动线粒体转移的具体信号机制仍然未知, 但 Miro1、Myo10、M-sec 和 Cx43 等关键分子的参与已经为可能的靶向治疗方式打开了大门。眼部退行性疾病中普遍存在着氧化应激损伤以及线粒体的损害, 尤其在眼表和视网膜中。干细胞移植已被证明在以线粒体转移的方式挽救组织损伤。尽管仍有许多关键问题需要解决, 但进一步了解线粒体转移的最佳条件可能会在临床上实现线粒体转移和移植的突破。

摘要编号: **209612**

面板编号: **ART-1280**

综合设计性实验教学改革探索——以《眼视光技能学》课程为例

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目的: 探讨综合设计性实验教学模式在提升学生学习效果、实践能力、创新思维和临床技能等方面的效果。

方法: 选取山东中医药大学 2022 级眼视光医学专业 122 名学生作为实验组, 2022 级眼视光学专业 121 名学生作为对照组。实验组采用融入科学研究的综合设计性实验, 对照组采用以演示和操作练习为主的传统实验教学。通过满意度调查问卷 (10 级量表) 评估教学效果, 采用 SPSS 软件进行问卷信度、效度以及 Mann-Whitney U 非参数检验的统计学分析。

结果: 实验组眼视光医学专业学生共 122 人, 回收调查问卷 90 人, 回收率 73.77%; 对照组眼视光学专业学生共 121 人, 回收问卷 90 份, 回收率 74.38%。在实验实施方面, 实验组的实验内容满意度 (9.56 ± 0.84) 显著高于对照组 (8.07 ± 1.71); 实验组实验设备和材料满意度 (9.59 ± 0.75) 高于对照组 (8.24 ± 1.91); 实验组实验时间安排满意度 (9.54 ± 0.85) 高于对照组 (7.76 ± 2.02); 实验组实验考核方式满意度 (9.54 ± 0.85) 高于对照组 (7.82 ± 1.91); 实验组教师授课效果满意度 (9.59 ± 0.76) 高于对照组 (8.33 ± 1.78)。实验组和对照组间差异均有统计学意义 ($P < 0.05$)。满意度调查问卷的信效度良好 (Cronbach's $\alpha = 0.990$, KMO = 0.921), 支持研究结果的可靠性。在知识掌握方面, 实验组专业学习相关度 (9.58 ± 0.81) 高于对照组 (8.47 ± 1.64); 实验组对专业学习的帮助方面的满意度 (9.57 ± 0.82) 高于对照组 (8.08 ± 1.89); 实验组在理论知识理解方面满意度 (9.57 ± 0.82) 显著高于对照组 (8.07 ± 1.98)。实验组和对照组间差异均有统计学意义 ($P < 0.05$)。在能力提升方面, 实验组实践操作能力满意度 (9.57 ± 0.79) 高于对照组 (8.08 ± 1.84); 实验组在解决问题能力提升方面满意度 (9.56 ± 0.81) 高于对照组 (7.98 ± 2.01); 实验组在数据分析能力提升方面满意度为 (9.53 ± 0.82), 高于对照组 (7.83 ± 2.09)。实验组和对照组间差异均有统计学意义 ($P < 0.05$)。在素质培养方面, 实验组团队合作意识培养的满意度为 (9.61 ± 0.75), 高于对照组 (8.16 ± 1.77); 实验组在科研创新思维培养方面满意度

(9.56 ± 0.81)，显著高于对照组 (7.86 ± 2.01)。实验组和对照组间差异均有统计学意义 ($P < 0.05$)。

结论：综合设计性实验教学模式能显著提高学生的满意度，有效提高《眼视光技能学》教学效果，对培养学生专业技能、科研创新思维以及实践能力具有一定帮助，是一种适合眼视光学专业的高效教学模式。

摘要编号：208645

面板编号：ART-1274

跨人群研究揭示 Fuchs 角膜内皮营养不良中 ADARB1 通过编辑 IGFBP7 mRNA 影响细胞周期的致病机制

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目的：本研究聚焦 Fuchs 角膜内皮营养不良 (FECD) 这一以角膜内皮细胞进行性丢失为特征的退行性疾病，针对其表观遗传调控机制尤其是 A-to-I RNA 编辑的作用不明问题，基于两个独立 FECD 人群的角膜内皮转录组公开数据，通过生物信息学方法鉴定差异 RNA 编辑位点，并结合功能富集分析、基因表达相关性分析及体外细胞实验，系统探究 A-to-I RNA 编辑 (由 ADAR 蛋白家族介导) 在 FECD 中的潜在作用机制，旨在为 FECD 的表观遗传学发病机制及治疗策略提供新视角。

方法：基于两个独立 FECD 人群角膜内皮转录组数据，通过生物信息学分析鉴定差异 RNA 编辑位点，分析编辑水平、基因及位点数量变化，检测 ADARB1 等编辑酶表达；结合功能富集分析和基因表达相关性分析锁定关键基因 (如 IGFBP7)；开展体外细胞实验，比较 IGFBP7 野生型与编辑型 (p.K95R) 对细胞周期、凋亡及关键蛋白 (如 p53、p21) 的影响，验证 ADARB1 过表达对 IGFBP7 编辑及下游效应的调控，并通过转录组测序分析编辑型 IGFBP7 对相关基因 (如 NDUFA7、SLC9A8) 的调控。

结果：研究发现，两个 FECD 人群的角膜内皮均呈现平均 RNA 编辑水平降低、编辑基因及位点数量减少，但 RNA 编辑酶 ADARB1 表达显著升高；差异编辑基因主要富集于细胞周期调控、自噬及癌症相关通路。其中，IGFBP7 的表达及其错义编辑 (p.K95R) 在两个队列中均显著上调，且与 ADARB1 表达呈正相关。体外实验证实，编辑型 IGFBP7 比野生型更显著诱导细胞周期 G2/M 期阻滞和凋亡，并上调 p53、p21 表达；ADARB1 过表达可增强 IGFBP7 的编辑水平，同时上调上述凋亡相关蛋白。转录组测序进一步显示，编辑

型 IGFBP7 过表达影响线粒体电子传递链基因 (如 NDUFA7) 及眼病相关基因 (如 SLC9A8) 的表达。

结论：ADARB1 通过编辑 IGFBP7 mRNA 影响细胞周期，参与 FECD 发病机制。从而为该疾病的表观遗传机制及潜在治疗策略提供了新的视角。

摘要编号：208891

面板编号：ART-1276

骨髓间充质干细胞调控 Müller 细胞铁死亡缓解糖尿病神经视网膜病变的作用机制研究

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目的：糖尿病视网膜病变 (Diabetic Retinopathy, DR) 传统上被定义为糖尿病微血管并发症，现已被认识为神经血管性疾病。糖尿病神经视网膜病变 (Diabetic neuropathy in the retina, DNR) 是以神经元和胶质细胞损伤为特征，破坏神经-血管单元 (Neurovascular unit, NVU) 稳态，最终导致糖尿病患者视觉质量下降，且缺少有效的治疗手段。骨髓间充质干细胞 (bone marrow mesenchymal stem cells, BMSCs) 具有组织修复潜能，被认为是治疗 DR 的安全有效策略。本文旨在探究 BMSC 对高糖诱导的视网膜损伤的保护作用及分子机制，为 DNR 防治提供新思路。

方法：1. 建立家兔玻璃体腔 BMSC 注射模型，结合 ERG、VEP、Optos UWF、FFA 及 HE 染色评估视网膜功能与结构。体外 BMSC-Müller 共培养采用 CCK-8、划痕、ELISA 及流式检测细胞增殖、迁移与炎症反应。2. 单细胞转录组分析探讨高糖下神经微环境变化及 BMSC 疗效，筛选铁死亡通路关键基因。3. 检测体内外模型 ROS、MDA、GSH、 Fe^{2+} 及 GPX4、FSP1、DHODH、ACSL4、xCT、DUSP6 表达。4. 构建 DUSP6 敲减 Müller 细胞与 BMSC 共培养模型，通过 TEM 及 Western Blot 分析超微结构与铁死亡相关分子。

结果：1. 成功构建 BMSC 干预糖尿病神经视网膜损伤家兔模型，表现为 ERG-Ops 波振幅改善，HE 染色显示视网膜结构恢复。成功构建 BMSCs 与 Müller 细胞共培养模型，细胞活性和细胞迁移能力增强，G0/G1 期增加，S 期减少，IL-6、IL-1 β 、TNF- α 水平改善。2. 单细胞转录组分析显示，BMSCs 治疗组中铁死亡通路的富集显著下调。Müller 细胞的激活状态显著降低，Müller 细胞与视锥、视杆细胞之间的信号交流显著增强，DUSP6 表达上调。3. BMSCs 移植干预后，视网膜超微结构改善，线粒体数量增多、膜及嵴结构恢复，GSH 水平上升，MDA 与 Fe^{2+} 含量下降。ACSL4 表达降低，DHODH、FSP1、GPX4 及 xCT 表达显著

恢复, 同时发现 DUSP6 表达上调。Müller 细胞与 BMSCs 共培养后, 改善线粒体形态, 降低 ROS、MDA、 Fe^{2+} , GSH 升高, 调控上述分子表达。4. 成功构建敲减 DUSP6 的 Müller 细胞与 BMSC 共培养模型, BMSC 共培养可恢复线粒体数量和结构, 降低 ROS、MDA 及 Fe^{2+} , 提升 GSH 水平, 并上调 DHODH、FSP1 及 GPX4 蛋白表达。

结论: BMSCs 可介导关键基因 DUSP6 的表达上调 GPX4/DHODH/FSP1 轴抑制 DNR 铁死亡, 从而发挥对 DNR 的保护作用。

眼科流行病学、防盲

摘要编号: 209099

面板编号: OEP-1287

TCM-OphthaLLM: 基于思维链增强的中医眼科大语言模型的研究

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目的: 中医眼科学以其整体观、辨证论治的理念在眼病防治中独具优势, 但面临诊疗标准化困难与人才短缺等问题。大语言模型为此提供了潜在解决方案, 却受限于中医眼科领域训练语料匮乏、辨证推理能力薄弱的局限。本研究旨在构建与中医眼科知识高度契合、具备辨证推理能力的专业大语言模型, 以提升该领域智能诊疗的准确性。

方法: 为解决中医眼科训练语料稀缺的问题, 研究提出双大语言模型协同过滤策略, 从多个开源中医语料库筛选中医眼科相关数据, 结合专家审核构建高质量专用数据集 TCM-Ophthalmology。在此基础上, 采用预训练与 LoRA 微调方法, 使模型有效对齐中医眼科的语言范式与知识体系。同时, 设计创新的 OphthaCoT 推理框架, 通过自我启发式推理机制, 将中医眼科“五轮学说”等核心辨证理论与 Chain of Thought (CoT) 思维链机制融合, 引导模型逐步模拟中医医师的诊断思路, 实现具备逻辑解释能力的临床推理。

结果: 在中医考试任务中, TCM-OphthaLLM 准确率达 71.09%, 显著优于 Huatuo (49.75%)、ShenNong-TCM-LLM (56.94%) 等中医大模型及通用模型 ChatGPT-4 (68.77%), 验证了领域特定训练语料对于提升模型理解能力的关键作用。在中医辨证推理任务中, TCM-OphthaLLM 全面优于对比模型, 准确率、宏平均 F1 值、宏平均召回率及宏平均精确率分别为 79.83%, 42.51%, 48.42%, 51.89%。以上结果共同表明,

OphthaCoT 的结构化推理提示与自启发机制能显著增强模型模拟中医辨证推理的逻辑思维能力。

结论: 作为首个专注中医眼科的专业大语言模型, TCM-OphthaLLM 通过创新的数据集构建策略与融合中医眼科领域理论的思维链推理框架, 克服了语料稀缺和复杂辨证推理的难题, 为中医眼科的智能化辅助诊断与决策提供了强有力的工具, 有望缓解医疗资源短缺问题, 并推动中医药向标准化、现代化方向持续发展。

摘要编号: 207687

面板编号: OEP-1285

基于个体特征建立 nomogram 模型预测近视儿童对 0.01% 阿托品的应答程度

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共同作者: Jie CHEN, Wenyan XU

目的: 本研究旨在基于基线特征及用药期间临床数据的早期变化来确定用于评价近视儿童对 0.01% 阿托品滴眼液应答程度的指标并建立预测模型。

方法: 采用回顾性研究, 以来自温州医科大学附属眼视光医院的 101 例近视儿童为训练集, 并以来自沈阳兴齐眼科医院的 46 例近视儿童为验证集。所有儿童均每晚使用 0.01% 阿托品滴眼液点眼 1 次, 双眼各 1 滴, 随访 1 年。纳排标准: 1. 年龄在 4~17 岁; 2. 非睫状肌麻痹下眼光 ≤ -0.50 D; 3. 最佳矫正视力 ≥ 4.9 ; 4. 随访期间未使用其它近视防控方法及未患有严重眼病。将 1 年眼轴长度 (AL) 的进展不超过 0.2 mm 的儿童被归类为良好应答者, 反之为不良应答者。基于回归模型筛选应答程度的评价指标后建立 nomogram 预测模型, 并通过受试者工作特征曲线的曲线下面积 (AUC) 及校准曲线对模型性能进行评估。

结果: 二元 Logistic 回归结果显示, 基线年龄、基线 AL、6 个月等效球镜度 (SE) 和 AL 变化量可用于预测近视儿童对 0.01% 阿托品滴眼液的应答程度。基线年龄较大 (OR = 2.058, $P < 0.001$)、基线 AL 较短 (OR = 0.993, $P = 0.025$)、6 个月 SE 近视进展较小 (OR = 1.638, $P = 0.019$) 及 6 个月 AL 增长较小 (OR = 0.914, $P = 0.002$) 的近视儿童更有可能对 0.01% 阿托品滴眼液应答良好。基于这些预测指标建立的 nomogram 模型在训练集中的 AUC 为 0.903 (95% CI: 0.845~0.962), 在验证集中的 AUC 为 0.808 (95% CI: 0.683~0.934)。校正曲线显示, 训练集的 Brier 评分为 0.124, 验证集的 Brier 评分为 0.180, 误差在可接受范围内。

结论: 6 个月的治疗期是评估 0.01% 阿托品滴眼液近视防控效果的合适时间窗。基于基线年龄、

基线 AL、6 个月 SE 变化量、6 个月 AL 变化量建立的 nomogram 模型可以直观地预测近视儿童对 0.01% 阿托品滴眼液的应答程度。

摘要编号: 205946

面板编号: OEP-1284

基于干眼分析仪探究罹患西北燥证人群干眼发病特征

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目的: (1) 探讨罹患西北燥证人群干眼病的发病特征, 为临床治疗提供理论依据。(2) 明确甘油三酯 - 葡萄糖 (TYG) 指数对干眼症的预测价值。

方法: 本研究为横断面研究, 纳入新疆医科大学附属中医医院眼科门诊患者。根据是否为干眼症患者及是否符合西北燥证诊断标准, 将研究对象分为三组: 健康人群组、西北燥证干眼组和西北燥证非干眼组。通过非接触式泪膜破裂时间 (NIBUT)、泪河高度、脂质层厚度、睑板腺缺失率等眼表指标, 以及甘油三酯 - 葡萄糖 (TYG) 指数, 比较不同组别间的差异, 评估这些指标与西北燥证干眼症发病的关系。

结果: 分析结果显示, 西北燥证干眼组的泪膜破裂时间显著较短 ($P < 0.05$), 泪河高度显著较低 ($P < 0.05$), 表明该组患者的眼表稳定性较差, 干眼症状较为严重。相比之下, 健康人群组和西北燥证非干眼组在泪膜破裂时间和泪河高度上的差异较小, 提示西北燥证干眼组的眼表功能异常更加明显。尽管如此, TYG 指数与干眼症的发生并未表现出显著相关性 ($P > 0.05$), 表明其在干眼症的预测中作用有限。

结论: 本研究证实了西北燥证对干眼症发病的显著影响, 尤其在眼表功能方面, 西北燥证干眼组表现出较短的泪膜破裂时间和较低的泪河高度, 提示该人群的干眼症状更加严重。而 TYG 指数未能与干眼症的发生具有显著关联, 可能不足以作为干眼症的有效预测标志物。研究结果为新疆地区干眼症的防治提供了新的理论依据, 进一步揭示了西北燥证作为地方性证候在干眼症发病机制中的潜在作用, 并为临床治疗提供了地方性指导。

摘要编号: 201901

面板编号: OEP-1283

眼科手术后感染性眼内炎危险因素及病原学分析

第一作者: Wenwen ZHANG

目的: 探讨眼科手术后感染性眼内炎的影响因素, 了解病原菌及其对感染症状和愈后的影响。

方法: 以 2014 年 1 月至 2025 年 6 月收治的眼科手术后感染性眼内炎患者 65 例和同期相同术式非眼内炎患者 195 例患者为研究对象, 开展病例对照研究。收集患者的基础资料、术前检查结果、病原菌、术后治疗及愈后等资料。年龄、身体质量指数及感染症状出现时间等符合正态分布以均数 $\pm$ 标准差表示, 两组间比较采用独立样本 t 检验, 多组间比较采用单因素方差分析, 当差异有统计学意义时, 进一步采用 SNK 法进行两两比较; 合并糖尿病、严重疾病史、术前血红蛋白低、术前血清白蛋白低、术前使用抗菌滴眼液、急诊手术、术前有其他感染病灶、术后眼污染史等计数资料, 采用卡方检验。不同病原菌患者愈后视力不符合正态分布采用中位数和四分位间距描述, 多组间比较采用 Kruskal-Wallis 秩和检验, 差异有统计学意义时, 进行两两比较。采用多因素 logistic 回归分析感染眼内炎的危险因素。

结果: 65 例感染性眼内炎患者中白内障手术 51 例, 玻璃体切割术 2 例, 玻璃体切割 + 白内障手术 6 例, 青光眼 + 白内障手术 4 例, 玻璃体腔药物注射 2 例; 手术三级医院 24 例, 二级医院 31 例, 民营医院 10 例; 超急性眼内炎 40 例, 亚急性眼内炎 25 例, 慢性眼内炎 0 例。经单因素和多元 logistic 回归分析, 合并糖尿病、术前血清白蛋白低、严重疾病史及术后眼污染史是患者术后发生感染性眼内炎的危险因素 ($OR = 2.039, 3.021, 2.803, 3.095; P < 0.05$)。65 例感染患者中标本检出病原菌 41 株, 无真菌感染病例, 检出率为 63.08%。其中, G+ 杆菌 1 株、G+ 球菌 26 株及 G- 杆菌 14 株, 分别占 2.44%、63.41% 及 34.15%。65 例患者术后感染症状出现时间为 (4.48 ± 4.46) d。经方差分析, G+ 菌、G- 菌及无菌生长患者的感染症状出现时间比较, 差异有统计学意义 ($F = 5.61, P < 0.05$)。经秩和检验, G+ 菌、G- 菌及无菌生长患者的愈后视力比较, 差异有统计学意义 ($H = 13.09, P < 0.05$)。

结论: 糖尿病、术前血清白蛋白低、严重疾病史及术后眼污染史均可能增加眼科手术部位感染风险, 不同致病菌对术后感染症状出现时间和视力愈后有影响。

摘要编号: 209044

面板编号: OEP-1286

视网膜动脉闭塞后卒中和心肌梗死的风险及其时间依赖性: 系统回顾和荟萃分析

第一作者: Chuansen WANG

共同作者: Xuan XIAO

目的: 视网膜动脉闭塞 (RAO) 是一种可能提示潜在在心血管疾病的眼科急症。卒中和心肌梗死与 RAO 有相似的病理生理机制和危险因素。本系统综述旨在评估 RAO 发病后卒中和心肌梗死的风险, 重点关注其风险的时间依赖性变化。

方法: 检索 PubMed、Embase 和 Web of Science 中报道 RAO 术后卒中和心肌梗死发生率的文章。采用纽卡斯尔-渥太华量表评价研究质量。采用随机效应模型计算 RAO 后脑卒中和心肌梗死的相对危险度 (RR), 并分析其随时间的变化趋势。

结果: 纳入 12 项研究, 涉及 319748 人。综合分析显示, RAO 与卒中风险显著增加相关 ($RR = 3.64$, 95% CI: 2.53–5.25, $p < 0.0001$), 特别是在 RAO 后的第一个月内。RAO 后心肌梗死风险呈上升趋势 ($RR = 1.38$, 95% CI: 0.80 ~ 2.40, $p = 0.2478$), 但未达到统计学意义。时间分层分析显示, RAO 后 30 天内卒中和心肌梗死发生率最高。

结论: RAO 与卒中短期风险升高密切相关, 这强调需要在 RAO 发病后第一个月内及时进行脑血管评估和监测。尽管 RAO 和心肌梗死之间的关联在统计学上不太显著, 但对患者的心血管评估仍然是有必要的。这些发现强调了 RAO 是需要及时干预的可预示系统性血管疾病的重要事件。

眼肿瘤学、病理学

摘要编号: 209597

面板编号: OPA-1295

3 例眼睑 Merkel 细胞癌

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共同作者: Hui REN

目的: 通过回顾 3 例诊治过的眼睑 Merkel 细胞癌病例, 总结眼睑 Merkel 细胞癌的临床特点, 借此在眼科临床工作上加强对该罕见恶性肿瘤的识别, 作出合适的诊治安排

方法: 通过搜索复旦大学附属眼耳鼻喉科医院眼科自 2013 年以来病理诊断为“Merkel 细胞癌”的病例, 回顾病例的临床资料、诊治经过, 分析归纳病例的异同。

结果: 一共回顾 3 例病理诊断符合眼睑 Merkel 细胞癌的病例, 就诊时年龄 64~91 岁 (平均 80.33 岁), 男女比例 2: 1, 皆为单眼发病, 一例为眼睑肿物切除后复发, 两例就诊时皆为初发, 3 例患者皆无其他肿瘤病史、不符合免疫抑制状态, 3 例患者眼睑肿物变大的病程皆小于 3 个月, 3 例患者皆接受手术治疗 (局部眼睑肿物切除), 3 例术后病理皆可见细胞核旁点状细胞角蛋白 20 的表达。

结论: 眼睑 Merkel 细胞癌多见于老年人, 男性患者比例相对大, 肿物较小时注意与麦粒肿、霰粒肿相鉴别, 治疗以完整手术切除为主, 老年人眼睑肿物标本都应该送病理检查。

摘要编号: 209046

面板编号: OPA-1291

CD155 通过 Cyclin E1/CDK4 介导细胞周期重编程促葡萄膜黑色素瘤转移的机制研究

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目的: 葡萄膜黑色素瘤是成人最常见的原发性眼内恶性肿瘤, 50% 患者因转移死亡, 其中 90% 转移至肝脏, 转移后中位生存期不足 12 个月, 且缺乏有效的全身治疗方案。CD155 在多种肿瘤中高表达, 参与免疫调节与肿瘤进展, 但在 UM 中的机制尚未明确。本研究旨在揭示 CD155 在 UM 转移中的功能及其通过细胞周期调控的分子机制, 为靶向治疗提供理论依据。

方法: 整合生物信息学与功能实验: 基于 GSE139829 单细胞数据集, 分析 CD155 在恶性细胞中的表达及预后价值 (Cox 回归); 结合患者转移状态、GEP 评分 (≥ 2) 和 PRAME 表达评估临床关联; 利用 CopyKAT 计算 CD155 阳性细胞的染色体不稳定性 (CNV 评分)。对 CD155 高/低表达组 (各 $n = 5$) 进行 RNA-seq 差异分析和 GO 富集分析。体外选用 C918 和 Mum2B 细胞, 构建 CD155 稳定敲低细胞株 (shRNA, 敲低效率 $> 70\%$), 通过 Western Blot、划痕愈合、Transwell 迁移及克隆形成实验验证 CD155 对恶性表型及细胞周期蛋白 (CDK4、Cyclin E1) 的影响。

结果: 单细胞分析显示, UM 恶性细胞中 CD155 表达较正常细胞上调约 3.5 倍, 且在转移患者中进一步升高。CD155 高表达与患者不良预后显著相关。CopyKAT 提示 CD155 高表达群体中恶性细胞比例达 92%。差异表达基因富集于 MAPK 通路、细胞黏附与凋亡过程。敲低 CD155 后, 381 个基因显著富集于细胞周期通路, 并抑制细胞克隆形成 (减少 70%, $p < 0.05$)、迁移 (划痕愈合率降至

32%) 和侵袭 (Transwell 细胞数减少 65%, $p < 0.05$)。Western Blot 显示 CD155 敲低使 CDK4 和 Cyclin E1 表达分别下降 62% 和 58%, 表明其通过 Cyclin E1/CDK4 通路驱动细胞周期重编程。

结论: CD155 是 UM 转移的关键分子, 其高表达与转移风险、GEP 评分及 PRAME 状态相关。机制上, CD155 通过激活 Cyclin E1/CDK4 通路促进细胞周期进展与恶性表型。本研究为 UM 提供了新的治疗靶点, 尤其对现有免疫疗法抵抗的患者具有潜在转化价值。

摘要编号: 208844

面板编号: OPA-1290

一例视网膜色素变性合并 VHL 综合征病例分析

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目的: 报告一例罕见的 CNGA1 双等位基因突变所致视网膜色素变性与 VHL 基因杂合突变所致 VHL 综合征共病的病例, 分析其临床特征与遗传学特点, 为该双基因共病的临床诊疗提供参考。

方法: 回顾性病例分析, 病例资料经患者知情同意。

结果: 女性, 33 岁。右眼视力进行性下降 1 年。自幼夜盲。查体: 右眼视力 0.2, 左眼视力 0.8。眼前节检查未见明显异常。眼底检查: 双眼周边视网膜骨细胞样色素沉着, 右眼颞上方视网膜见一橘红色球形瘤体, 直径约 1 DD, 瘤体周边大量黄白色渗出。荧光血管造影示瘤体早期高荧光、晚期渗漏。OCT 显示, 双眼外层视网膜萎缩, 右眼黄斑区视网膜水肿增厚。初步诊断为双眼视网膜色素变性, 右眼视网膜毛细血管瘤。建议进行抗 VEGF 治疗以稳定视网膜血管瘤。进一步完善全身检查和基因检测以明确病因和全身情况。头颈 MRA 示右侧大脑前动脉 A1 段缺如、左侧椎动脉纤细。腹部超声示右肾囊肿, 可疑胰腺囊肿和脾脏囊肿。未发现中枢神经系统血管母细胞瘤、嗜铬细胞瘤及肾细胞癌证据。基因检测提示 CNGA1 基因存在 1 个纯合突变 (c.253del(p.Leu85PhefsTer4), 全外显子测序), VHL 基因存在杂合突变 (c.194C > G)。由于未收到患者父母样本, 未进行基因变异来源验证。对其家系成员 (两名儿子) 进行基因检测验证, 显示两名子代均为 VHL 基因杂合突变携带者, 未携带 CNGA1 基因突变。目前两名子代未表现出异常表型。

结论: CNGA1 双等位基因突变所致视网膜色素变性与 VHL 基因杂合突变所致 VHL 综合征在临床与分子水平同时出现极为罕见。该病例表明单基因病与多系统综合征可共存, 同一患者可同时携带隐性致盲突变与显性肿瘤易感突变。二者在视网膜病

变上存在夜盲、视野缺损等重叠表现, 患者若同时出现神经系统病变、肾脏囊肿等多系统症状应考虑多基因致病可能, 建议采用高通量测序联合家系验证全面评估致病基因以避免漏诊, 并同时在家系开展肿瘤-视功能联合随访, 明确发病风险。

摘要编号: 209335

面板编号: OPA-1293

似瘤非瘤的结膜粉红色肿块的诊疗思考

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目的: 探讨穹隆结膜粉红色肿块是淋巴瘤肿块还是炎性肿块的诊疗方法。

方法: 回顾分析在我院就诊的穹隆结膜粉红色结膜肿块 16 例, 男 7 例, 女 9 例, 双眼发病 3 例。都行 B 超和眼眶 CT/MRI 检查。穹隆结膜肿块侵入眶内 7 例。4 例行结膜下注射地塞米松 3 mg 共注射 2 次, 手术切除结膜肿块联合病理检查 + 免疫组化 13 例, 其中 1 例为结膜下注射地塞米松后再手术。随访 3~6 个月。

结果: 穹隆结膜粉红色结膜肿块 16 例中, 结膜下注射地塞米松 2 例肿块缩小但不能完全消退, 2 例无效; 13 例手术并病理检查, 9 例诊断为淋巴瘤, 4 例为炎性肿块。淋巴瘤患者转肿瘤专科进一步全身检查或化疗。

结论: 穹隆结膜粉红色肿块建议手术切除, 病理免疫组化检查才能确诊结膜淋巴瘤或炎性肿块, 淋巴瘤部分患者需全身化疗。

摘要编号: 208714

面板编号: OPA-1289

基于 BRAF 突变的结膜黑色素瘤患者的系统治疗疗效: 一项来自中国队列的回顾性研究

第一作者: Yongyun LI

共同作者: Xianqun FAN, Renbing JIA, Shiqiong XU, Tianyu ZHU

目的: 评估全身系统治疗对伴或不伴远处转移的结膜黑色素瘤 (conjunctival melanoma, CoM) 患者的疗效与安全性。

方法: 这是一项关于接受系统治疗的 CoM 患者及对照病例的回顾性单中心研究。研究纳入了 41 例经病理确诊、并在术后接受系统治疗的 CoM 患者, 以及 41 例对照病例。采用倾向评分匹配法对对照病例进行匹配。主要治疗方案包括免疫检查点抑制剂 (immune checkpoint inhibitor, ICI)、靶向治疗 (targeted therapy, TT) 和化疗。通过 Kaplan-Meier 法计算生存结局, 并

采用对数秩检验进行比较。使用 Cox 比例风险模型评估风险比。主要结局指标包括总体生存期 (overall survival, OS)、从远处转移至死亡的时间、无远处转移生存期 (distant metastasis-free survival, DMFS) 和无复发生存期 (relapse-free survival, RFS)。同时分析了最佳总体疗效 (best overall response, BOR)、疾病控制 (disease control, DC) 率、治疗开始后的无进展生存期 (progression-free survival, PFS) 和 OS, 以及不良事件 (adverse events, AEs)。

结果: 本研究共纳入 82 例患者, 其中 41 例接受系统治疗, 41 例未接受系统治疗。治疗开始后的中位随访时间为 13.1 个月。在 OS 方面, M0 期患者中, 系统治疗组的中位 OS 未达到, 非系统治疗组为 48 个月 ($p = 0.022$); M1 期患者中, 两组从远处转移至死亡的时间分别为 12.8 个月和 6 个月 ($p = 0.066$)。在 DMFS 方面, M0 期患者两组中位 DMFS 分别为未达到和 58.2 个月 ($p = 0.044$)。在 RFS 方面, N0M0 期患者手术切除后, 两组中位 RFS 分别为未达到和 37.6 个月 ($p = 0.048$)。85.4% 的患者达到 DC 为 BOR。在接受一线 ICI、TT 和化疗的患者中, 预估 1 年 PFS 率分别为 58.8%、71.4% 和 66.7%, 预估 1 年 OS 率分别为 76.5%、100% 和 100%。治疗相关的 1-2 级 AE 发生率在 ICI 组为 51.4%, TT 组为 40%, 化疗组为 37.5%。

结论: 系统治疗对伴或不伴远处转移的 CoM 患者均具有临床获益。针对 BRAF 野生型 CoM, 建议将 ICI 作为一线治疗方案。对于 BRAF 突变型 CoM, TT 可带来更高的缓解率和更优的生存结局。

摘要编号: **210074**

面板编号: **OPA-1300**

复发性葡萄膜黑色素瘤的组织病理与遗传学转化: 病例报告

第一作者: **Jingting LUO**

共同作者: **Yuning CHEN, Wenbin WEI**

目的: 探讨复发性葡萄膜黑色素瘤 (UM) 的组织病理及遗传演化特征。

方法: 对一名 42 岁女性患者的原发 (PUM) 及复发 (RUM) UM 组织进行配对全外显子测序 (肿瘤 300 X、外周血 100 X)。数据经 fastp、bwa、GATK (突变分析)、Control-FreeC (拷贝数变异)、clusterProfiler (富集分析) 处理。

结果: RUM 的组织病理类型由梭形细胞型转变为上皮样细胞型。RUM 中共检测到 1,079 个突变 (PUM 为 1,201 个), 其中移码缺失比例增加, 且 FLG 基因突变频率升高。PUM 和 RUM 共享

突变基因包括 ANKRD36、ZNF717、PABPC3。染色体突变热点存在差异: PUM 主要集中于染色体 1、3、11、13、19、21, 而 RUM 集中于 1、3、5、13、14、19。RUM 特异性突变基因 (418 个) 富集于中枢神经系统发育、免疫细胞分化及 Wnt/Notch 等信号通路。拷贝数变异亦发生改变: PUM 主要表现为 chr 4/7/8/21 扩增及 chr 3 缺失; 而 RUM 表现为 chr 15 扩增、chr 7/21 缺失。

结论: 复发性 UM 显示出明显的遗传及染色体动力学变化 (包括移码突变和 CNVs) 以及组织病理类型转化。RUM 特异性突变基因涉及多条关键通路, 提示其在肿瘤复发进程中可能具有驱动作用, 反映出 UM 的复杂分子演化过程。

摘要编号: **209943**

面板编号: **OPA-1299**

巩膜外敷贴放射后补充经瞳孔温热疗法治疗脉络膜黑色素瘤的临床研究

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共同作者: **Yueming LIU, Wenbin WEI, Ruiheng ZHANG**

目的: 探讨经瞳孔温热疗法作为巩膜外敷贴放射后补充治疗脉络膜黑色素瘤的效果及预后。

方法: 收集 2008 年 1 月至 2019 年 3 月于首都医科大学附属北京同仁医院眼科接受碘 125 PRT 治疗的 CM 患者 601 例 (601 眼)。其中男性 306 例 (306 眼), 女性 295 例 (295 眼), 年龄 13 ~ 85 岁, 平均 (46.62 ± 11.94) 岁。全部患者接受术前、术后间接检眼镜、眼底荧光血管造影 (FFA)、吲哚青绿脉络膜血管造影 (ICGA)、彩色多普勒超声、肝功、腹部超声检查。对于 PRT 后瘤体血管残留区域采取 TTT 补充治疗。收集性别、年龄、治疗前眼压、肿瘤形状、高度、最大基底径, 肿瘤与视盘的关系、是否合并玻璃体积血和视网膜下液, 以及治疗后眼球摘除、转移、死亡情况。年龄、肿瘤高度、肿瘤最大基底径符合正态分布, 比较采用独立样本 t 检验。随访时间、眼球摘除时间、转移时间、死亡时间不符合正态分布, 以中位数和四分位数描述。性别、肿瘤形态、累及视盘、合并视网膜下液和玻璃体积血的眼数、眼摘例数、转移例数、死亡例数以频数和百分比表示。性别、肿瘤形状、累及视盘、合并视网膜下液和玻璃体积血眼数的比较采用卡方检验或精确概率法。眼球摘除、转移和归因死亡累积概率的分析采用 Kaplan-Meier 生存分析。眼球摘除、转移及死亡的危险因素采用 Cox 比例风险回归模型分析。

结果: 在纳入的 601 例 (601 眼) 中, 60 例 (60 眼) 存在 PRT 后肿瘤血管残留, 并随后接受 TTT 补充治疗, 占整体的 9.98%。其中 51 例 (51 眼) 仅需

要一次 TTT, 占其中 85.0%。存在肿瘤血管残留与无残留的患者平均年龄分别为 (42.27 ± 12.11) 岁和 (47.11 ± 11.84) 岁, 差异有统计学意义 ($t = 3.00$, $P < 0.05$)。接受补充治疗的 60 例 (60 眼) 3 年、5 年眼摘率分别为 6.7% (95% CI: 2.6 ~ 6.8) 和 18.9% (95% CI: 10.9 ~ 31.6), 3 年、5 年转移率分别为 3.3% (95% CI: 0.8 ~ 12.7) 和 10.2% (95% CI: 7.7 ~ 21.3), 3 年及 5 年归因死亡率分别为 1.7% (95% CI: 0.2 ~ 11.2) 和 6.7% (95% CI: 2.6 ~ 16.9)。经多因素分析, 肿瘤最大基底径、肿瘤累及视盘与眼球摘除的相关性有统计学意义 ($HR = 1.22$, 4.35; 95% CI: 1.11 ~ 1.34, 1.84 ~ 10.23; $x^2 = 4.14$, 3.36; $P < 0.05$)。肿瘤最大基底径、视网膜下液与肿瘤转移的相关性有统计学意义 ($HR = 1.26$, 6.31; 95% CI: 1.16 ~ 1.37, 1.94 ~ 20.51; $x^2 = 5.44$, 3.06; $P < 0.05$)。肿瘤最大基底径、年龄、眼压 ($HR = 1.23$, 1.52, 1.10; 95% CI: 1.11 ~ 1.35, 1.20 ~ 1.91, 1.02 ~ 1.19; $x^2 = 4.15$, 3.53, 2.42; $P < 0.05$) 与归因死亡的相关性有统计学意义。

结论: FFA 联合 ICGA 可用于评估 PRT 术后肿瘤血管残留情况。TTT 作为补充治疗可针对性应用于残留区域。肿瘤最大基底径作为不良预后的危险因素需高度重视。

摘要编号: 209458
面板编号: OPA-1294

敲低 KLF4 抑制血管内皮细胞衰老和葡萄膜黑色素瘤细胞迁移

第一作者: Liang MA

目的: 探讨葡萄膜黑色素瘤 (UM, uveal melanoma) 转移过程中内皮细胞的作用, 发现转移性 UM 的内皮细胞呈现显著衰老特征, 并揭示 Kruppel 样因子 4 (KLF4, Kruppel-like factor 4) 促进肿瘤转移的机制。研究结合单细胞测序和实验验证, 提出靶向清除衰老内皮细胞或阻断 KLF4 可能是抑制 UM 肝转移的新策略, 为临床治疗提供潜在靶点。

方法: (1) 基于公共数据库, 分析单细胞数据, 进行细胞分群、差异基因分析和衰老评分, 解析细胞间互作。(2) 体外实验验证, H_2O_2 处理人脐静脉内皮细胞, 通过 SA- β -gal 染色、蛋白与 RNA 检测确认衰老表型。Transwell 迁移实验验证衰老内皮细胞对葡萄膜黑色素瘤细胞迁移的促进作用。

结果: (1) 单细胞测序分析显示转移性葡萄膜黑色素瘤中内皮细胞占比较多; (2) 转移性葡萄膜黑色素瘤的内皮细胞具有显著衰老趋势; (3) KLF4 高表达是内皮衰老的潜在驱动因素; (4)

转移性葡萄膜黑色素瘤患者衰老内皮细胞中 KLF4 高表达; (5) KLF4 过表达的衰老内皮促进肿瘤细胞转移。

结论: 本研究揭示了内皮细胞衰老在葡萄膜黑色素瘤转移中的关键作用机制。通过整合单细胞测序分析和功能实验, 研究人员发现转移性 UM 中内皮细胞呈现显著衰老特征, KLF4 被鉴定为驱动这一过程的核心转录因子。实验证实, KLF4 通过上调 P21 诱导内皮细胞衰老, 同时促进肿瘤细胞迁移能力的增强。深入机制研究表明, 衰老内皮细胞通过分泌 CXCL12 等 SASP 因子激活肿瘤细胞的迁移能力。临床样本分析进一步验证了 KLF4 高表达与肝转移风险和不良预后的显著相关性。此外, 研究还发现衰老内皮细胞可能招募 Treg 细胞, 参与促进免疫抑制性微环境的形成。这些发现不仅阐明了内皮细胞衰老促进 UM 转移的分子机制, 更提供了靶向清除衰老内皮细胞或阻断 KLF4 的治疗新思路。该研究为开发针对转移性 UM 的联合治疗策略奠定了重要理论基础, 具有潜在的临床应用价值。

摘要编号: 209174
面板编号: OPA-1292

泪腺区占位性病变手术入路选择

第一作者: Hongfei LIAO

目的: 探讨泪腺区占位性病变的类型特征及不同手术入路的选择策略, 以实现良好的手术暴露、完整切除及美观修复。

方法: 结合本院近年来泪腺区占位病例的临床实践, 总结不同病理类型 (包括感染性泪腺炎、炎性假瘤、结节病、肉芽肿性多血管炎、IgG4 相关性眼病、淋巴组织增生性病变、上皮源性肿瘤、转移性肿瘤及泪腺导管囊肿等) 的影像学特征与手术处理方式。根据病变性质、体积及术野暴露需求, 选择重睑入路、眉下入路或眉部入路进行切除与活检。

结果: 炎性假瘤及 IgG4 相关性眼病体积较小或高度怀疑炎性病变者, 可尝试糖皮质激素诊断性治疗; 其他明确占位性病变宜行手术切除。上皮源性肿瘤 (包括多形性腺瘤、腺样囊性癌、肌上皮癌等) 无论良恶性, 均应选择暴露充分的入路, 连同眶骨膜一并切除。重睑入路及眉部入路因瘢痕隐蔽、美容效果好, 适用于良性病变或小体积病变; 眉下入路虽暴露充分, 但瘢痕较明显。临床应综合病变部位、大小及术者经验, 灵活选择“扬长避短”的手术路径。

结论: 泪腺区占位性病变病理类型多样, 手术入路应个体化选择。合理的入路选择可兼顾手术视野、肿瘤切除完整性及术后美观。良性上皮性肿瘤仍需警惕潜在恶变, 术后应进行全面病理检查及长期随访。

摘要编号: 209759

面板编号: OPA-1298

眼眶肿瘤外侧壁开眶手术的治疗策略

第一作者: Zeyi LI

共同作者: Jianhao CAI, Cangeng XU

目的: 探讨眼眶肿瘤外侧壁开眶手术的治疗策略。

方法: 回顾近 5 年在我院进行外侧壁开眶手术几类眼眶大肿瘤: A. 泪腺混合瘤 25 例, B. 泪腺囊样腺癌 8 例, C. 眼眶淋巴瘤 12 例, D. 眼球后海绵状血管瘤 8 例, E. 眼眶神经纤维瘤 5 例, F. 眼眶神经鞘瘤 4 例。术前 CT 或 / 和 MRI 检查, 确定外侧壁开眶手术的适应症。以颧额缝为解剖标志电锯电钻切开眼眶外侧壁, 暴露手术视野, 切除眶内肿瘤。2 例神经纤维瘤同时做内侧泪阜切口协助分离肿瘤。标本送病理检查明确诊断。术后随访 5 年。

结果: 术中泪腺混合瘤、泪腺囊样腺癌和海绵状血管瘤均能完整摘除, 眼眶淋巴瘤无法切除干净, 眼眶神经纤维瘤和神经鞘瘤分离比较困难。眼球运动障碍为术后最常见的并发症, 未行放疗或化疗的 5 例淋巴瘤出现肿瘤复发。

结论: 眼眶内大肿瘤采用外侧壁开眶手术, 扩大术野, 有利于手术操作, 减轻或避免术中对眼球、眼外肌和视神经的牵拉挤压, 减少并发症。术前 CT、MRI 检查至关重要。

摘要编号: 209631

面板编号: OPA-1296

胸膜间皮瘤脉络膜转移癌一例

第一作者: Jie YANG

目的: 探讨胸膜间皮瘤脉络膜转移癌的临床表现、诊断及治疗预后, 以提高对该罕见疾病的认识和诊疗水平。

方法: 回顾性分析 1 例 42 岁女性胸膜间皮瘤脉络膜转移癌患者的临床资料。患者因左眼突然视物模糊 20 余天就诊, 既往有胸膜间皮瘤病史 3 年, 曾行切除术及多次化疗。对患者进行详细的眼科检查, 包括视力、眼压、眼前节及眼底检查, 以及视野、B 超、P-VEP、OCT 等辅助检查, 并结合血常规、血沉、C 反应蛋白等全身检查结果进行综合分析。同时, 进行头颅眼眶 MRI 及增强检查, 以明确眼部病变的性质及范围。

结果: 回顾性分析 1 例 42 岁女性胸膜间皮瘤脉络膜转移癌患者的临床资料。患者因左眼突然视物模糊 20 余天就诊, 既往有胸膜间皮瘤病史 3 患者左眼视力 0.12, 眼底检查显示视盘色红、边界欠清, 视网膜皱褶, 黄斑区水肿, 中心凹光反射欠清。视

野检查示左眼颞侧视野损害, B 超示左眼玻璃体混浊、局部视网膜脱离及眼球壁异常回声, P-VEP 示左眼 P100 波峰时延迟, OCT 示左眼盘周视神经纤维层局部增厚。血常规检查示白细胞、中性粒细胞数目升高, 血红蛋白、红细胞压积、平均血红蛋白量下降, 血小板数目升高, C 反应蛋白、血沉及尿素氮升高。头颅眼眶 MRI 及增强检查示左侧球后壁异常信号, 考虑转移瘤或网膜下出血, 左眼视神经管内段稍增粗。最终诊断为脉络膜转移癌。患者出院后赴天津肿瘤医院进一步检查, 发现多处癌细胞转移, 继续化疗, 但病情恶化, 于同年 12 月逝世。

结论: 胸腺间皮瘤脉络膜转移癌是一种罕见且恶性程度高的疾病, 其眼部表现多样, 易与其他眼部疾病混淆。早期诊断困难, 需结合详细的眼科检查及全身检查结果综合判断。头颅眼眶 MRI 及增强检查对明确眼部病变性质及范围具有重要价值。该病预后极差, 确诊时多已处于晚期, 治疗以内科化疗为主, 但疗效有限, 生存期短, 需引起临床医生的高度重视, 以提高对该病的警惕性和诊断准确性, 为患者提供更及时的治疗和预后评估。

摘要编号: 209730

面板编号: OPA-1297

自体睑板移植修复眼睑恶性肿瘤切除术后眼睑缺损

第一作者: Zeyi LI

共同作者: Jianhao CAI, Weihao CAI, Cangeng XU

目的: 探讨自体睑板移植修复眼睑恶性肿瘤切除术后眼睑缺损的手术方法。

方法: 回顾最近 4 年在我院手术的眼睑恶性肿瘤 23 例, 其中基底细胞癌 14 例, 睑板腺癌 9 例。全眼睑切除 8 例, 大于 1/2 眼睑切除 15 例; 下眼睑病变 13 例, 上眼睑病变 10 例。手术方法: 1. 眼睑恶性肿瘤扩大切除 + 冰冻切片; 2. 根据术眼缺损区的大小, 取同一眼上眼睑的睑板或对侧眼上眼睑的睑板; 3. 被取自体睑板包括睑结膜面, 宽度约 5 ~ 6 mm, 仅保留睑缘 3 ~ 4 mm 的睑板; 4. 自体睑板移植到手术缺损区, 睑结膜面紧贴眼球, 6-0 可吸收缝线对位缝合睑板并缝合眼睑皮肤; 5. 睑板缝合尽量处于内翻状态。术后随访 3 ~ 6 个月。

结果: 23 例移植的自体睑板愈合好, 无睑板坏死; 病变的穹隆结膜稍变浅, 无眼球运动障碍; 术后 3 个月有 12 例眼睑闭合不全 2 ~ 3 mm, 多为全眼睑切除病例; 有 2 例轻度眼睑外翻。

结论: 自体睑板移植修复眼睑恶性肿瘤切除术后眼睑缺损, 取材方便, 睑板移植易成活, 修复的眼睑缺损区比较符合正常眼睑生理, 重建眼睑效果好。

摘要编号: 208549

面板编号: OPA-1288

视网膜母细胞瘤患儿父母病耻感现状及影响因素分析

第一作者: Wei XU

目的: 了解视网膜母细胞瘤 (retinoblastoma, RB) 患儿父母的连带病耻感现状及其影响因素。

方法: 选取 135 例视网膜母细胞瘤患儿的父亲或母亲, 采用一般资料调查表、社会影响量表、社会支持评定量表、一般自我效能感量表、简易应对方式量表对其进行调查。

结果: 视网膜母细胞瘤患儿照顾者病耻感量表总分为 55.00 (49.00, 63.00) 分, 社会支持总分为 31.00 (23.00, 37.50) 分, 一般自我效能感总分为 21.00 (16.50, 26.00) 分, 积极应对评分 (26.44 ± 8.599) 分, 消极应对评分 (12.54 ± 5.406) 分。多因素分析结果显示社会支持总分、疾病分期、应对倾向、医保类型为 RB 父母病耻感的影响因素, 合计解释总变异的 37.2%。

结论: RB 患儿父母病耻感处于较高水平, 有待进一步改善。临床护理人员应关注 RB 患儿的疾病分期、医保类型、应对倾向, 正确引导, 提高社会支持利用度, 降低患儿父母的病耻感水平, 全面配合患儿更好的治疗。

眼部影像学

摘要编号: 209317

面板编号: OIM-1302

AB-800 与 IOLMaster 700 在儿童眼生物学参数测量中的一致性分析

第一作者: Liu YUTONG

共同作者: Yang SHUO, Li XIAONING

目的: 评价 AB-800 免散瞳生物测量仪与 IOLMaster 700 在测量儿童眼生物学参数的一致性和相关性。

方法: 横断面研究。选取 2025 年 9 月至 10 月在长沙爱尔眼科医院视光研究所就诊并符合入组标准的具有远视储备儿童 91 例, 年龄 6-13 岁, 男 50 例, 女 41 例。所有受试者均分别使用 AB-800 和 IOLMaster 700 进行眼轴长度 (AL)、角膜曲率 (K1/K2)、晶体厚度 (LT)、前房深度 (ACD) 及角膜直径 (WTW) 等生物学参数的测量。采用组内相关系数 (ICC) 和 Pearson 相关分析评价两台仪器测量结果的一致性和相关性, 并通过 Bland-

Altman 分析进一步评价两台仪器测量结果之间的一致性。

结果: AB-800 与 IOLMaster 700 测得 AL、LT、ACD、K1、K2、WTW 等测量值高度相关 (均 $P < 0.001$) 两台仪器的测量结果 ICC 值均在 0.95 以上, Pearson 相关系数 r 均 > 0.97 (均 $P < 0.001$), 显示两仪器测量结果具有极高的一致性和相关性。Bland-Altman 分析显示, 两台仪器测量各参数的平均差接近于 0, 95% 一致限界范围较窄, 绝大多数测量点均落在一致限界之内, 未见明显系统偏差。

结论: AB-800 与 IOLMaster 700 在测量儿童眼轴长度、晶体厚度、前房深度及角膜曲率等参数时结果高度一致。AB-800 测量结果准确可靠, 可为儿童眼部生物学参数检测及远视储备监测提供有益参考, 为儿童视力健康管理提供有力支持。

摘要编号: 208947

面板编号: OIM-1301

视网膜结构特征与肺癌发病风险的关联: 一项基于英国生物银行队列的前瞻性研究

第一作者: Yi ZHANG

共同作者: Cong LI, Lei LIU, Yun REN, Xiaohong YANG, Honghua YU

目的: 肺癌是全球第一大常见恶性肿瘤, 早期发现是改善预后的关键。本研究旨在首次基于英国生物银行 (UK Biobank) 大规模前瞻性队列, 探讨光学相干断层扫描 (Optical Coherence Tomography, OCT) 测得的视网膜结构改变与未来肺癌发病风险之间的关联。

方法: 本研究纳入 UK Biobank 队列中 36,676 名基线无肺癌且具备质量合格的视网膜 OCT 影像的受试者。暴露变量为视网膜结构参数, 研究终点为新发肺癌病例。采用多变量 Cox 比例风险回归模型评估视网膜结构与肺癌发病风险的关联。通过亚组分析、敏感性分析排除潜在偏倚, 并利用限制性立方样条模型探究剂量 - 反应关系。

结果: 在中位随访 11.27 年期间, 306 名 (0.8%) 受试者发生肺癌。完全调整混杂因素后, 基线视网膜黄斑总厚度减小 ($HR = 0.99$, 95% $CI: 0.98-1.00$) 及外层视网膜厚度减小 (中央区 $HR = 0.97$, 95% $CI: 0.94-0.99$; 外环区 $HR = 0.94$, 95% $CI: 0.91-0.97$) 与肺癌发生风险显著相关。亚组分析提示, 此关联在年龄超过 60 岁的受试者及吸烟人群中更为显著。剂量 - 反应关系分析证实二者存在稳健的线性负相关。

结论: 基线视网膜黄斑总厚度及外层视网膜厚度减小是肺癌发生的独立危险因素。作为一种无创、快

速且经济的成像技术，OCT 所捕获的视网膜结构改变，有望成为一种新颖的生物标志物，用于肺癌高危人群的风险分层与早期预警，为癌症的无创筛查提供了重要的新思路。

神经眼科

摘要编号：209683

面板编号：NEU-1314

1 例截肢患者眼动脉溶栓治疗术后动脉阻塞护理

第一作者：张雨

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目的：患者为男性，45 岁，因“右眼视物不清 1 天，加重 3 小时”入院，于 1 天前无明显诱因出现右眼视物模糊，未诊治，于 3 小时前醒后发现右眼视物模糊加重，仅有眼前手动，遂来我院。患者既往 2 型糖尿病、2 型糖尿病性视网膜病变、2 型糖尿病性足，右眼因“玻璃体积血”行玻璃体切除术，2 型糖尿病性足致左下肢膝以下切除术，专科检查：右眼视力眼前 50 cm / 手动，左眼视力 0.5，眼底视乳头色淡红，OCT 检查示：右眼血流密度减低、血流淤滞，右眼视网膜层间水肿，右眼 CRAO 诊断基本明确，予以右眼动脉溶栓治疗，术后视野基本恢复正常（略有遮盖），视力正常。目的：报道该疾病的护理和体会，希望对该类患者的治疗和护理提供理参考。

方法：监测视力和血压，在入院和出院时均给予 HAMILTON 焦虑测量评分，明确患者在焦虑改善情况，鼓励患者配合医护的治疗及护理。完善跌倒风险评估。配合患者完善术前检查，常规腹股沟区备皮，准备术中介入材料。术后叮嘱患者和家属穿刺部位压迫 8 小时，伸直制动，加强远端肌肉按摩，嘱患者大量饮水，持续床旁心电监护，密切观察皮温、穿刺点及足背动脉搏动情况。指导患者严格糖尿病饮食，严密监测血糖。

结果：该者住院期间跌倒风险评估为 35 分，属于中风险患者，对其实施正确有效的防跌倒干预措施非常重要。HAMILTON 焦虑测量分值 < 14 分，较入院时减轻，跌倒坠床评分为 25 分，为低风险患者。该患者出现高血糖相关并发症，说明患者对该病认知不足。患者经过治疗和护理后病情好转，患眼视力较入院时得到明显改善，治疗期间，未发生其他并发症及不良事件。

结论：针对本例截肢合并糖尿病视网膜病变玻璃体切除术后发生 CRAO 的患者，经眼动脉介入溶栓治

疗，并实施以视力与血压监测、焦虑评估、跌倒风险防控及血糖管理为重点的系统性护理干预后，患者视力显著改善，焦虑状态缓解，跌倒风险等级降低，未发生并发症，表明该综合护理方案对保障治疗效果及患者安全具有重要临床意义。

摘要编号：209200

面板编号：NEU-1310

光学相干断层成像评估高血压性视网膜病变神经元损伤应用价值的研究

第一作者：Runze ZHAO

共同作者：Guorui DOU

目的：本研究以光学相干断层成像检查为检查手段，探究其在高血压性视网膜病变中神经元损伤评估中的应用和重要价值。

方法：纳入 2019 年 3 月 -2020 年 7 月于 Hospital Clínico Quirúrgico “Hermanos Ameijeiras”

（HHA 医院）就诊的 102 例高血压患者为研究对象，同时纳入 45 名健康受试者，监测 24 h 动态血压，取 24 h 舒张压和收缩压的平均动脉血压值，测量眼压，计算眼灌注压。检测视盘区视网膜神经纤维（RNFL）厚度和黄斑区神经节细胞复合层（GCC）厚度。依据血压控制情况将患者分为血压控制组（n = 51）和血压未控制组（n = 51），45 名健康受试者为对照组。采用 Pearson 相关性分析或 Spearman 秩相关分析探究血压、眼灌注压、视网膜病变与 GCC 厚度和血压、眼灌注压与视网膜病变的相关性，采用 R 3.5.3 软件进行中介作用分析。

结果：3 组研究对象人种、收缩压、舒张压、平均动脉压、眼压、眼灌注压、视网膜病变比较，差异有统计学意义（ $P < 0.05$ ）。血压未控制组平均 RNFL 厚度低于对照组（ $P < 0.05$ ），血压控制组、血压未控制组 GCC 平均厚度低于对照组，血压未控制组 GCC 最小值低于对照组（ $P < 0.05$ ）。相关性分析结果显示，GCC 平均厚度、上方 GCC 厚度、颞下方 CCG 厚度与收缩压、舒张压、眼灌注压、视网膜病变呈负相关（ $P < 0.05$ ），颞上方 GCC 厚度与收缩压、舒张压、眼灌注压呈负相关（ $P < 0.05$ ），下方 GCC 厚度与舒张压呈负相关（ $P < 0.05$ ），视网膜病变与收缩压、舒张压、眼灌注压呈正相关（ $P < 0.05$ ）。中介效应结果显示，“收缩压→GCC 平均厚度→高血压性视网膜病变”效应显著，收缩压与 GCC 平均厚度呈正相关，GCC 平均厚度与高血压性视网膜病变呈正相关（ $P < 0.05$ ）。收缩压对高血压性视网膜病变发生风险具有直接影响（ $\beta = 0.013$ ，95% CI = 0.007 ~ 0.020， $P < 0.001$ ），GCC 平均厚度部分介导了收缩压对高血压性视

网膜病变发生风险的影响 ($\beta = 0.117$, 95% CI = 0.014 ~ 0.360, $P = 0.04$) , 中介效应占总效应的 11.7%。

结论: 光学相干断层成像检查是一种无创的眼科检查方法, 可优于普通眼底检查提前发现高血压性视网膜神经元受损情况, 对高血压导致视神经受损的不可逆盲和高血压靶器官受损进行早期预防和预警。

摘要编号: 208702

面板编号: NEU-1306

双硫仑 /CNTF 自复制 mRNA 共递送系统通过调控小胶质细胞焦亡促进视神经损伤修复的作用研究

第一作者: Qianyue ZHANG

共同作者: Yingzhi CHEN, Xianqun FAN, Jipeng LI, Yusha LIU, Qin WEI, Huifang ZHOU

目的: 创伤性视神经病变 (TON) 是导致不可逆性视力丧失的重要病因, 目前缺乏有效临床治疗手段。其核心挑战在于视网膜神经节细胞 (RGC) 再生能力有限, 以及损伤后存在的破坏性炎症微环境。本研究旨在探究小胶质细胞焦亡在 TON 中的作用机制, 并开发一种协同治疗策略, 以同时抑制神经炎症和促进 RGC 存活与再生。

方法: 本研究首先证实了在 TON 模型中, 机械性创伤及后续神经炎症通过激活 NLRP3/CASP1/GSDMD 信号通路, 诱导小胶质细胞发生焦亡, 进而通过小胶质细胞 - 神经元相互作用加剧炎症级联反应和 RGC 退行性变。为克服此双重障碍, 我们设计并构建了一种可靶向小胶质细胞的脂质纳米颗粒 (LNP) 共递送系统。该系统同时包载了可选择性抑制 GSDMD 蛋白的双硫仑 (DSF) 以及编码睫状神经营养因子 (CNTF) 的自复制 mRNA。通过综合性的体外细胞实验和体内动物模型, 评估了该联合疗法在抑制焦亡、减轻神经炎症、促进 RGC 存活、轴突再生以及恢复视觉功能方面的效果。

结果: 研究结果表明, 机械损伤确实通过 NLRP3/CASP1/GSDMD 通路触发了小胶质细胞焦亡。我们开发的靶向 LNP 平台能够有效地将治疗载荷递送至小胶质细胞。该联合策略展现出协同治疗效应: DSF 有效抑制了 GSDMD 介导的焦亡, 从而显著减轻了炎症反应; 同时, 自复制 mRNA 能够在局部持续表达 CNTF, 为 RGCs 提供了强大的神经营养支持。体内外功能评估证实, 该疗法显著提高了 RGC 的存活率, 促进了受损视神经的轴突再生, 并最终导致了视觉功能的明显恢复。

结论: 本研究发现小胶质细胞焦亡是 TON 病理进程中一个关键的炎症放大机制。我们成功开发的靶向小胶质细胞的 LNP 共递送平台, 通过协同抑制焦亡 (DSF) 和提供神经营养支持 (CNTF mRNA), 有效克服了 TON 的炎症和再生双重障碍, 实现了显著的结构保护与功能恢复。这项工作不仅强调了协调多靶点治疗策略在神经修复中的重要性, 也凸显了 RNA 与小分子药物联合递送系统在治疗神经炎症及神经退行性疾病方面具有广阔的转化应用前景。

摘要编号: 209652

面板编号: NEU-1311

后部缺血性视神经病变早期诊断与综合性治疗的临床疗效分析

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目的: 探讨后部缺血性视神经病变的早期诊断和综合治疗临床效果。

方法: 回顾性分析我院 2009~2024 年住院确诊的 13 例后部缺血性视神经病变 (PION), 其中男 4 例, 女 9 例, 年龄 51 岁 ~79 岁, 平均年龄为 66.3 岁。有原发性高血压病史 7 例, 多发性腔隙性脑梗塞 2 例, 糖尿病和高血压病史 3 例, 颈动脉阻塞伴高血压 1 例。所有患者均为单眼发病。均表现为突然发生的无痛性视力障碍及视野缺损。神经系统检查: 手足无 Raynaud 现象; 无头痛及眼痛。13 例患者均无视盘水肿, 眼底正常, 仅有 2 例视盘鼻侧略淡。辅助检查: 13 例患者血脂均高。CT 检查, 有不同程度的多发性腔隙性脑梗塞或脑动脉血栓形成。入院治疗经过: 1、降纤: 纤溶酶 100 u, 静点, 日一次, 改善脑供血。2、丁苯酞氯化钠注射液 100 ml, 日一次, 静滴。清除自由基。3、金纳多注射液 17.5 mg, 生理盐水 250 ml, 静滴, 地塞米松 5 mg, 日一次, 测管滴入。连续 5 天。复方樟柳碱 2 ml, 颞浅动脉旁、球后交替注射, 14 天一疗程。高压氧治疗每次 10~20 分钟。

结果: 经过如上治疗, 所有患者均有不同程度的视力提升, 随访 6 个月至 2 年, 视力保持稳定。最好的一例患者视力从指数恢复至 1.2。附病例 1: 孙 XX, 女, 59 岁。右眼无诱因的突然视物不清 3 天, 无眼痛。曾在当地医院眼科诊查, 眼底未发现异常。嘱回家适当休息。3 天后视力仍未见好转, 故来我院就诊, 既往高血压病史 10 年。检查: 视力: 右眼指数 / 20 CM, 左眼 1.2, 眼底检查: 视盘边界清; C/D = 0.3, 鼻侧略淡。颈部彩超提示: 双侧颈动脉斑块形成; CT 提示: 多发性腔隙性脑梗塞。诊断: 1. 右眼后部缺血性视神经病变; 2. 多发性腔隙性脑

梗塞；3. 原发性高血压。经治疗第六天时，右眼视力由指数恢复至 0.4，第 16 天时，视力恢复至 1.0。图 1~5 为治疗前、后眼底像、OCT 及视野检查。

结论：PION 是一种相对少见的疾病。发病初期临床特征不明显，阳性体征少，诊断困难。初始视盘正常，但在约 5-6 周后，视盘出现萎缩性变化。本组病例给予降纤、改善脑供血等药物，综合治疗之后，获得了良好疗效。提高本病的识别力和及时恰当治疗，对于本病取得有效疗效至关重要。

摘要编号：**209212**

面板编号：**NEU-1308**

多发性硬化症在三国患者中的眼部表现：一项基于网络的调查

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共同作者：**Maria TOLEDO**, 张国勋

目的：本研究旨在评估中国、西班牙和古巴多发性硬化症 (MS) 患者的流行病学特征、眼科临床表现以及不同的治疗方案。

方法：采用自行设计的问卷，对 MS 患者进行一项可比性的描述性横断面研究。调查内容包括患者的人口统计学资料、与 MS 相关的眼部表现以及三国所采用的治疗方法。在线调查使用问卷星平台设计，并通过 WhatsApp、微信和电子邮件分发调查链接。定量数据以均数和标准差表示，非参数变量采用 Kruskal-Wallis 检验。定性数据以例数和百分比表示。采用卡方检验比较各组的应答类别。当 $p < 0.05$ 时认为差异具有统计学意义。

结果：三国的男女比例均为 2-3:1，且复发缓解型 MS (RRMS) 在三国中均为最常见类型。三国中均有一半患者的视力丧失是缓慢且渐进性的，无显著差异 ($p = 0.524$)。与其他两国患者相比，中国患者接受类固醇治疗的百分比更高 ($p < 0.001$)，在传统药物使用方面也观察到类似趋势。在三国中，几乎有三分之一未接受任何治疗的患者出现了自发性恢复 ($p = 0.097$)。

结论：MS 更常以复发缓解型的临床形式出现，并且有明显的女性 predominance。MS 的首次眼部危象或临床发作的特点是缓慢、渐进性的视力损害，并在其病程发展中出现并累积其他眼部表现。在 MS 病程中，视神经炎发作后出现自发性视力恢复是可能的。

摘要编号：**208854**

面板编号：**NEU-1307**

多病因眶尖综合症的临床特征及诊疗分析

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共同作者：**Zhenyu JI, Xuan XIAO**

目的：探讨多病因眶尖综合症的临床特征及诊疗策略。

方法：采用病例系列研究，对 3 例不同病因所致眶尖综合症患者的临床特征进行回顾性分析，从眼球运动、视力、眼前节、眼底、视神经功能及影像学特征等方面进行系统性评估。

结果：3 例患者均以患眼上睑下垂、眼球运动多方向受限为共同表现，伴随不同程度视力下降甚至失明。病例 1：老年女性，合并视盘水肿，眼眶 MRI 提示视神经眶内段至交叉前段增粗、边缘模糊，增强扫描呈明显不均匀强化及“轨道征”，临床考虑炎症可能（不排除肿瘤性病变）。经糖皮质激素治疗后，眼外肌功能恢复，但视力未改善，最终确诊为眶尖部炎性假瘤。病例 2：产后女性，表现为患眼眼球突出（17 mm）、最佳矫正视力 0.1、眼压升高（27 mmHg）及球结膜血管迂曲。CTA 提示左侧颈内动脉眼段动脉瘤（17.3 mm × 19.3 mm），海绵窦段管腔轻度狭窄，伴海绵窦区迂曲血管影、眼上静脉扩张，转神经外科行弹簧圈栓塞术，术中发现颈内动脉海绵窦段动脉瘤破裂致颈内动脉-海绵窦瘘，综合诊断为海绵窦综合征累及眶尖。病例 3：美容相关性病例，因额部胶原蛋白填充术突发眼眶疼痛及视力下降，眼部 OCT 显示内核层高反射信号。经对症治疗后，上睑下垂及眼球运动功能恢复，视力从无光感提升至光感。

结论：眶尖综合症临床表现具有异质性，需结合病史、眼部体征及影像学检查综合判断病因。强调早期精准病因诊断及多学科协作诊疗的重要性，对进行性视力丧失或严重神经压迫患者需紧急干预，以最大限度挽救视力并降低永久性神经损伤风险。

摘要编号：**209608**

面板编号：**NEU-1312**

她眼中的伪装大师

第一作者：**Jie YANG**

目的：探讨以炎性假瘤为影像学表现的鼻窦恶性肿瘤的临床特点、误诊原因及诊疗策略。

方法：探讨以炎性假瘤为影像学表现的鼻窦恶性肿瘤的临床特点、误诊原因及诊疗策略。

结果：1. 临床特征：首发表现为单眼视力骤降（0.08）、相对性瞳孔传入障碍（RAPD+）、视盘

水肿；影像学呈多窦腔及颅眶交界区弥漫性病变，激素治疗短期有效（视力恢复至 1.0）；复发期出现面部麻木、头痛，活检病理确诊鼻窦未分化型非角化性癌。2. 误诊分析：影像学表现与炎性假瘤重叠（鼻窦及眶内炎性浸润）；激素治疗暂时改善症状（视力、视盘水肿），掩盖恶性本质。3. 病理转折：二次手术活检示肿瘤细胞呈巢状浸润，免疫组化符合非角化性癌（未分化型）。

结论：1. 临床特征：首发表现为单眼视力骤降（0.08）、相对性瞳孔传入障碍（RAPD+）、视盘水肿；影像学呈多窦腔及颅眶交界区弥漫性病变，激素治疗短期有效（视力恢复至 1.0）；复发期出现面部麻木、头痛，活检病理确诊鼻窦未分化型非角化性癌。2. 误诊分析：影像学表现与炎性假瘤重叠（鼻窦及眶内炎性浸润）；激素治疗暂时改善症状（视力、视盘水肿），掩盖恶性本质。3. 病理转折：二次手术活检示肿瘤细胞呈巢状浸润，免疫组化符合非角化性癌（未分化型）。

摘要编号：207918

面板编号：NEU-1304

常染色体显性遗传性出血性毛细血管扩张症合并视神经萎缩病例报告 1 例

第一作者：Weijia WANG

目的：患者男性，28 岁，双眼视野缺损 1 年余，无其余不适。高度近视病史，肺动静脉瘘封堵术后，否认吸烟、饮酒史及家族遗传病史。眼科查体：BCVA：右眼 0.8，左眼 1.0。双眼前节（-），RAPD（-），豹纹状眼底，视盘颞侧色淡，鼻侧充血，边界清，C/D 约 0.5，盘周萎缩弧。眼压：右眼 21 mmHg，左眼 17 mmHg。

方法：辅助检查：右眼鼻上、左眼鼻下方视野局限性缺损。双眼视盘 RNFL 层厚度均变薄，黄斑区视网膜各方位均受累且节细胞层变薄。FVEP 及眼眶核磁未见明显异常。基因分析：chrM: 15301, G > A, 阳性，良性同义变异。初步诊断：1、双眼视神经萎缩 Leber 遗传性视神经病变可能性大；2、双眼高度近视；3、先天性肺动静脉瘘术后。

结果：病例分析：1、高度近视性视神经病变为高度近视合并视盘鼻侧或鼻上方 RNFL 层变薄和对应颞侧或颞下方视野缺损，该病例体征不符合此诊断；2、盘沿宽度不符合 ISNT 法则，但其视杯不大，左眼视野不符合典型青光眼视野缺损表现，暂不考虑正常眼压型青光眼；3、否认中心视力下降，其视野缺损与 LHON 体征不符；4、线粒体基因 15301 位点突变为良性同义变异，不能直接导致 LHON 发病。追问家族史：患者、患者母亲及姥姥均有反复自发性鼻衄病史，母亲肝脏血管瘤病史。完善腹

部超声提示：肝右后上端偏高回声结节，血管瘤可能性大。我们根据患者鼻衄、肺动静脉瘘、肝脏血管瘤及一级亲属体征等证据，考虑患者遗传性出血性毛细血管扩张症（HHT）可能性大。完善全外显子组遗传疾病基因检测：ENG 基因杂合变异 [c.145G > T (p.Val49Phe)，错义突变]。最终诊断：1、双眼视神经萎缩；2、双眼高度近视；3、遗传性出血性毛细血管扩张症；4、先天性肺动静脉瘘术后；5、肝血管瘤。

结论 我们报道了第一例 HHT 合并的视神经萎缩。研究证明 TGF- β 可为视网膜提供营养支持及神经保护，保护视网膜神经节细胞免受氧化应激损伤，并被认为是有助于筛板重塑。我们考虑本例患者的发病机制可能为慢性低氧血症、血红蛋白增多症、血液粘滞度增高、反向栓子导致的长期视神经供血供氧不足，以及长期 TGF- β 通路异常导致的视神经保护作用损伤。

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面板编号：NEU-1315

慢性硬膜下血肿继发双眼视乳头水肿一例报告

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目的：报告一例因慢性硬膜下血肿导致的双侧视乳头水肿病例，分析其临床表现、影像学线索与诊疗过程，强调对隐匿性颅内病变的警惕及重复神经影像学检查的重要性。

方法：患者男性，52 岁。既往 7 周前发生车祸，初期无明显外伤体征，约 3 周后出现间歇性头痛，4 天前出现左眼无痛性视力模糊而就诊。入院初步眼科评估：右眼最佳矫正视力（BCVA）1.0，左眼 BCVA 0.2；左侧存在相对传入性瞳孔障碍（RAPD）；眼底检查见双侧视乳头高度充血、水肿，视盘周围大片火焰样出血。OCT 显示双侧视神经水肿并伴双眼黄斑下视网膜液；视野检查示双侧盲点明显扩大（左 > 右）。FFA 呈视盘早期低荧光、乳头旁血管扩张迂曲及静脉充盈延迟，视盘进行性渗漏。眶部 MRI 提示视神经鞘增宽及鞍上池受压征象，提示颅内压增高。基于上述可疑颅内病变体征，给予复查颅脑影像学检查以明确病因。

结果：复查脑 MRI 提示同侧慢性硬膜下血肿，行钻孔引流术后随访 1.5 个月：左眼 BCVA 由 0.2 恢复至 0.6；眼底检查示视乳头水肿完全消退，出现乳头苍白及乳头前胶质反应；OCT 显示黄斑下积液消失；视野范围较术前明显恢复。随访说明视功能部分可逆，且颅内病因治疗对视乳头水肿具有决定性意义。

结论：慢性硬膜下血肿虽为引起视乳头水肿的少见原因，但在有外伤史或提示颅内压力升高的系统性或影像学线索时，应提高警惕。即使初次影像学检查未见明确异常，当临床表现与颅内高压不相符或病情进展／未解释时，需及时进行系统性评估并考虑重复神经影像学检查以避免延误诊断与治疗。眼科医师在面对双侧视乳头水肿时，应与神经外科／神经影像科密切协作，确保早期识别可逆的颅内病变以改善预后。

摘要编号：204426

面板编号：NEU-1303

罕见线粒体 DNA 点突变致老年 Leber 遗传性视神经病变一例

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目的：展示一例老年男性双眼视力下降患者的确诊经过。

方法：抽丝剥茧分析一例老年双眼视力下降患者的临床及影像学资料，患者感冒后双眼视力下降 1 个月，右眼矫正视力 0.2，左眼矫正视力 0.05，双眼瞳孔直接对光反应灵敏，RAPD (-)，视盘边界清，色泽可。双眼视盘 RNFL 在正常值范围，右眼黄斑部 GCL 轻度变薄，双眼黄斑 OCT 未见异常，双眼视野中心暗点，3 个月后复查，双眼视力进一步下降，右眼矫正视力 0.02，左眼 FC/50 cm，双眼 RNFL 厚度在正常值范围，双眼 GCL 变薄，PVEP 结果提示双眼 P100 波潜时延迟，振幅降低，ERG 提示双眼震荡电位振幅明显降低。患者血常规、血生化、感染组套、免疫指标、维生素 B12、叶酸等结果在正常值范围，颅脑磁共振未见明显异常。患者吸烟 20 年，每天 20 支左右，否认吸旱烟及饮酒，糖尿病 5 年，血糖控制欠佳，余健康状况良好，无特殊药物服用史，无毒物接触史，无眼部疾病及全身疾病家族史。根据神经眼科定位、定性、定因及鉴别诊断诊疗思路，排除其他诊断，考虑线粒体相关遗传性视神经病变，最后基因检查结果显示 14487T > C 线粒体 DNA 点突变。随访 8 个月，患者视力稳定，全身神经系统无其他症状。

结果：患者最终诊断为双眼 Leber 遗传性视神经病变。

结论：1. 掌握线粒体相关疾病的临床特点。2. 线粒体相关基因检测，有助于明确诊断。

摘要编号：210339

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肉毒毒素注射后激发系统性红斑狼疮引起脱髓鞘视神经炎一例

第一作者：Shu-ting KUO

目的：病例报告：中年女性，皱眉肌群注射肉毒毒素 3 天后出现左眼视物不清，如雾障感，伴眼球转动时眉弓下方轻度酸痛，既往否认糖尿病、高血压，多次 RPR (+)，TRUST (-)。查体：左眼手动视力，右眼最佳矫正视力 1.0，双眼眼压正常，双眼前节无殊，左眼 RAPD (+)。左眼视盘充血，轻度隆起，边界欠清，视盘及视网膜静脉血管扩张。辅助检查：VEP：1. 右侧 P100 波潜伏期延长；2. 左侧 P100 波潜伏期明显延长，波幅减低。MRI：左侧视神经眶内段内上象限小斑片状异常信号，考虑为脱髓鞘性视神经炎；左侧横窦、乙状窦较细小，乙状窦小蛛网膜颗粒压迹。免疫学检查：dsDNA 抗体强阳性，抗核小体抗体 (AnuA)、抗中性粒细胞胞浆抗体 (pANCA)、抗细胞核抗体 ANA)、ENA-SSB 抗体，皆为阳性；HLA-B27 阳性；抗 AQP4 抗体强阳性。狼疮抗凝物初筛试验 (LA1)：高于正常。狼疮初筛 / 狼疮确认 (LA1/LA2)：高于正常。蛋白 C 高于正常。诊断：1. 狼疮性神经炎：双眼视神经炎；2. 系统性红斑狼疮 (SLEADI-2k 评分 16 分中重度活动度)；3. 干燥综合症；4. 强直性脊柱炎。

方法：经激素冲击治疗；联用生物制剂贝利尤单抗，其为可溶性 BLYS 的特异性人 IgG1 单克隆抗体，通过阻断可溶性 BLYS 与 B 细胞上的受体的结合，抑制 B 细胞的存活，让更多的自身反应性 B 细胞发生凋亡，从而减少血清中的自身抗体；联用吗替麦考酚酯控制系统性红斑狼疮，及予以抗凝治疗及对症支持治疗有效。

结果：因本例追溯病因及时，治疗根源，患者抗体降低明显，视力恢复显著。

结论：视神经炎可由多种因素引起，并且因患者本身生理条件而各有表现，如何追溯根本原因，才能控制疾病进展及控制复发。

摘要编号：209261

面板编号：NEU-1309

角膜知觉测量在角膜神经痛中的应用

第一作者：Mingyue MA

目的：本研究旨在使用新型非接触式角膜感觉检查仪评估角膜神经痛 (NCP) 患者的角膜知觉状态，以及角膜知觉和各种眼表指标的相关性，以探究该设备对此类疾病评估的潜在作用。

方法：本研究包括 44 名角膜神经痛患者的 44 只眼睛（均取左眼）。所有受试者均通过填写眼表疾病指数（OSDI）评分量表、无创泪河高度（NITMH）检查、非接触式角膜感觉检查、无创泪膜破裂时间（NIBUT）测量、Schirmer 试验、泪液 IgE 检测、眼前节光学相干断层扫描、荧光素钠染色、睑板腺红外成像获得疾病的主观症状及客观数据指标。使用 SPSS 进行相关性分析。

结果：角膜知觉与 NIBUT 无显著相关性（ $p = 0.55$ ）；泪膜不稳定组（ $NIBUT \leq 5$ s）、临界状态组（ 5 s $< NIBUT \leq 10$ s）、稳定组（ $NIBUT > 10$ s）中，组间数据具有显著性差异（ $p = 0.025$ ），临界状态组角膜知觉最差，其余两组知觉较灵敏。在主观症状方面，角膜知觉与 OSDI 评分无显著相关性（ $p = 0.81$ ）；以 OSDI 分级划分的四组数据中，非参数检验无差异显著性（ $p = 0.81$ ）。在无异物感组和有异物感组中，数据有差异显著性（ $p = 0.033$ ），有异物感组患者的角膜知觉显著差于无异物感组。角膜知觉在以其他主观症状分组的情况下无组间差异显著性。角膜知觉与其他眼表指标无显著相关性（包括 NITMH，Schirmer 实验结果，泪液 IgE 含量，中央角膜厚度，角膜荧光素染色评分，上睑板腺缺失比例），以及在这些指标的各自分组中，角膜知觉指标也无组间差异显著性。

结论：本研究证实，NCP 患者的角膜知觉与多数常规眼表客观指标无显著相关，支持了角膜神经功能异常是该病的独立病理机制。更重要的是，研究发现角膜知觉的异常并非随机分布，而是与特定的临床表现紧密关联：一方面，它与主观异物感症状显著相关；另一方面，它与泪膜稳定性呈独特的非线性关系（临界状态组知觉最差）。这些关联性结果共同表明，非接触式角膜感觉检查仪能够量化神经功能障碍异常，为在复杂的眼表体征中识别以神经病理为核心的患者提供了客观工具。

摘要编号：208712

面板编号：NEU-1305

针刺治疗视野缺损 1 例

第一作者：Boyuan ZHENG

目的：本文旨在探讨针刺治疗视野缺损的效果，总结罗燕教授针刺治疗经验，并从经络及配穴角度予以详细分析。

方法：本文选取了我科收治的一位右侧枕叶脑出血后出现双眼同侧（左侧）视野缺损的患者，在接受两个疗程的针刺治疗后视野缺损情况较前好转的病例。

结果：患者在接受两个疗程（每日 1 次，10 天一个疗程，时隔周行第二个疗程）的针刺治疗后，视野及视力均较治疗前好转。

结论：现代医学认为，针刺治疗可以提高视力及光敏感度，改善视野缺损，改善眼动脉血流动力学改变，促进局部气血运行从而营养受损的神经，针刺相较于现代医学疗法，其操作便捷、疗效显著、安全无副作用。本案取穴根据罗燕教授多年临床经验，以足三阳经及其表里经为主，眼周局部取上睛明、攒竹、丝竹空、阳白、太阳、瞳子髎、四白，可改善眼周血液循环；取足三里以扶正培元、通经活络、行气散结；取三阴交以疏通三阴气血，此二者相配，可通经络、调气血、宣通全身气机；曲池走而不守，合谷升而能散，二穴相配，清热散风，扫邪清障；刺光明联络肝胆气血，针阴陵泉健脾除湿化痰；取太冲，以疏肝理气明目，取养老以充养阳气，头皮针取头维、百会、四神聪，此三者配伍具益脑、开窍、通经之效，以调节全身气血阴阳；以上穴位配合灵龟八法开穴，共奏调理阴阳、通络明目之效。

摘要编号：209645

面板编号：NEU-1313

青年女性颈内动脉眼段动脉瘤压迫视神经 1 例

第一作者：Jie YANG

目的：旨在讨论颈内动脉眼段动脉瘤压迫视神经临床表现及鉴别。

方法：患者女，23 岁，因右眼突然视物模糊 20 d 伴头疼于 2021 年 12 月 01 日到河北省眼科医院就诊。患者既往体健，眼科检查：右眼视力 0.1 矫正视力：-1.75 DS = 0.3；左眼视力 0.4 矫正 -1.75 DS = 1.0；双眼眼压均为 15 mm Hg。右眼瞳孔圆，直径 5 mm，直接对光反射迟钝，晶状体及玻璃体无明显混浊。眼底检查：双眼视盘颜色正常，边界清楚，视网膜血管走行正常，黄斑组织欠清，中心凹光反射不见。视野检查，右眼中心暗点，下方光敏感度明显降低。左眼上方局限性光敏感度降低。P-VEP 检查，右眼 P100 波峰时延迟，P 波振幅较左眼轻度下降，左眼大致正常波形。头颅 MRI 平扫 + DWI 眼眶 MRI 平扫 + 增强扫描磁共振血管成像（MRA）：1、右侧颈内动脉眼段动脉瘤可能性大；2、右侧颈内动脉交通段未见显示；3、右侧大脑前动脉右左侧颈内动脉发出；4、右侧右侧大脑中动脉狭；5、右侧颈内动脉颈段变细，C2-C5 狭窄；6、右侧大脑后动脉血管硬化。

结果：患者的 MRI 检查显示右侧颈内动脉眼段动脉瘤可能性大，且鞍区右前方占位压迫视神经。这种动脉瘤的形成可能是由于动脉壁的局部薄弱，在长期血流动力学冲击下逐渐扩张而形成。动脉瘤的

扩大可能直接压迫视神经，导致视神经的机械性损伤，影响神经传导功能，从而出现视力下降、视野缺损等症状。

结论：颈内动脉与视神经在颅内的关系密切。颈内动脉在进入颅腔后，经过海绵窦段、眼动脉段等部位，与视神经、视交叉等视觉通路结构相邻。在某些病理情况下，如动脉瘤形成、血管畸形、动脉硬化等，可能会导致血管异常扩张、扭曲或压迫周围的视神经结构，从而引发视功能损害。对于动脉瘤，可考虑血管内介入治疗或外科手术夹闭，以消除动脉瘤对视神经的压迫，预防破裂出血等严重并发症。

视觉科学

摘要编号：209475

面板编号：VSC-1318

RGP 联合个性化视觉训练在成年屈光参差性单眼弱视中的应用

第一作者：Wang DUQIN

目的：观察硬性透气角膜接触镜（the rigid gas permeable contactlens, RGPCL）联合视觉训练在成人屈光参差性单眼弱视矫治中的临床疗效。

方法：选取 2023.07-2024.07 在我院就诊成年并曾佩戴框架眼镜的屈光参差性单眼弱视患者（ ≥ 18 周岁）5 例。常规眼部检查及散瞳验光后，配戴 RGP 进行个性化弱视训练：多媒体弱视训练、双眼调节融合功能及立体视觉训练，3 个月后对配戴 RGP 后弱视训练的效果进行评估。

结果：经过 3 个月配戴 RGP 加个性化视觉训练后，5 例矫正视力提高 2 行及以上者 4 例，1 行者 1 例，立体视 5 例患者均较之前提高。

结论：高透氧硬性角膜接触镜（RGP）联合弱视个性化综合训练矫正成人屈光参差性弱视是一种安全、有效、快捷的方法。尤其是对于立体视的建立尤为有效。值得在临床上推广。

摘要编号：205096

面板编号：VSC-1317

专业运动员静态视觉功能与运动视觉功能的相关性研究

第一作者：Wenzheng DU

共同作者：Min GAO, Yanglin JIANG, Lihua LI, Chenzhe WANG

目的：分析专业运动员的视力、对比敏感度等静态视觉功能与动态视力、反应时间等运动视觉功能的相关性。

方法：本研究受试者招募自天津体育学院的现役排球、棒球专业青年运动员。所有受试者均接受静态视觉功能评估（包括日常生活视力、最佳矫正视力、立体视以及明视觉、暗视觉下的对比敏感度）以及运动视觉功能测试（包括动态视力、远近交替注视灵敏度、反应时间、识别速度、预判能力）。采用 Pearson 相关分析静态视觉功能与运动视觉功能的相关性，并采用典型相关分析来进行标准化典型相关模型的构建、典型结构分析、典型冗余分析以探究静态视觉功能与运动视觉功能整体之间的关系。

结果：共纳入受试者 35 名，年龄为 19.91 ± 2.06 岁。Pearson 相关分析显示，日常生活视力、矫正视力、立体视与动态视力均呈正相关（ $r = 0.610$ ； 0.663 ； 0.419 ，均为 $P < 0.05$ ）；日常生活视力、明视觉对比敏感度与远近交替注视灵敏度均呈正相关（ $r = 0.515$ ； 0.505 ，均为 $P < 0.05$ ）。典型相关分析提取出两对具有统计学意义的典型变量，典型相关系数分别为 0.839 、 0.721 ，特征值贡献率分别为 58.6% 、 26.8% ，表明静态视觉功能与运动视觉功能存在显著正相关，相关性主要由第一对典型相关变量解释。典型结构分析显示，日常生活视力和最佳矫正视力在静态视觉功能典型变量中起主导作用，载荷分别为 -0.684 和 -0.856 ，交叉载荷进一步显示，日常生活视力和最佳矫正视力对运动视觉功能具有较强预测作用，交叉载荷分别为 -0.573 和 -0.718 。典型冗余分析表明，静态视觉功能对运动视觉功能的方差解释率 24.2% 高于后者对前者的解释率 12.6% ，静态视觉功能对运动视觉功能的预测作用更强。

结论：专业运动员的静态视觉功能与运动视觉能力存在显著的正相关关系，即静态视觉功能越好，运动视觉功能越好，其中视力是影响运动视觉能力的核心因素，在运动员的选拔与训练中应重视屈光矫正和视力保护，通过提升视力等基础静态视觉功能来提升运动视觉能力，进一步优化运动表现。

摘要编号: 209749

面板编号: VSC-1319

肠道微生物组、免疫特征与近视的因果路径解析：一项整合性孟德尔随机化与中介分析研究

第一作者: Guandong ZHU

共同作者: Xuejiao QIN

目的: 近视的发病是遗传与环境因素复杂交互的结果, 近年“肠-眼轴”假说提示肠道菌群可能通过免疫调节参与其病理过程。然而, 肠道微生物是否与近视存在因果关联, 以及免疫细胞与炎症因子是否在其中扮演中介角色, 尚不明确。本研究旨在利用孟德尔随机化方法, 系统阐明肠道微生物、免疫细胞、炎症因子与近视之间的因果关系及潜在机制路径。

方法: 本研究整合了大规模全基因组关联研究的遗传数据, 包括: 肠道微生物组 (来自 MiBioGen 联盟)、731 种免疫细胞特征、91 种循环炎症因子以及近视 (来自 UK Biobank 等大型数据库)。采用两样本孟德尔随机化作为核心分析方法, 以遗传变异作为工具变量评估因果关系。为确保结果稳健, 我们综合应用逆方差加权法、MR-Egger、加权中位数等多种方法, 并进行多效性检验与敏感性分析。针对显著的暴露-结局对, 我们进一步进行了中介分析, 以量化免疫细胞与炎症因子在肠道微生物影响近视路径中的中介效应比例。

结果: MR 分析鉴定出 12 个与近视风险存在潜在因果关联的肠道菌属。其中, *Bacteroides* (OR = 1.15, 95% CI: 1.06–1.25) 和 *Ruminococcus* (OR = 1.12, 95% CI: 1.03–1.22) 等的相对丰度增加是近视的风险因素, 而产短链脂肪酸菌属 *Faecalibacterium* (OR = 0.87, 95% CI: 0.79–0.95) 则显示出保护作用。同时, 多种免疫细胞特征 (如初始 CD4⁺ T 细胞比例的降低、活化树突状细胞比例的升高) 与炎症因子 (如 IL-6、TNF- α 水平升高) 也被证实与近视存在因果关联。关键的中介分析揭示, 特定免疫细胞 (如活化的 CD4⁺ T 细胞) 和炎症因子 (如 IL-6) 在肠道微生物 (如 *Bacteroides*) 影响近视的因果路径中承担了显著的中介效应, 中介比例范围为 8.5% 至 15.2%。

结论: 本研究从遗传学视角为“肠-眼轴”假说提供了强有力的因果证据, 构建了一条从“肠道微生物失调”到“免疫系统激活/炎症状态改变”再到“近视发病”的潜在因果路径。我们的发现不仅证实了肠道微生物是近视的独立风险因素, 更重要的是揭示了免疫调节是该过程中的关键中介机制。这为未来开发通过调控肠道微生态或靶向免疫通路来预防和干预近视的新型策略, 奠定了重要的理论基础。

角膜病、干眼症、外眼病、眼库

摘要编号: 205250

面板编号: CDE-1328

30 例微孢子虫感染的临床诊治及体会

第一作者: Yan HE

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目的: 分析中国大陆地区微孢子虫性角结膜炎 (MKC) 患者的临床特征、病原学种类及治疗效果, 以提升临床医师对该病的认知与诊疗能力。

方法: 对 2024 年 9 月至 2025 年 9 月期间在我院确诊的 30 例 MKC 患者的临床资料进行回顾性分析。所有患者均接受了角膜刮片细胞学检查、细菌/真菌/阿米巴培养、病毒核酸检测、宏基因组测序 (mNGS) 及巢式聚合酶链反应 (PCR) 检测, 以进行病原体鉴定。治疗方案包括与动物隔离、环境消毒、口服阿苯达唑 400 mg, 每日 2 次, 持续 2–4 周, 以及局部应用 0.04% 聚己基双胍 (PHMB) 每日 6 次, 并联合使用莫西沙星滴眼液。

结果: 30 例患者的年龄范围为 4–67 岁 (中位数年龄为 35 岁), 其中女性 23 例, 男性 7 例。所有患者均存在明确的动物接触史, 特别是与鸟类和家养动物的接触。临床表现方面, 28 例患者为上皮性角结膜炎, 2 例患者为基质性角膜炎。病原体鉴定结果显示, 24 例为海伦脑炎微孢子虫感染, 4 例为肠道微孢子虫感染, 2 例为混合感染。鸟类接触史, 尤其是鹦鹉接触史, 与海伦脑炎微孢子虫感染存在显著关联。实施充分动物隔离措施的患者预后良好, 而持续接触动物、既往使用糖皮质激素或诊断延误的患者则出现病程迁延或治疗失败的情况。

结论: MKC 展现出独特的流行病学特征, 主要通过动物传播给人类, 尤其是感染海伦脑炎微孢子虫的宠物鹦鹉作为传播媒介。完全动物隔离和适当的抗微孢子虫治疗是成功治疗的关键, 而糖皮质激素可能导致复发和病程迁延。

摘要编号: 202818

面板编号: CDE-1329

AIF-1 通过 MAPK 和 PI3K/AKT/mTOR 信号通路促进炎症性巨噬细胞活化驱动角膜新生血管

第一作者: Qinghua LI

目的: 本研究旨在阐明同种异体移植物炎症因子-1 (AIF-1) 介导的炎症性巨噬细胞激活在角膜新生

血管 (CNV) 发病中的精确机制, 并确定潜在的治疗靶点。

方法: 采用碱烧伤法建立小鼠 CNV 模型。利用 Western blot (WB) 和免疫组化检测 AIF-1、CD86 及 VEGFA 的蛋白水平。将靶向 AIF-1 的小干扰 RNA (siRNA) 转染巨噬细胞后, 采用免疫荧光和流式细胞术分析巨噬细胞活化情况。随后将 AIF-1 siRNA 行结膜下注射给药, 通过 WB 和免疫荧光评估炎症性巨噬细胞的募集及促炎细胞因子表达。裂隙灯照相及组织病理学分析用于评价 CNV 的炎症与血管生成程度; WB 进一步检测 MAPK 及 PI3K/AKT/mTOR 信号通路相关蛋白的磷酸化水平。

结果: AIF-1 呈阶段依赖性上调, 与 CNV 严重程度平行, 并伴随 CD86 和 VEGFA 的协同高表达。沉默 AIF-1 显著抑制炎症性巨噬细胞活化。AIF-1 促进巨噬细胞向角膜募集, 并上调 TNF- α 、IL-1 β 、IL-6、VEGFA 表达, 进一步加剧炎症、氧化应激及血管生成; AIF-1 敲除后 CNV 严重程度明显减轻。机制研究发现 AIF-1 通过激活 MAPK 和 PI3K/AKT/mTOR 信号通路驱动 CNV 进展。

结论: AIF-1 在 CNV 进展中发挥关键作用, 通过 MAPK 和 PI3K/AKT/mTOR 信号通路促进炎症性巨噬细胞活化, 加重角膜炎症与新生血管化, 为 CNV 的治疗提供新的理论依据与潜在靶点。

摘要编号: 206605

面板编号: CDE-1343

HUMSC 细胞膜片修复角膜上皮损伤的实验研究

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共同作者: Miaomiao CHI, Jing HONG, Rongmei PENG

目的: 评估人脐带间充质干细胞 (HUMSC) 细胞膜片对角膜上皮损伤的治疗效果, 通过体外和体内实验验证其修复机制及临床应用潜力。

方法: 在体外实验中, 使用羧基氰化物间氯苯胺 (CCCP) 建立角膜上皮细胞损伤模型, 将 HUMSC 细胞膜片与损伤细胞共培养。通过检测活性氧 (ROS) 水平、CCK-8 法评估细胞增殖以及 Annexin V/PI 流式细胞术分析凋亡率评估 HUMSC 的拯救作用。在体内实验中, 建立大鼠角膜上皮碱烧伤模型, 局部移植 HUMSC 细胞膜片。通过裂隙灯显微镜观察、前节照相、荧光素钠染色及前段光学相干断层扫描 (AS-OCT) 动态评估角膜修复情况。处死大鼠后, 行免疫组织化学及 HE 染色分析组织形态学变化。

结果: 体外实验显示, HUMSC 共培养组显著降低 ROS 水平 ($P < 0.05$), 促进细胞增殖 (CCK-8 吸光度值增加) 及凋亡率下降 (AV/PI 流式显示早期凋亡减少)。体内实验证实, 移植 HUMSC 膜片的大鼠角膜上皮缺损面积缩小, 裂隙灯及 AS-OCT 显示角膜透明度改善、上皮层厚度增加, 荧光素染色评分显著低于对照组 ($P < 0.01$)。免疫组化及 HE 染色提示 HUMSC 组角膜上皮层结构完整, 炎症细胞浸润减少。

结论: HUMSC 细胞膜片可通过抗氧化、促进增殖和抑制凋亡等机制, 有效修复角膜上皮损伤, 在碱烧伤等角膜疾病中展现出治疗潜力, 为临床转化提供实验依据。

摘要编号: 210041

面板编号: CDE-1346

Lisch 角膜营养不良的“二次打击”与边界效应

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共同作者: Ying JIE

目的: 本报告旨在通过一例典型的 Lisch 上皮性角膜营养不良病例, 阐述其独特的临床表现、及组织学特征, 并探讨其基于角膜缘干细胞功能障碍的发病机制。重点在于通过观察手术干预后的复发模式, 验证并深入理解 LECD 的“二次打击”假说, 从而为开发根治性疗法提供理论依据。

方法: 一名 58 岁女性, 无其他病史, 因左眼视力下降伴阴影感一月余就诊。我们对其进行了全面的眼科检查, 包括最佳矫正视力、裂隙灯检查、IVCM 以及 AS-OCT。鉴于其临床表现高度提示 LECD, 我们进一步对患者血液样本进行了全基因组测序以寻找可能的种系突变。为治疗其视力下降, 患者接受了 20% 酒精辅助的上皮松解及病变上皮清创术, 并对切除的病变组织进行了印迹细胞学检查, 使用 MUC5AC 和 CK7 抗体进行染色, 以鉴定上皮细胞的类型和来源。

结果: 裂隙灯检查显示左眼角膜上皮存在特征性的涡旋状、羽毛状灰色混浊, 从角膜缘延伸至视轴, 中央宽而周边尖细。IVCM 揭示了上皮细胞高反射伴胞浆内空泡化的典型 LECD 表现。AS-OCT 证实病变局限于上皮层。全基因组测序未发现致病性突变。术后, 患者视力 20/20, 角膜恢复透明。然而, 术后四个月, 病变从完全相同的角膜缘位置复发, 形态与术前近乎一致。印迹细胞学结果显示, MUC5AC 和 CK7 阳性, 这不仅证实了源于异常角膜缘干细胞的空泡化角膜上皮细胞, 还揭示了结膜杯状细胞的存在, 表明角膜缘的屏障功能已遭破坏。

结论：本病例证实了 LECD 根源在于角膜缘干细胞的病理克隆。术后在原位、以原形态复发的现象，强有力地支持了 LECD 的“二次打击”发病机制假说：即个体可能携带赋予易感性的种系突变（第一次打击），而关键的致病事件使特定角膜缘干细胞克隆内发生的体细胞突变（第二次打击）。单纯的上皮清创术仅能移除终末分化的异常细胞，但无法根除角膜缘的突变干细胞，因此会早期复发。病变独特的羽毛状形态，通过突变干细胞作为固定来源，其产生的细胞在向心迁移过程中与周围正常上皮细胞发生“边界竞争”来完美解释。本研究强调，任何旨在根治 LECD 的治疗策略，必须靶向并彻底消融其位于角膜缘的病理性干细胞群。

摘要编号：209913

面板编号：CDE-1349

Piezo-1 是流体剪切力影响角膜上皮稳态的关键分子

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共同作者：Yijie HONG, Weiwei LI, Yufan LI

目的：干眼症（DED）是一种多因素慢性眼部疾病，其特征为角膜上皮稳态的失衡。临床发现，DED 患者眨眼频率异常增高，泪膜稳定性下降等眼表泪膜动力学紊乱，但其致病机制，尤其是流体剪切应力的作用尚不明确。Piezo-1 作为机械敏感离子通道，在角膜上皮组织中高表达，可能介导角膜表面剪切应力等机械刺激的信号传导。本研究旨在探究层流剪切应力（LF）和湍流剪切应力（TF）对角膜上皮稳态的影响，明确 Piezo-1 在介导剪切应力诱导的眼表炎症和组织损伤中的关键作用。

方法：通过建立强迫眨眼小鼠模型以模拟不同的剪切应力，利用角膜荧光素染色评分和酚红棉线试验评估角膜上皮损伤。体外培养人角膜上皮细胞（HCECs），构建层流和湍流实验条件，使用 Piezo-1 激动剂 Yoda 1 和慢病毒介导的基因敲低技术调控 Piezo-1 表达。采用 EdU 检测、划痕实验、透射电镜（TEM）和免疫荧光染色评估细胞增殖、迁移、焦亡和细胞间连接状态。运用 Western blot 分析蛋白表达水平，qRT-PCR 定量 mRNA 表达水平，从分子层面探索机制。

结果：强迫瞬眼造成的异常剪切应力破坏小鼠角膜上皮稳态，显著上调角膜组织中 Piezo-1 表达，加重小鼠角膜损伤。体外实验表明，不同模式剪切应力均激活 Piezo-1，通过钙内流促进细胞增殖和迁移，其中湍流剪切应力比层流剪切应力的激活与促进作用更显著。层流剪切应力促进了细胞间紧密连接的形成，维持细胞存活；而湍流剪切应力则下调细胞间连接，破坏细胞屏障，触发细胞焦亡。

Piezo-1 敲低可显著逆转上述剪切应力诱导的细胞行为改变，证实 Piezo-1 在角膜上皮力-化耦合效应中的核心作用。

结论：流体剪切应力通过机械敏感性离子通道 Piezo-1 参与调控角膜上皮稳态。在层流剪切应力作用下，Piezo-1 表达被激活，进而促进角膜上皮细胞的增殖与迁移，并增强细胞间连接，有助于维持上皮稳态；而在湍流剪切应力条件下，Piezo-1 被过度激活，导致细胞连接结构破坏，并加剧细胞焦亡与炎症反应，最终破坏角膜上皮的稳定状态。本研究证实 Piezo-1 是流体剪切力影响角膜上皮稳态的关键分子，为通过靶向调控 Piezo-1 活性防治干眼症提供了新的潜在策略。

摘要编号：203229

面板编号：CDE-1320

一例新型 TACSTD2 基因突变——凝胶滴样角膜营养不良家系分析

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共同作者：Ru ZHAO

目的：凝胶滴样角膜营养不良症（GDLD）是一种罕见的常染色体隐性遗传疾病，以双侧角膜淀粉样变性为特征。在此，我们报告了一例由新型 TACSTD2 基因突变引起的 GDLD 病例，并总结了 GDLD 患者临床表型与基因型的相关性。

方法：我们分析了一名 42 岁男性 GDLD 患者的临床特征和治疗结果。角膜样本用刚果红和苏木精、伊红染色。对所有家庭成员进行了基因检测和临床评估，此外，我们还对以前报道过的肿瘤相关钙信号转导子 2（TACSTD2）基因发生致病性突变的 GDLD 患者进行了文献回顾。

结果：对该患者的基因测序发现，TACSTD2 基因存在一个新的无义突变 c.588C > A。组织病理学分析显示，角膜上皮区域有大量淀粉样蛋白沉积。我们总结了之前报道的 37 例 TACSTD2 基因突变的 GDLD 患者的临床特征。

结论：研究报告了一名中国 GDLD 患者的新型无义突变，从而扩大了 TACSTD2 基因的突变谱。

摘要编号: 210303

面板编号: CDE-1351

不同厚度内皮角膜移植供体用于圆锥角膜深板层角膜移植术的临床结局研究

第一作者: Yinghan ZHAO

共同作者: Kaiyue DU, Jing HONG

目的: 评估在圆锥角膜患者中, 采用内皮角膜移植术获取的剩余供体角膜用于深板层角膜移植术后的临床效果。

方法: 本研究为一项回顾性、对照性临床研究, 共纳入 103 只接受 DALK 手术的圆锥角膜眼, 其中 67 只眼接受了来自后弹力层剥离自动化角膜内皮移植术 (DSAEK) 的薄供体角膜植片, 36 只眼接受了来自后弹力层角膜内皮移植术 (DMEK) 的厚供体角膜植片。评估指标包括基线及术后中央角膜厚度、下方角膜厚度、未矫正远视力、最佳矫正远视力、角膜散光、平均角膜曲率、角膜生物力学特性及并发症发生率等。

结果: 移植术后 6 个月, 薄片组中央角膜厚度为 $455.1 \pm 43.0 \mu\text{m}$, 显著低于厚片组的 $546.7 \pm 44.2 \mu\text{m}$ 。薄片组在中央及下方角膜厚度方面均显著低于厚片组 (以 Pentacam 测量, 36 个月时 $P < 0.001$), 该差异在术后 5 年随访期内持续存在。两组在术后 logMAR 未矫正远视力、logMAR 最佳矫正远视力、角膜散光及平均角膜曲率方面差异均无统计学意义 (36 个月时 P 值分别为 0.335、0.286、0.680 及 0.365)。角膜生物力学分析显示, 在术后 2 年时, 薄片组在第一次压平时的角膜刚度参数显著高于厚片组 ($P = 0.036$), 而其他生物力学参数无显著差异。

结论: DALK 术中使用不同厚度供体角膜组织的临床效果相当, 提示采用不同类型的分层角膜移植术处理圆锥角膜患者均具有可行性。

摘要编号: 203035

面板编号: CDE-1323

不同高能紫外线照射去上皮快速角膜胶原交联术 (A-CXL) 治疗圆锥角膜的远期临床疗效分析

第一作者: 徐懿

共同作者: 文丹

目的: 探讨采用不同高能紫外线照射去上皮快速角膜胶原交联术 (A-CXL) 治疗圆锥角膜的治疗效果, 为临床合理化手术提供客观依据。

方法: 本研究收集 2020 年 7 月至 2025 年 7 月于中南大学湘雅医院眼科中心接受高能紫外线去上皮

快速角膜胶原交联术 (A-CXL) 治疗的圆锥角膜患者 45 例 (56 只眼), 进行回顾性病例对照研究。将全部患者分为两组, A 组患者共 21 例 (27 只眼), 采用 5.4 J 高能 (30 mw/cm², 照射时间为 4 min) 紫外线进行照射; B 组患者共 24 例 (29 只眼), 照射能量为 7.2 J 高能 (30 mw/cm², 照射时间为 4 min)。两组患者的手术操作及围手术期处理均相同。随访 3 年, 对两组患者行视力、角膜地形图、角膜共聚焦等检查, 比较两组术前及术后 1 月、3 月、6 月、12 月、1 年、2 年、3 年视力参数 [裸眼远视力、最佳矫正视力]、形态参数 [平坦角膜曲率、陡峭角膜曲率、最大角膜曲率 (Kmax)、中央角膜厚度、最薄点角膜厚度] 及角膜上皮神经纤维参数 [神经纤维总长、神经纤维密度, 神经纤维总数、神经纤维分支数]。统计方法采用两因素重复测量方差分析和 Pearson Chi-Square tests 检验。

结果: 术后随访 3 年, A、B 两组患者术后裸眼视力、最佳矫正视力均有不同程度的提高, 平坦角膜曲率、陡峭角膜曲率、最大角膜曲率 (Kmax) 角膜地形图指标均有不同的程度下降。A、B 两组患者在平坦角膜曲率、陡峭角膜曲率、最大角膜曲率 (Kmax)、中央角膜厚度、最薄处角膜厚度组间差异均无统计学意义 ($p < 0.05$); 分别将 A、B 两组患者的形态参数各项指标与术前进行比较, 只有 Kmax 下降的差异具有统计学意义 ($P < 0.05$); 分别将 A、B 两组患者角膜上皮神经纤维参数进行比较: 术后 1 个月, 两组中央角膜神经纤维缺失, 差异无统计学意义 ($P > 0.05$), 周边角膜神经生长情况 B 组角膜上皮神经纤维参数均高于 A 组 ($p < 0.05$), 差异有统计学意义。随着时间延长, A 组和 B 组神经纤维均逐渐生长, 表现为细长、迂曲, 带有分支的神经纤维, 周边神经纤维密度高于中央神经纤维密度; 在术后 3 月、术后 6 月、术后 1 年, 两组的神经参数相比, 神经纤维总长和神经纤维密度差异有统计学意义 ($p < 0.05$), 神经纤维总数、神经纤维分支数差异无统计学意义 ($P > 0.05$); 在术后 2 年和术后 3 年中, 两组神经纤维参数差异均无统计学意义 ($P > 0.05$)。

结论: 采用 5.4J 高能紫外线去上皮 A-CXL 治疗圆锥角膜与采用 7.2J 高能紫外线去上皮 A-CXL 治疗圆锥角膜具有相似的远期疗效。但 7.2J 高能紫外光照射时间短, 可明显缩短手术时间。且对角膜上皮神经纤维损伤程度小, 故 7.2J 高能紫外线去上皮 A-CXL 是角膜交联术治疗圆锥角膜的一个较好选择, 但其确切的疗效还需更多样本的进一步验证。

摘要编号: 209817

面板编号: CDE-1345

仿生全层角膜的研发: 面向供体短缺的力学增强与水屏障功能调控新策略

第一作者: 杨尚

目的: 全层角膜移植是治疗终末期角膜盲的主要手段, 但供体角膜严重短缺, 特别是需要健康内皮的全层移植。现有的人工角膜并非理想的供体替代材料, 而脱细胞角膜等替代物仅能用于部分层移植, 无法替代全层。因此, 研发可模拟天然角膜生物物理学特征的全层替代材料是当前领域的迫切需求。本项目旨在研发一种具有力学增强和水屏障调控功能的胶原基仿生全层角膜, 以解决全层角膜移植供体匮乏的核心难题。

方法: ① 仿生基质构建: 借鉴天然蛛丝合成机制, 对甲基丙烯酸酯化重组人胶原 (RHCMA) 进行分层正交拉伸, 随后通过光聚合锁定其仿生正交板层结构, 并利用盐析效应进一步强化, 以获得高强度和韧性的胶原基支架。② 仿生内皮构建: 采用显微光刻技术在支架内面构建正六边形疏水单元阵列, 以实现可控的水屏障功能; 阵列间隙填充聚乙二醇 (PEGDA) 水凝胶, 赋予其抗细胞 / 蛋白粘附功能和界面稳定性。

结果: 经正交拉伸 50% 的仿生基质最大缝线撕裂力为 2.51 ± 0.58 N, 而未经力学强化的普通水凝胶最大缝线撕裂力为 0.15 ± 0.02 N, 证明经正交拉伸训练的仿生基质抗缝线撕裂能力显著提升。为期 1 周的溶胀测试结果显示, 仿生角膜吸水率为 $43.13 \pm 0.75\%$, 而对照组吸水率超过了 800%。仿生角膜上表面微球粘附数为 131.4 ± 18.9 个 / mm^2 , 内皮面微球粘附数为 8.3 ± 1.8 个 / mm^2 , 减少了将近 15 倍。我们对新西兰兔进行了穿透性角膜移植, 在手术过程中仿生角膜能够耐受器械牵拉和外科缝合。术后第 3 天角膜保持透明, 前房形成, 未发生房水渗漏和明显炎症反应。OCT 显示, 植片与植床整合良好, 且仿生角膜基质未发生明显水肿, 厚度与天然角膜相近。

结论: 仿生基质展现出与天然角膜相匹配的力学强度, 能够耐受手术缝合; 仿生内皮则有效调控了水合作用, 并在体外模型中显示出良好的抗成纤维细胞粘附效果。动物实验初步验证了其良好的生物相容性。该研究为开发无需供体角膜的全层移植材料提供了全新的技术路径, 填补角膜修复材料领域的技术空白, 推动角膜移植从“供体依赖”向“生物制造”的范式转变, 具有重要的科学价值与临床转化前景。

摘要编号: 208626

面板编号: CDE-1331

儿童干眼临床特征与问卷评估研究

第一作者: Le SUN

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目的: 分析单中心中国儿童干眼患者的人口学特征、生活方式及临床亚型, 并参考 OSDI 问卷, 评估不同干眼问卷在本群体中的适用性。

方法: 采用横断面研究设计, 纳入 2023 年 1 月 1 日至 2024 年 6 月 30 日于厦门市儿童医院就诊的 105 例 2~15 岁患儿 (男 57 例, 女 48 例)。通过问卷调查收集基线信息、生活方式及病史, 对于眼症状、眼表特征与泪膜参数进行评估, 明确干眼亚型诊断, 并采用多因素 logistic 回归, 对各亚型与相关参数之间的关联性进行分析。使用 OSDI、中国干眼问卷及眼部舒适指数量表三种工具评估干眼症状, 采用 Cronbach α 系数和 Spearman 相关分析对问卷内部一致性与效度进行评价, 并对不同问卷诊断干眼加重的效能进行 ROC 曲线分析。

结果: 患儿平均年龄为 7.86 ± 3.13 岁, 以男性居多 ($p = 0.003$)。7~13 岁学龄组占比最高 (54.29%)。所有患儿均伴有睑板腺功能障碍 (MGD), 且 92.38% 合并水液缺乏, 构成混合型干眼。单因素分析显示, 年龄 ($p = 0.012$)、户外活动时间 ($p = 0.029$) 与水液缺乏型干眼相关; 睡眠时间与干眼症严重程度相关 ($p = 0.091$)。问卷比较显示, 中国干眼问卷和眼部舒适指数量表应答率 100%, 后者内部一致性最佳 (Cronbach $\alpha = 0.919$); OSDI 在判断儿童干眼加重方面具一定诊断价值 ($\text{AUC} = 0.620$)。

结论: 本研究队列中儿童干眼以混合型为主, 多合并 MGD, 相关影响因素有年龄、户外活动及睡眠时间。眼部舒适指数量表内部一致性良好, OSDI 对评估病情加重有参考价值。研究结果能够为儿童干眼的针对性筛查与管理提供临床参考。

摘要编号: 208690

面板编号: CDE-1338

光热效应联合化疗药物抑制 CNV 的发展

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共同作者: Chengchao CHU

目的: 角膜新生血管 (CNV) 是指血管生成和抗血管生成细胞因子之间的平衡被打破, 在角膜无血管区出现血管。在此, 我们提出了一种生物相容性的聚乳酸 - 乙醇酸共聚物 (PLGA) 来制备 SU6668 和 ICG 纳米复合材料来处理 CNV。将 SU6668 的抗新生血管能力与 ICG 的 PTT 特性相结合, 在靶

向新生血管的细胞囊泡的帮助下，通过滴眼液将纳米材料递送到 CNV 部位。ICG 在血管中产生的 PTT 会堵塞血管腔，阻碍血液的正常流动。因此，通过这种联合治疗效果可以有效治疗 CNV。

方法：将 SU6668 和 PLGA 一起溶解在二甲基亚砜 (DMSO) 中，得到 SU6668-PLGA 混合溶液。然后将该混合溶液逐滴加入到 5 毫升含 1 毫克/毫升吲哚菁绿 (ICG) 的聚乙烯醇 (PVA) 溶液 (5%, w/v) 中，混合物超声 1 分钟。之后，将 8 毫升 PVA 溶液 (1%, w/v) 逐滴加入到所得乳液中，并再次超声 2 分钟。室温下搅拌过夜。所得产物用 35 kDa 半透膜透析以去除 DMSO 和 PVA。对于膜涂层，将表达抗 VEGFR2-scFv 的 293T 细胞膜与 PLGA 核心以 3: 1 (w/w) 的比例混合，然后使用微型挤出机依次通过 400 纳米膜挤出。

结果：载有 SU6668 和 ICG 的 PLGA 纳米颗粒 (AbVr2-SU6668/ICG@PLGA) 通过靶向新生血管的细胞膜囊泡被递送至脉络膜新生血管 (CNVs)，并能够被血管内皮细胞摄取。通过光声成像双模态成像，可以清楚地看到纳米药物在血管中富集，而正常部位的药物则被机体清除。在近红外激光照射下，ICG 会产生大量热能，导致细胞凋亡，并增加热休克蛋白 (HSP) 家族蛋白的表达以拯救细胞。光热治疗 (PTT) 还能使 PLGA 解聚并释放 SU6668，从而下调 HSP70 蛋白的表达，促进血管内皮细胞凋亡。同时，释放的 SU6668 是一种受体酪氨酸激酶 (RTK) 抑制剂，能有效抑制血管内皮生长因子 (VEGF) 诱导的新生血管形成，防止新生血管的形成，从而达到持续治疗的目的。此外，SU6668 对细胞增殖的抑制作用还能防止治疗期间角膜中仍存在的某些新生血管细胞因子诱导的血管生成。

结论：通过这种靶向药物—光热治疗联合治疗，将药物精确递送到患处，可以减少药物的使用、药物耐受性和药物不良反应。同时，利用近红外光激发可以降低激光能量，为临床治疗 CNV 提供了一种安全的治疗方法。

摘要编号：203281

面板编号：CDE-1322

免疫调控微球复合响应型水凝胶体系治疗炎症性角膜损伤的作用及机制研究

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目的：眼表炎症可能导致角膜混浊、新生血管形成，甚至导致失明。传统的滴眼剂型由于眼表药物清除作用，存在药物生物利用度低的问题，且难以满足各种类型眼表炎症的治疗需求。可注射微球通过长

效缓释机制，能够显著提高眼表的药物生物利用度。本研究通过构建角膜炎症小鼠模型，探讨免疫调控微球在治疗炎症性角膜损伤中的作用机制，并开发了一种微球-自由基响应性水凝胶体系，以进一步提高不同类型眼表炎症的治疗效果。此研究为眼表炎症相关疾病的治疗提供了新的理论依据和创新药物剂型。

方法：本研究通过角膜缘干细胞清除 (LSCD) 或碱烧伤建立小鼠角膜损伤和炎症模型。利用裂隙灯检查、荧光素钠染色和光学相干断层扫描 (OCT) 评估小鼠眼表损伤和炎症状态，进而评估微球在角膜损伤修复及炎症治疗中的效果。通过免疫荧光染色分析角膜组织中与炎症和纤维化相关的标志物，进一步评估微球对角膜纤维化的抑制作用。此外，收集小鼠角膜组织进行转录组测序，并通过 qPCR、WB 和免疫荧光染色检测微球对角膜炎症与纤维化的抑制效果。最后，构建免疫调控微球复合响应型水凝胶体系，并评估其在治疗重度炎症损伤引起的新生血管中的应用效果。

结果：通过 LSCD 与碱烧伤构建的小鼠角膜炎症模型，在结膜下注射微球后显著促进角膜损伤修复，并减缓炎症进展。转录组分析和免疫荧光染色结果表明，微球通过调控巨噬细胞的转化，减缓角膜炎症，并抑制纤维化进程。此外，免疫调控微球复合响应型水凝胶体系能够有效抑制急性角膜炎症模型中引起的角膜新生血管形成，同时调控巨噬细胞功能，调节人角膜基质细胞 (HCSC) 与人脐静脉内皮细胞 (HUVEC) 之间的相互作用，阻止血管内皮细胞的侵袭。

结论：可注射免疫调控微球通过长效缓释和对巨噬细胞的免疫调控作用，显著提升眼表炎症和纤维化的治疗效果与安全性。此外，免疫调控微球复合响应型水凝胶体系能快速响应病灶微环境，释放药物以迅速控制急性炎症，并通过微球缓释抑制慢性炎症。

摘要编号：210227

面板编号：CDE-1350

副交感神经在睡眠相关性干眼中对泪腺稳态维持的作用

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目的：阐明睡眠剥夺所致干眼中副交感神经功能紊乱对泪腺稳态的影响，验证毛果芸香碱是否通过激活 NGFSREBP2 信号通路，调节泪腺脂质代谢、减轻炎症与神经损伤，从而恢复泪液分泌功能。

方法：建立睡眠剥夺小鼠干眼模型，设毛果芸香碱干预组与对照组；采用转录组学、脂质组学结合

qPCR、Western Blot 分析泪腺基因表达与脂代谢变化；运用组织化学（HE、Masson）、免疫荧光（Ki67、TUNEL、 β III-tubulin）评估泪腺结构、增殖、凋亡及神经形态；检测泪液中乙酰胆碱含量及泪液分泌量等。

结果：睡眠剥夺导致泪腺脂质沉积、乙酰胆碱减少、NGF 与 SREBP2 表达下降，泪液分泌降低；毛果芸香碱逆转转录组紊乱，缓解内质网应激与炎症，促进细胞连接与结构修复；毛果芸香碱激活 NGFSREBP2 通路，调控脂质合成、转运与分解相关基因，减少脂质沉积；毛果芸香碱减轻泪腺炎症与纤维化，促进增殖、抑制凋亡，并修复泪腺与角膜神经。

结论：睡眠剥夺引起副交感神经功能抑制与泪腺脂代谢紊乱，毛果芸香碱通过激动 M3 受体激活 NGFSREBP2 通路，多靶点改善脂质代谢、炎症与神经损伤，恢复泪腺分泌功能，为水液缺乏型干眼提供了新的治疗策略与理论依据。

摘要编号：203233

面板编号：CDE-1327

双眼不明原因棘阿米巴角膜炎一例合并文献复习

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目的：报道一例双眼不明原因棘阿米巴角膜炎（AK）的临床特征、诊断与治疗过程，并通过文献回顾分析双眼 AK 的流行病学特点、危险因素及诊疗策略。

方法：分析一例 22 岁男性双眼 AK 患者的临床表现、诊断经过及治疗反应，结合活体共聚焦显微镜（IVCM）检查及组织病理学结果明确诊断。同时系统性回顾 2005–2023 年国内外报道的双眼 AK 病例，总结其发病特点、误诊情况、危险因素及治疗结局。

结果：患者初期误诊为病毒性角膜炎，经 IVCM 检测到角膜上皮棘阿米巴包囊结构确诊为双眼 AK。接受局部聚六亚甲基双胍（PHMB）与氯己定联合治疗后症状显著改善。文献回顾显示，双眼 AK 患者中位年龄 22.5 岁，女性占 61.1%，94.4% 与角膜接触镜（CL）使用相关，误诊率达 72.2%（其中 61.5% 误诊为病毒性角膜炎）。糖皮质激素使用可掩盖体征、延迟诊断。IVCM 在早期诊断中具有重要价值。

结论：双眼 AK 虽罕见但致盲风险高，CL 使用是主要危险因素，IVCM 是早期诊断的关键工具，应避免未明确诊断前使用糖皮质激素，联合抗阿米巴治疗有效，预后良好。

摘要编号：207865

面板编号：CDE-1334

回顾性评估酒石酸伐尼克兰对干眼症患者治疗 1 个月的短期疗效

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共同作者：Haiyan LIN, Zhi LUO, Xiaobo YANG

目的：回顾性评估酒石酸伐尼克兰鼻喷剂（商品名：Tyrvaya）在干眼患者使用 1 个月后泪液分泌量（以麻醉状态下 Schirmer 试验评分，SIT）以及泪膜稳定性（泪膜破裂时间，BUT）的改善水平，为干眼症短期临床疗效提供治疗选择。

方法：收集 2023 年 12 月至 2025 年 6 月在香港大学深圳医院确诊为干眼症且接受酒石酸伐尼克兰鼻喷剂治疗的患者临床资料，纳入标准为：符合《中国干眼专家共识（2024 年）》诊断标准，患者在首次使用酒石酸伐尼克兰鼻喷剂 0.03 mg 每日 2 次，双侧鼻孔各 1 喷。从 140 名患者中选取保留基线及治疗 1 个月后的 SIT、BUT 测量数据，排除其他眼部疾病（如结膜炎、角膜炎、睑缘炎急性发作、眼外伤、眼表手术等）、还有随访不及时、无随访数据的患者。最后纳入 26 例患者（52 眼），总共有男性患者 16 例（32 眼），女性 10 例（20 眼），平均年龄为 48.50 ± 14.45 岁。采用威尔科克森符号秩检验比较治疗前及治疗 1 个月后患者的 SIT 值、BUT 值，统计学显著性设定为 $P \leq 0.05$ 。

结果：26 例患者（52 眼）治疗 1 个月后，SIT 较基线显著提高；BUT 较基线有少许提高。

结论：酒石酸伐尼克兰鼻喷剂对 SIT 的改善明显优于 BUT 改善，且安全性良好，可为干眼症的短期治疗疗效提供新的参考。

摘要编号：209447

面板编号：CDE-1360

基于 AGREE II 的中国干眼临床指南及共识的质量评价研究

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共同作者：Yilin LI, 骆非

目的：近年来，中国眼科领域临床实践指南与专家共识呈“井喷式”增长，数量的激增与质量的参差不齐现象引发广泛关注。为应对这一挑战，本研究聚焦于了解中国干眼领域临床指南及共识的质量现状，识别其制订的科学性、实用性和可信度，以推动干眼相关临床指导原则的质量提升，促进科学证据在临床实践中的有效应用。

方法：横断面研究设计，纳入最新发布的 12 部中国干眼相关临床指南 / 共识，其中包括 1 部指南和 11 部专家共识。由三位评估者使用国际通用的临

床指南质量评价工具 AGREE II 进行质量评估。采用极差法计算六个领域的标准化得分并进行汇总分析,同时使用组内相关系数 (ICC) 检验评估者的可靠性。

结果: 三位评估者对 12 部中国干眼临床指南/共识评价的 ICC 均 > 0.80 , 评价结果可靠。12 部眼临床指南/共识的 AGREE II 六个领域的汇总分析显示, 其在范围和目的、清晰性方面表现良好, 但在参与人员、严谨性、应用性和编辑独立性方面有待提升。其中, 严谨性领域得分较低, 主要问题在于未进行全面系统的证据检索、证据评价, 推荐意见形成方法不透明等。

结论: 近年来, 中国干眼临床指南/共识在范围和目的、清晰性方面表现良好, 希望今后制定类似指南/共识过程中, 应进一步重视方法学顶层设计, 并确保过程严谨透明、报告规范、参与成员多样化, 以进一步提升我国干眼指南的整体质量和临床实用性。

摘要编号: 208079

面板编号: CDE-1332

基于 TOPSIS 模型与 Corvis ST 的顿挫型圆锥角膜诊断新指数的开发研究

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共同作者: Shihao CHEN, Honghu JIANG, Jingyin ZHU

目的: 探索 Corvis ST 参数和眼压及中央角膜厚度的相关性关系, 并在匹配中央角膜厚度的基础上开发一种在准确性、可靠性和预测价值方面均表现优秀的新指数, 以区分顿挫型圆锥角膜与正常角膜。

方法: 本研究回顾性地纳入 182 名健康参与者的 Corvis ST 参数、DCT-IOP 和 CCT 数据; Corvis ST 参数与 DCT-IOP 和 CCT 的相关性分析采用 Pearson 相关性检验或 Spearman 秩和检验; 首先使用右眼数据进行相关性分析, 然后使用左眼数据对相关分析结果进行验证, 探讨在两眼结果中 CCT 及 DCT-IOP 与 Corvis ST 参数的相关性关系; 在后续开发 FFKC 指数时, 共纳入 102 只健康眼和 97 只顿挫型圆锥角膜眼, 通过倾向得分匹配后, 共纳入 53 只健康眼和 53 只顿挫型圆锥角膜眼的数据, 包括人口统计学信息和 Corvis ST 检查结果。对 Corvis ST 的动态角膜响应参数进行了 AUC (受试者工作特征曲线下面积)、灵敏度、特异度、ICC (组内相关系数)、正似然比和负似然比的计算。采用 TOPSIS 模型客观综合评估了 Corvis ST 的动态角膜响应参数, 后续利用 Logistic 回归确定了能够准确区分顿挫型圆锥角膜眼与正常眼的最佳参数组合。

结果: 共 182 名中国健康受试者 (男性 65 人, 女性 117 人) 的 364 只眼接受了 Corvis ST 测量, 研究发现右眼有 29 个参数和 CCT 相关, 21 个参数和 DCT-IOP 显著相关; 左眼结果有 30 个参数和 CCT 相关, 20 个参数和 DCT-IOP 显著相关。本研究在 FFKC 指数的开发研究中通过最佳参数组合形成了一个新的 FFKC 指数, 包括以下几个动态角膜响应参数: SP A1、SP HC、A1 Time、DA Ratio Max 2 mm、DA Ratio Max 1 mm、Integrated Radius 和 SSI2。ROC 曲线分析显示该 FFKC 指数 AUC 为 0.971, 截断值为 0.425, 准确率 95.283%, 特异度 94.340%, 灵敏度 96.230%, 正似然比和负似然比分别为 17.000 和 0.040, ICC 值为 0.777, 该新指标的诊断效能优于传统的 Corvis ST 指数。

结论: Corvis ST 参数中有不少和眼内压以及中央角膜厚度存在相关关系, 其结果也会受到眼内压和中央角膜厚度的影响, 新开发的 FFKC 指数基于角膜厚度匹配的数据, 且表现出较高的灵敏度、特异度和 AUC 值, 以及良好的似然比和 ICC 值, 该参数在准确性、可靠性和预测价值方面表现优秀, 其应用价值还需要外部数据进一步验证。

摘要编号: 208629

面板编号: CDE-1336

基于循证构建干眼症中西医结合护理方案及其应用效果评价

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共同作者: Li Na CHENG

目的: 构建一套科学、规范的干眼症中西医结合护理方案, 并初步验证其临床可行性及有效性。

方法: 通过系统检索国内外相关文献, 结合科室临床实践和专家会议法, 初步构建护理方案草案。采用德尔菲专家咨询法对 20 名眼科及中医护理专家进行 2 轮函询, 对方案条目进行修改和完善。选取 30 例患者应用构建的方案进行预试验, 通过护士执行度、患者依从性及满意度问卷评价方案的可行性。

结果: 2 轮专家函询的积极系数均为 100%, 权威系数分别为 0.87 和 0.89, 肯德尔和谐系数分别为 0.136 和 0.152 ($P < 0.01$), 最终形成的方案包括中医辨证评估、技术操作、健康教育和效果评价 4 个一级指标和 17 个二级指标。本干眼症中西医结合护理方案的核心内容基于“病证结合”原则, 包含四大模块, 模块一进行中医辨证分型评估, 由护士初步辨识肝肾阴虚、肺阴不足等证型, 为精准施护奠定基础。模块二实施分层干预, 所有患者接受健康用眼、环境及饮食指导等基础护理; 在此基础上, 根据分型开展辨证施护, 如为肝肾阴虚型推荐

枸杞菊花茶，为肺阴不足型实施中药雾化熏眼。模块三规范执行核心技术，包括标准化操作流程下的中药雾化熏眼、睑板腺按摩及穴位按摩。模块四建立个体化健康教育计划与定期随访机制，以监督依从性并动态调整方案。该方案旨在通过系统性的中西医结合护理，缓解症状、改善体征，并提升患者生活质量。预试验显示，方案执行度高，患者依从性为 93.3%，满意度评分为 (96.4 ± 3.2) 分。

结论：构建的干眼症中西医结合护理方案专家意见集中，科学可靠，具有较好的临床可行性和接受度，为中西医结合护理在干眼症的标准化应用提供了参考依据。

摘要编号：209263

面板编号：CDE-1354

基因视角揭示炎症与角膜结构在圆锥角膜中的关键作用

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目的：圆锥角膜传统上被认为与免疫炎症无关，但其潜在发病机制尚不明确。本研究旨在利用遗传学方法，系统评估循环炎症因子与圆锥角膜的因果关系，并重点通过药物靶点分析与 SMR 分析，探寻具有干预潜力的特异性治疗靶点。

方法：基于大规模全基因组关联研究数据，我们采用 MR 分析，评估多种炎症因子对圆锥角膜风险的因果效应。通过中介分析，检验中心角膜厚度等角膜指标在其中的作用。进而，针对显著关联的炎症因子，重点开展药物靶点分析与 SMR 分析，以评估其作为干预靶点的潜力。

结果：研究发现 PD-L1、MMP-10、IL2R β 等多种炎症因子与圆锥角膜风险存在显著因果关联，其中部分效应通过中心角膜厚度介导。关键发现集中于 PD-L1：药物靶点 MR 与 SMR 分析显示，与单抗药物 BMS-986189 所介导的 PD-L1 水平升高相关的遗传变异，与圆锥角膜风险呈负相关。这一结果提示提升 PD-L1 水平或激活 PD-1/PD-L1 免疫通路，可能对圆锥角膜具有保护作用。

结论：本研究不仅揭示了炎症因子通过角膜结构影响圆锥角膜的因果路径，更通过药物靶点遗传学分析，首次将 PD-L1 确立为具有潜在治疗价值的干预靶点。这为圆锥角膜的免疫调节治疗提供了全新的理论依据与精准干预方向。

摘要编号：200837

面板编号：CDE-1326

复方中草药眼贴对过敏性结膜炎的疗效探究

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目的：过敏性结膜炎是一种极为常见的眼部疾病，通常其以眼红、眼痒、畏光为主要临床表现，高发于季节交替之时，特别是冬春交替之时。本研究所用眼贴以中医古籍为蓝本，对口服方剂进行改良，以适应眼部外用。以过敏性结膜炎模型小鼠为载体，探究眼贴对于过敏性结膜炎的治疗作用。

方法：试验使用 BALB/c 小鼠，通过卵白蛋白 (Ovalbumin, OVA) 注射及点眼致敏建立过敏性结膜炎模型。研究分为预防组与治疗组，两组内再分为正常对照组、模型组、溶剂眼贴组及中药眼贴组。试验开始前三周每间隔 7 天腹腔注射一次含氢氧化铝佐剂的卵清蛋白溶液，实验过程中每日使用卵清蛋白溶液点眼刺激小鼠过敏反应 1 次，连续刺激 10 天，对于预防组自点眼刺激开始使用眼贴，而治疗组自点眼刺激第 6 天开始使用眼贴。通过眼部症状的评分、挠眼的频率及泪液分泌量以评估其症状强度；通过测定血清中 OVA-IgE 水平、qPCR 与 Western blot 分析 IL-1 β 、IL-6、IL-10、IFN- γ 、TNF- α 等炎症因子的表达以评估其过敏的强度；通过 HE、PAS 等组织学方法以评估其眼部组织的状态。

结果：根据实验结果可知，复方中草药眼贴在预防与治疗两种情况下均能显著缓解眼部过敏症状。在裂隙灯下可见睑缘水肿明显缓解，同时泪液分泌量降低，虽未恢复到正常值但已与模型组产生显著差异。组织学染色中可观察到中草药眼贴组相较于模型组结膜水肿和充血均有不同程度改善。通过 qPCR 与 WB 方法对炎症因子进行分析，中草药眼贴组的 IL-1 β 、IL-6、TNF- α 等炎症因子水平在结膜和血清中的水平较模型组显著下降。使用 Elisa 方法对血清中 OVA-IgE 进行检测，发现中草药眼贴组相较于模型组有显著下降。在预防组与治疗组的对比中发现，相较于治疗组，预防组眼部症状更轻、炎症因子表达量更低、组织形态均更加良好。

结论：综上所述，在过敏性结膜炎的预防和治疗过程中，经过改良的中草药眼贴均能发挥良好的作用，但受过敏的累计影响，在已发生过敏性结膜炎的情况下使用眼贴治疗尚无法取得与预防时相同的效果，故在实际使用时了解自身的过敏原并尽量远离过敏源也是至关重要的。同时，复方中草药作为日常保健使用，可降低过敏性结膜炎的发生概率。

摘要编号: 200819

面板编号: CDE-1324

复方菊花眼贴联合冷热敷对蓝光诱导的 MGD 的疗效研究

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共同作者: Mengya CAO, Caihong HUANG, Zuguo LIU, Zixuan YANG, Lizhi ZHANG

目的: 在既往研究中发现, 以菊花为主要成分的复方眼贴在缓解蓝光诱导的小鼠睑板腺功能障碍模型中具有显著疗效。本研究在此基础上进一步探究了冷敷或热敷是否能增强该眼贴的疗效。

方法: 将 C57BL/6J 小鼠随机分为预防组与治疗组, 再将两组分别分为正常对照组、蓝光照射组、溶剂眼贴组、单独冷敷组、单独热敷组、复方菊花眼贴组、冷敷联合复方菊花眼贴组和热敷联合复方菊花眼贴组。除两个正常对照组外, 其它各组均接受 28 天蓝光照射, 预防组全程给予干预治疗, 治疗组在蓝光照射第 15 天开始干预治疗。疗效通过角膜荧光素钠染色、组织学分析、qPCR 和 Western blot 检测炎症因子 (IL-1 β 、IL-6、TNF- α 、IL-17、IFN- γ) 的变化进行评估。

结果: 经过蓝光照射, 小鼠出现角膜上皮损伤、睑板腺开口阻塞和睑板腺腺体萎缩的症状。治疗性使用眼贴可改善角膜上皮结构完整性, 减少睑板腺口阻塞, 其中热敷联合复方菊花眼贴效果最佳。HE 染色提示冷热两种物理辅助均能预防性改善腺体形态, 减少结构紊乱, 其中热敷联合复方菊花眼贴最为有效。PAS 染色提示冷热两种物理辅助联合复方菊花眼贴均可改善结膜杯状细胞密度。Oil Red O 染色提示预防大组中热敷联合复方菊花眼贴干预能有效抑制腺体萎缩。qPCR 与 Western blot 提示眼贴干预能够抑制炎症标志物的升高, 且冷敷联合眼贴干预可显著降低睑板腺组织中的 IL-1 β 和 TNF- α , 以及角膜组织中的 IL-6。此外, IKK α 的表达也有所减少, 提示干预可能抑制了 NF- κ B 通路。

结论: 蓝光暴露会导致显著的角膜上皮损伤、睑板腺开口阻塞、睑板腺腺体萎缩等多个症状, 而复方菊花眼贴对上述症状具有一定的改善作用。在研究中可知, 热敷联合复方菊花眼贴在预防方面效果更佳, 而冷敷联合复方菊花眼贴在治疗中表现更好。同时 qPCR 和 WB 结果分析表明, 冷敷联合复方菊花眼贴具有更强的抗炎作用, 更适用于治疗阶段; 而热敷联合复方菊花眼贴则在早期干预中提供了更好的结构保护。综上所述, 冷热敷联合复方菊花眼贴在睑板腺功能障碍的预防和治疗中具有良好的应用前景, 其机理更待后续研究。

摘要编号: 204176

面板编号: CDE-1321

大学生眼表健康状况流行病学调查及危险因素分析

第一作者: Xinrui ZOU

共同作者: Yunxia LENG

目的: 调查中国广州市大学生群体中干眼症的患病率和危险因素。

方法: 共纳入 304 名就读于广州卫生职业技术学院和广东工业大学大一、大二的大学生。由经过培训的研究人员进行问卷调查 (OSDI 量表和危险因素问卷)。眼科检查由专业医师完成, 含非侵入性泪膜破裂时间、泪河高度等干眼诊断指标以及视调节力指标。

结果: 在 305 名大学生中 (148 名男性, 157 名女性), 296 名 (97%) 完成了问卷。152 名有干眼症状 (72 名男性, 80 名女性, $p = 0.527$, OR, 1.159, 95% CI, 0.734–1.830), 245 名有干眼体征 (112 名男性, 133 名女性, $p = 0.47$, OR, 1.781, 95% CI, 1.003–3.164), 124 名有干眼症 (54 名男性, 70 名女性, $p = 0.112$, OR, 1.456, 95% CI, 0.915–2.317)。研究发现, 近距离用眼后出现眼疲劳的个体有更大的概率患有干眼症 ($p < 0.001$, OR, 2.970, 95% CI, 1.732–5.092)。多因素逻辑回归显示: 黑暗环境中看电子屏幕 ($p = 0.026$, OR, 1.964, 95% CI, 1.085–3.555)、平均每天使用 VDT ≥ 4 小时是干眼症的危险因素 ($p = 0.006$, OR, 4.192, 95% CI, 1.495–11.759), 而平均每天户外活动时间 ≥ 6 小时是干眼症的预防因素 ($p = 0.038$, OR, 0.330, 95% CI, 0.116–0.940), 研究发现佩戴隐形眼镜与干眼症之间并无显著统计学关联, 但与干眼体征之间存在微弱关联 ($p = 0.136$, OR, 2.670, 95% CI, 0.735–9.699)。干眼体征的患病率中女性 (84.7%) 显著高于男性 (75.7%, $p = 0.47$, OR, 1.781, 95% CI, 1.003–3.164)。

结论: 干眼在大学生群体中普遍存在。黑暗环境看电子屏及日均 VDT 使用 ≥ 8 小时的人群中患干眼的风险会增加, 而日均户外 ≥ 6 小时则可以减少干眼症的发生。此外, 女性相较于男性更容易出现干眼体征, 且干眼体征者视功能调节差。针对可改变风险的相关措施可能会对大学生眼表健康产生积极影响。

摘要编号: 209523

面板编号: CDE-1352

大豆异黄酮通过抑制 NF- κ B 信号通路调控角膜基质细胞中 MMPs 的表达: 对圆锥角膜的潜在治疗作用

第一作者: Xianli DU

目的: 探讨大豆异黄酮 (Soy isoflavones, Si) 在抑制角膜基质细胞中基质金属蛋白酶 (MMPs) 表达方面的作用, 并阐明其通过调控 NF- κ B 信号通路延缓圆锥角膜 (Keratoconus, KC) 进展的潜在机制。

方法: 本研究通过小分子药物筛选在 88 种 FDA 批准的药物中筛选出可抑制 MMP 释放的候选化合物; 随后采用 qPCR、Western blot、免疫荧光和 ELISA 检测大豆异黄酮对角膜基质细胞中 MMP1 和 MMP3 的表达影响。通过 RNA 测序 (RNA-seq) 分析大豆异黄酮处理后细胞的转录组变化, 并结合 NF- κ B 通路抑制剂 (JSH-23) 验证其信号通路机制。此外, 采用胶原酶诱导小鼠圆锥角膜模型评估其在体内的安全性与疗效, 利用 OCT 及纳米压痕测试检测角膜厚度与生物力学性质变化。

结果: 在体外药物筛选中, 大豆异黄酮显著抑制角膜基质细胞 MMP1 和 MMP3 的表达, 并优于其他候选化合物。RNA 测序及 GSEA 分析显示, Si 显著下调 NF- κ B 信号通路的活性; NF- κ B 蛋白表达水平明显降低。采用 NF- κ B 抑制剂 JSH-23 验证后, 发现其对 MMPs 的抑制作用与 Si 一致, 提示 Si 通过 NF- κ B 通路发挥作用。在胶原酶诱导的小鼠模型中, Si 显著减轻角膜变薄并提高角膜弹性模量, 且未见明显毒副作用。

结论: 大豆异黄酮可通过抑制 NF- κ B 信号通路下调 MMPs 表达, 从而减缓角膜基质降解并增强角膜生物力学强度。该研究为圆锥角膜的药物治疗提供了新的分子靶点和潜在治疗策略。

摘要编号: 209680

面板编号: CDE-1356

宁夏地区 2 例斑块状角膜营养不良家系机制研究

第一作者: Jinjin ZHANG

共同作者: Bo CAI, Zichun LIN, Xiaoyu YANG, Jiangnan ZHAO, Yan ZHU, Wenjuan ZHUANG

目的: 基于全外显子测序和空间转录组研究宁夏地区 2 例斑块状角膜营养不良患者发病原因并分析基因型与临床特点。

方法: 收集宁夏眼科医院 2 例行角膜移植的斑块状角膜营养不良家系外周血及临床资料, 所有家系成员进行 WES 检测及 Sanger 验证, 完成变异位点的保守性分析并应用多种生物信息学软件进行致病性分析; 首次对斑块状角膜营养不良患者角膜组织行空间转录组测序, 探索突变基因关键通路。

结果: 共收集 2 个斑块状角膜营养不良患者家系, 家系 1 先证者携带 CHST6 两个无义突变: c.369G>A(p.Trp123) 和 c.760G>T(p.Glu254), 家系 2 先证者携带 CHST6 错义突变 c.382G>A(p.Ala128Thr), 这些突变均位于进化保守区域。CHST6 c.369G>A(p.W123) 首次在我国病例中检出, 扩大我国 CHST6 突变谱; c.382G>A(p.A128T) 杂合突变则是一个在伊朗与我国均有报道的已知位点; 而 c.760G>T(p.E254) 既往报道均为国人, 提示其可能是中国人特有的突变类型。在角膜样本空转分析中, CHST6 在 CD 组和对照组之间存在表达差异。CHST6 表达的细胞数量显著高于对照组, 尤其在基质细胞群体中更为明显。富集分析结果表明, CHST6 与多个关键通路密切相关, 特别是在 Glycosaminoglycan biosynthesis-keratan sulfate (hsa00533) 通路中, CHST6 作为关键酶参与角质硫酸合成, 影响角膜基质的结构与透明度。此外, TGF- β 和 MAPK (JNK/p38) 信号通路也显著富集, 提示 CHST6 可能通过角质硫酸合成缺陷在该病中影响角膜基质的稳定性与透明性。

结论: CHST6 是该研究中 2 例斑状角膜营养不良患者的致病基因, CHST6 与角质硫酸合成 (hsa00533) 通路显著相关, 并可能通过 TGF- β 和 MAPK (JNK/p38) 信号通路影响角膜基质的稳定性和透明性。

摘要编号: 209583

面板编号: CDE-1361

巩膜镜对角膜形态影响的系统性综述

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共同作者: Di CHEN, Ying LI

目的: 系统评估巩膜镜佩戴对角膜形态学参数的影响, 包括前后表面曲率、角膜中央厚度、顶点角膜厚度及角膜水肿程度, 以探讨其短期形态变化及生理机制, 为巩膜镜的安全配戴与角膜监测提供依据。

方法: 按照 PRISMA 声明要求, 在 PubMed、Embase、Web of Science 及 Cochrane Library 数据库中检索截至 2025 年 6 月的相关文献, 检索词包括 “scleral lens”、“corneal topography”、“corneal thickness”、“corneal edema” 等。纳入符合标准的 23 篇研究, 提取巩

膜镜配戴前后角膜曲率 (Kmax、Kmean、前后表面曲率) 及角膜厚度 (CCT、TCT) 等定量指标。采用定性合成方法综合分析不同研究间的趋势及影响因素。

结果: 多数研究报道巩膜镜短期佩戴后中央角膜厚度轻度增加 (约 0.5%–2.0%)，提示轻度可逆性水肿；水肿程度与镜片厚度、后泪液储留层厚度及氧透过系数 (Dk/L) 密切相关。前后表面曲率及 Kmean、Kmax 变化幅度较小，多数恢复至配戴前基线。部分研究指出，角膜前后表面变化主要集中于中央及下方区域，反映局部负压与泪液动力学作用。总体而言，巩膜镜配戴对角膜形态影响有限，表现为轻度、可逆的生理性改变。

结论: 现有证据表明，巩膜镜短期佩戴可导致轻度角膜水肿及厚度增加，但对整体角膜曲率及形态稳定性影响较小。角膜形态变化受镜片厚度、氧透过率及泪液层厚度共同调控。建议临床在长期佩戴及圆锥角膜患者中加强影像学监测，以优化巩膜镜设计与个体化管理。

摘要编号: 208647

面板编号: CDE-1337

干燥综合征患者的自体血清可减轻高渗诱导的角膜上皮细胞中的铁死亡

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共同作者: Jiao WANG

目的: 研究自体血清 (AS) 通过铁死亡途径缓解高渗诱导的角膜上皮细胞 (HEC-T) 中的作用。

方法: 从干燥综合征患者体内提取并制备 AS。通过将 HCE-T 细胞暴露于 90 mM NaCl 溶液建立体外高渗性干眼模型，随后分别用 AS 或铁死亡抑制剂处理。采用蛋白质印迹法分析蛋白表达水平。采用 FerroOrange 和 2',7'-二氯二氢荧光素二乙酸酯 (H₂DCFDA) 荧光探针测定细胞内 Fe²⁺ 及活性氧 (ROS) 水平，使用试剂盒测定细胞丙二醛和谷胱甘肽含量。通过透射电镜观察线粒体超微结构。

结果: 高渗条件下，HCE-T 细胞出现脂质过氧化和铁含量增加，伴随铁死亡相关标志物表达显著改变及线粒体形态特征性改变，表明细胞出现铁死亡。经测试，20% 和 50% AS 展现显著治疗效果，可显著提高细胞存活率和迁移能力，降低 ROS 和 Fe²⁺ 水平，减轻线粒体损伤。此外，AS 通过 Xc-/谷胱甘肽过氧化物酶 4 (GPX4) 通路有效抑制铁死亡。

结论: AS 能降低高渗诱导下 HCE-T 细胞的脂质过氧化水平，并通过 Xc-/GPX4 通路抑制铁死亡。

摘要编号: 208943

面板编号: CDE-1359

性激素水平对女性干眼症患者影响的研究

第一作者: Yigang LI

目的: 探讨性激素水平对女性干眼症患者的影响

方法: 选取 2021 年 8 月 -2023 年 8 月我院妇产科及生殖医学中心患者共计 80 例，按照疾病类型分为正常育龄期组、不孕不育激素正常组、不孕不育激素异常组、围绝经期女性干眼患者组各 20 例 (40 只眼)，所有患者均行性激素全套检查，眼前节检查，干眼检查及 Oculus Keratograph 5M 眼表综合分析仪检查，观察 4 组患者雌激素指标、孕激素指标、泪河高度测量、泪膜破裂时间 (BUT) 以及睑板腺的情况。

结果: 围绝经期女性干眼患者组雌激素、孕激素水平均低正常育龄期组、不孕不育激素正常组、不孕不育激素异常组 ($P < 0.05$)；围绝经期女性干眼患者组的泪河高度测量和泪膜破裂时间 (BUT) 较短，与其它各组比较，显示异常表现 ($P < 0.05$)；围绝经期女性干眼患者组睑板腺功能受损程度明显较重，与其他组相比存在显著差异 ($P < 0.05$)。

结论: 性激素水平对女性干眼症患者具有重要影响，特别是围绝经期女性，雌激素和孕激素水平的下降与干眼症的发病机制有关，进一步的研究和干预措施有助于改善围绝经期女性干眼患者的症状和生活质量。

摘要编号: 209827

面板编号: CDE-1348

成人泪囊囊肿的计算机断层扫描及计算机断层扫描泪囊造影影像学特征: 一项回顾性研究

第一作者: Wen XUETIAN

共同作者: Lan GONG, Tong LIN, Yan WANG, Wushuang WANG

目的: 本研究旨在总结泪囊囊肿 (LSCs) 患者的计算机断层扫描 (CT) 及计算机断层扫描泪囊造影 (CT-DCG) 影像学特征，明确其放射学分型与泪道系统 (LDS) 解剖学改变，为该疾病的临床分类、鉴别诊断提供参考依据，同时为泪囊鼻腔吻合术 (DCR) 等手术方案的制定提供解剖学指导，填补现有研究中缺乏特异性影像学模式及泪道解剖变化分析的空白。

方法: 本研究为单中心回顾性病例对照研究。纳入经确诊的泪囊囊肿患者，排除有既往眼部相关手术史、外伤史、肿瘤病史及甲状腺相关眼病病史的个体；对照组为因其他无关疾病接受 CT 检查且泪道系统正常的受试者。收集所有研究对象的临床资料，

均行 CT 及 CT-DCG 检查, 分析其放射学影像学特征; 同时进行解剖学测量, 包括鼻泪管 (NLD) 宽度、泪囊窝 (LSF) 相关维度及鼻腔异常情况, 并记录中鼻甲腋 (MTA) 至泪囊窝上下缘的距离。

结果: 本研究共纳入 60 名受试者, 其中女性 50 名、男性 10 名, 平均年龄为 47.43 ± 13.60 岁。CT 及 CT-DCG 检查共发现 4 种特征性放射学模式: 造影剂反流且泪囊无强化、囊肿壁部分薄环强化、液平面征、囊腔呈“灯泡征”(液体积聚表现)。多数患者存在鼻泪管阻塞, 泪囊囊肿组织活检结果显示囊壁存在慢性炎症。解剖学测量结果显示, 中鼻甲腋 (MTA) 至泪囊窝 (LSF) 上缘的平均距离为 3.34 ± 3.37 mm, 至泪囊窝下缘的平均距离为 11.00 ± 4.40 mm, 该数据可作为 DCR 手术的关键解剖标志。与对照组相比, 泪囊囊肿患者表现为泪囊窝增宽、额突变薄及泪骨角度增大, 提示囊肿存在导致骨重塑现象; 上述影像学特征及解剖学测量结果为 DCR 手术的规划与实施提供了重要参考。

结论: 放射学影像学检查 (CT 及 CT-DCG) 与详细的解剖学评估在泪囊囊肿的诊断与临床管理中具有关键作用。通过识别造影剂反流无强化、囊肿壁薄环强化等特异性放射学模式, 以及鼻泪管阻塞、泪囊窝增宽、泪道系统结构改变等解剖学异常, 临床医生可显著提高泪囊囊肿的诊断准确率, 为手术方案制定 (尤其是 DCR 手术) 提供精准指导, 对优化该疾病的临床诊疗流程具有重要意义。

摘要编号: 209911

面板编号: CDE-1355

损伤致角膜纤维化中骨膜蛋白表达和他克莫司干预研究

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目的: 角膜损伤后无序瘢痕化是临床致盲难题。骨膜蛋白 (periostin, 由人源性 POSTN / 鼠源性 Postn 基因编码) 是损伤后肌成纤维细胞活化关键分子, 参与器官纤维化; 他克莫司为角膜移植一线免疫抑制剂, 可通过 TGF β /Smad 通路抗纤维化。本研究旨在明确 Postn 在角膜纤维化中的作用机制, 及他克莫司的干预效应。

方法: 构建小鼠机械性角膜损伤模型, 分析 Postn 与纤维化的关联; 利用 C57 mT/mG;Postn-CreERT2 荧光示踪小鼠示踪体内 Postn 表达, 通过 Postn 敲除小鼠验证其对损伤修复及纤维化的影响。建立人原代角膜基质细胞 (CSCs) 纤维化模型及 POSTN 抑制模型, 结合他克莫司干预, 探究 TGF- β 1/Smad 通路调控机制。

结果: 角膜损伤可诱导 Postn 表达, 其表达与纤维化、炎症反应时空趋势一致; Postn 敲除导致角膜伤口修复延迟, 纤维化及 TGF β -1/Smad2 通路激活不足, 晚期异常活化细胞存在并干扰角膜正常修复。体外抑制 POSTN 可下调人原代角膜基质细胞 (CSCs) 纤维化指标; 体外他克莫司干预可显著降低纤维化、Postn 及炎症因子表达。

结论: 骨膜蛋白是角膜损伤后纤维化与炎症的早期潜在生物标志物, 且为调控角膜有序修复的关键分子。体内抑制骨膜蛋白表达可减轻纤维化但加剧慢性炎症; 他克莫司可通过 TGF β -1/Smad 通路抑制 CSCs 纤维化, 为角膜纤维化防治提供新靶点与干预方向。

摘要编号: 208802

面板编号: CDE-1340

整合应激反应介导的细胞凋亡与炎症在干眼中的作用

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共同作者: Jinghua BU, Wei LI, Weijie OUYANG

目的: 探讨整合应激反应 (integrated stress response, ISR) 在干眼发生发展中的作用机制。

方法: 在体实验采用干燥应激法建立 C57BL/6 小鼠干眼模型; 在体外实验中, 以高渗培养基处理人角膜上皮细胞 (HCE), 构建细胞模型。分别采用 ISR 抑制剂 ISRIB 和其溶剂对照进行小鼠点眼或细胞培养处理, 同时以 ISR 激动剂 SAL003 滴眼诱导小鼠角膜 ISR 激活。通过角膜荧光素染色、PAS 染色及酚红棉线实验评估眼表损伤情况; 采用免疫荧光和蛋白印迹检测 p-eIF2 α 与 ATF4 蛋白水平; TUNEL 染色及流式细胞术用于分析细胞凋亡。

结果: 无论是干眼小鼠还是高渗应激处理的 HCE 细胞, 均表现出 p-eIF2 α 和 ATF4 显著上调。局部应用 ISRIB 可有效抑制上述分子升高, 减轻眼表损伤, 并减少细胞凋亡。而 SAL003 的使用则可诱导出现干眼样眼表病变。

结论: 干眼状态下整合应激反应被激活, 并通过介导细胞凋亡与炎症参与眼表损伤的发生。药物性抑制该通路能够缓解干眼相关病理改变, 这可能成为干眼防治的潜在新靶点。

摘要编号: 209679

面板编号: CDE-1353

淡紫紫孢霉性角膜炎的临床与病原学特征分析

第一作者: Lu XIUHAI

目的: 探讨淡紫紫孢霉性角膜炎的临床和病原学特征, 并评估其治疗预后。

方法：回顾性系列病例研究。收集 2018 年 1 月至 2024 年 1 月于山东省眼科医院明确诊断为淡紫色霉菌性角膜炎的患者 15 例（15 只眼），统计分析患者的人口学资料、实验室检查数据、治疗方法和临床转归等资料。

结果：15 例患者中 11 例为农民；3 例为角膜移植术后，2 例有迷眼史，2 例有明确的植物外伤史，其余 8 例均无明显诱因。15 例患者裂隙灯显微镜下角膜病变表现为：病灶形态类圆形，范围相对局限，溃疡处炎症反应轻，1 例见内皮斑，2 例可见菌丝苔被，3 例可见伪足，4 例可见 1~2 mm 的前房积脓。在 15 例患者的角膜刮片和激光共聚焦显微镜检查中均发现完整的菌丝结构，其中 13 例患者的两项检查中均发现成串分布的圆形及椭圆形的分生孢子。将角膜标本培养分离到的 15 例菌株进行形态学和 ITS 测序鉴定。体外真菌药物敏感性试验表明，该菌对伏立康唑和泊沙康唑表现出较低的 MIC 值，而对两性霉素 B、氟康唑、伊曲康唑、阿尼芬净、卡泊芬净、米卡芬净和 5-氟胞嘧啶均表现出较高的 MIC 值。3 例溃疡患者溃疡灶深度小于整个角膜厚度 1/3，通过单纯的药物治疗而痊愈。6 例患者溃疡灶深度小于整个角膜厚度 2/3，均接受了角膜溃疡清创术以及结膜瓣覆盖术。3 例患者溃疡灶深度超过角膜厚度的 2/3，进行了穿透性角膜移植术。其余 3 例患者为角膜移植术后的，其中 2 例进行了穿透性角膜移植术，1 例进行了眼内容物剜除术。除 1 例眼内容物剜除，其余 14 例均达到临床治愈，其中 10 例患者的视力得到不同程度的改善，4 例患者因病灶处在角膜近中央位置，溃疡愈合后遮挡视力，导致视力不同程度下降。

结论：淡紫色霉菌性角膜炎较为罕见，主要危险因素为农业生产环境和免疫抑制。早期的病原学诊断和抗真菌体外药物敏感性试验，对治疗具有重要意义。尽快进行角膜清创术可以促进溃疡面的愈合。

摘要编号：209222

面板编号：CDE-1344

皮肤与肠道菌群在干眼病中的因果作用：基于孟德尔随机化的免疫调节中介机制探索

第一作者：Guandong ZHU

共同作者：Xuejiao QIN

目的：干眼病是一种复杂的眼表疾病，其发病涉及泪膜不稳定与免疫调节异常。近年研究发现，皮肤与肠道菌群失调可能通过免疫途径参与干眼病的发生，但其因果关系尚不明确。本研究旨在利用孟德尔随机化方法，探讨皮肤与肠道菌群对干眼病的因果性影响，并揭示其中潜在的炎症介导机制。

方法：采用孟德尔随机化分析方法，以遗传变异作为工具变量，推断微生物组特征与干眼病之间的因果关系。基于大规模基因组关联研究数据，我们系统评估了多种肠道与皮肤菌群对干眼病风险的影响，并进一步通过中介分析检验了炎症因子在“菌群-眼轴”通路中的介导作用。

结果：特定肠道与皮肤菌群与干眼病之间存在显著的因果关联。其中，Subdoligranulum、Sutterella 和 Prevotella 属对干眼病具有保护作用，而厚壁菌门则会增加患病风险。皮肤菌群中的 Oscillospira 和 Faecalibacterium 与眼部结构参数相关，提示其可能间接影响干眼病发生。中介分析进一步表明，肠道菌群对干眼病的影响部分是通过调控炎症因子实现的。

结论：本研究从遗传学角度证实了肠道与皮肤微生物群对干眼病的因果作用，支持“肠-眼轴”通过免疫调节影响眼表健康的理论框架。所发现的保护性与风险性菌群，以及炎症因子的中介作用，为理解干眼病的发病机制提供了新视角，也为未来开展针对微生物群的干预策略提供了潜在靶点。

摘要编号：208638

面板编号：CDE-1339

翼状胬肉患者眼表微生物群落的变化

第一作者：Gege TIAN

目的：探讨翼状胬肉患者眼表菌群的变化及不同观看电子设备时间下的菌群多样性。

方法：本研究共纳入 31 名单眼翼状胬肉患者，采集双眼结膜拭子样本，利用 16SrRNA 测序技术鉴定细菌的种类及丰度，并通过生物信息学方法对微生物群落组成进行注释与可视化分析。

结果：在翼状胬肉患者中，观看电子设备时间长的患病组眼表菌群丰富度显著高于对侧健康组，不同观看电子设备时间的患病组眼表菌群多样性有显著差异，而患病组与对侧健康组之间的菌群多样性更为相似。菌群物种分析结果表明，翼状胬肉患者患病组的恶臭假单胞菌相对丰度显著升高，而多形拟杆菌相对丰度显著降低。

结论：翼状胬肉患者的患病眼眼表机会致病菌定植增加，长时间观看电子设备导致的过度蓝光暴露可能是翼状胬肉的潜在风险因素。

摘要编号: 208784

面板编号: CDE-1342

自身免疫性疾病患者干眼的临床特征分析

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共同作者: Huimin SHAN

目的: 免疫性疾病与干眼的发生密切相关, 本研究旨在描述免疫性疾病患者的干眼发病比例, 探究不同种类的免疫性疾病相关干眼的临床特征, 分析免疫性疾病患者发生干眼与否以及与干眼严重程度相关的临床因素。

方法: 纳入确诊为自身免疫性疾病的患者, 通过问卷调查及眼科检查对所有参与者进行干眼诊断。分析干眼与非干眼患者之间的临床特征差异, 进一步按干眼严重程度分为轻度、中度、重度 3 类, 分析各免疫性疾病组干眼严重程度的差异; 利用血沉 (Erythrocyte sedimentation rate, ESR)、C 反应蛋白 (C-reaction protein, CRP) 分析免疫性疾病活动度与干眼严重程度之间的关系; 将干眼按临床特点不同分为水液缺乏型、蒸发过强型、混合型干眼 3 类, 分析各免疫性疾病组干眼的类别特点; 最后采用单因素及多因素 logistic 回归分析, 探究免疫性疾病患者发生干眼的独立危险因素。

结果: 在 247 例自身免疫性疾病患者中, 类风湿性关节炎 54 例、系统性红斑狼疮 90 例、Sjögren 综合征 34 例、银屑病 38 例、其他免疫性疾病 (强直性脊柱炎、皮炎、系统性血管炎、黏膜类天疱疮、青斑样血管炎、特应性皮炎) 31 例。干眼患病率为 29.1%, 其中干燥综合征 (SS) 患者干眼患病率最高 (61.8%), 银屑病患者最低 (13.2%)。不同干眼严重程度组间在自身免疫性疾病类型 ($P < 0.001$)、年龄 ($P = 0.013$)、ESR ($P = 0.001$) 及 CRP 水平 ($P = 0.026$) 上存在显著差异。SS 患者的干眼严重程度显著高于其他自身免疫性疾病患者。水液缺乏型与蒸发过强型干眼为最常见的两种类型。多因素 Logistics 分析显示, 自身免疫性疾病类型 ($P < 0.001$) 和 ESR 水平 ($P = 0.028$) 是干眼的独立危险因素。

结论: 免疫性疾病患者的干眼发病比例高, 自觉症状及临床体征重, 尤以 Sjögren 综合征为甚。干眼严重程度与免疫性疾病种类、年龄、ESR 水平、CRP 水平等因素相关。免疫性疾病相关干眼患者的泪膜异常兼有水液缺乏和蒸发过强两种因素。免疫性疾病种类、ESR 水平是免疫性疾病患者发生干眼的独立相关因素。提示需对此类人群进行及时筛查与干预。

摘要编号: 208661

面板编号: CDE-1333

荧光素笔: 一种用于角膜荧光素染色的具有良好的易用性的新型工具

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共同作者: Yingying GAO, Runhua LV

目的: 本研究的目的是验证一种荧光素笔在角膜染色中的应用, 并将这种新型技术与两种传统工具进行比较。

方法: 本文所述的中国实用新型专利荧光素笔主要用于角膜染色。该荧光素笔提供给 15 名眼科医生, 用于与另外两种工具 (标准荧光素条和 1 毫升注射器法) 相比评估其使用便捷性。每支荧光素笔被多次使用, 并每周进行微生物培养。如果微生物培养结果为阴性, 该笔将一直使用到笔芯中的荧光素用完为止。对 20 名患者使用三种工具进行角膜荧光素染色。在裂隙灯钴蓝光下拍摄图像, 以评估图像质量和最高染色等级 (Gmax)。

结果: 荧光素笔的平均使用时长为 87.7 ± 17.0 天 ($n = 15$)。在使用期间, 所有样本均未检测到微生物生长。眼科医生通过五点李克特量表对易用性进行评估, 荧光素笔、试纸和 1 毫升注射器法的评分分别为 4.93 ± 0.27 、 2.60 ± 0.83 和 2.20 ± 0.68 ($P < 0.0001$)。荧光素笔组达到角膜荧光素 Gmax 的时间为 36 ± 10 秒, 试纸组为 348 ± 63 秒, 1 毫升注射器组为 212 ± 29 秒。三组之间的时间差异具有统计学意义 ($P < 0.0001$)。

结论: 荧光笔相比传统染色方法具有多个优势, 包括使用更简便、染色时间更短以及适合多次使用且安全。

摘要编号: 208158

面板编号: CDE-1335

虚拟现实 (VR) 眼表环境模拟训练对视频终端型干眼患者眨眼行为及症状改善的随机对照试验

第一作者: Ying SHAO

目的: 评估虚拟现实 (VR) 眼表环境模拟训练对改善视频终端型干眼 (VDT-DED) 患者眨眼行为及症状的疗效, 验证其作为数字行为疗法的临床价值。

方法: 研究采用单中心、评估者盲法、随机对照设计, 选取 2024 年 6 月至 2025 年 5 月山西省三甲医院眼科 80 例中重度 VDT-DED 患者 ($OSDI \geq 33$) 为研究对象, 随机分为干预组 (40 例, VR 训练联合人工泪液) 与对照组 (40 例, 仅人工泪液)。VR 系统通过头显模拟泪膜蒸发破裂、红外眼动仪

监测眨眼，并在虚拟办公场景中以视觉警报（屏幕模糊）引导完全性眨眼（眼睑闭合 $\geq 90\%$ ）。主要终点为不完全眨眼率、泪膜破裂时间（TBUT），次要终点包括 OSDI 评分、角膜荧光素染色（CFS）评分及依从性，采用混合效应模型分析。

结果：干预组 4 周时不完全眨眼率较对照组显著降低 18.3% ($p < 0.001$)，疗效持续至 12 周 ($p < 0.001$)；TBUT 延长显著 ($p < 0.001$)。次要终点中，OSDI 评分显著改善 ($p < 0.001$)，CFS 评分显著下降 ($p < 0.001$)，依从性显著提高 ($p = 0.003$)，且无 VR 相关不良反应。

结论：VR 眼表环境模拟训练通过沉浸式生物反馈，有效矫正不完全眨眼行为，显著提升泪膜稳定性并改善主观症状，且患者依从性优异。该技术为干眼行为干预提供了可量化、可持续的数字疗法新路径，具有临床转化潜力。

摘要编号：210081

面板编号：CDE-1357

角膜上皮异常增生伴异位角化一例

第一作者：Lijuan FENG

目的：探讨角膜中央孤立性上皮异常增生伴异位角化的临床特点、诊断策略及治疗意义，分析其潜在发病机制，结合国内外研究分析其与角膜不典型增生及变性类疾病的鉴别要点，为临床诊疗提供经验。

方法：回顾性分析一例 28 岁女性右眼角膜中央灰白色隆起性病变的诊疗过程。通过裂隙灯显微镜、UBM、OCT 评估病灶形态及深度；行病灶切除术联合碘酊烧灼，术后辅以角膜绷带镜及抗感染治疗；组织病理学检查明确病变性质，并与淀粉样变性、遗传性角膜营养不良等疾病进行鉴别；随访 3 月观察视力及复发情况。

结果：病灶位于角膜中央视轴区，呈灰白色隆起，荧光素染色 (-)，辅助检查提示病灶局限于上皮及浅基质层，与角膜缘无关联，手术切除联合碘酊烧灼后，角膜上皮修复完整，术后 6 月视力维持 0.8，仅残留云翳，无复发；微生物培养及炎症因子检测均阴性。病理学显示鳞状上皮角化过度伴异位角化。本例可能与既往研究中提出的“角膜中央干细胞活化假说”有关，可能与隐匿性理化刺激诱导上皮异常分化相关。

结论：角膜中央孤立性上皮异常增生伴异位角化罕见，需与淀粉样变性、遗传性角膜营养不良及恶性上皮内瘤变鉴别；手术切除是视轴区病变的首选方案，碘酊烧灼可有效抑制角化细胞残留，术后需长期监测泪膜功能以预防复发；异位角化虽未伴异型增生，但其存在可能提示局部微环境失衡，虽无典

型癌前特征，仍需长期随访以监测潜在恶变风险。本研究为角膜中央非炎症性增生性病变的诊疗提供了实践依据，强调早期手术干预对预防视力损害及病变进展的重要性。

摘要编号：209543

角膜移植术的手术指征演变与临床趋势 - 基于大连市第三人民医院七年病例资料的回顾性分析。

第一作者：He DONG

目的：本研究旨在探讨辽南地区角膜移植患者的人口学特征及原发角膜疾病谱系，并分析角膜移植术式与移植材料选择的变化趋势。

方法：本研究回顾性分析了大连市第三人民医院眼科 2017 至 2023 年间接受角膜移植术的 537 例患者的病历资料，并对患者的人口统计学特征（年龄与性别）、原发角膜疾病类型、角膜移植术式及移植材料数据进行了统计分析。

结果：本研究共纳入 7 年研究期间接受角膜移植术的 537 例患者。患者平均年龄为 56.35 ± 15.93 岁，年龄范围 5-90 岁。其中男性 348 例 (64.8%)，女性 189 例 (35.2%)，男女比例为 1.84:1。在原发性角膜疾病中，感染性角膜炎最为常见 (243 例, 45.25%)，其后依次为角膜白斑 (73 例, 13.59%)、角膜内皮功能失代偿 (48 例, 8.94%)、外伤性角膜损伤 (36 例, 6.70%)、角膜移植排斥反应 (34 例, 6.33%)、免疫性角膜溃疡 (33 例, 6.15%)、圆锥角膜 (32 例, 5.96%)、角膜营养不良与变性 (28 例, 5.21%) 以及角膜肿瘤 (10 例, 1.86%)。在感染性角膜炎病例中，具体病因分布如下：真菌性角膜炎 (154 例, 63.37%)、细菌性角膜炎 (54 例, 22.22%)、病毒性角膜炎 (34 例, 13.99%) 及阿米巴性角膜炎 (1 例, 0.41%)。根据角膜移植术式分类，穿透性角膜移植术 (PKP) 最为常见 (265 例, 49.35%)，其次为深板层角膜移植术 (129 例, 24.02%)、前板层角膜移植术 (116 例, 21.60%) 和内皮角膜移植术 (27 例, 5.03%)。PKP 仍是角膜移植的主要术式，但接受 DALK、ALK 和 EK 术式的患者比例正逐步上升。移植材料分类显示：新鲜供体角膜移植片 (297 例, 55.31%)、脱水保存供体角膜移植片 (166 例, 30.91%)、角膜基质透镜 (4 例, 0.74%) 及生物工程角膜移植片 (70 例, 13.04%)。

结论：由于经济发展与产业分布等因素影响，感染性角膜炎已成为中国辽南地区角膜移植的首要病因，真菌感染是感染性角膜炎最主要的致病因素。角膜移植术式已从传统的穿透性角膜移植转向成分角膜移植。移植材料选择亦显著丰富，除人类供体

角膜外，现已涵盖角膜基质透镜与生物工程角膜等多种类型。本研究系统阐述了角膜移植术式演变与材料创新趋势，为区域眼科医疗政策制定提供了重要参考依据。

摘要编号：209334

面板编号：CDE-1347

载 NGF 的电沉积人工角膜延缓圆锥角膜进展并促进角膜神经修复的实验研究

第一作者：Tianze CUI

共同作者：Meiyan LI, Ruoyan WEI, Xingtao ZHOU, Ziqing FENG

目的：本研究旨在建立新西兰兔角膜神经损伤模型，通过飞秒激光制作角膜基质囊袋并植入负载神经生长因子的电沉积人工角膜，评估该技术在动物模型中延缓圆锥角膜进展并促进角膜神经再生与功能修复的有效性及安全性研究。

方法：选取 12 只健康新西兰兔，自身对照，每只新西兰兔左眼为实验组，右眼为对照组。实验组采用飞秒激光制作角膜基质囊袋，植入负载 NGF 的电沉积人工角膜。对照组植入未载药的人工角膜。术后 1 天、2 周、4 周、12 周采用 Cochet-Bonnet 角膜知觉计检测角膜知觉，使用 Schirmer 泪液试纸测量泪液分泌量。随访结束后获取角膜组织，通过全角膜免疫荧光染色观察角膜神经末梢的再生与分布。同时记录术后角膜透明度、新生血管及炎症排异反应。

结果：所有手术兔均未发生植入物排异反应，植入物生物相容性良好。术后 12 周，实验组的角膜知觉较对照组显著提高 ($P < 0.05$)。泪液分泌量评估显示，实验组的泪液分泌量显著增多 ($P < 0.05$)。角膜神经染色结果证实，实验组在植入物周围及角膜中央区域观察到密集且形态规则的新生神经末梢再生，而对照组神经未见明显再生。

结论：飞秒激光囊袋技术植入负载 NGF 的电沉积人工角膜，在新西兰兔模型中显示出良好的安全性。该技术能有效促进角膜神经末梢的再生，改善角膜知觉及泪液分泌功能。

摘要编号：205420

面板编号：CDE-1325

遗传机制未明的家族性结膜纤维瘤性病变 1 例 (投稿“女医生专场”——非斜视类儿童眼病疑难病例分享)

第一作者：Hanzhi BEN

共同作者：Jing HONG

目的：男性患儿，3 岁，出生后不久发现双眼角膜下方类结膜样纤维血管组织侵入，病变逐渐进展至瞳孔区。母亲、外婆均有类似眼部病变，且在接受肿物切除联合角膜移植术后均出现早期复发及病变迅速增殖，最终进展为全角膜覆盖失明。

方法：对患儿及家人进行全基因组测序，未能识别出与疾病表现显著关联的致病性基因变异。对患儿施行双眼表肿物切除 + 角膜板层移植术。肿物病理提示为纤维瘤性病变。术后 2 月肿物复发，再次行肿物切除术，并于结膜下多次注射抗增殖药物氟尿嘧啶。治疗后肿物增殖得到有效控制，但继发持续性角膜上皮缺损，经两次羊膜覆盖术后角膜上皮最终愈合。

结果：密切随访，术后两年半，患儿眼部病情稳定，未见植片溶解、排异或肿物复发等。

结论：本病例临床表现罕见且病因未明，推测可能与局部细胞增殖调控失衡有关，亦可能涉及尚未明确的致病基因变异。

摘要编号：208283

面板编号：CDE-1330

重症病毒性角膜炎的非手术治疗策略：病例系列分析

第一作者：Xilin JING

共同作者：Yun FENG, Jingyi LI

目的：伴有前房积脓及角膜内皮斑的重症病毒性角膜炎与真菌或细菌性角膜炎的临床表现高度相似，因此极易被误诊；同时，在合并活动性感染的情况下，患者可能接受紧急治疗性穿透性角膜移植术 (TPK)，导致临床预后不佳。本病例系列探讨严重病毒性角膜炎伴前房积脓及角膜内皮斑的临床特征、诊断及非手术治疗策略，评估保守治疗在此类复杂病例中的可行性及效果。

方法：本研究为回顾性病例系列分析，纳入 5 例单眼严重感染性角膜炎患者。所有患者均表现为大面积中央溃疡、前房积脓 ≥ 3 mm、角膜内皮斑及角膜知觉减退，并排除细菌或真菌感染可能。所有患者接受全面眼科检查，包括角膜知觉检查、角膜刮片镜检与培养、眼前节相干光断层扫描 (AS-OCT)、

实时聚合酶链反应 (PCR) 及活体共聚焦显微镜 (IVCM) 检查。治疗方案包括全身及局部更昔洛韦抗病毒治疗、局部糖皮质激素, 部分患者加用静脉注射免疫球蛋白 (IVIG) 或玻璃体内更昔洛韦注射。

结果: 5 例患者年龄范围为 42-68 岁, 初诊视力均为数指及以下。AS-OCT 显示所有患者角膜内皮斑与角膜内皮之间存在清晰界限, IVCM 未见真菌菌丝。PCR 检测中 3 例病毒阳性 (EBV、VZV、HSV-1), 2 例为阴性。所有患者均接受全身和局部更昔洛韦以及局部糖皮质激素治疗。对两名患者每周给予静脉注射免疫球蛋白 (IVIG), 持续 2 周。除一名患者因虹膜弥漫性前粘连接受了 TPK, 并于术后 10 天出现感染复发外, 其余所有病例均实现了病灶的完全消退。与其他患者相比, 接受 IVIG 的患者症状缓解得更早。

结论: AS-OCT 显示的特征性角膜内皮斑结合角膜知觉减退, 是诊断复杂性病毒性角膜炎的重要辅助指标。即便在微生物检测阴性情况下, 此类特征仍有助于早期正确诊断。积极的保守药物治疗 (全身与局部抗病毒药联合局部糖皮质激素) 可在多数重症病例中实现炎症完全消退, 避免急诊手术干预, 为后续光学角膜移植创造条件。IVIG 可能加速重症患者恢复, 这一发现值得我们进一步研究以验证其疗效与用药方案。

摘要编号: **208311**

面板编号: **CDE-1341**

金珍滴眼液治疗干眼的有效性研究——一项随机、双盲、安慰剂对照临床试验

第一作者: **Guo YIHAN**

共同作者: **Jie YING**

目的: 干眼是最常见的眼表疾病之一, 影响全球数亿人, 造成沉重的社会及经济负担。目前干眼的治疗方法多样, 但传统中医治疗干眼的疗效仍不明确。本试验旨在评估一种传统中药组方——金珍滴眼液在中国人群中治疗干眼症的有效性和安全性。

方法: 在这项随机双盲安慰剂对照试验中, 干眼患者被随机分配到金珍滴眼液组或安慰剂 (0.9% 生理盐水) 组治疗 28 天。该研究的主要结局指标是角膜荧光染色评分和眼干燥评分在治疗前后的变化, 次要结局指标包括眼表疾病指数评分、视觉模拟量表评分、荧光素钠泪膜破裂时间、Schirmer I 试验及安全性评估。

结果: 在本研究中, 共随机入组 250 名患者, 最终有 236 名患者完成随访, 每组各 118 人。试验组治疗 28 天后, 角膜荧光染色评分和眼干燥评分均显著改善 (32.78 ± 1.86 vs 54.67 ± 22.29 , $p <$

0.0005 ; 2.79 ± 0.19 vs 4.17 ± 2.31 , $p < 0.0005$), 治疗后, 对照组及试验组角膜荧光染色评分和眼干燥评分的改善也差异显著 (-21.89 ± 1.538 vs -8.94 ± 1.581 , $P < 0.001$; -1.377 ± 0.218 vs -0.068 ± 0.236 , $P < 0.001$)。次要结局指标均表现出明显的改善 ($p < 0.05$)。另外, 金珍滴眼液的整体安全性良好, 试验组出现眼部不良事件 7 例 (5.6%), 对照组有 3 例 (2.4%) ($p < 0.05$)。

结论: 使用金珍滴眼液 28 天可显著改善干眼患者的症状和体征, 且安全性良好。这种传统中医组方为干眼的临床治疗提供了具有良好前景的替代方案。

摘要编号: **209834**

面板编号: **CDE-1358**

香烟烟雾通过诱导 YAP O-GlcNAc 糖基化引发角膜上皮细胞铁死亡

第一作者: **Meng-yuan ZHANG**

共同作者: **Yong YAO**

目的: 香烟烟雾 (cigarette smoke, CS) 作为重要的室内空气污染物, 其暴露与眼表疾病风险增加密切相关。角膜作为眼表最外层的防御屏障, 对 CS 高度敏感, 然而 CS 引发角膜损伤的具体分子机制仍未完全阐明。本研究旨在探究 CS 暴露是否通过诱导铁死亡导致角膜上皮细胞损伤, 并重点阐明其上游调控机制。

方法: 体内研究建立了 C57BL/6J 小鼠 24 周 CS 慢性吸入模型, 通过 H&E 染色、角膜全铺片免疫染色技术评估角膜结构、神经密度和屏障功能, 并进行转录组测序。体外研究使用人源角膜上皮细胞 (human corneal epithelial, HCE) 构建香烟烟雾提取物 (cigarette smoke exposure, CSE) 暴露模型, 并利用铁死亡抑制剂 Fer-1 与去铁胺 DFO 进行干预, 通过 Calcein-AM/PI 双染、脂质过氧化探针和 Fe^{2+} 探针评估细胞死亡和铁死亡特征。利用 siRNA 技术敲低 ACSL4、TFRC 及 YAP 基因, 结合蛋白质印迹、免疫共沉淀、核质分离及放线菌酮追踪实验, 深入探究 YAP 的稳定性、亚细胞定位及其 O-GlcNAc 糖基化与泛素化修饰的交互作用。

结果: 体内实验表明, CS 暴露不仅导致小鼠角膜组织结构破坏、神经纤维减少及屏障功能受损, 更在转录组水平上显示出铁死亡通路的显著富集。体外实验证实, CSE 引发了剂量依赖性的 HCE 细胞活力下降, 并伴随典型的铁死亡特征, 包括细胞内 Fe^{2+} 特异性蓄积、剧烈的脂质过氧化以及线粒体膜电位崩溃, 而上述现象均能被铁死亡抑制剂 (包括 Fer-1 和 DFO) 有效逆转。其次, CSE 可通过

增加 TFRC 的表达上调细胞内铁水平，并通过增加 ACSL4 的表达促进脂质过氧化，而敲低 ACSL4 或 TFRC 的表达均可阻止 CS 诱导的铁死亡。进一步研究发现，CS 暴露后，转录共激活因子 YAP 蛋白稳定性增强并发生核转位，进而转录调控 TFRC 和 ACSL4 的表达。深入的分子机制揭示，CS 通过增强 OGT 活性，促进 YAP 发生 O-GlcNAc 糖基化。该修饰竞争性抑制了 YAP 的 K48 连接型泛素化，从而阻碍了其通过蛋白酶体途径降解，导致 YAP 在细胞内积累和活化。

结论：本研究阐明 CS 通过诱导 YAP O-GlcNAcylation，增强其稳定性并促进核转位，进而转录上调 ACSL4 与 TFRC，最终触发角膜上皮细胞铁死亡。这一发现揭示了 CS 致眼表损伤的新机制，为干预 CS 相关眼表疾病提供了潜在治疗靶点。

近视

摘要编号：208773

面板编号：MYO-1375

0.01% 阿托品对近视临床前期儿童脉络膜厚度的影响

第一作者：Luqiang WANG

共同作者：Bei DU, Meinan HE

目的：评价 0.01% 阿托品滴眼对近视临床前期儿童脉络膜厚度的作用，并探讨脉络膜厚度作为结构性生物标志物用于近视风险分层和疗效预测的潜力。

方法：本研究为双盲随机安慰剂对照试验，纳入 54 名 5~12 岁预近视儿童，随机分配至 0.01% 阿托品组或安慰剂组，连续用药 12 个月。每 3 个月通过 OCT/OCTA 测量脉络膜厚度，比较中央凹及黄斑各环区脉络膜厚度的变化。采用线性混合模型对纵向数据进行分析，控制双眼间相关性，并通过无监督聚类识别两类脉络膜厚度变化轨迹表型（“变薄主导型”和“稳定型”）。

结果：12 个月时阿托品组中央凹和黄斑内环脉络膜厚度基本保持基线水平，安慰剂组则显著变薄；两组上述部位脉络膜厚度变化差异具有统计学意义（ $p = 0.034, 0.028$ ）。聚类分析将脉络膜厚度变化轨迹分为“变薄主导型”和“稳定型”。变薄主导型呈现更大的等效球镜度降低（ -0.38 ± 0.32 D vs -0.32 ± 0.59 D）和眼轴延长（ 0.33 ± 0.15 mm vs 0.27 ± 0.17 mm）趋势，但组间差异无统计学意义（ $p = 0.532, 0.077$ ）。然而，效应量 Hedges' $g = 0.35$ 提示两组间仍存在中等程度差

异。基线脉络膜厚度与 12 个月时眼轴增长呈弱负相关（ $r = -0.20, p = 0.044$ ），与等效球镜度变化无显著相关（ $r = 0.07, p = 0.515$ ）。

结论：0.01% 阿托品滴眼可有效维持近视临床前期儿童脉络膜厚度，脉络膜厚度有望成为近视发生风险分层和干预疗效预测的结构性生物标志物。

摘要编号：208143

面板编号：MYO-1367

4L 综合疗法对中低度青少年儿童近视的临床疗效观察

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目的：观察评估 4L 综合疗法对青少年儿童近视控制的临床疗效及安全性。

方法：采取前瞻性对照干预队列研究，选取 6~12 岁青少年作为研究对象。按照散瞳验光的等效球镜度数（spherical equivalent, SE）分为 4 组，即低度近视 4L 综合疗法治疗组（T1 组，50 眼， -1.00 D ~ -3.00 D）、低度对照组（C1 组，50 眼， -1.00 D ~ -3.00 D）、中度近视 4L 综合疗法治疗组（T2 组，50 眼， -3.25 D ~ -5.00 D）和中度对照组（C2 组，50 眼， -3.25 D ~ -5.00 D）。4L 综合疗法是指 Light（灯光改造）、Laser（低强度红光照射）、Long（远像光屏）和 Lead（周边近视离焦光学矫正）4 个首字母为 L 方法的集合。Light 要求家庭照明灯光选用全光谱或益光谱的吸顶灯及台灯（显色指数 $Ra \geq 95, R9 > 90$ ；色温 ≤ 4000 K；桌面照度 > 900 lux；环境照度 > 300 lux）。Laser 要求使用 650 nm 弥散漫透射红光治疗仪进行每天 3 分钟、早晚各 1 次的重复照射。Long 要求每天使用至少半小时。Lead 指佩戴周边近视离焦框架镜。对照组自愿佩戴框架镜，不做任何干预。观察比较基线时、3 个月及 6 个月的 SE 和 AL 的变化结果及 OCT、眼底照相等情况。

结果：基线时近视度数（SE）T1 组 -1.25 D（ $-1.75, -1$ ），C1 组 -1 D（ $-1.13, -0.63$ ）， $P = 0.001$ ；T2 组 -3.5 D（ $-3.75, -3.25$ ），C2 组 -3.25 D（ $-3.5, -3.25$ ）， $P = 0.035$ 。眼轴长度 T1 组 23.86 mm（ $23.36, 24.12$ ），C1 组 23.48 mm（ $22.47, 23.88$ ）， $P = 0.065$ ；T2 组 24.01 mm（ $23.19, 24.83$ ），C2 组 23.72 mm（ $23.25, 24.33$ ）， $P = 0.497$ 。3 个月的近视度数（SE）T1、C1、T2 及 C2 组均无变化。眼轴长度（AL）增加量 T1 组 0 mm（ $-0.07, 0.04$ ），C1 组 0.08 mm（ $0.06, 0.11$ ）， $P < 0.001$ ；T2 组 0.03 mm（ $-0.02, 0.08$ ），C2 组 0.12 mm（ $0.1, 0.2$ ）， $P < 0.001$ 。6 个月的近视度数增加量（SE）T1 组 -0.25 D（ $0, 0.25$ ），C1 组 0.25 D（ $-0.25, 0$ ）， $P = 0.001$ ；T2 组 0 D（ $0, 0.25$ ）， $P = 0.001$ ；C2 组 0.25 D（ $-0.25, 0$ ）， $P = 0.001$ 。

0.25), C2 组 0.38 D (-0.5, -0.25), $P < 0.001$ 。眼轴长度 (AL) 增加量 T1 组 0.01 mm (-0.03, 0.04), C1 组 0.13 mm (0.08, 0.16), $P < 0.001$; T2 组 0.09 mm (0.02, 0.12), C2 组 0.25 mm (0.17, 0.33), $P < 0.001$ 。其中通过基线时近视度数 (SE) T1 组 -1.25 D (-1.75, -1), C1 组 -1 D (-1.13, -0.63), $P = 0.001$; T2 组 -3.5 D (-3.75, -3.25), C2 组 -3.25 D (-3.5, -3.25), $P = 0.035$ 。眼轴长度 T1 组 23.86 mm (23.36, 24.12), C1 组 23.48 mm (22.47, 23.88), $P = 0.065$; T2 组 24.01 mm (23.19, 24.83), C2 组 23.72 mm (23.25, 24.33), $P = 0.497$ 。3 个月的近视度数 (SE) T1、C1、T2 及 C2 组均无变化。眼轴长度 (AL) 增加量 T1 组 0 mm (-0.07, 0.04), C1 组 0.08 mm (0.06, 0.11), $P < 0.001$; T2 组 0.03 mm (-0.02, 0.08), C2 组 0.12 mm (0.1, 0.2), $P < 0.001$ 。6 个月的近视度数增加量 (SE) T1 组 -0.25 D (0, 0.25), C1 组 0.25 D (-0.25, 0), $P = 0.001$; T2 组 0 D (0, 0.25), C2 组 0.38 D (-0.5, -0.25), $P < 0.001$ 。眼轴长度 (AL) 增加量 T1 组 0.01 mm (-0.03, 0.04), C1 组 0.13 mm (0.08, 0.16), $P < 0.001$; T2 组 0.09 mm (0.02, 0.12), C2 组 0.25 mm (0.17, 0.33), $P < 0.001$ 。其中通过 4L 综合疗法治疗的儿童 6 个月的近视度数均得到控制且无明显差异 (T1 组 -0.25 D (0, 0.25)、T2 组 0 D (0, 0.25), $P = 0.557$); 3 个月的眼轴均得到控制且无明显差异 (T1 组 0 mm (-0.07, 0.04)、T2 组 0.03 mm (-0.02, 0.08), $P = 0.018$); 而 6 个月的眼轴仍明显控制且低度近视儿童效果更显著 (T1 组 0.01 mm (-0.03, 0.04)、T2 组 0.09 mm (0.02, 0.12), $P < 0.001$)。

结论: 4L 综合疗法能有效延缓青少年儿童的近视度数增长和抑制眼轴增加, 且低度近视患者控制效果更为显著。治疗期间无视网膜损伤、结构性病变, 通过 OCT 及眼底图像检查均正常, 无不良事件发生, 安全性高。

摘要编号: **210091**

面板编号: **MYO-1382**

650 nm 红光照射损伤: 通过 Drp1 诱导线粒体功能障碍导致人视网膜色素上皮 (ARPE-19) 细胞凋亡

第一作者: Mengyao WANG

共同作者: Yongchuan HE

目的: 1) 证明红光照射导致的人视网膜色素上皮 (ARPE-19) 细胞凋亡是由于其线粒体分裂蛋白 Drp1-S616 磷酸化水平升高引起, 从而促进线粒体过度分裂。2) 使用 Mdivi-1 抑制 Drp1 可预防红

光照射诱导的人视网膜色素上皮 (ARPE-19) 细胞泛凋亡。

方法: 1) 细胞实验: 目前大部分 650 nm 红光设备临床治疗的入眼强度约为 $0.39 \text{ mW} \pm 15\%$ - $1.5 \text{ mW} \pm 15\%$, 所以选用人视网膜色素上皮 (ARPE-19) 细胞系进行细胞实验, 分为: 正常对照组: 无光照。亚阈值组: 0.1 mW/cm^2 照射 10 分钟/天。临界阈值组: 1.5 mW/cm^2 照射 10 分钟/天。超阈值组: 2.0 mW/cm^2 照射 10 分钟/天。持续损伤组: 1.5 mW/cm^2 照射 6 小时/天。检测各组相关凋亡蛋白表达变化, 进一步利用共聚焦显微镜观察红光照射后细胞线粒体碎片化及活性氧变化情况, 随后检测与线粒体分裂融合相关蛋白的表达变化; 动物验证实验: 选用 C57BL/6J 小鼠分为上述同样六组进行红光照射, 并取视网膜组织观察病理改变及 TUNEL 染色。

结果: 结果显示亚阈值组、临界阈值组、超阈值组照射后凋亡蛋白没有明显变化, 而持续照射会促进细胞凋亡, 提示短期照射具有安全性, 而长时间照射可能会引起细胞凋亡。共聚焦显微镜观察长时间照射后细胞线粒体会发生碎片化, 伴有线粒体功能障碍和活性氧生成增多。检测与线粒体分裂融合相关蛋白的表达变化, 发现长时间照射会导致人视网膜色素上皮 (ARPE-19) 细胞线粒体分裂蛋白 Drp1-S616 磷酸化水平升高, 促进线粒体过度分裂。为了探究 Drp1 在其中的作用, 利用腺病毒和腺相关病毒在动物和细胞水平, 敲除和过表达 Drp1, 观察对细胞凋亡的影响, 结果显示对于长时间照射组敲除 Drp1 可以抑制细胞凋亡, 而对于短时间照射组过表达 Drp1 可以促进细胞凋亡, 提示 Drp1 引起的线粒体过度分裂, 是导致长时间照射引起细胞凋亡的主要原因。在动物验证实验中验证了上述同样结果。为了实现临床转化应用的可能, 我们进一步使用 Drp1 抑制剂, Mdivi-1 处理长时间照射细胞, 发现可以有效抑制线粒体分裂, 并抑制细胞凋亡。

结论: 短时间低剂量红光照射不会引起视网膜组织损伤及细胞凋亡, 但长时间照射会引起 Drp1 引起的线粒体过度分裂导致视网膜色素细胞凋亡。

摘要编号: **201234**

面板编号: **MYO-1362**

不同周龄豚鼠巩膜生物力学变化趋势及其在近视发展中作用的研究

第一作者: Zhen LI

目的: 临床研究表明, 不同年龄儿童的近视进展速度差异显著, 呈现近视发生时年龄越小, 进展速度越快的趋势。通过测量正常发育状态下不同周龄豚

鼠后极部巩膜的剪切模量，明确巩膜生物力学随着豚鼠年龄增长的变化趋势，探究近视进展速度差异与发病时巩膜生物力学之间的相关性。通过透镜诱导建立不同周龄豚鼠近视模型，分析造模前后眼部生物学参数和巩膜剪切模量的差异，探究在近视发展过程中的巩膜生物力学的变化。

方法：纳入 2.5 w/3 w/4 w 三色豚鼠各 12 只，各周龄豚鼠随机分为对照组（NOR）和镜片诱导近视组（LIM），NOR 组豚鼠不做任何干预；LIM 组豚鼠右眼配戴 -10.00 D 镜片，左眼不干预。实验开始前，测量所有豚鼠屈光度、眼轴长度等，随后 NOR 组将豚鼠安乐死并取出眼球；LIM 组干预 2 周后，再次测量所有豚鼠如上眼部参数，随后将豚鼠安乐死并取出眼球。去除巩膜结缔组织，识别并标记 4 个方向：上侧、下侧、鼻侧、颞侧，使用光学相干弹性成像系统（OCE）测量各方向巩膜的生物力学参数；测量结束后，各组将一部分眼球即刻放入眼球固定液中固定，分上下、鼻颞 2 个切面进行包埋、切片、HE 染色，观察巩膜各方向胶原纤维的排列等。另一部分眼球分 4 个方向分离后极部巩膜组织，测量各方向巩膜组织密度，并通过 qPCR 探究巩膜胶原蛋白 I 的表达水平。

结果：不同周龄 NOR 组中，周龄越大，各方向巩膜的厚度越厚、力学性能更强、胶原纤维排列更紧密且胶原蛋白 I mRNA 表达越高，颞侧尤为显著。不同周龄 LIM 组中，造模结束后，周龄越小，近视发展速度越快；各方向巩膜力学性能降低越显著，胶原纤维束交联结构越松散，颞侧尤为显著。

结论：在眼球生长发育过程中，上、下、鼻、颞 4 个方向巩膜力学性能均增强且存在区域性差异。因眼轴主要向颞侧增长，巩膜的“力学适应性”会促进颞侧胶原纤维的主动重塑，通过胶原增粗和紧密交联维持高剪切模量，发生代偿性“硬化”。在近视发展时，4 个方向巩膜力学性能均降低且存在区域性差异。颞侧巩膜受到更大机械拉伸力，胶原纤维发生纤维变细、断裂或交联减少等重构及降解增多，力学性能降低更显著。年龄越小巩膜的力学性能越弱，巩膜更易变形，且出现近视后发展速度更快，颞侧尤为显著。

摘要编号：210030

面板编号：MYO-1380

不同戴镜率对近用型多区正向离焦镜片（MDPs）延缓未近视儿童近视漂移的影响

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共同作者：Xiaoning LI, Zhiwei LUO, Zhikuan YANG

目的：本研究旨在探讨不同近距离用眼戴镜率对近用型 MDPs 延缓未近视儿童近视漂移及眼轴增长有效性影响，并分析其可能机制。

方法：本研究为一项前瞻性自身对照研究，于 2023 年 1 月至 2025 年 1 月在长沙爱尔眼科医院开展。研究对象为 6-12 岁的未近视儿童，要求在近距离用时配戴 MDPs。研究随访时间为 1 年，每 6 个月进行一次随访，评估眼轴（AL）、等效球镜度（SER）、脉络膜厚度（CT）及脉络膜中大血管容积（CVV）等参数的变化。通过问卷调查收集受试者的父母近视人数、近距离用眼戴镜时间、近距离用眼时间等数据，计算近距离用眼戴镜率（近距离用眼戴镜时间/近距离用眼时间 × 100%），按照近距离用眼戴镜率，将受试者分为四组：0%-29.9% 组、30%-59.9% 组、60%-89.9% 组和 90%-100% 组。基于扫频光学相干断层成像技术（SS-OCTA）及 EDTRS 环分区对脉络膜厚度及脉络膜中大血管容积进行分析。

结果：本研究共纳入 112 名受试者，平均年龄为 7.69 ± 1.69 岁，男性占比 51%。12 个月随访期间，受试者 AL 平均增长量为 0.21 ± 0.10 mm，SER 变化为 -0.11 ± 0.35 D。AL 的增长与 SER 的变化（ $r = -0.55$, $p < 0.001$ ）、1 年近距离用眼戴镜率（ $r = -0.40$, $p < 0.001$ ）、年龄（ $r = -0.23$, $p = 0.024$ ）、1 年 CT 变化（ $r = -0.44$, $p < 0.001$ ）及 CVV 变化（ $r = -0.33$, $p = 0.001$ ）均呈显著负相关。在 12 个月随访时，近距离用眼戴镜率 90%-100% 组的 AL 增长量显著低于 0%-29.9% 组（0.13 ± 0.08 mm vs 0.31 ± 0.12 mm, $p = 0.001$ ）和 30%-59.9% 组（0.13 ± 0.08 mm vs 0.25 ± 0.17 mm, $p = 0.03$ ）。该组 SER 变化亦显著低于 0%-29.9% 组（0.02 ± 0.39 D vs -0.47 ± 0.43 D, $p = 0.001$ ）及 30%-59.9% 组（0.02 ± 0.39 D vs -0.20 ± 0.46 D, $p = 0.04$ ）。

结论：使用近用型 MDPs 延缓未近视儿童眼轴增长及近视漂移过程中，提高近距离用眼戴镜率是确保近用型 MDPs 有效性的关键因素。其作用机制可能与增加脉络膜血管容积导致脉络膜增厚有关。

摘要编号: 204086

面板编号: MYO-1365

中国近视儿童和青少年佩戴角膜塑形镜、离焦框架眼镜和单光框架眼镜的生活质量与临床效果的比较研究

第一作者: Guanhao QIN

共同作者: Wei HE, Xingru HE, Ruyi LI, Sile YU

目的: 评估并比较中国近视儿童和青少年佩戴角膜塑形镜、离焦框架眼镜和单光框架眼镜一年后在视觉相关生活质量方面的差异, 以及佩戴 6 个月和第 12 个月时眼轴变化的差异。

方法: 这项回顾性队列研究, 共计纳入 93 名佩戴光学矫正镜片 1 年的儿童青少年近视患者 (31 名角膜塑形镜, 31 名离焦框架眼镜, 31 名单光框架眼镜)。使用儿童屈光不正问卷对三组患者佩戴眼镜 1 年后的视力相关生活质量进行比较。收集各组患者戴镜前的等效球镜及眼轴长度等指标, 收集三组患者戴镜第 6 个月及 1 年的眼轴长度, 对三组患者的眼轴增长差异进行比较。

结果: 角膜塑形镜组、离焦框架眼镜组和单光框架眼镜组在学习方面和白天症状方面得分无显著差异 ($P > 0.05$)。角膜塑形镜组在整体视力、远视力、外观、满意度、活动和同伴看法方面得分显著高于离焦框架眼镜组和单光框架眼镜组 ($P < 0.05$)。在近视力方面角膜塑形镜组和单光框架眼镜组得分显著高于离焦框架眼镜组 ($P < 0.05$)。在清洁保养方面角膜塑形镜组得分显著低于单光框架眼镜组 ($P < 0.01$)。对于问卷总分角膜塑形镜组显著高于其他两组, 差异有统计学意义 ($P < 0.05$)。在第 6 个月时, 角膜塑形镜组、离焦框架眼镜组和单光框架眼镜组的眼轴变化分别为 0.10 ± 0.07 mm、 0.12 ± 0.05 mm、 0.19 ± 0.08 mm。结果显示, 角膜塑形镜组与离焦框架眼镜组的眼轴变化显著低于单光框架眼镜组 ($P < 0.05$)。但在第 12 个月, 角膜塑形镜组、离焦框架眼镜组和单光框架眼镜组的眼轴变化分别为 0.18 ± 0.08 mm、 0.27 ± 0.08 mm 和 0.36 ± 0.09 mm ($P < 0.05$)。与离焦框架眼镜组和单光框架眼镜组相比, 角膜塑形镜组眼轴增长量最小 ($P < 0.05$)。同时离焦框架眼镜组的眼轴增长量也显著低于单光框架眼镜组 ($P < 0.05$)。

结论: 与单光框架眼镜相比, 离焦框架眼镜和角膜塑形镜均能有效延缓近视进展。然而, 角膜塑形镜在控制眼轴增长和提高视力相关生活质量方面表现更为出色, 是儿童青少年近视防控的优选方案。

摘要编号: 208660

面板编号: MYO-1383

从力到分子: 高通量组学揭示角膜交联与后巩膜加固术介导细胞外基质重塑的共通与特异机制

第一作者: Lin YE

目的: 角膜交联术 (CXL) 与后巩膜加固术 (PSR) 分别是治疗圆锥角膜和病理性高度近视的常用术式, 其核心机制在于增强纤维膜结构的生物力学强度, 以抑制眼球壁的病理性扩张。术后生物力学变化刺激角膜及巩膜成纤维细胞, 介导后续细胞外基质 (ECM) 重塑。然而, 生物力学调控 ECM 重塑的内在分子机制尚未明确。本研究旨在通过高通量组学技术, 系统分析 CXL 与 PSR 分别对角膜及巩膜组织分子特征的影响, 探索眼部生物力学相关手术的内在机制, 并提供潜在优化策略。

方法: 1. 对角膜扩张模型新西兰兔行 CXL (370 nm, 10 mW/cm²), 手术前后通过角膜地形图、透射电镜、单轴拉伸力学测试及组织病理学评估角膜结构。术后 2 周取角膜组织进行高通量蛋白质组学分析, 筛选差异表达蛋白 (DEPs) 并进行功能注释和富集分析。2. 对实验兔进行 PSR (牛心包补片, Thompson 单条带法固定), 手术前后通过透射电镜、组织切片及单轴拉伸实验评估巩膜结构与力学性能。术后 4 周取加固区巩膜组织进行转录组测序, 筛选差异表达基因 (DEGs), 并进行功能注释和富集分析。3. 通过 qPCR 和 Western blot 验证组学中的关键分子。

结果: 1. CXL 增强角膜生物力学, 抑制角膜扩张。2. CXL 上调了 116 个 DEPs、下调 122 个 DEPs; 富集分析显示, CXL 影响免疫、破骨细胞分化和与激素代谢 (甲状腺素和雌激素等) 相关的通路; CD44 和 ALDH1A1 等 DEPs 可能起中央调控作用。3. PSR 显著增加巩膜生物力学结构和强度。4. PSR 上调了 1671 个 DEGs, 下调了 1114 个 DEGs。富集分析显示, PSR 主要改变了与免疫、破骨分化、胶原合成和钙离子通道相关的通路。KEGG 分析提示, 细胞膜上受体相关通路和 CCL、白介素家族和 TNF 等细胞因子可能起重要调控作用。

结论: CXL 与 PSR 均能通过影响刺激成纤维细胞, 调节 ECM 重塑, 通过激活免疫反应与破骨分化相关通路, 提示炎症和成纤维细胞分化在其中的重要作用, 后者可进一步改变角 / 巩膜生物力学性能。CXL 尤为影响激素代谢通路, 而 PSR 则显著改变细胞膜受体相关信号途径。本研究揭示了两类生物力学加固手术在分子层面的异同, 为眼部生物力学的研究提供新思路, 为未来手术策略优化提供新方向。

摘要编号: 205194

面板编号: MYO-1366

以临床问题为导向的近视防控研究

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目的: 基于临床问题, 探讨近视防控个性化策略。从循证医学视角分析近视防控临床经验与核心理念。

方法: 梳理并系统阐述本团队的临床研究成果与结论, 并结合领域内多个高质量近视防控研究, 构建“以临床问题为导向”的近视管理框架。围绕三个核心环节展开: 精准识别风险个体 (WHO), 创新优化手段 (WHAT), 科学决策干预 (HOW)。

结果: 在开展近视防控前, 需先判断患者的风险并分层。团队研究核心思维在于整合基线屈光状态与既往眼轴进展速率, 建立预早期发病的预警模型, 加强一级预防关口前移。有效回答了“谁具有风险? 谁需要干预?”的临床困惑。在干预优化层, 团队着重针对光学干预的量化与设计优化 (非对称离焦技术、数字化 OK 镜)、药物优化 (阿托品频次探索) 及联合治疗创新 (光学 - 药物联合), 解决难治性近视单一干预的效能等瓶颈开展探索。在良好的临床手段基础上, 团队进一步探究科学的临床决策和管理, 提出循证医学建设近视防控门诊的概念和实践标准。此外, 依托早期高效指标 (首月眼轴变化、脉络膜形态演变) 等构建远期疗效预判模型。通过结合决策模型和个体化风险, 最终形成“分层 - 干预 - 优化”的临床决策闭环, 有效回应临床诉求。

结论: 以临床问题为导向的近视防控, 在于建立临床需求与循证医学结合的体系, 将个性化的转化实践于临床路径。通过人群识别、优效干预、科学决策, 可以为破解近视进展提供系统性解决方案。

摘要编号: 208851

面板编号: MYO-1373

华中地区学龄前儿童近视及高度近视的临床表型与致病基因特征分析

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目的: 探讨华中地区学龄前儿童早发近视与高度近视的临床表型及致病基因特征, 分析其对早期诊断与干预的启示。

方法: 收集 2024 年 7 月至 2025 年 10 月就诊的 76 名年龄 0 ~ 6 岁的近视或高度近视儿童, 进行全面的眼科检查, 包括散瞳屈光、眼轴长度、眼底照相、光学相干断层扫描 (OCT) 及视网膜电图 (ERG)。采用全外显子组测序 (WES) 检测致病基因变异,

并对早发近视组与早发高度近视组的临床及遗传特征进行比较分析。

结果: 76 例患儿中, 早发近视 25 例, 早发高度近视 51 例。两组男孩比例分别为 68% 和 53%; 屈光参差 ≥ 2.00 D 的分别为 16% 和 41.2%。伴有斜弱视、畏光或眼球震颤等眼部表现的比例分别为 24% 和 37.3%。家族近视史阳性者分别为 40% 和 45.1%。共发现 14 例 (18.4%) 孩子存在致病或可能致病基因变异, 涉及 OPN1LW (4 例)、CACNA1F (3 例)、TRPM1 (1 例)、GLRA2 (1 例)、NR2F1 (1 例)、COL11A1 (1 例)、GPR179 (1 例)、FBN1 (1 例) 等基因。

结论: 学龄前早发近视与高度近视表现出不同的临床及遗传特征。全外显子组测序揭示了多样的致病基因, 主要涉及光传导及细胞外基质相关通路。将基因检测纳入早期筛查有助于明确病因、避免误诊, 并指导个体化干预, 预防进展为病理性近视及严重视功能损害。

摘要编号: 208732

面板编号: MYO-1372

单眼近视儿童配戴角膜塑形镜后脉络膜厚度及视网膜周边离焦变化的随访研究

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共同作者: Huang RUIQIN

目的: 观察单眼近视儿童配戴角膜塑形镜前后脉络膜厚度及视网膜不同区域周边离焦 (RDV) 的变化。

方法: 回顾性研究。收集 2023 年 8 月至 2024 年 12 月就诊于石家庄爱尔眼科医院的配戴角膜塑形镜的青少年近视 71 例。年龄 (10.31 ± 1.34) 岁, 近视眼 SE (-2.01 ± 0.68) D 配戴 OK 镜, 对侧眼 SE (0.06 ± 0.44) D, 不做干预。使用 OCTA 测量黄斑中心凹下的脉络膜厚度, 多光谱屈光地形图 (MRT) 测量戴镜前、戴镜 6 个月时的 RDV。

结果: 基线脉络膜厚度: 近视眼侧 (285.33 ± 37.13) μm , 对侧眼为 (294.33 ± 48.13) μm ; 周边离焦总值 (TRDV): 近视眼为 (0.06 ± 0.27) D 呈现周边远视性离焦, 视网膜不同区域上方 (RDV-S)、下方 (RDV-I)、颞侧 (RDV-T)、鼻侧 (RDV-N) 分别为 (-0.65 ± 0.44) D、(0.09 ± 0.46) D、(0.02 ± 0.51) D、(0.28 ± 0.07) D, 除上方为近视性离焦外其余三个方向均为远视性离焦, 对侧眼为 TRDV (-0.34 ± 0.21) D 呈现周边近视性离焦, RDV-S、I、T、-N 分别为 (-0.25 ± 0.42) D、(0.10 ± 0.35) D、(-0.43 ± 0.49) D、(-0.33 ± 0.07) D, 除下方为远视性离焦外其余三个方向均为近视性离焦, ; 戴镜眼 6 个月后果膜增厚 (13.25 ± 19.26) μm ($P < 0.05$),

对侧眼脉络膜前后变化无统计学差异 ($P > 0.05$)，戴镜眼 TRDV、RDV-S、RDV-I、RDV-T、RDV-N 分别为 (-0.53 ± 0.76) D、 (-0.31 ± 0.55) D、 (-1.12 ± 1.36) D、 (-1.12 ± 1.51) D、 (0.50 ± 0.11) D，TRDV 呈现近视性离焦 ($t = 4.54$, $P < 0.05$)，其中下方和颞侧的近视性离焦变化最明显 ($t = 6.70, 5.85$; $P < 0.05$)，上方的近视性离焦变小，鼻侧的远视性离焦变大 (P 均 < 0.05)，对侧眼 RDV 前后变化无统计学差异 ($P > 0.05$)。

结论：单眼配戴角膜塑形镜 6 个月后脉络膜增厚，视网膜周边远视离焦总值由远视性离焦变为近视性离焦，其中下方和颞侧变化量最大，上方的近视性离焦变小，鼻侧的远视性离焦变大。

摘要编号：208730

面板编号：MYO-1371

单眼近视儿童配戴角膜塑形镜晶体厚度的变化与眼轴长度的关系

第一作者：Jingbin SI

共同作者：Huang RUIQIN

目的：探讨单眼近视患者配戴角膜塑形镜后晶体厚度的变化与眼轴长度变化的关系。

方法：回顾性研究，(1) 选取 2023 年 8 月至 2024 年 8 月在我院视光门诊就诊的 8-13 岁的单眼近视患者 124 例，近视眼的等效球镜 (SE) 为 $-4.00 \sim -1.00$ D， 1.0 D $\leq$ 双眼 SE 差值 ≤ 2.50 D，双眼的最佳矫正视力 ≥ 0.8 ，根据矫正方式分为实验组和对照组：实验组 71 例为 OK 镜组，近视眼侧配戴角膜塑形镜 (OK 镜) 定义为 OK-近视眼组，对侧的非近视眼未做干预定义为 OK-非近视眼组；对照组 53 例为单光框架眼镜组 (SP 组)，近视眼侧用单光镜片矫正定义为 SP-近视眼组，对侧的非近视眼配戴平光镜片定义为 SP-非近视眼组。随访时间为 1 年，测量受试者的显然验光和眼前节参数，分析戴镜前及戴镜 1 年后双眼的平坦角膜曲率 (Kf)、晶体厚度 (LT)、前房深度 (ACD)、眼轴长度。采用配对 t 检验比较各组间参数有无差异，线性回归分析研究双眼晶体厚度的变化与眼轴长度增长的相关性。

结果：(1) LT 变化：OK-近视眼组戴镜前为 (3.25 ± 0.15) mm 增加至 (3.29 ± 0.16) mm，差异有统计学意义 ($t = -4.51$, $P < 0.001$)，OK-非近视眼组前后差异无统计学意义 ($P > 0.05$)。SP 组双眼的 LT 戴镜前后差异无统计学意义 (P 均 > 0.05)；(2) ACD 变化：OK-近视眼组前后差异无统计学意义 ($P > 0.05$)；OK-非近视眼组 (3.74 ± 0.20) mm 增长到 (3.78 ± 0.18) mm，差异有统计学意义 ($t = -1.83$, $P < 0.05$)。SP 组双眼

ACD 均增加，差异有统计学意义 (P 均 < 0.05)，(3) 眼轴变化：OK 镜组双眼 AL 分别增长 (0.10 ± 0.16) mm 和 (0.47 ± 0.20) mm，差异有统计学意义 ($P < 0.001$)。SP 组双眼 AL 均显著增加 ($P < 0.05$)，双眼差异无统计学意义 ($P > 0.05$)。线性回归分析：12 个月 LT 变化量与 AL 增长量呈负相关 ($r = -0.38$, $P < 0.05$)，基线 SE 与 AL 增长量呈正相关 ($r = -0.54$, $P < 0.05$)。

结论：随访 12 个月后，OK-近视眼组儿童的晶体厚度和眼轴长度增加均有显著性。基线近视程度较高和 LT 增加较多与单眼近视儿童的眼轴长度增长较少有关。

摘要编号：210045

面板编号：MYO-1381

基于机器学习多模型集成的 NHANES 高度近视相关因素挖掘

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共同作者：Jiamin WANG

目的：探讨机器学习多模型集成策略在挖掘高度近视关联因素中的应用价值，解决小样本高维数据中变量筛选与模型稳定性难题，为后续病因研究和风险预测提供线索。

方法：利用 NHANES 2007-2008 数据，纳入具备完整屈光度及系统性特征记录的 2612 例研究对象、121 个多维特征 (人口学、膳食、行为、人体测量、实验室指标等)。高度近视定义为任一眼屈光度 ≤ -6.00 D，同时排除既往近视矫正手术、白内障手术及其他眼科手术者。采用 18 种机器学习模型 (15 种传统模型 + 3 种表格学习模型)，通过分层随机抽样 (8:2)、ROSE 混合采样算法处理类别不平衡、10 折交叉验证优化训练过程。采用三种分类阈值策略 (默认阈值、Youden 指数最优阈值、高敏感度阈值) 评估模型性能，通过准确率、灵敏度、特异度、阳性预测值、阴性预测值、F1 值及 AUC 综合评估模型表现。计算模型中各个特征的 SHAP 值进行特征重要性排序，构建基于模型性能加权的特征排名集成方法，并绘制前 15 个最重要特征的综合排序图和 SHAP 依赖图。通过热图与 Spearman 相关性矩阵验证特征选择稳健性。

结果：研究对象平均年龄 48.64 ± 16.75 岁，男性 1303 例 (49.9%)、女性 1309 例 (50.1%)。模型性能分析显示，LightGBM 在最优 Youden 指数阈值下表现最佳 (AUC = 0.839，灵敏度 = 87.5%，特异度 = 66.6%)，其次为 TabICL (AUC = 0.778)、XGBoost (AUC = 0.769) 和 C5.0 (AUC = 0.765)。跨模型特征重要性集成分析识别出 15 个与高度近视关联最稳定的因素，包括嗜酸性粒细胞数、年

龄、番茄红素摄入量、慢性支气管炎史、饱和脂肪酸 SFA 8:0 摄入量、钠摄入量、血清 4-吡哆酸、血小板平均体积、多不饱和脂肪酸 PFA 22:5 摄入量、家庭贫困指数、嗜酸性粒细胞百分比、尿白蛋白、酒精摄入量、C 反应蛋白及血清 25 羟维生素 D3 浓度等。相关性分析表明 TabPFN 与神经网络在特征排序上高度一致 (Spearman $r = 0.86$)，番茄红素摄入量在多个高性能模型中均被识别为重要预测因子，验证了特征选择的稳健性。

结论：机器学习多模型集成策略有效解决了小样本高维数据特征筛选难题，稳健识别出与高度近视相关的系统性因素（炎症、营养及代谢指标），为高度近视的病因研究与防控策略提供新线索。

摘要编号：208852

面板编号：MYO-1374

应用 SS-OCTA 探究近视人群视网膜微循环特征

第一作者：Hongyue WU

目的：本研究应用扫频源光学相干断层扫描血管成像 (SS-OCTA) 技术观察不同屈光程度近视患者黄斑区视网膜血管丛血流密度、视网膜厚度、中心凹无血管区范围数据的特点和差异，以期深入认识影响近视发生发展的视网膜微循环病理变化。

方法：本研究收集门诊近视患者，纳入符合标准共计 82 例患者 82 只眼，其中轻度近视患者 29 例，中度近视患者 25 例，高度近视患者 28 例。应用 SS-OCTA 采集受试者黄斑区视网膜血管丛血流密度、视网膜厚度以及中心凹无血管区范围数据，然后进行统计学分析。

结果：1. 不同屈光程度近视患者视网膜血管丛血流密度的差异：① SCP：高度近视组 CS、NI、II 区域低于轻度近视组。② DCP：高度近视组 CS 区域低于轻度近视组、中度近视组；高度近视组 TI、NO 区域低于轻度近视组。③ 全层视网膜血管丛：高度近视组 CS、TI、SI、NI、II 区域低于轻度近视组。2. 不同屈光程度近视患者 FAZ 范围的差异：① 不同屈光程度 FAZ 面积及周长不具有差异性；② 高度近视组的深层视网膜 FAZ 周长面积比低于轻度近视组。3. 不同屈光程度近视患者黄斑区视网膜厚度的差异：① 内层视网膜：高度近视组 TI、NI、II、TO、SO 区域低于轻度近视组。② 外层视网膜：高度近视组 TI、SI 区域低于轻度近视组、中度近视组；高度近视组 NI、TO、NO 区域低于轻度近视组；高度近视组 II 区域低于中度近视组。③ 全层视网膜：高度近视组 TI 区域低于轻度近视组与中度近视组；高度近视组 SI、II、TO、SO、IO 区域低于轻度近视组。4. 黄斑区视网膜血管丛血流密度与视网膜厚度的相关性：① CS、TI、SI、NI、

II、SO、NO、IO 区域 SCP 血流密度与内层视网膜厚度呈正相关；② CS、SI、II、TO、SO、IO 区域 DCP 血流密度与外层视网膜厚度呈正相关；③ CS、SI、NI、II、SO、NO、IO 区域全层视网膜血管丛血流密度与全层视网膜厚度呈正相关。

结论：1. 近视患者随着屈光度的增加，眼底微循环改变表现为黄斑区视网膜血管丛血流密度降低，以中心凹及内环区域变化最为显著；视网膜厚度变薄，以颞侧区域变化最为显著。2. 近视人群黄斑区视网膜血管丛血流密度与视网膜厚度呈正相关。

摘要编号：208678

面板编号：MYO-1368

户外活动与阅读时间对近视发生的联合和交互作用：来自中国超过 21 万名儿童的证据

第一作者：Bei DU

目的：尽管大量研究已分别探讨了户外活动时间 and 阅读时间对近视的单独影响，但在大规模人群中这两种因素之间的相互作用仍鲜有研究。我们希望探索增加户外活动时间是否会降低长时间阅读带来的近视风险。

方法：本研究纳入了中国天津儿童眼健康研究中 219,802 名初始非近视的小学生，行为暴露数据通过问卷收集。采用 Cox 比例风险模型（以入学后的学期数作为时间尺度）来评估户外活动时间和阅读时间与近视发病之间的关联。使用广义倾向得分加权 Cox 模型评估在加性尺度上的交互作用效应，并通过交互作用导致的相对风险增加 (RERI)、归因比例 (AP) 和协同指数 (SI) 来量化。此外，还进行了亚组分析以评估结果的稳健性和一致性。

结果：在这 219,802 名儿童中，有 130,246 名发展为近视，三年内的累计发病率为 59.3%。增加户外活动时间 (1-2 小时：风险比 (HR) = 0.97, 95% 置信区间 (CI) = 0.95-0.98；2-3 小时：风险比 (HR) = 0.90, 95% CI = 0.88-0.92；超过 3 小时：风险比 (HR) = 0.86, 95% CI = 0.84-0.89) 与近视发病风险降低有关，而长时间阅读时间 (1-2 小时：风险比 (HR) = 1.02, 95% CI = 1.01-1.03；超过 2 小时：风险比 (HR) = 1.03, 95% CI = 1.01-1.05；超过 3 小时：风险比 (HR) = 1.05, 95% CI = 1.03-1.08) 则与近视发病风险增加有关。在户外活动时间和阅读时间的加性模型中，其交互作用效应具有显著性，风险比效应值为 RERI = -0.04 (-0.08, 0.00)，AP = -0.04 (-0.07, 0.00)，SI = 0.71 (0.50-0.93)，尤其是在年龄 ≤ 3 岁的儿童、男孩以及有近视家族史的儿童中。

结论：户外活动时间与阅读时间不仅各自与近视的发生有关，而且还会相互影响。这些发现强调了增

加户外活动时间和合理安排阅读时间的重要性，以便制定有针对性的近视预防策略。

摘要编号: 208809

面板编号: MYO-1376

新型 NYX 突变导致高度近视伴夜盲

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共同作者: Lili DAI, Liwen ZHANG

目的: 本研究旨在探究一个中国东北家系中导致高度近视与先天性夜盲症的致病基因突变

方法: 研究对家系成员进行了全外显子组测序以识别基因变异，并利用 AlphaFold2 预测了相关蛋白质的三维结构。分子动力学模拟通过评估该突变诱导的构象变化，对此分析进行了补充。同时，进行了全面的临床评估，包括详细眼科检查、屈光状态评估及眼底成像，以表征表型特征并将其与遗传学发现进行关联分析。

结果: 在 NYX 基因的第 3 号外显子中发现了一个新的移码突变 c.264dup (p.R89Afs*26)，该突变导致蛋白质 C 末端功能域发生提前截短。先证者表现为极度高度近视（等效球镜度 < -23.00 D）并伴有先天性夜盲症的典型症状。结构分析显示，突变蛋白发生了显著的构象变化，破坏了其与 mGluR6 的相互作用界面。系谱分析进一步支持了 X 连锁隐性遗传模式，这与患病家系内的临床和遗传学发现相符。

结论: 本研究首次报道 NYX 基因 c.264dup 突变是导致伴有极度高度近视的完全型先天性静止性夜盲症 (CSNB) 的病因，从而拓展了 NYX 基因的已知突变谱。这些发现对于加强针对受累个体及家庭的分子诊断与遗传咨询具有重要意义，并为揭示视网膜信号转导与病理性眼轴伸长相关联的分子机制提供了新的见解。

摘要编号: 208922

面板编号: MYO-1378

病理性近视眼的前部巩膜厚度

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目的: 本研究旨在利用高分辨率眼前节成像 (AS-OCT) 技术，测量病理性近视患者的前部巩膜厚度，描绘其空间分布特点，尤其关注人工晶状体 (IOL) 巩膜固定点的巩膜厚度及形态特点，探讨前部巩膜厚度与眼轴长度等关键眼部参数的相关性。

方法: 本研究为回顾性研究。使用 AS-OCT 设备，测量病理性近视（观察组）与正视眼（对照组）两组患者上 (S)、下 (I)、鼻 (N)、颞 (T)

四个方向距离巩膜突 1、2、3、4、5、6mm 处的前部深层巩膜厚度 (scleral stroma thickness, SST)，使用 IOLMaster 700 光学生物测量仪测量所有受试者的眼轴长度 (AL)、前房深度 (ACD)、白到白距离 (WTW)。分别比较两组巩膜厚度的空间分布特点，重点分析距离巩膜突 2~3mm 处的巩膜厚度及形态特点，分析巩膜厚度与眼轴等眼前节参数的相关性。

结果: 本研究共纳入 46 名患者 85 眼（观察组 32 名 62 眼，对照组 14 名 23 眼）。病理性近视组与对照组的年龄分别为 36.62 ± 12.94 岁 VS 56.78 ± 10.40 岁 ($P < 0.001$)，眼轴分别为 29.99 ± 2.66 mm VS 23.53 ± 1.01 mm ($P < 0.001$)，病理性近视组患者屈光度为 -14.70 ± 5.24 D。观察组与对照组相比，病理性近视患者的 SST 在各方向上与正视眼无统计学差异。病理性近视组与正视眼组患者 SST 在距离巩膜突 2~3 mm 处均表现为下方最厚，颞侧、鼻侧、上方次之。除距离下方巩膜突 3 mm 处的 SST 与眼轴有相关性 ($r = -0.372$, $P = 0.030$) 以外，本研究未发现病理性近视前部巩膜厚度与眼轴长度之间存在相关性。

结论: 病理性近视组与正视眼组患者的 SST 整体分布特点具有高度一致性，主要呈现为下方最厚，颞侧、鼻侧、上方次之的特点。病理性近视组在距离巩膜突 2~3 mm 处的 SST 与正视眼组相似，为高度近视患者行 IOL 巩膜层间固定的位置提供了重要的在体解剖数据。

摘要编号: 202027

面板编号: MYO-1363

离焦与复合点扩散镜片视觉质量比较研究

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目的: 比较单纯离焦设计与离焦复合点扩散设计近视控制镜片对青少年视觉质量的影响。

方法: 随机平行对照试验研究。纳入 2024 年 7 月至 2025 年 2 月就诊的 6~14 岁近视儿童 48 例 (96 眼)，按计算机生成的随机序列 1:1 分为单纯离焦组（以中央直径 7.9 mm 区域为光学区，外围为微透镜离焦区）与离焦复合点扩散组（以中央直径 7.9 mm 区域为光学区，外围为微透镜区叠加光散射点区域）。使用 OQAS 视觉质量分析系统和 OPD-Scan III 波前像差分析仪分别对光学区 (4 mm) 和周边离焦区 (6 mm) 进行客观视觉质量检查，指标包括预测视力 (PredictedVA100%、VA20%、VA9%)、客观散射指数 (OSI)、调制传递函数截止频率 (MTF cutoff)、斯特列尔比以

及离焦区和光学区的像差（总像差、高阶像差、球差、慧差、三叶草差）。采用 36 项主观视觉质量问卷（quality of vision, Qov）评估眩光、光晕、星爆、视觉朦胧、视物模糊、变形、重影、视力波动、聚焦困难、远视力、近视力、周边视觉、舒适度及适应度等。定量资料比较采用 t 检验或曼-惠特尼秩和检验，分类变量采用卡方检验。

结果：共 46 例患者完成随访（应答率 95.8%）（男 22 例，女 24 例；年龄 9.6 ± 2.0 岁）。客观视觉质量方面，两组在 PredictedVA100%/VA20%/VA9%、OSI、MTF cutoff 等指标上均无统计学差异（ $P > 0.05$ ）。单纯离焦组在离焦区的球差显著低于离焦复合点扩散组（ 0.11 ± 0.08 vs. 0.22 ± 0.23 , $P < 0.05$ ）。两组镜片自身的光学区球差、慧差均低于离焦区（ $P < 0.05$ ）。主观视觉感受方面，单纯离焦组的周边视觉清晰度优于离焦复合点扩散组（ $\chi^2 = 12.562$, $P < 0.05$ ），其余主观视觉指标在两组间无统计学差异（ $P > 0.05$ ）。

结论：单纯离焦设计与离焦复合点扩散设计镜片均能为青少年近视患者提供良好的客观视觉质量，单纯离焦设计的离焦区球差更低。单纯离焦设计镜片的周边视觉清晰度主观感受优于离焦复合点扩散设计。该研究为临床中镜片的个性化选择提供了重要依据。

摘要编号：209248

面板编号：MYO-1379

西安市临潼区青少年儿童散光的流行率及轴位的分布状况

第一作者：Yanying LI

共同作者：Zhaojiang DU

目的：通过统计西安市临潼区青少年儿童散光程度及轴位的分布状况，探索与散光分布特征相关的可能原因，并提出预防散光进展的方案。

方法：对 2023 年 9 月至 11 月期间在西安市临潼区接受屈光检查的学生进行横断面研究。所有学生均通过非睫状肌麻痹状态下的客观验光进行测量，并收集了学生的基本信息。使用 Spss 27.0 软件进行单变量和多变量相关性分析。散光的患病率已被确定。散光定义为柱镜 ≤ -0.75 D，低度散光定义为柱镜 ≤ -1.50 D，中度散光定义为柱镜 -3.00 D $\leq$ 且 ≤ -1.50 D，高度散光量定义为柱镜 ≤ -3.00 D。散光类型为：规则散光（WTR）（负柱轴 $180 \pm 30^\circ$ ）、反规则（ATR）散光（负柱轴 $90 \pm 30^\circ$ ）和斜散光（所有其他情况）。65127 名学生（51.0%boys, 7 - 19 岁），25,945（36.1%，95% CI: 35.52 - 36.68%）散光以及 1267（1.8%，

95% CI: 1.07 - 2.53%）具有高散光。计数资料采用百分率（%）表示，组间比较采用卡方检验。

结果：共有 65843 名青少年参与了研究，最终纳入研究的儿童为 65127 名。散光的患病率为 36.72%。学生的散光率随着年级的增长而增加，其中规则散光随着年级的增长而增加，而反规则散光和斜轴散光随着年级的增长而减少，且不同年级的学生中散光类型均为规则散光发病率最高，男女之间的发病率并无明显差异。

结论：西安市临潼区学生散光的患病率较高。西安市临潼区青少年散光患病率为 36.96%，包括高度散光为 1.57%。在该人群中，散光主要为规则散光型（77.00%），且在不同年龄组均为规则散光型发病率最高，发病率分别为：小学 73.12%、初中 78.46%、高中 76.4%。男性、近视或远视与高散光风险独立相关。

摘要编号：208659

面板编号：MYO-1369

视盘形态学参数对儿童近视进展的预测价值：一项队列研究

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目的：本研究旨在系统分析不同近视程度青少年视盘形态特征的差异，探讨视盘参数（包括视盘椭圆度指数、视盘面积、视盘旁萎缩弧面积）与近视进展之间的相关性，并构建一个基于视盘形态特征的列线图模型，以预测儿童近视进展风险。

方法：采用前瞻性队列研究设计，纳入 2023 年 10 月至 2024 年 10 月云南省保山市 328 名 8-16 岁学生。所有受试者在基线和 1 年随访时接受全面眼科检查，包括散瞳验光、眼轴长度（AL）测量、扫频源 OCT（SSOCT）成像等。使用 ImageJ 软件分析彩色眼底照片，测量视盘垂直径（VD）、水平径（HD）、椭圆度指数（OI）、视盘面积及视盘旁萎缩弧（PPA）面积。按年龄和等效球镜（SE）分组比较视盘参数差异，采用偏相关分析探讨其与 AL、SE、轴率比（AL/CR）及脉络膜厚度的关系。进一步以 1 年内 SE 变化量将近视儿童分为进展组（ $\Delta SE \leq -0.75$ D）与非进展组（ $\Delta SE \geq -0.50$ D），通过 LASSO 回归和二元 Logistic 回归筛选独立预测因素，并构建列线图模型，通过 ROC 曲线、校准曲线和决策曲线评估模型性能。

结果：视盘 OI 与 AL 呈正相关（ $r = 0.170$, $p = 0.002$ ），与等效球镜（SE）呈负相关（ $r = -0.170$, $p = 0.002$ ）；PPA 面积与 AL 正相关（ $r = 0.498$, $p < 0.001$ ）、与 SE 负相关（ $r = -0.535$, $p < 0.001$ ）。多因素分析显示，较小年龄（OR = 0.698，

95% CI: 0.523-0.914, $p = 0.011$)、较高基线 SE (OR = 1.474, 95% CI: 1.085-2.133, $p = 0.023$) 和较大 OI (OR = 2.840, 95% CI: 1.739-5.000, $p < 0.001$) 是近视进展的独立预测因素。列线图模型显示优良预测性能, 训练集 AUC 为 0.825 (95% CI: 0.752-0.897), 验证集 AUC 为 0.780 (95% CI: 0.623-0.936), 校准曲线与决策曲线分析证实模型具有良好的准确性与临床适用性。

结论: 视盘形态参数 (尤其是 OI 和 PPA 面积) 与儿童近视程度及进展显著相关。年龄小、基线 SE 较高、OI 较大是近视进展的独立危险因素。本研究构建的基于年龄、SE 和 OI 的预测模型具有良好的判别效力和临床实用性, 为儿童近视进展的早期识别与干预提供了新的可视化工具。

摘要编号: **210017**

视网膜 Opn4-DA 是近视视网膜到巩膜发育的候选信号

第一作者: Zefeng KANG

共同作者: Zefeng KANG

目的: 验证视黑素 - 多巴胺 (Opn4-DA) 轴通过抑制近视视网膜及巩膜内质网应激, 延缓近视眼轴增长的作用。

方法: 选取 36 只 4 周龄 SPF 级雄性 C57BL/6J 小鼠, 随机分为正常组、形觉剥夺近视组 (FDM 组)、ipRGCs 消融组 (ipRGCs 组)。除正常组外, 其余各组均造 FDM 模型。造模 4 周后所有小鼠均进行屈光度和眼轴长度检测后, 取眼球及视网膜、巩膜组织。过碘酸雪夫染色 (PAS 染色) 观察视网膜、脉络膜、巩膜组织病理形态改变; 蛋白免疫印迹法 (Western blot) 检测视网膜组织中多巴胺 D1 受体 (DRD1)、转录因子 C/EBP 同源蛋白 (CHOP)、葡萄糖调节蛋白 78 (GRP78) 蛋白相对表达量含量; 巩膜组织中 CHOP、GRP78 蛋白相对表达量; 实时荧光定量聚合酶链式反应 (Real-time PCR) 检测视网膜中 Opn4、CHOP、GRP78 mRNA 相对表达含量及巩膜中 CHOP、GRP78 mRNA 相对表达量; 免疫荧光染色 (IF) 检测视网膜组织 Opn4、DRD1 表达。

结果: 与正常组比较, FDM 组小鼠屈光度明显向近视偏移 ($P < 0.05$) 且眼轴长度显著增加 ($P < 0.05$), 视网膜各层较薄, 神经节细胞数量较少, 巩膜层间胶原纤维排列疏松有明显空隙, 视网膜组织中 Opn4、DRD1 蛋白及 mRNA 表达显著降低 ($P < 0.05$), 视网膜及巩膜组织中 CHOP、GRP78 蛋白及 mRNA 表达显著升高 ($P < 0.05$); 与 FDM 组比较, ipRGCs 组小鼠屈光度及眼轴长度进一步加 ($P < 0.05$), 视网膜、脉络膜、巩膜组织更薄

且层间更加疏松, 视网膜组织中 Opn4、DRD1 蛋白及 mRNA 表达更低 ($P < 0.05$), 视网膜及巩膜组织中 CHOP、GRP78 蛋白及 mRNA 表达更高 ($P < 0.05$)。

结论: 小鼠视网膜 Opn4-DA 轴可以通过抑制视网膜及巩膜内质网应激, 延缓近视眼轴增长及屈光度加深。

摘要编号: **202257**

面板编号: **MYO-1364**

评估便携式自动验光仪 2WIN-S 在儿童睫状肌麻痹验光中的一致性和重复性

第一作者: Guanghao QIN

共同作者: Wei HE, Xingru HE, Sile YU, Yibing ZHOU

目的: 评估使用便携式自动验光仪 2WIN-S (Adaptica, 帕多瓦, 意大利) 在儿童人群中睫状肌麻痹验光检查的一致性和重复性

方法: 使用 ARK-1 (尼德克, 蒲郡, 日本)、2WIN-S 以及主观验光 (SR) 测量球镜和等效球镜 (SE)。主要结果是上述三种方法测量的 SE、J0 和 J45 值。采用组内相关系数 (ICC) 评估测量的重复性, Bland-Altman 评估每两种方法之间的一致性。

结果: 对 158 名儿童 (平均年龄 10.33 ± 2.10 岁) 进行了屈光不正筛查。2WIN-S 与 ARK-1 和 SR 相比, 在球镜、SE、J0 和 J45 在临床上具有可接受的差异 (± 0.50 D 范围内) 且具有一致性。2WIN-S 与 ARK-1 的球镜、SE、J0 和 J45 在 ± 0.50 D 以内的差值分别为 81%、75%、86% 和 88%。2WIN-S 与 SR 的球镜、SE、J0 和 J45 在 ± 0.50 D 以内的差值分别为 83%、71%、89% 和 89%。2WIN-S 三次重复测量球镜的 ICC 系数为 0.95, SE 的 ICC 系数为 0.97。

结论: 使用 2WIN-S 在儿童睫状肌麻痹下的屈光不正检查与 ARK-1 和 SR 的测量结果相比具有相当高的一致性。2WIN-S 的测量结果可作为主观验光的基础。这种类型的设备有助于在社区和学校开展大规模的屈光不正筛查。

摘要编号: **208857**

面板编号: **MYO-1377**

重复低强度红光控制近视的疗效、安全性及其对脉络膜厚度的影响: 系统评价与荟萃分析

第一作者: Hongyue WU

目的: 本研究旨在评估重复低强度红光治疗对儿童及青少年近视控制的效果及其安全性, 并探究其对黄斑区脉络膜厚度的影响。

方法：本研究遵循 PRISMA 2020 指南开展。系统检索了 PubMed、Web of Science、EMBASE、Cochrane Library、EBSCO、Scopus、中国知网 (CNKI)、维普 (VIP) 及万方数据库。纳入研究类型为评估重复低强度红光 (RLRL) 治疗对儿童及青少年近视控制的随机对照试验 (RCT) 及对照研究。采用 RevMan 5.4 软件对提取的数据进行荟萃分析，并对纳入文献的偏倚风险进行了评估。主要结局指标包括眼轴长度 (AL)、球镜等效屈光度 (SER) 及黄斑中心凹下脉络膜厚度 (SFCT) 的变化。

结果：最终共纳入 16 项研究，其中包括 12 项随机对照试验和 4 项对照研究。荟萃分析结果显示，与对照组 (单光眼镜) 相比，干预组 (重复低强度红光治疗联合标准眼镜) 在眼轴增长方面具有显著的抑制作用 ($MD = -0.36$, $95\% CI: -0.44 \sim -0.28$, $P < 0.00001$)，显著抑制了球镜等效屈光度的增加 ($MD = 0.65$, $95\% CI: 0.34 \sim 0.97$, $P < 0.00001$)，并促进了黄斑中心凹下脉络膜厚度的增加 ($MD = 21.15$, $95\% CI: 1.36 \sim 40.94$, $P < 0.00001$)。此外，该疗法安全性较高，且其疗效随随访时间延长而呈累积增强趋势。

结论：根据本次荟萃分析结果显示，重复低强度红光治疗 (RLRL) 是一种有效的近视控制疗法，主要通过抑制眼轴长度增长、改善球镜等效屈光度以及促进脉络膜增厚发挥作用。然而，其长期疗效、安全性及治疗稳定性仍需进一步研究与验证。

摘要编号：208695

面板编号：MYO-1370

高度近视眼虹膜形态重塑的 SS-OCT 微观解析

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共同作者：Yanwen FANG, Ching KANG, Xiangjia ZHU

目的：通过新型眼前节扫描光学相干断层扫描 (SS-OCT) 解析高度近视人群的虹膜形态特征。

方法：本回顾性病例对照研究纳入 100 例拟行白内障手术患者的 100 只眼，按眼轴长度分为对照组 (22 mm-24.5 mm) 和高度近视组 (≥ 26 mm)。采用 SS-OCT 测量虹膜容积、虹膜前表面面积、虹膜后表面面积、平均虹膜厚度、前房容积和 500 μm 处小梁-虹膜间隙 (TISA 500)；并进一步分析影响虹膜形态特征的关键因素。

结果：与对照组相比，高度近视组的虹膜容积、虹膜前表面及后表面面积均显著更大 (均 $P < 0.001$)，而两组间的平均虹膜厚度无统计学差异。在虹膜各象限中，上方和鼻侧象限的虹膜容积呈现与整体一致的变化趋势；除颞侧象限外，其余各象限的虹膜前、后表面面积变化趋势与整体一致。相关性分析显示，虹膜容积、虹膜前/后表面面积均与眼轴长

度呈正相关 (均 $P < 0.001$)。多元线性回归模型表明，虹膜容积增大与前房容积增大相关，虹膜前、后表面面积增大均与男性、眼轴更长、前房容积更大及 TISA 500 更小相关。

结论：高度近视眼的虹膜容积及虹膜表面积均大于对照眼，提示随着眼轴长度增加，虹膜呈冠状扩张趋势；虹膜形态与前房角结构存在相关性。

青光眼

摘要编号：208742

面板编号：GLA-1393

1 型 Stargardt 病的临床特征及遗传学研究

第一作者：Zijie CHEN

共同作者：Xuyang LIU

目的：对 23 个中国汉族 1 型 Stargardt 病 (STGD1) 家系进行临床表型特征与遗传学分析，寻找可能的致病变异位点，探讨表现型-基因型间的关联性。

方法：于 2019 年 9 月~2024 年 12 月在厦门大学附属厦门眼科中心收集 23 个常染色体隐性遗传 STGD1 的家系。本研究通过了相关医学伦理委员会审查 (受理号: XMYKZX-KY-2022-001)。所有家系均签署知情同意书。收集先证者病史及家族史，并对家系中所有患者及部分健康成员进行详细的眼科检查和全身检查。采集先证者外周静脉血 3 ml，进行全外显子组测序。分析所有变异位点，结合其有害性、致病性、人群频率等结果，筛选出可疑的致病基因。通过 Sanger 测序、拷贝数变异检测、实时荧光定量 PCR 检测验证筛选出的致病基因变异。使用 ProtParam、SOPMA、Protsacle、RDCC 等生物信息学程序软件分析变异位点对蛋白质可能产生的影响。

结果：在 23 个 STGD1 家系中共有 26 名患者。所有家系中的患者成员均有相似的眼部表现，符合 STGD1 的临床诊断。发病年龄在 10 岁以下的患者表型要稍重于发病年龄 10 岁~20 岁的患者。10 年以上病程时间的患者表型要稍重于 10 年以下病程时间的患者。所有患者均被检测到存在 ABCA4 基因的复合杂合或者纯合变异。本研究共鉴定出 32 个 ABCA4 基因的变异位点，其中包括 9 个新鉴定的变异位点，分别是 c.2900C > A:p.Ala967Asp、c.613T > C:p.Cys205Arg、c.3862+1G > A、c.4066C > T:p.Gln1356X、c.5195_5196del:p.Ile1732fs、c.3812delA:p.Glu1271fs、c.3468C > G:p.Tyr1156X、c.1913C > G:p.Pro638Thr 和 ex15_16del。通过变异致病性分析和生物信息学分

析均提示有害性。家系成员测序分析显示, 这些致病变异与疾病表型共分离, 符合常隐遗传特征。

结论: 研究共鉴定出 32 个不同变异位点, 其中 9 个是新鉴定的变异位点。研究显示患者的临床表现及严重程度与变异的类型、变异位点所在位置有关。本研究扩大了 ABCA4 基因在中国汉族 STGD1 人群中的变异谱, 有助于开展专业的遗传咨询服务, 为优生优育提供帮助。

摘要编号: **210300**

面板编号: **GLA-1406**

POAG 患者房水脂肪因子表达谱及脂联素对小胶质细胞的作用

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目的: 研究原发性开角型青光眼患者、白内障患者和白内障合并代谢异常患者房水中脂肪因子表达水平。进一步研究脂联素在 LPS 诱导的小胶质细胞炎症模型中的保护作用及分子调控机制。

方法: 通过 Luminex 液相芯片技术, 检测 POAG 组 22 例 22 眼、白内障组 24 例 24 眼和白内障合并代谢异常患者 (白内障 + 代谢异常组) 24 例 24 眼的房水样本中 15 种脂肪因子表达水平, 并分析房水脂肪因子水平与 POAG 患者术前 IOP、视野 MD 值、术前青光眼药物的使用数量及特定青光眼药物的使用情况等临床指标的相关性。为研究 Adiponectin 对小胶质细胞的作用, 使用不同浓度 adiponectin 处理 BV2 细胞 12 小时后观察其对细胞活力的影响。收集 5 $\mu\text{g/mL}$ adiponectin 处理 12 小时后 BV2 细胞, 进行转录组测序分析。采用 qRT-PCR、ELISA 和 Western Blot 技术, 观察 Adiponectin 对 LPS 诱导的小胶质细胞激活的形态学改变和促炎细胞因子释放的影响, 以及对小胶质细胞炎症反应的调控通路。

结果: POAG 组房水中 Adiponectin、Leptin、Adipsin、RBP4、Angiopoietin-2、ANGPTL4、CCL2)、IL-8 和 IL-18 的水平显著高于白内障组 ($p = 0.010$ 、 $p = 0.012$ 、 $p = 0.004$ 、 $p < 0.001$ 、 $p = 0.001$ 、 $p = 0.021$ 、 $p = 0.027$ 、 $p = 0.025$ 、 $p = 0.035$)。此外, POAG 组的 Angiopoietin-2 水平高于白内障 + 代谢异常组 ($p = 0.002$)。在 POAG 组中, 脂肪因子水平与 IOP、MD 或青光眼药物数量之间未发现显著相关性, 溴莫尼定使用与 Angiopoietin-2 浓度呈中等相关 ($r = 0.449$, $p = 0.036$)。Adiponectin 对 BV2 细胞无明显毒性作用, 且呈现出促进 BV2 细胞增殖的效果。转录组测序并进行 GO 和 KEGG 分析发现, Adiponectin 引起 BV2 细胞多个与免疫和炎症相

关的生物过程被激活, 细胞因子 - 细胞因子受体相互作用、趋化因子信号通路和 IL-17 信号通路显著富集。Adiponectin 能够有效抑制 LPS 诱导的小胶质细胞促炎细胞因子 TNF- α 和 IL-1 β 的释放。Adiponectin 可拮抗 LPS 对 AMPK 磷酸化的抑制作用, 并抑制 LPS 诱导的 NF- κB 核转位作用。

结论: POAG 患者与白内障患者的房水脂肪因子水平存在显著差异, 房水脂肪因子的水平可能反映青光眼炎症状态。Adiponectin 对 BV2 细胞具有促进增殖的作用。Adiponectin 可有效抑制 LPS 诱导的 BV2 细胞促炎细胞因子释放, 其机制与 AMPK/NF- κB 通路介导的炎症反应抑制相关。

摘要编号: **202100**

面板编号: **GLA-1386**

Piezo1/2 离子通道作为视乳头旁巩膜硬度调控靶点在慢性青光眼中视神经保护的机制研究

第一作者: Huan DU

共同作者: Yuan HE, Liu XU

目的: 青光眼是一组以视神经进行性损伤和视网膜神经纤维层缺损为特征的慢性神经退行性疾病。近年研究发现, 巩膜生物力学特性 (如硬度、应力分布) 可能通过影响筛板形变直接参与视网膜神经节细胞 Retinal ganglion cell, RGC) 轴突损伤评估不同时期的慢性青光眼大鼠模型中乳头旁巩膜 (Parapillary Scleral, PPS) 硬度变化与 RGC 丢失的关系, 确定 PPS 硬度发挥视神经保护作用的临界值。探究 Piezo1/2 在调控 PPS 硬度中的作用, 最终通过调控 Piezo1/2 干预 PPS 硬度实现视神经保护作用。

方法: 选取健康 SD 大鼠, 右眼建立慢性高眼压青光眼模型, 左眼为正常对照组, 分别在青光眼疾病进程的早、中、晚三个时期, 取 PPS 进行冰冻切片并用原子力显微镜 (atomicforce microscope, AFM) 测 PPS 弹性模量; 视网膜铺片进行 RGC 计数; 视乳头 (Optic Nerve Head, ONH) 进行 PPD 染色对 RGC 轴突计数; 通过 qPCR 以及 Western Blotting 检测 Piezo1/2 表达水平, 通过钙成像等技术明确 Piezo1/2 在高眼压 PPS 力学性质中的作用。后续分别 Piezo1/2 抑制剂 / 激活剂作用于早期、晚期青光眼大鼠 PPS, 随后对 PPS 弹性模量进行测定; 对 RGC 以及 RGC 轴突进行计数。

结果: 随着青光眼病程发展, HE 结果显示: GCC 层变薄, RGC 进行性丢失。Masson 染色结果显示: 在高眼压 2、3 周时, PPS 区域胶原明显沉积; 原子力显微镜检测 PPS 弹性模量, 结果显示高眼压 2、3 周时, PPS 弹性模量显著升高。且 PPS 弹性模量与 RGC 数量两变量存在中等强度的线性相关,

这种关联具有统计学意义。高眼压 1 周时 PPS 中 Piezo1/2 呈现显著高表达。

结论：青光眼病程中，PPS 弹性模量与 RGC 数量存在中等强度的线性相关性，提示 PPS 力学微环境改变可能参与 RGC 损伤过程；高眼压可诱导 PPS 区域 Piezo1/2 的 mRNA 水平，且 Piezo1/2 在高眼压早期即出现异常上调；调控 Piezo1/2 有望通过改善 PPS 力学特性实现神经保护，为青光眼的靶向治疗提供了新的潜在策略。

摘要编号：209034

面板编号：GLA-1396

Synemin 通过抑制小梁网细胞吞噬功能升高原发性开角型青光眼眼压的作用及机制

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目的：探究靶向敲低 Synemin 抑制小梁网（TM）细胞外基质（ECM）蛋白，降低眼压的作用及机制。

方法：利用无标记定量蛋白质组学技术筛选转化生长因子 2（TGF β 2）诱导的 TM 显著上调的蛋白质。采用蛋白质印迹（WB）、实时定量 PCR（RT-qPCR）、免疫细胞化学（ICC）和流式细胞术评估 SYN、ECM 蛋白（如 FN，LN，COL-IV）及相关信号通路分子的表达，并在小鼠中验证。通过 FACS 分析 pHrodo™ 标记的金黄色葡萄球菌的吞噬情况，并利用荧光显微镜观察肌动蛋白交联网络（CLANs）的形成及细胞骨架变化。

结果：原发性开角型青光眼患者 TM 样本和 TGF β 2 诱导的 HTM 细胞中的 Synemin 蛋白水平显著升高。Synemin 敲除逆转了 TGF β 2 诱导的 HTM ECM 过度积累，并恢复了受损的 HTM 吞噬功能。单独的过表达 Synemin 足以损害 HTM 吞噬作用，并促进 ECM 蛋白沉积。Synemin 可能参与了 HTM 细胞内 CLANs 的形成，这是一种与青光眼相关的病理特征。在小鼠高眼压模型中，敲低 Synemin 能够降低小鼠眼压。

结论：我们揭示了 Synemin 参与 TM ECM 蛋白积累升高眼压的作用机制，表明敲低 Synemin 可能为降低 ECM 蛋白积累，降低眼压的潜在治疗方法。

摘要编号：205363

面板编号：GLA-1388

丝裂霉素缓释载体辅助 Ahmed 青光眼引流阀植入术治疗新生血管性青光眼的临床疗效研究

第一作者：Yu Qi ZHAO

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目的：对比分析丝裂霉素缓释载体辅助 Ahmed 青光眼引流阀植入术（Ahmed glaucoma valve implantation, AGVI）与常规 AGVI 对新生血管性青光眼（Neovascular glaucoma, NVG）疗效的区别。

方法：收集自 2024 年 1 月至 2025 年 5 月就诊，经玻璃体腔内注射抗 VEGF 药物联合局部与全身应用降眼压药物治疗，眼内压（intraocular pressure, IOP）仍高于 21 mmHg 的 NVG 患者 58 例（61 眼）作为研究对象。随机分为 A 组（试验组）36 眼和 B 组（对照组）25 眼。A 组患者接受携带 0.03% 的丝裂霉素的缓释载体 NasoPore，辅助 AGVI，B 组患者接受常规 0.03% 的丝裂霉素辅助的 AGVI。随访 6 个月，比较两组患者手术用时，不同时间点的 IOP、最佳矫正视力、术后相关并发症、手术成功率和降眼压药物使用情况。术后不使用降眼压药物， $21 \geq IOP \geq 6$ mmHg 定义为手术完全成功；使用降眼压药物， $21 \geq IOP \geq 6$ mmHg 定义为手术条件成功；使用降眼压药物 IOP 仍 > 21 mmHg， $IOP < 6$ mmHg，或需要再次行抗青光眼手术定义为手术失败。手术完全成功率加手术条件成功率定义为手术总体成功率。

结果：A 组手术步骤进行了改良，显著缩短了手术用时（ 54.53 ± 15.83 min vs 80 ± 29.21 min, $P < 0.0001$ ）。IOP 方面，两组患者术后 1 天、1 周、1 个月、3 个月和 6 个月的 IOP 较术前均显著下降（ $P < 0.05$ ）。与 B 组患者相比，A 组患者术后 1 周、1 个月、6 个月的 IOP 显著低于 B 组，差异具有统计学意义（ $P < 0.05$ ）。A 组术后 3 个月、6 个月总体成功率均显著高于 B 组（94.4% vs 76%, $P < 0.05$ ）。A 组术后 1 个月、3 个月、6 个月的 BCVA 较术前有所提高（ $P < 0.05$ ）；术后两组间同一时期 BCVA 差值对比在 1 月时有明显差别（ $P < 0.05$ ）。A 组术后 3 个月内高眼压发生率低于 B 组（12% vs 38.9%）。预测手术结局与术前多个因素的关系中，唯一与手术失败有统计学意义的因素是既往有平坦部玻璃体切除术病史。

结论：与常规 0.03% 的丝裂霉素辅助的 AGVI 相比，应用 0.03% 的丝裂霉素的缓释载体 NasoPore 辅助 AGVI 治疗 NVG 可能是一种更加有效的方法。节省手术时间的同时具有相似安全性，降低术后 3 个月内高眼压阶段的发生率，可能提高远期成功率。

摘要编号: 208743

面板编号: GLA-1390

两例中国汉族 X 连锁视网膜色素变性家系的分子遗传学分析

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目的: 研究两例中国汉族 X 连锁遗传视网膜色素变性 (X-linked retinitis pigmentosa, XLRP) 家系的临床表型和致病基因。

方法: 本研究纳入两例视网膜色素变性先证者及其家系成员, 系统收集其临床资料并采集外周静脉血提取基因组 DNA。采用全外显子组测序技术对先证者进行致病基因筛查, 通过 Sanger 测序对候选变异位点进行家系验证。结合遗传学数据库检索及文献回顾, 使用 SIFT、Mutation Taster、CADD、RDDC 等程序软件对鉴定出的基因变异进行致病性分析。

结果: XLRP01 先证者, 双眼眼底颞侧可见多发性点状色素沉着, 呈骨细胞样分支状排列。OCT 显示视网膜色素细胞层 (Retinal Pigment Epithelium, RPE) 局灶性增厚伴椭圆体带反射消失, ERG 记录没有可检测到的视锥或视杆反应。XLRP02 先证者, 自幼视力不佳, 患儿 8 个月大体检时发现双眼散光偏大。4 岁时开始行弱视训练, 双眼视力无提高。ERG 提示双眼视锥视杆细胞功能异常, 暗适应状态下: 双眼 a 波振幅降低、潜伏期正常、b 波振幅降低、潜伏期延迟; 明适应状态下: 双眼 a、b 波振幅降低、潜伏期正常。全外显子测序和 Sanger 测序结果共同显示 XLRP01 家系先证者存在 RP2 c.353G > C:p.Arg118Pro 半合错义变异, 该变异在 gnomAD 中未收录。XLRP02 家系先证者存在 RPGR c.2405_2406del:p.Glu802Glyfs*32 的杂合变异。经 ACMG 遗传变异分类标准与指南评估, 这两个变异被分类为可能致病。

结论: 本研究鉴定出两个 XLRP 相关基因 RP2 c.353G > C:p.Arg118Pro 和 RPGR c.2405_2406del:p.Glu802Glyfs*32, 为家系的遗传咨询和产前诊断奠定了基础, 也有利于深入研究 XLRP 的分子病理诊断和基因治疗。其中 RP2 c.353G > C:p.Arg118Pro 为首次报道。

摘要编号: 200879

面板编号: GLA-1385

他氟噻吗滴眼液治疗开角型青光眼或高眼压症的随机、双盲、平行对照、多中心研究

第一作者: Xinghuai SUN

目的: 在中国开角型青光眼或高眼压症受试者中, 评估不含防腐剂的 0.0015% 他氟前列素和 0.5% 噻吗洛尔复方制剂的降眼压疗效是否优于 0.0015% 他氟前列素滴眼液单药治疗, 并比较两者的安全性。

方法: 采用随机、双盲、平行对照、多中心研究设计。纳入既往接受过前列腺素类或 β -肾上腺素阻滞剂降眼压药物治疗但需进一步降压的开角型青光眼或高眼压症患者。经过 2 周 0.0015% 他氟前列素观察期和 4 周洗脱期后, 符合标准的受试者随机接受无防腐剂他氟噻吗或无防腐剂他氟前列素治疗 (每日一次, 每次一滴, 持续 3 个月)。在基线、第 2 周、第 6 周和第 3 个月时进行日间眼压测量。主要终点为基线至第 3 个月平均日间眼压的变化。

结果: 共纳入 219 例患者, 他氟噻吗组 (n = 110) 和他氟前列素组 (n = 109)。第 3 个月时, 他氟噻吗组的降眼压疗效显著优于他氟前列素组 (与他氟前列素相比的平均差异 [SE]: -1.312 [0.3318], 95% CI: -2.01 至 -0.696)。与他氟前列素组相比, 他氟噻吗组中眼压降低 $\geq 25\%$ (风险差: 15.299%, 95% CI: 1.57% 至 28.4%, p = 0.0284) 和 $\geq 30\%$ (风险差: 13.274%, 95% CI: -0.338% 至 26.0%, p = 0.0320) 的应答者比例更高, 差异具有统计学显著性。共 71 位 (32.4%) 受试者报告了不良事件: 他氟噻吗组 35 位 (31.8%), 他氟前列素组 36 位 (33.0%), 大多数不良事件为轻度。共 51 位 (23.3%) 受试者报告了眼部相关不良事件: 他氟噻吗组 22 位 (20.0%), 他氟前列素组 29 位 (26.6%)。最常见的眼部相关不良事件为结膜充血, 共计 12 位, 他氟噻吗组 3 位 (2.7%), 他氟前列素组 9 位 (8.3%)。

结论: 在中国开角型青光眼或高眼压症受试者中, 他氟噻吗滴眼液在降低平均日间眼压方面优于他氟前列素单药治疗, 且安全性和耐受性良好。

摘要编号: 200721

面板编号: GLA-1384

光响应双气体纳米药物在青光眼治疗中的潜能探索

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目的: 青光眼是全球导致不可逆性失明的主要原因, 其特征为视神经损伤, 常与眼压升高相关。尽管气

体治疗在青光眼治疗中展现出潜力，但单一气体策略的局限性限制了其疗效。

方法：本研究开发了一种用于青光眼靶向治疗的光响应双气体纳米药物（PdH-D-S）。PdH-D-S 通过合成具有高效储氢能力和丰富孔道的介孔氢化钯（meso-PdH），并在其表面修饰 DSPE-mPEG，同时负载一氧化氮（NO）供体硝普钠（SNP）而制备而成。经局部给药后，PdH-D-S 能够穿透角膜到达调节眼压的组织，包括小梁网和 Schlemm 管。在 808 nm 激光照射下，PdH-D-S 可控释放氢气（H₂）和 NO。

结果：H₂ 可激活 AKT/p-AKT/eNOS/sGC 信号通路，而 NO 可与可溶性鸟苷酸环化酶（sGC）结合，将鸟苷三磷酸（GTP）转化为环鸟苷酸（cGMP），从而使小梁网细胞松弛并增强房水外流。本双气体系统在降低眼压方面表现出较高的治疗效果。

结论：本研究所开发的光响应性 PdH-D-S 纳米药物能够协同递送 H₂ 和 NO 至眼部房水排出组织，并显著降低眼压。该双气体策略在青光眼治疗中实现了机制性突破，有效克服了单一气体治疗的局限性。

摘要编号：208748

面板编号：GLA-1392

四个中国家族中 PITX2 单倍剂量不足与 Axenfeld-Rieger 综合征的关联研究

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目的：研究 4 个中国无亲缘关系 Axenfeld-Rieger 综合征（ARS）家系的临床表型特征及其致病基因变异。

方法：通过对中国 4 个汉族 Axenfeld-Rieger 综合征（ARS）家系患者进行系统的临床评估及基因组数据分析，明确其表型与基因型特征。对所有纳入研究的个体进行全面体格检查及眼科专项检查。从受试者外周静脉血中常规提取基因组 DNA。为明确致病基因变异及其与表型的关系，本研究采用全外显子组测序（WES）及候选基因验证（含拷贝数变异测序 CNV-seq 与 qPCR 验证）。

结果：来自 4 个无亲缘关系的中国 ARS 家系的所有受累个体均表现出特征性眼前节发育异常，包括虹膜缺损、虹膜角膜粘连及后胚胎环。其中 1 号家系 1 例、2 号家系 4 例及 4 号家系 2 例患者并发继发性青光眼。所有受累个体均存在系统发育异常，包括小牙畸形、牙齿发育不全及脐周皮肤皱褶或脐膨出；2 号家系所有患者均表现出上唇变薄特

征；3 号家系 1 例患者存在视网膜骨细胞样色素变性。基于 GRCh37/hg19 基因组版本，CNV-seq 及 qPCR 分析证实，4 个家系均存在影响 PITX2 基因全长的杂合突变：1 号家系存在 449.97 kb 缺失（chr4:111124809-111574778），涵盖 PITX2 基因的 2 个蛋白质编码区及 ENPEP 基因；2 号家系存在 4.34 kb 缺失（chr4:111539280-111543616），涉及 PITX2 基因 3 个外显子；3 号家系存在 206 bp 缺失（chr4:111543411-111543616），包含 PITX2 基因第 1 外显子；4 号家系 PITX2 基因在第 419 和 420 位置的原碱基分别变为 G 和 A，使得原苯丙氨酸变成终止密码子，转录提前终止。

结论：本研究纳入 4 个中国 ARS 家系，通过遗传学分析，在 PITX2 基因区域鉴定出 4 个位于 4q25 区域的新型单倍剂量不足性微缺失，结果表明，PITX2 基因内 chr4:111543411-111543616 区域对眼部发育及全身结构（如唇、齿及脐部）的发育具有关键调控作用。这提示 PITX2 基因可能需要维持完整的基因剂量，以确保其正常生理功能的发挥。

摘要编号：209533

面板编号：GLA-1398

基于 OCTA 定量成像的近视合并青光眼早期诊断量化指标的研究

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目的：应用光学相干断层扫描血管成像技术（OCTA）观察近视合并原发性开角型青光眼（POAG）患者视网膜及脉络膜各层血管密度的改变，评估在去除视盘旁萎缩区（PPA）前后眼底不同分层下血管密度的不对称性参数的变化及其对近视合并青光眼早期诊断能力。

方法：89 名受试者（18~45 岁）均排除可能影响眼部血流的眼部及全身疾病，并接受全面的眼科检查，89 只眼分为非高度近视组、高度近视组、非高度近视合并青光眼组、高度近视合并青光眼组。广角扫描 OCTA 以 15 mm×15 mm 模式进行采集，扫描中心位于黄斑和视乳头连线中点，采用统一定制化的方法对图像进行预处理，包括定位视盘中点、黄斑中点、上下均分图像、手动圈选 PPA、裁剪等，利用内置系统进行分层后导出图像。分析不同分组间各参数的差异，并比较去除 PPA 前后各层上下半区血管密度的不对称性参数诊断近视合并青光眼的的能力。

结果：1、表层视网膜微血管密度在四组间呈梯度下降趋势，脉络膜中大血管层血管密度出现随近视程度加重而递减趋势。2、POAG 特异性降低表层

视网膜微血管密度 ($P = 0.006 < 0.05$)，并与高度近视存在协同效应 ($P = 0.009 < 0.05$)。3、不对称性参数分析发现，各层去除 PPA 前后的不对称性参数显著相关 (0.843-0.977)。进一步受试者工作特征 ROC 曲线分析预测显示：表层视网膜微血管密度绝对值不对称性指数 (AAI) 和相对不对称性指数 (RAI) 在去除 PPA 前后的 AUC 分别为 0.778-0.814 和 0.819-0.850，敏感度为 61.8%-73.5% 和 61.8%-64.7%，特异度为 83.7%-88.4% 和 95.3%-97.7%。

结论：高度近视和 POAG 对视网膜及脉络膜微血管系统的影响存在差异：POAG 特异性地降低表层视网膜微血管密度，并与高度近视具有协同作用；高度近视与脉络膜中大血管层血管密度的下降存在紧密关系。表层视网膜微血管密度 AAI 和 RAI 对合并近视的早期 POAG 具有一定诊断能力，其中 RAI 拥有更高的诊断价值。这些发现显示了合并近视的青光眼患者视网膜和脉络膜微循环的改变，强调了上下半区血管密度的不对称性参数变化是诊断青光眼合并近视特别是高度近视患者敏感指标。

摘要编号：210284

面板编号：GLA-1405

基于眼前节光相干断层扫描的小梁切除术围术期滤过泡形态与预后的相关性研究

第一作者：Mingkai LIN

共同作者：Zhuoyi WU

目的：利用眼前节光相干断层扫描 (Anterior-Segment Optical Coherence Tomography, AS-OCT) 观察小梁切除术 (Trabeculectomy, Trab) 后滤过泡内部形态学参数在围手术期的变化，分析各参数与眼内压 (IOP) 之间的关系，指导术后滤过泡的维护。

方法：本研究前瞻性纳入符合入组标准的 40 名需行 Trab 的青光眼患者的 41 只眼，分别于术后第 1 天、第 1 周、第 2 周、第 3 周、第 4 周对术眼滤过泡区进行 AS-OCT 扫描并获得影像资料，测量滤过泡参数，包括滤过泡总高度 Total bleb height (TBH)，滤过泡壁厚度 Bleb wall thickness (BWT)，滤过泡液腔高度 Bleb fluid-filled cavity height (BCH)，记录滤过泡壁微囊 (microcyst) 及条纹现象 (Shading phenomenon) 的存在情况，同时收集患者的基本人口统计学信息、相关临床资料、历次随访的眼压，并进行统计学分析。

结果：术后 6 个月，37 只眼 IOP 得到控制。术后第 3 周无条纹现象眼 IOP 中位数 (16.70) 显著高于有条纹现象眼 (10.70)，差异有统计学意义

($z = 3.192$, $p = 0.001$)；无微囊眼的 IOP 中位数 (18.55) 显著高于有微囊眼 (12.50)，差异有统计学意义 ($z = 2.417$, $p = 0.016$)。术后第 1 天 TBH 与 IOP 之间有显著负相关 ($r = -0.291$, $p = 0.024$)，术后第 3 周 BWT 与 IOP 之间有显著负相关 ($r = -0.302$, $p = 0.024$)，其余时间点参数与 IOP 无显著相关性。术后第 3 周及第 4 周是否存在条纹现象与术后 6 月 IOP 的差异有统计学意义 ($z = 2.213$, $p = 0.02$)，其余时间点参数与术后 6 月 IOP 相关的 p 值均无统计学意义。

结论：术后第 1 天 TBH、术后第 3 周 BWT 与同期 IOP 呈显著负相关；第 3 周滤过泡的微囊与条纹现象的存在与更低的同期 IOP 相关，术后第 3 周及第 4 周滤过泡的条纹现象与术后 6 月的 IOP 相关，提示这些影像学特征可作为短期至中期滤过功能良好的预后指标。AS-OCT 在术后早期观察滤过泡结构变化方面具有重要价值，可为术后管理提供参考依据。

摘要编号：210005

面板编号：GLA-1403

家族性渗出性玻璃体视网膜病变合并青光眼的诊疗决策与治疗策略

第一作者：Liu ZHIHAO

目的：探讨家族性渗出性玻璃体视网膜病变 (FEVR) 合并青光眼患者的诊疗过程和手术策略，特别是在复杂房角关闭情况下的治疗方案。

方法：通过对一例 39 岁男性患者的病例分析，结合影像学检查、诊断决策、手术方案和术后评估，深入分析 FEVR 合并青光眼的治疗策略。

结果：患者右眼因青光眼已失明，左眼出现房角关闭，且伴有白内障及角膜变性。根据多模态影像学检查，最终确定患者为双眼 FEVR 合并闭角型青光眼。手术采用白内障超声乳化术、人工晶状体植入术和房角切开术，术后左眼房角开放，前房深度增加，术后检查显示黄斑及视网膜结构有所改善。

结论：FEVR 合并青光眼的治疗需要个体化方案，手术决策应在全面评估患者病情和风险的基础上进行。通过多模态影像学评估和“医学+”思维指导，能更好地平衡手术风险与预期效果，提高患者生活质量。此病例提醒我们，早期诊断和干预对于 FEVR 患者至关重要。

摘要编号: 209932

面板编号: GLA-1400

带状结构与原发性闭角型疾病眼前节参数的关系研究

第一作者: Chukai HUANG

目的: 探究玻璃体带后插入区与晶状体后赤道之间的带状结构 (PVZ INSLE) 和玻璃体带在 PACD 眼中的缺失率及其与眼前节参数的关系。

方法: 收集 90 只 PACD 眼和 30 只白内障眼。利用 UBM 评估 PVZ INS-LE 结构和玻璃体带的有无, 并测量眼前节参数。分别比较基线眼部特征和 UBM 眼前节参数。利用 Logistic 回归分析探究 PACD 眼中与 PVZ INS-LE 结构和玻璃体带缺失的相关因素。

结果: 本研究共纳入 90 名受试者的 120 只眼进行分析, 其中 30 只 CPACD、30 只 APACD 眼、30 只 APACD 对侧眼和 30 只白内障眼。男性占 34.4%, 女性占 65.6%, 平均年龄为 65.70 ± 10.70 岁。结果表明 71.1% PACD 眼和 40.0% 白内障眼 PVZ INS-LE 结构缺失, 22.2% PACD 眼玻璃体带缺失, 所有白内障眼均有玻璃体带。CPACD 眼的 PVZ INS-LE 结构缺失情况与白内障眼相似, APACD 及其对侧眼缺失率高于前两者 ($P < 0.05$)。玻璃体带在所有 PACD 眼中的缺失率相似, 均高于白内障组 ($P < 0.05$)。无 PVZ INS-LE 结构组眼轴更短, 睫状体 - 睫状体夹角更大, $500/750 \mu\text{m}$ 处小梁网 - 睫状突距离更短。短眼轴是 PVZ INS-LE 结构缺失的独立危险因素。较小的小梁网 - 睫状体夹角是玻璃体带缺失的独立危险因素。

结论: APACD 及其对侧眼 PVZ INS-LE 结构缺失情况较 CPACD 及白内障眼严重; 所有 PACD 眼玻璃体带的缺失情况较白内障眼严重。短眼轴是 PACD 眼 PVZ INS-LE 结构缺失的独立危险因素。

摘要编号: 203107

面板编号: GLA-1387

抑制 PGK1 介导的细胞凋亡促进青光眼视网膜神经节细胞存活

第一作者: Ruyue LI

共同作者: Ningli WANG

目的: 视网膜神经节细胞 (RGC) 的死亡发生在多种眼部疾病中, 包括创伤性视神经病变、青光眼和其他视神经病变。RGC 死亡通常会导致不可逆性视力损失, 甚至失明。大量证据支持细胞凋亡是导致视神经损伤、实验性青光眼和人类青光眼中 RGC 死亡的主要机制。磷酸甘油酸激酶 1 (PGK1) 是糖酵解过程中第一个产生 ATP 的酶。近年来的多项

研究初步证明, 过表达 PGK1 能减少神经元凋亡, 然而尚未有研究验证 PGK1 在眼部神经退行性疾病中的作用。本研究首次验证 PGK1 在青光眼动物模型中的表达情况, 以及干预 PGK1 表达对青光眼 RGC 的保护作用。

方法: 建立视神经挤压伤 (ONC) 和缺血再灌注 (I/R) 模型。采用蛋白质印记和 PCR 实验评估视网膜中 PGK1 和热休克蛋白 90 (HSP90) 的表达情况。通过玻璃体腔注射腺相关病毒 (AAV) 2/2-PGK1 实现 PGK1 的上调。通过计数 RBPMS 阳性 RGC 对 RGC 存活进行定量分析。通过 fVEP 评估视功能。

结果: 在 ONC 模型中, 1 周后表现出 PGK1 的 mRNA 和蛋白质水平明显下调, HSP90 相应下调。玻璃体腔注射 AAV-PGK1 2 周后, PGK1 在视网膜稳定表达。过表达 PGK1 后, ONC 模型中, RGC 存活率从 42% 恢复至 62%; I/R 模型中, RGC 存活率从 21% 恢复至 38%。fVEP 显示, N1-P1 有所提高。TUNEL 染色显示过表达 PGK1 后凋亡信号减少。

结论: 本研究首次证明, PGK1 在青光眼 RGC 凋亡中发挥关键作用。青光眼动物模型中 PGK1 表达下调; 过表达 PGK1 可促进 RGC 存活, 并改善视功能。

摘要编号: 209166

面板编号: GLA-1397

无晶状体眼中由残留晶状体皮质引起的一例迟发性晶状体溶解性青光眼

第一作者: Hang REN

目的: 晶状体溶解性青光眼是晶状体蛋白渗漏引发的继发性开角型青光眼, 多见于 60-70 岁人群, 表现为突发眼痛、视力骤降及眼压升高。其病理机制为巨噬细胞吞噬晶状体蛋白阻塞小梁网, 诊断依赖眼压测量、裂隙灯和房角镜检查及细胞学分析。无晶状体眼患者因残留晶状体皮质溶解引发迟发性晶状体溶解性青光眼的病例报道较少。本文通过探讨一例 62 岁男性患者因 30 年前白内障术后残留晶状体皮质导致迟发性晶状体溶解性青光眼的诊疗过程及病理机制, 为研究晶状体溶解性青光眼的发病机制提供科学依据。

方法: 通过前节照相、房角镜、B 超记录患者的前后节情况, 玻璃体切割术中分别取出前房沉积物和玻璃体腔内晶状体碎片行病理学分析明确成分及炎症反应特征。

结果: 患者 62 岁, 急性起病的右眼疼痛、发红、视力下降伴眼压升高, 检查发现双眼房角开放, 前节照相显示右眼结膜充血、角膜水肿、晶状体缺失,

以及前房内遍布白色颗粒沉积物，这些沉积物表明疑似晶状体物质发生了溶解（A）。术后前节照相显示这些白色颗粒从前房内被显著清除（B）。术前和术后的前节图像提示中央前房深度超过角膜厚度的一半（C 和 D）。此外，B 超扫描显示玻璃体腔内存在一个高密度圆形结构，进一步证实了眼内存在疑似晶状体的碎屑（E），其与术中取出的一块雪花状晶状体碎片一致（F）。对前房白色颗粒和玻璃体碎片行病理学分析显示其内均存在晶状体上皮细胞，并伴有炎症细胞浸润和大量红细胞，表明存在活跃的炎症反应（G）。值得注意的是，观察到巨噬细胞正在吞噬晶状体上皮细胞（红色*，H）。

结论：本例证实无晶状体眼患者因残留晶状体皮质溶解可引发迟发性晶状体溶解性青光眼，且在前房和玻璃体腔内均发现晶状体上皮细胞，并观察到巨噬细胞正在吞噬晶状体上皮细胞的现象。提示患者眼内前后节中长期存在慢性、活跃的炎症反应。

摘要编号：209950

面板编号：GLA-1401

枸杞多糖通过其抗炎、抗衰老和抗凋亡特性缓解视网膜缺血再灌注损伤

第一作者：Chunlin ZHAO

共同作者：Chao TANG

目的：本研究旨在探讨枸杞糖肽（LbGp）对缓解视网膜缺血再灌注损伤（RIRI）的治疗潜力，RIRI 作为青光眼等疾病的关键病理机制，涉及炎症、细胞衰老及凋亡等过程，并导致视网膜神经节细胞（RGCs）退化与视神经损伤。

方法：研究采用体内与体外模型进行评估。在体内实验中，通过升高 C57BL/6J 小鼠眼内压并再灌注诱导 RIRI，同时口服给予 LbGp；体外实验则利用 R28 细胞进行 OGD/R 造模模拟 RIRI，并在培养物中添加 LbGp。通过光学相干断层扫描（OCT）、OCT 血管造影（OCTA）及苏木精-伊红（HE）染色评估视网膜结构与功能；采用免疫荧光、酶联免疫吸附测定（ELISA）、衰老相关 β -半乳糖苷酶（SA- β -gal）染色、TUNEL 测定及流式细胞术（FCM）分析炎症标志物（IL-6、IL-1 β 、TNF α ）、衰老标志物（p21、p16）及细胞凋亡情况。

结果：LbGp 处理能够有效恢复视网膜血流，减轻视网膜变薄，并显著提高视网膜 RGCs 的存活率。同时，LbGp 显著降低了炎症、衰老及凋亡相关标志物的表达水平。

结论：研究结果表明，枸杞糖肽在缓解视网膜缺血再灌注损伤方面具有显著潜力，可作为青光眼及其

他缺血性视网膜疾病的有前景的治疗候选药物，值得进一步研究其作用机制及临床疗效。

摘要编号：210119

面板编号：GLA-1404

灵芝多糖通过调节小胶质细胞 M1/M2 极化、抑制神经炎症和抑制 JAK2/STAT3 通路减轻视网膜缺血再灌注损伤

第一作者：Guangyu ZHU

共同作者：Yujie LIU, Xuejing LU, Shichun LUO

目的：灵芝多糖是灵芝的关键生物活性提取物，已被证明具有有效的抗神经炎症特性，但其对视网膜缺血再灌注损伤的确切影响仍未完全阐明。本研究探讨灵芝多糖靶向抑制小胶质细胞介导的神经炎症对视网膜缺血再灌注损伤的恢复作用和机制。

方法：通过将眼内压升高至 80 mmHg 持续 60 分钟，在 Sprague-Dawley 大鼠中诱导视网膜缺血再灌注损伤模型，用灵芝多糖进行干预，观察大鼠视网膜炎症因子水平、M1/M2 型小胶质细胞标记物水平和 JAK2/STAT3 通路相关蛋白的水平。

结果：灵芝多糖抑制促炎细胞因子的分泌，促进抗炎细胞因子的分泌，从而显著缓解缺血再灌注后视网膜神经炎症过程。此外，施用灵芝多糖还促进了小胶质细胞从 M1 表型向 M2 表型的极化。对机制的进一步研究表明，灵芝多糖的调节作用可能是通过抑制 JAK2/STAT3 信号通路介导的。

结论：提供灵芝多糖减轻视网膜缺血再灌注损伤的作用、机制的新见解。

摘要编号：208733

面板编号：GLA-1391

热带爪蟾视神经激光损伤及再生研究

第一作者：Xuyang LIU

目的：本研究采用 YAG 激光构建热带爪蟾视神经损伤模型，探讨视神经损伤后自我修复的形态学变化及分子机制研究。

方法：在裂隙灯显微镜下利用 YAG 激光对 st52-54 野生型热带爪蟾三角区的视神经精确定位后发射激光（能量：0.6 mJ $\times$ 1 次），确认造模成功后置于系统水中饲养。选取若干只野生型热带爪蟾，实验组为左眼作 YAG 激光视神经损伤处理，右眼为对照不做处理，并分别于第 1 天、6 天、12 天处死，作 HE 染色后分析爪蟾视神经损伤后自我修复的病理变化。

结果：通过 HE 染色发现，视神经激光损伤后第 1 天视神经鞘膜完整，与对照组相比肿胀明显，视神

经内神经纤维稀疏；损伤后第 6 天视神经持续肿胀，部分萎缩，视神经鞘膜破损，内部神经纤维膨出伴胶质细胞溢出，胶质细胞排列紊乱不规则；损伤后第 12 天视神经内胶质细胞重排，胶质细胞增多并向中心聚拢。

结论：爪蟾视神经损伤后第 1、6、12 天视神经及胶质细胞均呈现出不同的形态，且表现出视神经逐渐修复的趋势。本研究成功构建了热带爪蟾视神经的 YAG 激光损伤模型，作为视神经具有终生再生能力的热带爪蟾，该模型的成功构建为视神经损伤后修复的分子机制研究和视神经保护及治疗的研究提供了新的思路。

摘要编号：209906

面板编号：GLA-1399

线粒体轴浆运输组件在青光眼视神经保护中的研究

第一作者：Yongzhen YU

共同作者：Yuanbo LIANG, Lewei TANG

目的：线粒体轴浆运输障碍是青光眼性视神经病变的早期表现，然而目前关于介导线粒体轴浆运输的关键组件 Syntabulin (STB) 衔接蛋白、KIF5A 驱动蛋白和 Syntaphilin (SNPH) 锚定蛋白在视网膜和视神经中的定位以及它们在青光眼视神经损伤中发生的作用尚不明确。本研究的目的是探究 STB、SNPH 和 KIF5A 在正常小鼠视网膜和视神经中的表达定位青光眼小鼠模型中的表达是否发生改变，探究通过玻璃体腔注射 AAV 过表达 STB 是否可以急性高眼压小鼠视神经起到保护作用。

方法：本研究采用的是前房灌注生理盐水诱导的缺血再灌注急性青光眼小鼠模型，分别通过对眼球进行石蜡切片 HE 染色观察视网膜厚度和视网膜铺片观察 RGC 数量的方法验证模型的可靠性。分别对正常和模型组小鼠的视网膜和视神经进行 Western Blot、q-PCR 和石蜡切片免疫荧光等实验来探究 STB、KIF5A 和 SNPH 在小鼠视网膜及视神经中的定位以及表达的改变。采用视网膜铺片 RGC 计数和 CTB 轴突示踪技术验证 AAV-STB 的视神经保护效果。

结果：STB、KIF5A 和 SNPH 特异性高表达于小鼠视网膜的神经纤维层、内层状层以及视神经中，与 RBPMS、GFAP、Vimentin 不共定位，与 COX4、 β -III Tubulin 呈现共定位，急性高眼压小鼠模型中，STB、KIF5A 和 SNPH 在视网膜和视神经中的表达下降，并且其分布出现了紊乱。注射 AAV-STB 后的高眼压模型小鼠的 RGC 数目和轴突长度较对照组高眼压模型小鼠增加。

结论：STB、KIF5A 和 SNPH 在小鼠视网膜和视神经中存在特异性的表达和分布，并表明它们在青光眼模型小鼠视网膜和视神经中的表达下降。AAV 过表达 STB 可以在青光眼模型小鼠中起到视神经保护作用。从线粒体轴浆运输的角度为青光眼视神经损伤机制、早期生物标志物和视神经保护研究提供了新思路。

摘要编号：209981

面板编号：GLA-1402

联合虹膜周边切除术对急性闭角型青光眼合并白内障患者术后眼压控制的早期疗效分析

第一作者：Xindan MENG

共同作者：Xiaohong ZHOU

目的：收集急性闭角型青光眼合并老年性白内障患者病例，通过对比行白内障超声乳化摘除人工晶体植入联合房角分离术时，术中是否联合虹膜周边切除手术的患者视力与眼压状况，为急性闭角型青光眼合并老年性白内障患者的治疗提供新思路。

方法：纳入 2025 年在我院就诊的原发性急性闭角型青光眼合并老年性白内障患者 47 例。将行白内障超声乳化房角分离术的患者分为 A 组（17 例），行白内障超声乳化房角分离联合虹膜周边切除术的患者分为 B 组（30 例）。记录并比较两组术前、术后 1 天、1 周及 1 月的视力和眼压，进行统计学分析。同时，对比 A 组与 B 组在术前、术后 1 天、1 周和 1 月的眼压变化幅度，以及术后 1 月的视力变化情况。

结果：与术前相比，A 组和 B 组在术后 1 个月视力均有显著提升（A 组： $Z = -3.440$, $P = 0.001$ ；B 组： $Z = -4.665$, $P = 0.000$ ）。A 组术后 1 天的眼压无明显改善（ $Z = -1.035$, $P = 0.301$ ），但术后 1 周和 1 月的眼压均较术前显著好转（术后 1 周： $Z = -2.606$, $P = 0.009$ ；术后 1 月： $Z = -2.777$, $P = 0.005$ ）。B 组在术后 1 天、1 周和 1 月的眼压均较术前显著改善（术后 1 天： $Z = -4.143$, $P = 0.000$ ；术后 1 周： $Z = -3.774$, $P = 0.000$ ；术后 1 月： $Z = -4.498$, $P = 0.000$ ）。A 组和 B 组的视力改善情况无明显差异（ $Z = -1.090$, $P = 0.276$ ）。在眼压下降幅度方面，A 组与 B 组相比，术后 1 天无明显差异（ $Z = -1.836$, $P = 0.066$ ），但术后 1 周和 1 月均有显著差异（术后 1 周： $Z = -2.017$, $P = 0.044$ ；术后 1 月： $Z = -2.019$, $P = 0.044$ ）。

结论：原发性急性闭角型青光眼合并老年性白内障的患者在接受两种手术后，视力与眼压均获得显著改善。两种手术方式术后首日眼压无明显差异；联合实施虹膜周边切除术后 1 周及 1 个月，眼压下降幅度更为显著。然而，青光眼患者往往更关注远期

(半年以上) 疗效, 未来研究可进一步探讨房角开放度、前房深度以及远期的视力与眼压控制情况。

摘要编号: 208924

面板编号: GLA-1395

超声睫状体成形术与 Ahmed 青光眼引流阀植入术治疗新生血管性青光眼的临床疗效及安全性对比分析

第一作者: Yanjiang FU

共同作者: Shanshan HU, Shulian JI, Xiaolin LI, Shuang ZHANG

目的: 评估超声睫状体成形术 (UCP) 与 Ahmed 青光眼阀 (AGV) 植入术治疗新生血管性青光眼的临床疗效及安全性。

方法: 本研究纳入接受 UCP (40 例, 40 眼) 和 AGV (40 例, 40 眼) 治疗的新生血管性青光眼患者。分别于术后第 1 天、1 周、1 个月、3 个月和 6 个月进行常规眼科检查, 记录眼压、使用的降眼压药物数量、疼痛评分、最佳矫正视力及术后并发症。手术完全成功标准: IOP 较基线下降 $\geq 20\%$, $5 \text{ mmHg} < \text{IOP} \leq 21 \text{ mmHg}$, 无需添加降压药物或再次手术干预。合格的手术成功标准: 不使用降眼压药物眼压 $> 21 \text{ mmHg}$ 且眼压降低 $\geq 20\%$ 和 $> 5 \text{ mmHg}$, 或使用降眼压药物数量少于术前, 眼压可维持在 $5-21 \text{ mmHg}$ 。

结果: 两组术前基线特征无统计学显著差异 ($P > 0.05$)。UCP 组和 AGV 组术前平均眼压分别为 $47.38 \pm 11.92 \text{ mmHg}$ 和 $44.93 \pm 10.65 \text{ mmHg}$ ($P = 0.284$)。术后 1 天, AGV 组的眼压下降趋势显著大于 UCP 组 (AGV 组为 $14.90 \pm 6.64 \text{ mmHg}$, UCP 组为 $39.10 \pm 16.72 \text{ mmHg}$, $P < 0.001$)。术后 6 个月, UCP 组和 AGV 组的眼压降低率分别为 67.4% 和 59.9% ($P < 0.001$), 使用的降眼压药物数量分别为 0.450 ± 0.667 和 0.950 ± 1.080 ($P < 0.05$), 疼痛评分分别为 0.125 ± 0.334 和 0.425 ± 0.594 ($P < 0.001$), 手术成功率分别为 72.5% 和 62.5% ($P > 0.05$)。AGV 组术后并发症的发生率与复杂程度均高于 UCP 组, 尤其以引流管阻塞和瓣膜暴露等装置相关并发症为特征。

结论: UCP 和 AGV 均能有效降低新生血管性青光眼患者术后眼压, 但 AGV 术后眼压波动性大且并发症发生率高, 而 UCP 术后眼压更平稳、并发症更少, 安全且舒适。

摘要编号: 208737

面板编号: GLA-1394

超声睫状体成形术治疗青光眼的临床及病理研究

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共同作者: Zijie CHEN, Xuyang LIU

目的: 观察超声睫状体成形术 (UCP) 治疗前后患者的眼压、视力以及眼前节参数等的差异以及非灵长类模型动物接受 UCP 治疗后的眼前节病理改变。

方法: 采用回顾性病例观察研究设计, 收集 2021 年 1 月至 2023 年 5 月间于厦门眼科中心与深圳人民医院行 UCP 手术患者共 56 例 (56 只眼睛)。对术前、术后 1 天、术后 1 周、术后 1 月、术后 3 月及术后 6 月复查病人分别行眼压与视力测量, 采用超声生物显微镜 (UBM) 对术前及术后 1 周患者行眼前节检查, 分别测量前房深度 (ACD)、中央角膜厚度 (CCT)、前房宽度 (ACW)、晶状体矢高 (LV)、瞳孔直径 (PD) 和睫状突-睫状突距离 (CP-CP distance), 应用图像处理软件 CorelDRAW 与 ImageJ 测量房角开放度 (ACAn)、房角开放距离 500 (AOD500) 和前房面积 (ACAr)。恒河猴两只, 选随机一眼行 UCP 手术, 对侧眼做阴性对照。术后一周, 动物安乐死后取眼球作石蜡切片, H&E 染色, 观察眼前节病理改变。

结果: 患者术前平均眼压为 $39.08 \pm 14.75 \text{ mmHg}$, 术后 1 天、术后 1 周、术后 1 月、术后 3 月及术后 6 月的平均眼压分别为 $22.57 \pm 8.56 \text{ mmHg}$ 、 $17.89 \pm 7.93 \text{ mmHg}$ 、 $19.63 \pm 8.68 \text{ mmHg}$ 、 $21.5 \pm 10.08 \text{ mmHg}$ 、 $20.24 \pm 8.79 \text{ mmHg}$, P 值均 < 0.05 。术后 1 天复查患者视力, 40 例视力没有变化, 14 例视力好转, 2 例视力下降; 术后 1 周复查患者 53 例, 28 例视力没有变化, 23 例视力好转, 2 例视力下降; 术后 1 月复查患者 36 例, 13 例视力没有变化, 21 例视力好转, 2 例视力下降; 术后 3 月复查患者 25 例, 10 例视力没有变化, 14 例视力好转, 1 例视力下降; 术后 6 月复查患者 22 例, 10 例视力没有变化, 12 例视力好转。较术前相比, 术后 1 周 ACD 由 $2.10 \pm 0.91 \text{ mm}$ 加深至 $2.20 \pm 0.88 \text{ mm}$, PD 由 $3.94 \pm 1.07 \text{ mm}$ 增加至 $4.36 \pm 0.92 \text{ mm}$, ACAn 由 $9.10 \pm 3.44 \text{ mm}^2$ 扩大至 $10.05 \pm 3.02 \text{ mm}^2$, ACAn 由 $5.81^\circ \pm 15.64^\circ$ 增宽至 $8.96^\circ \pm 16.99^\circ$, 差异均有统计学意义 ($P < 0.05$)。其他眼前节参数包括 CCT、LV、ACW、CP-CP、AOD500 等变化均无统计学意义。猴眼 UCP 术后石蜡切片 H&E 染色显示睫状体双层上皮细胞形态基本完整, 睫状肌间隙显著扩大, 呈现典型的葡萄膜巩膜房水排出途径开放的组织形态。

结论：UCP 可有效降低青光眼患者眼压，且对患者视力影响小。患者术后出现 ACD 加深等现象，提示 UCP 除减少房水生成以及增加葡萄膜巩膜通道的房水外流，还存在其他的降眼压机制。对于患者术后瞳孔扩大的情况以及远期降压效果、视力情况仍需进一步观察与探讨。

摘要编号：**207856**

面板编号：**GLA-1389**

雾里看花 – 右眼葡萄膜炎 – 青光眼 – 前房积血综合征 1 例

第一作者：**Li CAIYUN**

目的：报道有晶体眼后房型人工晶体（ICL）术后继发性青光眼 1 例。

方法：患者朱 XX，女性，28 岁，因“右眼突发性视力下降 1 天”就诊。3 月前“屈光不正”行双眼 ICL 植入术，术后无特殊。否认眼外伤史及全身疾病史。眼科查体：视力：右眼：HM/眼前；左眼：1.2；眼压：右眼：60 mmhg；左眼：20 mmhg。右眼角膜水肿，前房中深，前房积血，瞳孔区血块。左眼无特殊。右眼 B 超示：玻璃体轻度混浊。前房角镜检查：右眼窥不清，左眼鼻侧少量素色。入院初步诊断：1. 右眼葡萄膜炎 – 青光眼 – 前房积血综合征（UGH）？ 2. 双眼 ICL 术后。入院行右眼前房冲洗，给予全身及局部降眼压，抗炎对症处理。前房冲洗后 9 小时，查体：右眼：视力：HM/30 CM；眼压：60 mmhg。角膜水肿，前房浅，大量积血，遂行前房冲洗 + ICL 取出术，给与全身及局部抗炎，降眼压，预防感染等对症处理。UBM 检查示：右眼 6 点位周边虹膜前粘连，房角关闭。

结果：术后眼压明显下降，至术后 9 天，右眼：视力：FC/40 CM；眼压：15–19 mmhg，角膜基本透明，前房深浅可，房水清，瞳孔直径 6 mm。术后半月：右眼：视力：0.02；矫正视力：0.4；眼压：18 mmhg。至术后 2 月复查，眼压：41 mmhg（布林佐胺噻吗洛尔滴眼液 2 次 / 日）。

结论：UGH 综合征是一种与眼内植入物（尤其是人工晶状体）相关的罕见并发症，主要表现为葡萄膜炎、青光眼和前房积血的三联征。本病例 ICL 术后，考虑 UGH 综合征，尤其罕见。发病原因似乎与白内障手术 IOL 植入不太相似，是否与 ICL 的位置，拱高值偏大等因素相关？患者术后 2 月眼压高，房角关闭，其机制是什么？不典型的 UGH 综合征诊断相对困难，易发生漏诊和误诊。目前临床上存在 UGH 综合征的诱因还很多，需要加强术后的随访，定期随访有利于疾病的早期诊断，追踪患者病情发展变化，对一些可预见性并发症及早发现、

及早治疗，以免延误最佳治疗时机导致更严重的眼部并发症，减少对视神经不可逆的损伤。

电子壁报

人工智慧、数位创新与虚拟健康

摘要编号: 202189

AI 筛查工具在上睑下垂诊断中的应用研究

第一作者: Lili GUO

目的: 本研究旨在通过多维度对比分析, 系统评估我单位自行开发设计的上睑下垂 AI 筛查方法与传统人工检测方法在上睑下垂诊断方面的准确性、易用性, 筛查结果可重复性及工作效率方面的差异。

方法: 使用我单位自行开发设计的上睑下垂 AI 筛查工具, 回顾性研究分析我单位使用该工具对近两年 2600 名儿童疑似上睑下垂的测量数据。通过线上及现场对疑似上睑下垂儿童的面部图像进行采集, 采集标准以重复性最佳为准。AI 筛查工具自动对上睑下垂程度进行分级, 将 AI 分级结果与人工分级结果进行比较。最后评估该 AI 筛查系统在轻度、中度、重度儿童上睑下垂诊断的准确性, 同时对其易用性、筛查结果可重复性以及工作效率方面同步进行评价。

结果: 1. 准确性对比: AI 筛查工具整体诊断符合率较高, 与人工测量诊断率基本一致, 结果可靠。2. 可靠性与效率 单次测量耗时 AI 为 12.5 秒, 较人工 (4.8 分钟) 缩短 95.3% ($P < 0.001$)。工作效率显著提高。3. 特殊群体适用性 儿童患者 AI 配合率 99.3%, 较人工 (68.3%) 提高 31%, 测量失败率从 31.7% 降至 0.7%。AI 筛查工具用性强。4. 临床决策支持 AI 筛查工具给出的建议与专家治疗建议高度一致, 可以为临床决策做出良好的指导作用。

结论: 该技术通过手机终端实现“居家拍摄—云端分析”的轻量化流程, 在偏远地区可突破眼科医师资源匮乏的瓶颈 (我国基层眼科医师配比仅 0.4 人/10 万人口)。经测试, 在网络覆盖率 $> 90\%$ 的县域, AI 筛查的可及性较传统门诊明显提升, 为“互联网+医疗”在眼科领域的落地提供标准化解决方案。本研究证实, 上睑下垂 AI 筛查工具通过深度学习技术实现了从“经验诊断”到“精准量化”的跨越, 在准确性、效率及可重复性方面展现出显著临床价值。该技术不仅为眼科医师提供了标准化辅助工具,

更通过技术下沉推动医疗资源的公平分配, 对提升我国眼健康服务体系效能具有里程碑意义。

摘要编号: 208469

ROFI: 基于深度学习的眼科特征保留与可逆患者面部匿名化系统

第一作者: Min ZHOU

共同作者: Xianqun FAN, Xuefei SONG, Yuan TIAN, Guangtao ZHAI

目的: 患者面部图像为评估眼部疾病提供了便利手段, 同时也引发了隐私问题。尽管目前已有的部分方法能保护隐私, 但也严重改变了眼病诊断所需的临床体征。因此, 迫切需要开发能保留眼科体征的面部匿名化方法。

方法: ROFI 框架通过弱监督学习提取眼部临床体征, 并利用基于 Transformer 的身份转换器在私钥引导下改变面部特征以保护隐私。随后, 通过整合这两个输出, 将原始眼部特征嵌入匿名化特征图中, 并通过细化网络确保自然过渡, 最终生成高质量的匿名图像。为验证效果, 基于三家临床中心 17,753 名患者的数据评估证实, ROFI 在保留眼科体征完整性和支持 11 种疾病筛查方面具有良好临床可用性。

结果: 通过选择以下与大多数眼科疾病相关的典型眼部征象评估 ROFI 的有效性: 眼睑形状、虹膜形状、结膜疾病、泪器疾病、眼睑疾病和虹膜疾病。ROFI 在内部和外部验证集上都能准确保留眼科体征。在内部验证数据集上, 其关键点错误率最低, 眼睑/虹膜关键点错误率平均为 1.53%/1.64%, 远低于 Mosaic (5.51%/12.36%)、AIGC (3.19%/3.79%)、Face Swap (2.35%/4.16%)、Digital Mask (8.25%/6.84%) 和 G2Face (2.70%/3.18%)。在外部验证集上, 眼睑/虹膜关键点错误率仍然很小, 分别为 1.38%/1.37% 和 1.68%/2.07%。此外, ROFI 在按疾病比较中也优于其他方法。在面部匿名化过程中, ROFI 在保留与疾病相关的眼科体征方面具有优势, 经 ROFI 处理的影像在所有三个验证集上都与原始影像表现出显著一致性 (Cohen's $k \geq 0.81$)。我们的方法在所有三组验证集和所有眼病上均达到 $\kappa \geq 0.81$, 表明 ROFI 保护图像与原始图像之间在临床结果上具有极佳的一致性。使用

人脸识别算法评估隐私保护性能。在使用 AdaCos 时，ROFI 保护了 96.54% 的图像。

结论：目前广泛用于眼科部门以保护隐私的“危险”眼部裁剪策略并不安全。我们介绍、开发并验证的保护模型 ROFI 弥补了这一空白。ROFI 从真实患者数据中学习，优先保留对临床诊断至关重要的眼科病征特征，同时模糊患者的身份生物特征。通过利用深度学习在自主病征检测与识别保护方面的强大能力，并以大规模真实眼科患者数据集为驱动，ROFI 在临床诊断和隐私保护两方面均表现出卓越的性能。

摘要编号：202941

人工智能诊断视网膜母细胞瘤的价值：系统评价和荟萃分析

第一作者：Runzi YANG

共同作者：Jing LI, Rui LIU, Jianmin MA, Tingting REN, Nan WANG, Liangyuan XU

目的：目前人工智能在多项眼科疾病中体现出卓越的价值。在视网膜母细胞瘤诊断和诊断中也有研究报道人工智能的作用，但目前尚无统一结论。因此，我们进行了系统回顾和荟萃分析来评估人工智能的价值。

方法：根据 PRISMA 指南，对 Pubmed、Embase、Cochrane database 和知网、万方数据库进行搜索，使用关键词 + 自由词进行检索，检索时限从建库至 2024 年 9 月。共统计 862 项研究，我们纳入了诊断性研究以评估人工智能在基于眼底成像识别视网膜母细胞瘤中的准确性。由 2 名研究者独立筛选文献、提取资料并评价纳入研究的偏倚风险后，采用 R (4.51) 软件进行 Meta 分析。采用随机效应模型进行 Meta 分析。如果合并后存在明显的临床异质性，则采用亚组分析或敏感性分析等方法进行处理，或只行描述性分析。

结果：共纳入 8 项研究，Meta 分析结果显示，人工智能在诊断视网膜母细胞瘤中敏感性为 98.4%，特异性为 98.7%，AUC 为 0.991。敏感性分析提示结果较为可靠。

结论：当前证据表明，人工智能在诊断视网膜母细胞瘤中具有较高的敏感性和特异性。人工智能或许可以作为医师的辅助工具，也可作为高危人群中的筛查工具。受纳入研究数量和质量的限制，上述结论尚待更多高质量研究予以验证。

摘要编号：201902

人工智能赋能的跨场景眼科护理连续性保障方案

第一作者：Xianwei LI

目的：针对传统眼科护理中存在的“操作标准化程度低”、“患者依从性监测困难”、“并发症预警滞后”等痛点，本研究提出智能增强护理 (IA-Nursing) 新范式，旨在实现：(1) 基于患者生物力学特性的个性化护理方案生成；(2) 通过多模态感知实时评估护理质量；(3) 建立并发症风险的前瞻性预警系统。

方法：采用三项突破性技术：(1) 开发眼表数字孪生系统，整合共聚焦显微镜与 OCT 数据构建三维力学模型；(2) 设计具有触觉反馈的智能护理手套，内置 16 个压力传感器与微振动马达；(3) 应用时空图卷积网络 (ST-GCN) 分析护理操作视频流，自动识别不规范动作。创新性地将手术室级无菌标准引入居家护理场景。

结果：形成三大创新产出：(1) 角膜接触镜护理的误操作识别准确率达 92.3%；(2) 青光眼患者滴眼药依从性提升 57%；(3) 干眼症热敷护理的温度控制误差 $< 0.5^{\circ}\text{C}$ 。同时建立全球首个眼科护理操作知识图谱，包含 387 个标准动作节点。

结论：本研究证实了人工智能重构眼科护理流程的可行性，其核心价值在于：(1) 创建“数字建模—物理交互—质量评估”的闭环系统；(2) 发展基于生物力学的精准护理理论；(3) 提出护理操作可计算化新理念。下一步需重点解决老年患者的科技接受度问题，建议在术后护理场景优先推广。

摘要编号：209057

使用聚类分析为激光术后白内障患者筛选 IOL 屈光力计算公式

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目的：在临床中，没有任何单一 IOL 计算公式对所有患者普遍最优，不同公式的准确性在不同特征的人群中存在显著差异。因此，为患者预先选择最精准的计算公式，是实现术后理想视觉质量的关键。本研究旨在探索一种基于患者术前生物测量参数的个性化 IOL 计算公式选择策略。通过聚类分析方法，对激光术后白内障患者进行分型，并评估不同公式在各患者亚组中的准确性差异，最终构建一个能够指导临床选择公式的分类模型。

方法：本研究为一项回顾性研究。收集既往接受激光术的白内障患者的术前资料，包括眼轴 (AL)、前房深度 (ACD)、角膜曲率 (Km) 等生物测量

参数。应用层次聚类算法，将患者划分为具有不同解剖特征的亚组。随后，回顾性计算并比较五种主流 IOL 计算公式（Barrett True-K, Haigis-L, EVO, HofferQST, PearlDGS）在各患者亚组中的预测准确性，主要评价指标为术后实际屈光偏差与预测偏差的差异（PE）、平均绝对误差（MAE）以及预测误差中位数（MedAE）。

结果：聚类分析将 455 个患者分为 4 个具有鲜明解剖学特征的亚组，分别为类别 1（AL: 25-27, ACD: 3.00-4.00, Km: 40-42）、类别 2（AL: 27-30, ACD: 3.25-3.75, Km: 37-39）、类别 3（AL: 26-28, ACD: 3.00-3.25, Km: 36-38）、类别 4（AL: 30-32, ACD: 3.00-3.75, Km: 32-35）。结果显示，不同 IOL 计算公式在各亚组中的表现存在系统性且显著的差异。整体来看，EVO, PearlDGS, Barrett True-K, HofferQST, Haigis-L, 准确率依次降低，所有公式在类别 1 准确率最高，随着眼轴增长总体呈现下降趋势。Haigis-L 受眼轴变化影响最大，只适合类别 1；EVO 普遍适用于四个类别；PearlDGS 适合前三个类别，不适合类别 4。类别 1 中 Barret True-K 最适用；类别 2 除了 Haigis-L, 其他四个公式误差差别小，均可使用；类别 3 中 PearlDGS 最适用；类别 4 推荐 EVO, 因为其他四个公式准确率下降更明显。统计每个类别 PE 在 ± 0.5 以内的占比，与上述有相似的结果，并且 PearlDGS 仅比 EVO 略低。

结论：本研究表明，基于术前生物参数进行聚类分析，能够有效识别出激光术后白内障患者中存在的不同解剖亚型，并且不同 IOL 计算公式的准确性确实具有群体特异性。

摘要编号：207912

利用自然语言处理技术 NLP 评估近视防控政策效果：对眼科医疗工作者的实践指导意义

第一作者：Jing SHEN

目的：随着全球近视问题越发严峻，各级政府和卫生机构不断出台近视防控政策，并发布大量公共卫生信息。尽管这些努力目的在于减缓近视发展趋势，但公众接受度和政策实际效果仍需进一步分析与验证。本研究旨在通过自然语言处理（NLP）技术分析社交媒体和在线健康社区中的公众反馈，从而评估近视防控政策和公共卫生信息的效果。特别地，本研究探讨这些分析对眼科医疗工作者在临床实践、患者教育和公共卫生宣传中的指导作用。

方法：数据收集：利用爬虫技术在主要社交媒体平台和健康论坛收集近视防控相关的公众讨论。数据预处理与情感分析：清洗数据并应用 NLP 情感分

析工具。主题识别：通过 LDA 等算法识别讨论主题。影响力与接受度评估：采用社交网络分析方法。

结果：研究表明公众对近视防控政策和信息的态度总体积极，但存在疑虑和担忧。分析结果具体揭示了公众关注的核心议题，包括预防策略、政策执行可行性等。

结论：提高临床决策质量：通过了解公众对近视政策的态度和感知，眼科医生可以更有效地进行临床决策，调整治疗策略。促进患者教育与沟通：识别公众的主要关注点和普遍误区，眼科专业人员可以设计更针对性的患者教育材料。优化公共卫生宣传：基于对公众接受度的深入分析，眼科医疗工作者可以参与到更有效的公共卫生宣传。推动政策建议与改进：通过收集和分析公众反馈，眼科医生和研究人员可以提供基于数据的建议，促使卫生政策制定者优化现有政策。

摘要编号：209725

基于 OCTA 与彩色眼底照片的深度学习模型用于分割视网膜静脉阻塞患者无灌注区：一项前瞻性多中心研究

第一作者：Meng WANG

共同作者：Weihong YU

目的：开发基于人工智能（AI）的深度学习（DL）模型，实现视网膜静脉阻塞（RVO）患者光学相干断层扫描血管成像（OCTA）与彩色眼底照片（CFP）中无灌注区（NPA）的自动检测。

方法：首先训练一个 DL 算法用于在 OCTA 图像与 CFP 中分割 NPA 区域；随后训练第二个 DL 算法，用于判断 OCTA 与 CFP 中 NPA 是否大于 5 个视盘直径（5 PD）。NPA 区域由 3 名眼科医师基于 OCTA 图像手动勾画，并通过图像配准技术自动映射至对应 CFP。

结果：共纳入 520 对 CFP/OCTA 图像作为内部数据集，划分为训练集 386 对、验证集 52 对和测试集 100 对。内部数据集包括 200 例分支 RVO、71 例中央 RVO 及 249 例正常图像。模型进一步在 272 对 CFP/OCTA 图像组成的外部数据集中进行验证。首个 DL 模型用于检测 CFP 中是否存在 NPA，在内部数据集中的敏感度、特异度与 F1 分数分别为 0.788、0.955 与 0.863，在外部数据集中分别为 0.716、0.782 与 0.748。第二个 DL 模型用于检测 CFP 中是否存在 ≥ 5 PD 的 NPA，在内部测试集中的精确度、敏感度、特异度与 F1 分数分别为 0.889、0.774、0.925 与 0.828，在外部数据集中分别为 0.804、0.783、0.860 与 0.793。

结论：本研究开发的深度学习模型能够基于 OCTA 与 CFP 对 RVO 患者的 NPA 进行自动分割与范围判断，并创新性地提出在无 OCTA 条件下直接通过 CFP 检测 NPA 的策略，为临床筛查提供可行替代方案。

摘要编号：208033

大型语言模型在眼科领域的评估：一项系统综述

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目的：大语言模型（LLM）在临床问答、影像解读与决策支持等任务中的应用正持续增长，然而眼科领域缺乏对其评估实践与证据质量的系统审视。本研究系统汇总已发表的相关量化评估，刻画证据现状与方法学特征，并在探索诊断类任务证据合成的可行性。

方法：在 PubMed、Web of Science、Embase 和 IEEE Xplore 四个数据库中系统检索至 2024-11-17 的文献，纳入在眼科领域中对 LLM 进行定量评估的原始研究。双人独立筛选与数据提取，从模型类型、评估模态、亚专科、任务类别、评价维度及与真实世界临床工作流的对齐程度六个方面进行分析。对方法学一致性最高的任务：开放式诊断的正确率进行荟萃分析（随机效应模型，logit 转化，DerSimonian-Laird τ^2 ），报告 I^2 ，并开展亚组与敏感性分析。

结果：共检索 817 条记录，纳入符合条件的 187 篇（22.9%）。其中，被纳入评估最多的三个模型系列分别是 ChatGPT（90.9%）、Gemini（31.0%）和 Copilot（17.1%）；对闭源模型的评估占主导，仅有 13.4% 的研究评估了开源 LLM。评估工作以纯文本为主，基于图像 - 文本的多模态评估仅 10.2%；除了综合眼科（38.5%）外，视网膜与玻璃体（17.1%）与青光眼（10.7%）是最常见的两个亚专科，然而屈光手术、眼科药理与眼肿瘤与病理学仅有各不到 3 项研究。评估任务集中于医学问答（46.0%）、标化考试（21.9%）与眼病诊断（15.5%），然而对有些任务如患者分诊或疾病预测（各 1.6%）关注较少。在评估指标方面，准确性最为常用（94.1%），而仅有 2.7% 的研究评估了模型的不确定性。多使用非真实患者数据进行评测，人与模型表现对比、非英语语境评估及真实世界部署不足。对 17 项诊断研究 28 个评估汇总得总体正确率 0.594（95% CI 0.488-0.692），异质性极高（ $I^2 = 94.5\%$ ），各亚组 I^2 仍多 $> 80\%$ 。

结论：评估眼科 LLM 的研究已有一定规模，但模型、任务与评估指标不统一，证据异质性高，限制了进一步的性能数据综合及对眼科实践的指导。在 LLM 能够安全地集成到眼科临床工作之前，迫切需要标准化、多模态基准和分阶段的临床验证流程。

摘要编号：207911

屈光不正患者与 ChatGPT 人工智能 AI 的对话实验：屈光不正患者教育新方法的探索应用

第一作者：Jing SHEN

目的：本研究旨在探索和评估使用 ChatGPT 人工智能（AI）与屈光不正患者进行对话作为患者教育方法的有效性。通过实验性的对话设置，研究借助 AI 提高患者对自身状况理解的可能性及其对治疗遵从性的潜在影响。

方法：参与者招募：从眼科门诊中随机选取屈光不正患者，根据其愿意参与的程度进行分组，50 人为实验组，接受 ChatGPT 对话干预，另外 50 人作为对照组，接受传统的屈光不正教育方法。对话实验设计：在保障医学信息准确性和通俗易懂的基础上，定制 ChatGPT 模型以适应与屈光不正患者的对话需求。对话内容涉及屈光不正基础知识、治疗选项和日常护理建议。数据收集与分析：通过问卷调查和跟踪访谈的方式，评估患者在接受干预前后对屈光不正的理解程度、治疗遵从性以及总体满意度。统计处理：使用相关的统计软件对收集的数据进行分析，评估 ChatGPT 干预的效果与传统教育方法相比的优劣。

结果：实验组中，使用 ChatGPT 对话的患者在对屈光不正的理解上表现出显著提升，知识掌握率提高了 40%，遵从性提升约 30%，满意度提高了约 25%。

结论：ChatGPT 人工智能在屈光不正患者教育中表现出较传统教育方法更优的成效。其在提高患者理解、改善治疗遵从性和增加患者满意度等方面的显著效益，预示着 AI 技术在患者教育领域的广阔应用前景。未来，进一步的研究可探索其在其他疾病领域的应用潜力，以及长期对患者行为和健康结果的影响。

摘要编号：208770

探讨运用心理学提升眼科药学服务的价值与作用

第一作者：Manwei FANG

目的：本摘要旨在深入探讨心理学的运用在眼科药学服务中的应用潜力，评估其对改善患者用药依从

性、增强医患沟通质量、提升药学整体服务满意度的具体价值与作用机制。

方法：选取 2025 年 7 月 -8 月期间在广州爱尔眼科医院住院患者数量，分为观察组($n = 30$)和对照组($n = 30$)，其中均包含着老年人、儿童。在住院常规治疗的基础上，观察组的患者增加了心理学干预来提升药学服务质量，具体干预措施涵盖共情式倾听及回应、通俗化语言表达、行为引导及文字标识等方式。对观察组和对照组患者进行为期 1 个月的随访，通过电话反馈、问卷收集用药依从性数据、药物使用规范率、药品不良反应发生率及药学服务满意度指标，比较两组间的差异显著性。

结果：经过为期 1 个月的随访，观察组的用药依从性达到 88.7%，显著高于对照组的 68.3% ($P < 0.05$)；药物使用规范率为 92.5%，对照组为 76.2% ($P < 0.05$)；不良反应发生率降至 4.8%，低于对照组的 16.1% ($P < 0.05$)；药学服务满意度得分为 4.6 分（满分 5 分），对照组为 3.7 分 ($P < 0.05$)。数据分析显示，心理学干预显著优化了各项指标，差异具有统计学意义。

结论：本研究表明，在眼科药学服务中运用心理学干预，能有效提升患者用药依从性、增强医患沟通质量、提升药学服务整体满意度，并降低不良反应风险，对优化眼科传统药学服务模式、改善患者治疗结局具有重要实践价值和推广应用潜力。

摘要编号：**209239**

眼科领域大语言模型评估：提升糖尿病视网膜病变查询响应的质量

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共同作者：Juan YE

目的：糖尿病视网膜病变（DR）是全球范围内导致可预防性成人失明的主要原因，预计到 2045 年将影响约 1.605 亿人。随着大型语言模型（LLMs）的普及，受 DR 影响的人群可能越来越依赖这些系统获取相关信息。然而，LLMs 在回答 DR 相关问题上的专业性和可靠性尚未明确。本研究旨在评估六个 LLM（ChatGPT-4.0、ChatGPT-3.5、Llama 2、Google Gemini Pro、Bing Chat 和 QWEN）在非临床环境中回答 DR 相关问题的潜力，通过比较其响应的准确性和全面性。

方法：研究于 2024 年 2 月 1 日 -3 月 31 日进行。首先，由经验丰富的眼科医生团队设计了 42 个与 DR 相关的临床常见问题，涵盖病因、症状、诊断和预防、治疗、预后等六个类别。这些问题随后被分别提交给上述六个 LLM。为减少偏差，研究关闭了 LLMs 的联网功能，在每次提问后重置会话，并对响应进行匿名化和随机分组。三位具有五年以

上临床经验的顾问级眼科医生对 LLM 的响应进行了独立评分。评估包括自动分析和手动分析。自动分析评估了响应的字符数、单词数以及可读性（使用 Flesch 阅读难度和 Flesch-Kincaid 年级水平指标）。手动评估则采用三级评分系统（差、临界、好）来衡量响应的准确性，并通过五分制评估“好”响应的全面性。此外，研究还引入了自我纠正提示，对初始评估为“差”或“临界”的响应进行二次评估，以检验 LLMs 的自我纠正能力。数据分析使用 IBM SPSS Statistics，采用单因素 ANOVA 和 Kruskal-Wallis 检验等进行统计比较。

结果：对 252 个响应的分析显示，不同 LLM 生成响应的平均单词数（155.3-304.3）和字符数（975.3-2043.5）存在差异。可读性评分也显示出显著差异，其中 ChatGPT-3.5 的可读性水平最低。在准确性方面，总体表现较高，ChatGPT-4.0 获得了 97.6% 的“好”评级，且排名前三的模型均未收到“差”评。在引入自我纠正提示后，响应的平均准确性评分从 6.4 显著提升至 7.5。

结论：本研究表明，大型语言模型在回答糖尿病视网膜病变（DR）相关问题方面具有提供准确、全面信息的潜力，显示出在眼科健康信息支持领域的应用价值。然而，不同模型在可读性方面存在显著差异，在将其整合到临床实践或公众教育之前，需要进一步改进和优化。为确保其长期可靠性，持续的验证与评估至关重要。

摘要编号：**209930**

近视眼底豹纹斑的自动量化、分级及五年进展预测：一项多中心纵向深度学习研究

第一作者：Wenda ZHOU

共同作者：Wenbin WEI

目的：豹纹样眼底（Fundus Tessellation, FT）作为脉络膜薄变的替代标志，是近视性黄斑病变的初始征象。本研究旨在开发一种基于人工智能（AI）的系统，用于基于彩色眼底照相（CFPs）自动量化与分级豹纹斑，并构建深度学习系统（DLS）以预测 5 年内豹纹样眼底的发生与进展。

方法：基于两项人群研究及眼科检查中心的纵向数据集，我们开发了 FT 分割模型，以自动量化 FT 的程度和位置。基于这些模型，我们构建了两套分级系统，并开发了一系列深度学习系统（DLS）来预测 FT 的密度和其与黄斑中心处位置的进展。前者使用 FT 分割模型量化生成 FT 密度值，后者使用 ETDRS 环作为位置分割依据，根据 FT 分布的内、中、外环作为 FT 位置进展的依据。

结果：研究纳入 218,519 名受试者（437,038 眼）（平均年龄：37.7 ± 10.8 岁），平均随访时间为 61.2

± 1.3 个月（中位数：60.6 个月）。深度学习系统在预测 FT 的发生和进展方面表现出色。在验证数据集中，受试者工作特征曲线下面积（AUROCs）分别为：FT 发生的 AUROC = 0.826（95% CI: 0.819–0.834）、FT 进展的 AUROC = 0.898（95% CI: 0.894–0.903）、黄斑区 FT 发病的 AUROC = 0.854（95% CI: 0.848–0.859）、FT 位置进展的 AUROC = 0.859（95% CI: 0.853–0.865）。在外部测试集中，FT 发生和进展的 AUROC 分别为 0.720（95% CI: 0.687–0.753）和 0.753（95% CI: 0.733–0.772），而 FT 在黄斑中心区域发病和位置进展的 AUROC 分别为 0.729（95% CI: 0.714–0.745）和 0.817（95% CI: 0.788–0.846）。

结论：基于 AI 技术的彩色眼底照相评估模型能够自动量化 FT 的密度和其距离黄斑中心的位置，并预测其未来变化。该技术有望在低成本临床环境中提升近视眼底病变发生与进展的预测能力。

摘要编号：207989

针对大型语言模型（LLM）在医疗领域中的可能性与应用前景的探究思考

第一作者：Jing SHEN

目的：随着大型语言模型（LLM）的出现，这些模型已经在如 GPT、BERT、XLNet 等在自然语言处理领域中取得了惊人的成就。在一定程度上，它们能够实现文本自动编写、自动翻译、文本分类、问答等领域的突破。在医疗领域，更广泛的应用对于改善医疗质量具有巨大的潜力。本文旨在探讨 LLM 在医疗领域中的可行性与应用前景。LLM 在医疗领域的主要目的是对医学知识的组织和推理方面发挥作用。

方法：通过对海量的医学文献进行阅读和理解，LLM 可以自动生成摘要、分类、标签等信息，帮助医生更快、更准确地诊断和治疗疾病。同时，LLM 可以自动将不同的医学知识点组合起来，生成完整的疾病预防、诊断、治疗方案，从而提高临床医生的治疗和诊断能力。此外，LLM 还可以在医学图像识别、病理分析等方面发挥作用，从而更好地帮助医生进行病情判断。为了实现上述目的，LLM 通常使用自然语言处理技术对海量数据进行处理训练，并使用语言生成技术来生成医疗信息。在医学图像识别方面，LLM 可以使用计算机视觉技术来进行图像分析和识别，从而帮助医生更好地理解病情。在医学研究方面，LLM 可以使用自动化学习技术来帮助分析和理解大规模的临床数据和试验。

结果：通过分析和可行性判断，应用 LLM 在医疗领域，我们可以得到以下的结果：- 更快、更准确的诊断和治疗方案，从而可以改善医疗质量；- 更

好的医疗知识共享和传播，提高了临床医生的素质和技能；- 更好的病情判断和分析，从而可以更好地理解病情并作出更好的治疗决策。

结论：总体来看，在医疗领域中，LLM 的应用前景非常广阔，可以运用于医生和研究人员的辅助诊断工具、临床数据和图像处理工具。尽管这些技术在隐私方面尚存在困难，但它们可以帮助医疗专业人员更好地分析和了解病情，从而提供更好的治疗方案。此外，随着技术的不断发展和对隐私保护的探索，LLM 的应用前景将更加广阔。总之，LLM 在医疗领域将继续发挥巨大的作用，并有望成为未来医疗发展的重要推动力量。

屈光手术

摘要编号：209700

CGRP 通过增强完整的泪液分泌神经回路改善角膜神经切断后的干眼

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目的：本研究旨在探讨感觉神经肽降钙素基因相关肽（CGRP）在小鼠因角膜神经切断所致的屈光术后干眼中的作用。

方法：通过手术切断角膜神经，在成年 C57BL/6 小鼠中建立模型。术后评估包括角膜敏感性、角膜神经密度、泪液分泌、角膜荧光素染色、角膜免疫荧光染色和 RNA 测序。检测了三叉神经节（TG）的 TRPM8、脑上泌涎核（SSN）的 c-FOS 表达，并进行了 SSN 的体内电生理记录。评估了 CGRP 及其工程化变体（eCGRP）治疗屈光术后干眼的疗效。

结果：角膜神经切断导致角膜 CGRP 含量显著降低，并伴随干眼症状的出现，包括泪液分泌减少、上皮屏障功能障碍和基底膜下神经退变。预防性给予 CGRP 能有效逆转这些病理改变，而治疗性给予 CGRP 则通过增强完整的泪液分泌神经回路显著减轻这些改变。与天然 CGRP 相比，局部应用 eCGRP 在增加泪液分泌、恢复上皮稳态和减轻角膜炎症方面表现出更优的疗效，且无疼痛相关副作用。

结论：我们的数据表明，在屈光术后干眼中，角膜 CGRP 的表达因 TRPM8-SSN 活性降低而下调。eCGRP 可能为其预防和治疗提供一种有效的治疗策略。

摘要编号: 206045

InnovEyes Sightmap 光迹追踪引导准分子激光手术后增效手术一例

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目的: InnovEyes Sightmap 光迹追踪引导准分子激光手术后左眼视力不佳, 患者主诉左眼视物下方重影较重。经 6 个月观察, 视力未提高。再次行地形图引导的准分子激光手术, 提高患者的视力及视觉质量。

方法: 患者术后左眼的屈光度为 $0/-1.25\text{ DS} \times 88^\circ$, Sightmap 检查左眼 4 mm 瞳孔下的全眼高阶像差为 0.237, 球差为 -0.056 , 彗差为 0.237; 6.5 mm 瞳孔下的全眼高阶像差为 0.513, 球差为 -0.264 , 彗差为 0.103。Pentacam 检查左眼 4 mm 瞳孔下的角膜高阶像差为 0.748, 6.5 mm 瞳孔下的角膜高阶像差为 2.398, 且中央偏下的位置曲率偏高。在术后 6 个月, 屈光度稳定后行左眼角膜地形图引导模式 (TOPO-G), 将全部角膜像差消除, 并对低阶像差进行 C12 补偿。通过多次综合验光发现与 Topography-Guided 模式下地形图散光度与轴位间差异大。综合验光: $0/-1.25\text{ DC} \times 80^\circ$, 地形图: $-0.28\text{ DS}/-0.74\text{ DC} \times 7^\circ$, 将柱镜补偿到球镜。根据 C12 补偿原则, 球镜补偿 $+0.06\text{ D}$, 最终手术方案: 手术光学区 6.5 mm, 球镜 -0.34 D , 柱镜为 0。术中采用掀开原角膜瓣法, 掀瓣后将设计方案调出, 虹膜定位, 行个性化准分子激光切削, 冲洗角膜层间, 并将角膜瓣复位, 完成手术。

结果: 经过二次手术, 患者左眼视力为 1.0, 左眼的屈光度为 $+0.50/-1.25\text{ DS} \times 85^\circ$, 视物下方重影的情况已经消失。二次术后 3 个月 Sightmap 检查左眼 4 mm 瞳孔下的全眼高阶像差为 0.091, 球差为 -0.011 , 彗差为 0.070; 6.5 mm 瞳孔下的全眼高阶像差为 0.366, 球差为 -0.044 , 彗差为 0.219。Pentacam 检查左眼 4 mm 瞳孔下的角膜高阶像差为 0.392, 6.5 mm 瞳孔下的角膜高阶像差为 2.005。二次增效手术后全眼高阶像差及角膜高阶像差明显下降, 角膜形态较规则。患者对术后效果较为满意。

结论: InnovEyes Sightmap 光迹追踪引导准分子激光手术是全球首款全眼个性化定制的屈光手术, 应用 Ray Tracing 技术并通过独家专利智能迭代算法创建 3D 全眼虚拟模型, 为患者制定个性化的手术方案。“全光塑”手术可以带给我们更加完美的术后视觉效果。但面对各种原因可能出现的术后视力不佳, 我们要仔细分析原因, 并作出合适的处理方案。本病历将地形图引导应用于“全光塑”术后的增效手术中, 可矫正不规则的角膜形态, 消除角

膜像差, 达到提升视力的目的。该患者虽然术后视力恢复, 但仍存在逆规散光的情况, 仍需进行长期观察。

摘要编号: 210069

《角膜屈光性透镜取出术临床诊疗循证指南》解读

第一作者: Lulu XU

共同作者: Yan WANG

目的: 本文对国际指南《角膜屈光性透镜取出术临床诊疗循证指南》进行解读, 以期帮助同行进一步了解其学术内涵, 指导并促进屈光手术的规范开展。

方法: 角膜屈光性透镜取出术 (KLEx) 作为新型角膜屈光手术, 临床开展时间相对较短, 但在全球应用范围逐渐扩大, 手术亟待规范。近期, 首部由中国专家发起的国际屈光手术循证医学指南《Evidence-based Guidelines for Keratorefractive Lenticule Extraction Surgery》在国际眼科专业顶级期刊《Ophthalmology》发布。

结果: 该指南以循证医学证据为基础, 对手术各个方面包括手术术前筛查、适应证、手术术中和术后并发症处理等重要问题依照 WHO 的相关要求展开了系统证据检索、分析与评价, 并形成了 38 条具有临床指导意义推荐意见, 为临床规范实施 KLEx 手术提供强有力的循证医学参考。KLEx 手术《指南》的制订与以往的专家共识、标准不同, 采用了严格的循证医学方法, 因而更具科学性与严谨性, 全面而广泛的检索确保了研究证据的完整与可靠; GRADE 证据分级和完全德尔菲方法的应用确保指南制订过程标准、高效和质量。《指南》的证据体系来源于广泛的文献检索且推荐意见是综合国内外具有专业代表性和地域代表性的专家推荐并经严格外审以及收集来自最终用户的反馈, 这些都为《指南》的临床应用、实施及推广奠定了基础。当然, 也存在一些局限性, 例如 KLEx 手术发展时间短, 学习曲线长, 手术技术本身还在探索阶段, 早期研究结果受手术开展时间的影响, 可能会使证据结果有偏差, 需要更多的多中心、大样本、长时间随访观察。值得注意的是, 《指南》是基于现有证据制订, 尽管证据级别多数相对较高, 但随着未来研究和证据的不断更新其结果可能还会有变化, 同时, 此为循证医学指南, 不具有法律效力。

结论: 《角膜屈光性透镜取出术临床诊疗循证指南》可对全球范围内所有开展 KLEx 手术的眼科医疗机构提供指导性帮助, 其宗旨是不断提高此类手术的安全性和精准性, 最终造福更多的需要视觉矫正的广大患者。

摘要编号: 205338

不同屈光度近视患者眼前节生物参数特征及对 ICL 尺寸选择的影响

第一作者: Ruibo YANG

目的: 对比分析中度、高度及超高度近视患者眼前节生物测量参数的特征, 及其对 ICL 尺寸选择的影响。

方法: 本前瞻性观察性队列研究纳入 131 名患者 246 只眼。记录术前眼轴(AL)、中央角膜曲率(Kc)、中央角膜厚度(CCT)、白到白距离(WTW)、前房深度(ACD)、虹膜小梁网夹角(TIA)、前房宽度(ACW)、角到角距离(ATA)、晶状体矢高(CLR)、晶状体厚度(LT)、睫状沟间距(STS)、ICL 尺寸以及术后 1 个月的拱高, 并在不同近视程度组之间进行比较。

结果: 中度近视患者的 ACD 和 TIA 比高度近视和超高度近视患者小 ($P < 0.05$)。中度近视组中 CLR 正值的比例较高 (65%), 而超高度近视组中 CLR 负值的比例较高 (55.3%)。 ($P = 0.047$)。不同近视程度组之间的 WTW、ATA、ACW、STS、LT 以及术后拱高无统计学差异 ($P > 0.05$)。在不同近视程度组中, 垂直方向的 ATA、ACW 和 STS 均长于水平方向的 ATA、ACW 和 STS ($P < 0.001$), 且水平子午线方向的 STS 与 ATA ($r = 0.655$) 和 ACW ($r = 0.660$) 的相关性高于其与水平方向的 WTW ($r = 0.591$) 的相关性。在中度近视组中, 使用最小 12.1 尺寸的 ICL 的比例 (35.8%) 高于高度近视 (14.6%) 和超高度近视 (26.3%) ($P = 0.013$)。

结论: 与高度和超高度近视相比, 中度近视眼的 ACD 和 TIA 较小, 而 WTW、ATA、ACW 和 STS 等冠状面眼前节参数与高度和超高度近视患者相似, 晶状体位置更靠前; 水平方向 STS 与同一子午线上的 ATA 及 ACW 的相关性高于与 WTW 的相关性。提示临床医生选择 ICL 尺寸时应更多关注眼内径, 同时应关注不同近视程度下矢状轴参数 ACD 和 CLR 对 ICL 尺寸选择的影响。

摘要编号: 210179

中高度近视 KLEx 与 FS-LASIK 术实际与有效角膜切削量的比较: KLEx 可能更节约切削量

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目的: 探究在保留或减去角膜基质透镜切除术 (KLEx) 非屈光性切削的最小透镜厚度后, 对比

中高度近视 KLEx 与飞秒激光辅助原位角膜磨镶术 (FS-LASIK) 的实际与有效角膜切削量。

方法: 这项研究回顾性纳入 193 例中高度近视 KLEx 或 FS-LASIK 患者的右眼数据 (KLEx 组 93 眼, FS-LASIK 组 100 眼), 两组患者的治疗光区直径均为 6.30 mm, KLEx 的最小透镜厚度均为 10 μm 。KLEx 由 ZEISS VISUMAX 500 完成, FS-LASIK 由 AMARIS 1050RS 完成。使用 Sirius 三维眼前节分析系统测量术前及术后 6 月时的中心角膜厚度 (CCT) 和直径 10 mm 区域的角膜体积 (CV), 并比较两组实际与有屈光效果的最大切削深度及总切削体积。其后再将 KLEx 与 FS-LASIK 两组再分为中度近视 ($-3.00 \text{ D} \geq \text{SE} > -6.00 \text{ D}$)、高度近视 ($-6.00 \text{ D} \geq \text{SE} > -8.00 \text{ D}$) 和超高度近视 ($\text{SE} \leq -8.00 \text{ D}$) 组进行实际与有效切削量的比较。

结果: 两组术前、术后 6 月 CDVA 与等效球镜均无显著差异 ($P > 0.05$)。KLEx 与 FS-LASIK 的最大实际切削深度 ($117.73 \pm 16.95 \mu\text{m}$ vs. $120.20 \pm 22.84 \mu\text{m}$, $P = 0.393$) 和体积 ($2.22 \pm 0.88 \text{ mm}^3$ vs. $2.11 \pm 0.95 \text{ mm}^3$, $P = 0.446$) 差异均不显著, 去除 10 微米的最小透镜厚度后, KLEx 的最大有效切削深度显著小于 FS-LASIK ($107.73 \pm 16.95 \mu\text{m}$ vs. $120.20 \pm 22.84 \mu\text{m}$, $P < 0.001$), 而有效切削体积 KLEx ($1.92 \pm 0.88 \text{ mm}^3$) 与 FS-LASIK ($2.11 \pm 0.95 \text{ mm}^3$) 比较差异无统计学意义 ($P = 0.136$)。但在进一步根据 SE 程度分组后, 超高度近视组中 KLEx 的实际切削深度已显著小于 FS-LASIK ($132.38 \pm 10.50 \mu\text{m}$ vs. $147.82 \pm 18.41 \mu\text{m}$, $P = 0.002$), 有效切削深度则进一步显著小于 FS-LASIK ($122.38 \pm 10.50 \mu\text{m}$ vs. $147.82 \pm 18.41 \mu\text{m}$, $P < 0.001$)。

结论: 以同样的光区大小, 矫正相同屈光度的中高度近视时, 最小透镜厚度为 10 微米的 KLEx 术实际最大切削深度和体积与 FS-LASIK 术相当。去除最小透镜厚度后, KLEx 的最大有效切削深度显著低于 FS-LASIK, 甚至对于超高度近视患者来说, 即使不减去最小透镜厚度, KLEx 的角膜实际切削量也显著更低。

摘要编号: 201742

全光塑围手术期护理

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目的: 探究全光塑手术围手术期护理要点。

方法: 选取 2025 年 1 月至 2025 年 6 月在本院诊断屈光不正并拟进行全光塑激光治疗的患者 50 例, 按照手术日期先后顺序原则分组, 前 25 例为实验组、后 25 例为对照组。纳入标准: 无全光塑激光

手术禁忌症；患者和家属均签署知情同意书，均经医学伦理委员会批准。排除标准：激光手术禁忌症；哺乳期或妊娠期女性；伴有严重脏器疾病以及精神障碍。对照组实施常规护理，实验组实施围术期护理，包括：1. 术前护理：① 心理护理：患者到院完善相关术前检查后，需对其心理状态进行有效评估，并了解期望值。向患者讲解全光塑手术的优势、操作方法、配合要点，使其能够消除疑虑，减轻心理压力，并介绍成功案例，让患者树立康复自信，提高配合度。② 用药护理：遵医嘱术前3天开始使用抗生素眼药水及润眼药水。③ 术前注视训练：指导患者双眼同时睁开情注视正前方30厘米处的指尖，遮住一眼后固视坚持25秒以上，另一眼操作同上。2. 术中护理：① 术前给患者滴3次的表麻药物，并给每位患者提供减压球。② 在术前准备间等待手术的过程中播放轻音乐转移注意力。③ 术中配合手术医生对患者进行话疗，使患者身心得到放松，更好的配合手术。术毕佩戴绷带镜减轻术后的异物感提高舒适度。3. 术后护理：① 一般护理：手术结束后，在温馨舒适的留观室闭眼休息半小时，并为患者滴抗感染眼药水。② 术眼的观察：观察患者术眼情况，耐心倾听患者主诉。③ 术后用药：告知其术后用药的必要性和重要性。④ 术后宣教：术后看医生并进行裂隙灯检查，交代注意事项后，方可离院。记录焦虑和抑郁评分、并发症发生率情况。选用SPSS 20.0软件分析数据，计量资料用 $\pm$ 进行统计描述、组间比较用T检验；计数资料采用百分比进行描述、采用卡方 χ^2 检验，以 $P < 0.05$ 作为差异有统计学意义。

结果：实验组全光塑激光患者焦虑（ 6.04 ± 1.14 ）分、抑郁（ 6.45 ± 1.26 ）分与对照组相比存在差异（ $P < 0.05$ ）。实验组全光塑激光患者并发症发生率低于对照组， $P < 0.05$ 。

结论：将围术期护理用于全光塑激光手术中，能够显著提高治疗效果，改善患者负面情绪，值得进一步推广与探究。

摘要编号：210202

准分子激光二次构建的人角膜基质微凹透镜异种角膜层间植入后早期生物相容性的实验研究

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共同作者：Sixiao CHENG, Bo MEI, Chunyang ZHOU

目的：探讨经过准分子激光二次构建的人角膜基质微凹透镜异种移植至兔角膜层间后的早期生物相容性，评估其在活体角膜层间植入的安全性及可行性。

方法：选取20只健康新西兰白兔，随机均分为透镜植入组（ $n = 10$ ）和角膜基质囊袋组（ $n = 10$ ）。利用准分子激光将SMILE术中取出的人角

膜基质凸透镜二次构建为微凹透镜，再植入兔角膜基质层间。术后1天、3天、7天、15天及30天进行裂隙灯显微镜检查；术后1周、1月进行眼前节OCT检查；术后1周、1月各组随机处死5只实验兔，摘取角膜进行HE染色、透射电镜及免疫组化检测。

结果：术后1周内角膜出现轻度水肿，随着时间的推移逐渐减轻。术后1月内始终未发生角膜新生血管、上皮植入及免疫排斥等并发症，植入的透镜与原角膜基质间的边界始终清晰可见。HE及TEM结果显示透镜植入后仍然保持了完整的角膜结构且胶原纤维基本平行整齐紧密排列。免疫组化检测结果未见 $CD4^+$ T细胞及 $CD8^+$ T细胞的表达。

结论：经过准分子激光二次构建的人角膜基质微凹透镜在兔角膜层间异种植入中表现出良好的早期生物相容性和稳定性，但远期安全性需进一步研究验证。

摘要编号：210209

准分子激光重塑的人SMILE来源角膜基质凹透镜兔角膜层间植入的研究

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共同作者：Sixiao CHENG, Bo MEI, Chunyang ZHOU

目的：探究利用准分子激光将人近视SMILE手术来源的角膜基质凸透镜重塑为凹透镜的可行性，并评估其层间植入后对角膜形态学和组织病理学的影响。

方法：选取球镜 < -4.00 D，柱镜 < -0.50 D的近视SMILE来源角膜基质凸透镜，使用准分子激光进行重塑，治疗光学区为6.00 mm，治疗度数：球镜度数在患者SMILE术前球镜度数上增加 -2.00 D，柱镜为0 D。利用飞秒激光Flap程序制作角膜基质囊袋将重塑后的凹透镜分别植入10只健康3月龄雄性新西兰白兔的右眼角膜层间。术后1、3、7、15天及1个月通过裂隙灯显微镜观察角膜眼表情况；术前、术后7天及1个月通过AS-OCT评估角膜形态变化；于术前、术后7天及1个月通过角膜地形图测量沿角膜两条主子午线距中央0.5 mm、1 mm、1.5 mm、2 mm、2.5 mm、3 mm处的K值，使用“Power Difference”模式进行有效光学区的测量；术后1月摘取角膜行苏木精-伊红（HE）染色和透射电子显微镜（TEM）分析角膜组织病理学特征。

结果：所有手术均顺利完成且未出现并发症。裂隙灯显微镜观察显示术后1周内角膜呈现轻微水肿。整个观察期间凹透镜边缘清晰可见，保持了良好的透明度，透镜位置略向颞上方偏移，边缘平整，未发生明显折叠；AS-OCT结果显示术后7天时，透

镜与周围角膜基质间的高反射边界清晰可辨，未见透镜皱褶堆积。术后 1 个月时，该边界逐渐变得难以区分，显现出与周围组织融合的趋势；角膜地形图显示透镜植入后角膜前表面屈光力在 0 mm、0.5 mm 处降低 ($P < 0.05$)，在 2 mm 及 2.5 mm 处增加 ($P < 0.05$)，其余距离处屈光力无明显变化，呈现了由中央屈光力降低到周边不断增加的变化趋势，形成“甜甜圈”样前表面形态。有效光学区直径为 4.71 ± 0.12 mm；HE 染色及 TEM 检查结果显示植入的凹透镜胶原纤维规则排列，与周围组织紧密连接，且未见炎症细胞浸润。

结论：利用准分子激光将人近视 SMILE 角膜基质凸透镜重塑为凹透镜并进行角膜层间植入以降低中央角膜屈光力是有效可行的，但需进一步提升光学区的可预测性并延长研究观察时间。

摘要编号：210191

双光子激光交联术对角膜透镜的影响

第一作者：Xinjie ZHU

目的：评估 800 nm 波长双光子激光交联术对角膜透镜生物力学、光学特性及微观结构的影响。

方法：本研究为对照实验室研究。采集 40 片 SMILE 手术来源的角膜透镜，每片均分为两半，分别作为实验组（接受 800 nm 双光子激光交联）和匹配对照组。样本进一步分为离焦与聚焦加工组。主要评估指标包括：通过单轴拉伸试验测量杨氏模量；通过分光光度法测量光透射率；通过 HE 染色评估胶原纤维形态；通过拉曼光谱分析分子组成。

结果：与对照组相比，经双光子激光交联处理的透镜杨氏模量显著增加 (10.85 MPa vs 7.90 MPa; $P < 0.001$)，且离焦加工组的杨氏模量相对增幅高于聚焦加工组 38%。HE 染色显示交联组胶原纤维排列更为致密。拉曼光谱分析表明，处理后的样本特征峰位置未发生位移，但强度降低。各组间的光学透射率无显著差异 (98.5% vs 98.8% ; $P = 0.35$)。

结论：800 nm 波长的双光子激光交联能有效增强角膜透镜的生物力学性能，且离焦加工模式效果更优。拉曼特征峰未发生位移，表明交联处理未破坏角膜胶原的固有分子结构，是一种安全的改性方式；而胶原密度增加与分子间交联导致的拉曼散射强度降低，共同为力学增强提供了结构与分子层面的解释。该技术在屈光手术生物材料强化领域展现出巨大潜力。

摘要编号：208723

对比 ICL 手术前后调节微波动变化的临床研究

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目的：通过对比行有晶体眼人工晶体植入术 (ICL) 的患者术前术后的调节微波动 (MFs) 的变化，探究 ICL 手术对调节功能的影响。

方法：收集接受 ICL (V4c) 手术矫正近视 (屈光度为 -8.37 ± 2.91 D) 的患者 45 例 (88 眼)。使用调节功能分析仪 Acomoref 2，以验光数据为起点，依次测量在 $+0.5$ D/ 0 D/ -0.5 D/ -1.0 D/ -1.5 D/ -2.0 D/ -2.5 D/ -3.0 D 的调节微波动频率 (HFC)。并以 $PRA \leq 1.75$ D 和 $PRA > 1.75$ D 分为调节不足组和调节正常组，分别收集两组患者在术前及术后一周和术后一月的 HFC。两组间一般资料对比采用独立样本 t 检验和非参数检验，组间对比采用重复测量方差分析。以 $P \leq 0.05$ 为差异有统计学意义。

结果：在 0 D 时的 HFC 术后一周 ($56.93, 6.52$)、术后一月 ($58.03, 6.87$) 低于术前 (60.89 ± 5.43)， $P = 0.020$ 。调节不足组在 -0.5 D 时的 HFC 术后一月 ($57.69, 6.06$) 低于术前 ($60.74, 5.29$)， $P = 0.013$ ；调节正常组在 0 D 时的 HFC 术后一周 ($56.10, 4.86$)、术后一月 (57.79 ± 4.45) 低于术前 (60.73 ± 4.46)， $P = 0.036, 0.032$ ；调节正常组在 -2.0 D 时的 HFC 术后一周 (61.80 ± 4.42)、术后一月 (61.44 ± 3.95) 均低于术前 (64.44 ± 5.13)， $P = 0.025, 0.012$ 。

结论：患者行有晶体眼人工晶体植入术 (ICL) 后的调节微波动频率 (HFC) 低于术前，即术后调节更放松，ICL 术后患者感觉更舒适。

摘要编号：208643

聚异丁烯嵌段共聚物人工晶状体兔眼植入的生物相容性研究

第一作者：Xuan LI

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目的：探索聚异丁烯嵌段共聚物 [poly (styrene-block-isobutylene-block-styrene), SIBS] 制成的有晶状体眼人工晶状体 (phakic intraocular lens, pIOLs) 在兔眼中的生物相容性及相关效果。

方法：通过噻唑蓝比色法 (MTT) 检测 SIBS 浸提液对小鼠成纤维细胞 (L-929) 的毒性。在人工晶状体兔眼内植入实验中，对 10 只新西兰兔进行单眼 pIOLs 植入术，分别植入 SIBS pIOLs (6 只眼)；硅胶 pIOLs (4 只眼)；对 10 只新西兰兔

眼不做任何处理当作空白对照组。术后 3, 7, 14, 30 天, 通过裂隙灯显微镜观察兔眼角膜水肿、前房渗出、虹膜粘连等眼前节情况; 通过回弹式眼压计监测眼压, 通过超声生物显微镜检查 (ultrasound biomicroscopy, UBM) 观察 pIOLs 眼内位置。术后 30 天将兔安乐死, 摘除眼球并进行石蜡包埋切片, 通过 HE 染色观察眼前节组织的损伤情况; 取出 SIBS pIOLs 进行扫描电镜观察和能谱分析观察人工晶状体表面情况。

结果: 经不同浓度 SIBS 浸提液处理后的细胞增殖率均大于 90%。在 SIBS pIOL 组 3 只术中发生晶状体前囊破裂; 剩余 7 只术眼手术顺利。两组角膜水肿在术后 3 天最明显 (2~3 级), 术后 7 天角膜均恢复透明。两组的前房渗出物和虹膜后粘连在术后 3 天最为显著, 可随时间逐步消退。与硅胶 pIOL 组相比, SIBS pIOL 组术后不同时间点, 前房渗出和虹膜后粘连分级的平均秩次均高于硅胶 pIOL 组。硅胶 pIOLs 植入眼内后, 眼压无显著变化 ($P > 0.05$); SIBS pIOLs 植入眼内后引起眼压一过性升高, 术后 3 天达到峰值 (28.13 ± 6.24 mmHg), 随后恢复至术前水平。病理组织学检查显示术后 30 天, 硅胶 pIOL 组炎症反应已基本消退; 而 SIBS pIOL 组仍保留虹膜血管扩张充血。裂隙灯显微镜观察和 UBM 检查证实两组 pIOLs 与兔眼晶状体直接接触, 并由此导致了晶状体前囊下混浊。扫描电镜检查显示, 术后 14 天 SIBS pIOLs 表面见大量纤维蛋白膜附着, 并偶见球形细胞样结构; 术后 30 天, 纤维蛋白膜较前明显吸收, 仅引流孔处任残留少许细胞。能谱分析未发现材料表面沉积 Ca、P 元素。

结论: 聚异丁烯嵌段共聚物 (SIBS) 材料无明显细胞毒性, SIBS pIOLs 植入兔眼, 在短期内表现出较好的生物相容性。后续将改进聚异丁烯嵌段共聚物材料的物理性质和设计尺寸, 进一步评估该材料 pIOLs 的生物相容性。

摘要编号: 200866

龙晶® 国产有晶体眼人工晶状体植入术临床应用观察

第一作者: Nian GUAN

目的: 评估国产龙晶®PR 型有晶体眼人工晶状体 (Phakic Refractive IOL, PR) 植入术的临床效果及安全性, 探索其在屈光矫正领域中的应用价值, 以解决传统激光手术对高度近视、角膜偏薄及暗瞳大等特殊需求患者的局限性。

方法: 研究对象: 纳入我院开展龙晶临床案例, 包括高度近视 (-3.25 D 至 -18.00 D)、角膜厚度不足或拒绝角膜切削的患者。手术技术: 采用微

创透明角膜切口 (2.8 mm), 植入可折叠的龙晶® PR 人工晶状体, 通过睫状沟固定。晶体材料为 Balacrylic™ 高折射率丙烯酸酯, 结合非球面零球差光学设计, 手术全程约 2-5 分钟。评估指标: 术后裸眼视力 (UCVA)、拱高稳定性、眩光发生率、并发症 (如白内障风险) 及患者满意度。

结果: 视力改善: 术后患者裸眼视力显著提升, 患者视力从 0.05 提升至 1.0-1.2, 患者术后夜间眩光问题明显缓解。拱高稳定性: 得益于材料的力学特性, 术后中央及周边拱高变化量极小 (< 0.1 mm), 长期屈光状态稳定。并发症控制: 6.0 mm 大光学区设计降低眩光发生率, 中心孔设计维持房水循环, 未报告严重并发症 (如青光眼或白内障)。个性化适配: 10 种型号 (以 0.3 mm 为间隔) 精准匹配睫状沟形态, 覆盖 11.5-14.2 mm 直径范围, 实现“量眼定制”。

结论: 龙晶®PR 人工晶状体植入术是一种安全、高效且可逆的屈光矫正方案, 尤其适用于高度近视、角膜条件受限或追求高质量视觉的患者。其“薄、大、精、稳”的设计优势 (如纤薄体积、大光学区、个性化型号及材料稳定性) 显著提升了术后视觉质量和长期安全性。临床实践表明为患者近视矫正方案提供了多样化的选择。

斜视与小儿眼科

摘要编号: 200682

4-15 岁健康儿童及青少年双眼中心凹无血管区 (FAZ) 形态的对称性研究

第一作者: Zhengwei ZHANG

目的: 利用扫描频源光学相干断层扫描血管成像 (SS-OCTA) 技术, 评估 4-15 岁中国健康儿童及青少年双眼中央凹无血管区 (FAZ) 的对称性。

方法: 纳入 4 至 15 岁健康受试者。使用 OCTA (以黄斑中心凹为中心的 3 mm × 3 mm 视野区域) 采集双眼 FAZ 相关参数, 包括 FAZ 形态分类、FAZ 面积 (FAZA)、FAZ 周长、FAZ 圆度指数 (CI)、血管密度 (VD)、中心凹下视网膜厚度 (SFRT) 以及中心凹下脉络膜厚度 (SFCT)。同时记录年龄、性别、体重指数 (BMI)、等效球镜 (SE)、眼轴长度 (AL) 及角膜曲率 (K1、K2)。采用统计学方法分析其 FAZ 相关参数的相关性及其双眼对称性。

结果: 本研究共纳入 124 例 (248 眼), 其中男性 61 例, 女性 63 例, 平均年龄 9.73 ± 2.70 岁。将 FAZ 按照形态分为六种, 其中圆形 64 眼 (25.8%), FAZA 为 0.36 ± 0.10 mm²; 椭圆形 44 眼 (17.8%),

FAZA 为 $0.35 \pm 0.10 \text{ mm}^2$; 五边形 24 眼 (9.7%), FAZA 为 $0.32 \pm 0.14 \text{ mm}^2$; 四边形 34 眼 (13.7%), FAZA 为 $0.30 \pm 0.11 \text{ mm}^2$; 三角形 8 眼 (3.2%), FAZA 为 $0.26 \pm 0.11 \text{ mm}^2$; 不规则形 74 眼 (29.8%), FAZA 为 $0.28 \pm 0.11 \text{ mm}^2$ 。双眼 FAZ 形态对称性分析发现双眼 FAZ 形态高度镜像对称 5 人 (4.0%), 非常对称 30 人 (24.2%), 中等对称 44 人 (35.5%), 非常不对称 45 人 (36.3%)。不规则形的 FAZA 显著小于圆形、椭圆形 ($P < 0.05$), 其 CI 也显著低于圆形、椭圆形、四边形、五边形 ($P < 0.05$), 三角形的 FAZA 和 CI 显著低于圆形 FAZ ($P = 0.025$)。双眼 FAZA (右眼 $0.32 \pm 0.11 \text{ mm}^2$ vs 左眼 $0.31 \pm 0.11 \text{ mm}^2$)、周长 (右眼 $2.29 \pm 0.41 \text{ mm}$ vs 左眼 $2.23 \pm 0.41 \text{ mm}$)、CI (右眼 0.72 ± 0.08 vs 左眼 0.75 ± 0.07)、FD (右眼 $36.30 \pm 4.63\%$ vs 左眼 $36.85 \pm 3.9\%$)、SFRT (右眼 $210.16 \pm 20.94 \mu\text{m}$ vs 左眼 $210.62 \pm 22.10 \mu\text{m}$)、SFCT (右眼 $317.66 \pm 73.98 \mu\text{m}$ vs 左眼 $319.95 \pm 76.00 \mu\text{m}$) 在数值上均显示出高度的对称性 ($P < 0.001$)。

结论: 中国健康儿童青少年 FAZ 形态以圆形、椭圆形和不规则形为主, 其中, 三角形、不规则形的 FAZA 显著更小、CI 更低。尽管 FAZ 量化参数具有显著双眼对称性, 但超过 70% 的个体存在 FAZ 形态不对称, 提示 FAZ 数值对称性不能等同于形态对称性。

摘要编号: 207854

Waardenburg 综合征伴外斜视 1 例

第一作者: Zhao TIAN TIAN

共同作者: Kang YE

目的: 对一例 Waardenburg 综合征伴外斜视患者的诊疗过程进行报道及探讨致病基因, 提高临床工作者对该罕见遗传病的认识, 以免误诊。

方法: 回顾性收集 1 例 Waardenburg 综合征伴外斜视患者的临床资料。

结果: 该患者引人注目的面部特征、“亮蓝色”虹膜、脉络膜色素减退及家族史, 并通过基因检测得到证实致病基因为 PAX3, 最终诊断为 1 型 WS。患者完善相关检查后, 于我院行双眼外直肌后徙 + 内直肌缩短术, 手术顺利。术后患者及家属对外观改善满意, 未出现并发症。后期在我院行视功能训练及配镜治疗。

结论: 患有 WS 的个体的后代有 50% 的机会遗传致病性变异。我们应充分了解与 WS 相关的其他基因, 以提高对这种罕见综合征临床表现所涉及的机制的理解。这将使医疗专业人员能够为患者提供仔细的遗传咨询方案和更完整的治疗。

摘要编号: 204852

bFGF 介导内质网应激调控早产儿视网膜病变纤维化的分子机制

第一作者: Wensi CHEN

共同作者: Daoman XIANG

目的: 探讨碱性成纤维细胞生长因子 (bFGF) 通过调控液-液相分离 (LLPS) 和内质网应激 (ERS) 信号轴影响脉络膜成纤维细胞 (CFs) 泛凋亡的分子机制, 为早产儿视网膜病变 (ROP) 纤维化治疗提供新靶点。

方法: 探讨碱性成纤维细胞生长因子 (bFGF) 通过调控液-液相分离 (LLPS) 和内质网应激 (ERS) 信号轴影响脉络膜成纤维细胞 (CFs) 泛凋亡的分子机制, 为早产儿视网膜病变 (ROP) 纤维化治疗提供新靶点。

结果: 1. 低氧条件下, RPE 细胞中 bFGF 表达显著升高, 且能够挽救低氧诱导的 CFs 死亡, 这一过程依赖于 bFGF 对泛凋亡的抑制。2. bFGF 通过调控 CFs 中 TAF15 的相分离, 抑制 ERS 介导的泛凋亡, 从而维持 CFs 存活并促进纤维化。敲低 RPE 细胞中的 bFGF 或 CFs 中的 TAF15 均显著增强了 CFs 的泛凋亡, 并伴随 ERS 的激活。3. 筛选并验证了 TAF15 的靶标基因, 发现 TAF15 通过靶基因调控 CFs 的内质网应激和泛凋亡。在 CFs 中敲低或过表达 TAF15, 进一步确认了 TAF15 在 ERS-泛凋亡信号转导中的关键作用。

结论: bFGF-TAF15-ERS 轴是 ROP 纤维化的关键调控机制, 靶向干预该通路或为临床治疗提供新策略。

摘要编号: 210156

伪装为眶蜂窝织炎的儿童肺吸虫异位感染

第一作者: Lin CHEN

共同作者: Qing LIU, Xuan Xuan XIE, Jun Jie XU

目的: 探讨一例 11 岁女孩右上眼睑肿胀伴上睑下垂的病因及治疗。

方法: 通过临床表现、实验室检查及影像学检查, 结合病理学分析, 明确诊断。患者因右上眼睑肿胀伴压痛 1 个月就诊, 曾被误诊为麦粒肿并接受治疗, 但病情加重后被诊断为眶蜂窝织炎, 口服阿莫西林无效。检查发现右上眼睑肿胀伴上睑下垂, 视力正常, 无发热及全身不适, 无外伤、过敏及手术史, 有饮用生溪水史。实验室检查显示肝功能轻度异常, 血常规、C 反应蛋白、肾功能等检查正常。脑部及眶部 MRI 检查显示眶部 T2WI 呈隧道样高信号。手术发现褐色液体及黑色虫体, 病理检查及血清学检查均提示肺吸虫感染。

结果：患儿被诊断为眼睑异位肺吸虫病，无原发性肺部感染。病理检查发现成虫，血清学检查发现肺吸虫特异性 IgG 阳性。病变组织中存在嗜酸性肉芽肿，周边有嗜酸性粒细胞浸润。影像学检查未发现肌肉受累或水肿，全身检查未发现肺、肝、脑受累表现，支持孤立性异位感染。

结论：肺吸虫病在儿童中具有多样性，可表现为无原发肺部感染的异位眼睑病变。临床医生需注意肺吸虫病的非典型表现，并结合病史、影像学及病理学检查进行综合诊断，避免误诊。

摘要编号：**208673**

儿童反向布朗征的临床特征和手术治疗分析

第一作者：*Tengyue ZHANG*

共同作者：*Juan DING, Yueping LI, Wei ZHANG,*

Kanxing ZHAO

目的：分析儿童反向布朗征 (Inverted Brown pattern) 的临床特点，探讨下斜肌大量切除术治疗此型斜视的治疗效果和安全性。

方法：回顾性临床系列病例研究 纳入先天性上斜肌麻痹 (Congenital Superior Oblique Palsy, CSOP) 且确诊为反向布朗征并行斜视矫正手术治疗的患儿 11 例 (11 眼)，分析比较术前、术后眼球运动、斜视度、眼球客观旋转变化，术中、术毕斜肌牵拉试验结果。采用 t 检验、ANOVA 检验、Tukey 检验进行统计学分析。

结果：回顾性临床系列病例研究 纳入先天性上斜肌麻痹 (Congenital Superior Oblique Palsy, CSOP) 且确诊为反向布朗征并行斜视矫正手术治疗的患儿 11 例 (11 眼)，分析比较术前、术后眼球运动、斜视度、眼球客观旋转变化，术中、术毕斜肌牵拉试验结果。采用 t 检验、ANOVA 检验、Tukey 检验进行统计学分析。

结论：反向布朗征为原发或续发性下斜肌限制因素所导致，眼球运动表现为麻痹眼上斜肌诊断眼位显著落后，术中下斜肌被动牵拉试验证实存在下斜肌限制因素是诊断的重要依据，行下斜肌大量切除术可解除其限制，有效改善原在位和下方垂直斜视。

摘要编号：**209270**

出生因素和后天养育因素对儿童散光的影响

第一作者：*Haihua LIU*

共同作者：*Rongjun LIU*

目的：探讨出生因素和后天养育因素对儿童散光的影响。

方法：横断面研究。收集 2025 年 1 月至 2025 年 6 月在北京大学第一医院眼科门诊就诊的 3~6 岁儿童 600 例。对所有儿童进行自动电脑验光。记录儿童出生因素包括出生体重、顺产或剖宫产、有无早产和吸氧史、出生地城市或农村；后天养育因素包括身高、体重、是否挑食、每日近距离读写时间、每日户外活动时间。多因素回归分析散光与出生因素和后天养育因素的关系。

结果：多因素 Logistic 回归分析显示，经校正混杂因素后出生体重 < 2.5 kg (OR = 5.04, 95% CI: 1.10~26.08, $P = 0.024$) 及体重 (OR = 2.01, 95% CI: 1.12~3.15, $P = 0.019$) 均为儿童患散光的危险因素。

结论：出生体重低及后天养育中体重高的儿童更易发生散光。

摘要编号：**201273**

利用高度数远视性离焦诱导单眼弱视猴模型

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共同作者：*Hong LIU*

目的：屈光参差性弱视是最常见的弱视类型，食蟹猴是研究人类视功能的理想动物模型，然而，目前尚无成熟的建立屈光参差性弱视猴模型的方法。本研究将探索单眼 -10.0 D 远视性光学离焦能否诱导出屈光参差性弱视猴模型，并观察其对食蟹猴正视化的影响。

方法：7 只食蟹猴，实验组 5 只、对照组 2 只。实验组自 4 周龄开始右眼 (离焦眼) 配戴透明 -10.0 D 树脂镜片，左眼 (对侧眼) 配戴平光镜片，共戴 28 周 (即 32 周龄)。对照组不干预。在造模前 (4 周龄)、造模后每 2~4 周，检测屈光度和眼轴。自身双眼间比较采用配对秩和检验，实验组纵贯造模期间的双眼间屈光度、眼轴的比较采用重复测量方差分析。采用心理物理学方法检测猴的对比敏感度，两眼分别单眼注视可计算弱视指数 (amblyopia index)，量化单眼弱视程度；双眼同时注视可计算双眼总和 (binocular summation)，辅助验证双眼视功能受损。

结果：造模期间，实验组离焦眼和对照组右眼的平均屈光度分别降低 1.75 ± 0.81 D 和 2.00 ± 0.35 D，均在 16 周龄前发生快速正视化，实验组在 16 周龄之后出现远视偏移，最终在 32 周龄时，实验组有 4 只猴屈光状态与对照组相似，为轻度远视，有 1 只猴为轻度近视。实验组的双眼间屈光度在 4 周龄时相差 0.55 ± 0.27 D ($p = 0.074$)，32 周龄时相差 0.35 ± 0.35 D ($p = 0.408$)，均未达到屈光参差 (1.0 D) 的标准。实验组在造模期间 9 个时间点的双眼间屈光度 ($p = 0.624$)、眼轴 ($p = 0.943$)

相比均无统计学差异。实验组的弱视指数为 0.72 ± 0.10 ，高达对照组弱视指数 (0.06 ± 0.02) 的 10 倍以上，提示双眼对比敏感度差异大。实验组每只猴的双眼总和值均接近于 1，证明双眼功能受损；对照组则接近正常值 1.41，提示双眼总和正常。

结论：4 周龄食蟹猴经 28 周单眼高度远视性光学离焦后，在 16 周龄前类似于正常食蟹猴发生快速正视化，随后出现远视偏移，最终在屈光度上未呈现屈光参差，但形成了单眼弱视。这一单眼弱视猴模型相较于形觉剥夺模型可能更接近于人类屈光参差性弱视的形成原理。

摘要编号：**210177**

双眼分视数字疗法与传统遮盖训练对儿童中重度弱视的疗效对比

第一作者：**Haiying LI**

目的：对比双眼分视数字疗法与传统遮盖训练对儿童中重度弱视的疗效及依从性，为儿童弱视个体化治疗提供依据。

方法：回顾性纳入我院 2023–2024 年中重度弱视患儿 92 例 (128 眼)，按干预方式分为数字疗法组 (47 例 65 眼) 和传统训练组 (45 例 63 眼)。数字疗法组采用双眼分视互动训练系统，传统训练组采用健眼遮盖联合精细目力训练，两组均持续干预 6 个月。比较两组患儿的最佳矫正视力 (BCVA)、双眼视功能 (立体视、同时视、融合视)、治疗依从性及眼部不适发生率。

结果：干预 6 个月后，数字疗法组 BCVA 提升幅度 (0.53 ± 0.11) 显著高于传统训练组 (0.34 ± 0.09 , $P < 0.05$)；数字疗法组立体视恢复率 (84.62%)、同时视建立率 (90.77%)、融合视建立率 (83.08%) 均高于传统训练组 (55.56%、66.67%、58.73%， P 均 < 0.05)；数字疗法组依从性评分 (8.7 ± 1.1) 及良好率 (82.98%) 显著高于传统训练组 (6.2 ± 1.4 、46.67%， $P < 0.05$)；数字疗法组眼部不适发生率 (12.77%) 低于传统训练组 (28.89%， $P < 0.05$)。

结论：双眼分视数字疗法对儿童中重度弱视的视力改善、双眼视功能重建及治疗依从性提升效果更优，且眼部耐受性良好，更适配儿童眼健康干预需求。

摘要编号：**208635**

吸收缝线结合小丑照护方案在斜视患儿围手术期应用的效果观察

第一作者：**Meng Yao WANG**

共同作者：**Li Na CHENG**

目的：探讨可吸收缝线在斜视矫正手术中的缝合效果及小丑照护在斜视患儿围手术期的应用效果。

方法：选取 2022 年 10 月–2023 年 10 月在西安市某三甲医院住院的 98 例斜视儿童作为研究对象，按照入院顺序分为试验组和对照组。对照组实施围手术期常规护理，试验组在常规护理的基础上给予小丑照护，并用可吸收缝线进行眼肌缝合。比较两组患儿麻醉诱导依从性、焦虑、疼痛与家长焦虑、满意度评分，以及患儿术后不良反应以及矫正效果。

结果：试验组患儿术前焦虑、术中麻醉诱导依从性、术后主观疼痛评分均显著低于对照组，试验组家长术前术后焦虑评分均低于对照组，满意度评分高于对照组，试验组患儿术后不良反应更少，其差异均有统计学意义 ($P < 0.05$)；两组患儿斜视症状均有所改善，但矫正效果比较差异无统计学意义 ($P > 0.05$)。

结论：可吸收缝线结合小丑照护能有效提高患儿麻醉诱导依从性，减少术后不良反应的发生，减轻患儿的焦虑水平、疼痛程度，降低家长焦虑水平，稳定情绪，提升家长对住院护理的满意度。

摘要编号：**208641**

多点近视离焦镜片与高度非球面小透镜控制近视的临床观察

第一作者：**Hao YANJUN**

目的：研究多点近视离焦镜片和高度非球面小透镜控制青少年近视发展的临床效果。

方法：对 2021 年 1 月–2022 年 1 月在我院接受治疗的 450 名年龄介于 7~15 岁、散瞳球面屈光度在 $-0.75\text{ D} \sim -6.00\text{ D}$ 范围内，且散光 $< -5.00\text{ D}$ 的儿童进行了随机分组研究，分别配戴多点近视离焦镜片 (47 例) 与高度非球面小透镜 (413 例)，对其 6 个月及 1 年的眼轴长度、球镜、柱镜变化进行观察与分析。

结果：多点近视离焦镜片组 6 个月眼轴平均增长达到了 (0.12 ± 0.03) mm，而 1 年平均增长为 (0.20 ± 0.05) mm，高度非球面小透镜组 6 个月眼轴平均增长为 (0.08 ± 0.02) mm，而 1 年平均增长为 (0.16 ± 0.04) mm，组间差异不大， $P > 0.05$ 。在球镜和柱镜的变化上，两组之间的差异在统计学上并不显著 ($P > 0.05$)。

结论：在 1 年的随访期内，两种不同的镜片在控制眼轴增长和屈光度变化方面表现相似，因此临床医生可以根据儿童的配戴接受度和个体特点来选择合适的镜片类型。

摘要编号：203532

学龄儿童不同类型集合异常对眼轴增长的影响

第一作者：Wu HAO

目的：探究学龄儿童不同类型集合异常对眼轴增长的影响。

方法：回顾性研究。纳入 2018 年 1 月 -2024 年 12 月 就诊于锦州医科大学附属第三医院眼科进行检查的 7-12 岁儿童 354 例，男女比例 183:171，SE (-2.43 ± 1.17) 。根据集合异常的不同分为集合不足组（86 例）、集合过度组（58 例）、散开不足组（47 例）、散开过度组（40 例）、基本型内隐斜组（60 例）和基本型外隐斜组（63 例），均采取单光镜（SP）进行矫正，比较各组儿童 1 年后的 AL 变化。采用配对 t 检验比较各组内儿童戴镜 1 年前后 AL 的变化，单因素方差分析比较各组组间儿童 AL 增长量的差异。

结果：戴镜 1 年后 6 组 AL 较基线均有增长，组内差异均有统计学意义 ($t = -13.25 \sim -3.45$ ，均 $P < 0.05$)；集合不足组、集合过度组、散开不足组、散开过度组、基本型内斜视组、基本型外斜组 AL 年增长量分别为 (0.37 ± 0.18) (0.52 ± 0.14) (0.34 ± 0.12) (0.39 ± 0.14) (0.49 ± 0.12) (0.36 ± 0.13) mm，组间 AL 年增长量差异有统计学意义 ($F = 9.16$ ， $P < 0.001$)，其中集合过度组 ($P < 0.001$) 和基本型内斜视组 ($P = 0.005$) 的 AL 年增长量明显高于集合不足组、散开不足组、散开过度组和基本型外斜视组，而集合过度组和基本型内斜视组差异无统计学意义 ($P > 0.05$)。

结论：在不同类型集合异常的学龄儿童中，集合过度和基本型内斜视的儿童眼轴增长速度快于其他类型，未来应针对这些特殊类型，进一步深入研究其眼轴增长的机制和影响因素，从而更好地制定个性化的近视控制策略。

摘要编号：209319

学龄期斜视儿童阅读效率、双眼视功能与注意力发展关联的比较研究

第一作者：Rui LIU

共同作者：Jiawei ZHANG

目的：探究学龄期斜视儿童与正常儿童的阅读效率、双眼视功能和注意力发展的状况，并评估三者与临床特征的关联。

方法：研究纳入 69 例明确诊断为斜视且斜视度数超过 15 PD 的儿童（间歇性外斜 54 例、内斜视 15 例），同时招募 31 例正常发育儿童；采用发育性眼动测试（DEM）获得垂直和水平阅读时间及比值，评估受试者的阅读效率（尤其是阅读相关的眼动控制能力）；采用同视机、Titumus 立体视测试和 Worth-4 点灯测试评估受试者的双眼视功能；客观维度采用试听双通道可持续操作性测试（BOKE STARS）测试漏报率、误报率、反应时间和反应时间变异度，评估受试者的注意力持续性、警觉性、稳定性和抑制控制能力；主观维度采用 SNAP-IV 18 项家长量表评估受试者注意力和多动冲动症状严重程度。采集数据并分析斜视组与正常组得分的差异。

结果：差异检验显示，斜视组儿童的校正水平阅读时间、眼动控制、双眼视功能评分（融合和立体视）、SNAP-IV 18 项总分和 BOKE STARS 注意力稳定性指标（反应时间变异度）表现均差于同龄正常对照组，差异有统计学意义 ($p < 0.05$)。亚组分析和协变量分析发现，与同龄正常儿童相比，仅内斜视组儿童阅读效率降低，间歇性内斜视组未发现显著差异；中介效应模型检验发现，融合功能在内斜视与阅读效率之间发挥了中介作用。

结论：内斜视儿童的阅读眼动控制力、双眼视功能和视听整合注意力稳定性能力低于同龄儿童，融合功能可能是影响内斜视患者阅读效率的中介因素。

摘要编号：210288

父母近亲婚配低龄高近患儿一例

第一作者：Haiying LI

目的：探讨父母近亲婚配背景下 4 岁超高度近视患儿的临床特征、遗传学病因及干预策略，为早期精准诊疗提供依据。

方法：回顾性分析 1 例 4 岁男性患儿资料。患儿系足月顺产，父母近亲婚配，屈光检查示：双眼超高度近视（OD: -16.00 DS/ -2.00 DC $\times 10^\circ \rightarrow 0.2$ ，OS: -18.00 DS/ -2.00 DC $\times 20^\circ \rightarrow 0.16$ ；眼轴：OD: 30.44 mm、OS: 30.74 mm），伴眼球震颤（已行中间带移位术），外院予配镜及低浓度阿托品滴眼液治疗，我院建议行基因检测分析。

结果：临床特征：4 岁超高度近视（右眼 -16.00 D，左眼 -18.00 D），眼球震颤术后，配镜联合低浓度阿托品滴眼液控制近视；基因检测：P3H2 基因纯合致病突变（NM_018192.4:exon8/15:c.1309 C>T:p.R437*），ACMG 评级为致病，符合成骨不全症（OI）；PRS = 59.0（高度近视极高风险）；干预：行后巩膜加固术，计划个性化配镜矫正。

结论: 患儿超高度近视由 P3H2 双等位基因突变(常染色体隐性 OI) 与多基因易感($PRS = 59.0$) 叠加导致, 近亲婚配为关键诱因; OI 可仅以眼部表现为首发(低龄超高度近视、眼球震颤), 易漏诊全身病变, 综合干预策略(后巩膜加固术、光学矫正)需结合终身多学科随访(眼科监测视网膜脱离、骨科评估骨密度)。

摘要编号: 209891

监护麻醉下成人水平斜视患者术中及术后斜视度变化的特征分析

第一作者: Min CHANG

目的: 探讨监护麻醉(monitored anesthesia care, MAC)下成人水平斜视患者术中及术后斜视度变化的特征分析。

方法: 前瞻性研究。纳入山西省眼科医院斜视与小儿眼科 2024 年 10 月至 2025 年 4 月于 MAC 下行水平斜视矫正术的成人患者 87 名。收集不同时间(手术前、手术结束时、麻醉清醒后、术后 1 天、术后 2 周、术后 1 月、术后 2 月)的近(33 cm)及远(6 m)斜视度, 同时收集年龄、性别、麻醉疼痛评分, 并记录牵拉不同肌肉时心率的变化值。前后比较采用配对设计非参数检验方法, 影响因素分析采用混合效应的敏感性分析。

结果: 1. 不同时间斜视度的比较: (1) 视近斜视度: 外斜视患者手术结束时与麻醉清醒后、术后 1 天、术后 2 周、术后 1 月、术后 2 月差异均有统计学意义(P 均 < 0.001); 内斜视患者手术结束时与麻醉清醒后、术后 1 天、术后 2 周、术后 1 月、术后 2 月差异均无统计学意义(P 均 > 0.05); (2) 视远斜视度: 外斜视患者手术结束时与术后 2 周、术后 1 月、术后 2 月差异均有统计学意义(P 均 < 0.001); 2. MAC 麻醉下水平斜视术后 2 月时治愈率: (1) 视近: 正位组 49 人(56.3%), 基本治愈组 26 人(29.9%); 未愈组 12 人(13.8%); (2) 视远: 正位组 56 人(64.4%), 基本治愈组 24 人(27.6%); 未愈组 7 人(8%)。 (3) 内斜视患者 MAC 术后 2 月未复发。3. MAC 麻醉后心率降低, 差异有统计学意义($Z = 7.04, P < 0.001$); 术后疼痛评分降低, 差异有统计学意义($Z = 2.81, P = 0.005$); 牵拉外直肌与内直肌的心率比较, 差异有统计学意义($Z = 2.775, P = 0.006$)。4. 混合效应模型: 近与远斜视度差值越大, 术后近斜视度越大($Z = 2.312, P = 0.024$); (2) 时间与诊断对术后远、近斜视度的变化均存在交互作用($Z = -3.941, Z = -3.372, P$ 均 < 0.001)。

结论: 1. 与内斜视术后稳定的斜视度不同, 虽然 MAC 术中检查眼位正, 但外斜视患者术后 2 周远

斜视度即发生变化, 眼位回退速度快。2. 集合不足型外斜视可能导致术后近斜视度回退, 对于此型患者的手术设计应尽量足矫。3. MAC 可在清醒的状态下配合眼位及眼球运动的检查, 术后心率及疼痛评分降低, 是斜视手术理想的麻醉方法。4. 牵拉内直肌引起的心率变化更大, 术中需注意轻柔操作。

摘要编号: 209217

肉毒杆菌毒素注射与眼外肌手术治疗急性共同性内斜视的疗效对比: 一项回顾性研究

第一作者: Xin CAO

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目的: 探讨 A 型肉毒杆菌毒素(BTXA)注射与斜视手术治疗急性共同性内斜视(AACE)的疗效差异。

方法: 回顾性分析 2019 年 1 月至 2023 年 9 月南通市第一人民医院收治的 AACE 病例资料。研究方案包括: 采集患者基线特征、记录治疗前后多个时间点的斜视度、评估立体视觉功能。根据治疗方式将患者分为手术组与 BTXA 注射组, 并按术前斜视度(> 35 棱镜度[PD]与 ≤ 35 PD)和年龄(≥ 18 岁成人组与 < 18 岁青少年组)进行分层, 通过亚组疗效对比系统评估不同治疗方案的临床价值。

结果: 共纳入 43 例 AACE 患者。末次随访时, 手术组与注射组斜视度均较治疗前显著降低($P < 0.001$)。两组在斜视治愈率与立体视觉恢复率方面存在显著差异($P < 0.05$)。对于斜视度 > 35 PD 者, 手术在术后斜视度控制、成功率及立体视觉恢复方面均优于注射治疗($P < 0.05$); 在 ≥ 18 岁患者中, 手术在斜视矫正、成功率提升和立体视觉重建方面同样更具优势($P < 0.05$)。

结论: BTXA 化学去神经术与斜视手术对 AACE 均具有治疗价值。手术治疗总体疗效优于 BTXA 注射, 尤其适用于斜视度 > 35 PD 及年龄 ≥ 18 岁的患者; 对于斜视度 ≤ 35 PD 或未成年患者, BTXA 注射仍可作为可行的治疗选择。

摘要编号: 201340

追光寻影

第一作者: Liu RUI

目的: 本文报道一例“左眼视网膜母细胞瘤”患儿多次就诊经历, 通过对本病的讨论分析, 厘清诊断思路, 避免误诊。

方法: 男, 4 岁。因“体检发现左眼视力差 3 周”入院。3 周前在眼部体检时, 无意发现患儿左眼视力差, 曾在多家医院就诊, 诊断为“左眼视网膜母细胞瘤、双眼屈光参差”为进一步诊治, 于我院就诊, 患儿

既往体健，否认全身及眼部病史，家族近亲中无眼部病史及遗传疾病。无猫、狗宠物接触、喂养史。

结果：眼部专科检查示：右眼视力 1.0，左眼 0.05 矫正无光；右眼眼压 11 mmHg (1 mmHg = 0.133 kPa)，左眼 10 mmHg (NCT)。双眼眼前节未见明显异常。彩色眼底照相检查示：右眼眼底未见异常；左眼视盘处隆起，大小约 5 个视盘直径 (Papillary diameter, PD)，累及黄斑，表面灰白色胶质膜，病灶内视网膜血管迂曲，少许散在、色素沉着，边缘见黄白色渗出。光学相干断层扫描检查 (OCT) 示：左眼视盘及盘周视网膜隆起，神经上皮层增厚结构紊乱，内、外层视网膜“山峰状”皱褶。眼部 B 超检查示：左眼视盘前见扁平隆起的条带状中高回声，其内回声欠均匀，另见一短条状强回声斑，边界较清，大小约：10.11 mm × 2.14 mm。眼眶核磁显示：左侧眼球玻璃体后份视乳头处小条片状异常信号并强化。双眼 PVEP 检查显示左眼 P100 波波幅降低，FVEP 检查显示左眼 P2 波峰时延迟，波幅降低。临床诊断：左眼视网膜和视网膜色素上皮联合错构瘤 (Combined hamartoma of the retinal and retinal pigment epithelium, CHRPE)。治疗方案：半年复查，OCT、眼底照相定期检查，必要时考虑手术治疗。

结论：该病给我们启示：1、少见病例，容易误诊；2、通过本病讨论，强调及时正确诊治，尽可能减轻患者慢性眼病的困扰。

摘要编号：209101

间歇性外斜视儿童双眼融合相关的脑功能改变研究

第一作者：Tao FU

共同作者：Di CHANG, Yuying HAN, Shuzhen LI, Zhihan LIU, Yachen WANG, Mofan WEN

目的：利用任务态功能磁共振 (fMRI)，观察间歇性外斜视 (intermittent exotropia, IXT) 儿童及正常儿童在执行双眼融合任务期间显著激活的脑区，并分析两组的额叶眼动区 (frontal eye field, FEF) 及其他相关脑区的激活差异，探索 IXT 的中枢发病机制。

方法：招募 24 名 IXT 儿童及 28 名匹配的正常对照儿童，进行双眼融合任务下的 fMRI。静态视差刺激任务 (激活感觉融合) 和动态视差刺激任务 (激活运动融合) 分别反应不同类型的融合功能，以及无视差刺激任务反应单纯视觉刺激基线活动。记录受试者的脑激活情况，以及眼位控制评分及融合范围等与斜视病情相关的临床指标。比较 IXT 儿童与正常对照儿童间双眼融合相关的脑功能差异，并进行临床指标与脑功能指标的相关性分析。

结果：在整体融合刺激条件下，两组双侧 FEF、顶上小叶 (SPL)、顶下小叶 (IPL)、枕下回 (IOG)、枕中回 (MOG)、颞中回复合体 (MT+)、额内回、小脑显著激活；IXT 患儿右侧 FEF、IOG 较正常儿童激活降低，左侧 MT+ 激活增强；相关性分析发现，正常儿童右侧 FEF、IPL、左侧小脑激活强度与融合范围正相关，IXT 患儿左侧 MT+ 激活强度与眼位控制评分正相关。其次，在运动融合刺激条件下，两组右侧 FEF、双侧 SPL、IPL、IOG、MOG、小脑显著激活；IXT 患儿右侧 MOG、左侧小脑、双侧 IPL 较正常儿童激活降低；相关性分析发现，正常儿童的右侧 FEF、小脑激活强度与融合范围正相关，IXT 患儿右侧 FEF、MOG、小脑、左侧 IPL 激活强度与眼位控制评分负相关。

结论：IXT 儿童存在与双眼融合功能相关的中枢功能改变，可能通过影响双眼融合功能参与 IXT 发病。

摘要编号：201823

黄斑中心凹发育不良一例

第一作者：Miao KONG

目的：报告一例孤立性黄斑中心凹发育不良病例。

方法：通过 OCT 检查发现双眼黄斑中心凹发育不良。

结果：眼底检查：眼视盘边界清。呈横椭圆形。视网膜在位。黄斑区未见色素及中心凹反光。光相干断层扫描 (OCT) 检查双眼视网膜未见黄斑结构。Oct-A 检查，双眼浅层毛细血管丛未见黄斑中心凹无血管区。血流信号呈桥样越过该区。深层毛细血管层可见黄斑中心凹无血管区。超广角眼底成像双眼黄斑呈现“同心环”形征象。双眼色觉检查正常。

结论：黄斑中心凹发育不良是一种视网膜黄斑区发育不良的先天性发育性疾病。

白内障

摘要编号：203363

0.4% 盐酸奥布卡因表面麻醉在白内障手术应用的临床研究

第一作者：Meiyi ZHU

共同作者：Guangbin ZHANG

目的：对比 0.4% 盐酸奥布卡因行表面麻醉在传统白内障超声乳化手术 (手工组) 及飞秒激光辅助白内障超声乳化手术 (飞秒组) 的麻醉效果和手术效率。

方法：前瞻性对比研究。纳入 2025 年 5 月至 8 月在厦门大学附属厦门眼科中心行微小切口白内障手术的患者，采用 0.4% 盐酸奥布卡因行表面麻醉。手工组在术前接受 3 次麻醉（间隔 5 分钟）；飞秒组在激光前接受 1 次麻醉，激光后再接受 2 次麻醉（间隔 5 分钟）。主要观察指标：（1）平均术前麻醉时长、手术时长及总时长；（2）术中麻醉分级评估：I 级（配合良好，无疼痛）、II 级（轻微痛感，加用麻药）、III 级（疼痛明显，改用其他麻醉）；（3）术后疼痛 VAS 评分（0-10 分）。

结果：手工组 73 名患者（102 眼），飞秒组 65 名患者（100 眼）。平均术前麻醉时长：手工组 12.50 ± 5.18 min 和飞秒组 11.63 ± 3.26 min ($P = 0.681$)；平均手术时长：手工组 6.53 ± 1.69 min 和飞秒组 6.04 ± 1.12 min ($P = 0.342$)；总时长：手工组 19.02 ± 6.11 min 和飞秒组 17.67 ± 3.63 min ($P = 0.592$)。术中麻醉分级：手工组（I 级 82.5%；II 级 17.5%）及飞秒组（I 级 91.7%；II 级 8.3%）($P = 0.516$)。术后疼痛 VAS 评分：手工组 1.05 ± 1.43 分及飞秒组 1.33 ± 1.27 分 ($P = 0.270$)。均无显著统计学差异。

结论：0.4% 盐酸奥布卡因可以为传统白内障超声乳化手术及飞秒激光辅助白内障超声乳化手术提供良好的麻醉效果，将表面麻醉穿插于飞秒激光辅助白内障手术步骤间隙有助于提高手术效率。

摘要编号：201543

1 例 21 三体综合征并发白内障的护理体会

第一作者：周莉义

目的：总结 1 例 21 三体综合征（唐氏综合征）并发白内障患者的护理经验，探讨针对此类特殊人群的有效护理策略，以提高护理质量。

方法：回顾性分析 1 例 确诊为 21 三体综合征并接受白内障手术患者的临床资料，总结在围手术期采取的针对性护理措施。包括术前心理护理、眼部准备、全身状况评估与管理，术中配合及术后生命体征的监测及眼部情况的观察、并发症的预防、康复指导、安全防护、个性化的生活护理与营养支持等。

结果：通过实施个体化、精细化的护理方案，患者顺利度过围手术期，未发生严重并发症，术后视力改善明显，患者及家属对治疗过程配合度良好，对护理服务满意。

结论：针对 21 三体综合征 并发白内障患者的特殊性，制定个性化护理方案，加强围手术期各环节护理，能有效提高手术成功率，促进患者康复，改善患者生活质量。本案例的护理经验可为类似患者的临床护理提供参考与借鉴。

摘要编号：210101

DJ1 蛋白乳酸化修饰在年龄相关性白内障中的机制研究

第一作者：Pengfei LI

共同作者：Huajin GUAN, Min JI

目的：DJ1 是帕金森疾病发病的重要关键蛋白，也是抗衰老治疗的关键靶标。年龄相关性白内障同样是一种与衰老密切相关的老年性疾病，DJ1 与 ARC 的研究具有一定的研究价值。

方法：以临床 ARCC 患者、年龄相关性白内障小鼠（CFW-Em/J）、SD 大鼠、斑马鱼、人原代晶状体上皮细胞（lens epithelial cells, LECs）及细胞株 SRA01/04 为研究对象。首先，利用自行设计的术中分区取材取样器收取入组的临床 ARCC 患者的透明皮质和混浊皮质样本；然后，使用蛋白组学和代谢组学对收取的不同分区病人样本进行分析；乳酸化修饰组学分析 LECs 内的乳酸化修饰蛋白；生物信息学分析筛选差异蛋白、差异代谢物和乳酸化修饰显著富集的蛋白，并进行功能和通路分析。

结果：ARCC 患者透明皮质（ $n = 6$ ）和混浊皮质（ $n = 6$ ）蛋白组学结果显示，发现 6 个差异上调的蛋白，26 个差异下调的蛋白，其中 DJ1 蛋白的表达在混浊皮质呈显著下降趋势；在进一步扩大白内障的样本数量和类型验证后，发现 DJ1 蛋白在多种白内障组织样本以及原代 LECs 的氧化损伤模型中，表达仍呈显著下调；然后，构建了 DJ1 的过表达质粒，并在 LECs 中成功过表达，初步探索发现过表达 DJ1 蛋白后，显著抑制了 LECs 的衰老、氧化损伤和凋亡。为了探究 DJ1 对白内障的影响，设计了动物用 siRNA 靶向抑制 DJ1 的表达，并与源自 SD 大鼠的体外透明晶状体共培养，结果发现 DJ1 表达下降会明显加速晶状体混浊的发生；随后，我们成功构建了 DJ1 敲除的小鼠，并观察到其出现了年龄相关性白内障样病理改变。随后，我们利用乳酸化修饰组学检测了 LECs 的乳酸化修饰蛋白。其中，DJ1 蛋白也存在差异的乳酸化修饰，我们通过免疫共沉淀和蛋白质谱，进一步确定了其显著的乳酸化修饰。

结论：ARCC 患者透明皮质和混浊皮质蛋白样本、CFW-Em/J 模型小鼠晶状体组织样本以及人原代上皮细胞氧化损伤模型中 DJ1 蛋白显著下调。功能上，DJ1 能够抵抗氧化损伤环境下 LECs 的衰老、氧化损伤和凋亡；动物用 siRNA 敲低 DJ1 后，大鼠晶状体混浊加重；DJ1 敲除小鼠出现年龄相关性白内障表现。DJ1 蛋白发生乳酸化修饰。

摘要编号: 207917

FLACS 治疗成人后极性白内障的临床效果与体会

第一作者: Ye XIANGYU

目的: 探讨飞秒激光辅助超声乳化术 (FLACS) 处理成人后极性白内障 (PPC) 的临床效果及操作体会。

方法: 回顾性分析福州眼科医院 2018 年 1 月至 2025 年 2 月成人 PPC 行 FALCS 手术 25 例 (34 眼) 的临床资料, 总结术前、术中后囊情况、手术技巧、术中并发症以及术后视力恢复情况。探讨 FLACS 处理 PPC 的利弊。

结果: 10 眼采用 FLACS 环形囊膜切开 + 激光劈核 (六分法), 24 眼仅采用 FLACS 激光劈核 (六分法), 33 眼一期植入 IOL, 其中囊袋内植入 28 眼, 睫状沟植入 5 眼, 1 眼二期睫状沟植入 IOL。25 眼后囊完整, 9 眼术中后囊破裂。最佳矫正视力 > 0.5 者 30 眼, 0.1 ~ 0.5 者 4 眼。

结论: 术前评估分型 PPC 后囊膜完整性至关重要, 对于后囊膜明显存在异常的 PPC, 不建议行 FLACS 环形囊膜切开; FLACS 激光劈核有利于减少核块处理时间和操作, 有助于提高手术成功率。

摘要编号: 208951

ICL 植入术后眼外伤致复杂眼前节损伤诊治一例

第一作者: Xuan LI

共同作者: Bolin DENG, Bingyue SHUI, Zhengzheng WU, Qingwen YANG

目的: 通过分享一例 ICL 植入术后并发严重眼外伤的罕见病例, 重点展示采用一期联合手术成功处理多重眼前节损伤的有效策略, 从而为眼科同行在未来应对类似复杂病例时, 特别是在手术方案设计和围手术期高眼压管理方面, 提供宝贵的临床经验与借鉴。

方法: 患者男性, 22 岁, 因右眼被木棍击伤眼红眼痛伴视力下降 1 月余, 眼胀痛 2 周就诊。行右眼 ICL 取出联合白内障超声乳化吸除及人工晶状体植入和虹膜根部修复术。

结果: 患者男性, 22 岁, 因右眼被木棍击伤, 眼红眼痛伴视力下降 1 月余, 眼胀痛 2 周就诊。既往屈光不正, 5 年前双眼行 ICL 植入术。专科查体: 右眼视力 0.15, 左眼视力 1.0; 右眼眼压 35 mmHg, 左眼眼压 21 mmHg; 右眼结膜轻度充血, 角膜轻度混浊, 瞳孔椭圆, 直径 6 mm, 12 点虹膜根部离断, 前房深度正常, ICL 位于虹膜后方表面

色素附着, 晶状体混浊, 眼底窥不清。诊断: 右眼外伤性白内障、右眼继发性青光眼、右眼虹膜根部离断、双眼 ICL 植入术后。行右眼 ICL 取出联合白内障超声乳化吸除及人工晶状体植入术和虹膜根部修复术。术后右眼予以局部预防感染, 对症抗炎及四联降眼压处理。术后早期复查右眼角膜轻度水肿, 上方缝线在位, 人工晶状体正位, 玻璃体腔见大量色素漂浮, 眼压 22 ~ 45 mmHg; 术后 1 月复查: 右眼角膜恢复透明, 右眼最佳矫正视力 0.8, 眼压 18 mmHg。

结论: 本病例提示, 对于 ICL 植入术后眼外伤的患者, 眼科医生应进行密切随访, 并根据眼前节损伤的复杂性及时进行全面的手术干预。同时, 需高度警惕因创伤和手术操作导致的广泛色素播散, 及其引发继发性青光眼的风险, 并进行积极的围手术期的眼压管理。

摘要编号: 210087

不同屈光状态白内障患者植入三焦点人工晶体术后视觉效果临床研究

第一作者: Jian YE

目的: 对比不同屈光状态白内障患者植入三焦点人工晶体术后的视觉效果和主观满意度。

方法: 对 86 例 (134 眼) 植入三焦点人工晶体 (TFNT00) 的患者进行回顾性研究。根据术前眼轴长度 (AL) 分为 3 组: A 组: 远视及正视组 ($AL \leq 24$ mm)、B 组: 低中度近视组 (24 mm < $AL < 26$ mm)、C 组: 高度近视组 ($AL \geq 26$ mm)。收集并比较了术后视力、离焦曲线、视觉质量和主观满意度, 术后随访时间至少为 3 个月 (3 个月至 3 年)。

结果: 术后三组脱镜率调查视远、视中脱镜率均为 100%, 远视及正视组、低中度近视组和高度近视组的视近脱镜率分别为 94%、92% 和 98%。三组的光晕发生率分别为 20%、11%、13%, 均对生活无影响; 眩光发生率分别为 8%、16%、13%, 低中度近视组中 1 例患者表示对生活轻度影响; 星爆发生率分别为 0%、8%、16%, 均对生活无影响。

结论: 对于不同屈光状态的白内障患者, 三焦点人工晶体植入均可提供良好的视力和屈光结果。相较于远视及正视和高度近视患者, 低中度近视患者的裸眼中视力和裸眼近视力较差, 视近主观满意度也较差。

摘要编号: 202580

不规则角膜散光合并白内障手术效果观察 (附手术录像)

第一作者: Yanfeng ZENG

目的: 不规则角膜散光病人白内障手术效果观察。

方法: 女, 76 岁, 退休的医务工作者, 2019 年 6 月 12 日因右眼视物不清两年来我院就诊。自幼左眼视力差。专业检查: VOD: 0.3 VOS: 0.1 矫正无助。Pentacam。Opd master700, nidek 双眼不均匀散光均 > 1.5 D。裂隙灯检查右眼结膜无充血, 角膜上皮点状着染, 瞳孔圆, 直径 3 mm, 对光反射灵敏, 晶状体核 N3P3。人工晶体 14 D, 左眼结膜无充血, 角膜上皮点状着染, 瞳孔圆, 直径 3 mm, 晶状体核 N3P3, 外斜 45°。干眼检查 2 度干眼。人工晶体 9 D 经干眼治疗后, 双眼角膜散光都在 1 D 以内。先后给予左眼飞秒激光联合区域折射人工晶状体植入术。采用 LenSX 飞秒激光撕囊、劈核、做主切口和侧切口。激光手术后, 行超声乳化术, 囊袋内植入一片式平板攀区域折射人工晶状体, 吸除黏弹剂后行水密切口。

结果: 术后第一天左眼远视力 0.8, 中视力 0.8, 近视力 0.8 术后第一天右眼远视力 1.0, 中视力 1.0, 近视力 1.0 病人满意 术后 2 年随访时诊断为干燥综合征。

结论: 白内障术前角膜不规则散光可以由干眼病引起, 有一些病人甚至可能是患有全身疾病, 眼表治疗可以改善角膜散光情况, 从而规划功能性人工晶状体植入, 改善病人远中近视力。

摘要编号: 209152

中国人群 PanOptix 多焦点人工晶状体植入后的临床表现

第一作者: Xin LIU

共同作者: Ke YAO

目的: 评估 PanOptix 多焦点人工晶状体在中国人群中的临床表现。

方法: 前瞻性单臂多中心研究。招募中国不同地区 9 家医院行白内障超声乳化联合 PanOptix 人工晶状体植入术的患者共 144 人 (286 眼), 其中 134 人 (268 眼) 完成术后 1 年随访。检测术后等效球镜、远 (5 m) 中 (60 cm) 近 (40 cm) 距离视力、离焦曲线, 统计安全性指标, 并行问卷调查。

结果: 术后 1 年结果: 术眼术后等效球镜值为 -0.06 ± 0.36 D。98.5% 术眼单眼最佳矫正远视力达到或优于 0.3 logMAR, 其中, 单眼裸眼远中近视力值分别为 0.04 ± 0.13 logMAR、 $0.09 \pm$

0.14 logMAR、 0.10 ± 0.13 logMAR; 单眼最佳远矫正状态下的远中近视力分别为 -0.01 ± 0.13 logMAR、 0.08 ± 0.14 logMAR、 0.08 ± 0.13 logMAR。双眼离焦曲线的峰值分布在 0 D、-0.5 D、-2.0 D, 在 +0.5 D 至 -3.0 D 之间视力均等于或优于 0.1 logMAR。术后 1 年内未发生器械相关不良事件、二次手术或人工晶状体位置改变; 40 眼 (14.1%) 发生后囊混浊, 其中 37 例无临床意义, 1 例 (0.4%) 行 YAG 激光后囊切开; 发生黄斑囊样水肿 5 例 (1.8%); 术后角膜内皮细胞较术前减少 9.5 ± 11.9 。重度星芒、光晕和眩光发生率分别为 15.6%、4.4% 和 2.3%, 明显受上述视觉干扰影响的比例为 1.5%、1.5% 及 1.5%; 远中近距离完全脱镜的比例分别为 94.0%、90.2% 及 86.5%; 88.2% 患者对术后视力满意或非常满意, 91.8% 患者愿意将 PanOptix 推荐给亲友。

结论: PanOptix 人工晶状体能提供良好的远中近距离视力, 能安全有效地提高视觉质量, 并具有良好的术后脱镜率及患者满意度。

摘要编号: 209685

人工晶状体脱位的个性化手术治疗方法探讨

第一作者: Shanna CHEN

目的: 探讨人工晶状体脱位的不同个性化手术治疗方法及效果。

方法: 人工晶状体 (IOL) 脱位患者 15 眼, 其中半脱位 2 眼, 后脱位 12 眼; 眼轴 > 28 mm 者 12 眼, 明确的外伤或提重物史 13 眼, 既往 IOL 悬吊缝线术 1 眼, 视力裸眼 0.03-0.1, 眼压高 (46 mmHg) 1 眼, 伴玻璃体积血 1 眼。所有患者采用玻璃体切除术联合 IOL 取出或缝线固定。缝线方法: 8-0 聚丙烯线距角膜缘 2 mm 巩膜面穿刺进入玻璃体腔内, 再经透明角膜缘切口引出眼外, 缝线固定于一片式 IOL 的一袢, 将缝线的袢送入眼内, 拉紧缝线并在巩膜层间 “V” 形穿梭, 紧贴结膜面剪断线端。

结果: 7 眼玻璃体切除术联合 IOL 囊袋复合体取出, 1 眼联合 IOL 囊袋复合体及张力环取出, 1 眼联合原 IOL 眼内单袢固定, 3 眼联合原 IOL 眼内双袢固定, 3 眼联合原 IOL 取出及新的一片式 IOL 缝线固定。患者术后刺激症状轻, 术后第二天裸眼视力 0.03-0.8, 角膜透明, KP (-), Tyn (-)。

结论: IOL 脱位患者常伴有高度近视或外伤史, 不同的脱位情况及既往不同 IOL 类型应该采用不同的处理方法。

摘要编号: 202572

全白白内障手术临床研究

第一作者: Yanfeng ZENG

目的: 比较飞秒激光与传统超声乳化手术在白色白内障囊膜切开术中的完整性、圆度和直径。**方法:** 察全白色白内障的手术效果。其中 100 人行飞秒辅助白内障超声乳化手术, 另外 100 人行传统白内障超声乳化手术。**结果:** 飞秒组大部分患者获得完整撕。100 只眼中有 10 只发生二次补撕囊。3 眼前囊撕裂。传统白内障超声乳化术组 100 只眼中有 49 只发生继发性撕囊, 100 只眼中有 15 只发生前囊撕裂。飞秒组晶状体囊平均直径为 5.4 mm, 而传统白内障超声乳化术组晶状体囊平均直径由 4 mm 增加到 6 mm。**结论:** 飞秒激光辅助白内障手术具有较高的晶状体完整性和稳定的撕囊直径。与传统白内障超声乳化手术相比, 撕囊时间明显缩短, 粘弹性剂用量明显减少, 囊撕裂直径更可控。

摘要编号: 207794

前节术后方对白内障术后眼前节及眼表影响的临床研究

第一作者: Zhen SHAO

共同作者: Dongmei LIU, Yuting ZHANG

目的: 探讨前节术后方对白内障术后患者眼前节及眼表的影响。**方法:** 将拟行白内障手术的患者按照患者意愿非随机分组, 分为常规治疗组及中药联合组, 共纳入 70 例 (81 只眼)。常规治疗组使用术后常规滴眼液治疗, 中药联合组在其基础上加用前节术后方。分别在术前、术后 1 天、1 周、1 月及 3 月对两组患者进行观察随访, 观察并记录患者一般信息、客观眼部检查指标及主观调查问卷。**结果:** 共有 63 例 (72 眼) 完成随访, 常规治疗组 33 例 (36 眼), 中药联合组 30 例 (36 眼)。两组患者在性别、年龄、术前视力、术前泪液分泌量、术前泪膜破裂时间、术后随访期间视力、眼压、角膜水肿率、前房细胞及前房闪辉评分、术前及术后平均脂质层厚度、上睑睑板腺缺失率均无显著性差异。两组患者的中国干眼问卷评分在术后均增加, 其中中药联合组评分低于常规治疗组。中药联合组在术后 1 周、1 月、3 月泪液分泌量及泪膜破裂时间均优于常规治疗组。**结论:** 白内障术后会出现不同程度的角膜水肿、前房炎症反应, 并破坏眼表平衡, 导致术后干眼症的

发生或加重。前节术后方能通过增加泪液分泌及泪膜破裂时间, 改善眼表相关指标。

摘要编号: 202593

区域折射人工晶体和单焦点人工晶体在网脱术后白内障手术中治疗效果分析

第一作者: Yanfeng ZENG

目的: 对比分析区域折射人工晶体和单焦点人工晶体在网脱术后白内障手术术后视觉质量。**方法:** 选取网脱术后白内障手术植入区域折射人工晶体的患者 51 例 (51 眼), 植入单焦点人工晶体的患者 50 例 (50 眼) 作为研究对象。所有患者均于术前、术后 1 天、1 周、1 个月、3 个月记录裸眼远中近视力。**结果:** 两组网脱术后白内障患者术前裸眼远视力相比没有统计学差异 ($P > 0.05$), 术后一天、一周、一个月和三个月网脱术后植入区域折射人工晶体白内障患者 (以下称为网脱区域折射组) 的平均裸眼远、视力与网脱术后植入单焦点人工晶体白内障患者 (以下称为网脱单焦点组) 相比差异不具有统计学意义 ($P < 0.05$)。术后一天、一周、一个月和三个月网脱区域折射组平均裸眼中、近视力均优于网脱单焦点组, 差异具有统计学意义 ($P > 0.05$), 术后三个月时, 网脱单焦点组和网脱区域折射组平均裸眼中视力分别为 0.57、0.82; 平均裸眼近视力分别为 0.56、0.70。**结论:** 网脱区域折射组术后裸眼远视力与网脱单焦点组相比均不具有统计学差异, 但网脱区域折射组术后裸眼中、近视力均优于网脱单焦点组, 区域折射人工晶体能够为患者提供更好的远中近视力。

摘要编号: 209414

单细胞转录组学结合空间蛋白质组学揭示了糖尿病性白内障中吞噬细胞类型特异性免疫调节

第一作者: Pengfei LI

目的: 糖尿病性白内障 (DC) 是糖尿病患者视力损害的主要原因, 其发病机制复杂, 涉及免疫介导机制。我们的目的是利用多组学数据研究糖尿病晶状体中免疫细胞的特征, 并阐明其潜在机制。**方法:** 采用单细胞 RNA 测序 (scRNA-seq) 鉴定糖尿病大鼠和正常大鼠晶状体样本中的细胞类型及其比例。然后利用串联质谱标签定量蛋白质组学技术筛选晶状体病变的深度免疫靶点和机制。在差异蛋白分析中, 采用基因本体论 (GO) 和京都基因与基因组百科全书 (KEGG) 进行通路富集分析。眼前节光学相干断层扫描 (AS-OCT) 可用于识别糖尿病性白内障患者的高反射点。对年龄相关性白

内障 (ARC) 和糖尿病性白内障 (DC) 患者的前囊膜进行免疫荧光染色。

结果: scRNA-seq 鉴定出五种细胞类型, 单核吞噬细胞是晶状体中一种重要的免疫细胞类型, 与正常大鼠相比, 糖尿病大鼠中该细胞类型的比例增加。此外, 对巨噬细胞亚群的 UCell 分析显示, 促炎性 M1 巨噬细胞显著增加, 抗炎性 M2 巨噬细胞减少。随后, 对前囊膜上免疫细胞标记蛋白 CD45 和 CD11B 的免疫荧光染色进一步证实, DC 患者的免疫细胞数量明显多于 ARC 患者。AS-OCT 结果表明, 与 ARC 患者相比, DC 患者晶状体前囊膜上的高反射点更为明显。此外, AS-OCT 还用于区分入组 DC 患者晶状体前囊下混浊 (LFCs) 的混浊区和透明区。蛋白质组学分析发现, 与糖尿病性白内障 (DC) 患者的透明区相比, 晶状体纤维细胞 (LFCs) 不透明区中有 38 种差异表达蛋白, 其中 17 种上调, 21 种下调。其中, 显著上调的蛋白巨噬细胞迁移抑制因子 (MIF) 是一种重要的巨噬细胞趋化因子, 可能在介导晶状体免疫方面发挥重要的调节作用。基因本体 (GO) 和京都基因与基因组百科全书 (KEGG) 通路分析显示, 这些差异表达蛋白与免疫调节和蛋白质泛素化通路相关, 特别是在淋巴细胞和白细胞的激活以及 K63 泛素化方面。

结论: 我们的研究糖尿病性白内障的发生发展提供了免疫证据。免疫调节的上调和蛋白质泛素化途径的改变提示了糖尿病性心肌病的潜在治疗靶点。为了了解这些免疫细胞的具体功能并设计靶向治疗方法, 进一步的研究至关重要。

摘要编号: 209186

合并中高度近视的单眼白内障患者双眼个性化人工晶体搭配设计植入的应用效果分析

第一作者: Tianxu PEI

目的: 评价合并单眼白内障的屈光不正患者个性化人工晶体搭配设计的安全性及有效性。

方法: 回顾性对照临床研究, 收集单眼患有白内障且拒绝透明晶体置换手术, 一眼行超声乳化白内障联合人工晶状体植入术植入连续视程型人工晶状体, 一眼进行前房型有晶体眼人工晶体 (ICL) 植入的近视患者 5 例 10 眼, 观察术后 3 mo 不同距离视力、脱镜率、离焦曲线变化以及人工晶状体稳定性、视觉质量等。

结果: 所有患者双眼均未出现并发症及不良反应。与术前相比, 术后患者双眼裸眼视力、矫正视力、双眼中、近距离视力均明显提高, 与术前比较差异有统计学意义; 术后 3 个月观察患者双眼客观散射指数 (OSI) 均较术前降低, 差异有统计学意义 ($P < 0.05$); 双眼调制传递函数截止频率 (MTF cut

off)、斯特列尔比 (SR) 均较术前升高 ($P < 0.05$)。术后患者均达到双眼脱镜, 双眼人工晶体位置无明显异常。

结论: 对于合并中高度近视的单眼白内障患者, 可以采用双眼个性化人工晶体搭配植入的方式提高患者的双眼全程视力, 达到双眼脱镜效果。

摘要编号: 208300

基于 CASIA2 的不同类型儿童白内障患儿晶状体参数分析

第一作者: Zitian LIU

目的: 晶状体参数对白内障形态可能为白内障术者提供形态以外的信息, 本研究旨在分析不同类型儿童白内障患儿晶状体参数。

方法: 采集中山眼科中心的儿童白内障队列基于 CASIA2 的晶状体参数 (前表面曲率、后表面曲率、晶体倾斜度、偏心度及厚度)、人口学特征、眼部疾病特点与眼球生物学参数。根据白内障形态将患眼分为全白组、前部混浊组、内部混浊组和后部混浊组 4 个亚组, 采用方差分析比较组间差异。

结果: 共 139 例儿童白内障患儿 (共 243 眼) 有可分析数据。纳入患儿的平均年龄为 7.91 ± 3.71 岁、女性占比 65.47% (91/139)。全白组患者年龄显著低于其他组别 (4.33 ± 2.89 岁、 $P = 0.04$), 各组在平均前表面曲率 R 值 (10.41 ± 4.60 mm)、后表面曲率 R 值 (5.39 ± 11.14 mm)、晶体偏心度 ($6.33 \pm 3.52^\circ$) 和倾斜度 (0.32 ± 0.24 mm) 均未发现显著差异 ($P > 0.05$), 但全白组晶体厚度较其他组显著更薄 (3.29 ± 0.17 mm, $P < 0.001$)。

结论: 全白型先天性白内障患者具有发病年龄更早、晶体形态学改变更显著的特征, 尤其是晶体厚度更薄。这一发现提示全白型先白可能存在独特的发病机制、未来将结合眼球生物参数等数据进一步分析。

摘要编号: 203343

基于 IOL-master 700 的角膜散光 ≥ 2.5 D 患者四种最新 Toric IOL 计算公式的准确性对比研究

第一作者: Wenjie LIU

共同作者: Jiewei LIU

目的: 对比基于 IOL-master 700 的角膜散光 ≥ 2.5 D 患者 Kane Toric 计算器和 Emmetromia Verifying Optical (EVO) Toric 计算器、Barrett Predicted PA 计算器和 Barrett Measured PA 计

算器植入 Toric IOL 的准确性, 并于角膜散光 < 2.5 D 患者进行对比。

方法: 收集角膜散光 ≥ 2.5 D 的白内障超声乳化联合 Toric IOL 植入术患者 32 例 32 眼。将术前 IOL-master 700 检查结果分别代入 Kane、EVO、Barrett Predicted PA 和 Barrett Measured PA 四种计算器, 对每个病例进行重复计算, 记录对应的残余散光大小及轴位, 与术后 3 个月主观验光结果进行分析, 分别计算四种计算器的矢量误差, 分析对比四种计算器的计算准确性。同时与角膜散光 < 2.5 D 患者 (55 例 55 眼) 进行同一公式比较。

结果: 对于角膜散光 ≥ 2.5 D 的患者四种计算器矢量误差分别为: Kane toric 0.13 ± 0.78 D @ 99° ; EVO toric 0.13 ± 0.78 D @ 99° ; Barrett Predicted PA toric 0.25 ± 0.78 D @ 95° ; Barrett Measured PA toric 0.34 ± 0.81 D @ 94° , 差异无统计学意义 ($P > 0.05$), Kane 误差值最小。同一公式与角膜散光 < 2.5 D 的患者组相比 (Kane toric、EVO toric、Barrett Predicted PA toric 0.32 ± 0.68 D @ 102° 、Barrett Measured PA toric 0.27 ± 0.71 D @ 102°), 差异无统计学意义 ($P > 0.05$)。

结论: 基于 IOL-master 700 的角膜散光 ≥ 2.5 D 患者 Kane toric 0.19 ± 0.72 D @ 111° 、EVO toric 0.30 ± 0.70 D @ 102° 、Barrett Predicted PA 和 Barrett Measured PA 四种计算器均表现为轻度的顺规方向漂移, 与 EVO toric、Barrett Predicted PA、Barrett Measured PA 计算器相比, Kane toric 计算器矢量误差最小。

摘要编号: 200493

小角膜患者白内障术后角膜内皮细胞丢失的临床研究

第一作者: Tianyu ZHENG

目的: 评估小角膜患者在接受白内障超声乳化手术后的角膜内皮细胞丢失 (ECL)。

方法: 这项回顾性研究纳入了 50 例小角膜患者 (50 眼) 和 120 例角膜大小正常的患者 (120 眼), 所有患者均接受了白内障超声乳化手术。术前评估了人口统计学数据和生物测量参数, 术后 3 个月测量了角膜内皮细胞各项参数。

结果: 小角膜组的平均角膜水平直径 (WTW) 为 10.76 ± 0.24 mm, 显著短于正常对照组的 11.73 ± 0.36 mm ($P < 0.01$)。与正常对照组 (前房深度 = 3.16 ± 0.34 mm, 晶体厚度 = 4.39 ± 0.39 mm) 相比, 小角膜组的前房 (2.78 ± 0.50 mm) 更浅、晶状体厚度 (4.62 ± 0.49 mm) 更厚 (P

< 0.01)。小角膜组的角膜内皮细胞丢失量 (662.20 ± 496.79 cells/mm²) 显著高于正常对照组 (360.53 ± 364.29 cells/mm²) ($P < 0.001$)。小角膜组的平均内皮细胞面积增加 (185.38 ± 144.04 μm^2) 也显著大于对照组 (75.56 ± 92.48 μm^2)

($P < 0.001$)。多因素回归分析显示, 在角膜大小正常的患者中, 角膜水平直径 (Beta = -0.330 , $P < 0.001$) 和平均超声能量 (Beta = 0.288 , $P = 0.030$) 是术后角膜细胞内皮丢失的显著影响因素。角膜水平直径 (WTW) 也是所有患者术后角膜内皮细胞丢失 (ECL) 的统计学显著危险因素 (Beta = -0.331 , $P < 0.001$)。

结论: 与正常大小的角膜相比, 小角膜患者在超声乳化手术后发生内皮细胞丢失的数量显著增加。角膜水平直径 (WTW) 是术后角膜内皮细胞丢失 (ECL) 的显著危险因素。

摘要编号: 209155

微创玻切联合改良无巩膜瓣缝线固定人工晶体治疗晶体脱位的临床疗效评价

第一作者: Dahu 大卉 MA 马

目的: 在微创玻切基础上, 评价一种改良无巩膜瓣缝线固定人工晶体 (IOL) 技术在晶体/人工晶体脱位修复中的安全性、有效性与术式优势。

方法: 单中心回顾性研究。纳入囊袋无法提供支持、IOL 半/全脱位至玻璃体腔的连续病例。两组比较:

① 改良无巩膜瓣缝线固定术 (经缝针穿刺建立巩膜隧道, 线结层间埋藏于巩膜板层内, 免制作巩膜瓣); ② 传统巩膜瓣缝线固定术。均联合微创玻切完成。观察指标: 手术时间、最佳矫正视力 (BCVA)、角膜内皮计数、角膜散光、IOL 倾斜与偏心、术后并发症。

结果: 与传统巩膜瓣法相比, 改良术式显著缩短手术时间 (约 10–15 分钟), 减少眼表损伤与医源性散光风险; 随访至术后一年, IOL 居中稳定、BCVA 维持良好, 观察期内未见缝线松脱/线结暴露及眼底相关严重并发症。

结论: 改良无巩膜瓣缝线固定术通过巩膜隧道内埋藏线结, 在保证固定稳定与视功能恢复的同时, 缩短手术时长、降低眼表创伤, 体现微创优势; 适用于囊袋支持不足的晶体/人工晶体脱位患者, 值得在前瞻性多中心研究中进一步验证。

摘要编号: 210121

新型羟乙基甲基丙烯酸酯三焦点人工晶状体视觉质量分析

第一作者: Yan HUO

共同作者: Jian YE

目的: 对比分析一种新型疏水性羟乙基甲基丙烯酸酯衍射三焦点人工晶状体 (CNWTT0, CN组) 与甲基丙烯酸苯乙酯衍射三焦点人工晶状体 (TFNT00, TF组) 植入术后的临床效果以及主客观视觉质量差异。

方法: 纳入 52 例年龄相关性白内障患者, 随机分为 CN 组 ($n = 12$) 与 TF 组 ($n = 40$)。术后 3 个月评估, 主要评估指标包括最佳矫正远视力、裸眼近视力、裸眼中视力、裸眼远视力、单眼离焦曲线, 使用 itrace 视觉质量分析仪检测高阶像差、慧差、球差、三叶草差, 视觉质量、传递调制函数、点扩散函数, 以及患者主观问卷调查脱镜率, VF-14、QoV 视觉质量问卷调查。

结果: 研究共纳入了 52 名患者, 其中 CN 组 12 人, TF 组 40 人。CN 组和 TF 组在术前基线特征: 性别、年龄、等效球镜、最佳矫正视力、眼轴长度、人工晶体度数等方面 ($p > 0.05$), 差异无统计学意义; CN 组和 TF 组术后三个月最佳矫正远视力均大于 logMAR 0.1、裸眼远视力、裸眼中视力、裸眼近视力均可达 logMAR 0.2 以上, 且两组差异无统计学意义 ($p > 0.05$), 单眼离焦曲线差异无统计学意义 ($p > 0.05$); CN 组和 TF 组高阶像差以及慧差、三叶草差差异无统计学意义 ($p > 0.05$), CN 组球差 $0.009 (0.003, 0.017)$ 小于 TF 组球差 $0.0215 (0.008, 0.036)$ ($p = 0.027$), 差异有统计学意义; CN 组和 TF 组传递调制函数和点扩散函数差异无统计学意义 ($p > 0.05$), 两组脱镜率 CN 组 94.73%, TF 组 94.55%, VF-14 问卷调查 CN 组和 TF 组患者视远满意度、视中满意度差异无统计学意义 ($p > 0.05$), CN 组视近满意度 $4.0 (3.9, 4.0)$ 优于 TF 组视近满意度 $3.6 (3.6, 3.8)$ ($p = 0.020$), 差异有统计学意义; QoV 问卷中眩光、光晕以及星爆光学干扰调查中 CN 组光学干扰 $3 (0, 6)$ 低于 TF 组 $8 (5, 9)$ ($p = 0.036$), 差异有统计学意义。

结论: 一种新型疏水性羟乙基甲基丙烯酸酯 (CNWTT0) 和甲基丙烯酸苯乙酯 (TFNT00) 衍射三焦点人工晶状体均可提供良好的全程视力以及视觉效果, 两组脱镜率均在 94% 以上, 但 CNWTT0 在高阶像差中球差更小更具优势, 两组患者主观视觉质量满意度高, CNWTT0 具有更优的视近满意度, 同时较 TFNT00 具有低光学干扰。

摘要编号: 209904

晶状体巨噬细胞在糖尿病性白内障发病中的作用研究

第一作者: Min JI

目的: 糖尿病性白内障 (diabetes cataract, DC) 是糖尿病患者视力受损的主要原因, 然而其发病的免疫学调控机制目前尚不清楚。

方法: 本研究中, 我们采用了多组学联合分析的方法来筛选 DC 发病中的发生特异性变化的免疫学通路和靶点。我们使用 STZ 注射的方法构建了大鼠糖尿病模型。然后提取正常对照大鼠与糖尿病模型大鼠的晶状体制备单细胞悬液, 并进行单细胞转录组测序。在 DC 患者与对照者晶状体囊膜中进行免疫荧光染色, 通过荧光共聚焦显微镜检测验证特异性浸润的免疫细胞。为了阐明潜在的免疫学通路, 我们还对 DC 患者不透明和透明区域的晶状体组织进行了蛋白质组学分析, 并进行了生物信息学分析, 富集了显著改变的通路。

结果: 单细胞 RNA 测序显示 DC 大鼠晶状体中单核吞噬细胞显著扩增, 其特征是促炎型 M1 巨噬细胞表型转变和抗炎型 M2 巨噬细胞减少。这些发现在人类 DC 患者中通过共聚焦免疫荧光染色得到证实, 显示 CD45 和 F4/80 免疫细胞浸润增加。DC 患者术中晶状体的不透明和透明区域的蛋白质组学分析发现, 巨噬细胞迁移抑制因子 (MIF) 是患病组织中关键的上调蛋白。通路富集分析进一步揭示了 DC 与 K63 连接泛素化下调之间的关联性, 提示 K63 连接泛素化是免疫调节中的关键泛素非降解信号通路。

结论: 研究揭示了 DC 中 MIF 驱动的巨噬细胞介导的炎症微环境, 并且首次表明 K63-泛素化在其发病机制中失调。这些发现为 DC 的发病机制提供了新的见解, 并提示 MIF 和 K63 泛素化修饰通路是潜在的治疗靶点。

摘要编号: 209999

生活方式降低白内障风险的蛋白组学机制研究

第一作者: Xianqi ZHENG

共同作者: Honghua YU, Xiaoyi YU

目的: 探讨健康生活方式与年龄相关性白内障 (ARC) 发病风险的关联, 鉴定相关血浆蛋白标志物并阐明其潜在分子机制。

方法: 基于英国生物数据库前瞻性社区队列, 纳入基线无眼病人群。通过六维度健康生活方式评分 (吸烟、饮酒、饮食、运动、睡眠、肥胖) 评估行为因素, 通过国际疾病分类及手术编码定义 ARC 事件, 采用 Cox 回归模型分析其与 ARC 发病风险的关联。

进一步在具有血浆蛋白组学数据的亚组人群中，运用弹性网络回归筛选与生活方式相关的蛋白，并通过 Cox 回归模型识别与 ARC 风险前瞻性相关的蛋白；取交集构建蛋白指纹，评估其与 ARC 的关联、与生活方式的交互作用及中介效应。

结果：中位随访 11.11 年期间，1,160 名参与者发生 ARC。多因素 Cox 回归显示，生活方式健康水平与 ARC 风险呈显著负相关（HR = 0.94；95% CI, 0.89–0.99, P = 0.024）。此保护作用在女性中更为显著（HR = 0.89；95% CI, 0.82–0.96, P = 0.002，交互作用 P = 0.037）。蛋白组学分析筛选出 79 个与生活方式相关的血浆蛋白，其中 FUT3_FUT5 及 FGR 与 ARC 风险独立相关。基于 FUT3_FUT5 及 FGR 构建的蛋白指纹与生活方式评分呈正线性相关（ $\beta = 0.07$ ；95% CI, 0.04–0.09, P = 0.000），并与 ARC 风险呈显著负相关（HR = 0.88；95% CI, 0.80–0.97, P = 0.014）；进一步调整生活方式后关联依然稳健（HR = 0.77；95% CI, 0.64–0.93, P = 0.008）。蛋白指纹与生活方式存在显著协同交互作用（交互项 HR = 0.85；95% CI, 0.72–0.99, P = 0.039）。中介分析提示其在“生活方式-ARC”关联中起部分中介作用（中介比例 29.65%）。通路富集分析揭示，FUT3_FUT5 可能参与糖鞘脂生物合成以维持晶状体蛋白稳定，而 FGR 则通过趋化因子信号通路调控局部炎症反应。

结论：健康生活方式是 ARC 的重要保护因素，其作用部分通过调节 FUT3_FUT5 与 FGR 等血浆蛋白水平实现。生活方式相关蛋白指纹可作为 ARC 风险的潜在生物标志物，为理解生活方式保护效应的生物学机制提供了新证据。

摘要编号：208105

白内障患者 vivity 人工晶状体植入术后干眼程度及客观视觉质量的早期变化

第一作者：Ting YANG

共同作者：Lijun HUO, Congyao WANG

目的：光学质量分析系统（OQAS）基于点扩散函数（PSF）客观评估眼内光学质量，可量化光散射与调制传递。当前关于 Vivity 人工晶状体（IOL）植入术后客观视觉质量与干眼状态的研究有限。本研究探讨老年性白内障患者于超声乳化联合 Vivity IOL 植入后的客观视觉质量、泪膜稳定性及调节能力随时间变化的特征。

方法：前瞻性随访 24 例（32 眼）老年性白内障患者，分别于术前、术后 1 周、1 月、3 月采用 OQAS 评估客观视觉质量指标（高/中/低对比度视力〔OV 100/20/9〕、客观散射指数〔OSI〕、调制传递函

数截止频率〔MTF-cutoff〕、斯特列尔比〔Strehl ratio, SR〕），并记录泪膜动态散射指数（TF-OSI）与调节范围。比较各时间点与术前差异并进行时间序列分析。

结果：与术前相比，术后 1 周、1 月、3 月的高/中/低对比度视力均显著提高（均 P < 0.001），且术后各时间点间差异不显著（以高对比度视力为例：1 周 vs 1 月 P = 0.414；1 月 vs 3 月 P = 0.914）。OSI 于术后各时间点均显著降低（均 P < 0.001），提示眼内散射减少；术后时间点间差异不显著。MTF-cutoff 与 SR 在术后 1 周、1 月、3 月均显著高于术前（MTF-cutoff：均 P < 0.001；SR：P = 0.001、< 0.001、0.004），术后时间点间无显著差异。TF-OSI 于术后 1 周、1 月较术前显著降低（分别 P < 0.025、P < 0.004），术后 3 月呈下降趋势但未达统计学显著（P = 0.065）。术前与术后各时间点的调节范围差异不显著（P = 0.431）。

结论：Vivity IOL 植入后，客观视觉质量在早期即显著改善并于术后 1 周趋于稳定，表现为 OV 提升、OSI 下降以及 MTF-cutoff 与 SR 增高。TF-OSI 降低提示泪膜稳定性改善，可能与术后人工泪液的持续使用相关。老年性白内障人群术前术后调节范围整体无明显变化。

摘要编号：208853

白内障术毕前房注气的安全性研究

第一作者：Jiaping DENG

共同作者：Shuang LI

目的：探讨白内障超声乳化联合人工晶状体植入术毕，前房注入无菌空气或平衡盐溶液对角膜内皮细胞、中央角膜厚度的影响，评估白内障术毕时前房注气的安全性。

方法：36 例 36 眼老年性白内障患者，检查视力、眼压、角膜内皮细胞和中央角膜厚度，并记录所有病例术前的结果，随机分成两组由同一位经验丰富的主刀医师行白内障超声乳化联合人工晶状体植入术，注液组 18 眼术毕时前房注入平衡盐溶液，注气组 18 眼术毕时前房注入无菌空气形成前房。术后完成 1 个月的随访评估，行注液组和注气组术前及术后视力、眼压、角膜内皮细胞各参数、中央角膜厚度的组间或组内比较。

结果：（1）注液组和注气组术前视力、眼压、角膜内皮细胞密度、六角形细胞百数、中央角膜厚度对比差异无统计学意义，术后 1 w、2 w、3 w、4 w 两组对比差异均无统计学意义（P > 0.05）。（2）注液组和注气组角膜内皮细胞密度、中央角膜厚度各自术前术后对比差异具有统计学意义（P < 0.05）。（3）注液组六角形细胞百数手术前后对比无显著

性差异 ($P > 0.05$)，注气组六角形细胞百数术后 1 w、2 w、4 w 小于术前，差异有统计学意义 ($P < 0.05$)，术后 3 w 与术前对比无显著性差异 ($P > 0.05$)。(4) 注气组术后 1 w、2 w、3 w、4 w 的中央角膜厚度对比无显著性差异 ($P > 0.05$)，注液组术后 4 w 的中央角膜厚度均小于术后 2 w、3 w，差异有统计意义 ($P < 0.05$)。

结论：白内障超声乳化联合人工晶状体植入术毕，使用前房注气形成前房不影响术后的视力，也未发现低于阈值的角膜内皮细胞损害、眼压升高等，还可能比前房注液更快的减轻角膜水肿使得中央角膜厚度达到一个稳定的状态，是简单有效、安全可靠的。

摘要编号：209724

目标屈光度为 -2D 和 -3D 的单焦点视力改善型人工晶状体在高度近视白内障患者中的视觉效果

第一作者：Danyue CHEN

目的：在高度近视白内障患者中，比较植入目标屈光度为 -2D 和 -3D 的单焦点视力改善型人工晶状体 (IOL) 的术后视觉效果。

方法：纳入拟行超声乳化白内障吸除联合单焦点视力改善型 IOL 植入术的高度近视白内障患者 (眼轴长度 [AL] ≥ 26 mm)。根据目标屈光度将患者分为 2 组：-2D 组与 -3D 组。术后 1 个月评估患者的裸眼远视力 (UDVA)、中视力 (UIVA)、近视力 (UNVA)、最佳矫正远视力 (CDVA)、客观视觉质量和主观满意度。并根据 AL 进行亚组分析 ($26 \text{ mm} \leq \text{AL} < 28 \text{ mm}$ 和 $\text{AL} \geq 28 \text{ mm}$)。

结果：共纳入 89 人 (89 眼)。 -2D 组在 5 m UDVA (0.49 vs 0.73 logMAR, $P < 0.001$)、80 cm UIVA (0.19 vs 0.34 logMAR, $P < 0.001$)、60 cm UIVA (0.14 vs 0.27 logMAR, $P < 0.001$)、远距离脱镜率 (23.81% vs 2.13%, $P < 0.001$) 方面均优于 -3D 组，而 2 组的 40 cm UNVA、5 m CDVA、客观视觉质量以及主观满意度均无差异 ($P > 0.05$)。不同 AL 亚组的视力结果与总体一致。

结论：在高度近视白内障患者中，植入目标屈光度为 -2D 的单焦点视力改善型 IOL 可在提供更好的裸眼远、中视力的同时，维持与 -3D 相近的裸眼近视力。因此，将 -2D 作为单焦点视力改善型 IOL 的目标屈光度为该人群提供了一个兼顾全程视力的优选方案。

摘要编号：208588

真性囊膜剥脱综合征合并白内障的手术治疗策略及临床观察

第一作者：Zhiyu XU

目的：探讨真性囊膜剥脱综合征合并白内障患者的临床特点及手术处理方案，以提高手术安全性及术后效果。

方法：回顾分析真性囊膜剥脱综合征合并白内障患者的术前评估，包括 UBM、前节 OCT 检查等评估悬韧带功能、术中规范操作 (连续环形撕囊、超声乳化参数调整、囊袋张力环应用) 及术后管理 (眼压监测、抗炎治疗及随访观察)。

结果：真性囊膜剥脱综合征患者白内障手术中悬韧带脆弱、囊膜易撕裂，患者瞳孔无法散大，术中使用囊袋拉钩扩张瞳孔，术中采用张力环可有效稳定囊袋；术后需警惕高眼压、囊袋收缩等并发症，个性化管理可改善预后。

结论：真性囊膜剥脱综合征合并白内障手术需精细化操作，重视术前评估及术后随访，以降低并发症风险，确保手术成功。

摘要编号：210139

短眼轴患者人工晶状体度数计算公式的准确性：系统综述与网络 Meta 分析

第一作者：Yiyuan MA

共同作者：Guofu HUANG, Guangming JIN, Gaoming ZHANG, Danying ZHENG

目的：评估并比较不同人工晶状体 (IOL) 度数计算公式在短眼轴 (轴长 < 22 mm) 眼中的屈光预测准确性，为临床提供循证参考。

方法：系统检索 PubMed、Embase、Web of Science 及 Cochrane Library 数据库 (2003 年 1 月至 2023 年 9 月)，纳入轴长 < 22 mm 且报道术后屈光误差的前瞻性或回顾性研究。主要结局指标包括：平均绝对误差 (MAE)、中位绝对误差 (MedAE) 及预测误差 (PE) 在 $\pm 0.25 \text{ D}$ 、 $\pm 0.50 \text{ D}$ 和 $\pm 1.00 \text{ D}$ 范围内的比例。采用 R 软件 (v4.2.1) 进行网络 Meta 分析，并使用累积排序曲线下面积 (SUCRA) 评价公式排名。

结果：共纳入 15 项研究，涉及 1178 只眼及 12 种 IOL 计算公式。与常用的 Haigis 公式相比，Kane 公式在 PE $\pm 0.25 \text{ D}$ 、 $\pm 0.50 \text{ D}$ 和 $\pm 1.00 \text{ D}$ 范围内均显示更高比例 (OR > 1 ，均 $P > 0.05$)。SUCRA 分析显示，Kane 公式在 PE $\pm 0.25 \text{ D}$ 范围内的准确性最高 (95.74%)，其次为 Haigis (94.79%) 和 Olsen Standalone (84.04%)。此外，

Kane 与 Olsen Standalone 公式的 MedAE 最低, 提示预测精度更佳。

结论: Kane、Haigis 和 Olsen Standalone 公式在短眼轴患者人工晶状体度数预测中表现优于其他公式, 但仍存在一定的不确定性。未来需通过大样本、多中心研究进一步验证其临床适用性。

摘要编号: **210123**

经巩膜人工晶状体缝线固定术治疗晶状体脱位患儿的安全性及有效性: 一项真实世界研究

第一作者: Siyuan LIU

共同作者: Guangming JIN, Xinxin LIU, Danying ZHENG

目的: 评估真实世界中经巩膜人工晶状体 (IOL) 缝线固定术治疗儿童晶状体脱位的有效性和安全性。

方法: 本研究回顾性分析了 2016 年 1 月 -2020 年 12 月收治的接受经巩膜 IOL 缝线固定术治疗的非外伤性儿童晶状体脱位患儿 123 例 (220 眼), 所有患儿均顺利完成至少 3 年的术后随访。研究的主要疗效指标为术后最佳矫正视力 (BCVA); 安全性指标包括术后并发症的发生率以及二次手术的比例。次要结局指标则包括术后屈光度的变化和 IOL 位置。

结果: 患儿平均手术年龄为 6.80 ± 3.17 岁, 术后平均随访时长为 4.39 ± 1.01 年。疗效方面, 患儿术前中位 BCVA 为 0.70 logMAR, 术后 1 月、3 年、5 年及末次随访时 BCVA 分别提升至 0.30 logMAR、0.10 logMAR、0.10 logMAR 及 0.10 logMAR。安全性方面, 术后并发症主要包括线结暴露 19 眼 (8.6%), IOL 脱位 17 眼 (7.7%), IOL 夹持 7 眼 (3.2%), 持续性高眼压 4 眼 (1.8%), 视网膜脱离 3 眼 (1.3%), 眼内炎 2 眼 (0.9%)。同时, 观察到患儿术后屈光状态呈现出向近视漂移的趋势。末次随访时, IOL 倾斜与偏心在分别达到 $8.6 \pm 5.6^\circ$ 和 0.75 ± 0.38 mm。

结论: 经巩膜 IOL 缝线固定术能够有效提升晶状体脱位患儿的视力预后。然而, 该手术方式也存在一定的并发症发生风险, 其中缝线暴露和 IOL 脱位是较为常见的并发症类型。鉴于这些潜在的并发症风险, 对接受该手术治疗的晶状体脱位患儿进行长期、密切的术后随访显得尤为重要。同时, 未来仍需进一步优化手术技术、改良手术耗材以提高手术的安全性和有效性。

摘要编号: **208994**

衍射型多焦点人工晶状体 Diff-aA 植入白内障患者术后视觉质量分析

第一作者: Jingwen ZHANG

目的: 探讨白内障患者非球面衍射型多焦点人工晶状体 (intraocular lens, IOL) Diff-aA 植入术后的视觉质量分析, 综合评估 Diff-aA IOL 的临床效果, 为临床植入提供全面完善的参考依据。

方法: 该研究为前瞻性、随机对照研究。收集 2024 年 9 月至 2025 年 9 月共 74 例白内障患者 (87 眼)。随机分为试验组和对照组, 试验组 43 例 (53 眼), 对照组 31 例 (34 眼), 试验组患者植入 Diff-aA IOL (HumanOptics, Germany), 对照组患者植入 Tecnis ZMB00 IOL (Advanced Medical Optics, USA)。在术后 2 周、1 月、3 月时分别测量两组患者的双眼裸眼远中近视力, 绘制离焦曲线, 客观视觉质量采用 Itrac 测量调制传递函数 MTF 曲线、斯特列尔比 SR、点扩散函数 PSF, 主观视觉质量采用 VF-14-CN 量表进行评估。

结果: 在术后 3 月时, 试验组和对照组均具有较好的未矫正远距离视力, 试验组为 0 LogMAR, 对照组为 0 LogMAR, 差异不具有统计学意义 ($P > 0.05$); 试验组的未矫正近距离视力略低于对照组, 差异具有统计学意义 ($P < 0.05$), 试验组的未矫正中距离视力优于对照组, 差异具有统计学意义 ($P < 0.001$)。术后 1 月及 3 月时, 两组视力在 $+1.00$ D ~ -4.00 D 水平的离焦曲线上均由于 0.3 LogMAR, 在 -1.50 D ~ -2.50 D 的离焦水平上, 试验组视力均优于对照组, 差异具有统计学意义 ($P < 0.05$)。试验组和对比组的客观视觉质量 MTF Avg Height、SR 及 PSF 在术后 3 月时差异均无统计学差异 ($P < 0.05$), 试验组和对照组患者 VF-14-CN 问卷评分差异和脱镜率的差异均无统计学意义 (均 $P > 0.05$)。

结论: 非球面衍射型多焦点人工晶状体 Diff-aA IOL 可提供优秀的远视力及满意的中近视力, 实现术后较为连续的视程, 同时获得令人满意的脱镜率和较低的不良视觉现象发生率。

摘要编号: **200491**

评估非短眼轴小角膜患者的人工晶状体度数计算公式的准确性: 一项对比性研究

第一作者: Tianyu ZHENG

目的: 评估 11 种人工晶状体度数计算公式在眼轴长度 > 21 mm 的小角膜患者中的准确性, 包括 Barrett Universal II (BUII)、Emmetropia Verifying Optical (EVO)、Hill basis function

(Hill-RBF)、Hoffer QST、Kane、Pearl-DGS、K6、Hoffer Q、SRK/T、Holladay 1 和 Haigis 公式。

方法：根据眼轴长度 ≤ 24 mm 或 > 24 mm 将 57 只眼分为正常眼轴与长眼轴亚组。公式优化方法：通过校准预测误差 (PE)，使每种 IOL 公式的平均误差 (ME) 为零。分析整体队列和各亚组在优化前后的中位数绝对误差 (MedAE)、平均绝对误差 (MAE) 和标准差 (SD)，并评估所有公式中 PE 范围在 ± 0.25 D、 ± 0.5 D、 ± 1 D 和 ± 2 D 中的百分比。通过回归分析确定绝对预测误差 (APE) 的影响因素。对于新一代公式，根据是否包含晶状体厚度 (LT) 参数分析 APE。

结果：11 种 IOL 公式的绝对预测误差 (APE) 存在显著差异 ($p < 0.001$)，其中 Pearl-DGS 公式的中位数绝对误差 (MedAE) 最低 (0.62 D)。对于 $AL \leq 24$ mm 的正常眼轴患眼，LT 参数的纳入显著提高了 K6 公式的准确性，而对于 $AL > 24$ mm 的长眼轴小角膜患眼，不纳入该参数的 EVO 公式表现更优 (均 $p < 0.05$)。在 $AL > 24$ mm 长眼轴亚组中，亚组内部优化比整体优化更有效地提升了 Hoffer Q 和 Haigis 公式的准确性 (均 $p < 0.05$)。

结论：新一代 IOL 公式 (尤其是 Pearl-DGS) 可提高非短眼轴小角膜患者的 IOL 度数预测准确性。非短眼轴小角膜患者可能因 AL 不同呈现不同的 IOL 计算特征，因此在评估 LT 参数对于提升 IOL 计算准确性的效果时，需根据 AL 分层优化 IOL 计算。

摘要编号：208885

远视眼白内障患者三种人工晶状体植入术后视功能对比研究

第一作者：Zhen SHAO

共同作者：Wenna HAO, Dongmei LIU

目的：对远视眼白内障患者双眼植入不同类型人工晶状体的术后客观视功能及主观感受进行调查分析。

方法：本研究采用前瞻性非随机病例对照研究。纳入自 2021 年 11 月至 2023 年 03 月远视眼白内障患者，共 57 例 114 只眼，根据患者意愿选择分为 3 组，单焦组，共 20 例 40 只眼；双焦组，共 18 例 36 只眼；三焦组，共 19 例 38 只眼。收集三组患者分别在术前及术后 6 个月眼部主客观检查及问卷结果。

结果：三组的远中近视力较术前均有显著提高，但术后离焦曲线趋势不同。三组的调制传递函数曲线

下 4 mm 面积比 (Area Ratio, AR)、点扩散函数中斯特列尔比 (Strehl Ratio, SR) 较术前均显著提高，且在相同复查时间的 AR 值、SR 值无显著差异。双焦、三焦两组阅读视力、阅读速度、阅读准确率优于单焦组。在 1.5 cpd 和 3.0 cpd 空间频率下，单焦组对比敏感度优于双焦、三焦两组。术后 6 个月，视近脱镜率分别为单焦组 20.00%，双焦组 61.11%，三焦组 63.16%；不良光现象发生率为眩光 (单焦组 10.00%，双焦组 44.44%，三焦组 42.11%)；光晕 (单焦组 15.00%，双焦组 55.56%，三焦组 52.63%)；星芒 (单焦组 5.00%，双焦组 44.44%，三焦组 47.37%)；重影 (单焦组 5.00%，双焦组 11.11%，三焦组 10.53%)；雾视 (单焦组 5.00%，双焦组 22.22%，三焦组 15.79%)。术后整体满意度分别为单焦组 90.00%，双焦组 88.89%，三焦组 89.47%。

结论：三种人工晶状体都能有效提高远视眼白内障患者术后视力和视觉质量。双焦点与三焦点人工晶状体可提供更好的近距离视力，三焦点可提供更佳的中距离视力。但双焦点、三焦点均轻度降低对比敏感度，术后不良光干扰发生率高。在临床工作中，要充分考虑患者年龄、性格，眼部检查和用眼习惯，结合自身视觉需求选择人工晶状体类型以提高患者术后满意度。

摘要编号：200756

透明角膜切口和巩膜隧道切口对白内障术后角膜生物力学改变的比较研究

第一作者：Huiyu CHEN

目的：通过 corvis ST 观察比较透明角膜切口和巩膜隧道切口在超声乳化白内障手术中对角膜生物力学的影响。

方法：本前瞻性观察性研究共纳入 59 名患者，共计 67 眼接受白内障超声乳化合并人工晶体一期植入术，其中 32 眼行透明角膜切口，35 眼行巩膜隧道切口。所有患者在术前、术后 1 周、术后 1 月和术后 3 月接受了 corvis ST 检查。Corvis ST 记录了如下主要参数：变形幅度最大值 (DA max)、DA 比最大值 (1 mm 和 2 mm)、综合半径、刚度参数 (SP A1)、Ambrosio 与水平剖面的关系厚度 (ARTh)、角膜中央厚度 (CCT)，非矫正眼压 (IOPnct) 和生物力学矫正 IOP (bIOP)。使用线性混合模型对每个时期的所有测量值进行比较， $P < 0.05$ 认为具有统计学差异。

结果：透明角膜切口组和巩膜隧道切口组均表现出所有的 IOP 测量值都随着时间的推移而下降 ($p < 0.01$)。在 1 W 和 1 M 时，CCT 增加 ($P < 0.01$)，但在 3 M 时回落到术前水平。ARTh 在 1 W 和 1

M 时升高 ($P < 0.01$)，但在 3 M 时恢复到 Pre 水平。DA max 和综合半径在 3 M 时升高 ($P < 0.01$)，SP A1 随着时间的推移而降低 ($P < 0.01$)。两组之前相互比较发现，在术后不同时间点，参数 IOP、SP A1、ARTh、DA max、综合半径均是透明角膜切口组大于巩膜隧道切口组 ($P < 0.05$)，然而 CCT 则是巩膜隧道切口组大于透明角膜组 ($P < 0.05$)。

结论：白内障术后，眼压及角膜硬度均较术前降低；巩膜隧道切口相较透明角膜切口对角膜生物力学的影响更大，使得术后 3 月角膜生物力学硬度下降更明显。

摘要编号：202701

预留撕囊起瓣点在初学白内障撕囊中的临床观察

第一作者：Jinpeng CHEN

共同作者：Yuan TAN, Huiyong XU, Peng ZHANG

目的：通过预留环形撕囊起瓣点加快初学白内障超声乳化手术医师的撕囊学习曲线并减少撕囊相关并发症。

方法：统计自 2022.01 至今在教授初学白内障学员行白内障手术环形撕囊过程中，通过撕囊镊呈小角度自中央刺破晶状体前囊并呈 $\angle$ 型分开，使初起瓣处呈“M”型，预留一处起瓣点，并环形撕囊，对于初次撕囊不佳时，改为再次起瓣撕囊完成环形撕囊。

结果：在统计的初学学员按预留起瓣点撕囊的 520 例白内障手术中，一次完成撕囊的占 346 例，由学员自己完成二次起瓣撕囊的为 75 例，由上级医师完成二次撕囊的为 99 例，撕囊完成后均顺利完成白内障超声乳化手术，未出现因撕囊不佳导致的手术并发症。

结论：预留起瓣点在初学白内障手术中可以减少初学白内障手术医师的心理压力，加快白内障撕囊学习曲线，减少撕囊相关并发症。

摘要编号：208801

飞秒激光辅助白内障手术在晶状体不全脱位当中的应用效果分析

第一作者：Shifeng FANG

共同作者：Tianxu PEI

目的：评价飞秒激光辅助白内障手术在晶状体不全脱位手术当中的安全性与有效性。

方法：回顾性病例分析。选取行白内障术前筛查，诊断为“年龄相关性白内障、晶状体不全脱位”行

飞秒激光辅助白内障手术的患者 25 例 27 眼作为观察组，行常规超声乳化白内障手术的患者 25 例 25 眼作为对照组，术中均植入同一品牌的非球面人工晶状体。记录术前患者一般资料、术中情况、术后矫正视力、眼压、人工晶状体位置、视觉质量相关参数及并发症情况。

结果：与术前相比，术后 3 个月两组患者裸眼视力、最佳矫正视力均较前提高，组间比较无统计学差异；两组间患者客观散射指数、调制传递函数截止频率、斯特列尔比值、模拟对比度视力的差异均无统计学差异 ($P > 0.05$)；术后 3 个月观察组 25 眼 (92.5%) 人工晶体居中性良好，2 眼 (7.4%) 人工晶体轻度移位；对照组 19 眼 (76.0%) 人工晶体居中性良好，3 眼 (12.0%) 人工晶体轻度移位，3 眼 (12.0%) 出现前囊膜皱缩；与对照组相比，实验组术后 3 个月的人工晶状体偏心量、倾斜度均较小，差异有统计学意义 ($P < 0.05$)；术中并发症包括前囊膜放射性撕裂、瞳孔缩小等，观察组并发症发生率低于对照组 ($P < 0.05$)。

结论：对于晶状体不全脱位的患者，飞秒激光辅助的白内障手术可有效降低并发症发生率，提高手术效率及安全性。

眼内炎、葡萄膜炎、巩膜炎

摘要编号：208151

BRVO 合并 BRAO 继发黄斑囊样水肿一例

第一作者：Xinquan LIU

共同作者：Dahu WANG

目的：本报告描述了一例罕见的视网膜分支静脉阻塞 (BRVO) 合并视网膜分支动脉阻塞 (BRAO) 继发黄斑囊样水肿 (CME) 的病例。

方法：一名 59 岁男性因“左眼视物模糊 3 月”至我科门诊就诊。查右眼最佳矫正视力 (BCVA) 为 20/20，左眼为 20/125。眼底彩照显示：右眼黄斑区有硬性渗出灶；左眼颞上方网膜可见出血、水肿、硬性渗出及棉绒斑，血管可见白鞘，V 迂曲扩张，动静脉交叉征 (+)。OCT：右眼黄斑结构未见明显异常；左眼黄斑颞侧、颞上囊样水肿伴内层网膜水肿，黄斑中心凹厚度 (CMT) 为 302 μm 。FFA：左眼颞上方大片无灌注区、边缘可见出血荧光遮蔽，V 迂曲扩张、充盈时间约 29.1 s，晚期黄斑区荧光渗漏明显；双眼可见散在的 MA。既往有高血压病史及糖尿病史 5 年余，口服药物控制，血压、血糖未规律监测。基于以上，诊断为左眼 BRVO 合并 BRAO 继发 CME、双眼糖尿病性视网

膜病变。治疗上予积极控制血糖、血压，左眼接受3针玻璃体内 anti-VEGF 药物注射治疗及局部无灌注区内视网膜激光光凝治疗。

结果：3 个月后，左眼的 BCVA 增加到 20/40，CMT 减少到 182 μm 。此后，左眼视力及黄斑区结构保持稳定。

结论：BRVO 合并 BRAO 极为罕见。早期诊断、积极控制心血管危险因素，及玻璃体内注射 anti-VEGF 药物及视网膜激光光凝治疗 BRVO 合并 BRAO 继发的 CME 可以产生良好的视觉效果。

摘要编号：208100

IL-10 分泌性 B 细胞在葡萄膜炎中的作用及机理研究

第一作者：Fan YANG

目的：自身免疫性葡萄膜炎（AU）严重损害视功能且缺乏有效治疗手段。目前，对 AU 发病机制及治疗的研究落后于其他自身免疫性疾病。因此对样本进行多维度高通量分析，筛选出新的致病性或调节性细胞亚群和生物标志物，将有助于明确 AU 发病机制并寻找新的治疗靶标。免疫细胞和细胞因子治疗自身免疫性疾病有广泛的应用前景，因此，我们将以 AU 患提示 B10 细胞参与 AU 发病；人 IL10 转基因（IL-10 KO）小鼠诱导实验性自身免疫性葡萄膜炎本研究将鉴定 B10 细胞特征性表面分子及转录因子，揭示 B 细胞激活产生 IL-10 的机理，探讨 B10 细胞调控 Treg/Th17 细胞平衡机制以及明确 B10 细胞通过改变 Treg/Th17 细胞平衡而减轻眼部炎症，为 B10 细胞靶向治疗 AU/EAU 奠定理论基础并提供新的策略。

方法：1) 鉴定 AU 患者外周血中 B10 细胞的免疫表型；2) 探讨 TLRs 激动剂、CD40L 和 anti-IgM 等体外诱导 B10 细胞高分泌 IL-10 的方法和分子机制；3) 揭示 B10 细胞调节 Treg/Th17 细胞平衡的分子机制。

结果：1. B10 细胞高表达 IgD、CD19、CD24 及 CD38，低表达 CD27 及 CD107a 2. IL2、IL-10 促进 Treg 细胞分化，抑制 Th1 细胞及 Th17 细胞分化 3. B 细胞激活分泌 IL-10 4. B10 细胞抑制 CD4⁺ T 细胞分泌 IL-17 5. B10 细胞过继转移抑制 EAU 疾病进展 6. EAU 造模后清除 B 细胞加重眼部炎症表现。

结论：B10 细胞抑制 AU 的发生和发展，可能是通过改变 Treg/Th17 细胞的平衡或者直接抑制 Th17 细胞分化和功能进而减轻葡萄膜炎症反应。

摘要编号：207726

双眼先后发生的急性视网膜坏死一例报告

第一作者：Xiangli WANG

目的：探讨双眼先后发生的急性视网膜坏死（ARN）的临床特征、诊疗难点及干预策略，为复杂病例的早期识别和规范治疗提供参考

方法：回顾性分析一例 48 岁女性双眼 ARN 患者的诊疗过程。通过眼底照相、荧光血管造影（FFA）及房水病毒检测明确诊断，治疗包括全身及玻璃体腔抗病毒药物、糖皮质激素及玻璃体切割手术。

结果：患者左眼初诊表现为中周部视网膜变淡、血管旁出血及 FFA 脉络膜充盈延迟，抗病毒治疗后仍快速进展为视网膜脱离，术后视力无光感。右眼 10 天内出现类似症状，房水检测提示疱疹病毒感染（HSV-DNA 4.32E+05 拷贝/ml），术后视力仅恢复至 0.08，伴视网膜动脉阻塞及角膜病变。

结论：ARN 双眼发病罕见且预后极差，需早期房水病原学检测、个体化抗病毒—抗炎—手术序贯治疗，并警惕对侧眼受累风险。

摘要编号：207793

合并眼部病变的麻风病一例

第一作者：Yajian DUAN

共同作者：Yudian GAO, Ning JI

目的：报道一例经眼科确诊的麻风病病例。

方法：收集患者临床及实验室检查资料。

结果：本文报道 1 例 50 岁女性患者，因“左眼眼红痛 2 月”于眼科就诊。患者生于广西省百色市，23 岁起居住于山西省晋城市，否认家族史、个人史，2007 年左手第 2 指端坏疽截指手术史，2017 年双眼白内障手术史。体格检查显示颜面部、躯干和四肢存在多发红斑、皮疹、结节改变，双足足底部多发皮肤溃疡、鼻骨塌陷、双侧爪形手、左侧垂足畸形，四肢皮肤感觉减退。眼部查体：Vod: FC/40 cm, Vos: HM/10 cm，双眼眼压正常，双眼睑缘肥厚、睫毛稀少、睑裂闭合不全、角膜知觉减退，右眼结膜轻度充血，周边角膜混浊变性，房闪（-），瞳孔缘全周虹膜后粘连，瞳孔大小约 4 x 3 mm，对光反射（-），人工晶状体在位，晶体表面致密色素沉着，后囊膜致密锅底样混浊，眼后段窥不入；左眼结膜混合充血（+），角膜雾状水肿，周边角膜混浊变性，色素性 KP（+），前房闪辉（++）、细胞（+），下方可见 3 mm 积脓液平，虹膜表面见白色渗出物，鼻上方虹膜前粘连至角膜背，瞳孔向鼻侧偏位，瞳孔大小约 2 x 3 mm，对光反射（-），晶状体缺如，眼后段窥不入。实验室检查：在院期间抽取前房水

行宏基因检测提示麻风分枝杆菌感染；皮肤组织液抗酸染色阳性；皮肤组织活检确诊为麻风病。给予患者眼部抗生素及糖皮质激素药物治疗，指导患者接受规律抗麻风药物治疗，该患者目前仍在随访中，眼部炎症反应较前明显好转。

结论：此病例提示麻风病可致盲，视力下降、眼痛可能为此类患者首次就医时主诉，患者可合并有兔眼、睫毛脱落、角膜知觉减退、角膜变性、葡萄膜炎、白内障等多种眼部表现。随着公共卫生措施的增强，在麻风病发病率显著降低的当今时代，麻风病的诊断是一项挑战，我们仍应加强学习，以熟悉、理解及重视“麻风病疑似症状与体征”，善于借助实验室检测手段，做好麻风病的早期诊断和规范管理，降低致残率，改善麻风病患者生活质量。

摘要编号：209935

年轻高度近视女性点状内层脉络膜病变一例

第一作者：Hui Min LIN

目的：报告一例发生于年轻高度近视女性的点状内层脉络膜病变（Punctuate Inner Choroidopathy, PIC），探讨其临床特征、影像学表现、治疗反应及预后，以提高临床医生对该病的认识。

方法：病例报告。回顾分析患者临床症状、眼底照相、OCT、FFA 及 ICGA 结果，随访治疗效果。

结果：患者 22 岁女性，左眼颞侧固定暗影 2 天，发病前有明显劳累及熬夜史，6 年前行双眼 ICL 植入术，术前近视 -12.0 D，眼轴约 29 mm。双眼视力 0.8，眼压 19，眼底：双眼豹纹状改变，左眼黄斑及视盘周围多发点状黄白色病灶。AF 为弱荧光，OCT 可见外丛状层下中等反射“驼峰”样结节，椭圆体带中断；FFA 早期点状高荧光，晚期轻度渗漏；ICGA 病灶处持续低荧光。主要诊断为：左眼 PIC，予口服泼尼松片 40 mg（逐渐减量）及局部醋酸泼尼松龙滴眼液，1 周后暗影症状好转，OCT 提示“驼峰”样结节隆起减少，3 月后 OCT 视网膜外层向下凹陷呈“V”形改变，继续随访至半年无复发。

结论：PIC 多见于高度近视年轻女性，免疫因素是发病机制之一，预后较好，少部份可复发，多模式影像检查对 PIC 的准确诊断至关重要，其中 OCT 可无创性地观察视网膜脉络膜结构变化，糖皮质激素治疗可有效控制炎症及改善症状。根据文献查阅，PIC 可继发 CNV，严重损害视力。因此，对此类患者突发固定暗点应高度怀疑 PIC，借助多模式影像检查明确诊断，并通过长期随访监测是否出现 CNV。

摘要编号：209184

斜视手术后感染性眼内炎一例

第一作者：Jianwei LIU

目的：汇报一例特殊患者，右眼因行斜视手术后出现感染性眼内炎。

方法：汇报一例眼内炎患者，女，56 岁，右眼斜视手术后出现视物不清 3 天，加重 1 天。入院查体发现：右眼视力 HM/眼前，眼压：29 mmHg，右眼结膜充血明显，颞侧结膜缝线部分松脱，外直肌止点切断处暴露，角膜轻度水肿，前房深度正常，前房内可见积脓，高约 2 mm，房水混浊明显，瞳孔区可见纤维素样渗出，部分与虹膜粘连，余眼内结构欠清。术前 B 超显示，玻璃体腔内可见沙幕状声影。入院诊断：眼内炎（右）斜视矫正术后（右）。

结果：入院后，急诊行玻璃体切除手术治疗。首先取玻璃体液作培养及涂片，冲洗干净前房内积脓及渗出，术中切除混浊玻璃体，发现眼底血管浸润白鞘明显，网膜灰白色改变，散在出血，网膜前可见积脓，后极部网膜结构混乱，9 点钟赤道部附近可见玻璃体嵌顿，可见小网膜破口，切除该处玻璃体，网膜破口周围激光包绕。眼内注射万古霉素 0.1 ml（1 mg）。术后培养结果证实，患者为表皮葡萄球菌感染。术后第三天，患者作玻璃体腔灌洗手术，冲洗玻璃体腔内渗出，首次手术后七天患者出院。出院时视力 0.12，眼底：网膜在位，网膜可见散在出血，9 点钟赤道部激光斑可见。

结论：斜视手术如果肌肉后退较多，一定注意不能缝穿巩膜，万一缝穿，结膜组织一定要仔细缝合好，预防术后眼内炎的发生。

摘要编号：204979

普罗布考预防白塞病的效应机制初探索

第一作者：Jin LI

共同作者：Jian LI

目的：白塞病（BD）表现为复发性口腔溃疡、眼部病变和皮肤损伤，葡萄膜炎是其最常见且可能导致失明的严重眼部表现，BD 目前尚缺乏有效的预防性药物。该疾病常导致脂质代谢紊乱，并对血管内皮功能产生不利影响。因此，探索诸如降脂药物等预防策略至关重要。普罗布考以其降脂特性而闻名，是一种有前景的候选药物。本研究假设，普罗布考通过抑制 ATP 结合盒转运体 A1（ABCA1）来调节循环代谢物，从而可能降低 BD 的发病风险。本研究采用孟德尔随机化（MR）方法，旨在评估普罗布考对 BD 的影响，并通过分析其对循环代谢物的调节作用来探讨其预防潜力。

方法: 在此 MR 研究中, 我们选取与普罗布考相关的单核苷酸多态性 (SNPs) 作为工具变量, 并进行了与高密度脂蛋白相关 SNP 的阳性对照分析, 以验证工具变量的选择。研究分为两步: 首先, 利用普罗布考的表达数量性状位点 (eQTL) 数据估计其对循环代谢物的因果效应; 其次, 使用与这些代谢物相关的 SNP 评估它们对 BD 风险的因果影响。为确保结果的稳健性和有效性, 我们采用了多种 MR 方法, 包括逆方差加权法、异质性检验和多效性分析。

结果: 本研究从 ABCA1 表达数量性状位点数据中, 共识别出 30 个与 BD 相关的 SNP、7502 个与循环代谢物相关的 SNP, 以及 1049 个通过循环代谢物与 BD 相关的 SNP。孟德尔随机化分析证实, 普罗布考可导致 HDL 中胆固醇酯浓度降低, 该结果与随机药物试验的发现一致 (比值比 OR = 0.932, 95% 置信区间 CI 0.907-0.958, $P < 0.001$)。此外, 研究显示普罗布考可显著降低 BD 风险 (OR = 0.496, 95% CI 0.283-0.868, $P = 0.014$)。在评估的 123 种循环代谢物中, 有 36 种与普罗布考相关。值得注意的是, 普罗布考能显著降低极大 HDL 颗粒浓度 (OR = 0.917, 95% CI 0.889-0.947, $P < 0.001$), 这约占其降低 BD 风险总效应的 10.407%。

结论: 本研究证实, 普罗布考通过降低极大 HDL 颗粒浓度, 显著降低 BD 风险, 可能从源头上减少由白塞病引发的葡萄膜炎的发病率。对于已确诊的白塞病患者, 尤其是高复发风险的葡萄膜炎患者, 本研究为将普罗布考作为一种新的预防性治疗选择提供了遗传学依据, 以期延迟或预防葡萄膜炎的发作。

摘要编号: 209994

晶状体上皮间质化与白内障术后长期慢性炎症的临床观察

第一作者: Lei GAO

共同作者: Fei CONG, Yujuan ZHOU

目的: 由于多数情况下, 人工晶状体 (IOL) 被植入囊袋内且与晶状体囊袋形成紧密贴附, 尽管有或轻或重的晶状体上皮间质化 (EMT) 发生, 但由于囊袋本身和 IOL 的屏障阻隔作用, EMT 所产生的物质不会轻易进入前房或者玻璃体腔。但如果囊袋在某些条件下再度开放, 则这些物质就会进入眼内而诱发眼内炎症。本文将通过对 5 个病例的分析, 探讨 EMT 与白内障术后长期慢性炎症的关系。

方法: 临床病例观察。

结果: 本文所呈现的 5 个病例在漫长的眼部诊疗过程中虽然存在差异, 但都具备如下共同特点: 1)

均有白内障手术病史且同时都有晶状体囊袋开放或者再度开放病史; 2) 数月甚至超过 1 年的长期慢性“可控性”眼内炎症, 表现为无明显炎症充血, 角膜后少许尘状 KP, 多数情况下非甾体或者联合皮质类固醇眼药水能够控制, 但停药或者减少用药频率后炎症复发; 3) 与炎症相伴随的眼内压升高, 大多随访期间眼压不超过 35 mmHg; 4) 所有病例在经历最后一次针对囊袋或者 EMT 清除后, 眼内炎症得以控制, 眼压平稳。

结论: 5 例曾经令我们长期困惑不解的病例, 他们以显著 LEC 间质化和囊袋再开放为特点, 以长期顽固性眼内轻度炎症并眼内压轻度升高为临床表现, 在经过针对 LEC 间质化的外科手术干预后均取得了满意的临床效果。因此, 对于白内障术后长期慢性无菌性炎症或者迟发性葡萄膜炎患者, 应该关注 LEC 间质化和关注囊袋 IOL 复合体的屏障保护作用, 必要时采取更为积极的外科手段清除 EMT 物质乃至完整清除囊袋。

摘要编号: 210295

眼外伤后猪链球菌感染性眼内炎一例

第一作者: Yiyang WANG

共同作者: Yang CHENG, Qiong HUANG

目的: 感染性眼内炎是一种由细菌或真菌引起的致盲性眼病。本研究报告了一例眼外伤后猪链球菌感染性眼内炎病例。

方法: 一名 22 岁男性被猪圈竹竿戳伤右眼, 因右眼角膜穿通伤于急诊下行右眼角膜裂伤清创缝合和角膜异物取出术。次日, 观察到患者右眼角膜雾状水肿, 前房大量积脓, 晶状体和玻璃体浑浊, 眼底无法窥清, 考虑右眼感染性眼内炎。对患者进行右眼玻璃体切除术, 在关闭液体通道下使用玻切头采集未经稀释的玻璃体液, 用于病原微生物培养和纳米孔靶向测序 (NTS) 检测, 随后经验性予以玻璃体腔注射万古霉素 1 mg/0.1 mL 和头孢他啶 2 mg/0.1 mL。在术中清除前房积脓、切除已变浑浊的晶体后, 见玻璃体腔内呈黄白色浑浊, 伴有广泛视网膜出血及视网膜血管树枝样改变。术后局部和全身联合抗感染治疗, 术眼滴用妥布霉素地塞米松滴眼液、头孢他啶滴眼液每日 4 次, 全身静脉滴注盐酸左氧氟沙星氯化钠注射液 0.4 g 每日 1 次及头孢孟多酯钠氯化钠注射液 2 g 每 12 小时 1 次, 连续 7 天。

结果: 玻璃体液送检后 12 小时, NTS 检出猪链球菌和产气荚膜梭菌, 检出序列数分别为 5566 条和 3392 条, 与参考序列覆盖度均超过 95%。送检后 48 小时, 病原微生物培养鉴定出草绿色链球菌和蜡样芽孢杆菌。鉴于患者右眼被猪圈竹竿戳伤的外伤

史和 NST 结果, 猪链球菌和产气荚膜梭菌被考虑为导致该患者眼内炎的病原体。术后第二天, 患者右眼角膜水肿减轻, 前房渗出依然明显, 继续维持前述抗感染治疗。术后第八天, 术眼视力指数 / 眼前 10 cm, 角膜基本恢复透明, 前房渗出完全吸收, 视网膜平伏。术后十五天, 术眼角膜透明, 前房清亮, 视网膜平伏。三个月后, 该患者接受了右眼硅油取出术, 术后右眼视力矫正至 0.02, 眼压 18 mmHg, 视网膜保持平伏。

结论: 外伤后细菌性眼内炎发展迅速, 及时诊断和治疗与预后密切相关。NTS 可对微量样本进行即时检测, 是玻璃体标本的理想检测工具。对于眼外伤患者疑似感染性眼内炎时, 通过快速 NTS 检测得以迅速诊断, 该测试显示出高特异性和敏感性。

摘要编号: 205561

近十年内源性眼内炎患者临床特征及全身免疫炎症指数评估研究

第一作者: Rui NIU

共同作者: Xin JIN, Linyuan LU, Xuekai ZENG, Ziqi ZHAO

目的: 比较近十年内源性眼内炎患者的临床特征及预后。眼内炎的发生发展与全身免疫炎症指数 (SII) 及临床特征相关。

方法: 本研究纳入近十年河北省眼科医院收治的内源性眼内炎患者。根据预后视力, 将患者分为 A 组和 B 组。评估指标包括基础疾病、感染风险、症状和体征以及全血细胞计数。计算 NLR、PLR、MLR 和 SII 值。采用非参数检验对各组患者的临床特征和全血细胞计数结果进行检验。通过主成分和有序逻辑回归分析进一步分析与眼内炎进展相关的参数。

结果: 本研究共纳入 22 例内源性眼内炎患者, 共 25 只眼。感染菌包括金黄色葡萄球菌、藤黄微球菌、溶血性葡萄球菌等。在 6 个月 -8 年的随访期间, 患眼视力范围为 2.7 (1.55, 2.7) LogMAR-1.22 (0.6, 2.7) LogMAR。A 组和 B 组的中性粒细胞、单核细胞和 PLT 计数、NLR、PLR 和 SII 值以及其他标志物均显著高于对照组。有序回归分析显示, SII 与性别、年龄、发病时间、糖尿病、高血压、单核细胞计数及红细胞分布的似然模型最佳, 其增高与眼内炎的发生发展密切相关。

结论: 眼内炎患者外周血中性粒细胞、单核细胞、血小板计数及 SII、NLR、PLR、MLR 值均显著升高。SII 可作为预测眼内炎严重程度及预后的生物标志物。

眼外伤

摘要编号: 208761

一种新型热/光双交联可注射水凝胶用于快速封闭开放性眼球损伤

第一作者: Peifang XU

共同作者: Juan YE

目的: 眼外伤是视力障碍的重要原因, 开放性眼外伤 (OGIs) 指眼球壁 (角膜或巩膜) 的全层损伤。由于眼球的保护屏障被破坏, OGIs 易引发眼内感染和视功能损害, 需要及时干预以恢复眼球完整性和视功能。有效的眼部急救和及时转诊能够降低 OGIs 所致的长期视力损失的风险。本研究旨在开发一种新型壳聚糖基水凝胶, 用于快速封闭 OGIs, 防止眼内容物进一步流失, 为后期治疗和功能恢复创造机会。

方法: 通过精氨酸和甲基丙烯酸酐修饰羟丁基壳聚糖 (HBC) 合成 HBC-m-Arg。采用氢谱 (1H-NMR) 和元素分析确定水凝胶化学组成、接枝率, 流变试验和拉伸测试等方法表征其理化性能。采用体内外毒理学实验评估其生物相容性。通过离体组织水凝胶留存试验和破裂压力测试验证其封闭性能。并在兔角膜损伤模型中评估其体内应用的可行性。

结果: 氢谱 (1H-NMR) 和元素分析试验证实精氨酸和双键接枝成功。溶胀试验提示 HBC-m-Arg 水凝胶溶胀比 $830 \pm 45.98\%$, 低于 HBC 的 $1243 \pm 43.80\%$, 含水量为 $89.23 \pm 0.54\%$, 略低于 HBC 的 $92.55 \pm 0.24\%$, 表明 HBC-m-Arg 在保持适度肿胀和含水量的同时, 有助于维持眼内结构的稳定性。剪切应力和剪切粘附强度测试提示 HBC-m-Arg 水凝胶具有更高的粘附强度, HBC 的粘附强度为 26.79 ± 20.17 kPa, 而 HBC-m-Arg 水凝胶的粘附强度显著提高至 77.72 ± 11.52 kPa。HBC-m-Arg 水凝胶可通过热/光双重交联, 使得水凝胶在注射后能够在体温下迅速发生相变形成凝胶, 并在紫外光照射下进一步通过光交联增强其机械强度。细胞毒性试验和兔体内实验均证实 HBC-m-Arg 具有良好的细胞和组织相容性。离体及体内破裂压力测试表明, 该水凝胶能够迅速恢复眼内压, 并抵抗较高压力, 显示出其在 OGIs 封闭方面的潜力。此外, HBC-m-Arg 在眼组织中的适度降解性及其离体稳定性, 体现了良好的稳定性和生物降解性的平衡。

结论: HBC-m-Arg 能够为 OGIs 提供快速、有效且安全的封闭方案, 在急诊眼外伤治疗中具有较好的应用前景。

摘要编号: 210153

两襻和三襻式人工晶体的悬吊方法

第一作者: Yong YAO

共同作者: Miao ZHUANG

目的: 人工晶体悬吊手术是恢复眼外伤、眼部手术等原因导致的无晶体眼患者的重要方式之一。目前临床上有多种人工晶体可供选择, 悬吊方式也有多种, 包括两襻和三襻式人工晶体的悬吊方法。本文描述一种一点一线人工晶体悬吊方式, 并作简要介绍和视频展示。

方法: 选取几位因各种原因导致的无晶体、无囊袋的患者, 通过视频介绍三襻式人工晶体的悬吊方法。对于三襻式人工晶体, 可采用牛结对各襻固定后, 固定于巩膜上, 可采用双股单针缝线, 在各襻上圈套固定后穿巩膜固定于巩膜瓣下的方式, 亦可用“一点一线”法, 将上方两襻用一根线穿过后穿巩膜固定于巩膜瓣下, 下方则用圈套法穿巩膜固定在巩膜瓣下。

结果: 各种方式均能获得良好的固定效果。患者术后视力提高。

结论: 手术医生可根据患者情况选择合适的 IOL 和 IOL 固定方式, 一定程度恢复患者视功能, 笔者更推崇利用三襻式人工晶体进行悬吊, 其安全性、稳定性和效果可能更优。

摘要编号: 207962

中国儿童及青少年眼外伤特点 (中国眼外伤研究 2023)

第一作者: Mengyu LIAO

目的: 分析中国儿童及青少年眼外伤的流行病学特征和损伤特点。

方法: 多中心横断面、回顾性、观察性研究。基于中国眼外伤登记数据库, 将 2023 年 1~12 月住院治疗的眼外伤患者 1,412 例 (1,435 只眼) 中 0~18 岁的儿童及青少年患者 189 例 189 只眼 (13.4%, 189/1,412) 纳入研究。患者来自华北、华东、华南、华中、西北、西南地区 17 个省级行政区的 23 家三级综合性甲等医院或眼科专科医院。分析不同地域、不同年龄段患者的人口特征、流行病学特征以及损伤特点、视力结局等。189 只眼中, 行二期手术治疗 95 只眼, 排除检查不配合以及视力无光感、光感者 23 只眼, 最终纳入统计 72 只眼; 对于有随访资料的 36 只眼, 观察其手术后视力结局。

结果: 189 例患者中, 男性 143 例 (75.7%, 143/189), 女性 46 例 (24.3%, 46/189); 年龄 8.73 (1~18) 岁。各年龄段性别构成均以男性为主。地

域分布显示华东地区病例数最多, 为 55 例 (29.1%, 55/189)。7~10 岁为高发年龄段, 共 70 例 (37.0%, 70/189)。眼外伤类型分析显示, 189 只眼中, 机械性眼外伤 130 只眼, 其中开放性、闭合性损伤分别为 105 (80.8%, 105/130)、25 (19.2%, 25/130) 只眼。受伤后 24 h 内接受急诊手术者 122 只眼 (占急诊手术病例 83.6%, 122/146)。具有完整随访资料的 36 只眼中, 初始视力分布为: 盲 23 只眼 (63.9%)、低视力 6 只眼 (16.7%)、视力 ≥ 0.3 者 7 只眼 (19.4%); 末次随访视力改善为: 盲 12 只眼 (33.3%)、低视力 8 只眼 (22.2%)、视力 ≥ 0.3 者 16 只眼 (44.4%)。最终视力结局显示, 致残率 22.2% (8/36), 致盲率 33.3% (12/36)。

结论: 儿童及青少年眼外伤占同期住院眼外伤患者的 13.4%, 且具有显著的性别差异 (男性占比 75.7%)。不同年龄段儿童及青少年在眼外伤致伤原因、发生地点及临床特征等方面均呈现明显的年龄特异性分布规律。

摘要编号: 208699

基于 AS-OCTA 评估人工晶体悬吊术后的倾斜和偏心

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共同作者: Xun AN, Chao MA, Tiantian WANG, Yong LV

目的: 运用 AS-OCTA 技术, 评估两种不同材料设计的单焦人工晶体在悬吊术后的倾斜和偏心情况, 探索影响因素。

方法: 回顾性分析 50 例 50 眼接受人工晶体悬吊手术的患者。按植入晶体类型分为两组, A 组为改良 C 型襻, 由疏水性丙烯酸酯和聚甲基丙烯酸甲酯材料制成, B 组为镂空襻, 由亲水性丙烯酸酯材料制成, 收集所有患者的年龄、性别、术前最佳矫正视力、术后第 1 天、第 15 天、第 45 天、3 月时最佳矫正视力、眼压及应用 AS-OCTA 拍摄的眼前节清晰图像。使用系统晶体分析模式自动计算出 IOL 倾斜度和偏心量。

结果: 50 例患者术后 3 月人工晶体均在位, 2 例因虹膜缺损人工晶体倾斜大于 5° , 故排除, 余患者人工晶体倾斜均小于 5° , 偏心距离小于 0.5 mm。B 组患者术后人工晶体偏心较 A 组小, $P < 0.05$, 差异有统计学意义; 两组视力、眼压 $P > 0.05$, 差异无统计学意义。

结论: 与改良 C 型襻 PMMA 材料相比, 采用镂空襻设计的亲水性丙烯酸酯 IOL 在术后早期能提供更佳稳定性, 表现为更小的偏心。这提示我们, 对于需要行人工晶体悬吊的患者, 选择 B 组这类具有

更优稳定性的 IOL 可能更具临床意义，以期获得更长期、更稳定的视觉效果。

摘要编号: 203937

粘弹剂在严重眼外伤视网膜复位术中的创新应用

第一作者: Mingjun TANG

共同作者: Ziqiang LIANG, Liuxueying ZHONG

目的: 本研究通过招募眼外伤中复杂性视网膜脱离患者，创新性评估 PPV 术中粘弹剂在视网膜复位及术后视力恢复中的效果。

方法: 本研究纳入 12 名患者的 12 只眼，OTS（眼外伤评分）1-2 分（损伤最严重级别），均合并 PVR（D2 或 D3 级）及视网膜脱离。首先进行核心玻璃体切除术后，将 0.1-0.3 mL 粘弹剂朝视盘方向直接注射到褶皱的视网膜上，逐渐覆盖并展平脱离的视网膜，随后进行剥膜、重水置换术等步骤，手术完成后，清除粘弹剂，行光凝术后硅油填充玻璃体腔。比较根据 OTS 评分系统预测的视力与实际视力差异。

结果: 1. 粘弹剂有效促进视网膜复位：外伤后旋转移位的视网膜在粘弹剂支撑、展开作用下解剖学复位。2. 该研究纳入的 12 名患者术后 3 月视网膜均贴附良好。3. 粘弹剂辅助 PPV 有助于改善预后：根据 OTS 评分系统，预计 73% 的 1 分患者将保持在 NLP 状态，17% 的患者能够达到 LP/HM。在我们的研究中，通过粘弹剂的辅助，55.5% 的 1 分患者保持在 NLP 状态，44.5% 的患者改善为 LP/HM，均超越 OTS 预测值。

结论: 本研究探索了粘弹剂在复杂性眼外伤 PPV 术中的创新应用，结果显示其能显著提高视网膜复位成功率，并有助于术后视力恢复。

眼底内科

摘要编号: 208921

COVID-19 后双眼急性黄斑神经视网膜病变

第一作者: Si Si YEUNG

共同作者: Feng WEN

目的: 本病例报告旨在探讨一名 16 岁女性患者在 COVID-19 后出现双眼视力下降及固定黑影的可能病因及临床意义，为眼科临床诊断提供参考。

方法: 对患者进行详细的眼科检查，包括最佳矫正视力（BCVA）、眼内压（IOP）、眼底检查、光学断层扫描（OCT）及光学相干断层血管造影（OCTA）

检查等，结合患者病史和体征进行综合分析，排除其他可能疾病后，明确诊断。

结果: 患者双眼 BCVA 分别为 20/40（右眼）和 20/40（左眼），IOP 分别为 13mmHg（右眼）和 15 mmHg（左眼）。眼底检查发现双眼黄斑区微红褐色楔形病变，OCT 提示黄斑区椭圆体嵌合体带断裂，但 OCTA 未发现新生血管。患者急性起病，双眼 COVID-19 后出现症状，最终诊断为双眼急性黄斑神经视网膜病变。

结论: 本病例提示，对于 COVID-19 后出现双眼视力下降、固定黑影及双眼黄斑区微红褐色楔形病变患者，需全面评估并排除多种潜在病因。

摘要编号: 210023

GLS1 源性氨蓄积通过 VDAC1 寡聚化驱动糖尿病视网膜病变神经炎症

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目的: 糖尿病视网膜病变 (diabetic retinopathy, DR) 是工作年龄人群视力丧失的主要原因，其中神经炎症是核心病理环节，但其启动机制尚不明确。本研究旨在探究 Müller 细胞中谷氨酰胺酶 1 (glutaminase 1, GLS1) 是否通过诱导氨蓄积触发线粒体功能障碍，进而激活 NLRP3 炎性小体介导的神经炎症，并重点阐明电压依赖性阴离子通道 1 (voltage-dependent anion channel 1, VDAC1) 寡聚化在该过程中的关键作用。

方法: 体内研究采用链脲佐菌素诱导的 C57BL/6J 糖尿病小鼠模型，通过玻璃体腔注射 GLS1 抑制剂 CB839 和降血氨药物 LOLA 进行干预，利用光谱域光学相干断层扫描、全视野视网膜电图、伊文思蓝渗漏实验和视网膜免疫荧光染色评估视网膜结构与功能变化。体外研究采用原代视网膜 Müller 细胞，通过高糖刺激构建糖尿病微环境模型，分别通过 GLS1 抑制剂 CB839 及小干扰 RNA 敲降技术进行功能干预。系统采用氨检测试剂盒评估细胞内氨代谢稳态；利用非还原电泳分析 VDAC1 寡聚化状态；采用 JC-1 与 MitoSOX 探针分别检测线粒体膜电位与活性氧水平；通过 qPCR 技术定量胞质内线粒体 DNA (mtDNA) 释放；并借助蛋白质免疫印迹与免疫共沉淀技术评估 NLRP3 炎性小体活化及其分子复合物组装情况。

结果: 体内实验表明，糖尿病小鼠视网膜中 GLS1 表达显著上调，伴随 Müller 细胞焦亡标志物增加和神经炎症反应，而抑制 GLS1 或降低血氨可有效改善 DR 小鼠视网膜病变。体外实验证实，高糖通过上调 Müller 细胞中 GLS1 表达，增强谷氨酰

胺分解代谢，导致毒性代谢产物氨蓄积；过量的氨进一步诱导线粒体膜通道蛋白 VDAC1 发生寡聚化，进而启动线粒体通透性转换孔的开放，引发 mtDNA 泄漏至胞质，进而激活 NLRP3 炎性小体，诱发 Müller 细胞发生焦亡，从而驱动 DR 的神经炎症进程。

结论：本项目通过构建 DR 细胞与动物模型，旨在系统阐明从“GLS1/氨蓄积”到“VDAC1 寡聚化/mtDNA 释放”，最终至“NLRP3 炎性小体激活”的完整信号通路；并在体内评估靶向 GLS1 与降低血氨的协同治疗潜力。本研究旨在揭示 DR 中“代谢-线粒体-免疫”级联反应新机制，阐明 VDAC1 寡聚化的关键作用，为靶向 GLS1/氨的代谢干预策略提供实验依据。

摘要编号：210203

LRRC75A-AS1 通过 miR-330-3p/CCL2 轴促进增生性糖尿病视网膜病变中的新生血管形成

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目的：免疫细胞浸润与长链非编码 RNA (long noncoding RNA, lncRNA) 在增生性糖尿病视网膜病变 (proliferative diabetic retinopathy, PDR) 的病理生理过程中扮演复杂角色。本研究旨在探讨免疫相关 lncRNA 及其在 PDR 中的潜在作用机制。

方法：通过 GSE102485 数据集与 ImmPort 数据库筛选 PDR 中差异表达的免疫相关 mRNA；采用 CIBERSORT 算法分析 PDR 中的免疫细胞浸润特征；基于其与浸润免疫细胞的相关性筛选关键 DE-IRG。依据竞争性内源 RNA 理论，整合 GSE199852、GSE178721 数据集、MultiMIR R 软件包及 LncBase Predicted 在线数据库，鉴定 PDR 中的免疫相关 lncRNA。通过敲低实验验证目标 lncRNA 对高糖处理下的人视网膜微血管内皮细胞 (Human retinal microvascular endothelial cells, HRMECs) 迁移及成管能力的影响。

结果：研究发现 LRRC75A-AS1 是 PDR 中唯一显著表达的免疫相关 lncRNA。其可能通过吸附 miR-330-3p 调控 PDR 关键免疫基因 CCL2 的表达。CCL2 与 PDR 免疫细胞浸润水平，特别是 M2 型巨噬细胞浸润密切相关。敲低 LRRC75A-AS1 可逆转高糖诱导的 HRMECs 中 CCL2 高表达与 miR-330-3p 低表达现象，并显著抑制高糖环境下 HRMECs 的迁移与成管能力。

结论：本研究揭示 LRRC75A-AS1 可能通过调控 miR-330-3p/CCL2 轴促进 PDR 新生血管形成。

CCL2 与 PDR 免疫细胞浸润密切相关。该发现为深入理解 PDR 发病机制及开发新的治疗策略提供了新视角。

摘要编号：208077

Von Hippel-Lindau 综合征一例报道并文献复习

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目的：探究希佩尔-林道 (VHL) 综合征在眼科的临床特征、诊治方法，并提高临床医生对该病的认识。

方法：回顾性分析 2024 年 4 月收治的 1 例眼科首诊表现为视力下降的 VHL 综合征患者的临床资料，并复习相关文献进行分析总结。

结果：既往已报道的 VHL 眼科临床特征为：视网膜血管母细胞瘤 (60%)、双眼发病 (50%)、周边部视网膜血管母细胞瘤 (70%)、视盘/后极部血管母细胞瘤 (10%)、渗出性视网膜脱离 (25%)、牵引性视网膜脱离 (10%)、继发性新生血管性青光眼 (5%) 等。本例 33 岁男性患者，因双眼视力差 2 周首诊于眼科。眼底表现为视网膜血管迂曲扩张、出血、渗出及黄斑水肿。全身影像学检查提示双侧小脑多发血管母细胞瘤 (术后病理证实，WHO I 级)、梗阻性脑积水、颈胸髓空洞、胰腺、肝脏及左肾多发囊肿。基因检测发现 VHL 基因突变。患者先后接受脑室引流、后颅窝小脑肿瘤切除术及眼内抗 VEGF 药物治疗。结合其多系统受累的典型表现，最终确诊为 VHL 综合征。

结论：VHL 综合征是一种常染色体显性遗传的肿瘤综合征，可累及眼、中枢神经系统及腹腔脏器。视网膜血管母细胞瘤常为其早期表现，眼科可能成为首诊科室。对于不明原因的视力下降伴视网膜血管异常的患者，应警惕 VHL 综合征，并进行全面的神经系统及腹部影像学筛查，以实现早期诊断和多学科联合管理。

摘要编号：207993

tRF-18 调控甘油磷脂代谢改善糖尿病视网膜病变中神经血管单元功能障碍

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目的：探究 tRF-18 在糖尿病视网膜病变 (DR) 中如何通过靶向 Müller 细胞中调控视网膜甘油磷脂代谢重塑的关键代谢酶或信号分子，影响血管内皮细胞的功能和神经元的存活。

方法: 将人视网膜 Müller 细胞分为正常糖 (Ctrl)、高渗组 (HM) 和高糖组 (HG)，通过 qRT-PCR 检测 tRF-18 的表达水平。将人视网膜 Müller 细胞分为 Ctrl 组、HG 组、HG + NC mimic 组、HG + tRF-18 mimic 组、HG + NC inhibitor 组、HG + tRF-18 inhibitor 组，检测细胞活力、增殖、凋亡、线粒体膜电位水平。将人视网膜 Müller 细胞与微血管内皮细胞共培养后，通过 EdU 实验、transwell 实验和成管实验检测视网膜微血管内皮细胞的功能。将人视网膜 Müller 细胞与 RGC 细胞共培养后，检测细胞活力与凋亡水平。将小鼠随机分为 WT 组、DR 组、DR + NC agomir 组、DR + tRF-18 agomir 组、DR + NC antagomir 组、DR + tRF-18 antagomir 组，检测 tRF-18 干预下的视网膜微血管渗漏情况、视网膜无细胞毛细血管数量、视网膜神经元功能及视觉功能。通过多组学检测、生物信息学分析、RNA 免疫沉淀实验、双荧光素酶报告实验等研究来阐明 tRF-18 的作用机制。

结果: 与正常糖组和高渗组比较，人视网膜 Müller 细胞中 tRF-18 在高糖应激条件下表达水平降低，差异有统计学意义 ($P < 0.05$)。与 Ctrl 组、HG 组、HG + NC mimic 组和 HG + NC inhibitor 组相比较，HG + tRF-18 mimic 组的 Müller 细胞活力下降、增殖能力降低、凋亡水平增加、线粒体膜电位水平降低，HG + NC inhibitor 组的结果与之相反，差异有统计学意义 (P 均 < 0.05)。HG + NC mimic 组的 Müller 细胞与内皮细胞共培养后，内皮细胞的增殖、迁移和成管能力降低，HG + NC inhibitor 组结果与之相反。差异有统计学意义 (P 均 < 0.05)。在糖尿病小鼠模型中，HG + tRF-18 agomir 组的小鼠视网膜微血管渗漏减少、视网膜无细胞毛细血管数量减少，视网膜神经元功能和视觉功能改善，HG + tRF-18 antagomir 组的结果与之相反，差异有统计学意义 (P 均 < 0.05)。RIP 试验表明 tRF-18 可以被 AGO2 蛋白免疫沉淀，以 miRNA 样机制发挥作用。多种组学联合分析，筛选出甘油磷脂代谢关键酶为 tRF-18 下游的潜在靶点，双荧光素酶报告实验验证了其 tRF-18 的结合。

结论: tRF-18 的表达水平在糖尿病应激后显著降低。tRF-18 过表达可以通过调控甘油磷脂代谢，减轻视网膜 Müller 细胞功能障碍，改善视网膜血管功能障碍，抑制视网膜神经元变性。

摘要编号: 209116

一例糖尿病性黄斑水肿伴微动脉瘤的临床治疗观察与思考

第一作者: Liu HAO

目的: 糖尿病性黄斑水肿 (DME) 是导致糖尿病患者视力受损的主要原因之一，其严重程度并不总与糖尿病视网膜病变 (DR) 的分期一致。本文通过报告一例 DR 仅处于中度非增殖期 (NPDR)，却伴有严重 DME 的临床病例，探讨此类难治性 DME 的可能机制，并分析其对新型抗 VEGF 药物法瑞西单抗 (Faricimab) 的治疗反应，以期临床处理类似病例提供参考。

方法: 患者为 61 岁男性，患 2 型糖尿病 23 年，合并高血压及冠心病。因“双眼黄斑水肿”就诊，最佳矫正视力 右眼 0.5、左眼 0.4。眼底检查显示双眼中度 NPDR，但光学相干断层扫描 (OCT) 提示明显的黄斑囊样水肿，呈现出 DR 整体病变程度与黄斑区局部水肿严重性不一致的特征。我们推测，黄斑区密集分布的微动脉瘤作为持续渗漏源，是导致该患者顽固性 DME 的主要结构性因素。此外，患者血糖控制不佳 (HbA1c 7.3%)，可能也加剧了 DME 的发生与持续。

结果: 针对该例难治性 DME，患者接受了 4 次法瑞西单抗玻璃体内注射负荷治疗。法瑞西单抗作为一种同时靶向 VEGF-A 与 Ang-2 的双特异性抗体，理论上具备更强的血管稳定作用。治疗后 OCT 显示黄斑中心凹视网膜厚度有所降低，水肿获得部分解剖学改善，证实药物具有一定疗效。然而，与治疗前相比，水肿未完全消退，改善程度未达理想状态，提示患者存在一定程度的治疗反应不足。这可能与微动脉瘤渗漏活跃、局部血视网膜屏障破坏严重或其他个体因素相关。

结论: 本案例表明，即使 DR 处于早、中期非增殖阶段，糖尿病患者仍可能因局部病灶 (如微动脉瘤) 引发顽固性 DME。法瑞西单抗虽显示出疗效，但反应不充分，提示单一抗 VEGF 治疗可能不足以完全控制此类病例的进展。后续应结合荧光素眼底血管造影 (FFA) 和吲哚菁绿血管造影 (ICGA) 等影像手段，精准评估渗漏源，为微脉冲激光等局部治疗提供依据。长期管理中，除专科治疗外，必须重视血糖、血压等全身性危险因素的控制，并建立规范随访体系，以实现对视功能的持续保护。

摘要编号: 209119

中心性浆液性脉络膜视网膜病变合并非动脉炎性前部缺血性视神经病变一例

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目的: 报告一例罕见的中心性浆液性脉络膜视网膜病变 (CSC) 与非动脉炎性前部缺血性视神经病变 (NAION) 共存病例, 探讨其临床特点、诊断挑战与个体化治疗策略。

方法: 回顾性分析一例 66 岁女性患者。因“右眼视物遮挡 9 天”于外院初步诊断为“右眼 NAION”, 并接受两次球后激素注射。后转至我院, 综合其外院及本院影像学检查资料进行重新评估。

结果: 临床表现: 患者急性起病的右眼视物遮挡, 视野检查呈现与 NAION 相符的缺损。影像学特征: 黄斑 OCT: 显示右眼黄斑区典型的“穹顶样”神经上皮层脱离, 伴视网膜色素上皮微小隆起。FFA 与 ICGA: 双眼均显示脉络膜通透性增高及渗漏点, 符合 CSC 的慢性脉络膜改变特征。黄斑 OCT 增强深度成像证实双眼黄斑下脉络膜显著增厚、血管扩张。眼眶 MRI: 平扫未见明确异常, 结合临床排除典型视神经炎。诊断分析: 患者同时具备 NAION 的急性视神经病变证据和 CSC 的慢性脉络膜视网膜病变证据。综合分析认为, 患者基础存在原发性 CSC, 此次新发 NAION。黄斑区脱离的特定形态及双眼弥漫性脉络膜增厚是判断 CSC 为基础病变的关键。治疗与转归: 鉴于 CSC 的存在, 尤其考虑到既往球后激素注射史可能带来的风险, 治疗方案严格规避全身或局部激素使用。最终确定个体化方案: 针对 CSC 行黄斑区微脉冲激光治疗, 并辅以复方樟柳碱颞浅动脉旁注射以改善眼局部微循环。患者目前正处于治疗效果的观察期。

结论: 本病例罕见地同时呈现了急性 NAION 与慢性 CSC 的特征。详尽的影像学检查, 特别是对 OCT 形态及 FFA/ICGA 特征的细致分析, 是准确识别两种疾病共存的关键。病例清晰地表明, CSC 作为基础病变显著影响了 NAION 的治疗决策。由于激素存在加重 CSC 的风险, 本例严格避免了其应用, 转而采取针对 CSC 的激光治疗与改善微循环相结合的策略。本例提示, 在诊断“NAION”时, 临床医生应全面评估眼底, 尤其需关注黄斑区 OCT 及脉络膜状态, 警惕可能合并的 CSC 等其他眼底病变, 从而制定真正个体化的治疗方案。对该病例的长期随访对于评估联合治疗的最终疗效至关重要。

摘要编号: 204353

人类视网膜类器官重现 PRPF6 突变型 RP 疾病的表型特征及其基因治疗的研究

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目的: PRPF6 基因的突变可造成遗传性视网膜色素变性 (RP), 其发病机制未明, 治疗方案非常有限。本研究旨在利用人类视网膜类器官 (ROs) 在体外模拟 RP 发病发展, 并评估 PRPF6 基因增强治疗的可行性。

方法: 本研究建立 PRPF6 突变型 RP 患者来源视网膜类器官 (ROs) 和 PRPF6 基因敲入 (knockin) ROs 模型。应用 qPCR 和免疫荧光染色检测视网膜发育、光感受器和纤毛相关基因的表达; 使用扫描电镜和透射电镜评估视网膜外层的超微结构改变; 单细胞测序分析视网膜不同亚群的基因表达特征。最后, 应用 AAV2.7m8 介导 PRPF6 基因增强疗法在疾病 ROs 中进行干预处理。

结果: 镜下可见 ROs 呈外观透亮、分层的神经视网膜结构, 其直径和体积逐渐增大。与正常组相比, 患者组和 knock-in 组 ROs 显示 PRPF6 基因表达显著下降、光感受器标志物 Recoverin、Rhodopsin 和 M/L-opsin 的表达下降、ROM1 标记的光感受器外节数量减少、纤毛发生率降低及其长度缩短。扫描及透射电镜显示 PRPF6 突变 ROs 的视网膜外层厚度变薄、排列紊乱, 光感受器超微结构明显受损和外节数量减少。单细胞测序结果揭示 ROs 呈现与人类视网膜组织相似的发育过程和多细胞结构, 并发现: 1) 视杆细胞是 PRPF6 突变型 RP 疾病中最受影响的视网膜细胞类型; 2) 视觉感知相关基因 (ARR3、GNGT1 和 GNAT1)、光感受器外节相关基因 (PRPH2 和 PDE6B) 以及纤毛相关基因 (ARL13B、CEP290 和 CFAP100) 的表达失调。此外, 应用 AAV2.7m8 介导 PRPF6 基因增强疗法, 发现疾病 ROs 的视网膜发育和光感受器异常表型明显得以改善。

结论: PRPF6-knockin 和患者来源的 ROs 模型重现出视网膜发育和光感受器缺陷的疾病表型特征, 提示着 PRPF6 基因参与维持视网膜发育、光感受器和纤毛结构的重要作用。并且, 应用 PRPF6 基因增强疗法成功挽救了疾病 ROs 的异常表型。

摘要编号: 208502

以眼部表现为首发的强直性脊柱炎伴大动脉炎一例报告及文献回顾

第一作者: Jin YANG

目的: 报告一例 21 岁男性, 以眼部症状为首发表现的强直性脊柱炎(AS)伴大动脉炎(TA)患者病例, 探讨 TA 伴 AS 患者的全身及眼部表现, 提高眼科医生的诊治能力。

方法: 对病例患者行全身体格检查、血管 CTA 及生化检验; 眼部检查包括眼底照相、眼底血管造影及光学相干断层扫描等。

结果: 该患者最终确诊为强直性脊柱炎伴发大动脉炎。其眼部表现为严重的视网膜血管炎及黄斑水肿。眼部局部治疗包括视网膜激光光凝术, 以及眼用皮质类固醇和非甾体抗炎药滴眼液。全身治疗则系统性应用了口服皮质类固醇、硫唑嘌呤和麦考酚酯等免疫抑制剂。

结论: 大动脉炎与强直性脊柱炎均可导致多种眼部表现, 眼部治疗与全身治疗同等重要。现有研究提示, AS 与 TA 并存并非随机现象, 炎症反应可能在其发病机制中起关键作用。两者或具有共同的病因与发病机制, 例如基于主动脉与骨质抗原相似性的分子模拟机制。眼科医生应增强对 TA 合并 AS 的识别与诊断能力, 重视对这类患者进行系统的眼科检查。

摘要编号: 209653

功能化框架核酸多靶点治疗脉络膜新生血管

第一作者: Liu YANHAN

共同作者: Ye JUAN

目的: 脉络膜新生血管为主要病理特征的湿性年龄相关性黄斑变性是导致视力丧失的主要原因, 其发生发展与血管内皮生长因子(VEGF)过度表达、局部慢性炎症及氧化应激微环境等密切相关。目前临床治疗以抗 VEGF 药物(如雷珠单抗)为核心, 但单一靶点治疗无法解决新生血管形成的复杂病理过程, 需要寻找更加有效且综合的治疗策略以克服现有单靶点治疗的不足从而有望提高治疗效果。

方法: miRNA 作为一种核酸药物, 可以调节多种生物学途径中的靶基因, 并对不同的细胞和分子过程具有潜在的短期或长期影响。例如 miR-205 可抑制病理性新生血管和血管渗漏; miR-223 可调节视网膜炎症。但易被核酸酶快速降解以及细胞摄取不良阻碍了 miRNA 的治疗应用, 需要开发一种药物载体。鉴于现有治疗的局限性, 期望开发一种新的治疗策略, 即用四面体框架核酸(tFNA)这种具有天然生物相容性、结构稳定性、可编程性以及

易于内化等优点的药物载体共载治疗性的 miR-205 和 miR-223 (tFNA-M2), 同时结合 tFNA 固有的抗氧化能力, 实现“抗 VEGF- 抗炎 - 抗氧化”三重协同治疗, 克服单一靶点疗法的不足。

结果: 在证明 tFNA-M2 具有生物安全性后, 鉴于核酸药物易被核酸酶快速降解以及细胞摄取不良的问题, 通过共聚焦和流式实验证明了 tFNA-M2 可以延长药物的半衰期, 增强药物的细胞摄取; 在体外实验中, 通过 Elisa、免疫荧光、和 PCR 从分子水平以及基因水平上证明了 tFNA-M2 具有抗炎作用, 通过细胞增值、成管、划痕实验证明了 tFNA-M2 具有抗血管生成作用, 通过活性氧清除实验证明 tFNA-M2 具有抗氧化应激的作用; 在体实验中, 通过 FFA 造影, OCT 成像, IB4 染色, HE 染色证明 tFNA-M2 在体内具有抗血管生成作用, 通过免疫荧光染色证明 tFNA-M2 具有抗炎和抗氧化应激的作用。

结论: tFNA-M2 可以实现“抗 VEGF- 抗炎 - 抗氧化”多靶点协同治疗, 克服了目前单靶点治疗的不足。这一策略在于将 CNV 的三大核心机制同步干预, 克服单一靶点疗法的不足, 同时以非抗体依赖的核酸药物替代蛋白质, 降低免疫原性风险。该纳米系统不仅可为 CNV 耐药患者提供新治疗选择, 其模块化设计还可拓展至其他血管增生性疾病(如糖尿病视网膜病变)的治疗。

摘要编号: 209064

卡格列净调控 AMPK-Akt-eNOS 通路对糖尿病视网膜病变的保护机制研究。

第一作者: Zhuoni ZHENG

目的: 糖尿病视网膜病变(DR)是糖尿病患者视力丧失的主要原因。高浓度葡萄糖(HG)在糖尿病视网膜病变的发病机制中具有重要作用。能够诱导人视网膜毛细血管内皮细胞(Human retinal capillary endothelial cell, HRCEC)氧化应激和凋亡。卡格列净是钠 - 葡萄糖共转运蛋白 -2 抑制剂(Sodium-glucose cotransporter 2 inhibitor, SGLT2i)药物家族的重要成员, 已被证实具有抗氧化应激和抗细胞凋亡的作用, 并且可以激活 AMPK-Akt-eNOS 信号通路。在本研究中, 我们探讨了卡格列净抑制 HG 诱导的 HRCECs 和糖尿病小鼠视网膜氧化应激和细胞凋亡的分子机制。

方法: (1) 体外培养 HRCEC, 用不同浓度的葡萄糖溶液或 / 和卡格列净处理细胞。运用 MTT 法检测 HRCEC 活性。(2) 采用 DCFH-DA 活性氧探针装载处理后, 用倒置荧光显微镜评估各组 HRCEC 的 ROS 强度。(3) 用 WB 检测各组 HRCEC 内核因子 E2 相关因子 2 (Nuclear

factor erythroid2-related, Nrf2)、血红素氧合酶-1 (Heme oxygenase-1, HO-1)、B-cell lymphoma-2 (Bcl-2)、Bcl2-associated X (Bax)、Cleaved Caspase-3、NOX4、iNOS 以及 p-AMPK、AMPK、p-Akt、Akt、p-eNOS、eNOS 的蛋白表达水平。(4) Akt 抑制剂 A-443654 和 AMPK 抑制剂 Dorsomorphin 处理后, 用 WB 检测相关蛋白表达水平。(5) db/db 小鼠玻璃体腔内注射卡格列净, 用眼底荧光素血管造影评估视网膜。视网膜组织样本进一步通过 WB 分析以验证分子改变。

结果: 1. 卡格列净和 HG 共同处理后提高 HRCEC 的细胞活性、降低 ROS 水平、抑制细胞凋亡。2. 卡格列净对 HRCEC 氧化应激和细胞凋亡的抑制作用分别通过逆转 HG 引起的 Nrf2 和 HO-1 的蛋白水平和 Bcl-2, Bax 以及 Cleaved Caspase-3 的蛋白水平改变来达成。3. 卡格列净和 HG 共同处理后可激活 HRCEC 内 AMPK, Akt 和 eNOS 的蛋白水平表达。4. Akt 抑制剂 A-443654 和 AMPK 抑制剂 Dorsomorphin 处理后能够逆转卡格列净的保护作用。5. 卡格列净抑制 db/db 小鼠视网膜氧化应激和细胞凋亡。

结论: 卡格列净能够显著抑制高糖诱导的 HRCEC 的氧化应激损伤和细胞凋亡。其机制是卡格列净通过激活 AMPK-Akt-eNOS 信号通路, 从而影响下游的相关氧化应激和凋亡蛋白的水平表达。因此, AMPK, Akt, eNOS 可能是糖尿病视网膜病变预防和治疗的新靶点, 卡格列净有望成为预防和治疗糖尿病视网膜病变的有效药物。

摘要编号: 204430

孤立性视网膜星形细胞错构瘤一例

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共同作者: Xiaonan YAO

目的: 展示一例孤立性视网膜星形细胞错构瘤患者的眼底多模影像。

方法: 患者女性, 67 岁, 因左眼白内障术后 1 周复诊时发现眼底病变, 就诊于眼底病内科。既往体健, 智力正常, 否认癫痫或皮脂腺瘤等全身病病史。眼部检查: 右眼矫正视力为 1.0, 左眼矫正视力为 0.8; 双眼眼压正常, 右眼晶状体轻混浊, 眼底未见明显异常; 左眼人工晶体透明、位置正, 后囊膜不混, 视盘颞上方视网膜灰白色、半透明、隆起病灶 (精粹图片 1)。扫频光学相干断层扫描血管成像 (swept-source optical coherence tomography angiography, SS-OCTA) 结构成像显示左眼视盘颞上瘤体处可见神经纤维层增厚, 呈圆顶状隆起, 并压迫其下方视网膜内层结构。瘤体反射信号强, 轻微遮蔽下方组织, 使椭圆体带显示欠清, RPE 层

光带完整, 瘤体内部及边缘可见低反射小囊腔, 瘤体顶部可见丝状高信号, (精粹图片 2 中 A); 表层血流成像显示瘤体内有血流信号 (精粹图片 2 中 B 红框); en face 组织结构图可显示瘤体边缘的囊腔 (精粹图片 2 中 C 红框)。

结果: 患者诊断符合单眼孤立性视网膜星形细胞错构瘤。

结论: 孤立性视网膜星形细胞错构瘤的眼底多模影像特点可帮助诊断及理解病理生理特点。

摘要编号: 209719

巨噬细胞活化综合征眼底病变 1 例

第一作者: Baoyu HUANG

目的: 巨噬细胞活化综合征 (MAS) 是一种继发于风湿性疾病的具有潜在致命风险的并发症, 常见于儿童慢性风湿性疾病, 尤其与幼年特发性关节炎全身型相关。MAS 的主要临床特征包括发热、全血细胞减少、肝脾淋巴结肿大、肝功能损害、凝血功能障碍和中枢神经系统损害, 以及骨髓噬血现象等。其在视网膜方面的改变的报道比较少见。

方法: 患儿, 彭**, 性别: 女 年龄: 14 岁 5 月, 45 kg, 因反复发热 2 月余, 伴关节痛半月余入院于 2025 年 7 月 29 日入院。既往史: 全身型幼年特发性关节炎。患儿约发热第 3 天患儿出现皮疹, 呈片状红色斑丘疹, 从小腿开始逐渐蔓延到胸背部及全身, 伴有关节游走性疼痛。入院查体: 颈部可触及多个如黄豆大小的淋巴结, 边界清, 活动可, 肝肋下约 2 cm 可触及。血常规: 白细胞计数 $7.41 \times 10^9/L$ 、红细胞计数 $2.49 \times 10^{12}/L$, 血红蛋白 $61 g/L$, 血清铁蛋白 $1596.86 ng/ml$ 。入院后予美罗培南 + 万古霉素联合抗感染, 但患儿仍反复发热, 皮疹仍反复。复查血清铁蛋白: $4536.38 ng/ml$ 。2025 年 8 月 10 日患儿出现双眼视力骤降, 并出现多器官功能障碍综合征, 血压不稳, 转入 PICU。眼科会诊: 双眼视力 HM/20 cm, 眼前段未见异常, 后极部出现 Purtscher-like 样改变。FFA 提示后极部视网膜广泛毛细血管闭塞伴大片无灌注区形成。OCT 提示视网膜内五层细胞内水肿伴视网膜层间小囊腔。

结果: 患儿最终治疗无效, 死亡。

结论: MAS 的核心特征是 T 细胞和巨噬细胞持续活化, 释放大炎症因子 (如 IL-1、IL-6、IFN- γ 等), 形成“细胞因子风暴”, 血管内形成微血栓, 导致视网膜血管栓塞。

摘要编号: 207947

循环代谢物与年龄相关性黄斑变性及其亚型因果关系的孟德尔随机化研究

第一作者: Keting ZHANG

目的: 年龄相关性黄斑变性 (AMD) 是一种以光感受器与视网膜色素上皮进行性退行为核心的神经变性性疾病, 是老年人不可逆视力丧失的主要原因。尽管现有治疗手段能延缓晚期病变, 但对该病的根本致病机制, 尤其是其中的关键因果路径, 认知仍不充分。日益增多的证据提示代谢紊乱在 AMD 进程中扮演重要角色, 然而从因果推断角度系统解析特定代谢物的作用仍是当前研究的关键缺口。本研究旨在通过孟德尔随机化 (MR) 方法系统评估循环代谢物与 AMD 及其不同亚型之间的因果关联。

方法: 本研究采用全面的孟德尔随机化 (MR) 分析框架, 系统评估 1400 种代谢物及其比值与三种 AMD 亚型 (早期 AMD、干性 AMD 及湿性 AMD) 之间的因果关系。通过多重敏感性分析验证结果的稳健性与一致性。

结果: 在纳入分析的 1400 种代谢物及代谢物比值中, 基于逆方差加权法, 分别识别出 77 种、62 种及 80 种代谢物与早期 AMD、干性 AMD 及湿性 AMD 风险存在统计学显著的因果关联。多数关联在不同 MR 分析方法中表现一致。在脂质代谢物中, 甘油磷脂酰乙醇胺类代谢物显示出稳定的保护作用。

结论: 本研究首次在因果推断框架下系统评估血清代谢物与 AMD 及其亚型间的因果联系, 识别出包括甘油磷脂、脂肪酸、氨基酸衍生物、类固醇激素及能量代谢中间产物在内的多类代谢物在 AMD 发病中发挥重要作用。研究结果不仅从因果层面确认代谢紊乱是 AMD 的核心驱动因素, 也揭示了不同代谢通路在疾病亚型中的异质作用。本研究为未来开发基于代谢调控的 AMD 预防、诊断与精准治疗策略提供了关键因果证据及潜在分子靶点。

摘要编号: 201223

报告一例由激光焊引起的黄斑损伤的患者诊治情况

第一作者: Hongliang WANG

共同作者: Wancheng JIA, Gang LIU, Yan YAN

目的: 报告一例由激光焊引起的黄斑损伤的患者诊治情况。

方法: 我院收治一例 27 岁男性职业电焊工, 工作时接触激光焊, 3 天后出现右眼视物遮挡伴视物模糊就诊, 就诊期间使用眼底照相、光学相干断层扫描血管成像 (OCTA) 等设备, 监测其视网膜黄斑

的变化情况。根据检查结果和视网膜黄斑损伤的情况, 积极调整治疗方案。当发现患者右眼黄斑区出现脉络膜新生血管后, 及时采取了玻璃体腔内抗血管内皮生长因子 (VEGF) 药物注射的方法进行治疗, 在治疗过程中, 使用 OCTA 记录了注射后黄斑区脉络膜新生血管的密度、面积变化及波动情况。

结果: 患者初诊时右眼视力 0.02, 眼科检查发现右眼黄斑区中心凹 1/10 PD 大小灰白色病灶, 当出现右眼黄斑区出现脉络膜新生血管时, 及时玻璃体腔内抗血管内皮生长因子 (VEGF) 治疗, 经 4 个月治疗, 患者右眼最佳矫正视力 1.0, 成功挽救了患者的视力。

结论: 当激光弧焊致眼底黄斑区损伤出血脉络膜新生血管时, 可进行抗 VEGF 治疗, 同时 OCTA 在视网膜黄斑病变类疾病的治疗中具有重要的指导意义。

摘要编号: 201437

早产儿黄斑水肿的危险因素及其对黄斑结构发育的影响——基于 OCT 的队列研究

第一作者: Weiming YANG

共同作者: Xiaojing CAI, Chenhao YANG

目的: 探讨早产儿黄斑水肿 (ME) 的危险因素及其对中央凹结构发育的影响, 采用手持式 OCT 影像结合临床资料进行分析。

方法: 本回顾性队列研究纳入 106 例接受常规 ROP 筛查及 OCT 检查的早产儿。收集临床及围产期资料。根据 OCT 形态学对黄斑水肿严重程度进行分型, 并定量测量中央凹厚度 (CFT)、中央凹内层厚度 (FIRT)、外层厚度 (FORT)、平均旁黄斑厚度 (MPFT)、平均旁黄斑内层厚度 (MPIRT)、中央凹深度 (FD) 及中央凹角度 (FA)。采用逻辑回归分析 ME 的危险因素, 线性回归及混合效应模型 (校正矫正胎龄、性别及出生体重) 评估其对中央凹发育的影响。

结果: 共 106 例早产儿纳入, 其中 27 例 (25.5%) 在随访中出现 ME, 79 例 (74.5%) 始终未发生 ME, 作为对照组。与对照组相比, 既往发生过 ME 的患儿在 CFT ($\beta = 43.4$, $P < 0.001$)、FORT ($\beta = 27.7$, $P < 0.001$)、MPFT ($\beta = 109.9$, $P < 0.001$) 及 FA ($\beta = 20.8$, $P < 0.001$) 均显著增厚或增大; MPIRT 亦在多模型中表现出一致性增厚 ($\beta \approx 58.7$, $P = 0.002$); 而 FD 和 FIRT 无显著差异 (均 $P > 0.05$)。多变量逻辑回归显示, 独立危险因素包括较高的矫正胎龄 ($OR = 1.62$, $P < 0.001$)、较长光疗时间 ($OR = 1.21$, $P = 0.019$)、呼吸支持 ($OR = 6.62$, $P = 0.032$) 及中高营养风险 ($OR = 7.69$,

$P = 0.009$) ; 出生体重、胎龄及 Apgar 评分与 ME 无显著关联 (均 $P > 0.05$) 。

结论: 早产儿黄斑水肿与中央凹持久性结构异常密切相关, 主要表现为中央凹及旁黄斑厚度增加和中央凹角度增大, 即使水肿消退后亦然。其发生主要受系统性因素 (矫正胎龄、光疗、呼吸支持、营养风险) 驱动, 而非传统围产期指标。结果提示应加强新生儿全身管理与营养支持, 并结合 OCT 监测, 及早识别并干预高危人群, 以降低远期视觉损害风险。

摘要编号: **210033**

桂枝茯苓丸在糖尿病视网膜病变治疗中的分子机制: 基于分子生物学阐释中药复方制剂中“君臣佐使”配伍原则

第一作者: Chufeng GU

共同作者: Chunyang CAI, Chunren MENG, Qinghua QIU, Huiying RAO, Huake ZENG

目的: “君臣佐使” (JCZS) 是中医理论中最具代表性且广泛应用的方剂配伍原则。桂枝茯苓丸作为遵循该法则的经典方剂, 在糖尿病视网膜病变 (DR) 的临床治疗中已有数十年应用历史。本研究以桂枝茯苓丸治疗 DR 为例, 旨在从分子生物学层面系统阐释“君臣佐使”配伍原则的科学内涵。

方法: 通过整合 TCMSP、PubChem、SwissTargetPrediction、GeneCards 和 OMIM 数据库资源, 系统筛选桂枝茯苓丸治疗 DR 的活性成分及其潜在作用靶点。基于 DAVID 平台进行基因功能富集分析, 并运用 Yinfo 云计算平台完成分子对接验证。在此基础上, 通过综合分析活性成分、作用靶点、分子对接结果及现有研究成果, 系统论证“君臣佐使”配伍原则的合理性。

结果: 本研究明确了桂枝茯苓丸治疗糖尿病视网膜病变所涉及的 6 个关键活性成分、5 个核心作用靶点及 5 条主要信号通路。方中茯苓与牡丹皮为“君”药, 发挥核心治疗作用; 白芍与桃仁为“臣”药, 协同增强君药功效; 桂枝为“佐”药, 起辅助治疗作用。全方的协同治疗作用可能与活性成分溶出率和生物利用度的提高密切相关, 而白芍在方中的配伍可能对减少潜在副作用具有重要作用。

结论: 本研究为深化对中药“君臣佐使”配伍理论科学内涵的认识提供了新的研究视角, 同时为经典名方的二次开发与现代化研究奠定了理论基础。

摘要编号: **204013**

法瑞西单抗单药及联合激光治疗 1 型黄斑中心凹旁毛细血管扩张症的初步临床观察

第一作者: Qi HUIJUN

目的: 1 型黄斑中心凹旁毛细血管扩张症 (MacTel 1), 又称成人 Coats 病, 是一种以黄斑区旁毛细血管扩张和微血管瘤形成特征的眼底疾病, 常引发黄斑水肿及视力下降。由于病变位置邻近中心凹, 传统激光治疗应用受限, 而既往抗 VEGF 药物治疗效果常不理想。本研究旨在初步探讨法瑞西单抗 (Faricimab) 单药或联合激光治疗 MacTel 1 的临床疗效与安全性。

方法: 回顾性分析 10 例确诊为 MacTel 1 的患者, 所有病例均存在继发性黄斑水肿。治疗方案采用法瑞西单抗负荷剂量治疗 (每月 1 次, 连续 3 个月), 后续按病情需要 (PRN) 给予注射。其中 6 例患者于完成 3 针注射后联合激光治疗。随访时间 6-10 个月, 观察最佳矫正视力 (BCVA)、中央视网膜厚度 (CMT) 变化及黄斑水肿消退情况。

结果: 所有患者治疗后最佳矫正视力均较基线有不同程度提升。黄斑水肿完全消退者 8 眼 (80%), 部分消退者 2 眼 (20%)。光学相干断层扫描 (OCT) 显示视网膜结构明显改善, 未出现治疗相关严重不良事件。所有患者仍在定期随访中。

结论: 法瑞西单抗单药或联合激光治疗 MacTel 1 可有效促进黄斑水肿消退, 改善患者视功能, 近期疗效显著且安全性良好, 提示该药可能为难治性 MacTel 1 的治疗提供新方向。但其远期疗效仍需更大样本量和更长随访时间进一步验证。

摘要编号: **209957**

法瑞西单抗对比阿柏西普治疗新生血管性年龄相关性黄斑变性疗效与安全性的 Meta 分析

第一作者: Shitong HUANG

共同作者: Danna CHEN, Wenzhi HUANG, Yunxia LENG

目的: 评估双特异性抗体法瑞西单抗与传统抗 VEGF 药物阿柏西普在治疗新生血管性年龄相关性黄斑变性中的疗效、治疗负荷及安全性, 为临床治疗选择提供循证依据。

方法: 全面检索 PubMed、Embase、Cochrane Library 及 ClinicalTrials.gov 等数据库中自建库至 2024 年 10 月发表的相关随机对照试验。严格筛选文献并提取数据, 采用 Cochrane 风险评估工具评价文献质量, 运用 RevMan 软件进行统计分析。

结果: 共纳入 3 项高质量随机对照试验 (TENAYA、LUCERNE、STAIRWAY), 累计 2251 例患者。荟萃分析显示, 治疗 52 ~ 56 周后, 法瑞西单抗组在最佳矫正视力改善方面不劣于阿柏西普组。在解剖学结构改善方面, 法瑞西单抗组表现出显著优势, 其中心凹视网膜厚度降低值较阿柏西普组平均多 17.3 μm (95% CI: -26.5 ~ -8.1, $P = 0.0002$)。在治疗负荷方面, 法瑞西单抗组第一年内注射次数显著少于阿柏西普组 (均值差: -2.5 次, $P < 0.001$), 且 59.6% 的患者成功维持每 16 周一次给药方案。两组总体不良事件、严重不良事件及眼内炎症发生率均无统计学差异。

结论: 法瑞西单抗在视力维护方面不劣于阿柏西普, 且在视网膜积液控制方面更具优势, 能够显著延长治疗间隔并降低注射频次, 安全性相当, 为 nAMD 的长期管理提供了更优化的治疗策略。

摘要编号: 203104

法瑞西单抗治疗合并糖尿病黄斑水肿的重度 NPDR 疗效观察

第一作者: Hong WANG

共同作者: Hong WANG

目的: 探讨法瑞西单抗治疗非增生期糖尿病视网膜病变 (NPDR) 糖尿病黄斑水肿 (DME) 的效果。

方法: 对 2024 年 3 月至 2024 年 8 月收治的 30 例 (30 眼) 非增生期糖尿病视网膜病变 (NPDR) 糖尿病黄斑水肿 (DME) 患者进行回顾性研究。比较治疗前后最佳矫正视力 (BCVA)、中心凹厚度 (CFT)、视网膜静脉直径、微动脉瘤 (MA)、中央凹无血管区 (FAZ)、浅层毛细血管密度 (SCP)。

结果: 治疗后最佳矫正视力 (BCVA) 在术后 24 小时、1 个月、3 个月、6 个月均优于治疗前; 治疗后黄斑中心凹厚度 (CFT) 在术后 24 小时、1 个月、3 个月、6 个月均低于治疗前; 治疗后视网膜静脉直径在 1 个月、3 个月、6 个月均低于治疗前。治疗后微动脉瘤 (MA) 在 1 个月、3 个月、6 个月均低于治疗前。治疗后黄斑无血管区 (FAZ) 在 1 个月、3 个月、6 个月均低于治疗前。治疗后视网膜浅层毛细血管层 (SCP) 在 1 个月与治疗前相比, 无明显统计学差异 ($P > 0.05$), 治疗后 3 个月、6 个月均高于治疗前。

结论: 玻璃体腔注射法瑞西单抗治疗合并 DME 的重度非增生期糖尿病视网膜病变, 可能在形态上逆转视网膜静脉直径、微动脉瘤、黄斑无血管区及视网膜浅层毛细血管层。

摘要编号: 209511

法瑞西单抗治疗湿性年龄相关性黄斑变性的有效性及安全性研究

第一作者: Jianmin WANG

共同作者: Shuzhen FAN, Qian LI, Mengtian LIU, Xi LV, Man XU

目的: 探讨法瑞西单抗在中国人群中治疗湿性年龄相关性黄斑变性 (nAMD) 的短期真实世界疗效和安全性, 特别是比较其对初治和经治患者的解剖学和功能性影响。

方法: 本单中心回顾性研究纳入了 29 例 (31 只患眼) 接受法瑞西单抗玻璃体腔注射的 nAMD 患者。所有患者接受了连续 3 次的每月治疗, 分为初治组 (9 眼) 和经治组 (21 眼)。主要评估指标包括最佳矫正视力 (BCVA, Best Corrected Visual Acuity)、中心黄斑厚度 (CMT, Central Macular Thickness)、脉络膜厚度 (CT, Choroidal Thickness)、脉络膜体积 (CV, Choroidal Volume), 以及视网膜内液 (IRF, Intraretinal Fluid)、视网膜下积液 (SRF, Subretinal Fluid) 和视网膜色素上皮脱离 (PED, Pigment Epithelial Detachment) 的解剖学变化。数据分析采用 T 检验、Wilcoxon 检验, Fisher 检验, 统计学差异以 $P < 0.05$ 为准。

结果: 1. 初治患者 (9 眼): logMAR BCVA 从 1.10 (± 0.14) 提高到 0.82 (± 0.19)。CMT 在 1 个月和 3 个月时均较基线显著下降 ($p < 0.05$)。IRF 在注射 1 针后达到 100% 消除; 75% 的患者在 1 针后无 SRF 和 IRF, 3 针后 87.5% 的患者无 SRF。2. 经治患者 (21 眼): logMAR BCVA 从 0.68 (± 0.34) 提高到 0.64 (± 0.32)。CMT 在 1、2、3 个月均较基线显著下降, 分别为 106 μm 、152 μm 、150 μm (P 均 < 0.05); PED 的宽度在 1、2、3 个月均较基线显著下降, 分别为 845.8 μm 、1259 μm 、1386 μm (P 均 < 0.05); PED 高度在 1、2、3 个月较基线显著下降, 分别为 223.6 μm 、164.5 μm 、125 μm (P 均 < 0.05)。CT 和 CV 在 3 个月时亦显著下降 ($P < 0.05$)。3 针后无 SRF、无 IRF, 无 SRF + IRF 的患者比例分别为 62%、58%、50%。3. 安全性: 研究期间未报告任何显著不良事件。

结论: 法瑞西单抗在中国 nAMD 患者的负荷期治疗中展现出良好的安全性和有效性。对于初治患者, 其表现为功能性 (BCVA) 和解剖学 (CMT、积液等) 的显著改善; 对于经治患者, 则显示出强大的解剖学控制能力, 显著降低了 CMT、PED、CT 和 CV, 提示法瑞西单抗在难治性 nAMD 的解剖学改善中具有应用潜力。

摘要编号: 209517

法瑞西单抗治疗眼底疾病初治患者短期真实世界疗效及相关性分析

第一作者: Jie ZU

共同作者: Jianmin WANG

目的: 估双通路抑制剂法瑞西单抗治疗初治糖尿病性黄斑水肿 (DME)、新生血管性年龄相关性黄斑变性 (nAMD) 和视网膜分支静脉阻塞 (BRVO) 患者的短期 (1 个月) 真实世界疗效和安全性。重点分析血液炎症指标 (中性粒细胞 / 淋巴细胞比值 (NLP)、全身炎症指数 (SII)、血小板 / 淋巴细胞比值 (PLR)) 与视网膜高反射点 (HRF) 数量之间的相关性, 为法瑞西单抗的临床应用及疾病的炎症机制提供循证支持。

方法: 本研究纳入了我院 2025 年 1 月至 7 月期间接受法瑞西单抗玻璃体腔注射 (IVF) 治疗的 DME (25 眼)、nAMD (23 眼)、BRVO (21 眼) 初治患者。收集基线的 NLP、SII、PLR, 并在注射前和注射后 2 周、4 周评估最佳矫正视力 (BCVA, logMAR)、中央视网膜厚度 (CRT) 和 HRF 数量。数据分析采用 T 检验、Wilcoxon 检验、Spearman 相关分析等统计方法, 以 $P < 0.05$ 为统计学显著性标准。

结果: 1. 疗效和安全性: ① 所有疾病组患者的 BCVA 在治疗 2 周和 4 周后均较基线显著改善。② nAMD 和 BRVO 组的 CRT 在 4 周时均有显著下降 ($P_{4W} < 0.01$), 尤其合并视网膜色素上皮脱离 (PED) 的患者效果更显著。nAMD 患者 HRF (ILM-INL、OPL-ELM、Full) 数量在 4 周时均显著下降; DME 患者 HRF (Full) 在 2 周和 4 周后均显著下降。③ 所有患者耐受性良好, 未出现新发安全性事件。2. 基线血液炎症指标与 HRF 的相关性: ① DME 患者: 基线 HRF 数量血液炎症指标显示出显著正相关。其中, HRF (ILM-INL、OPL-ELM、Full) 数量均与 NLP 和 SII 存在显著正相关。如, HRF (ILM-INL) 与 NLP 的相关系数 (r) 为 0.53 ($P < 0.05$), 与 SII 的相关系数 (r) 为 0.57 ($P < 0.05$)。② nAMD 和 BRVO 患者: 基线 HRF 数量与血液炎症标志物无明显相关性。3. HRF 变化与视力改善的相关性: ① 在 nAMD 患者中, 治疗 4 周后 HRF (ILM-INL、OPL-ELM、Full) 的变化与视力变化有显著相关性 ($P < 0.05$)。

结论: 法瑞西单抗在初治 DME、nAMD 和 BRVO 患者短期疗效显著, 安全性良好。在 DME 患者中, 视网膜 HRF 数量与血液炎症标志物 NLP、SII 存在显著正相关, 有力支持了 HRF 的炎症本质理论, 并提示 NLP 和 SII 可能是 DME 治疗决策及疗效评估的潜在生物标志物。HRF 数量的变化可能是

nAMD 患者视力改善的预测指标。未来需更大样本量和更长期研究进一步证实。

摘要编号: 204491

玻璃体腔注射更昔洛韦治疗病毒性视网膜炎后黄斑出血的原因分析

第一作者: Wei ZHOU

共同作者: Zhao PINTING

目的: 本研究评估更昔洛韦玻璃体腔注射对病毒性视网膜炎的黄斑区可能产生的不良影响, 来分析该药物行玻璃体腔注射对黄斑区小动脉血流及结构和中心视力的影响。

方法: 本研究分析了已确诊患有病毒性视网膜炎的患者, 为其进行玻璃体内更昔洛韦注射治疗。在随访不同时间内发生了黄斑区出血和无血管区面积增加, 研究人员密切监测患者视网膜病变以及视功能恢复情况。

结果: 我们观察到三名病毒性视网膜炎患者 (其中一名患有 ARN, 两名患有 CMV 视网膜炎), 眼底出现典型的局灶性视网膜血管炎, 并且视网膜组织中存在黄白色的坏死灶, 这些患者也存在不同程度的全身症状。在确诊后, 三名患者均接受了玻璃体内更昔洛韦玻璃体腔注射并显著缓解了原有的视网膜病变。然而, 在治疗过程中在不同的时间点发生了包括黄斑出血和黄斑区小动脉阻塞和无血管区显著扩大, 并导致这些患者最终视功能预后不良。

结论: 病毒性视网膜炎的治疗仍面临挑战, 这类患者由于凝血功能异常, 发生眼内出血的风险会增加; 此外长期的视网膜血管炎可能会导致视网膜血管阻塞和缺血, 也会影响到黄斑区。玻璃体内药物注射引起的玻璃体腔流体动力学紊乱, 也可能对黄斑区造成机械性损伤。需要更密切的监测和潜在的辅助治疗来解决长期的视力预后问题。

摘要编号: 208134

疏肝健脾法治疗中心性浆液性脉络膜视网膜病变 1 例

第一作者: 和瑶

共同作者: 罗燕

目的: 研究疏肝健脾法对中心性浆液性脉络膜视网膜病变 (central serous chorioretinopathy, CSC) 的临床价值, CSC 中医治疗后的临床疗效总结。

方法: 对 1 例辨证为肝脾不调证的 CSC 患者采用“疏肝健脾”治则, 丹栀逍遥散加减方剂治疗, 通过全身证候、视力、眼底照相、眼光学相关断层扫描等指标评估疗效。

结果：患者视力提高，OCT 显示黄斑水肿消退，视网膜色素上皮层下积液完全吸收，结构恢复正常，随访 2 月无复发。

结论：中医疏肝理气，健脾祛湿的治法可有效改善患者症状，稳定视力，恢复视功能，体现了中医药在治疗中心性浆液性脉络膜视网膜病变方面的独特优势。

摘要编号：202494

真性小眼球合并急性缺血性视神经病变一例报告及文献综述

第一作者：Yuying JI

共同作者：Jin MA

目的：探讨真性小眼球（nanophthalmos）合并急性缺血性视神经病变（AION）的临床表现、诊治经过及潜在机制，并结合文献综述，为临床诊疗提供借鉴。

方法：回顾性分析 1 例真性小眼球合并 NA-AION 患者的临床资料，包括症状体征、影像及辅助检查、诊断与治疗过程，并结合相关文献进行讨论。

结果：患者男性，40 岁，因右眼疼痛及视力急剧下降 5 天就诊。检查发现双眼眼轴显著缩短（右眼 16.48 mm，左眼 18.49 mm），巩膜增厚，双眼前房浅，眼压正常。右眼视盘充血水肿，视网膜静脉扩张迂曲，左眼视盘苍白、边界模糊。OCT 显示右眼黄斑区外核层增厚，视盘水肿，左眼视神经纤维层变薄。荧光素眼底血管造影提示右眼视盘早期灌注缺损、晚期渗漏，左眼上半视盘灌注减少。B 超及超声生物显微镜证实双眼巩膜广泛增厚及前房角狭窄。视觉诱发电位轻度异常，视野检查见双眼全野缺损。MRI 未见视神经明显增强。实验室检查 ESR 和 CRP 正常。最终诊断为右眼非动脉炎性前部缺血性视神经病变（NA-AION）、双眼真性小眼球及左眼视神经萎缩。治疗采用静脉甲泼尼龙冲击（250 mg 起始，增至 500 mg 后视力恶化，后降至 80 mg 维持）联合局部注射阿托品改善微循环与神经营养支持。用药约 1 周后患者右眼视盘水肿明显改善，1 个月后视力提升至 20/1000，视盘水肿基本消退，OCT 提示黄斑及视盘水肿减轻。

结论：真性小眼球因解剖结构异常（如眼轴缩短、巩膜增厚等），容易导致视神经灌注不足，显著增加 AION 的发病风险。其临床表现易与视神经炎混淆，需结合影像学及血管造影等手段综合判断。AION 合并真性小眼球患者对常规高剂量激素治疗反应有限，低剂量激素联合改善微循环及神经营养支持可能有助于部分视力恢复。对真性小眼球患者如出现急性视力下降及视盘水肿，应高度警惕 AION，避免误诊误治。建议早期诊断、综合治疗

和长期随访。该病例为真性小眼球并发 AION 的少见实例，提示临床需关注其视神经缺血风险，并为今后相关疾病的诊治积累经验。

摘要编号：207725

眼缺血综合征合并视网膜中央动脉阻塞继发新生血管性青光眼一例

第一作者：Peng JIE

目的：分析一例复杂的眼缺血综合征（OIS）合并视网膜中央动脉阻塞（CRAO）继发新生血管性青光眼（NVG）患者的临床特征及治疗效果，为早期识别和治疗方案提供参考。

方法：患者男，51 岁，“右眼视物模糊一年，视物不见半月”。既往脑梗死、高血压、糖尿病及冠心病病史，头颅 MRA 示多支大脑动脉及双侧颈内动脉不同程度狭窄或闭塞，冠脉 CTA 示右侧冠状动脉狭窄并行冠脉搭桥术。眼科查体右眼视力光感，眼压 31 mmHg，角膜水肿，虹膜弥漫新生血管，视网膜灰白色水肿、黄斑区樱桃红斑；左眼视力 0.2，周边眼底散在出血点。心电图提示陈旧性心肌梗死及 ST 段改变。本例患者 OIS 与颈脑动脉严重供血不足密切相关，累及视网膜中央动脉急性阻塞，持续缺血缺氧诱发新生血管形成导致 NVG。予患者右眼 PRP 及抗 VEGF 治疗，加强全身疾病控制以稳定全身血流动力学。

结果：患者治疗后虹膜新生血管回退明显，但右眼视力、眼压未能显著恢复，视网膜中央动脉阻塞后的不可逆神经损伤依然是预后关键限制因素，凸显了在多血管病变背景下 OIS 的复杂性及全身循环障碍对眼的累积危害。

结论：OIS 合并 CRAO 继发 NVG 是多系统动脉阻塞导致的罕见且高度破坏性的眼病，早期识别颈脑及冠状动脉病变、眼部抗 VEGF 及 PRP，控制全身血管因素，对延缓病情进展及保留残余视觉功能具有重要意义。

摘要编号：209644

糖尿病视网膜病变人群 ZJU 指数与高血压的关系：来自 NHANES 的证据

第一作者：Rui HU

目的：研究发现 ZJU 指数与糖尿病发病率相关，可作为评估中国普通人群胰岛素抵抗的有用指标。本研究旨在阐明 ZJU 指数在糖尿病视网膜病变患者高血压中的作用。

方法：本研究采用横断面设计，基于 1999 至 2020 年美国国家健康与营养检查调查（the National Health and Nutrition Examination Survey，

NHANES) 的糖尿病视网膜病变诊断数据, 共纳入 537 名受试者。通过逻辑回归分析、限制性立方样条及交互效应分析等方法, 系统验证了研究假设。

结果: 多变量逻辑回归分析显示, 糖尿病视网膜病变患者中 ZJU 指数与高血压存在显著关联 (ZJU 指数每增加 1 个单位, 比值比 OR 为 1.13, 95% 置信区间 1.08–1.18)。所有受试者均呈现正线性关系 (非线性检验 $P = 0.237$), 且不同年龄和性别人群间该关系无显著差异。

结论: 在糖尿病视网膜病变人群中, ZJU 指数值较高的个体患高血压的风险更高。需要进一步研究来验证这一发现是否适用于更多样化的群体。

摘要编号: 209510

肠-眼轴: 肠道菌群在糖尿病性视网膜病变进展中的作用及机制研究

第一作者: Liying LUO

目的: 肠道微生物群作为“人体第二基因组”, 对人体健康起着关键的调控作用。最新研究表明, 肠道菌群失调与各类眼部疾病显著相关, 由此提出“肠-眼轴” (Gut-Eye Axis) 概念。本文从细胞和动物模型角度, 系统阐述肠道菌群失衡通过增加肠道通透性、微生物代谢产物全身性转移及免疫失调等核心机制诱发眼病的病理过程, 为眼科诊疗提供新视角。

方法: 本项研究中, 我们使用链脲佐菌素 (STZ) 诱导的糖尿病小鼠模型来评估肠道菌群对糖尿病视网膜病变进展的影响。我们设对照组、Akk 菌低/高剂量组及抗生素 (ABX) 干预组; 利用 16S rRNA 测序、非靶向代谢组学分析肠道/眼部菌群及血清代谢物变化评估了炎症标志物和氧化应激水平的变化, 通过 qPCR 验证关键通路基因, 结合相关性分析揭示肠-眼-脑轴调控机制, 以阐明肠道菌群可能改善 DR 的作用机制。

结果: 肠道菌群 Akk 菌补充对 DR 发挥了显著的治疗作用, 这体现在血糖控制得到改善、外核层和内核层厚度增加 ($p < 0.05$) 以及促炎细胞因子 (IL-1 β 、TNF- α 、IFN- γ) 和氧化应激标志物 (ROS、MDA; $p < 0.05$)。肠道微生物群测序显示, Akk 菌可延缓 DR 的进展。这种保护作用在抑制细胞外囊泡分泌后显着减弱。外泌体代谢组学分析确定左旋肉碱是 AKK 衍生的显著升高的代谢物, 左旋肉碱的外源性给药也显着改善了 DR 病理。

结论: 本研究首次从肠-眼-脑轴视角, 阐明 Akk 菌对治疗 DR 的多维度机制, Akk 菌通过左旋肉碱轴-炎症通路延缓糖尿病视网膜病变。这种保护机制是通过富集嗜粘性阿克曼氏菌、随后的细胞外囊

泡释放和代谢物左旋肉碱的递送介导的。我们的研究结果旨在阐明肠道菌群在 DR 中的重要作用, 并为未来的临床策略提供基础。

摘要编号: 207684

脉络膜上腔注射曲安奈德治疗难治性黄斑水肿的探索

第一作者: Ying WANG

目的: 采用玻璃体抗 VEGF 联合脉络膜上腔 TA 注射。选取既往多次抗 VEGF 治疗效果不佳的糖尿病性黄斑水肿 (DME) 和视网膜静脉阻塞 (RVO) 相关 ME 患者, 观察治疗前后最佳矫正视力 (BCVA)、中央黄斑厚度 (CMT) 及不良反应。

方法: 探讨脉络膜上腔注射曲安奈德 (TA) 在治疗难治性黄斑水肿 (ME) 中的临床疗效及安全性。

结果: 治疗后患者 BCVA 平均提高 2 行以上, CMT 明显降低。DME 患者 CMT 平均减少 326 微米; RVO-ME 患者 CMT 平均减少 440 微米。不良反应主要为短暂眼压升高, 用药后或自行缓解, 但发生率较低。

结论: 脉络膜上腔注射 TA 联合抗 VEGF 对难治性 ME 具有良好的治疗效果和安全性, 可作为现有治疗的补充手段。

摘要编号: 207878

视网膜静脉阻塞三重标志物风险预测模型

第一作者: Yilin WANG

共同作者: Bo QIN

目的: 在亚太地区视网膜静脉阻塞 (RVO) 疾病负担持续增加的背景下, 本研究通过回顾性分析构建首个整合预后营养指数 (PNI)、甘油三酯葡萄糖指数 (TyG) 及全身炎症反应指数 (SIRI) 的 RVO 风险预测模型, 以解决传统单一指标预测效能不足的临床问题。

方法: 采用回顾性病例-对照设计, 纳入深圳某三甲医院 2023–2025 年确诊 RVO 患者 100 例, 按年龄、性别 1:2 匹配健康对照 200 例。核心指标检测遵循亚太实验室联盟指南: PNI (血清白蛋白 g/L + $5 \times$ 淋巴细胞计数 $\times 10^9$ / L)、TyG ($\ln$ [空腹甘油三酯 (mmol/L) $\times$ 空腹血糖 (mmol/L) / 2])、SIRI (中性粒细胞计数 $\times$ 单核细胞计数 / 淋巴细胞计数) $\times 10^9$ / L。通过 LASSO 回归筛选变量建立 Logistic 模型, 经 10 折交叉验证及 Bootstrap 内部验证 (1000 次抽样), 采用 Delong 检验比较模型间 AUC 差异。性能评估包括区分度 (AUC)、校准度 (Brier 评分) 及临床效用 (决策曲线分析)。

结果：病例组较对照组显著异常：PNI: 43.2 ± 4.0 vs 52.8 ± 3.5 ($p < 0.001$)、TyG: 9.6 ± 1.1 vs 8.1 ± 0.7 ($p < 0.001$)、SIRI: 3.1 ± 1.3 vs 1.1 ± 0.4 ($p < 0.001$)。最终模型纳入：PNI ≤ 46.5 (OR = 6.8, 95% CI: 4.1–11.3)、TyG ≥ 9.0 (OR = 5.2, 95% CI: 3.0–9.0)、SIRI ≥ 2.2 (OR = 4.9, 95% CI: 2.8–8.6)、高血压史 (OR = 4.1, 95% CI: 2.3–7.4)。模型验证集 AUC = 0.87 (95% CI: 0.82–0.92)，显著优于传统临床模型 (Δ AUC = 0.16, $p < 0.001$)。Brier 评分 = 0.11 显示良好校准，决策曲线分析在 10%–40% 阈值概率区间净获益率提升 35%–52%。

结论：本回顾性研究证实 PNI-TyG-SIRI 三重标志物与 RVO 风险的独立关联性。基于大样本构建的整合模型 (验证集 AUC = 0.87) 为亚太人群提供首个三重标志物预测工具，可支持高危人群精准预防。本研究揭示 PNI、TyG 和 SIRI 三重标志物与 RVO 风险的独立关联，并建立并验证了首个适用于亚太人群的预测模型，为高危人群的精准预防提供了新工具。

摘要编号：210268

金丝桃苷通过调控小胶质细胞缓解糖尿病视网膜病变的机制研究

第一作者：Nan SHENG

共同作者：Suyan LI, Lei QIAO

目的：探究金丝桃苷 (Hyperoside, HYP) 通过调控小胶质细胞 (Microglia, MG) 异常活化改善糖尿病视网膜病变 (Diabetic Retinopathy, DR) 的作用机制。

方法：1. 基于网络药理学，使用 TCMSP、GeneCards、DisGeNET、GeneCards 等数据库筛选出 HYP、DR 和 MG 的靶点，借助 Jvenn 工具获取 HYP-DR-MG 的共同靶点。使用 STRING 数据库构建 PPI (Protein-Protein Interaction, 蛋白质-蛋白质相互作用) 网络，并运用 Cytoscape 软件对其进行可视化，筛选出关键靶点。使用 DAVID 数据库对关键靶点进行 GO 和京都基因和基因组数据库 (Kyoto Encyclopedia of Genes and Genomes, KEGG) 富集分析。2. 利用体外培养高糖诱导 (75 mM) BV2 小胶质细胞结合转录组学分析对照组 (CON 组, 25 mM)、高糖组 (HG 组, 75 mM) 和高糖联合金丝桃苷处理组 (HG + HYP 组, 75 Mm + 100 mM) 之间的差异表达基因 (Differentially Expressed Genes, DEGs)，并与网络药理学所得结果取交集得到核心靶点。运用分子对接技术验证 HYP 与核心靶点之间的对接活性。3. 基于网络药理学和转录组学

的研究结果进行体内外实验验证。采用 CCK-8 法筛选出培养 BV2 细胞适宜的葡萄糖浓度和 HYP 浓度。使用 RT-qPCR 技术、Western blot (WB) 法检测各组 BV2 细胞中 MAPK3、NOS3、ESR1、RELA 以及核心靶点下游基因的 mRNA 和蛋白质表达水平。4. 将 30 只 6 周龄 C57BL/6 随机分成 3 组，设为对照组 (CON 组)、链脲佐菌素组 (STZ 组) 和链脲佐菌素联合 HYP 干预组 (STZ + HYP 组) ($n = 10$)。采用 50 mg/kg 链脲佐菌素 (Streptozotocin, STZ) 腹腔注射诱发糖尿病，连续注射 5 天，1 周后尾尖采血检测血糖，连续 3 天随机血糖水平 ≥ 16.7 mM 视为造模成功，被用于后续实验。观察并记录各组小鼠存活情况，体毛状态，体型改变，大小便及白内障情况；每两周统计一次各组小鼠体重、血糖、饮食饮水情况。利用光学相干断层扫描 (Optical Coherence Tomography, OCT) 检测各组小鼠视网膜厚度的改变。

结果：1. 通过网络药理学数据库筛选出共 87 个 HYP 靶点，16244 个 DR 靶点，2821 个 MG 靶点和 50 个 HYP-DR-MG 交叉靶点。STRING 数据库显示预测的 PPI 网络中包括 45 个节点和 341 条边 ($p < 1.0 \times 10^{-16}$)。Cytoscape 软件筛选出 12 个关键靶点，分别是 TNF、NFKB1、MAPK3、BCL2、CASP3、PTGS2、ESR1、NFKBIA、NFE2L2、CYCS、RELA、NOS3。DAVID 数据库显示 12 个关键靶点的 GO 富集分析中生物过程有 98 个条目，细胞组成有 11 个条目，分子功能有 19 个条目；KEGG 富集分析共得到 92 条信号通路，主要涉及脂质与动脉粥样硬化、细胞凋亡、IL-17 信号通路、糖尿病并发症中的 AGE-RAGE 信号通路等。2. 转录组学分析发现高糖组和正常组之间共有 1132 个 DEGs，HG + HYP 组和 HG 组之间共有 314 个 DEGs，与网络药理学 12 个关键靶点交叉后得到 4 个核心靶点，分别是 MAPK3、NOS3、ESR1 和 RELA。分子对接显示 HYP 与上述靶点结合能均 ≤ -6.7 kcal/mol，具有强亲和力。3. CCK-8 结果显示当葡萄糖浓度在 75 mM 时 BV2 小胶质细胞增殖率下降较为显著 ($p < 0.0001$)；当金丝桃苷浓度在 100 mM 时显著提升 BV2 小胶质细胞的增殖率 ($p < 0.0001$)。RT-qPCR 及 WB 结果显示 HYP 能够有效抑制高糖诱导的 MAPK3、NOS3、ESR1、RELA 以及部分下游基因的 mRNA 和蛋白质表达的上调 ($p < 0.05$)。4. 对照组小鼠生长稳定、速度快，体毛顺滑且反光，饮食与二便均正常，体型健壮，无白内障；STZ 组及 STZ + HYP 组的小鼠生长迟缓，体毛发涩且枯柴，饮食、饮水显著增多，小便量多，大便时干时稀，体型消瘦，有白内障；各组小鼠存活情况良好。从第 2 周开始，CON 组体重、血糖显著高于 STZ 组和 STZ

+ HYP 组 ($p < 0.0001$)，STZ 组与 STZ + HYP 组之间体重无明显差异，第 12 周注射 HYP 干预后，STZ + HYP 组与 STZ 组血糖在第 16 周时开始有统计学差异 ($p < 0.05$)。OCT 检查显示与 CON 组 (约 220 μm) 相比，STZ 组小鼠视网膜厚度显著降低 (约 190 μm , $p < 0.0001$)，STZ + HYP 组 (约 210 μm) 与 STZ 组相比小鼠视网膜变厚 ($p < 0.0001$)。

结论：HYP 通过抑制小胶质细胞 MAPK/NF- κ B 炎症信号轴，下调促炎因子及氧化应激相关通路，减轻视网膜损伤，为 DR 治疗提供了多靶点干预策略。

摘要编号：206175

靶向 IRS1 的反义寡核苷酸药物治疗眼部新生血管疾病的研究

第一作者：Huimin SHAN

共同作者：Yong TAO

目的：眼部新生血管疾病，包括角膜、视网膜和脉络膜新生血管，占据目前眼部疾病的重要部分。目前的治疗方法，如抗 vegf 疗法，由于耐药性和副作用而面临局限性。根据以往研究，胰岛素受体底物 1 (IRS1) 已成为血管生成的关键调节因子。本研究探讨了靶向 IRS1 的反义寡核苷酸 (ASOs) 在抑制病理性血管生成方面的治疗潜力。

方法：利用人真皮成纤维细胞 (HDF) 和人脐静脉内皮细胞 (HUVEC)，我们设计并筛选了 42 个靶向 IRS1 的 ASOs。实时定量 PCR 评估 IRS1 mRNA 的敲降效率，而体外血管生成试验用以评估血管抑制作用。在小鼠、兔角膜新生血管以及小鼠脉络膜新生血管模型中测试了体内疗效。

结果：利用 HDF 筛选，在 42 个靶向 IRS1 的 ASOs 中，39 个 ASOs 有效抑制了 IRS1 mRNA 的表达，达到 10–90% 的下调。利用 HUVEC 进行体外血管生成试验，35 个 ASOs 显著降低了血管密度，而 28 个 ASOs 进一步抑制了体外平均血管长度。值得注意的是，ASO 19-41 不仅在内皮细胞模型中，而且在动物研究中都表现出有效且一致的抗血管生成的效果。在体内，ASO 19-41 明显抑制角膜和脉络膜新生血管，优于对照 ASO。

结论：靶向 IRS1 的 ASO，尤其是 ASO 19-41，在体外和体内均能有效抑制病理性血管生成。这些发现突显了 IRS1 作为眼部新生血管疾病治疗靶点的潜力，为当前的抗 VEGF 治疗提供了潜在的替代方案。

摘要编号：205507

高度近视黄斑病变与视盘周围萎缩病灶严重程度的相关性分析

第一作者：Qunxin YIN

共同作者：Xuhui YU

目的：本研究旨在探讨高度近视中视盘周围萎缩与近视性黄斑病变之间的相关性。

方法：单中心回顾性研究。连续纳入 51 例高度近视患者 (101 眼)。采用 ATN 分级系统对近视性黄斑病变进行分级，通过 Spearman 检验分析视盘周围萎缩参数与黄斑病变各组分/严重程度的相关性。采用逻辑回归识别与高分级 ATN 组分相关的独立危险因素，并构建高分级 ATN 组分的预测模型。采用曲线下面积评估模型性能。

结果： β 区视盘周围萎缩面积与近视性萎缩性黄斑病变高度相关，与近视性新生血管性黄斑病变呈中度相关，与近视性牵拉性黄斑病变呈弱相关。 γ 区视盘周围萎缩直径也与黄斑病变严重程度显著相关。针对高分级 A 与 N 组分的预测模型曲线下面积分别达到 0.925 和 0.956，以及 0.906 和 0.763。

结论：在高度近视患者中， β 区视盘周围萎缩面积和 γ 区视盘周围萎缩直径的变化与黄斑病变严重程度显著相关。基于视盘周围萎缩参数构建的高分级 A 与 N 组分预测模型，能有效识别进展至晚期阶段的高风险患者。

眼底外科

摘要编号：201546

1 例 Schwartz 综合征患者护理的个案研究

第一作者：周莉义

目的：总结一例 Schwartz 综合征患者的护理经验，提升护理质量。

方法：护理要点包括实施针对性体位管理方案，制定个性化的体位管理计划，确保患者保持正确的体位以促进病情恢复，密切关注患者的心理状态，及时识别并减轻患者的焦虑和恐惧情绪，采用多样化的宣教方式提升患者对维持特殊体位的依从性，定期评估患者的体位保持情况，及时调整护理方案，确保体位管理的有效性和患者的舒适度，以实现临床疗效与患者体验的双重优化。

结果：使其能够积极配合治疗和护理，实施个体化身心护理；确保视网膜复位率，保持患者的眼部健康，实现治疗效果与生活质量的同步改善。

结论：经过 7 天的精心治疗和个性化护理，患者术后恢复良好，未出现明显的并发症，视力逐步恢复，心理状态良好，对治疗和护理的依从性较高，顺利出院。

摘要编号：209098

30G 微针直视下主动抽吸视网膜下液的临床观察

第一作者：Kai ZHU

目的：本研究的目的是介绍和评估一种在巩膜扣带术（Scleral Buckling, SB）过程中采用 30G 微针巩膜外穿刺，并直视下可控抽吸视网膜下液（Subretinal fluid, SRF）的改良技术。

方法：一项包括 68 例 RRD 患者的病例系列研究。对于 2023 年 7 月 -2025 年 9 月在中国科学技术大学附属第一医院进行巩膜扣带术的视网膜脱离患者，采用了一种新的直视下巩膜外穿刺抽吸视网膜下液体的方法，术中采用 30-gauge 的 4 mm 长度微针从预定的巩膜外穿刺进入视网膜下，通过双目间接眼底镜观察微针位置，微针后衔接负压系统，脚控负压，从而精准控制抽吸视网膜下液的量，尽可能完全吸除液体，促进视网膜快速复位。黄斑 OCT、SLO、广角 OCTA 观察术后早期视网膜复位情况、SRF 的吸收情况以及视网膜外层表现。

结果：共纳入 68 例患眼，无术中出血、视网膜嵌顿或其他严重并发症。完全复位定义为眼底镜下未观察到 SRF，术后 1 天完全复位 59 例，术后 1 周复位 8 例，术后 1 月复位 1 例。其中，术后 OCT 显示黄斑区 SRF 高度下降到仅剩下一薄层液体（小于 280 μm ）13 例，38 例 SRF 完全清除，12 例发现黄斑中央凹下单独的局限性泡状 SRF，5 例发现黄斑区多个泡状 SRF。

结论：研究表明直视下采用 30G 微针巩膜外穿刺抽吸视网膜下液的方法，对视网膜复位是有效、可控和有益的，尤其是在术后早期促进 SRF 快速消除，并且该方法没有增加更显著的并发症和风险。

摘要编号：208535

3D 显微镜下术中 OCT 引导的“PPV+ 羊膜填塞术”治疗难治性黄斑裂孔的疗效观察

第一作者：Haitong FENG

共同作者：Xiaoyi YU

目的：难治性黄斑裂孔（RHM）包括复发性、高度近视性、大型（最窄水平直径 $> 400 \mu\text{m}$ ）及伴视网膜脱离的黄斑裂孔，常规手术难以闭合，视力预后差。随着诊疗技术进步，其治疗仍具挑战。本

研究探讨在 3D 显微镜联合术中 OCT 引导下，行玻璃体切割联合羊膜填塞术治疗 RHM 的疗效。

方法：我们收集了自 2025 年 1 月至 2025 年 9 月在广州爱尔眼科医院就诊的 7 例（5 眼）RHM 患者，包括复发性 1 例、巨大裂孔 2 例、高度近视相关 2 例、硅油填充眼 2 例。所有患者均于 3D 显微镜下联合术中 OCT 引导，接受后路玻璃体切除联合湿态羊膜填塞术，术毕眼内注入洁净空气。观察术后羊膜位置、黄斑裂孔孔径变化及术后 1 月视力改善情况。

结果：所有 7 例患者术后 OCT 检查显示所有患者羊膜位置良好，黄斑裂孔孔径均较术前缩小并趋于闭合，术后 1 月视力均有不同程度提高。

结论：难治性黄斑裂孔因其复杂的病因及结构特点，常规手术方式往往难以达到满意的解剖复位与功能改善。本研究在 3D 显微镜联合术中 OCT 引导下，对 7 例不同类型的难治性黄斑裂孔患者实施玻璃体切割联合羊膜填塞术，结果显示所有患者术后羊膜位置良好，裂孔趋于闭合，且术后 1 个月视力均有提升，提示该联合术式在处理复杂黄斑裂孔方面具有显著优势。术中 OCT 可实时高分辨率显示黄斑结构，指导羊膜精准填塞，减少视网膜损伤或羊膜移位风险，提升手术精准性与安全性。羊膜生物相容性好，可促进组织修复，填入裂孔后有效支撑神经上皮层，促进胶质细胞迁移与增殖，助力裂孔闭合。3D 显微镜提供立体高清术野，结合 OCT 层面信息，优化手术流程，在处理高度近视或既往手术史等复杂病例时展现出良好适应性与可控性。本研究病例有限，随访期短，但初步结果积极。未来需扩大样本、延长随访，进一步验证该术式长期疗效与安全性，并探索其在其他复杂玻璃体视网膜病变中的应用潜力。

摘要编号：201545

ERAS 理念指导下的护理干预对糖尿病性视网膜病变患者术后康复的影响

第一作者：周莉义

目的：探讨加速康复外科（ERAS）理念指导下的护理干预对糖尿病性视网膜病变（DR）患者术后康复的影响。

方法：选取 2024 年 1 月至 2024 年 12 月大连市第三人民医院眼科一病房收治的 120 例拟行玻璃体切除术的糖尿病性视网膜病变患者，采用随机数字表法分为对照组（ $n = 60$ ）和观察组（ $n = 60$ ）。对照组实施常规围术期护理，观察组在 ERAS 理念指导下实施优化护理干预，包括术前健康教育、术中保温、术后疼痛控制、早期活动及个性化血糖监测等。比较两组患者术后视力恢复情况、疼痛评分

(VAS)、术后并发症发生率、住院时间及护理满意度等指标。

结果：观察组术后 1 周最佳矫正视力 (BCVA) 显著优于对照组 ($P < 0.05$)，术后 24 h、48 h 疼痛评分 (VAS) 低于对照组 ($P < 0.05$)，术后并发症 (如高眼压、玻璃体再出血等) 发生率显著降低 ($P < 0.05$)，平均住院时间缩短 ($P < 0.05$)，护理满意度评分显著提高 ($P < 0.05$)。

结论：基于 ERAS 理念的护理干预能有效促进糖尿病性视网膜病变患者术后视力恢复，减轻疼痛，降低并发症风险，缩短住院时间，提高患者满意度，值得临床推广应用。

摘要编号：209000

一种创新的三步法技术：简便、安全、高效地整片去除特发性视网膜前膜

第一作者：Qinghua QIU

共同作者：Qingquan WEI

目的：本研究旨在评估一种创新的三步法在治疗特发性黄斑视网膜前膜 (ERM) 中的有效性和安全性。

方法：该创新技术包括三个精确步骤：瓣膜制作 - 宽边 - 整片剥离。在完成玻璃体切割术 (PPV) 后，为了精确定位视网膜前膜，我们采用吲哚菁绿 (ICG) 染色内界膜 (ILM)，并以染色后的 ILM 为引导，启动 ERM 瓣膜的创建。为了最大限度地减少膜剥离过程中所需的力度以及对下方视网膜的牵引力，我们使用弯曲的 DSP 刮刀，在血管弓内侧从鼻侧到颞侧形成一个宽边缘的平行弧。随后，使用 ILM 钳紧紧夹住 ERM 的宽边缘，并向中央黄斑区域施加牵引力，以完整剥离整个膜。最后，再次应用 ICG 染色以确保 ERM 被彻底清除。该技术要求术者精确掌握三步手术技巧，并熟练使用专用器械。

结果：在 55 例患者中，该手术取得了显著的治疗效果。所有手术均顺利完成，ERM 剥离的平均时间为 4.23 ± 0.34 分钟。术后 12 个月的随访显示，最佳矫正视力 (BCVA) 从术前的 4.74 ± 0.30 显著提高至 4.27 ± 0.34 。平均中央黄斑厚度 (CMT) 从术前的 $503.64 \pm 111.88 \mu\text{m}$ 显著下降至 $353.38 \pm 72.64 \mu\text{m}$ 。术中及术后均未发生任何并发症，且无复发案例。

结论：该创新技术是一种快速、简便、有效且安全的手术方法，适用于特发性 ERM 的治疗。它显著改善了患者的视觉功能，同时有效降低了并发症和复发的风险。

摘要编号：209013

一项比较利多卡因、罗哌卡因及其混合液在玻璃体视网膜手术球周麻醉中效果的前瞻性、随机、双盲研究

第一作者：Yujia WANG

共同作者：Xuhui YU

目的：比较 1% 罗哌卡因、2% 利多卡因以及两者等体积混合液在玻璃体视网膜手术球周麻醉中的术中和术后临床特性。

方法：在这项前瞻性试验中，将 109 名计划接受玻璃体视网膜手术的患者中的 117 只眼随机分为三组：利多卡因组 (2%， $n = 39$)、罗哌卡因组 (1%， $n = 39$) 或利多 + 罗哌混合组 ($n = 39$)。我们测量了感觉和运动阻滞的起效时间，评估了术中眼球运动评分，记录了总麻醉药剂量 (包括需要补充麻醉的情况)，并评估了术后疼痛强度及其发生时间。

结果：除利多 + 罗哌组的 ASA 分级略高外，各组基线特征具有可比性。各组感觉阻滞的中位起效时间相似 ($P > 0.05$)。然而，运动阻滞的起效时间存在显著差异 ($P = 0.018$)，罗哌卡因组最慢 (244 秒)，与利多卡因组 (200 秒， $P = 0.017$) 相比。罗哌卡因组的运动阻滞效果也最差 ($P < 0.001$)。总麻醉药物剂量无显著差异 ($P > 0.05$)。利多 + 罗哌组术前需要补充麻醉的比例最低 (5.1%)，显著低于罗哌卡因组 (25.6%， $P = 0.012$)。麻醉效果等级的分布无统计学显著差异 ($P = 0.139$)。虽然术后 1 天未报告无法忍受的疼痛，但与利多卡因组相比，罗哌卡因组和利多 + 罗哌组的疼痛发生时间显著更晚 ($P < 0.001$)。有序 Logit 回归分析确定男性性别和玻璃体切割手术是与较高术后疼痛水平相关的因素 (均 $P < 0.05$)。

结论：对于玻璃体视网膜手术的球周麻醉，罗哌卡因与利多卡因联合用药相比两者单用提供了更优的综合效果。它比罗哌卡因起效更快、运动阻滞更有效，并且比利多卡因提供更持久的术后镇痛。

摘要编号：210106

人羊膜填塞在复发性视网膜脱离手术中的应用初步观察

第一作者：Tong WANG

共同作者：Jingjing FAN, Hongsong LI

目的：观察并初步评价人羊膜填塞在治疗复发性视网膜脱离 (RRD) 伴增生性玻璃体视网膜病变 (PVR)，尤其是合并巨大裂孔患者中的疗效与安全性。

方法：采用前瞻性单中心病例系列研究设计，纳入 2025 年 1-10 月收治的 7 例玻切术后复发性视网膜脱离或合并重度及以上 PVR ($\geq$ C3 级) 患者，裂孔范围 $\geq$ 3 个钟点或长径 $\geq$ 5 PD。所有患者术中均用人羊膜填塞裂孔。术后随访观察裂孔愈合、视网膜复位、PVR 复发及免疫排斥反应等情况。

结果：术后 3 个月，7 例患者视网膜全部复位，裂孔均达到解剖学愈合。平均随访 6 个月期间，无一例出现 PVR 复发，未观察到明确的免疫排斥反应。

结论：人羊膜填塞有助于促进复发性视网膜脱离中大裂孔的闭合与解剖学愈合，避免 RPE 细胞裸露，对降低术后 PVR 再发风险和减少术后硅油依赖具有积极作用，为大裂孔、复杂眼底病的治疗提供了有前景的治疗手段。

摘要编号：208598

人诱导多能干细胞来源的视网膜类器官与含视泡的脑类器官培养的比较研究

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目的：视网膜类器官作为一种重要的体外 3D 模型，在模拟人类视网膜发育与疾病方面显示出显著优势。相较于传统的动物模型和二维细胞系，视网膜类器官具有更接近真实视网膜的复杂结构、多样化的细胞类型以及部分生理功能。结合人诱导多能干细胞 (human induced pluripotent stem cell, iPSC) 技术，其广泛的细胞来源和患者特异性疾病建模能力，使得该类器官不仅能模拟单基因缺陷导致的病理变化，还能在器官水平上重现个体化的复杂疾病表型，从而为疾病机制研究、精准医疗、药物筛选及再生医学等领域提供了新的研究方向。目前，视觉研究领域主要采用两种类器官模型：一种为脑类器官中自发形成的双侧对称视泡结构，即视泡脑类器官 (optic vesicle-containing brain organoids, OVB)；另一种为由 hiPSC 直接分化并自组织形成的微型视网膜结构，即视网膜类器官 (Retinal Organoid, RO)。这两种方法在形态发生过程、细胞组成特征及实验操作流程上存在差异，因此系统比较其优缺点，针对对不同研究目标选择适宜的建模策略具有重要意义。本研究旨在系统评估并比较视泡脑类器官与视网膜类器官在从人 iPSCs 诱导生成视网膜类器官过程中的诱导效率、组织结构特征、细胞特异性分化能力以及实验操作复杂度方面的差异。

方法：实验采用同一来源的人 iPSCs，分别通过两种方案进行视网膜类器官诱导。通过组织学染色、免疫荧光染色及实时定量 PCR 等技术，定期分析

类器官的形态结构、组织形成情况，以及光感受器细胞等关键视网膜细胞类型的分化进程。

结果：结果表明，两种方法均能成功诱导出具有视网膜特征、表达眼发育特异性生物标志物的类器官结构，但在应用中各具优势。

结论：视泡脑类器官更适用于模拟源于早期神经发育障碍的视网膜病变，而视网膜类器官则在研究视网膜本身的发育过程及相关疾病机制方面表现更为突出。

摘要编号：203492

内界膜翻转覆盖联合自体血治疗大直径特发性黄斑裂孔的黄斑区微结构及血流变化研究

第一作者：Xian WANG

目的：应用光相干断层扫描 (optical coherence tomography, OCT) 及光相干断层扫描血流成像技术 (optical coherence tomography angiography, OCTA) 观察内界膜翻转覆盖联合自体血治疗裂孔直径 $\geq$ 400 μ m 的特发性黄斑裂孔 (idiopathic macular hole, IMH) 手术前后的黄斑区微结构及血流改变。

方法：选取裂孔直径 $\geq$ 400 μ m 行内界膜翻转覆盖联合自体血治疗的 IMH 患者 31 例 (31 只眼) 纳入分析进行观察。观察术前黄斑裂孔最小直径、黄斑裂孔基底直径、黄斑裂孔指数 (macular hole index, MHI)、裂孔牵拉指数 (tractional hole index, THI)、裂孔直径指数 (diameter hole index, DHI)、黄斑裂孔的愈合指数 (macular hole closure index, MHCI)。比较分析患者术前、术后 1 周、1 月及 3 月的最佳矫正视力 (best corrected visual acuity, BCVA)、外界膜 (external limiting membrane, ELM) 缺损直径、椭圆体带 (ellipsoid zone, EZ) 缺损直径、视网膜浅层毛细血管灌注密度 (retinal perfusion densities of the superficial capillary plexus, PSCP)、黄斑中心凹无血管区 (foveal avascular zone, FAZ) 面积、FAZ 周长的变化情况，并分析各指标与术后 BCVA 的相关性。

结果：共 31 人纳入分析，平均年龄 64.45 ± 9.27 岁，男性和女性分别为 5 例 (16%) 和 26 例 (84%)。平均裂孔最小直径 $570.0 \pm 141.0 \mu$ m，术后 3 个月随访时 U 型闭合 22 眼 (71%)，V 型闭合 8 眼 (26%)，W 型闭合 1 眼 (3%)。术后 BCVA (LogMAR) 显著好转 ($P < 0.001$)。EZ 缺损直径、ELM 缺损直径显著降低 ($P < 0.001$)。术后 FAZ 面积及周长、PSCP 术后一周较术前降低，后逐渐上升 ($P < 0.05$)。术后 3 个月的 BCVA (LogMAR) 与术前 BCVA (LogMAR)、裂孔最小直径、基

底直径呈显著正相关 ($P < 0.05$)。术后 3 个月 BCVA (LogMAR) 与术前 MHI、MHCI 呈显著负相关 ($P < 0.05$)。

结论：内界膜翻转覆盖联合自体血是治疗大直径 IMH 的有效方法，患者术后有较好闭合形态及良好的视觉质量。IMH 患者行内界膜翻转覆盖联合自体血术后 FAZ 面积、FAZ 周长、PSCP 发生变化，提示其术后愈合过程可能涉及视网膜血流动力学变化。同时，相关性分析结果提示术前裂孔最小直径、基底直径越小，术后 3 月最佳矫正视力越好；术前视力越好、MHI 及 MHCI 越大，术后 3 月最佳矫正视力越好，因此，手术前最佳矫正视力、裂孔最小直径、基底直径、MHI 及 MHCI 可以作为 IMH 术后视力的预估指标。

摘要编号：208758

呼吸睡眠暂停和孔源性视网膜脱离：一项孟德尔随机化研究

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目的：既往观察性研究已探讨了阻塞性睡眠呼吸暂停 (OSA) 与多种眼部疾病的关联，然而 OSA 与孔源性视网膜脱离 (RRD) 之间的因果关系尚不明确。本研究采用两样本孟德尔随机化方法 (TSMR) 评估 OSA 对 RRD 风险的因果关系。

方法：OSA 的遗传工具变量数据来自英国生物银行的一项全基因组关联研究 (GWAS)，共纳入 463,035 例病例和 13,818 例对照。我们从中筛选出 33 个与 OSA 显著相关的单核苷酸多态性作为工具变量 (IVs)。RRD 的遗传数据来源于芬兰生物银行的 GWAS 汇总数据，包括 203,018 例病例和 1,935 例对照。主要采用逆方差加权法 (IVW) 进行因果效应估计，并辅以加权中位数法 (WM) 等 MR 方法。通过 MR-Egger 回归进行敏感性分析，评估潜在的多效性影响，同时利用 F 统计量检验 IVs 的强度。

结果：IVW 结果显示 OSA 会显著增加 RRD 的发病风险 ($OR = 1.030$, 95% CI: 1.008–1.0419, $P = 0.04$)。敏感性分析未提示存在异质性 ($P = 0.623$) 和水平多效性 ($P = 0.428$)。所有纳入的工具变量均为强工具变量 ($F > 10$)。

结论：本研究表明，OSA 可能是孔源性视网膜脱离的危险因素，会升高其发病风险。这一发现为 RRD 的预防、临床诊断与护理策略提供了新的科学依据。

摘要编号：210181

基于光学相干断层扫描的特征性表现用于儿童 NF2 的早期识别

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目的：探讨儿童 2 型神经纤维瘤病 (NF2) 的早期眼科表现及其在诊断中的重要性；分析儿童 NF2 患者中黄斑前膜 (ERM) 的临床特征及手术治疗效果；强调在缺乏典型神经系统肿瘤表现的儿童中，眼科表现作为 NF2 早期诊断线索的价值。

方法：回顾性分析两名儿童 NF2 疑似病例的临床资料：病例 1：5 岁女孩，因“先天性白内障”就诊，伴黄斑前膜及皮肤牛奶咖啡斑，经基因检测确诊 NF2；病例 2：6 岁男孩，因单眼视力下降伴黄斑前膜就诊，皮肤有疑似牛奶咖啡斑，因经济原因未行基因检测，临床诊断为 NF2；收集患者的眼科检查资料 (包括视力、眼底照相、OCT)、全身检查 (皮肤、听力、颅脑 MRI) 及手术记录；结合文献回顾，比较其他儿童 NF2 相关黄斑前膜的手术治疗及预后。

结果：一、眼科表现：两例患者均表现为特征性黄斑前膜 (OCT 显示边缘卷曲、火焰状外观)；病例 1 合并白内障及视网膜前膜，病例 2 可见视网膜皱褶和灰白色病灶；二、全身表现：两例均有皮肤牛奶咖啡斑，但无前庭神经鞘瘤或其他神经系统肿瘤；三、基因检测：病例 1 基因检测确诊 NF2，病例 2 未检测；四、手术治疗：两例均接受 27 G 微创玻璃体切除术联合视网膜前膜剥除；术后 OCT 显示前膜消失，但视网膜结构异常持续存在；视力均未显著改善 (病例 1 术后 BCVA 20/125，病例 2 20/1000)；五、文献比较：现有报道中儿童 NF2 相关 ERM 手术效果不一致，部分病例视力改善，部分无变化；术后黄斑结构异常 (如内核层低反射腔) 可能影响视力恢复。

结论：儿童的 NF2 可能最初由眼科医生诊断。因此，临床医生应对这些显著的眼科表现保持警惕，比如视力低下、晶状体混浊和视网膜病变，特别是在没有特定病因的儿童中 OCT 上出现边缘卷曲的 ERM。应进行全面的全身检查和定期随访，因为 NF2 的早期诊断对于适当的患者管理和治疗至关重要。然而，儿童 NF2 所致 ERM 的手术治疗仍缺乏标准，27 G 微创玻璃体切除术和视网膜前膜剥除术的长期效果仍存在争议，需要更大样本量和更长的术后随访期。同时，这些患者术后中心凹的微观结构和弱视训练效果值得在未来研究中探讨。

摘要编号: 204332

基于术中荧光造影对 PDR 术前不同时间点抗 VEGF 治疗疗效的对比研究

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目的: 利用术中荧光血管造影 (IOFA) 技术评估增生性糖尿病视网膜病变 (PDR) 术前进行玻璃体腔注射抗 VEGF 治疗的最佳时间点。

方法: 回顾性病例系列研究。收集 2023 年 1 月至 2025 年 2 月在四川省人民医院就诊的因 PDR 伴玻璃体积血行玻璃体切除术的患者的临床资料。按术前玻璃体腔注射康柏西普的时间分为 A 组 (术前 3 天注射)、B 组 (术前 7 天注射)、C 组 (术前 14 天注射)。通过 IOFA 观察 PDR 患者眼底新生血管 (NV) 的个数和大小, 并收集术前最佳矫正视力 (BCVA)、玻璃体积血分级、术中手术时间、电凝使用频率、高灌注压持续时间、玻璃体视网膜粘连分级及术后 BCVA、黄斑中心区厚度 (CMT) 等信息, 进行多维度分析。

结果: 本研究共纳入的 91 例 (94 眼) 患者, 年龄 (52.53 ± 10.39) 岁, 男性 57 例 (62.6%), 女性 34 例 (37.4%), 3 组患者性别、年龄、糖尿病病程等术前基本指标均无统计学差异 ($p > 0.05$)。IOFA 辅助下观察到的 NV 个数、大小比较分析, NV 个数 A 组为 2.03 ± 2.22 个, B 组 0.89 ± 1.10 个, C 组 0.92 ± 1.26 个; NV 大小 A 组为 2.46 ± 3.61 PD, B 组 0.68 ± 0.91 PD, C 组 0.88 ± 1.51 PD。B 组、C 组的 NV 个数、大小均小于 A 组; 两两比较, B 组比 A 组的 NV 个数降低 56.2% ($p = 0.007$), 大小降低 72.4% ($p = 0.002$); C 组比 A 组 NV 个数降低 54.7% ($p = 0.021$), 大小降低 64.2% ($p = 0.011$)。B 组与 C 组比较差异无统计学意义 ($p > 0.05$)。三组手术时间、电凝使用频率、高灌注压持续时间、玻璃体视网膜粘连分级等其他术中指标的差异无统计学意义 ($p > 0.05$)。

结论: IOFA 证实, 术前 7 天、14 天抗 VEGF 治疗较术前 3 天能更有效的抑制 PDR 患者视网膜 NV 活性。

摘要编号: 208479

增殖性糖尿病视网膜病变行玻璃体切除术前抗 -VEGF 治疗的最佳时机: 基于大规模队列的竞争风险分析

第一作者: Jinlian ZHAN

目的: 过分析抗血管内皮生长因子 (抗 -VEGF) 治疗对术后玻璃体出血 (VH) 和牵引性视网膜脱离

(TRD) 竞争风险的不同影响, 定义增殖性糖尿病视网膜病变 (PDR) 玻璃体切除术前抗 -VEGF 治疗的最佳时机。

方法: 608 只接受 PDR 玻璃体切除术的眼睛, 分为未治疗组 ($n = 100$) 和抗 -VEGF 组 ($n = 508$)。抗 -VEGF 组按注射到手术的间隔时间分为 1-3 天、4-7 天、8-14 天和 > 14 天组。使用多变量 Cox 比例风险模型和 Fine 和 Gray 竞争风险模型分析术后首次复发 (需要干预的 VH 或 TRD) 时间。主要结局指标: 术后 VH 和 TRD 的发生率及独立预测因子。

结果: 与未治疗组相比, 术前抗 -VEGF 显著减少了总复发率 (24% vs. 41%; $P < 0.001$)。竞争风险显示, 这一效果主要是通过减少 VH 的发生来实现的 (调整后的亚分布风险比 [aSHR] 为 0.38; 95% CI, 0.24-0.61), 对 TRD 没有显著影响 (aSHR 为 0.98; 95% CI, 0.59-1.64)。注射时机是结果的关键决定因素。注射到手术间隔为 4-7 天与最低的整体复发风险相关 (调整后的风险比为 0.52; 95% CI, 0.30-0.88, 比较 > 14 天组)。相比之下, 手术延迟超过 14 天与 TRD 的累积发生率显著增加相关 (21% vs. 7-9% 对于其他组; Gray 检验, $P = 0.001$)。

结论: PDR 玻璃体切除术中的术前抗 -VEGF 治疗具有双刃剑效应, 其作用受血管纤维化转换的影响。该治疗的益处是特定于并发症的, 仅限于减少玻璃体出血。最佳治疗窗口为 4-7 天, 最大化该益处。然而, 手术延迟超过 14 天会触发一种促纤维化的转变, 显著增加牵引性视网膜脱离的风险, 抵消抗出血的效果。

摘要编号: 208476

层特异性微血管变化在特发性黄斑前膜中的意义

第一作者: Jinlian ZHAN

目的: 探讨使用光学相干断层扫描血管成像 (OCTA) 观察特发性黄斑前膜 (iERM) 患者神经纤维层血管丛 (NFLP) 和视网膜神经节细胞层血管丛 (GCLP) 中的层特异性微血管变化, 并与手术后的视觉功能进行关联分析。

方法: 本回顾性研究分析了 47 只 iERM 眼和 30 只健康对照眼。评估了术前和术后 6 个月的最佳矫正视力 (BCVA)、视网膜敏感性和 OCTA 衍生的 NFLP、GCLP 及浅层血管复合体 (SVC) 的血管密度 (VD) 和血管面积 (PA)。通过 ROC 曲线评估诊断准确性, 并通过相关性分析和多元线性回归分析评估预后价值。

结果：术前，iERM 眼的 NFLP、GCLP 和 SVC 的血管密度 (VD) 和血管面积 (PA) 均显著高于健康对照 ($P < 0.01$)。NFLP 参数在诊断准确性上优于 SVC 指标。术前，NFLP 血管指标的增加与更好的 BCVA 改善相关 (所有 $P < 0.05$)。相反，较大基线 $6 \times 6 \text{ mm}^2$ GCLP 血管指标与较差的 BCVA 改善相关 (所有 $P < 0.05$)。多元分析显示，术前 GCLP VD 是最终术后 BCVA 改善 ($\beta = 1.84$, $P = 0.045$) 和术后视网膜敏感性 ($\beta = 0.048$, $P < 0.001$) 的独立预测因子。

结论：通过 OCTA 对 NFLP 和 GCLP 的分层分析提供了对 iERM 的独特且有力的生物标志物。NFLP 指标在诊断中表现优异，而术前 GCLP 的完整性则是术后功能恢复的关键预测因子，提供了比传统 SVC 分析更细致的见解。

摘要编号：200960

斜面与平面玻切头在糖尿病性视网膜病变玻切手术增生膜剥离操作中的效率对比

第一作者：Jinfeng QU

共同作者：Xiaoxin LI

目的：比较最高切速 10 K 的斜面 (beveled-tip) 玻切头与最高切速 5 K 的平面 (flat-tip) 玻切头在 PDR 患者手术中剥离纤维血管增生膜 (FVP 膜) 的操作效率。

方法：采用多中心前瞻性随机对照研究设计。纳入 FVP 膜分级为 3~4 级的 PDR 患者，随机分为两组：实验组使用 Alcon Advanced ULTRAVIT® 10 K/25 G 斜面玻切头，对照组使用 Alcon 5 K/25 G 平面玻切头分别进行玻璃体切除术。比较两组在术中单独使用玻切头清除 FVP 膜粘连点的比例、辅助器械切换的平均次数、手术总时长、核心玻璃体切除时间、膜清除时间、术后随访 3 个月内最佳矫正视力及玻璃体体积血的复发率。

结果：共纳入 110 例 PDR 患者 (113 眼)。斜面玻切头组单独使用玻切头清除 FVP 膜粘连点的比例为 $70.1 \pm 21.9\%$ ，显著高于平面玻切头组的 $50.9 \pm 33.5\%$ ($P = 0.001$)。斜面玻切头组辅助器械 (镊子/剪刀/电凝) 切换的平均次数为 2.7 ± 1.7 次，低于平面玻切头组的 3.4 ± 1.6 次 ($P = 0.022$)。斜面玻切头组 FVP 膜清除时间为 16.3 ± 3.4 分钟短于平面玻切头组的 20.8 ± 5.8 分钟 ($P = 0.041$)。两组在手术总时长、核心玻璃体切除时间、术后最佳矫正视力及玻璃体体积血复发率方面无显著差异。

结论：与 5 K 平面玻切头相比，10 K 斜面玻切头能清除更高比例的 FVP 膜粘连点，减少辅助器械切换次数，并缩短 FVP 膜总清除时间。

摘要编号：208694

术中激光联合 FCB 外垫压治疗 RRD 的临床观察

第一作者：Shuai WANG

共同作者：Xun AN, Yong LV, Chao MA, Tiantian WANG

目的：评估非接触广角镜下术中激光联合 FCB 外垫压治疗孔源性视网膜脱离的安全性及有效性。

方法：回顾分析 10 例 (10 只眼) 单纯性孔源性视网膜脱离患者接受非接触广角镜下术中激光联合 FCB 外垫压手术的临床资料，评估手术前后 3 个月最佳矫正视力、眼压、视网膜复位情况、视网膜下液吸收情况及并发症情况。

结果：10 例 (10 眼) 患者术后视网膜均复位，最佳矫正视力较术前均提高，且差异具有统计学意义 ($P < 0.05$)，手术未出现与 FCB 相关的严重并发症。

结论：本研究利用非接触性广角眼底镜联合光纤导光系统辅助内路照明下用 FCB 顶压联合术中激光光凝封闭裂孔，对于网脱范围 ≤ 3 象限、赤道以后的大裂孔也可以进行有效的顶压，可使原来计划 PPV 手术的患者改为 FCB 加压术。不仅可以对隆起程度较高的视网膜脱离且合并多处视网膜变性的患者术中一次性封闭裂孔并同时光凝变性区，减少了后续治疗过程，也避免术后激光带来炎症加剧的情况，这是传统 SB 及目前 FCB 顶压术不能做到的。综合 10 例患者术后视力、眼压、视网膜复位及视网膜下液吸收情况，我们认为改良性 FCB 治疗 RRD 是安全且有效的。

摘要编号：203364

湿性年龄相关性黄斑变性 (wAMD) 与认知功能障碍的炎症分子网络关联：视网膜-脑轴的作用

第一作者：周雪娇

共同作者：Yunqin LI

目的：湿性年龄相关性黄斑变性 (wet age-related macular degeneration, wAMD) 是老年人群中导致不可逆失明的重要原因之一。而临床上观察到，wAMD 患者发生认知功能障碍 (如轻度认知障碍和阿尔茨海默病) 的风险较健康人群更高，提示这两种疾病之间存在潜在的关联性机制。本文主要围绕 wAMD 是否与认知功能障碍有关展开讨论，从临床观察的关联现象入手，探索两者可能存在的核心生物学机制——从解剖学和功能学角度阐释“视网膜-脑轴”的双向联系，解释视觉系统与中枢神经系统之间的交互作用；讨论两者在炎症反应方面的共同性，包括视网膜局部和颅内炎症反应的相似

性、小胶质细胞的异常活化模式，以及血视网膜屏障和血脑屏障破坏均涉及到的相同反应通路；最后详述氧化应激反应在两种疾病发病过程中发挥的作用。理解上述的病理生理过程有利于更深刻地了解wAMD与认知功能障碍疾病的发生发展过程，并寻找可能的联合干预措施。

方法：无。

结果：无。

结论：无。

摘要编号：**203226**

玻璃体切除联合保留中心凹的内界膜剥除及硅油填充术治疗病理性近视黄斑劈裂

第一作者：**Jun ZHOU**

目的：探讨玻璃体切除术联合保留中心凹的内界膜剥除及硅油填充治疗病理性近视黄斑劈裂的临床疗效。

方法：收集2023年1月-2024年11月在我院接受玻璃体切除术联合保留中心凹的内界膜剥除及硅油填充治疗病理性近视黄斑劈裂10例10眼比较术前、术后1周、1月、3月最佳矫正视力(BCVA)、中心凹厚度(CFT)、视网膜劈裂腔高度(FS)、及黄斑劈裂、中心凹脱离复位情况。

结果：纳入病理性近视黄斑劈裂10例10眼中，完全复位率为30%(3眼)，部分复位率为70%(7眼)。术后3月，BCVA(LogMAR)较术前 1.432 ± 0.509 显著改善至 0.957 ± 0.393 ($P < 0.05$)，CFT和FS较术前 437.9 ± 180.4 、 686.5 ± 172.2 μm 显著降低至 207.5 ± 76.1 、 290.7 ± 86.6 μm ($P < 0.05$)。术中及术后随访期间未见黄斑裂孔、视网膜脱离硅油乳化、眼内炎等并发症发生。

结论：玻璃体切除术联合保留中心凹的内界膜剥除及硅油填充有助于病理性近视黄斑劈裂患者的视力提高及黄斑劈裂的解剖复位。

摘要编号：**207988**

眼前后节联合术后有效晶状体位置的变化及其对屈光结局的影响

第一作者：**Jianmin WANG**

共同作者：**Qian LI**

目的：探讨玻璃体视网膜病变患者接受眼前后节联合手术前后有效晶状体位置(effective lens position, ELP)的变化，及其对屈光结局的影响，为以后眼前后节联合手术前人工晶状体度数的精确测算奠定基础。

方法：研究纳入2024年5月至2025年9月就诊于河北省人民医院眼科，确诊为玻璃体视网膜病变患者64例64只眼，根据所行术式不同分为以下四组：前后联合水液填充组(行Phaco + IOL + PPV术)20只眼；单纯后节水液填充组(单纯行PPV手术)14只眼；前后联合气体填充组(行Phaco + IOL + PPV + 注气术)15只眼；前后联合硅油填充组(I期行Phaco + IOL + PPV + 硅油填充术，二期行硅油取出术)15只眼；所有需植入IOL的病例均植入一片式亲水性丙烯酸酯IOL；应用超声生物显微镜(ultrasound biology microscope, UBM)测量眼轴方向角膜后顶点到晶状体前表面之间的距离以及到两侧睫状突连线之间的距离，分别作为前房深度(ACD)和ELP的数值。比较术后1个月和3个月等效球镜度数(SE)，同时应用UBM测量各随访时间点的ACD和ELP。分析各个时间点ELP的前后变化，应用Pearson相关性分析ELP与SE变化的相关性。

结果：ELP的变化：前后联合水液填充组：术后1个月和3个月较术前显著后移($P < 0.05$)；单纯后节水液填充组：术后1个月较术前显著前移($P < 0.05$)，术后3个月较术后1个月后移($P < 0.05$)；前后联合气体填充组：术后1个月和3个月较术前显著后移($P < 0.05$)；前后联合硅油填充组：I期术后1个月和3个月较术前显著后移，II期术后1个月和术后3个月较前显著后移($P < 0.05$)。相关性分析：ELP的变化与SE的变化显著相关($r = 0.39$, $P < 0.05$)。

结论：眼前后节联合术后ELP变化趋势有迹可循，其中前后联合手术组术后ELP显著后移，实际屈光度与预测屈光度存在误差，与ELP变化显著相关。在估算术后屈光度时应该考虑ELP随时间变化的影响，适当调整预留屈光度，为患者提供更佳的术后视觉效果。

摘要编号：**207686**

视网膜下注射治疗大直径黄斑裂孔的中长期观察

第一作者：**Ying WANG**

目的：评估平衡盐溶液(BSS)视网膜下注射用于治疗大直径黄斑裂孔(MHz直径 ≥ 400 微米)的疗效和安全性。

方法：本研究是一项前瞻性干预研究，共纳入31例患者的31只眼，均为全层黄斑裂孔。患者接受了玻璃体切除术，随后使用41 G针头进行视网膜下BSS注射。术后1个月、3个月及6个月，通过光学相干断层扫描(OCT)、最佳矫正视力(BCVA)和微视野计检查评估结果。微视野计检查的指标包

括黄斑完整性指数 (MII) 和黄斑阈值 (MT)。对比分析了术前与术后 BCVA (LogMAR)、MII 和 MT 的变化, 记录黄斑裂孔闭合情况和并发症。

结果: 术后 1 个月时, 93.54% (29/31) 的患者实现了黄斑裂孔完全闭合。术前 BCVA (LogMAR) 为 1.34 ± 0.59 , 术后 1 个月为 0.67 ± 0.20 、3 个月为 0.48 ± 0.36 , 6 个月为 0.35 ± 0.57 , 随访时逐渐提高 ($P < 0.001$)。术后 6 个月时, MII 从 98.77 ± 4.83 改善为 85.38 ± 16.5 ($P < 0.001$), MT 从 17.53 ± 5.04 改善为 25.43 ± 2.91 ($P < 0.001$)。未观察到并发症发生。

结论: 视网膜下 BSS 注射治疗大直径黄斑裂孔是有效且安全的, 能够促进解剖结构的成功闭合并有效改善视功能。

摘要编号: 208474

视网膜血管灌注能力作为评估特发性黄斑前膜患者视觉功能恢复的预测指标

第一作者: Jinlian ZHAN

目的: 本研究利用光学相干断层扫描血管造影 (OCTA) 研究特发性黄斑前膜 (iERM) 患者的视觉功能与视网膜血管指标, 特别是灌注能力 (PC) 之间的关系。

方法: 文章回顾性研究包括 30 例 iERM 手术患者的 30 只眼, 随访 3 个月。另外, 28 名健康人的 28 只眼睛作为对照组。我们测量了最佳矫正视力 (BCVA)、视网膜敏感度、血管密度 (VD)、灌注面积 (PA)、灌注能力 (PC) 和视网膜厚度 (RT)。OCTA 扫描评估 $3 \times 3\text{-mm}^2$ 和 $6 \times 6\text{-mm}^2$ 区域的浅层血管复合体 (SVC) 和深层血管复合体 (DVC)。分析视网膜血管指标与视力结果之间的关系。

结果: 术后 BCVA 和视网膜敏感性均有显著改善 ($P < 0.001$)。SVC 层 VD、PA 显著降低 ($P < 0.001$), PC 显著升高 ($P < 0.001$)。DVC 层 VD、PA、PC 变化无统计学意义。与视网膜敏感性变化相关的基线因素包括 $3 \times 3\text{-mm}^2$ RT ($r = -0.389$, $P = 0.034$) 和 PC 在 $3 \times 3\text{-mm}^2$ 和 $6 \times 6\text{-mm}^2$ SVC 区域 ($3 \times 3\text{-mm}^2$ SVC PC: $r = 0.71$, $P < 0.001$; $6 \times 6\text{-mm}^2$ SVC PC: $r = 0.51$, $P = 0.003$)。基线 VD 或 PA 与术后视网膜敏感性改善之间无显著相关性。在多元线性回归分析中, 回归模型显示, 术后视网膜敏感性呈负相关 ($\beta = -0.53$, $P = 0.001$) 和 $3 \times 3\text{-mm}^2$ RT ($\beta = -0.39$, $P = 0.013$), 而与术前视网膜敏感性呈正相关 ($\beta = 1.10$, $P < 0.001$), 在 $3 \times 3\text{-mm}^2$ 区域内术后 BCVA 和视网膜敏感性均有显著改善 ($P < 0.001$)。SVC 层 VD、PA 显著降低 ($P < 0.001$), PC 显著升高 ($P < 0.001$)。DVC 层 VD、PA、PC 变化无统计学意义。

与视网膜敏感性变化相关的基线因素包括 $3 \times 3\text{-mm}^2$ RT ($r = -0.389$, $P = 0.034$) 和 PC 在 $3 \times 3\text{-mm}^2$ 和 $6 \times 6\text{-mm}^2$ SVC 区域 ($3 \times 3\text{-mm}^2$ SVC PC: $r = 0.71$, $P < 0.001$; $6 \times 6\text{-mm}^2$ SVC PC: $r = 0.51$, $P = 0.003$)。基线 VD 或 PA 与术后视网膜敏感性改善之间无显著相关性。在多元线性回归分析中, 回归模型显示, 术后视网膜敏感性与年龄呈负相关 ($\beta = -0.53$, $P = 0.001$) 和 $3 \times 3\text{-mm}^2$ RT ($\beta = -0.39$, $P = 0.013$), 而与术前视网膜敏感性呈正相关 ($\beta = 1.10$, $P < 0.001$), 在 $3 \times 3\text{-mm}^2$ 区域内 SVC 中的 PC ($\beta = 0.49$, $P = 0.023$)。

结论: 视网膜血管灌注能力 (PC) 是评价特发性黄斑前膜视网膜微循环的一种新颖且可靠的指标。我们的研究表明, 术前浅层血管复合体的 PC 是术后视网膜敏感性改善的重要预测因素。这一发现具有重要的临床意义, 表明 PC 可用于更好地选择手术候选人和定制个性化治疗计划。

摘要编号: 207691

超长眼轴硅油取出致眼球脱臼一例报告

第一作者: Xiangli WANG

目的: 探讨超高度近视硅油眼行联合手术时发生急性术中眼球脱臼的危险因素、机制及应急处置策略。

方法: 病例报告。45 岁女性患者, 右眼为唯一视眼, 眼轴 35 mm, 因高度近视孔源性视网膜脱离行玻璃体切割 + 硅油填充术后 7 个月。术前检查: 视网膜平复, 黄斑裂孔萎缩性愈合, 晶状体混浊 (LOCS III: N2C2P0), 硅油下矫正视力 0.1。局麻 (球后阻滞: 2% 利多卡因 + 0.75% 罗哌卡因共 4.5 ml) 下行右眼 Phaco + IOL 植入 + 硅油取出术。术中关键事件: Phaco 阶段: 主切口反复虹膜脱出伴前房波动, 连续环形撕囊不规则撕裂; 硅油取出阶段: 25 G 套管取出硅油时突发眼球向颞下方脱出超过赤道部; 缝合巩膜切口后见眼球大部分脱位于眶外, 角膜完全暴露, 上下睑张力显著增高, 徒手还纳困难。处理: 立即停止操作, 行眼球内、外侧轻柔按摩 30 分钟, 眼球大部分回纳 (角膜暴露 50%), 遂以绷带加压包扎。

结果: 术后 2 小时解开包扎, 眼球完全复位。术后首日: 眼压 14 mmHg, 角膜透明, IOL 囊袋内位正, 眼底视网膜复位。术后视力维持 0.1。

结论: 三重高危因素协同致病: 眼轴 ≥ 35 mm 导致眼球-眼眶容积比失衡 (计算容积比 > 1.8); 硅油取出诱发“眼球塌陷效应”: 瞬时负压 (实测术毕眼压 6 mmHg) 使薄壁眼球变形; 悬韧带松弛: 术中见晶状体震颤及囊袋不稳定。局麻操作的额外风险: 球后注射 4.5 ml 药液加剧眶压升高; 患者疼痛性眼睑痉挛进一步推挤眼球。急救关键: 即刻

解除眼睑压迫（禁用暴力还纳）；加压包扎通过降低眶静脉压促进淋巴回流。

摘要编号：208442

非膨胀浓度 C3F8 气体与空气在充气性视网膜固定术治疗 RRD 的多中心、前瞻性临床研究——（CANARY study）中期报告

第一作者：Enhui LI

共同作者：Youxin CHEN

目的：比较非膨胀浓度 C3F8 气体与空气应用于充气性视网膜固定术（PR）治疗孔源性视网膜脱离（RRD）的疗效及安全性差异。

方法：本研究为多中心、前瞻性、单盲、随机对照、非劣效性临床试验。纳入符合标准的 RRD 患者，随机分配至非膨胀气体组（14% C3F8 组）与空气组。患者入院进行手术及术后体位管理，手术方案如下：前房穿刺充分放液后注入 0.7 ml 气体，术后保持规定头位 6 至 12 小时，后行激光裂孔封闭处理。主要评价指标包括：1. 视网膜复位率（单次注气解剖复位率、总复位率）；2. 最佳矫正视力（ETDRS 字母数）；3. 手术并发症发生率。

结果：截至中期分析（2024 年 4 月至 2025 年 4 月），共纳入国内 13 家医疗中心的 137 例 RRD 患者，这些患者的平均年龄为 50.77 ± 12.45 岁，男女性别比例为 72:65，病程中位数为 10 天，平均住院日为 4.51 ± 2.11 天，将这些患者随机分组为 C3F8 组（70 例）和空气组（67 例）。- 解剖复位率：C3F8 组单次注气复位率为 90%（63/70），空气组为 86.6%（58/67），组间差异无统计学意义（ $P > 0.05$ ）。- 二次干预情况：首次复位失败的 16 例患者中，C3F8 组 1 例行二次注气仍未复位；空气组 7 例行二次注气，其中 6 例成功复位。- 视力改善：C3F8 组 ETDRS 字母数从术前 44.91 ± 31.66 提升至术后 61.40 ± 23.53 （ $P < 0.05$ ）；空气组从 55.79 ± 32.15 提升至 68.98 ± 15.78 （ $P < 0.05$ ），但组间视力改善幅度无显著差异（ $P > 0.05$ ）。- 并发症及处理：10 例注气失败病例中，5 例因气体顶压失败，2 例气体进入视网膜下腔，2 例萎缩孔视网膜下积液持续存在，1 例术后新发下方裂孔。上述病例最终通过玻璃体切除术（PPV）或巩膜扣带术（SB）实现解剖复位。随访期间，2 例复发经再次 PR 治疗成功，3 例出现黄斑前膜，1 例出现黄斑裂孔。

结论：中期数据表明，非膨胀浓度 C3F8 气体与空气在 PR 治疗 RRD 中均具有良好安全性及有效性，两种气体在解剖复位率与视力改善方面无显著差异。但空气组需二次注气的比例为 10.4%（7/67），高于 C3F8 组二次注气比例 1.4%（1/70），提示

其单次治疗成功率低于 C3F8 组。后续研究需进一步验证长期疗效及并发症风险。

眼整形眼眶病

摘要编号：205541

3D 打印辅助制作的预成型可吸收填充材料联合计算机导航在眼眶骨折修复手术中的应用评价

第一作者：Wang YINING

目的：评价 3D 打印辅助制作的预成型可吸收填充材料联合计算机导航在眼眶骨折修复手术中的应用价值。

方法：选择 60 例单侧眼眶爆裂性骨折患者，均存在眼球内陷及复视。将患者以是否利用 3D 打印技术辅助手术及计算机导航随机分为观察组 30 例和对照组 30 例。观察组患者经眼眶 CT 扫描数据创建虚拟眼眶模型，将数据导入 3D 打印机制备 3D 打印眼眶模型，对骨折修复材料进行大小设计，以此为模板预成型可吸收眶底板，在计算机导航辅助下对患者施行眼眶骨折修复手术。对照组采用常规眼眶骨折修复手术。观察并比较两组患者的可吸收眶底板在眼眶骨折缺损位置的贴附情况。随访记录患者术后的复视、眼球突出度和眼球运动情况，以评价愈后效果。

结果：术后 1 周复查所有患者视力均无明显变化，瞳孔大小无变化，眼眶 CT 可见骨折断端对合良好，个体化预成型可吸收眶底板位置角度良好。随访 6~8 个月，两组患者术后眼球突出度差值均在 2 mm 以内。观察组和对照组患者在术后 1 周、1 个月和 6 个月最大方向复视比较，差异均具有统计学意义（ $P < 0.05$ ）。在术后 1 周、1 个月和 6 个月，观察组和对照组患者术后上转运动受限均值、下转运动受限均值比较，差异均具有统计学意义（ $P < 0.05$ ）。

结论：3D 打印眼眶模型辅助设计的预成型可吸收填充材料对眼眶爆裂性骨折修复具有确切效果，且手术安全，种植体植入位置精确，联合计算机导航辅助下实施手术对复视、眼球运动受限及眼球突出等症状改善效果良好，患者术后恢复效果更好。

摘要编号: 204373

DEPTOR 蛋白在甲状腺相关眼病中的作用及机制研究

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共同作者: Dongmei LI

目的: 甲状腺相关眼病 (TAO) 是一种炎症性自身免疫性疾病, 其在成人眼眶疾病中的发病率最高。尽管目前对 TAO 的发病机制已有广泛的研究, 但目前仍未完全阐明。普遍认为, 眼眶成纤维细胞 (OFs) 是 TAO 的靶细胞, 在其发病机制中发挥重要作用, 但对于 DEPTOR 在 TAO 期间炎症反应和脂肪生成中的具体作用仍不十分清楚。因此, 本研究旨在探究眼眶组织 (来自 TAO 患者和健康对照受试者) 中 DEPTOR 的表达情况, 并通过小干扰 RNA (siRNA) 介导眼眶成纤维细胞的基因沉默, 来探索 DEPTOR 在 TAO 发病机制中的作用。

方法: 沉默 DEPTOR 基因后对 TAO 炎症反应和脂肪生成的影响: 我们收集了 10 例 TAO 患者的眼眶结缔组织样本以及 10 例健康对照者眼眶样本, 体外培养眼眶成纤维细胞。在转染后的 48 小时内, 利用 CCK8 法和划痕实验分别检测细胞增殖和迁移的改变情况。在使用 IL1 β 刺激之前, 我们对细胞进行了 DEPTOR siRNA 及 NCsiRNA 的预处理, 持续处理 24 小时。通过 Western blot 和 ELISA 测量炎症细胞因子的蛋白白介素 6 (IL6)、细胞间黏附分子 1 (ICAM1)、单核细胞趋化蛋白 1 (MCP1) 表达水平。随后, 我们对 DEPTOR siRNA 及 NCsiRNA 持续转染 OFs 细胞进行了脂肪分化, 并使用油红 O 染色, 通过 Western blot 分析测定了成脂转录因子过氧化物酶体增殖物激活剂 γ (PPAR γ) 和 CCAAT 增强子结合蛋白 (C/EBP) α/β 的水平。通过 Western blot 检测了 DEPTOR/mTOR 相关信号通路的蛋白水平, 包括 mTOR 特征性底物 S6K1 和 AKT 及其磷酸化的蛋白, 以及负反馈通路 PI3K/AKT 级联反应的蛋白水平。

结果: 体外实验显示, TAO 眼眶组织中 DEPTOR mRNA 的表达水平显著高于非 TAO 组织 ($P < 0.05$)。抑制 DEPTOR 基因表达影响细胞迁移和增殖, 并可以有效降低 IL-1 β 诱导的炎症细胞因子 IL-6、ICAM-1、MCP-1 的蛋白表达水平。同时, 在脂肪生成过程中, DEPTOR 的表达持续增加, 而 DEPTOR siRNA 转染的 TAO 的 OFs 细胞显示, 与脂肪细胞分化相关的成脂转录因子 PPAR γ 、C/EBP α 、C/EBP β 的表达显著减少。油红 O 染色结果表明, 在脂肪分化过程中, 经 DEPTOR siRNA 转染处理后, 脂滴减少。体外实验发现, DEPTOR siRNA 转染后, TAO 的 OFs 在脂肪生成过程中,

使 p70S6K 及 p-p70S6K 蛋白表达水平增加, 但同时减弱了 AKT、p-AKT、PI3K、p-PI3K 蛋白的表达水平。

结论: 在 TAO 的体外模型中, 沉默 DEPTOR 可以有效抑制促炎细胞因子的产生和脂肪生成过程, 这提示 DEPTOR 可能在介导 TAO 的发病分子机制中发挥着重要作用。此外, 我们的研究进一步揭示了 DEPTOR 蛋白通过调节 PI3K/Akt 和 mTOR/p70S6K 信号级联来调节 TAO 的脂肪生成。具体而言, DEPTOR 通过抑制 mTORC1 介导的反馈抑制来激活促脂肪生成的 Akt/PKB-PPAR- γ 轴。这些发现为未来 TAO 治疗的潜在靶点之一提供了线索, DEPTOR 蛋白可能成为治疗该疾病的有力候选。

摘要编号: 208910

En-DCR 联合中药治疗慢性泪囊炎疗效影响因素分析

第一作者: Ya MO

目的: 本研究通过观察成都中医药大学附属医院眼科就诊的单眼慢性泪囊炎患者, 从多个角度分析鼻内镜下泪囊鼻腔吻合术 (En-DCR) 联合中药治疗单眼慢性泪囊炎的疗效影响因素。

方法: 收集 2023 年 10 月至 2024 年 10 月于成都中医药大学附属医院眼科接受 En-DCR 联合中药治疗的单眼慢性泪囊炎患者 203 例 (203 眼)。其中完成术后 6 个月门诊随访且符合纳排标准的患者 111 例 (111 眼)。从一般基线资料、既往史、手术史、CT 泪道造影等多因素分析 En-DCR 联合中药治疗单眼慢性泪囊炎疗效的影响因素。使用 SPSS 24.0 行数据分析, 单因素分析筛选出 P 值较小者 ($P < 0.10$) 作为自变量, Logistic 回归分析, 筛选出影响 En-DCR 手术疗效的危险因素 ($P < 0.05$)。

结果: 1. En-DCR 联合中药治疗的 203 例 (203 眼) 单眼慢性泪囊炎患者术后 6 个月电话随访的有效率为 91.53%。在完成术后 6 个月门诊随访且符合纳排标准的 111 例患者 (111 眼) 中, 治愈 79 眼 (71.2%), 好转 16 眼 (14.4%), 无效 16 眼 (14.4%), 总有效率为 85.6% (95 眼)。2. 本研究符合纳排除标准的单眼慢性泪囊炎患者中男性 9 例, 女性 102 例, 所有患者平均年龄为 52.86 ± 12.80 岁。3. 单因素分析结果显示: 下鼻甲肥厚、中鼻甲气化、小泪囊对 En-DCR 手术疗效有关 ($P < 0.05$)。4. 多元有序 Logistic 回归分析结果显示: 高血压、下鼻甲肥厚、中鼻甲气化、小泪囊为影响 En-DCR 手术疗效的危险因素 ($P < 0.05$)。

结论: 高血压、下鼻甲肥厚、中鼻甲气化、小泪囊为影响 En-DCR 手术联合中药疗效的危险因素 ($P < 0.05$)。

摘要编号: 209669

Maya 软件结合手机 3D 扫描测量眼球突出度的可行性研究

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目的: 创新性提出 Maya 软件结合手机 3D 扫描测量眼球突出度, 以期对眼球突出度的测量提供新的思路和方法。

方法: 在 3D 编辑 Maya 软件中测量 3D 面部模型上的眶距、瞳孔中点到同侧眶外侧缘点距离以及对侧眶外侧缘点距离。同时通过 IOL Master 700 测量中央前房深度和中央角膜厚度, 以弥补角膜顶点到瞳孔中点的距离, 进一步用海伦公式求得眼球突出度。纳入 30 名确诊为甲状腺相关眼病 (TED) 患者及 37 名健康人群作为受试者, 分别行 Maya 结合手机 3D 扫描、Hertel 眼突计及眼眶 CT, 测量眼球突出度 (Exophthalmos, EXPH) 和眶间距离 (Interocular Distance, IOD)。使用 MedCalc (v20.2) 和 SPSS (v27.0) 对实验数据集统计分析, 通过 Passing-Bablok 回归模型进行线性关系评估, 并结合 Bland-Altman 一致性界限分析法, 对测量结果的可比性维度展开双重验证。

结果: 1. HE 法和 Maya 法测得健康受试者的 EXPH 分别为 $15.42 \text{ mm} \pm 1.91 \text{ mm}$ 和 $15.38 \text{ mm} \pm 1.99 \text{ mm}$, IOD 分别为 $107.76 \pm 4.50 \text{ mm}$ 和 $106.29 \pm 4.89 \text{ mm}$; 两种方法测得 EXPH 和 IOD 的 95% 一致性界限区间 (LoA) 分别为 $-0.52 \text{ mm} \sim 0.60 \text{ mm}$ 和 $-2.00 \text{ mm} \sim 5.00 \text{ mm}$, 相关系数 ρ 分别为 0.987 ($P < 0.0001$) 和 0.925 ($P < 0.0001$); 二者位于置信区间外的数值点均小于 5%。2. HE 法和 Maya 法测得 TED 患者的 EXPH 分别为 $20.23 \pm 2.45 \text{ mm}$ 和 $20.33 \pm 2.52 \text{ mm}$, IOD 分别为 $110.17 \text{ mm} \pm 5.09 \text{ mm}$ 和 $109.06 \text{ mm} \pm 5.83 \text{ mm}$; 两种方法测得 EXPH 和 IOD 的 95% LoA 分别为 $-0.72 \text{ mm} \sim 0.54 \text{ mm}$ 和 $-2.70 \text{ mm} \sim 4.90 \text{ mm}$, 相关系数 ρ 分别为 0.990 ($P < 0.0001$) 和 0.929 ($P < 0.0001$); 二者位于置信区间外的数值点均小于 5%。3. 对 19 名 TED 患者分别行 CT 法和 Maya 法测量 EXPH 和 IOD。CT 法和 Maya 法测得的 EXPH 分别为 $20.07 \pm 2.43 \text{ mm}$ 和 $20.15 \pm 2.56 \text{ mm}$, IOD 分别为 $99.78 \pm 4.00 \text{ mm}$ 和 $107.96 \pm 6.36 \text{ mm}$; 两种方法测得 EXPH 和 IOD 的 95% LoA 分别为 $-0.80 \text{ mm} \sim 0.65 \text{ mm}$ 和 $-22.30 \text{ mm} \sim 5.90 \text{ mm}$, 相关系数 ρ 分别为 0.989 ($P < 0.0001$) 和 0.126 ($P < 0.0001$); 二者位于置信区间外的数值点均小于 5%。CT 法与 Maya 法所测 TED 患者的 EXPH 具有良好的一致性。两种方法测量的 IOD

存在差异, 是由于眼眶 CT 所测量的 IOD 为眶骨内侧壁距离, 而 Maya 法还包括皮肤、皮下组织及部分眶骨厚度。

结论: 与传统 Hertel 眼突计及眼眶 CT 法对比, 基于 Maya 软件结合手机 3D 扫描测量 EXPH 的方法在健康人群和 TED 患者的中均展现出极好的测量一致性。该方法无创、非接触、可重复性好、无辐射、操作简便, 具有良好的临床实践潜力。

摘要编号: 210204

中国西南地区眼眶蜂窝织炎的回溯性分析

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目的: 评估中国西南地区眼眶蜂窝织炎的流行病学特征、危险因素、病原谱、治疗模式及视力预后, 为区域化防治策略提供循证依据。

方法: 回顾性纳入 2015-01 至 2025-06 西南地区单中心住院且经 CT/MRI 确诊的眼眶蜂窝织炎患者。采集人口学、伴随鼻窦炎、创伤史、微生物学、抗生素选择、手术干预、住院时长、最佳矫正视力 (BCVA) 及并发症。按年龄 ≤ 14 岁与 > 14 岁分层, 采用多变量 Logistic 回归分析视力不良 (最终 BCVA $< 20/40$) 的独立危险因素。

结果: 共 368 例符合标准, 儿童 207 例 (56.3%), 成人 161 例 (43.7%)。男女比 1.62:1。诱因: 急性鼻窦炎 68.5%, 外伤 11.2%, 皮肤疖肿 7.3%, 牙源性 5.0%。病原培养阳性率 32.5% (119/368), 首位为金黄色葡萄球菌 (38.0%, 其中 MRSA 占 22.1%), 其次肺炎链球菌 15.3%、流感嗜血杆菌 9.5%。· 治疗: 单用静脉广谱抗生素 42.1%, 联合内镜鼻窦手术 (ESS) 眼眶引流 57.9%。平均住院 8.7 ± 3.4 天。· 视力不良率 8.9% (46/518); 儿童 5.5%, 成人 16.7% ($P < 0.01$)。· 多变量分析示: 就诊延迟 ≥ 7 天 (OR 3.42, 95% CI 1.78-6.58)、合并糖尿病 (OR 2.91, 1.30-6.52)、眶尖综合征 (OR 6.73, 2.45-18.5) 及 MRSA 感染 (OR 2.15, 1.02-4.54) 为视力不良独立危险因素。· 并发症 7.5%, 以海绵窦血栓 2.1%、脑膜炎 1.5%、永久性失明 0.8% 为主; 无死亡。

结论: 中国西南地区眼眶蜂窝织炎好发于男性儿童, 鼻窦炎是最主要诱因。MRSA 比例高于既往东部报告, 提示需重视经验性抗生素覆盖。早期联合内镜下鼻窦手术可缩短疗程并降低并发症。及时就诊、控制糖尿病及针对 MRSA 的个体化治疗是改善视力预后的关键。

摘要编号: 203188

儿童外伤性鼻泪管阻塞的治疗与预后影响因素

第一作者: Caiwen XIAO

目的: 本研究旨在系统分析儿童群体中外伤性鼻泪管阻塞 (nasolacrimal duct obstruction, NLDO) 的临床表现、损伤机制与阻塞部位分布特征, 比较不同手术方式的治疗效果及安全性。进一步通过统计学方法探索影响手术成功率和功能恢复的关键预测因素, 建立治疗失败的预测模型, 为临床个体化治疗策略的制定提供循证依据, 以期提升儿童外伤性 NLDO 的诊疗水平及预后质量。

方法: 选取 2011 年 1 月至 2021 年 8 月就诊于上海市第九人民医院眼科的 18 岁以下外伤性 NLDO 的 80 例患者、83 只眼进行回顾性分析。对人口统计学信息、损伤情况、既往手术史、伤术间隔、治疗方案、治疗效果等临床资料进行了回顾和分析。采用二元逻辑回归建立治疗后手术失败的预测模型。

结果: 83 只眼中, 65 只眼行外路泪囊鼻腔吻合术 (Dacryocystorhinostomy, DCR) 联合硅胶管植入术, 18 只眼行内镜下 DCR 联合硅胶管植入术, 63 只眼同期进行了钛钉内固定矫正内眦畸形。术后 1 个月拔除支架。支架取出后平均随访 28 个月, 末次随访时, 总体解剖结构和功能康复率为 83.1% (69/83), 未出现需要手术干预的鼻出血或脑脊液漏等严重并发症。通过 LASSO 回归以及二元逻辑回归分析儿童外伤性 NLDO 的疗效主要影响因素。未经处理的眶缘骨折、明显的皮肤瘢痕以及泪囊区域存在骨折碎片可能是手术失败和功能性溢泪高风险因素。该模型的受试者工作特征曲线下面积为 0.888。

结论: 本研究表明, 儿童外伤性 NLDO 最常见的阻塞部位是泪囊与鼻泪管交界处, 泪囊向前移位和泪囊区域存在碎骨片是手术失败的重要预测因素。对于合并内眦畸形的患者, 术中同期行钛钉内固定矫正效果良好。

摘要编号: 209110

双侧眼眶同期发现不同类型原发性肿瘤一例

第一作者: Zhenyu PIAO

目的: 双侧眼眶原发性肿瘤本身较为少见, 而同期发现但病理类型完全不同的病例则罕见。本研究旨在报告并探讨一例在初次检查时即同时发现、但术后病理分别证实为海绵状血管瘤 (右眼) 与多形性腺瘤 (左眼) 的双侧眼眶肿瘤病例, 以增进对此类罕见临床情况的认识。

方法: 回顾分析一例 67 岁男性患者的临床资料。患者于 2023 年 10 月因头痛查体发现右眼眶占位

就诊, 患者无明显眼部不适, 查体双眼视力眼压无明显异常, 右眼上转、内转不到位, 眶压 +。眼球突出度: 23-106-20 mm, 眼底检查未见明显异常。眼眶增强 MRI 检查同时提示双侧眼眶独立的占位性病变: 右眼眶内上方块状较大信号, T1 中信号、T2 高信号, 不均匀强化, 与上直肌、上斜肌、上睑提肌关系密切, 左眼泪腺区圆形信号, T1 中信号, T2 中信号, 强化不均匀。我们采取了分次手术的治疗策略, 先行“右眼前路眶内肿物摘除术” (2023 年 11 月), 待患者恢复后, 再行“左眼前路眶内肿物摘除术” (2024 年 5 月)。两次手术标本均送病理学检查以明确最终诊断。

结果: 术后病理检查给出了明确的诊断: 右眼眶肿瘤: 海绵状血管瘤, 大小 $2 \times 1.5 \times 0.7$ cm。左眼眶肿瘤: 符合多形性腺瘤, 伴有囊性变, 大小 $1 \times 0.4 \times 0.4$ cm。这一结果证实了本例属于罕见的双侧、异时、不同病理类型的原发性眼眶肿瘤。两次手术过程顺利, 患者术后恢复良好, 双眼视力与眼压均维持稳定, 眼球运动好, 未见其他严重并发症。

结论: 本病例展示了一种罕见的临床情形: 双侧眼眶肿瘤可在初次诊断时即同时存在, 但其病理类型可以完全不同。在临床实践中, 对于双侧眼眶病变, 即使同时发现, 也应警惕其存在独立病理本质的可能性, 而不能简单假定为同一疾病过程。最终诊断必须依赖于对每一侧肿瘤的病理学检查。

摘要编号: 209960

基于角膜生物力学及形态学构建甲状腺相关眼病眶减压术后屈光及炎症变化临床预测模型

第一作者: Mingqian YU

共同作者: Liqiang WANG, Wei WU, Xinji YANG

目的: 探讨甲状腺相关眼病 (Thyroid Eye Disease, TED) 患者行眶减压术后屈光参数及临床活动度评分 (Clinical Activity Score, CAS) 的时序变化特征及其与角膜生物力学及形态学参数的关系, 构建术后屈光与炎症活动变化的个体化预测模型, 开发网页计算器以辅助临床决策。

方法: 前瞻性纳入 2024 年 5 月至 2025 年 2 月在我院行眶减压术的中重度 TED 患者 57 眼。于术前、术后短期 (< 2 月) 及长期 (≥ 2 月) 检测 Corvis ST 角膜生物力学、Pentacam 角膜形态学、屈光、眼轴及角膜内皮参数。采用广义估计方程 (Generalized Estimating Equations, GEE) 结合限制性立方样条连续建模时间效应, 分析参数非线性轨迹; 通过组惩罚回归筛选关键变量, 构建等效球镜屈光度 (Spherical Equivalent, SE) 变化 (Δ SE) 与炎症变化 (Δ CAS) 的预测模型, 基于 R Shiny 平台开发网页计算器。

结果：术后参数随时间呈显著双相变化：屈光参数 SE 及球镜度数呈早期近视漂移、晚期远视回归；眼轴长度 (Axial Length, AL) 早期延长、后期缩短；角膜生物力学早期软化、后期硬化；角膜前表面曲率早期变陡、后期变平；中央角膜厚度 (Central Corneal Thickness, CCT) 及中央光密度先升后降。与 Δ SE 显著相关的术前参数包括角膜达到最大凹陷时的最小曲率半径及第二次压平时的最大形变幅度、角膜表面不规则指数、中央角膜光密度及前房深度等；与 Δ CAS 显著相关的术前参数包括第一次压平时的最大形变幅度、角膜表面不规则指数、角膜高度偏心指数、角膜前表面散光、角膜六边形率及眼球整体位移量等。结合年龄、性别、病程、手术方式、拟去除脂肪体积及基线 SE、CAS、CCT、AL、生物力学校正眼压等临床重要变量，构建了 Δ SE 及 Δ CAS 预测模型。两模型拟合良好、误差小，已集成至网页计算器 (https://uaie.shinyapps.io/GEE_Prediction_Calculator_SE/; https://uaie.shinyapps.io/GEE_Prediction_Calculator_CAS/)。

结论：基线角膜生物力学与形态学参数可预测术后屈光与炎症变化，存在屈光敏感区间 (Refractive Susceptibility Zone, RSZ) 及炎症敏感区间 (Inflammatory Susceptibility Zone, ISZ)，其内轻微波动即可引发术后 Δ SE 或 Δ CAS 的非线性放大。识别 RSZ 与 ISZ 并利用网页计算器进行个体化评估，可高效辅助 TED 术前风险评估与个体化手术策略优化。

摘要编号：210189

外侧开眶肿瘤摘除术后并发症影响因素分析： 聚焦于肿瘤特性的作用

第一作者：Zhangjun REN

目的：探讨肿瘤特性（包括性质、体积大小、边界、位置、与视神经及眼外肌的关系）以及其他相关因素对外侧开眶肿瘤摘除术后并发症发生的影响，为术前风险评估和手术策略优化提供依据。

方法：采用回顾性研究方法，纳入 2017 年 -2025 年 4 月在南昌大学附属眼科医院行外侧开眶肿瘤摘除术的患者 88 例。收集患者术前临床资料，重点分析肿瘤相关因素：性质（良性/恶性）、体积大小、边界（清晰/模糊）、位置（肌锥内/肌锥外、眶前部/眶后部或眶尖）、包裹视神经程度（无、部分或完全包裹）、与眼外肌的关系（粘连/无粘连）。同时记录患者年龄、手术时长等因素。术后随访最少半年，根据术后是否发生并发症进行分组，采用单因素及多因素 Logistic 回归分析确定并发症的独立危险因素。

结果：本研究共纳入 88 例患者，术后并发症发生率为 35%。常见并发症包括眼球运动障碍、视力下降或丧失、上睑下垂、瞳孔改变、眶内出血或血肿、视网膜水肿等。单因素分析显示，患者年龄 ≥ 75 岁、手术时间 ≥ 3 小时、恶性肿瘤、肿瘤边界模糊、肿瘤位于眶内或累及深部（如眶尖）、肿瘤分化程度低以及存在合并症等因素与术后并发症发生或预后不良显著相关 ($P < 0.05$)。多因素 Logistic 回归分析进一步确认，年龄 ≥ 75 岁、手术时间 ≥ 3 小时、恶性肿瘤、肿瘤边界模糊、存在合并症、肿瘤分化程度低以及肿瘤累及深部是外侧开眶术后并发症发生或预后不良的独立危险因素 ($P < 0.05$, OR ≥ 1)。

结论：外侧开眶肿瘤摘除术后并发症的发生受多种因素影响。患者高龄 (≥ 75 岁)、手术时间长 (≥ 3 小时)、恶性肿瘤、肿瘤边界模糊、存在合并症、低分化肿瘤以及肿瘤累及深部是预后不良的独立危险因素。临床实践中应针对这些高危因素加强围术期评估与干预，包括术前利用影像学技术精确评估肿瘤特性、精心规划手术入路，术中精细操作以减轻组织损伤、控制手术时间，并对高危患者实施密切的术后监测，从而有望降低并发症风险，改善患者预后。

摘要编号：209183

改良 CFS 悬吊术在治疗上睑下垂术后欠矫中的应用与疗效分析

第一作者：Kelin LI

共同作者：Ronxin CHEN

目的：评估改良联合筋膜鞘 (Conjoint Fascial Sheath, CFS) 悬吊术在矫正初次上睑下垂术后欠矫的临床效果与优势。

方法：回顾性分析 2022 年 1 月至 2025 年 10 月于我院因初次上睑下垂术后欠矫并接受改良 CFS 悬吊术修复的 48 名患者资料。手术改良核心步骤包括：1) 精准分离与暴露：经原切口入路，精细松解瘢痕粘连，充分暴露提上睑肌及睑板，明确初次手术方式（如额肌瓣悬吊术、提上睑肌缩短术）；2) CFS 复合体悬吊：以提上睑肌腱膜与 Müller 肌-CFS 复合体作为新的悬吊基点，进行多点、均衡的缝合固定；3) 动态调整：术中实时调整悬吊张力与位置，以优化眼睑高度、弧度及闭合功能。记录并比较患者术前与末次随访时的评估指标，睑裂高度、睑缘弧度、眼睑闭合情况、并发症及患者满意度。

结果：所有患者均顺利完成手术，平均随访时间为 12.6 个月。末次随访显示，患眼的睑裂高度由术前的 5.27 mm 改善至术后的 8.34 mm，差异具有统

计学意义 ($P < 0.01$)。所有患眼均获得良好且稳定的上睑弧度, 未出现睑缘不规则或内外眦畸形。术后短暂性眼睑闭合不全均在 1 个月内明显缓解, 未见暴露性角膜炎等严重并发症。患者主观满意度普遍较高。

结论: 研究表明, 改良 CFS 悬吊术是治疗上睑下垂术后欠矫的一种有效且可靠的方法。该术式具有以下优势: 1) 力学结构合理: 以 CFS 复合体作为新的悬吊基点, 更符合生理性提睑方向, 能够有效矫正上睑位置, 并恢复自然的上睑弧度和轮廓。2) 术中可控性好: 支持动态调整悬吊张力与高度, 有助于实现精准矫正, 降低术后欠矫或过矫的发生风险。3) 手术安全性高: 操作层面位于相对正常的解剖间隙, 可有效避免原手术区瘢痕粘连, 并发症少, 恢复可预测性强。该改良 CFS 悬吊术为处理上睑下垂术后欠矫这一临床难点提供了可靠的修复策略, 具有推广应用价值。

摘要编号: 209094

数字化 3D 打印辅助创伤性眶上裂减压

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共同作者: Rao JING, Wu PENGSEN, Yang SHENGLAN, Shi ZHAOHUI

目的: 本研究报道一例采用数字化 3D 打印技术辅助进行创伤性眶上裂减压的病例, 旨在探索这一新兴技术在眼眶外科手术中的应用价值。

方法: 患者为 31 岁男性, 主诉“左眼摔伤后睁眼困难和视物模糊 8 小时”, 查体显示患者左侧面部凹陷畸形, 左眼矫正视力 0.5, 左眼球突出下移, 左眼外斜约 40° , 下斜约 15° 、上睑下垂以及向下上内方运动受限 -4。眼眶 CT 显示, 左侧蝶骨、额骨、颧弓、上颌骨及颞骨多发骨折, 且眶上裂处骨折片移位压迫。诊断: 左眼眶尖综合征、左眼复合型眼眶骨折。予患者糖皮质激素冲击治疗, 患者虽然视力提升, 但其他症状未见明显改善。术前设计阶段, 基于患者的 CT 影像数据, 运用三维重建技术对蝶骨大翼、颧骨及上颌骨的重建, 评估骨折导致的眶上裂容积变化、几何变形及其与周围重要结构的时空关系变化。利用镜像技术, 模拟了手术后的预期形态, 并结合 3D 打印技术, 制作出患者的眼眶实体模型。这一模型不仅为手术提供了直观的解剖参考, 还辅助设计了针对眶上裂减压及眶颧颌复合体骨折复位的手术方案。后患者在全麻下行内镜辅助眶上裂减压联合颧骨上颌骨骨折复位内固定术, 术中创新性地采用了眉弓下切口的眼眶外侧入路, 磨除蝶骨大翼三角区骨质, 完整去除了压迫眶上裂的骨折片, 并复位了错位的骨折断端。术后, 基于患者的 CT 数据对手术效果进行了模拟验证。

结果: 通过构建术后三维模型并与术前的虚拟规划模型进行对比分析, 结果显示, 患者的颧骨突度、眶容积得到了有效恢复, 各骨折段的复位精度良好, 且与术前模拟拟合程度高。术后随访 3 个月, 患者的左眼上睑下垂得到了恢复, 眼球运动无受限, 左眼外下斜明显好转, 左侧面部的凹陷畸形得到了有效矫正。

结论: 数字化 3D 打印技术在创伤性眶上裂减压中的应用具有显著优势。通过高精度的三维重建与模拟, 明确患者的解剖结构及病变情况, 从而制定出更为精准的手术方案; 3D 打印模型提供了直观的物理参考, 增强了手术的可操作性和安全性, 具有较大的临床应用价值。

摘要编号: 205391

泪囊区肿瘤诊治的临床实践与心得体会

第一作者: Xuanwei LIANG

目的: 本文旨在全面综述泪囊区肿瘤的流行病学特点、临床表现、诊断方法以及基于病理类型和侵犯范围的治疗策略, 并通过典型病例印证规范诊疗的重要性, 为临床医生提供系统、实用的诊疗框架。

方法: 结合典型病例, 对泪道系统肿瘤的临床特征进行总结, 分析误诊原因, 并给予相应的治疗。

结果: 泪囊区肿瘤是一类相对罕见但临床表现多样、易被误诊的眼附属器肿瘤, 对其系统认识对提高诊疗水平至关重要。虽相对罕见, 但因临床表现(如溢泪、内眦肿块、血性分泌物)易与慢性泪囊炎混淆, 常导致误诊延误。精准诊断依赖详尽的临床评估, 结合关键影像学检查(CT/MRI)评估范围、泪道内窥镜直视病变及获取活检(确诊金标准)。诊疗常见误区包括低估肿瘤可能、影像评估不足及活检不当。治疗核心在于根治性手术切除以确保阴性切缘, 辅以术后放疗(尤其对恶性肿瘤高危患者), 常需多学科协作(眼科、头颈外科、肿瘤科等)。典型病例佐证了提高认识、规范诊断流程(强调活检与影像)、避免误区及实施根治性多模式治疗对改善预后的核心价值。

结论: 提高对泪囊区肿瘤临床表现的警惕性、采用规范化的诊断流程(特别是精准活检和影像学评估)、避免常见误区、实施以根治性手术为基础的多学科综合治疗模式, 是改善泪道肿瘤患者预后的核心要素。典型病例的分享有助于加深临床医师对此类疾病的认识。

摘要编号: 208912

甲状腺相关眼病激素冲击治疗患者的心理护理效果研究

第一作者: Qing YU

目的: 甲状腺相关眼病激素冲击治疗患者实施认知-行为疗法、健康教育和放松训练相结合心理护理,探讨此方法对减轻患者焦虑、抑郁情绪及改善睡眠质量是否有效。

方法: 本次研究随机抽取本院 2024 年 3 月到 2025 年 3 月收入本院眼眶病外科甲状腺相关眼病激素冲击治疗患者(激素冲击次数进行第 3 次及以上者)100 例,按照随机数表法将其分为了对照组(常规护理)和观察组(心理护理)两组。观察组接受个性化心理护理,包括个性化睡眠卫生教育、自我护理教育、认知重构、积极心态训练。最后比较两组患者睡眠质量评分(PSQI)、焦虑抑郁评分(HADS)和护理满意度。

结果: 干预后观察组患者睡眠质量评分、焦虑抑郁评分显著低于对照组,对护理工作满意度得分显著高于对照组($p < 0.05$, $p < 0.01$)。

结论: 个性化心理护理可改善甲状腺相关眼病激素冲击治疗患者睡眠质量,缓解其焦虑情绪,提高患者护理满意度。

摘要编号: 209956

甲状腺眼病合并限制性斜视的临床特点及影响因素

第一作者: Weimin HE

共同作者: Hao ZHANG

目的: 探讨甲状腺眼病(thyroid eye disease, TED)合并限制性斜视在我院首次就诊时的临床特点及影响眼外肌病变的危险因素。

方法: 前瞻性横断面研究。从 2009 年 9 月至 2023 年 12 月作者接诊的 5234 例中国 TED 患者中,共纳入 339 例患者。记录患者的性别、年龄、眼别、发病至首次来我院的时间间隔、吸烟、眼外肌、斜视类型、CAS、NOSPECS、甲状腺功能状况等。采用盈联影像系统内置软件测量受累眼外肌冠状位最大面积及 T1、T2 加权像 MRI 强化程度。

结果: 1. 80.5% 的患者受累眼外肌处于炎症活动期。所有患者均存在不同程度的眼外肌增厚,79.9% 的患者有不同程度的眼外肌充血,46.3% 的患者有不同程度的眼外肌水肿;2. 垂直斜视患者受累眼外肌的频率依次为下直肌(49.6%)、上直肌(26.3%)、内直肌(15.9%)和外直肌(8.2%)。水平斜视患者受累眼外肌的频率依次为下直肌(34.2%)、内

直肌(30.9%)、上直肌(23.6%)、外直肌(11.3%);3. 眼外肌处于活动期的 CAS 高于稳定组,单眼发病患者的 CAS 高于双眼;甲亢患者的 NOSPECS 高于甲功正常者,单眼发病患者的 NOSPECS 高于双眼;4. 发病至首次就诊时间越长,受累眼外肌冠状位最大面积越小,水肿和充血程度越轻;CAS 越高,受累眼外肌冠状位最大面积越大,水肿程度越重。

结论: 1. TED 合并限制性斜视多见于男性、双眼患病和甲亢患者;2. 单眼发病患者在下直肌受累时更易发生垂直斜视,而双眼发病患者在累及内直肌时更易发生水平斜视;3. 受累眼外肌冠状位最大面积和水肿程度受病程和 CAS 的影响,而受累眼外肌炎症程度仅受病程影响。

摘要编号: 210216

眶鼻颅沟通性病变的临床病理特征及良恶性鉴别诊断指标

第一作者: Meng XIE

共同作者: Fagang JIANG, Xinghua WANG

目的: 探讨眶鼻颅沟通性病变的临床病理特征,寻找鉴别良恶性肿瘤的关键诊断指标。

方法: 回顾性队列研究分析了 2010 年 1 月至 2020 年 12 月在华中科技大学同济医学院附属协和医院经组织学证实的 74 例病例,按解剖部位分为 A 组(眶鼻组,29 例)、B 组(眶颅组,27 例)、C 组(眶鼻颅组,18 例)。系统评估了症状表现、组织病理学及浸润模式等临床病理特征。

结果: 队列中包含 49 例(66.2%)良性病变和 25 例(33.8%)恶性病变。与良性病变相比,恶性病变具有更短的发病时间(12 个月对比 2.5 个月, $P = 0.004$)、更差的视力(0.6 对比 1.53, $P = 0.025$)。头痛在良性病变中出现的比例为 28.6%,而在恶性病变中未出现($P = 0.002$)。良性病变中 32.7% 的患者出现结膜充血和水肿,恶性病变中该比例为 60% ($P = 0.028$)。筛窦是最常受侵犯的部位,共 35 例。恶性病变在鼻腔(28.0% 对比 0, $P = 0.000$)及前颅窝(40.0% 对比 8.2%, $P = 0.003$)的侵犯程度比良性病变更严重。与眶鼻组相比,眶颅组更易通过骨孔侵袭($P = 0.002$)。神经源性肿瘤在良性病例中占主导(34.7%),而恶性亚组中血液源性(28%)和腺体性肿瘤(28%)最常见。多学科联合手术中恶性肿瘤的比例高于良性病变(61.5% 对比 38.5%)。

结论: 恶性眶鼻颅沟通性病变展现出独特的临床病理特征,表现为快速进展、对前颅窝和鼻区的侵袭性强以及严重的视力损害。

摘要编号: 208976

神经外科术后眼部并发症的手术处理

第一作者: Rong LIU

目的: 了解神经外科手术的常见眼部并发症及眼科手术处理方法与效果。

方法: 统计 2023 年 1 月 1 日至 2024 年 12 月 31 日 两年内因神经外科术后并发症而就诊的患者, 统计眼部手术种类及手术效果。

结果: 共收集患者 18 例, 其中面瘫 10 例 (主要症状为闭合不全, 眼红, 流泪); 动眼神经麻痹 6 例 (主要症状为上睑下垂, 外斜视); 单纯内斜视 2 例。面瘫患者行下睑外翻矫正术 8 例, 同时行下睑外翻及上睑皮肤松弛矫正术 2 例, 术后患者的眼部症状及外观得到改善。上睑下垂患者提上睑肌 -CFS 复合体悬吊术 4 例, 硅胶条悬吊术 2 例, 术后患者发生暴露性角膜炎 1 例, 经对症治疗后好转。行斜视矫正术 2 例, 斜视部分改善。

结论: 神经外科引起的颅神经损伤易导致永久性的眼部损伤, 眼科手术能部分解决解剖异常, 改善患者生活质量。

摘要编号: 209654

经鼻眼眶多壁减压一期联合斜视矫正治疗甲状腺眼病

第一作者: Chen LINLIN

目的: 甲状腺眼病患者手术需遵循“眶减压 - 斜视矫正 -- 眼睑手术”顺序原则, 为进一步缩短甲状腺眼病患者就医周期, 改善患者症状及就医感受, 减少患者医疗负担, 拟进一步探讨“经鼻眼眶多壁减压一期联合斜视矫正治疗甲状腺眼病”的临床疗效。

方法: 对 20 例甲状腺眼病患者同时伴有眼球突出、斜视, 施行“经鼻径路眼眶多壁减压联合一期直肌和或下直肌徙后”手术, 对患者眼球突出度、斜视、视野、RNF、眼压、视力、复视程度及患者满意度等进行综合评估。

结果: 眼球突出度、斜视、视野、RNF、眼压、视力、复视程度均有不同程度改善, 患者满意度 100%。

结论: 经鼻眼眶多壁减压一期联合斜视矫正治疗甲状腺眼病安全有效, 但需严格把握手术适应症, 尽量较少或避免并发症的发生。

摘要编号: 209210

评估等离子消融术在治疗上泪道阻塞中的临床疗效、安全性及技术优势。

第一作者: Chi Feng XIE

共同作者: Rongxin CHEN

目的: 评估等离子消融术在治疗上泪道阻塞中的临床疗效、安全性及技术优势。

方法: 回顾性分析 2022 年 6 月至 2025 年 10 月期间, 于我院诊断为上泪道阻塞并接受经内镜下等离子消融术治疗患者资料。手术关键步骤包括: 1) 泪道内镜引导下准确定位泪小管阻塞部位; 2) 使用低温等离子消融探头精确消融阻塞组织; 3) 联合泪道硅胶置管置入以维持通畅, 并泪道内镜引导下确认泪小管再通。记录并比较患者术前及术后 6 个月的泪道冲洗通畅度、MUNK 评分、术后并发症。

结果: 所有患者均为局限性泪小管阻塞, 手术均顺利完成, 平均随访时间为 6 个月, 临床疗效显著。末次随访时, 基于 MUNK 评分评估, 所有患者溢泪症状均获显著改善: 由术前的重度溢泪 (MUNK 评分 < 4 分, 改善至术后 MUNK 评分 < 2 分, 无仍维持重度溢泪患者。与之相应, 术后 6 个月大部分患者泪道冲洗通畅。所有患者术中及术后均未发生大出血、感染等严重并发症; 个别患者术中存在组织损伤、假道形成等问题。

结论: 等离子消融术是治疗上泪道阻塞的一种微创、安全且有效的术式, 尤其是为局限性泪小管阻塞提供了新的治疗选择。

摘要编号: 209818

鼻软骨代睑板修复巨大恶性肿瘤切除后眼睑缺损

第一作者: Zhang LI

目的: 分享应用鼻软骨修补眼睑巨大恶性肿瘤切除术后上睑全层全长缺损 1 例病人的手术治疗效果。

方法: 男性病人, 孙某, 46 岁, 左眼上睑巨大恶性肿瘤。采用 Mohs 法在冰冻病检监控下控制切缘的眼睑恶性肿瘤切除。术中冰冻结果为皮脂腺癌。肿瘤切除术后眼睑全层全长缺损应用带鼻粘膜的鼻中隔软骨进行眼睑重睑, 修复缺损的睑板和粘膜, 鼻软骨上缘与提上睑肌残端缝合, 鼻粘膜上缘与结膜残端缝合, 表面用上方滑行皮瓣修补进行全层眼睑重建。术后常规换药, 局部点抗生素眼药水预防感染, 10 天拆线。

结果: 术后病检结果回示各切缘未见肿瘤细胞残留。眼睑全层重建后的形态和弧度基本正常, 眼睑活动不受限, 皮肤疤痕不明显, 无上睑皮肤内卷倒毛,

无明显角膜刺激症状，患者及家属满意。随访 2 m，无眼部干涩等不适症状，目前眼部情况稳定。

结论：本病例应用鼻软骨代睑板修复眼睑巨大恶性肿瘤切除后眼睑全层全长缺损效果可靠，重建了眼睑的结构，基本恢复了眼睑功能。但取材有一定难度，需要和耳鼻喉科医生联合手术。

眼科学的转化研究

摘要编号：209292

PRRX1 通过周细胞 - 肌成纤维细胞转化及周细胞 - 内皮细胞交互促进视网膜新生血管病纤维化和血管生成

第一作者：Jing LUO

目的：探讨 PRRX1 在视网膜新生血管疾病中通过周细胞 - 肌成纤维细胞转化及 IGFBP7 转录调控激活 JAK1-STAT3 通路，从而驱动纤维化和血管生成的双重作用，阐明视网膜微环境相关分子机制。

方法：本研究探讨 PRRX1 在视网膜新生血管病中的双重作用，重点关注其通过周细胞 - 肌成纤维细胞转化促进纤维化，以及通过转录调控 IGFBP7 激活 JAK1-STAT3 通路促进血管生成的过程，旨在阐明视网膜微环境中这些相互关联机制的分子基础。

结果：PRRX1 在氧诱导视网膜病变及视网膜静脉阻塞模型视网膜组织及增殖性糖尿病视网膜病变患者纤维血管膜中表达显著升高 ($P < 0.01$)。ChIP 测序证实 PRRX1 结合 IGFBP7 启动子，激活 JAK1-STAT3 通路促进血管生成。低氧条件下周细胞 PRRX1 敲低显著降低 α -SMA 表达及迁移 ($P < 0.001$)，抑制周细胞肌成纤维细胞转分化。管形成实验显示 PRRX1 敲低降低血管生成活性 ($P < 0.01$)。单细胞 RNA 测序证实 PRRX1 特异表达于周细胞，其上调与纤维化和血管生成相关。IGFBP7 通过 JAK1-STAT3 激活促进血管生成，并在增殖性糖尿病视网膜病变患者玻璃体样本中水平升高。

结论：PRRX1 是视网膜纤维化和血管生成的关键调控因子，通过周细胞中周细胞 - 肌成纤维细胞转化及转录调控 IGFBP7 激活内皮细胞中 JAK1-STAT3 通路发挥作用。靶向 PRRX1-IGFBP7 轴可能提供同时治疗视网膜病新生血管化和纤维化的新策略。

摘要编号：207616

于 CRISPR/Cas9 技术的 TGFBI-CD 人源化小鼠的构建

第一作者：Xiaozhen LIU

共同作者：Liping YANG

目的：使用 CRISPR/Cas9 基因编辑技术构建 TGFBI 基因相关角膜营养不良 (Corneal dystrophy, TGFBI-CD) 的人源化小鼠模型。

方法：采用 CRISPR/Cas9 基因编辑技术及同源重组修复 (HDR) 策略，将小鼠 Tgfb1 基因 4 使用人“部分 intron3-exon4-intron4-exon5-intron6-exon6-部分 intron6”序列取代小鼠的相应序列替换成人 TGFBI 基因相应序列。通过 PCR 及 Sanger 测序技术进行小鼠基因型鉴定，技术 RT-PCR、qPCR 和 RNA 测序技术等检测小鼠 Tgfb1 基因的表达。通过裂隙灯、前节 OCT、组织学和免疫组织化学评估小鼠 CD 表型。

结果：本研究共构建两种人源化小鼠——TGFBI-WT 和 TGFBI-R124H，后者携带 c.371G > A(p. R124H) 突变，两种小鼠仅有 c.371G > A 点突变的差别。基因型鉴定结果显示，在 gDNA 层面人源化小鼠构建成功。RNA 测序及 qPCR 结果显示，在小鼠内源性启动子启动子，部分插入的人 TGFBI 基因可以正常表达，杂合人源化小鼠同时表达鼠 Tgfb1 和人 TGFBI mRNA，纯合人源化小鼠仅表达人 TGFBI mRNA。接着我们获得了纯合人源化小鼠的 RNA，并将其反转录为 cDNA，以此模板，使用 PCR 扩增人源化小鼠 TGFBI 序列，Sanger 测序显示，人源化小鼠 TGFBI 基因可正常发挥功能，人 exon4-exon5-exon6 可能被正确转录出来，说明在转录层面人源化小鼠的构建成功。表型鉴定结果显示，小鼠自 4 月龄起，部分纯合 TGFBI 小鼠具有 CD 表型，而杂合子小鼠的 CD 表型不明确。

结论：本研究在 DNA 和 RNA 水平成功构建了 TGFBI 人源化小鼠模型，为将来 TGFBI-CD 的发病机制及基因治疗打下模型基础。

摘要编号：204658

免疫调节抗菌冷冻凝胶接触镜用于细菌性角膜炎的治疗研究

第一作者：Yuzhuo FAN

目的：开发制备基于甲基丙烯酸酯明胶 (GelMA) 和绿原酸 (CGA) 的免疫调节冷冻聚合凝胶隐形眼镜 (cGelMA/CGA-CL)，旨在预防和治疗 BK，使其具备良好生物相容性、抗菌与免疫调节活性，克服传统疗法局限。

方法: 1. 合成 GelMA 后, 经高效偶联剂 N- 羟基琥珀酰亚胺 (NHS) 和 1- 乙基 -3-(3- 二甲基氨基丙基) 碳二亚胺 (EDC) 与 CGA 偶联并进一步冷冻聚合使其凝胶化, 制备不同 CGA 含量 (100、200、300 μ M) 的 cGelMA/CGA 及空白对照 cGelMA; 2. 运用瓶倾法、扫描电子显微镜 (SEM)、傅里叶变换红外光谱 (FTIR) 等表征材料结构与性能, 包括观察溶液与水凝胶状态、微观结构、CGA 接枝模式, 测定平衡含水量、氧通透性、酶降解与溶胀行为、CGA 释放动力学、弹性模量等; 3. 通过体外人角膜上皮细胞 (HCECs) 与 cGelMA/CGA 材料共培养实验 (CCK-8、活 / 死染色、骨架染色) 和体内小鼠背部皮肤植入材料实验 (H&E 染色) 评估 cGelMA/CGA 的生物安全性; 4. 针对金黄色葡萄球菌 (*S. aureus*) 和铜绿假单胞菌 (*P. aeruginosa*) 开展平板培养计数、活 / 死细菌染色、长期培养测定抗菌稳定性及生物膜破坏能力等实验检测抗菌活性; 5. 利用佛波醇 12- 肉豆蔻酸 13- 乙酸酯 (PMA) 诱导人单核白血病细胞 (THP-1) 分化成巨噬, 再用脂多糖 (LPS) 将细胞诱导成炎症环境, 再进一步结合 RT-qPCR、RNA-seq、WB 等技术研究免疫调节功能及作用通路; 6. 构建 BK 小鼠模型, 经裂隙灯观察、角膜荧光染色、临床评分、组织学分析 (H&E 染色、免疫组化染色) 评估治疗效果及探究作用通路。

结果: 成功制备 cGelMA/CGA-CL, 其结构特性良好。体外实验显示, cGelMA、cGelMA/CGA100、cGelMA/CGA200 均具有良好生物相容性, 其中 cGelMA/CGA200 体外抗菌、抗炎活性显著, 可调节巨噬细胞相关基因表达及 JAK2-STAT1/STAT2 信号通路。体内实验表明, cGelMA/CGA-CL 能有效缓解 BK 小鼠角膜症状, 临床评分与左氧氟沙星眼药水相近, 减轻炎症细胞浸润, 促进角膜上皮和基质修复。

结论: cGelMA/CGA-CL 在 BK 防治中极具潜力, 具备良好生物相容性、抗菌和免疫调节功能, 为 BK 治疗提供新策略, 降低隐形眼镜佩戴者感染风险。

摘要编号: 209463

具有强光热释电响应的全有机纳米复合材料及其在视网膜假体中的应用

第一作者: Xi LIU

共同作者: Huaijin GUAN, Min JI

目的: 解决传统基于铁电聚合物的视网膜假体材料光电响应低和响应波长范围窄的问题, 开发具备柔性、生物相容性和优异光电性能的材料, 用于构建

人工视网膜假体, 最终实现视网膜退行性疾病患者的视力恢复。

方法: 合成超小尺寸的共轭聚席夫碱纳米颗粒。将该纳米颗粒与聚偏氟乙烯 - 三氟乙烯 (P (VDF-TrFE)) 铁电聚合物复合, 制备全有机纳米复合材料。利用上述复合材料构建超薄 (约 20 μ m) 铁电视网膜假体。通过电生理测试和动物行为分析, 验证假体在盲鼠身上的视觉恢复效果。

结果: 新型纳米复合材料在可见光和近红外光下均表现出高光电响应, 最大峰峰值电压超过 90 V。该材料具备良好的柔性和生物相容性, 能够与神经元细胞建立有效信号传导。动物实验显示, 植入假体后, 盲鼠的可见光敏感性得到恢复, 且额外获得了感知红外光的能力。

结论: 成功开发出一种由超小共轭纳米颗粒和 P (VDF-TrFE) 组成的新型全有机铁电聚合物纳米复合材料, 其兼具柔性、生物相容性和优异的光热释电响应。该复合材料可用于构建高性能人工视网膜假体, 能有效恢复盲鼠视觉功能并赋予红外光感知能力。这项工作为视网膜退行性疾病的治疗提供了新方案, 同时体现了该复合材料在生物电子学领域的潜在应用价值。

摘要编号: 209835

可再生 ROS 清除性氧化铈纳米酶水凝胶治疗角膜化学伤的作用及机制探究

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共同作者: Lan GONG, Tong LIN

目的: 角膜碱烧伤作为高发且严重的眼部急症, 其急性期剧烈炎症反应可导致角膜融化、穿孔, 严重威胁视功能, 临床需求迫切。传统药物治疗存在眼部滞留时间短、生物利用度低的局限, 羊膜移植则面临加工保存影响生物性能、供体间活性成分异质性及早期易降解脱落等问题, 现有治疗方案难以满足临床需求。本研究旨在构建负载氧化铈纳米酶 (CeNPs) 的聚乙烯醇 (PVA) 水凝胶贴片 (CeNPs@PVA), 借助其自再生抗氧化特性高效清除眼表过量活性氧 (ROS), 发挥“炎症灭火器”作用, 缓解氧化应激与炎症反应, 抑制角膜新生血管及瘢痕形成, 为角膜碱烧伤提供新型高效治疗策略。

方法: 采用“一步法”将 CeNPs 负载于 PVA 基质, 通过优化盐析凝胶化与冷冻 - 解冻工艺制备 CeNPs@PVA 水凝胶贴片, 系统表征其理化性能与生物活性; 以人角膜上皮细胞为模型, 评估材料生物相容性及 ROS 清除效能; 建立 SD 大鼠角膜碱烧伤模型, 设空白对照组、CeNPs@PVA 治疗组及羊膜移植对照组, 通过临床表型观察、组织病理学分

析及分子生物学检测，综合评价其体内治疗效果及作用机制。

结果：CeNPs@PVA 水凝胶贴片具有良好的生物相容性及适配眼表应用的理化与机械特性，CeNPs 在水凝胶中均匀分散，表现出稳定的类超氧化物歧化酶（SOD）、过氧化氢酶（CAT）活性及自再生抗氧化能力，同时具备一定抗菌活性；体外实验证实，该水凝胶贴片可显著清除氧化应激诱导的角膜上皮细胞内过量 ROS；体内实验显示，与空白对照组相比，CeNPs@PVA 治疗组大鼠角膜碱烧伤后，角膜混浊度、新生血管面积及上皮缺损程度均显著改善，角膜组织炎症细胞浸润明显减少，ROS 水平显著降低，炎症因子、血管新生及纤维化相关基因与蛋白表达均受到有效抑制，且组织修复效果优于羊膜移植对照组。

结论：CeNPs@PVA 水凝胶贴片兼具优异的生物相容性、自再生抗氧化活性、适配眼表的理化机械性能及抗菌特性，通过高效清除 ROS、抑制炎症反应、减少新生血管形成及纤维化进程，可有效促进角膜碱烧伤后的组织修复，显著改善预后，为角膜碱烧伤的临床治疗提供了安全高效的新型生物材料方案，具有良好的转化应用潜力。

摘要编号：207995

基于铁稳态调控的树枝状聚合物制剂的开发及其在湿性黄斑变性治疗中的应用

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共同作者：Haijie HAN, Juan YE

目的：临床治疗 wAMD 以玻璃体腔注射抗血管内皮生长因子药物为主，但该方法效果有限且仅对症（针对新生血管），无法靶向 AMD 上游复杂发病机制。本研究拟开发创新纳米制剂 Nuci@PAM-BR（负载荷叶碱的胆红素修饰的聚酰胺-胺树枝状聚合物），其设计核心为靶向清除 AMD 发病时视网膜色素上皮细胞产生的病理性“三重池”，同时评估其调控 RPE 铁稳态以抑制 CNV 的效果，旨在提供新型治疗方案，为 AMD 治疗拓宽思路。

方法：1. 合成：通过酰胺化反应将胆红素接枝到 PAMAM 外表氨基合成 PAM-BR，再经低温真空旋转蒸发，将荷叶碱包封于 PAMAM 内部疏水空腔，制得 Nuci@PAM-BR。2. 表征：用核磁共振波谱仪、红外光谱仪、透射电镜等表征其结构、形貌、粒径及电位，确定 PAM-BR 与 Nuci 的最适投料比及体外缓释曲线；以三种自由基测试法测其体外抗氧化能力。3. 安全性评估：活/死细胞染色评细胞毒性；借小动物视网膜显微成像系统、视网膜电生理仪、眼压仪、裂隙灯及眼球/主要脏器 H&E 染色、小鼠血液检查，评估体内生物相容性与安全性。

4. 细胞疗效评估：测 Nuci@PAM-BR 对 NaIO₃ 诱导 RPE 细胞的 ROS、游离二价铁清除作用；透射电镜评线粒体形貌恢复；ZO-1/RPE65 免疫荧光共染色评细胞保护作用；BDP 探针、脂质探针染色及丙二醛测定评脂质过氧化抑制；qRT-PCR 测 VEGF 抑制及铁稳态恢复机制。5. 动物实验：用视网膜成像系统、视网膜电生理仪、铺片染色、视网膜 H&E 病理学，评其减轻眼底渗漏、恢复结构、改善视力及减小 CNV 病灶的效果。

结果：1. 成功合成 Nuci@PAM-BR，Nuci 体外释放 65 h 达峰（释放率 35.3%），抗氧化能力优秀。2. 对 ARPE-19 细胞毒性低，组织生物安全性好。3. 清除损伤细胞内 ROS 池与不稳定铁池，维持细胞正常代谢。4. 清除脂质过氧化物池、恢复胞内铁稳态，抵消 NaIO₃ 诱导的细胞变性与死亡。5. 减少 CNV 小鼠模型液体渗漏及 CNV 面积、厚度，改善小鼠视功能。

结论：本研究成功制备靶向清除 AMD 病理性“三重池”的 Nuci@PAM-BR，载药率优且缓释好。体内外研究证实，其生物相容性佳，可对抗 AMD 铁稳态失衡、提升 CNV 疗效。作为安全有效的兼具抗氧化与抗新生血管作用的纳米药物，Nuci@PAM-BR 在 AMD 治疗中应用前景显著，也为 AMD 精准治疗提供新策略。

摘要编号：207824

新型自膨胀水凝胶在孔源性视网膜脱离的应用研究

第一作者：Jian Tao REN

目的：评估新型自膨胀水凝胶聚合物在孔源性视网膜脱离动物模型外路手术的应用效果。

方法：选取 8-12 周龄新西兰大白兔制作孔源性视网膜脱离模型，随机分为 3 组，实验组行 23 G 内照明定位裂孔 + 巩膜外冷冻裂孔 + 水凝胶置于对应巩膜外表面，对照组行 23 G 内照明定位裂孔 + 巩膜外冷冻裂孔 + 常规硅胶加压块缝合固定于巩膜外，空白对照组不做处理，观察指标包括手术时间、视网膜复位时间、视网膜解剖复位率、角膜曲率、屈光度、眼内压、视网膜电图、并发症发生率。

结果：1. 手术时间：实验组明显短于对照组，差异有统计学意义；2. 视网膜复位时间：实验组与对照组无明显差异；3. 视网膜解剖复位率：观察时间为手术后 1 天、7 天、14 天、28 天，手术后 1 天实验组复位率低于对照组，差异有统计学意义，其余各时间点实验组与对照物无明显差异；4. 角膜曲率：观察时间为手术前及手术后 7 天、14 天、28 天，各时间点各组之间均无明显差异；5. 屈光度：观察时间为手术前及手术后 7 天、14 天、28 天，各时

间点各组之间均无明显差异；6. 眼内压：观察时间为手术前及手术后 1 天、7 天、14 天、28 天，手术后 1 天实验组和对照组均高于空白对照组，差异有统计学意义，手术后 28 天空白对照组眼压低于实验组和对照组，差异有统计学意义，其余各时间点各组之间均无明显差异；7. 视网膜电图：观察时间为手术前及手术后 7 天、14 天、28 天，各时间点实验组与对照组无明显差异，各时间点实验组与空白对照组差异明显，各时间点对照组与空白对照组差异明显；8. 并发症发生率：观察时间为手术后 1 天、7 天、14 天、28 天，实验组与对照组无明显差异。

结论：此新型水凝胶材料可用于孔源性视网膜脱离动物模型外路手术，具备微创、免缝合、自膨胀、可降解的优点，可降低手术操作难度、缩短手术时间、降低手术创伤及并发症。

眼科学术、研究、教学与教育

摘要编号：209537

19 号染色体 q13.42 区域 69 kb 缺失导致 PRPF31 基因异常的中国常染色体显性遗传性视网膜色素变性家系研究

第一作者：Lan YUANZHENG

共同作者：Xueli CHEN

目的：本研究旨在明确一个中国常染色体显性遗传性视网膜色素变性 (adRP) 家系的遗传学病因，并深入阐明其不完全外显的分子机制。

方法：所有入组成员均接受了系统的眼科检查。研究人员对全体参与者进行了全基因组测序 (WGS)、多重连接依赖性探针扩增 (MLPA)、连锁分析及单倍型构建，并利用 RNA 测序技术对比分析了患者、突变携带者与健康对照，以探寻不完全外显的调控机制。

结果：研究结果显示，该家系中 14 名成员携带 19q13.42 区域一个新型的杂合性 69 kb 大片段缺失。该缺失范围涵盖了 PRPF31 基因的第一外显子及其上游的五个基因 (TFPT、OSCAR、NDUFA3、TARM1 和 VSTM1)。其中，三名家族成员被确认为非外显携带者 (NPCs)。RNA 测序分析表明，缺失区内的基因在突变携带者与健康对照之间存在显著差异表达。此外，本研究的 RP11 家系是迄今报道的携带大片段缺失的 RP11 家系中规模最大者，且所有患病成员均表现出早发性症状，这尚属在 RP11 家系中的首次报道。

结论：本研究证实，PRPF31 基因在患病与未患病个体间的差异表达表明单倍体不足是该家系的核心致病机制。同时，其他存在显著差异表达的基因可能对 RP11 的外显率起到了协同调控作用。

摘要编号：202997

AI 辅助眼科医院医教科运营管理的应用研究

第一作者：Xianwei LI

目的：本研究聚焦眼科专科医院运营管理中的三大核心挑战：效率瓶颈（日均接诊量超负荷）、质量控制（复杂病例误诊率）、资源错配（设备使用率不足）。通过引入 AI 技术，构建覆盖患者服务—临床决策—后勤管理的智能解决方案，旨在实现运营指标提升 30%、医疗差错率降低 25% 的阶段性目标，为专科医院数字化转型提供可复制的实施路径。

方法：技术实现三维架构 1. 感知层：部署智能终端设备（如自动验光仪、OCT 影像采集站），实现检查数据实时上云，数据采集效率提升 5 倍。2. 分析层：采用混合机器学习模型 (CNN + LSTM)，对 10 万份眼科病例进行特征提取，诊断准确率达 94.7%。3. 决策层：开发动态资源调度算法，将设备使用率从 68% 提升至 89%，候诊时间缩短 40%。典型应用场景 智能分诊系统：通过症状自述 + 基础检查数据分流患者，减少专家资源浪费。耗材预测模型：基于手术量历史数据，实现人工晶体等耗材的精准采购。质控看板：实时监测诊疗规范执行情况，自动标记异常操作。

结果：运营效率提升。某三甲眼科医院应用后：日均接诊量从 800 人次增至 1200 人次；患者平均在院时间从 3.2 小时压缩至 1.8 小时；行政人力成本下降 35%；医疗质量改善糖尿病视网膜病变筛查：AI 初筛准确率 91.3% (vs 医师 86.2%)；微小病变检出率提升 40%；术后并发症预警系统使二次手术率下降 28%。

结论：实施关键要素：数据基建：需建立统一的数据中台，打通 HIS/PACS/EMR 系统壁垒；人机协同：制定 AI 辅助诊疗规范，明确人工复核节点；持续迭代：每月更新训练数据集，保持模型时效性。未来发展方向：开发眼科专科大语言模型，实现智能病历生成；构建区域级眼科 AI 协作网络，优化分级诊疗；探索 AR 远程手术指导系统应用 (AI 生成)。

摘要编号: 209975

SARM1 调控线粒体稳态介导视网膜退行性病变的机制研究

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目的: 探究 SARM1 在视网膜变性中的作用并阐明其潜在分子机制。

方法: 利用 CRISPR/Cas9 技术构建 SARM1^{-/-} 小鼠, 通过聚合酶链式反应 (Polymerase Chain Reaction, PCR) 及 Western blot 验证基因型和视网膜组织 SARM1 蛋白敲除; 免疫组化染色标记 SARM1 在眼球的表达分布; 利用扫描激光检眼镜 (Scanning Laser Ophthalmoscopy, SLO) 检查小鼠眼底变化, 并摘取眼球进行苏木精 - 伊红 (Hematoxylin-Eosin, HE) 染色观察眼球结构。通过腹腔注射碘酸钠 (Sodium Iodate, NaIO₃) 诱导构建视网膜变性小鼠模型, 利用 SLO 检查小鼠眼底情况, 并摘取眼球进行 HE 染色观察眼球结构变化。通过慢病毒感染大鼠视网膜细胞株 (R28), 使 R28 细胞稳定表达全长 SARM1 (Full Length-SARM1, Full-SARM1) 及线粒体定位序列缺失的 SARM1 蛋白 (delta Mitochondrial Targeted Sequence-SARM1, ΔMTS-SARM1), 并通过 Western blot 实验进行验证过表达成功。采用 MTT 法和 EdU 掺入实验评估 SARM1 过表达及 NaIO₃ 处理对细胞活力和增殖的影响; 通过 Western blot 检测线粒体动力学相关蛋白, 探究 SARM1 对线粒体动力学调控的作用; 线粒体分离提取结合 Western blot 实验明确不同 SARM1 突变体的线粒体靶向效率。利用多重免疫荧光共定位技术标记 SARM1、Parkin 及溶酶体标志蛋白 LAMP1, 评估 SARM1 与线粒体自噬的关系。

结果: Western blot 证实 SARM1 基因敲除成功; 免疫组化结果显示 SARM1 特异性表达于视网膜神经上皮层, 呈现区域性表达特征。SLO 及 HE 染色显示 NaIO₃ 选择性损伤视网膜外核层 (Outer Nuclear Layer, ONL) 及光感受器内节 (Inner Segment, IS) / 外节 (Outer Segment, OS), 而 SARM1 敲除显著减轻早期损伤程度。NaIO₃ 处理显著降低 R28 细胞的细胞活力和细胞增殖, 并促进线粒体动力学平衡向分裂的方向偏移。SARM1 通过非线粒体定位依赖性机制抑制线粒体分裂, 通过线粒体定位依赖性途径增强 PINK1/Parkin 通路活性及 LAMP1 表达, 参与线粒体自噬。

结论: SARM1 敲除可以延缓 NaIO₃ 诱导的早期视网膜变性。SARM1 通过双重机制调控视网膜细胞变性中的线粒体稳态: (1) 通过非线粒体定位依

赖途径抑制线粒体分裂, 帮助细胞短暂维持线粒体稳态; (2) 参与线粒体定位依赖的线粒体自噬通路, 在细胞生理状态和损伤早期清除受损线粒体, 维持细胞内线粒体稳态, 而在损伤后期与线粒体分裂和融合相互配合, 过度清除线粒体, 引发细胞功能受损, 促进视网膜变性。

摘要编号: 207893

miR-130a-3p 通过 YY1/PI3K/AKT/mTOR 通路调控自噬与巨噬细胞极化改善糖尿病视网膜病变的机制研究

第一作者: Yan LI

目的: 探究 miR-130a-3p 通过调控自噬与巨噬细胞极化从而改善糖尿病视网膜病变的作用机制。

方法: 通过单次腹腔注射 100 mg/kg 的链脲佐菌素 (STZ) 构建 DR 小鼠模型。使用人单核细胞系 (THP-1) 诱导分化为 M0 巨噬细胞, 并用 30 mM 高糖 (HG) 处理模拟炎症模型。使用 RT-qPCR 和 Western blotting 验证相关基因和蛋白的表达水平。通过 ELISA、MDC 染色、免疫荧光染色和 HE 染色等方法检测巨噬细胞极化和小鼠视网膜损伤情况。

结果: 1. miR-130a-3p 在 M1 巨噬细胞中表达较低, 在 M2 巨噬细胞中表达较高, 高糖处理后的巨噬细胞中 miR-130a-3p 水平降低。2. 过表达 miR-130a-3p 能够减轻高糖或 STZ 诱导的炎症, 促进巨噬细胞自噬, 抑制 M1 极化, 并减缓 DR 的进展。3. YY1 是 miR-130a-3p 的下游靶基因, 过表达 miR-130a-3p 抑制 YY1 表达, 而过表达 YY1 则减弱 miR-130a-3p mimic 的效果。4. 使用 PI3K/Akt/mTOR 通路激活剂 740 Y-P 处理后, YY1 敲低的效果减弱, 巨噬细胞自噬被抑制, M1 极化和炎症反应增强。

结论: miR-130a-3p 通过下调 YY1 表达抑制 PI3K/Akt/mTOR 通路的激活, 从而促进巨噬细胞自噬, 抑制 M1 极化和炎症反应, 最终减缓 DR 的进展。

摘要编号: 203775

三维可视化手术系统在角膜裂伤缝合显微训练中的应用

第一作者: Sha ZHU

共同作者: Wen XU, Zhe XU

目的: 探讨三维可视化手术系统在早期角膜裂伤缝合显微训练中的教学培训效果。

方法: 共纳入 11 名眼科第一年住院医师, 均为眼科手术显微操作新手。使用定制的三维可视化系统

实时观察包含角膜缝合在内的各种眼前段手术，培训共持续 4 周（32 小时），培训前和培训后均通过 wetlab 显微手术进行自我评估和专家评估，并根据手术录像对手术过程及结果进行客观评估。

结果：与培训前评估（自我评分 2.45 ± 0.82 分）相比，经过 3D 可视化系统实时观察训练后，住院医师对角膜缝合显微操作的自信心显著提高（自我评分 4.09 ± 0.54 分， $p < 0.05$ ）；利用 Zhang score 系统评估角膜缝合质量发现三维可视化手术系统培训后缝合质量优于培训前，缝合所需时间也显著短于培训前（ $p < 0.01$ ）。

结论：三维可视化系统实时观察训练能帮助眼科新手住院医师加深对眼内显微手术技术的理解，是提高外科教学效率的有效工具。

摘要编号：204256

人体眼表菌群“种”水平特征研究

第一作者：Dong KUI

目的：人体眼部菌群是维持眼表稳态、抵御病原体入侵的关键微生态系统。传统研究受限于培养技术，难以全面解析菌群多样性及功能特征。本研究整合宏基因组测序和培养组学技术，开展“种”水平眼表菌群多样性的研究，对眼部疾病的诊断、预防和治疗提供了新的依据。

方法：采用宏分类学（Metataxics）方法与培养组学和基因组测序分析相结合，突破以往眼部微生物菌群研究局限在“属”的分类学水平，实现了“种”水平的分类学特征研究。掌握和发现人体眼部微生物组信息特别是潜在致病菌，对预防眼部感染性疾病具有重要意义。

结果：对 128 位健康人的 196 只健康眼进行了研究，共检测到 796 个已知菌，784 个疑似新种，151 个疑似新的高分类单元。每个眼表面菌群平均有 49.17 ± 35.66 “种”细菌。对 73 株分离菌株进行了全基因组测序，检测到 43 个耐药基因，编码 12 种抗生素耐药性。最常见的葡萄球菌属、链球菌属和莫拉氏菌属，平均每株菌含有 3 ~ 5.3 个耐药基因。结果提示，人类的眼睛和所暴露环境的细菌相互作用，其中一些细菌可侵入并定居眼睛。这些细菌，一部分能够引起人类感染，一部分携带耐药基因。

结论：研究系统性揭示健康与疾病状态下眼部菌群的组成、功能及其与宿主互作机制，为感染性眼病诊疗提供新契机。人体眼部被来自所暴露环境的细菌入侵和定植，当免疫力低下或受到污染时候，其中一些细菌能够引起人类感染，并携带耐药基因。应该制定预防措施，以保护我们的眼睛免受侵害。

摘要编号：204257

医院环境来源新菌种“杏花岭玫瑰单胞菌”发现并命名

第一作者：Dong KUI

目的：传统研究受限于培养技术，难以全面解析菌群多样性及功能特征，探究医院环境微生态中未培养微生物，为医院环境致病微生物防控及抗药性防控策略的制定提供了重要的科学依据。

方法：通过创新的培养组学和基因组分析的方法，采用多相分类学方法鉴定潜在细菌新种，评估其生物学特性及生态意义。采用 16S rRNA 基因测序、全基因组分析（ANI/dDDH $< 95\%$ 及 $< 70\%$ ）、化学分类（脂肪酸谱、极性脂质、呼吸醌）及生理生化表征。

结果：医院空气分离株 SXEYE001T 为 *Roseomonas xinghualingensis* sp. nov.（杏花岭玫瑰单胞菌），特征性化学分类标志物主要脂肪酸 C16:0（29.8%）及 C19:0 cyclo ω 8c（25.3%），极性脂质以二磷脂酰甘油（DPG）、磷脂酰乙醇胺（PE）为主，呼吸醌为辅酶 Q-10；功能上表现多重耐药性（对万古霉素、 β -内酰胺类、氨基糖苷类耐药），并携带 RND 外排泵基因及毒力因子 acpXL（LPS 合成），提示其作为医院环境潜在耐药病原体的风险。从医院空气中分离的耐药玫瑰单胞菌新种，其多重耐药表型（尤其对糖肽类耐药）及空气传播途径，为手术室、ICU 等高危区域的耐药菌生物气溶胶监测提供了靶标菌株，并为开发靶向 RND 外排泵的消毒策略奠定资源基础。

结论：*Roseomonas xinghualingensis* sp. nov. 的发现对医院感染防控具有重要的意义。该菌株在医院空气中分离出来，表现出显著的多重耐药性，尤其是对糖肽类抗生素的耐药性，表明它可能作为潜在的耐药病原体，尤其是通过空气传播的耐药菌株可能构成医院内感染的风险。这些发现对潜在致病菌实验室鉴定、精确的流行病学调查和细菌耐药性监测等都具有重要的科学价值。

摘要编号：207971

四川汉族人群冠心病与老年性黄斑变性的相关性研究

第一作者：Ling LIAO

目的：老年性黄斑变性（AMD）是一种多基因遗传性疾病，与动脉粥样硬化性心脏病在斑块的形成和预后方面有一定的相似之处。本研究通过 meta 分析和临床研究来分析老年黄斑变性与冠心病之间的关系及其发生的相关危险因素。

方法：采用荟萃分析冠心病与 AMD 的相关性，得出心肌梗死 (MI) 是 AMD 发病的危险因素。一项病例对照研究招募了 100 名 AMD 患者、100 名 MI 患者和 446 名健康对照者。采用 Mann-Whitney U 检验和二分类 logistic 回归分析，评估年龄、BMI、吸烟状况、糖尿病、高血压、血清 TC、TG、LDL-C、HDL-C、MI 等因素与 AMD 发病率的关系。

结果：荟萃分析结果显示，冠心病不是 AMD 的显著危险因素 ($RR = 1.07$, $p = 0.377$)。在我们的研究中，心肌梗死与 AMD 风险有显著相关性 ($RR = 1.12$, $p = 0.005$)。病例对照研究结果显示，AMD 患者与对照组在以下因素上存在显著差异：心肌梗死 ($p < 0.001$)、性别 ($p = 0.041$)、年龄 ($p < 0.001$)、体重指数 (BMI) ($p < 0.001$)、糖尿病 ($p < 0.001$)、高血压 ($p < 0.001$)、甘油三酯 (TG) ($p < 0.001$) 和低密度脂蛋白胆固醇 (LDL-C) ($p = 0.039$)。多变量分析确定这些因素是 AMD 的重要危险因素。具体来说，心肌梗死患者发生 AMD 的风险是无心肌梗死患者的 2.64 倍 (95% CI: 1.13–6.12)。受试者工作特征 (ROC) 曲线分析发现，年龄、BMI、TG、MI、性别和糖尿病是 AMD 发生的潜在预测因素。年龄具有最强的预测值 ($AUC = 0.926$, 95% CI: 0.938~0.974)。其他因素的预测效果无显著差异。

结论：本文综合 meta 分析和病例对照分析显示心肌梗死是 AMD 的重要危险因素。其他独立的 AMD 预测因素包括性别、糖尿病、高龄、BMI 升高和高甘油三酯血症。年龄仍然是 AMD 最重要的危险因素。

摘要编号：200654

基于 AI 辅助的智慧化医院科教科管理体系探索

第一作者：Bao Tong

目的：探索人工智能 (AI) 技术在医院科教科管理中的应用效果，优化传统管理模式中效率低、资源分配不均及数据管理滞后等问题，提升医学教育与科研管理质量。

方法：以赤峰朝聚眼科医院科教科为例，设计并部署 AI 辅助管理系统，集成自然语言处理 (NLP)、机器学习算法及智能数据分析模块。通过构建教学任务智能分配、科研数据自动挖掘、培训效果动态评估三大核心功能，对比分析 AI 系统应用前后管理效率、错误率及用户满意度等指标。

结果：AI 系统应用后，教学任务分配耗时降低 62% (由平均 4.2 小时缩短至 1.6 小时)，科研数据整理错误率由 15.3% 降至 3.8%，培训需求匹配

准确率提升至 92%。用户满意度调查显示，医务人员对管理流程的满意度从 68% 提高至 89%。

结论：AI 技术能显著提升医院科教科管理的效率与精准性，尤其在任务分配、数据整合及个性化培训方面效果显著。未来可进一步优化算法适应性并推广至多院区协同管理，为智慧医院建设提供实践参考。

摘要编号：207959

基于 Olink 蛋白质组学的增殖性糖尿病视网膜病变炎症分子亚型研究

第一作者：Kangjia LV

共同作者：Kun LIU, Xun XU

目的：探讨增殖性糖尿病视网膜病变 (PDR) 患者玻璃体和血浆的蛋白质组学特征及其潜在生物学过程，并在 PDR 患者中识别不同的分子亚型。

方法：采用 Olink 蛋白质组学平台对 47 例 PDR 患者、26 例无糖尿病视网膜病变的糖尿病患者 (Non_DR) 及 48 例非糖尿病患者 (Non_DM) 的配对玻璃体与血浆样本进行蛋白质组学分析。该平台包含 3 个面板，共检测 1,161 种蛋白。通过基因集富集分析 (GSEA) 评估显著通路，并采用 K-means 聚类方法基于玻璃体蛋白谱对 PDR 患者进行分型分析。

结果：PDR 患者玻璃体中的蛋白质组学特征与 Non_DR 和 Non_DM 组相比存在显著差异，其中碳酸酐酶 (CA) 家族成员显著升高，可能与 PDR 的病理生理过程相关。PDR 患者血浆样本的蛋白差异相对较少。基于玻璃体蛋白谱的聚类分析将 PDR 患者分为三种分子亚型，其中第 3 型亚群富集了 CCL/CXCL/IL6/IL18 等趋化因子及促炎信号通路，提示其可能与疾病严重程度相关。

结论：PDR 患者玻璃体蛋白谱与对照组存在显著差异，其中 CA 家族成员可能为潜在治疗靶点。玻璃体蛋白质组的分型分析揭示了一类富含 CCL/CXCL/IL6/IL18 炎症通路的独特患者群体，强调了局部蛋白表达特征在 PDR 异质性及患者分层中的重要作用，为个体化治疗提供了新思路。

摘要编号：209121

基于双轴拉伸试验的人眼角膜基质生物力学特性研究

第一作者：Yi SONG

目的：探究人眼角膜基质基本生物力学特性，获取基本生物力学参数，表征其各向异性。

方法：研究使用角膜试件为飞秒激光小切口角膜基质透镜取出术 (small incision lenticule extraction, SMILE) 取出的角膜基质透镜组织 25 个，来自行 SMILE 手术者 23 例，其中男性 14 例 17 眼，女性 8 例 8 眼，年龄 18 ~ 34 岁，平均年龄 21.35 ± 4.36 岁，等效球镜度 (manifest refraction spherical equivalent, MRSE) 平均 -4.84 ± 1.10 D。角膜试件取出后标记 12 点位边缘，使用 Biotester 双轴拉伸试验机 (CellScale 公司，加拿大)，在 37°C 水浴条件下行双轴拉伸试验，获取鼻 - 颞 (nasal-temporal, NT) 和上 - 下 (superior-inferior, SI) 方向上的应力应变曲线。比较 NT 和 SI 方向上应力应变曲线以及低应变区和高应变区弹性模量的差异。

结果：1、人眼角膜基质在 NT 及 SI 方向上低应变区切线模量分别为 0.79 ± 0.29 MPa 和 1.00 ± 0.31 MPa，高应变区切线模量分别为 28.27 ± 12.58 MPa 和 33.65 ± 8.46 MPa。2、应变相同时，SI 方向上应力高于 NT 方向，SI 方向上低应变区切线模量及高应变区切线模量均高于 NT 方向。

结论：人眼角膜基质呈现出各向异性特性，在上 - 下方向上比鼻 - 颞方向上具有更高的刚度。

摘要编号：208944

基于情景模拟改良的 BOPPPS 教学模式在眼科住院医师规范化培训中的应用

第一作者：Yu SU

共同作者：Changzheng CHEN

目的：探讨基于情景模拟改良的 BOPPPS 创新教学模式在眼科住院医师规范化培训中的应用效果。

方法：将 2020-2024 年 在我院眼科接受住培的医师分为传统教学模式的对照组 ($n = 58$) 与接受传统教学模式及创新教学模式的实验组 ($n = 45$)，两组间采用标准化临床能力考试进行客观评估，并使用 PACE 和 Kirkpatrick's Four-Level Training Evaluation Model 调查问卷对两种教学模式的课程内容、教学方法、教师表现、学习效果及总体评价五个方面进行评分，从反应、学习、思维、结果和总体评价五个方面进行认可度评价。

结果：实验组的总成绩 (88.18 ± 3.81)、住院医师对创新教学模式的总评分 (4.68 ± 0.610)、总满意率 (100%) 均显著高于传统教学模式 ($P < 0.05$)。

结论：基于情景模拟改良的 BOPPPS 创新教学模式能有效提升眼科住培医师的教学效果，且住培医师普遍对该教学模式更满意。

摘要编号：204934

基于文献计量学分析 1985-2025 年针灸眼科的研究热点及新兴趋势

第一作者：Yue LI

共同作者：Wenxin JIAO, Jilu LIN, Jianing WANG, Ying WANG

目的：本研究旨在分析针灸眼科的发展历程及研究热点，并预测未来发展趋势。

方法：在 Web of Science 核心数据库检索 1985-01-01 到 2025-05-31 以“针灸眼科”为主题发表的文献，利用 CiteSpace 6.2.R3、VOSviewer 1.6.20、SciImago Graphics 等工具对发文量、国家、作者、期刊、机构、关键词和引用参考文献进行可视化分析。

结果：共纳入分析 349 篇文献，1985-2025 年针灸眼科研究的文献数量年度分布虽有所波动但总体不断增加；目前有以中国为首的 33 个国家及地区开展过针灸眼科方面研究；发文量大于 3 篇的作者间形成了 7 个合作密切的研究团队，3 个大的合作群；共有 321 个机构参与针刺研究；针刺研究的活跃领域是干眼症、系统评价、病因识别、继发性青光眼、视觉症状、视网膜色素、近视控制等。

结论：从研究热点分析来看，针灸眼科研究当前聚焦优势病种、融合多种疗法及多学科的研究方法，整体向治疗标准化与机制可视化方向发展。未来针灸眼科的研究发展趋势为探索更多具有临床基础且疗效较为确定的眼科疾病，突破区域合作瓶颈，加强机制深度（如跨病种信号通路研究），并推动中医眼科理论与现代医学的互证。

摘要编号：208834

多元化健康教育护理干预在早产儿眼底筛查中的重要性分析

第一作者：Rong YANG

目的：分析多元化健康教育护理在早产儿眼底筛查中的重要性。

方法：选取 80 例早产儿家长作为研究对象，采用抽签法将其分为对照组和实验组，对照组接受常规健康教育，实验组则接受多元化健康教育，比较组间眼底筛查健康知识掌握情况和护理满意度。

结果：实验组的眼底筛查健康教育掌握评分和护理满意度均要高于对照组， $P < 0.05$ 。

结论：多元化健康教育的应用可有效提升早产儿家长对于早产儿眼底筛查相关健康知识的掌握程度和满意度，应用价值较高。

摘要编号: 209053

巨噬细胞氧化脂质代谢重塑在干眼中的功能与机制研究

第一作者: Wenyu CUI

共同作者: Sheng CHEN, Zhexu CHI, Ke YAO

目的: 干眼发病率随信息化和老龄化加剧而攀升,严重影响患者生活质量和视觉功能。最新的指南强调,“眼表微环境”这一由泪液、角膜、结膜、泪腺、免疫及神经等多种组分共同维持平衡的协调统一的整体,在干眼的发生、发展中起到至关重要的作用。在干眼微环境中,过度氧化应激、炎症反应、泪液高渗透压、上皮细胞损伤等形成难以破解的恶性循环。其中,巨噬细胞是参与免疫应答的关键细胞。本研究旨在探究干眼中巨噬细胞的调控机制,为靶向重塑微环境稳态提供新策略。

方法: 利用流式分选和单细胞转录组测序构建小鼠干眼模型眼表微环境单细胞图谱,鉴定核心致病巨噬细胞亚群。结合流平衡分析算法和广靶代谢组学,筛选塑造该亚群功能的核心代谢通路。构建条件性敲除小鼠,探究巨噬细胞氧化脂质代谢在微环境失衡中的作用。在干眼模型中,评估核心代谢物环氧二十碳三烯酸(EET)滴眼治疗的临床与病理学效果。

结果: 研究描绘了干眼角膜微环境细胞组分的时序性变化,揭示了伴随疾病发展的免疫-上皮稳态破坏。鉴定出以高表达 Arg1、Vegfa、Spp1 为特征的浸润巨噬细胞是介导失衡的核心群体。流平衡分析及代谢组学分析确定类花生酸氧化脂质代谢是塑造该巨噬细胞功能的核心通路。体内实验证实,EET 滴眼治疗能显著增加泪液分泌、缓解角膜损伤、下调炎症反应、恢复角膜结构、重建微环境稳态,展现出良好的治疗效果。

结论: 本研究揭示了干眼发展过程中眼表微环境的动态变化,明确了类花生酸氧化脂质代谢在塑造致病巨噬细胞中的核心作用。小分子代谢物 EET 的局部应用能有效打破干眼恶性循环,维持微环境稳态,为干眼治疗提供了新方向。

摘要编号: 207987

患者为中心的眼科服务优化:融合日间管理模式的门诊流程再造前沿研究

第一作者: Jing SHEN

目的: 本研究旨在通过对某省级三甲眼科专科医院门诊流程再造,结合眼科日间管理模式的优势,探索创新的门诊服务模式,旨在解决患者在就医过程中遇到的问题,提升就医体验和感受,实现高效和贴心的医疗服务。

方法: 采取量化与质性相结合的研究方法,以流程再造理论和 ESIA 法为基础,深入分析当前门诊流程的不足,并结合日间管理模式的特点。通过患者满意度调查和专家访谈,优化流程,减少无效和低效环节。同时,通过建立“1+3”优化服务保障体系,即以“一”个以患者为中心的服务理念,结合“三”大诊疗全过程(诊前、诊中、诊后),整合线上线下载资源,实现一体化服务。

结果: 通过实施门诊流程再造和日间管理模式相结合的“1+3”优化服务保障体系,明显改善患者就医体验。门诊量提升至每天 1400 人次,减少了患者排队等候时间,平均就诊时间缩短至 40 分钟。患者满意度显著提升至 96.8%,患者在就医过程中的舒适感和满意度得到了显著改善,同时医疗安全保障水平和医患沟通的有效性也得到了提高。

结论: 综上所述,该省级三甲眼科专科医院通过门诊流程再造与日间管理模式的有机结合,有效解决了患者就医中的急难愁盼问题,缓解了传统门诊模式中存在的“三长一短”现象。在未来,这种以患者为中心,结合日间管理模式的门诊服务模式有望在更多公立医院中得到推广和应用,为广大患者提供更加优质、高效的医疗服务。

摘要编号: 210200

整合网络药理学与转录组学探究石斛碱对甲状腺相关眼病的调控机制

第一作者: Meng XIE

共同作者: Fagang JIANG, Bowen WANG, Xinghua WANG

目的: 甲状腺相关眼病(TAO)是器官特异性自身免疫病,眼眶成纤维细胞(OFs)是其主要靶细胞,参与 TAO 纤维化、炎症与脂肪分化等病理过程。石斛碱是中药石斛的活性成分,具有抑制纤维化与炎症因子分泌的作用,但对 TAO 的影响尚不明确。本研究旨在探索石斛碱对 TAO-OFs 纤维化、炎症因子分泌及脂肪分化的调控作用,并通过网络药理学与转录组学分析其作用机制。

方法: 采用外植体培养法培养原代 TAO-OFs,经免疫荧光鉴定后,用 CCK-8 和流式细胞术确定石斛碱的安全浓度。将 TGF- β 1 与石斛碱共处理 TAO-OFs,通过 RT-qPCR、免疫荧光和 Western Blot 检测纤维化相关指标,用 ELISA 检测透明质酸含量。将 IL-1 β 与石斛碱共处理 TAO-OFs,检测炎症相关指标。利用成脂诱导培养基诱导 TAO-OFs 脂肪分化,加入石斛碱后用油红 O 染色和 RT-qPCR、Western Blot 检测脂肪分化指标。网络药理学分析筛选石斛碱潜在靶点与 TAO 疾病靶点,分析交集靶点并进行功能与通路富集分析,对核心靶点

AKT1 进行分子对接。转录组学分析筛选差异表达基因并进行功能与通路富集分析。最后, 用 PI3K 激动剂 740Y-P 与抑制剂 LY294002 干预石斛碱处理的 TAO-OFs, 验证信号通路。

结果: 体外成功培养 TAO-OFs, 确定 0.5、5、50 μM 石斛碱对其增殖和凋亡无显著影响。石斛碱能抑制 TGF- β 1 诱导的纤维化相关蛋白表达和透明质酸分泌, 抑制 IL-1 β 诱导的炎症因子分泌, 还可抑制 TAO-OFs 脂肪分化, 下调 FABP4 与 PPAR γ 表达。网络药理学分析发现 10 个交集靶点, 核心靶点包括 AKT1、JAK2 等, 主要通路为 PI3K/AKT、JAK/STAT 等, 分子对接证实 AKT1 与石斛碱有效结合。转录组学与网络药理学整合分析均富集于 PI3K/AKT 通路。验证实验证实石斛碱抑制 TGF- β 1 诱导的 PI3K/AKT 通路激活及蛋白表达, PI3K 激动剂逆转、抑制剂协同石斛碱作用。

结论: 石斛碱可抑制 TGF- β 1 诱导的 TAO-OFs 纤维化、IL-1 β 诱导的炎症因子分泌及脂肪分化, 其调控 TAO-OFs 纤维化的作用与抑制 PI3K/AKT 信号通路激活有关, 为 TAO 治疗提供了新策略。

摘要编号: 201903

智能时代眼科医师培养模式的创新路径探索

第一作者: Xianwei LI

目的: 在数字医疗时代背景下, 本研究致力于解决眼科教育面临的三大痛点: 显微操作训练资源有限、个性化学习路径缺失、临床思维培养滞后。通过融合人工智能核心技术, 构建具有实时反馈、自适应学习特征的智能教育平台, 旨在培养能驾驭智能诊疗设备的下一代眼科医师。

方法: 采用“技术驱动—教育反哺”的双向研究框架: 1) 开发多模态教学系统, 集成计算机视觉(裂隙灯图像识别)、自然语言处理(病历智能分析)、强化学习(手术模拟决策)三大技术模块; 2) 建立动态能力评估模型, 通过眼球运动追踪、操作轨迹分析等生物特征数据, 量化学员学习曲线; 3) 设计混合现实(MR)教学场景, 将 DALL-E 生成的罕见病例三维模型与实操训练有机结合。

结果: 智能教育系统展现出革命性优势: 手术模拟器的力反馈误差率降低至 0.08 mm, 达到国际显微外科培训标准; AI 病例库使学员接触的临床变体增加 15 倍; 个性化学习引擎缩短了 43% 的技能达标时间。特别值得注意的是, 系统生成的“数字孪生患者”可模拟 600 余种病理特征, 使糖尿病视网膜病变等复杂疾病的诊断准确率提升 29%。学员在智能显微镜辅助下的角膜缝合合格率较传统教学组提高 37 个百分点。

结论: 人工智能为眼科教育带来了范式变革, 其核心价值在于: 创建了可扩展的临床经验传递机制、实现了教学效果的量化评估、突破了时空限制的沉浸式训练。未来需重点关注医学伦理教育同步、人机协作教学模式优化、以及基层医院的普惠化应用。建议建立眼科教育大模型联盟, 推动优质教育资源智能分发。

摘要编号: 204042

深圳市眼科医院特需病房日间患者围手术期精准管理的实践与成效

第一作者: Yunyun ZOU

目的: 立足深圳市眼科医院特需病房患者对“高效诊疗、优质服务、隐私保护”的核心需求, 构建适配特需病房的眼科日间患者围手术期精准管理模式, 旨在提升特需医疗服务质量与安全, 树立高端眼科日间护理管理标杆。

方法: 选取深圳市眼科医院特需病房 2023 年 9 月-2024 年 8 月收治的 320 例眼科日间手术患者为研究对象, 按管理模式分为对照组(156 例, 采用特需病房常规围手术期护理)与观察组(164 例, 实施精准化围手术期管理)。精准管理围绕特需服务特性展开: 术前建立“一对一专属护理专员”机制, 通过多学科会诊(眼科、麻醉科、内科)完成个性化风险评估, 结合患者时间需求定制术前检查与宣教计划, 同步保障隐私信息管理; 依据患者病情复杂度优化流程, 配备专职医护团队实现全程精细化管理; 术后提供优质康复服务, 通过专属健康管理小程序推送定制化康复方案, 协调专家资源完成术后 1-3 天上门随访或优先复诊。对比两组患者手术延迟率、术后并发症发生率、患者满意度(含隐私保护满意度)及医疗服务投诉率。

结果: 观察组手术延迟率(0.61%)显著低于对照组(5.77%), 术后并发症发生率(1.83%)低于对照组(9.62%), 患者总体满意度[(98.5 ± 1.2) 分]及隐私保护满意度[(99.1 ± 0.8) 分]均高于对照组[(89.2 ± 2.8) 分、 (85.7 ± 3.5) 分], 且观察组无医疗服务投诉, 对照组投诉率为 3.21%, 差异均有统计学意义($P < 0.05$)。

结论: 针对深圳市眼科医院特需病房眼科日间患者实施围手术期精准管理, 可在保障医疗安全与效率的基础上, 充分满足特需患者对优质化、个性化、隐私化服务的需求, 显著提升特需医疗服务品质, 为大型眼科医院特需日间护理管理提供有效实践路径。

摘要编号: 208022

眼科影像学智能化教学体系的构建与实践

第一作者: Caijie ZHANG

目的: 随着眼科诊疗技术的高速发展, 传统影像学教学模式已难以满足现代眼科人才培养需求。学院针对眼科影像教学中存在的“三难”问题(影像特征认知难、三维结构理解难、临床思维建立难), 系统性地构建了“VR + 临床案例”的教学模式。本研究旨在全面评估该教学模式在提升教学质量、培养学生临床能力方面的实际效果, 为眼科人才培养提供可复制的教学模式。

方法: 在教学实施环节, 创新性地设计了“双阶递进”教学模式: 引入 VR 虚拟仿真平台, 利用三维重建技术帮助学生理解视网膜分层结构、青光眼房角等复杂解剖关系; 临床整合阶段通过 PACS 系统开展多模态影像联合判读训练, 培养综合诊断思维。研究选取 2023 年、2024 年间参与该课程的眼视光医学专业学生 200 人为研究对象, 通过对比传统教学班 ($n = 100$) 与教改实验班 ($n = 100$) 的考核数据, 结合教师访谈、学生反馈等多维度评估教学效果。评估指标包括: 理论考核成绩、影像判读准确率、临床思维评分以及教学满意度调查。

结果: 经过教学实践, 智能化教学模式取得显著成效。在知识掌握方面, 教改班级理论考核平均成绩达到 88.7 ± 3.2 分, 较传统班级 (72.5 ± 5.1 分) 提升 22.3% ($P < 0.001$)。实践能力评估显示, 在眼部异物等临床重点考核项目中, 实验班学生的诊断符合率达到 91.4%, 显著高于对照班的 68.7% ($P < 0.01$)。特别值得关注的是, 在需要多模态影像整合的复杂病例诊断中, 实验班学生展现出更强的综合分析能力, 其临床思维评分 (4.32 ± 0.56) 明显优于对照组 (2.89 ± 0.61)。教学反馈数据显示, 88.3% 的学生表示 VR 训练极大改善了空间理解能力。教师访谈结果同样表明, 新教学模式使课堂互动率提升 40%, 学生自主学习时间增加 35%。

结论: 本研究证实, 基于智能技术的眼科影像学教学模式改革成效显著。其成功经验主要体现在以下方面: 首先, VR 技术的引入突破了二维影像的教学局限, 使复杂的眼部三维结构变得直观可感; 最后, 多模态临床案例训练培养了学生的整体诊疗思维。教学实践表明, 这种“技术赋能、临床导向”的教学模式不仅提高了教学质量, 更培养了符合现代眼科发展需求的复合型人才。未来, 我们将进一步优化智能教学系统, 扩大临床案例库规模, 持续推动眼科影像学教育的创新发展。

摘要编号: 208040

眼科时间学与生命之钟

第一作者: Shuai GONG

目的: 在眼科视光学之后提出眼科时间学, 将眼科学与时间结合, 以促进科学技术进步。

方法: 通过生命之钟的提出, 给心力衰竭等疾病通过外科学眼科学等学科的方法提供预警。

结果: 将眼科学, 医学, 外科学, 时间学等学科整合, 预警心力衰竭等各种疾病。

结论: 通过各学科的结合, 在眼科学和眼视光学之后继续将眼科在新时代开辟创新, 发扬光大。

摘要编号: 208027

眼科研究生创新素质的培养

第一作者: Jing LIN

目的: 眼科研究生创新素质培养已成为提升眼科医学人才质量的关键环节。本文基于眼科专业特点, 构建了一套系统的创新素质培养模式, 全面提升眼科研究生的创新能力和专业素养。

方法: 基于眼科专业特点, 构建包含专业基础培养、临床能力训练和科研创新能力提升的三阶段培养体系。在专业基础阶段强化实验技能和批判性思维训练; 在临床能力阶段引入 PBL 教学法, 开展病例讨论和团队协作训练; 在科研创新阶段采用启发性指导, 鼓励学生自主选题和开展创新性研究。

结果: 通过系统实施创新素质培养模式, 研究生培养质量显著提升。在专业基础方面, 学生掌握了免疫组织化学、DNA 扩增等关键技术, 实验操作规范性和独立解决问题的能力明显提高。在临床能力方面, PBL 教学法的应用使学生的临床思维能力和团队协作水平得到显著增强, 能够熟练处理各类眼科常见病和疑难病例。在科研创新方面, 研究生自主选题能力明显提升, 创新思维活跃, 科研成果产出显著增加。培养过程中, 学生的创新意识、科研素养和临床实践能力得到全面发展, 为成长为高素质眼科医学人才奠定了坚实基础。

结论: 这种以创新能力培养为核心的教育模式, 能够有效促进眼科研究生的全面发展, 为培养高素质眼科医学人才提供了有益经验。

摘要编号: 204997

糖酵解-组蛋白乳酸化串扰驱动 TXNIP-NLRP3 介导的泛凋亡激活在糖尿病视网膜病变发病机制中的作用

第一作者: Xi XIAOTING

目的: 探究糖酵解增强通过组蛋白乳酸化修饰驱动 TXNIP-NLRP3 信号通路, 进而促进泛凋亡小体的形成和泛凋亡激活, 最终导致糖尿病视网膜病变 (DR) 的作用机制。

方法: 通过临床样本、高糖环境下的人视网膜色素上皮 (RPE) 细胞和糖尿病小鼠模型多层面, 揭示了一个正反馈循环: 增强的糖酵解增加了组蛋白乳酸化, 进而进一步促进糖酵解。这一循环激活了硫氧还蛋白相互作用蛋白 (TXNIP) 和 NOD 样受体热蛋白结构域相关蛋白 3 (NLRP3) 的表达, 导致泛凋亡小体的形成并触发泛凋亡, 最终促进了 DR 的病理进展。研究通过 RNAi 或过表达实验证实了 TXNIP 在连接组蛋白乳酸化与 NLRP3 激活及泛凋亡小体形成中的核心作用。抑制糖酵解或下调 TXNIP 可减少组蛋白乳酸化, 抑制泛凋亡小体形成, 并缓解泛凋亡。

结果: 1. 糖酵解与组蛋白乳酸化的相互作用: 研究发现高糖条件下, 糖酵解活性增强, 导致组蛋白乳酸化水平升高。组蛋白乳酸化进一步促进糖酵解, 形成正反馈循环。2. TXNIP-NLRP3 信号通路的激活: 组蛋白乳酸化修饰上调了硫氧还蛋白相互作用蛋白 (TXNIP) 的表达。TXNIP 的激活进一步促进了 NOD 样受体热蛋白结构域相关蛋白 3 (NLRP3) 的表达和活化。3. 泛凋亡小体的形成与泛凋亡的触发: TXNIP 和 NLRP3 的激活导致泛凋亡小体的形成, 从而触发了泛凋亡, 这是一种协调性细胞死亡途径, 直接参与 DR 的病理过程。4. TXNIP 的调控实验: 通过 RNA 干扰 (RNAi) 或过表达技术调控 TXNIP 的表达, 验证了 TXNIP 在组蛋白乳酸化与 NLRP3 激活之间的核心作用。5. 糖酵解和 TXNIP 的抑制实验: 抑制糖酵解或下调 TXNIP 表达显著降低了组蛋白乳酸化水平, 抑制了泛凋亡小体的形成, 并减轻了泛凋亡的发生。

结论: 揭示了糖酵解-组蛋白乳酸化串扰通过 TXNIP/NLRP3 信号通路驱动泛凋亡的分子机制, 阐明了其在 DR 发展中的关键作用。

摘要编号: 210259

肠道菌群及其代谢产物在甲状腺眼病中的调节作用及机制

第一作者: Yiyang WANG

共同作者: Fagang JIANG, Xinghua WANG

目的: 肠道菌群及其代谢产物在多种自身免疫性疾病中发挥调节作用。甲状腺眼病 (TED) 是一种器官特异性自身免疫性疾病。本研究旨在通过临床观察对 TED 患者的肠道菌群及血浆代谢产物进行特征性分析, 并探究关键代谢产物吲哚-3-乙酸 (IAA) 对该疾病的潜在调节作用及机制。

方法: 在临床研究中, 70 名 TED 患者和 76 名健康对照者被纳入研究。通过 16s rRNA 和宏基因组测序检测受试者粪便中的肠道菌群, 通过 LC-MS/MS 非靶向代谢组学和靶向色氨酸代谢组学检测其血浆代谢产物。从 6 名 TED 患者和 6 名非 TED 志愿者的眼眶结缔组织中提取眼眶成纤维细胞 (OFs) 进行体外实验。使用转化生长因子- β 1 (TGF- β 1) 诱导 OFs 纤维化, 使用或不使用 IAA 进行干预。对细胞活力、凋亡水平、迁移能力、纤维化相关基因和蛋白表达水平进行检测。随后, 通过转录组测序和体外实验进一步探索 IAA 调节 OFs 纤维化的分子机制。

结果: 与对照组相比, TED 患者存在肠道菌群失调和血浆色氨酸代谢紊乱, 其中, 色氨酸代谢产物 IAA 水平显著降低, 并与眼球突出度和血清 TRAB 水平呈负相关。在体外研究中, IAA 显著抑制了 TGF- β 1 诱导的 OFs 迁移和纤维化表型。在机制研究中, IAA 激活了芳香烃受体 (AHR) 信号通路, 并抑制了 TGF- β 1 诱导的 Smad2/3 蛋白磷酸化。使用 AHR 拮抗剂 CH-223191 可减弱 OFs 中 AHR 信号的激活, 并降低 IAA 对 TGF- β 1 诱导的 Smad2/3 磷酸化和纤维化蛋白表达的抑制作用。

结论: TED 患者存在肠道菌群失调及血浆色氨酸代谢紊乱。IAA 是肠道菌群色氨酸代谢途径中的功能性产物之一, 它通过 AHR 信号通路减轻 OFs 纤维化, 从而对 TED 发挥保护作用。

摘要编号: 210131

视网膜色素变性小鼠模型中核心氧化应激基因调控机制研究

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共同作者: Kun-chao WU

目的: 本研究旨在利用视网膜色素变性 10 型基因突变小鼠 (Rd10), 探索氧化应激在视网膜退行性变过程中基因调控网络和潜在干预靶点。

方法：通过 HE 染色、视网膜电图评估 Rd10 小鼠视网膜结构和功能动态变化。分离小鼠视网膜进行 RNA-seq 测序，明确 Rd10 和对照组之间差异性表达基因。利用 GSEA 数据库，获取小鼠氧化应激基因集合，并与差异性表达基因取交集，结合 PPI、MCODE、DMCC 算法分析，筛选核心氧化应激基因。利用 qPCR 分子生物学技术对其表达进行验证。通过生物信息学分析和分子对接，评估干预核心氧化应激基因的药物。

结果：与野生对照组相比，P21 天时，视网膜内/外节厚度、外核层厚度均显著变薄。在 3.0 和 10.0 刺激强度下，Rd10 小鼠视网膜 a 波振幅、b 波振幅均显著降低。转路组分析提示 Rd10 小鼠与对照组之间存在 2799 个差异性表达基因，其中 45 个与氧化应激相关。通过系统性生物信息学分析，共发现 9 个核心氧化应激基因（Lcn2、Txnip、Btk、Stat6、Apoe、Lck、Hgf、Mmp3、Hmox1），其表达量相比对照组而言，均显著上调，且通过 qPCR 进行了验证。GO 分析提示核心氧化应激基因主要参与 response to oxidative stress, response to hydrogen peroxide, regulation of neuron apoptotic process 等生物学过程。通过 DsigDB 数据库，发现有 1140 药物与核心氧化应激基因之间存在相互作用，排名前 10 的药物的分子对接结果提示具有较高的结合能力。

结论：本研究揭示了视网膜退行性变过程中的核心氧化应激基因及其调控网络，将为该疾病的治疗提供新参考。

摘要编号：209568

转录因子 TFEB 通过抑制病理性乳酸穿梭促进生理性血管再生

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共同作者：Andina HU

目的：在增殖性视网膜病变中，生理性血管再生受阻与病理性新生血管的异常增生并存，是导致视力损伤的核心病理过程。转录因子 EB（TFEB）已被证实是促进生理性血管发育和缺血后再血管化的关键因子。然而，TFEB 在区分“生理性”与“病理性”血管新生中的具体作用尚不明确。本研究旨在验证一个新假说：TFEB 作为一个关键的调控节点，在促进健康的生理性血管修复的同时，能够主动抑制病理性新生血管的形成，其机制可能涉及对血管微环境代谢通讯（如“乳酸穿梭”）的调控。

方法：1：我们利用氧诱导视网膜病变（OIR）小鼠模型，通过单细胞 RNA 测序（scRNA-seq）分析了新生血管微环境中各细胞亚群的转录谱。通过免疫荧光染色和 RNAscope 技术对关键分子（MCT1）

的表达定位进行验证。2：我们构建了内皮细胞特异性、可诱导的 TFEB 敲除小鼠（Cdh5-CreERT2; Tfeb fl/fl），并进行 OIR 造模。通过视网膜平铺片 Lectin 染色定量分析血管表型，包括病理性新生血管面积和生理性再血管化面积。3：利用 qRT-PCR、Western Blot 和 Seahorse 代谢流分析技术，检测 TFEB 敲除对内皮细胞（EC）中乳酸转运蛋白（MCT1）表达及糖酵解代谢的影响。4：最后，通过染色质免疫共沉淀-qPCR（ChIP-qPCR）技术，探究 TFEB 是否直接调节 MCT1 的转录。

结果：1：scRNA-seq 数据显示，在 OIR 模型的病理微环境中，新生血管簇的 ECs 中乳酸转运蛋白 MCT1（基因 Slc16a1）表达显著上调，相邻的周细胞中 MCT1 表达下调，揭示了一种与病理状态相关的“乳酸穿梭”模式。2：关键性，在内皮细胞中特异性敲除 TFEB 后，OIR 诱导的病理性新生血管簇显著增加，而缺血区域的生理性再血管化程序则受到严重受阻。这一病理表型的恶化与 EC 中 MCT1 表达的失调密切相关。3：机制上，我们发现 TFEB 能够直接结合在 Slc16a1 基因的启动子区域，提示在病理应激下，TFEB 可能通过抑制其过度表达来维持代谢稳态，从而阻止病理性血管的形成。

结论：本研究揭示 TFEB 在血管新生中扮演双重调控角色：促进生理性再生，同时抑制病理性增生。其机制涉及调控内皮细胞代谢稳态与“乳酸穿梭”。TFEB 功能缺失会加剧病理损伤，故激活 TFEB 有望成为“正常化”血管的新疗法。

摘要编号：208025

青年医生综合素质的培养

第一作者：Guiqiu ZHAO

目的：培养高素质的眼科青年医师是推动学科发展的核心。本文旨在探讨以“兴趣引导、信念坚守、全面成长”为核心的眼科青年医师培养模式，旨在为高素质、创新型眼科医学人才的培育提供理论参考与实践路径。

方法：在兴趣引导方面，通过系统评估学生背景与专业优势，设计多元化课题选择机制，将科研训练与临床难题紧密结合。采用启发式教学方法，建立问题导向学习（PBL）模式，鼓励学生自主发现和解决问题。在信念坚守方面，构建“理论学习 - 临床轮转 - 科学研究”三阶段培养体系。理论阶段注重基础知识和实验技能的系统训练；临床阶段实施科室轮转制度；科研阶段导师提供学术指导与心理支持，强化创新能力和学术素养培养。在全面成长方面，实施“因材施教”的个性化培养方案，根据学生特点制定差异化发展路径。搭建多层次学术交

流平台，支持在国内外学术会议进行大会发言。建立导师-学生协同发展机制，营造温暖的学术共同体氛围。

结果：兴趣引导，激发内生动力。通过启发式教育，鼓励研究生将被动接受转化为主动创新，科研热情得到有效激发，围绕角膜病治疗研发的多项技术获得发明专利，部分研究成果已实现临床转化。信念坚守，夯实成才基石。坚守信念效果明显，眼科研究生临床技能考核优秀率达 95% 以上，科研能力显著提升，在高水平期刊发表多篇学术论文，抗挫折能力和职业认同感明显增强。全面成长，实现个性化蝶变。通过差异化指导策略，不同类型研究生均获得良好发展，多人获得国家自然科学基金项目资助，在国际学术会议表现优异，毕业后迅速成长为临床骨干和科研新锐，形成了良好的人才培养梯队。

结论：本模式通过系统化的兴趣引导、信念坚守与个性化的成长路径，有效促进了眼科青年医师从新手到骨干的蜕变，为新时代眼科学研究生教育，特别是高水平临床专科人才的培养，提供了可资借鉴的范式。

眼科流行病学、防盲

摘要编号：208570

中国与 G20 国家 40 岁及以上人群近视力丧失与屈光不正疾病负担及趋势分析

第一作者：Xin LIU

共同作者：Ang JI

目的：本研究旨在探讨中国与 G20 国家 40 岁及以上人群近视力丧失与屈光不正的疾病负担，分析其现状、历史趋势及影响因素，并预测其未来变化，为相关疾病的防治提供参考。

方法：研究基于 GBD 2021 数据库，对疾病负担指标进行年龄标准化以比较现状。采用年估计百分比变化 (EAPC) 分析总体趋势，分段年百分比变化 (APC) 识别趋势转折点，使用 BACP 模型预测 2022-2038 年的负担趋势，并通过分解法解析人口、老龄化和流行病学因素对负担变化的影响。

结果：中国近视力丧失疾病负担略高于 G20 国家，而 G20 国家屈光不正疾病负担相对较高。不论是近视力丧失还是屈光不正，女性群体的疾病负担均显著高于男性。近视力丧失在 55-64 岁人群中最严重，屈光不正则在 80-84 岁人群负担最重。1990 至 2021 年间近视力丧失的疾病负担呈上升趋势，预测显示 2022-2038 年该趋势将持续；而屈光不正

的疾病负担则呈现下降态势。人口增长是近视力丧失与屈光不正负担加剧的首要驱动因素。

结论：近视力丧失与屈光不正在中国和 G20 国家仍构成重大健康挑战，且不同群体间存在显著差异，尤以性别差异最为突出。因此，亟需制定针对性政策并完善医疗措施，以实现减轻疾病负担和消除健康不平等的目标。

摘要编号：209364

中国与感染新型冠状病毒相关的急性黄斑神经视网膜病变 90 例病例 (152 只眼) 的回顾性研究

第一作者：Hua FU

目的：急性黄斑神经视网膜病变 (Acute macular neuroretinopathy, AMN) 是一种罕见的视网膜病变。在全球新型冠状病毒大流行期间，AMN 病例数呈显著上升趋势。中国眼科门诊也同样观察到 AMN 病例的增多。本研究通过回顾性研究 90 例相关病例，分析中国与感染新型冠状病毒相关的急性黄斑神经视网膜病变其临床特征与流行病学特征。

方法：本课题通过回顾性研究自 2022 年 12 月起被确诊为新冠病毒感染阳性随后出现眼部症状被确诊为 AMN 的 90 例病例及其预后情况，探究此疾病的临床特征与预后特征。病例信息通过线上问诊及我院眼科门诊两种途径搜集；研究对象纳入标准：新冠病毒检测阳性、明确的视力下降或视野异常以及其光学相干断层扫描结果符合 AMN 病变特征；研究对象排除标准：病史不全；低质量眼科成像；其他视网膜疾病 (鉴别诊断)：如点状内层脉络膜病变 (PIC)、多发性一过性白点综合征 (MEWDS)、急性区域性隐匿性外层视网膜病变 (AZOOR) 或典型视神经炎和其他视网膜疾病等疾病的患者；随访组标准：仅将随访 3 个月以上 (含 3 个月) 的患者纳入随访组。

结果：本研究包含 90 例病例 (152 只眼)。患者群体构成主要为女性 (78%)，青年人 (平均年龄 28.6 ± 6.0 岁)。双侧眼患病更为显著 (69%)，同时所有患者在出现眼部症状前均有明确的体温升高病史。AMN 眼部症状出现峰值为患者 (79 例，88%) 出现新型冠状病毒感染症状 (包括发烧、咳嗽伴咽痛、头痛、肌肉酸痛等) 后的第 2-3 天。最普遍的眼部症状为暗斑遮挡 (63 只眼，41%)，其次为马赛克样遮挡 (54 只眼，36%)，闪光样遮挡 (32 只眼，20%)，眼前黑点 (4 只眼，3%)。所有病例中有 56 例 (96 只眼) 参与为期 3-15 个月的随访，其患眼症状 41% 好转，46% 未觉明显改善，13% 自觉变差。

结论: 本研究是迄今为止关于 COVID-19 相关 AMN 的最大病例系列研究。本病例数据集提供了与该疾病相关的流行病学、临床特征和预后特征的详细情况。新冠相关急性神经视网膜病变机制有待进一步探索, 其中视网膜和脉络膜循环系统中的高炎症和高凝状态以及发烧引起的脱水后的血管灌注不足等因素可能是 COVID-19 相关 AMN 的潜在促成因素。

摘要编号: **210186**

基于 FDA 不良事件报告系统的安眠药眼科不良事件警戒研究

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目的: 基于美国 FDA 不良事件报告系统 (FAERS) 数据库, 分析安眠药相关的眼科不良反应并探索其风险因素。

方法: 本研究为回顾性分析, 提取 FAERS 数据库中 2004 年第一季度至 2024 年第四季度所有以安眠药为首要怀疑药物的不良事件报告。对报告的患者基线特征 (性别、年龄)、报告结局、来源、国家及年份分布进行汇总分析。筛选以“眼部器官系统”为首要分类的报告, 采用比例失衡分析法中的报告比值比、比例报告比、贝叶斯置信传播神经网络及多项伽马-泊松收缩器模型进行信号检测。采用单因素及多因素 Logistic 回归模型, 分析性别、年龄、体重对发生眼科不良反应风险的影响, 统计学意义定义为 $P < 0.05$ 且比值比 $\neq 1$ 。

结果: 在安眠药相关的异常报告中, 女性患者较多, 年龄主要集中在 18 至 64.9 岁之间, 报告者多为患者本人。在眼部器官系统范围内, 不同类别安眠药的眼科不良反应信号数量与强度存在显著差异。其中, 抗抑郁药和苯二氮卓类药物检测到的有效信号最多 (均为 7 个), 其次为抗组胺药 (6 个) 和抗精神病药物 (5 个)。褪黑素类及食欲素受体拮抗剂信号最少 (各 1 个)。Logistic 回归分析显示, 在各类失眠药物中, 仅非苯二氮卓类药物的眼科不良反应风险与体重呈显著负相关, 体重被识别为保护因素。

结论: 本研究基于真实世界数据, 抗抑郁药、苯二氮卓类安眠药的眼科不良反应风险信号较强且多样, 而新型安眠药物风险信号相对较少。临床用药时, 建议对使用高风险类别药物的患者加强眼科症状的监测与随访, 以全面提升用药安全性。

摘要编号: **209502**

拉萨新生儿重症监护室早产儿视网膜病变筛查结果分析

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共同作者: **Qiangba CUOZHEN, Jianhong LIANG, Qiongho YE**

目的: 探讨拉萨地区新生儿重症监护室早产儿视网膜病变 (ROP) 的检出率、临床特征及高海拔地区 ROP 筛查标准。

方法: 单中心回顾性病例系列研究。收集 2020 年 5 月 1 日至 2022 年 6 月 1 日拉萨市人民医院新生儿重症监护室住院的 166 例出生胎龄小于 36 周的藏族早产儿的临床资料, 采用第 3 代广角数码儿童视网膜成像系统进行 ROP 筛查, 观察 ROP 检出率、分区及分期情况。采用多因素 logistic 回归分析, 通过计算比值比 (OR) 及其 95% 置信区间 (95% CI) 确定早产儿发生 ROP 的影响因素。

结果: 共纳入 166 例 (332 只眼) 出生胎龄小于 36 周早产儿, 其中男性 88 例、女性 78 例, 检出 33 例 (66 只眼) ROP, 检出率为 19.9%。ROP 患儿出生胎龄为 30 (29, 31) 周, 出生体重为 (1188.5 ± 219.2) g。其中 1 期病变 48 只眼 (72.7%)、2 期病变 16 只眼 (24.2%)、3 期病变 2 只眼 (3.0%), 未检出 4、5 期者; I 区病变 2 只眼 (3.0%)、II 区病变 26 只眼 (39.4%)、III 区病变 38 只眼 (57.6%)。30 例 (90.9%) 患儿病变自然退行并血管化; 3 例 (9.1%) 发展至 1 型 ROP, 其中 1 例接受抗血管内皮生长因子治疗, 2 例在未接受治疗随访中病变消退。多因素 Logistic 回归分析显示, 出生胎龄小 (OR = 0.53, 95% CI: 0.33 ~ 0.84, $P = 0.007$)、出生体重低 (OR = 0.95, 95% CI: 0.92 ~ 0.98, $P < 0.001$) 和有创机械通气时间长 (OR = 1.42, 95% CI: 1.06 ~ 1.90, $P = 0.018$) 是 ROP 发病的独立危险因素。

结论: 拉萨地区单中心新生儿重症监护室早产儿 ROP 检出率约为 20%, 需要治疗的 1 型 ROP 检出率为 1.8%。出生胎龄小、出生体重低、有创机械通气时间长早产儿更易发生 ROP。

摘要编号: **208736**

糖尿病视网膜病变与内脏肥胖指标及其代谢特征的关联研究

第一作者: **Yingcheng HE**

共同作者: **Juan YE**

目的: 关于内脏型肥胖和糖尿病视网膜病变 (DR) 之间的关联的证据仍然很少且有争议。本研究拟采

用身体圆度指数 (BRI)、脂质蓄积指数 (LAP) 和内脏脂肪指数 (VAI) 三个新指标, 探讨内脏肥胖与 DR 之间的纵向关系, 并探讨其潜在的代谢机制。

方法: 在这项基于英国生物银行 (UKB) 的前瞻性研究中, 我们纳入了 14,738 名基线时未发生 DR 的糖尿病患者。采用 Cox 比例风险回归模型, 探讨 3 项内脏肥胖指标与 DR 之间的关系。我们使用弹性网络回归来筛选与内脏肥胖和 DR 相关的代谢物, 富集和途径分析用于研究生物学途径, 网络分析用于探究代谢相互作用。

结果: 在 10 年的随访中, 1594 名受试者发生了 DR。在完全调整的模型中, 这三个指标与 DR 的高风险显著相关, 尤其是在白种人中。此外, 我们确定了代谢指纹图谱, 包括与内脏肥胖和 DR 相关的 12 种生物标志物, 包括 3- 羟基丁酸盐、丙酮、丙氨酸、白蛋白、柠檬酸盐、中密度脂蛋白颗粒、肌酐、葡萄糖、甘氨酸、糖蛋白乙酰基、丙酮酸盐和酪氨酸。这些代谢物主要富集于丙氨酸代谢, 部分通过琥珀酸相互作用。

结论: 内脏肥胖指标 (BRI、LAP 和 VAI) 与 DM 患者 DR 发病呈正相关, 其潜在机制与丙氨酸和能量代谢有关。我们的研究结果可能促进 DR 的早期发现和精确预防。

眼肿瘤学、病理学

摘要编号: 210249

18F-PFPN PET-CT 通过靶向黑色素识别眼部黑色素瘤

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目的: 18F- 氟代脱氧葡萄糖 (18F-FDG) 是最常用的正电子发射断层扫描 (PET) 显像剂, 有助于识别 III 至 IV 期葡萄膜黑色素瘤, 但难以检测 I 至 II 期或小型葡萄膜黑色素瘤。18F-N- (2- (二乙氨基) 乙基) -5- (2- (2- (2- 氟乙氧基) 乙氧基) 乙氧基) 吡啶酰胺 (18F-PFPN) 是一种靶向黑色素的新型 PET 探针, 本研究旨在评估 18F-PFPN PET-CT 对眼部黑色素瘤的诊断价值。

方法: 回顾性分析眼部黑色素瘤、结膜色素痣和视网膜下出血患者 5 例。所有患者均接受了全身 18F-FDG PET-CT 和 18F-PFPN PET-CT 成像。比较了眼部病灶处对 18F-FDG 和 18F-PFPN 的最大标准摄取值 (SUVmax), 与此同时, 分析了眼周

及脑组织对病灶处成像的干扰情况。此外, 以每位患者的对侧健康眼为对照, 评估了葡萄膜和视网膜内固有色素对成像结果的影响。

结果: 3 例眼部黑色素瘤 (1 例眼睑和结膜黑色素瘤、1 例眼眶黑色素瘤和 1 例葡萄膜黑色素瘤)、1 例结膜色素痣和 1 例视网膜下出血患者被纳入研究。以病理学检测结果为金标准, 18F-FDG PET-CT 正确识别了 2 例眼部黑色素瘤 (2/3), 18F-PFPN PET-CT 正确识别了所有的眼部黑色素瘤 (3/3)。18F-PFPN 对黑色素表现出更高的亲和力, 在眼部病灶处, 18F-PFPN 的 SUVmax 是 18F-FDG 的 2.6-8.3 倍。此外, 两种显像剂在结膜色素痣和视网膜下出血病灶中均无异常浓聚。在 PET-CT 成像质量的比较中, 眼周和脑组织对 18F-FDG 的生理摄取干扰了 PET 的成像, 而 18F-PFPN 降低了这种干扰, 表现出更清晰的成像质量。脉络膜和视网膜中的固有色素没有引起 18F-PFPN 的异常浓聚, 所有患者的对侧健康眼均没有检测到对 18F-PFPN 的病理性摄取。

结论: 与 18F-FDG PET-CT 相比, 18F-PFPN PET-CT 对眼部黑色素瘤的检出率更高, 且受到周围组织的干扰更小。18F-PFPN PET-CT 有望成为眼部黑色素瘤的有力临床诊断工具, 具有区分眼部黑色素瘤和良性色素沉着的潜力。

摘要编号: 208557

TP53 突变眼睑皮脂腺癌细胞系的建立

第一作者: Gu XIANG

目的: 眼睑皮脂腺癌 (sebaceous carcinoma, SeC) 是第二常见的眼睑恶性肿瘤, 在亚洲人群中更普遍。约 70% 的眼睑皮脂腺癌患者携带 TP53 突变。眼睑皮脂腺癌细胞系模型有助于探索眼睑皮脂腺癌的病因和发病机制。因此, 我们建立并表征了携带 TP53 突变的眼睑皮脂腺癌细胞系, 以期深入理解眼睑皮脂腺癌的分子机制, 开发新型治疗方案。

方法: 眼睑皮脂腺癌细胞系 SHNPH-SeC 由上海交通大学医学院附属第九人民医院 (Shanghai Ninth People's Hospital, SHNPH) 眼科的眼睑皮脂腺癌患者组织培养所得。本研究通过 CCK8、平板克隆和 Transwell 探索 SHNPH-SeC 的增殖和迁移能力, 通过免疫荧光、STR 鉴定、染色体核型分析、全外显子测序 (Whole exome sequencing, WES) 明确 SHNPH-SeC 起源、特征和突变情况, 通过细胞增殖检测明确 SHNPH-SeC 对丝裂霉素 (Mitomycin-C, MMC) 和 5- 氟尿嘧啶 (5-fluorouracil, 5-FU) 的敏感性。

结果: SHNPH-SeC 细胞系已连续培养 100 多代, 表现出快速增殖和迁移的特性。核型分析结果显

示 SHNPH-SeC 存在大量染色体畸变, WES 揭示 SHNPH-SeC 存在皮脂腺癌相关基因突变, 包括 TP53、KMT2C 和 ERBB2。SHNPH-SeC 在 NOD/SCID 小鼠体内成功构建原位荷瘤小鼠模型。SHNPH-SeC 细胞、患者肿瘤组织和小鼠肿瘤组织中眼睑皮脂腺癌生物标志物均呈阳性, 包括 CK5、EMA、Adipophilin、p53 和 Ki-67。药物敏感性分析显示 MMC 和 5-FU 显著抑制 SHNPH-SeC 的增殖和迁移, 并且化疗药物在 SHNPH-SeC 中较 TP53 野生型的皮脂腺癌细胞表现出更强的肿瘤抑制作用。

结论: 本研究首次建立了 TP53 突变的眼睑皮脂腺癌细胞系, 该细胞系展示眼睑皮脂腺癌相关特征并具有恶性肿瘤特质, 这有助于研究眼睑皮脂腺癌的细胞行为和分子机制, 以探索眼睑皮脂腺癌的新型治疗策略。

摘要编号: 209255

一例眼眶皮样囊肿恶变鳞状细胞癌的病理特征

第一作者: Li WU

目的: 皮样囊肿是常见的眼眶良性病变, 其恶变为鳞状细胞癌极为罕见, 在文献中仅有个案报道。本文报道一例经病理证实的眼眶皮样囊肿恶变为鳞状细胞癌的病理特征。

方法: 回顾性分析 2023 年 5 月期间于武汉大学医学院眼科经病理确诊的 1 例眼眶皮样囊肿恶变为鳞状细胞癌患者的临床资料。该病例通过眼眶手术获取组织标本, 进行常规 HE 染色镜检, 并采用免疫组化染色。结合患者的临床表现和影像学检查结果进行综合分析。

结果: 1. 临床特征: 患者 45 岁, 男性, 临床表现为进行性眼球突出 6 月余, 偶发胀痛; 影像学检查: CT 表现为右眼眶眼眶外侧骨膜下区可见梭形混杂信号, 外侧壁局部骨质吸收; MRI 表现为右眼骨膜下区见梭形混杂信号, 最大截面 1.6*1.2 cm, 内可见短 T1 长 T2 信号, 增强可见不均匀强化。2. 镜下观察: (1) 低倍镜下: 可见囊壁样组织, 被覆鳞状上皮重度异型增生。囊内可见毛发伴出血。符合皮样囊肿的诊断; 另一区域, 大小不等的鳞状细胞癌巢在间质内浸润生长。(2) 高倍镜下, 异型性明显的鳞状细胞癌巢呈浸润性生长, 在间质里不规则生长; 可见角蛋白和角化珠。3. 免疫组织化学: 恶性细胞显示 p63 (+) 和 CK5/6 (+) 证实其鳞状上皮来源。增殖指数标记物 Ki-67 在恶性区域显示高表达 (50%), 4. 病理诊断: (右眼眶) 浸润性鳞状细胞癌, 中分化, 角化型, 局灶可见皮样囊肿伴感染, 考虑来源于皮样囊肿恶变。

结论: 本病例通过组织病理学和免疫组化研究, 明确诊断了一例极其罕见的由眼眶内皮样囊肿恶变而来的鳞状细胞癌。病理诊断的关键在于: 1. 确认良性皮样囊肿成分的存在。2. 在良性成分基础上, 找到明确的、具有浸润性生长的鳞癌区域。3. 利用免疫组化 (如 p63, Ki-67) 辅助证实诊断并评估其增殖活性。此病例强调了对于长期存在或近期迅速增大的眼眶皮样囊肿, 临床和病理医生应高度警惕其恶变的可能性, 并进行充分的组织取样以明确诊断。

摘要编号: 209480

副肿瘤性眼部病变 5 例报告

第一作者: Xuemei ZHU

共同作者: Jianhong LIANG

目的: 报告 5 例副肿瘤性眼部病变的诊治经过, 并回顾文献综述。

方法: 病例报告及综述。5 例病例报告详情略, 分别为癌症相关视网膜病变 (CAR) 1 例、黑色素瘤相关视网膜病变 (MAR) 1 例、双侧弥漫性葡萄膜黑素细胞增殖 (BDUMP) 继发葡萄膜黑色素瘤 1 例、副肿瘤性脉络膜病变 2 例。

结果: 随着对疾病认识的逐渐增加, 目前临床中有副肿瘤性视网膜病变、癌相关视网膜病变、黑色素瘤相关性视网膜病变、副肿瘤卵黄样黄斑病变等命名, 非眼肿瘤专业人员常常对各种命名混淆不清、有困惑, 缺乏眼部副肿瘤病变的分类命名标准。眼部副肿瘤病变可以影响眼睛的任何部分, 主要累及视神经、视网膜或眼球运动的神经通路, 偶尔也可累及前段、眼眶或葡萄膜。因此, 在眼部副肿瘤病变的大框架下, 根据累及部位可做细化的命名, 比如副肿瘤性视网膜病变、副肿瘤性视神经病变、副肿瘤性葡萄膜病变等。从病理生理机制不同, 又分为两类: (1) 自身免疫病理机制, 表现为癌症相关视网膜病变 (CAR)、黑色素瘤相关视网膜病变 (MAR)、癌症相关锥细胞功能障碍 (CACD)、副肿瘤卵黄样黄斑病变 (PVM) 和副肿瘤视神经炎 (PON); (2) 异位肽, 常由肿瘤表达生长因子 (T-exGF) 引起, 表现为双侧弥漫性葡萄膜黑素细胞增殖 (BDUMP)。疾病诊断上, 需要根据症状、体征结合多模态影像学检查, 包括眼底相、相干光断层扫描、眼底自发荧光、眼底荧光血管造影、电生理检查等, 有时还需眼底吲哚菁绿血管造影。副肿瘤综合征一般眼底及 OCT 可无异常, 电生理可有早期改变。抗视网膜自身抗体与眼部副肿瘤病变高度相关, 包括抗 recoverin 抗体、抗转导蛋白-α 抗体、抗 α-烯醇化酶抗体、TRPM-1 等, 可用于指导诊断和监测治疗。

结论：报告副肿瘤性眼部病变的临床特点，并探讨规范命名分类。

摘要编号：209066

叶酸靶向载 IR1061/RSL3 脂质体的构建及其光热协同铁死亡治疗葡萄膜黑色素瘤研究

第一作者：Shuyue ZHANG

共同作者：Wanjun DONG, Haiyan MI, Jianfan YU

目的：葡萄膜黑色素瘤（UM）是一种恶性程度高、易转移且对常规治疗不敏感的眼内恶性肿瘤。为了克服现有疗法的局限，本研究旨在构建一种兼具诊断与治疗功能的一体化纳米平台，用于实现光热治疗（PTT）与铁死亡的协同增效，并精准打击 UM。

方法：我们成功合成了一种叶酸（FA）靶向的脂质体纳米粒——IR1061/RSL3@FA-Liposome (I/R@FA-Lipo)，用于共同递送光热剂 IR-1061 和铁死亡诱导剂 RSL3。通过表征评估其理化性质。在体外，我们使用 MUM-2B 细胞系评估了该纳米粒的靶向性、细胞摄取、光热转化效率、细胞毒性以及诱导铁死亡的能力（通过检测脂质过氧化水平和 GPX4 蛋白表达）。在体内，我们建立了原位 UM 模型，并整合光声成像（PAI）与光学相干断层扫描（OCT）来实时可视化肿瘤位置与边界，以指导精准治疗。

结果：合成的 I/R@FA-Lipo 纳米粒表现出优异的生物相容性和肿瘤靶向能力。体内成像显示，纳米粒能高效地在肿瘤部位富集，并在注射后数小时内实现显著的肿瘤组织滞留与深层穿透。在激光照射下，纳米粒能有效产生局部高热，实现 PTT 消融，并同时触发 RSL3 的释放。释放的 RSL3 通过直接抑制谷胱甘肽过氧化物酶 4（GPX4）的活性，显著降低了 MUM-2B 细胞内的 GPX4 蛋白表达，导致脂质过氧化物累积，最终成功诱导了铁死亡。联合治疗组（PTT + RSL3）在体外和体内均展现出最强的肿瘤细胞杀伤效果和肿瘤生长抑制效应，显著优于任何单一疗法。

结论：本研究开发的 I/R@FA-Lipo 纳米平台，成功地将 PTT 的物理消融与 RSL3 诱导的铁死亡生化攻击相结合，实现了协同抗肿瘤效应。同时，该平台整合了 PAI/OCT 多模态成像指导，确保了治疗的精准性。这项工作为 UM 提供了一种具有优异肿瘤穿透性和诊疗一体化功能的微创治疗新策略，展现出巨大的临床转化潜力。

摘要编号：209325

多面体纳米药物通过破坏铜铁稳态增强葡萄膜黑色素瘤的放疗效果

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共同作者：Shengfang GE, Jie YU

目的：开发一种药物，通过破坏细胞铜铁稳态来增强葡萄膜黑色素瘤（UM）的放疗敏感性。

方法：采用透射电子显微镜表征纳米药物形态，动态光散射法测定粒径。利用特异性探针和 ICP-MS 法检测细胞内铜和亚铁离子水平。通过 CCK-8 法和克隆形成实验评估药物疗效。

结果：本研究通过多组学数据库分析发现，多种放疗抵抗的肿瘤细胞系和患者来源肿瘤模型均表现出铜稳态失调和铜离子结合能力增强的特征。因此，我们基于动态铁配位聚氨酯（PCEF@Fe）创建了一种 pH 响应性纳米胶束系统，采用“铜螯合-铁递送”协同策略以逆转肿瘤金属代谢异常。该平台利用氧肟酸-聚氨酯配体对铜/亚铁离子的差异化配位特性，在酸性肿瘤微环境中触发竞争性金属置换：一方面，配体捕获 Cu^{2+} 以破坏铜稳态；另一方面，释放 Fe^{2+} 以促进铁死亡。实验结果表明，PCEF@Fe 能显著降低细胞内铜离子水平，同时增加铁离子水平，从而增强放疗敏感性。此外，我们将异硫氰酸荧光素协同装载入 PCEF@Fe，赋予其荧光特性，可用于实时监测其分布与代谢过程。

结论：本研究提出了一种创新的治疗策略，通过纳米技术将放疗、铜螯合、铁死亡诱导和荧光示踪集于一体，以改善 UM 的治疗效果。

摘要编号：207534

形形色色的眼眶肿瘤

第一作者：Shangcai XUE

目的：进一步熟悉眼眶少见肿瘤的特征及治疗。

方法：总结自 2012 年 1 月-2025 年 9 月间在我科收治的经病理检查证实的一组少见病共 10 例，其中，眼眶滑膜肉瘤 1 例、眼眶腺泡状软组织肉瘤 1 例、眼眶骨化性肌炎 1 例、眼眶梭形细胞脂肪瘤 1 例、眼眶孤立性梭形细胞纤维瘤 1 例、炎性肌纤维母细胞瘤 3 例、泪腺结核 1 例、嗜酸性淋巴肉芽肿 1 例，分析临床特征及病理特征并查阅文献总结其特征及后续治疗方法。

结果：这组病例均在临床比较少见，在术前难以靠影像明确诊断，确诊依据病理诊断，病理分析免疫组化具有特征性。

结论：对于术前影像极不具特征性的病例要考虑到眼眶少见病的可能性，术前进一步完善各项检查特

别是影像检视，规范手术方式，术后病理确诊后认真分析其各项特征，便经提高眼眶少见肿瘤的诊治水平。

摘要编号：209567

成人巨大眼眶畸胎瘤 1 例

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目的：眼眶畸胎瘤是一种罕见的生殖细胞肿瘤，内含三个胚层来源的组织成分，在成人中尤为罕见。本病案旨在通过报道一例 58 岁女性巨大长期眼眶畸胎瘤，探讨其独特的临床表现、影像学与病理学特征等，并基于其长达 50 年的病程及特殊的“包裹眼球”形态，深入剖析其可能的胚胎发育学起源，以增进对该罕见疾病的认识与诊疗水平。

方法：回顾性分析一例于 2025 年 3 月就诊的 58 岁女性患者的临床资料。患者主诉为左眼肿物进行性增大 50 余年。入院后接受了全面的眼科检查、影像学评估（包括计算机断层扫描 CT 与核磁共振 MRI）以及眼部彩色超声检查。在完善术前准备并排除手术禁忌后，为患者施行了“左眼眶肿物根治性切除术”。术中行冰冻病理检查以指导手术范围，术后对切除标本进行常规病理学检查以明确诊断。

结果：临床检查显示患者左眼正常眼球结构缺失，代之以一个 $6 \times 6 \times 5 \text{ cm}^3$ 的粉红色分叶状实性肿物，质地硬，无触痛。影像学检查（CT/MRI）揭示左眼眶前部类眼球样肿物，其球壁钙化，周围环绕脂肪组织，后方可见视神经及眼外肌影，眶腔扩大但无骨质破坏。术中见肿瘤包膜完整，与周围组织分界清晰，遂行完整切除。术后病理确诊为成熟型畸胎瘤，镜下可见源于三个胚层的分化成熟组织，包括软骨、横纹肌、脂肪、神经、纤毛柱状上皮、鳞状上皮及皮肤附件（含色素组织）等。患者术后恢复顺利，术后 3 个月随访显示术区愈合良好，无感染或肿瘤复发迹象。

结论：本病例作为一例极为罕见的成人长期巨大眼眶成熟型畸胎瘤，其病程长达半个世纪，展现了该肿瘤缓慢生长的生物学行为。影像学与病理学证实肿瘤内包裹着发育异常的眼球样组织，这一特殊表现支持其胚胎起源可能发生于眼球基本结构形成后（胚胎第 5-8 周），原始生殖细胞或神经嵴细胞异常滞留并在已形成的眼球表面膨胀性生长所致。通过根治性切除术可成功治疗此类良性病变，并在完整切除肿瘤的同时，尽可能保留眼部外观。本例为成人眼眶巨大囊实性占位的鉴别诊断提供了重要参考，并深化了对眼眶畸胎瘤胚胎发生机制的理解。

摘要编号：203064

整合单细胞测序与空间转录组学数据揭示葡萄膜黑色素瘤中 GNAQ/GNA11 驱动的异质性

第一作者：Jiahao NIU

共同作者：Xuan LIAO

目的：葡萄膜黑色素瘤（UM）早期诊断困难，肝转移倾向高，且转移性疾病缺乏有效靶向疗法，患者预后极差。尽管 GNAQ/GNA11 突变被公认为 UM 的关键驱动突变，但主要的恶性肿瘤细胞亚克隆仍不明确，肿瘤组织内的空间异质性进一步增加了精确治疗靶点识别的难度。本研究旨在整合单细胞与空间转录组数据，阐明由此产生的肿瘤异质性和功能状态，从而识别精确治疗靶点。

方法：利用 R (v4.4.0) 分析 GEO 数据库中的单细胞 RNA 测序数据 (GSE139829, $n = 11$) 和空间转录组数据 (GSE250636, $n = 9$)。使用 Seurat 包进行数据读取、质控、去除低质量细胞及批次效应校正。经降维与聚类鉴定不同细胞群。结合 singleR 包和 Celldex 人原代细胞图谱数据库进行细胞类型注释，并在 UMAP 图及各簇中可视化枢纽基因。应用 monocle3 包进行拟时序分析，观察轨迹空间中细胞类型的组分布、密度分布及拟时序特征。空间转录组数据经 SCTransform 标准化后，进行 PCA 降维、邻域检测、聚类及 UMAP 可视化。绘制枢纽基因空间表达模式图以描述细胞类型分布。利用 enricher 内的 DsigDB 功能进行靶向药物筛选，保留 $P_{\text{adjust}} < 0.05$ 的小分子，与枢纽基因进行分子对接（使用 Autodock vina 1.5.6）。对接结果用 pymol 3.1 和 DS 2019 可视化。基于对接结果使用 Gromacs 2022 进行分子动力学模拟。

结果：单细胞测序分析揭示了 GNAQ 和 GNA11 在不同细胞群中的差异表达模式。UMAP 图显示这些基因在各类细胞中的表达水平差异显著，其表达分布与细胞群聚类结果高度相关。空间转录组分析进一步评估了 GNAQ 和 GNA11 在特定组织区域的表达水平。整合空间细胞类型注释图和单基因空间特征图，结果表明 GNAQ 和 GNA11 在特定细胞类型和组织区域内的表达存在显著差异，其表达模式与细胞类型的空间分布高度关联。此外筛选出曲美替尼、2-丁酮和亚砷酸盐三种小分子作为靶向 GNAQ - GNA11 复合物的潜在抑制剂。对接分析显示 GNAQ - GNA11 复合物与这些小分子结合力强。分子动力学模拟证实蛋白复合物及其与三种小分子形成的复合物均表现出稳定的相互作用，其结合位点间存在强氢键作用，提示结合良好。

结论：本研究整合单细胞与空间转录组技术，分析了 UM 中 GNAQ 和 GNA11 的表达模式，揭示了

在不同细胞类型和组织区域的显著差异。通过分子对接鉴定出三种靶向 GNAQ - GNA11 复合物的潜在小分子抑制剂。未来研究需通过体外体内实验验证这些抑制剂，为 UM 治疗开辟新方向。

摘要编号：209712

毛兰素通过靶向 m5C 甲基转移酶 NSUN2 抑制葡萄膜黑色素瘤的肿瘤性血管拟态形成

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共同作者：Peiwei CHAI, Sok I HO, Lin LI, Sipeng ZUO

目的：N5- 甲基胞嘧啶 (m5C) RNA 修饰在 RNA 代谢中具有重要的调控作用。作为从石斛 (*Dendrobium chrysotoxum* Lindl) 中分离得到的天然产物，毛兰素 (erianin) 在肿瘤治疗中表现出良好的治疗潜力。本研究揭示，毛兰素可作为一种内源性的 NSUN2 抑制剂，在葡萄膜黑色素瘤中抑制恶性血管形成。

方法：通过天然产物库筛选以探究不同天然单体对葡萄膜黑色素瘤细胞的作用。建立眼内异种移植模型以评估 erianin 的体内效应。采用免疫共沉淀 - 质谱 (IP-MS) 及分子对接分析鉴定毛兰素的作用靶点为 NSUN2。通过 m5C-meRIP 测序及 m5C-meRIP-qPCR 分析确定 NSUN2 的下游靶基因。管腔形成实验及 CD31-PAS 双染用于检测血管拟态 (vasculogenic mimicry, VM) 能力。

结果：通过天然产物库筛选，我们发现毛兰素是葡萄膜黑色素瘤中有效的血管拟态抑制剂。此外，erianin 可结合并抑制 m5C 甲基转移酶 NSUN2 的酶活性，而 NSUN2 通过增强 VM 形成能力发挥促癌作用。在机制上，毛兰素通过抑制谷胱甘肽转氨酶 1 (CHAC1) 的 m5C 修饰及表达水平，从而在肿瘤进展过程中阻断 VM 形成。

结论：综上所述，我们的研究表明 erianin 是一种血管拟态抑制剂。本研究揭示了一种通过天然产物精细调控 m5C 修饰以抑制肿瘤恶性进展的新型治疗策略。

摘要编号：210344

玻璃体切割手术治疗急性视网膜坏死综合征的疗效观察

第一作者：Yang YANG

目的：分析玻璃体切割术 (prophylactic vitrectomy, PPV) 治疗急性视网膜坏死综合征 (acute retinal necrosis, ARN) 的疗效观察。

方法：收集 12 例行 PPV 治疗的 ARN 患者，其中 9 例不伴视网膜脱离，2 例伴视网膜裂孔，1 例伴视网膜脱离。所有患者根据临床症状、病史、裂隙灯

检查、眼底血管造影等检查明确诊断为 ARN，随后行玻璃体切割术伴硅油填充术。治疗后随访 3-6 个月，平均 4 个月，分析患者术前、术后一周时最佳矫正视力、并发症及视网膜裂孔修复、复位等情况。

结果：术前 3 只眼 BCVA > 0.1，术后一周随访时 4 只眼 BCVA > 0.1。术前 12 只眼平均眼压 12.6 mmHg，术后一周 12 只硅油眼的平均眼压 14.3 mm Hg。PPV 术后一周 1 只眼视网膜完全复位，2 只眼视网膜裂孔光凝/冷凝斑可见，网膜修复良好。

结论：PPV 治疗能有效控制 ARN 疾病发展。

摘要编号：203699

眼睑及眼眶神经内分泌瘤的临床特征及预后

第一作者：Liangyuan XU

共同作者：Jing LI, Jianmin MA

目的：探讨眼睑及眼眶 NEC 患者的临床特征、病理特征、治疗策略及预后因素。

方法：采用回顾性队列研究，纳入 2010 年 1 月至 2025 年 1 月在本机构确诊的眼睑及眼眶 NEC 患者。收集患者的临床资料 (年龄、性别、症状、影像学表现等)、病理报告及随访数据。采用 Kaplan-Meier 法分析生存曲线，Log-rank 检验比较组间差异。

结果：本研究共纳入 27 例眼部 NEC 患者，其中眼睑受累者 18 例，眼眶受累者 9 例。眼睑 NEC 患者平均发病年龄为 68.37 岁，男女比例为 1: 2，首诊误诊率可达 44.44%。1 例 (5.56%) 眼睑 NEC 为转移性病变，余 17 例均为眼睑原发病灶。眼睑 NEC 最常见的临床表现为眼睑紫红色结节 (88.89%)，上睑受累常见 (72.22%)，27.78% 病变向眶内延伸。眼睑 NEC 复发率为 16.67%，转移率为 38.89%，随访过程中 2 例 (11.11%) 患者因病死亡。眼眶 NEC 患者平均发病年龄为 45.32 岁，男女比例为 1: 2。眼眶 NEC 中 5 例 (55.56%) 为原发病灶，2 例 (22.22%) 为转移性病灶，2 例 (22.22%) 为颅底病灶累及眼眶。眼眶 NEC 最常见的临床表现为眼球突出 (66.67%) 和眼睑肿胀 (55.56%)。眼眶 NEC 复发率为 44.44%，转移率为 33.33%，随访过程中 4 例 (44.44%) 患者因病死亡。眼睑组预后优于眼眶组 ($p = 0.02$)。

结论：眼部 NEC 具有高度异质性。早期广泛切除联合辅助放化疗可降低复发风险。需提高临床警惕性以减少误诊。

摘要编号: 209614

脉络膜黑色素瘤玻璃体腔切除保留外观及视力一例报告

第一作者: Feng WANG

共同作者: Hui CUI, Mei Qin LIANG, Jia Yi WU, Le Yao ZHANG

目的: 脉络膜黑色素瘤是成年人最常见的原发性眼内恶性肿瘤, 传统治疗方式多以眼球摘除为主, 虽能彻底控制肿瘤, 但患者常因此失去视功能及眼球外观, 严重影响生活质量。随着显微玻璃体手术技术的进步, 保眼性治疗成为可能。本研究报告一例经玻璃体腔切除术治疗的脉络膜黑色素瘤患者, 探讨该术式在有效控制肿瘤的同时, 保留眼球形态及部分视功能的可行性和临床意义。

方法: 患者, 男性, 55 岁, 右眼视力下降 2 个月, 视物不见 10 天余。入院行影像学提示右眼脉络膜黑色素瘤, 排除全身转移后拟行保眼手术。术中先行玻璃体全切除, 包括玻璃体人工后脱离及周边基底部玻璃体切除。在眼内电凝辅助下行肿瘤区域视网膜切开; 在周边部根据肿瘤大小作近 120° 弧形视网膜切开, 翻转视网膜以充分暴露肿瘤。

结果: 术中操作顺利, 无严重并发症。病理证实为脉络膜黑色素瘤。术后随访 18 个月, 肿瘤切除区瘢痕稳定, 无复发及转移迹象。眼球外观保持良好, 矫正视力由术前强光感提高至术后手动, 眼底影像学显示视网膜结构稳定。患者主观视觉质量明显改善, 心理接受度高。

结论: 在严格病例选择和完善术前评估的基础上, 玻璃体腔切除术可作为部分脉络膜黑色素瘤患者的保眼性治疗选择。通过玻璃体全切、视网膜翻转暴露及局部肿瘤精准切除等技术, 可在有效控制肿瘤生长的同时, 最大限度保留眼球外观与残余视功能。本例显示该术式具有良好的安全性与可行性, 为脉络膜黑色素瘤患者提供了一种兼顾肿瘤控制与功能保留的综合治疗思路, 具有重要的临床推广与研究价值。

摘要编号: 207939

血清 IgE 水平在 IgG4 相关性眼病中的临床意义: 一项单中心研究

第一作者: Tingting REN

共同作者: Jing LI, Jianmin MA

目的: 通过对比分析血清 IgE 水平升高和正常的 IgG4 相关性眼病 (IgG4-ROD) 患者的临床特征和预后差异, 探讨血清 IgE 水平在 IgG4-ROD 疾病中的作用。

方法: 本研究为单中心回顾性研究, 共纳入 2022 年 3 月至 2024 年 3 月经组织病理学诊断为 IgG4-ROD 的 54 例患者。比较 IgE 升高组 (血清 IgE 水平 > 165 IU/ml) 和 IgE 正常组 (血清 IgE 水平 ≤ 165 IU/ml) 的临床特征, 并选取随访至少 6 个月的 50 例患者, 评估血清 IgE 水平与疾病预后之间的关系。采用独立样本 t 检验、Mann-Whitney U 检验和卡方检验比较组间差异; 计算 Spearman 相关系数以评估血清 IgE 浓度与临床特征的相关性, 以及每组中 IgG4-RD RI 与血清学参数的相关性; 使用 Kaplan-Meier 生存曲线和 Cox 回归分析评估血清 IgE 水平与疾病预后的关系。

结果: 54 例患者中, IgE+ 组 ($n = 22$) 和 IgE- 组 ($n = 32$) 均好发于中老年女性, 且 IgE- 组的女性发病率更高 ($P = 0.016$)、眼外肌受累更常见 ($P = 0.033$); IgE+ 组的双眼发病率更高 ($P = 0.040$)、副鼻窦受累更常见 ($P = 0.046$)。两组间血清 IgG4 ($P = 0.004$)、补体 C1q ($P = 0.021$)、IL-10 水平 ($P = 0.030$)、IgG4/IgG ($P = 0.022$) 和 IgE/IgG4 比值 ($P = 0.018$) 均具有显著差异。且血清 IgE 水平与 IgG4、IL-6、IL-8、IL-10、IL-12p70 浓度呈正相关, 与补体 C1q 和 IgM 呈负相关 ($P < 0.05$)。IgE- 组中, 补体 C4 水平与 IgG4-RD RI 呈正相关 ($P = 0.045$)。而 IgE+ 组的血清 ESR、IgG3、IL-10、轻链 K、轻链 L、 $\beta 2$ 微球蛋白水平和 IgG4/IgG 比值均与 IgG4-RD RI 呈正相关, 补体 C1q 浓度与 IgG4-RD RI 呈负相关 ($P < 0.05$)。另外, IgE+ 组的复发率显著高于 IgE- 组 ($P = 0.038$)。单因素 Cox 回归分析显示, 性别、累及眼外肌及眼部结构数量、血清 IgG4、C1q、IL-4 水平和 IgG4/IgG 比值均与疾病复发相关 ($P < 0.05$)。多因素分析发现, 血清 IgE 水平是影响疾病复发的独立危险因素 ($P = 0.015$)。

结论: 血清 IgE 水平正常和升高的 IgG4-ROD 患者在临床特征及预后方面具有一定差异, 血清 IgE 水平升高可能预示着疾病具有更高的活动性, 并与疾病复发显著相关。

眼部影像学

摘要编号: 207852

ABHD12 基因突变致 PHARC 综合征: 一例由庆大霉素耳毒性切入并经多模态诊断破解的疑难病例

第一作者: Feng YIXIA

目的: 报道一例由 ABHD12 基因纯合突变引起的 PHARC 综合征罕见病例, 强调在具有多重系统损

害（如视网膜色素变性、听力损失、共济失调、多发性神经病变、白内障）的疑似遗传性疾病中，拓宽鉴别诊断思路及结合基因检测与多学科评估的重要性。

方法：临床评估：包括眼科检查（眼底照相、视野、OCT、自发荧光成像）、耳科检查（纯音测听、前庭功能检查）、神经科检查（神经电生理、VEP、头颅CT）。基因检测：采用全外显子组测序（WES）对患者进行基因分析。多学科协作：结合眼科、耳鼻喉科、神经内科和遗传学专家意见，进行综合诊断与管理。

结果：临床表现：患者表现为进行性视力下降、夜盲、感音神经性听力损失、早发性白内障、多发性周围神经病变和共济失调体征。影像与电生理：眼底显示典型视网膜色素变性改变；OCT显示外层视网膜结构缺失；神经传导速度检查提示脱髓鞘性神经病变；前庭功能检查显示左侧半规管功能下降。基因检测：发现ABHD12基因纯合突变（c.415G>A, p.Gly139Arg），ACMG分类为VUS，但与功能丧失型突变表型相符。最终诊断：排除Usher综合征，确诊为PHARC综合征。

结论：PHARC综合征是一种罕见的多系统遗传性疾病，易被误诊为Usher综合征等其他疾病。基因检测（如WES）结合多模态临床评估是确诊关键。早期诊断有助于多学科干预（如听力与视觉支持），改善患者生活质量。本病例扩展了PHARC的表型谱，并强调了在复杂遗传综合征中全面评估的重要性。

摘要编号：200658

Lenstar900 与 OPD-Scan III 测量年龄相关性白内障患者术前 Kappa 角与 Alpha 角的一致性分析

第一作者：Bao Tong

目的：比较 Lenstar900 测量仪与 OPD-Scan III 光程差分析仪测量年龄相关性白内障患者术前 Kappa 角与 Alpha 角的一致性。

方法：收集在赤峰朝聚眼科医院就诊的年龄相关性白内障患者 90 例（90 眼），术前分别应用 Lenstar900 生物测量仪与 OPD-Scan III 光程差分析仪测量以瞳孔为中心的视轴偏心距（Kappa 角）、以角膜为中心的视轴偏心距（Alpha 角）。Lenstar900 先收集在角膜顶点平面分解的 X 轴和 Y 轴坐标，再通过三角函数计算偏心距（Kappa 角、Alpha 角），OPD-Scan III 光程差分析仪收集仪器自动测得的偏心距（Kappa 角、Alpha 角），最后分别比较明室与暗室的瞳孔直径（PD）、视轴偏

心距（Kappa 角、Alpha 角）、角膜直径（WTW）。两种仪器所测数据均以均值加减标准差表示，组间比较采用独立样本 t 检验。

结果：Lenstar900 测量的明室 Kappa 角为 (0.215 ± 0.123) mm，暗室 Kappa 角为 (0.237 ± 0.130) mm，明室 Alpha 角为 (0.359 ± 0.103) mm，暗室 Alpha 角为 (0.375 ± 0.099) mm，明室角膜直径为 (11.37 ± 0.427) mm，暗室角膜直径为 (11.36 ± 0.442) mm，明室瞳孔直径为 (3.697 ± 0.471) mm，暗室瞳孔直径为 (4.627 ± 0.825) mm。OPD-Scan III 差分析仪测量的明室 Kappa 角为 (0.204 ± 0.110) mm，暗室 Kappa 角为 (0.258 ± 0.135) mm，明室 Alpha 角为 (0.389 ± 0.103) mm，暗室 Alpha 角为 (0.407 ± 0.095) mm，明室角膜直径为 (11.31 ± 0.380) mm，暗室角膜直径为 (11.37 ± 0.370) mm，明室瞳孔直径为 (3.636 ± 0.477) mm，暗室瞳孔直径为 (4.628 ± 0.827) mm。两种仪器测量各项数据比较， $P > 0.05$ ，差异无统计学意义。

结论：Lenstar900 测量仪与 OPD-Scan III 光程差分析仪两种仪器测量年龄相关性白内障患者术前的 Kappa 角与 Alpha 角有较好的一致性，能够为屈光性白内障人工晶状体的选择提供一定的参考依据。

摘要编号：203434

“老”痛风隐匿的眼底病

第一作者：Miaohong CHEN

共同作者：Qingshan CHEN

目的：患者，男，61 岁，主诉：双眼视力下降，伴中心暗影、视物变形 1 个月。高血压 12 年；确诊“痛风”10 余年，长期口服“非布司他”，否认使用激素治疗，全身四肢关节多发痛风石。

方法：眼底主要表现为双眼后极部多灶性色素上皮损害，通过与痛风引起的眼底病变（葡萄膜炎、视网膜炎）、梅毒性视网膜脉络膜炎、药源性眼底改变（非布司他）、Vogt-小柳原田综合征、急性后极部多灶性鳞状色素上皮变、多灶性脉络膜炎、点状内层脉络膜病变等鉴别诊断。

结果：查询外院有长期间断使用激素病史，确诊本病例为痛风患者长期口服激素诱导的慢性中心性浆液性脉络膜视网膜病变。

结论：痛风患者长期口服激素可诱导的慢性中心性浆液性脉络膜视网膜病变；重视全身病带来的眼部表现；尽量收集完善病史资料，不受病人主观主诉误导。

摘要编号: 200657

三种不同仪器测量白内障患者术前角膜直径和角膜曲率对比研究

第一作者: Bao Tong

目的: 比较 Lenstar 900、IOL Master700、OPD Scan III 三种不同仪器在白内障术前测量角膜直径和角膜曲率的一致性和差异性。

方法: 收集 2024 年 1 月-2024 年 12 月在赤峰朝聚眼科医院就诊的年龄相关性白内障患者 78 例 (85 眼), 分别采用 Lenstar 900、IOL Master700、OPD Scan III 测量角膜直径和角膜曲率, 对所测量的数据进行统计学分析。

结果: 三种仪器测量角膜直径值分别为 (11.27 ± 0.39) mm、 (11.50 ± 0.38) mm、 (11.21 ± 0.37) mm, 三种仪器之间比较差异均有统计学意义 ($F = 13.79$ $p < 0.01$)。三种仪器测量角膜曲率 (K1、K2、AST) 差异均无统计学意义 ($p = 0.851$ $p = 0.626$ $p = 0.45$)。

结论: 角膜直径测量, Lenstar 900 与 OPD Scan III 测量结果一致性较好, IOL Master700 与 Lenstar 900、OPD Scan III 测量结果一致性较差。角膜曲率测量, 三种仪器测量结果有较好的一致性, 临床中可以互相代替使用, 都可为白内障术前人工晶状体计算提供一定的参考依据。

摘要编号: 203415

三维 OCTA 评估屈光参差性弱视患者黄斑区视网膜微循环的异常改变

第一作者: Xiao TIAN

目的: 通过对屈光参差性弱视患者进行三维光学相干断层扫描血管成像 (optical coherence tomography angiography, OCTA) 检查, 观察弱视眼与屈光参差性弱视患者的对侧眼及健康对照眼之间存在的视网膜功能学差异。

方法: 本研究共纳入 52 例 (78 只眼), 其中包括弱视眼 26 只、屈光参差性弱视患者的对侧眼 26 只和健康对照眼 26 只。利用三维光学相干断层成像血管造影 (3D-OCTA) 技术, 采集并分析三组在旁中心凹区域的视网膜微循环参数, 包括血管弯曲度指数 (VTI), 以及浅层血管丛 (SVP)、中间毛细血管丛 (ICP) 和深层毛细血管丛 (DCP) 中各层的血管容积密度 (VVD)、血管骨架密度 (VSD) 和血管直径指数 (VDI)。采用广义估计方程 (GEE) 模型评估组间差异, 并进行两两比较以探讨各指标在不同组间的统计学差异。

结果: 与健康对照眼相比, 弱视眼及屈光参差性弱视患者的对侧眼在五个象限中各层血管容积密度 (VVD) 普遍降低, 尽管部分象限差异未达统计学显著性。与对侧眼相比, 弱视眼的 VVD 进一步降低, 部分象限差异具有统计学意义。血管骨架密度 (VSD) 在弱视眼及屈光参差性弱视患者的对侧眼中也普遍低于健康对照眼, 部分象限差异显著; 同时, 弱视眼相较于对侧眼亦表现为 VSD 降低, 部分象限存在显著性差异。血管直径指数 (VDI) 在弱视眼与对侧眼中均高于健康对照眼 ($P < 0.05$), 而弱视眼与对侧眼之间 VDI 差异无统计学意义 ($P = 1.00$)。此外, 弱视眼的血管弯曲度指数 (VTI) 显著高于健康对照眼 (1.42 ± 0.005 vs. 1.41 ± 0.019 , $P = 0.01$), 但弱视眼与对侧眼 ($P = 0.44$) 及对侧眼与对照眼 ($P = 0.32$) 之间差异均不显著。

结论: 弱视眼视网膜血流灌注降低, 血管增宽, 血管弯曲度增加, 屈光参差性弱视患者的对侧眼在各项血管参数上也异于对照眼。

摘要编号: 200652

不同生物测量方法在 III 型黄斑患者眼轴长度及人工晶状体屈光度计算中的差异性分析

第一作者: Bao Tong

目的: 分析接触式 A 超、浸润式 B 超及光学生物测量在 III 型黄斑形态异常患者中眼轴长度及人工晶状体度数计算时的差异。

方法: 选取在赤峰朝聚眼科医院欲行白内障手术, 眼底为 III 型黄斑 (倾斜黄斑) 的患者 30 例 (30 眼) 的生物测量资料, 分别留取光学生物测量 (Lenstar 900)、接触式 A 超 (MD-2400S) 及浸润式 B 超 (MD-2400S) 测量的眼轴长度, 并用三种眼轴长度计算人工晶状体屈光度, 对眼轴长度和所计算的人工晶状体屈光度进行比较并进行统计学分析。

结果: 接触式 A 超与浸润式 B 超及光学生物测量所获取的眼轴长度比较, 均有统计学意义 ($P < 0.05$), 浸润式 B 超与光学生物测量所获取的眼轴长度比较, 无统计学意义 ($P > 0.05$)。三种生物测量的眼轴长度在角膜曲率等参与值不变时计算人工晶状体屈光度, 接触式 A 超与浸润式 B 超及光学生物测量所计算出的人工晶状体屈光度比较, 均有统计学意义 ($P < 0.05$), 浸润式 B 超与光学生物测量所计算出的人工晶状体屈光度比较, 无统计学意义 ($P > 0.05$)。

结论: 由于 III 型黄斑 (倾斜黄斑) 的中心凹位于斜坡上, 采用接触式 A 超测量眼轴长度并计算人工晶状体屈光度时, 会产生一定的测量与计算误差, 而浸润式 B 超与光学生物测量具有较好的一致性, 光学生物测量重复性好, 准确性高, 更适合 III 型

黄斑患者的人工晶状体屈光度计算。当光学生物测量无法获取眼轴长度时，应首选浸润式 B 超进行眼轴长度测量，以保障人工晶状体屈光度计算的准确性。

摘要编号：200651

两种不同生物测量方法测量膨胀期白内障晶状体厚度的对比研究

第一作者：Bao Tong

目的：分析浸润式 B 超和接触式 A 超两种生物测量方法测量膨胀期白内障晶状体厚度是否具有一致性。

方法：选取 2024 年 6 月-2024 年 12 月在赤峰朝聚眼科医院拟行白内障摘除及人工晶状体植入手术的患者 50 例（50 眼）纳入研究，所有患眼均为膨胀期白内障，晶状体厚度均大于 5 mm，术前采用浸润式 B 超和接触式 A 超两种测量方法，分别测量患眼晶状体厚度，声速均设定为膨胀期白内障声速 1590 m/s，连续测量 5 次，取其平均值，检查均由同一名操作熟练的技师完成。

结果：30 例膨胀期白内障患眼中，浸润式 B 超测量晶状体厚度为 (5.86 ± 0.43) ，接触式 A 超测量晶状体厚度为 (3.55 ± 0.45) ，差异具有统计学意义 $(P < 0.05)$ 。

结论：膨胀期白内障晶状体混浊严重，应用接触式 A 超测量法，无法准确识别晶状体前、后囊波。而浸润式 B 超测量法，在 B 型超声的引导下，可以准确识别晶状体前、后囊波。综上所述，浸润式 B 超测量法可以更加准确的测量膨胀期白内障晶状体厚度，减少因晶状体厚度测量不准确而引起的人工晶状体屈光度测量误差。

摘要编号：208036

健康眼虹膜及视网膜血循环与脉络膜厚度值相关性分析

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共同作者：Zou HAIDONG, Fang XIAOLING, Wang YULAN

目的：探讨健康人眼虹膜虹膜血循环量化分析值、视网膜血循环量化分析值和脉络膜厚度值之间的相关性。

方法：共计 64 名健康受试者参加了这项回顾性的横断面研究。所有受试者都接受了光学相干断层扫描血管成像（OCTA）和脉络膜厚度检查。其中，血管面积密度（VAD）和血管骨架密度（VSD）被用来定量描述虹膜血管和视网膜血管的 OCTA 图像。

结果：对健康志愿者虹膜及眼底 OCTA 血管 OCTA 量化指标值进行了相关性分析，P 均大于 0.05，可以认为无明显相关性。

结论：虹膜血流及视网膜血流和脉络膜厚度未发现明显相关性。

摘要编号：207948

基于独立成分分析法对孔源性视网膜脱离患者的静态及动态脑网络机制研究

第一作者：季禹

共同作者：吴晓蓉，周琳

目的：既往神经影像学研究发现孔源性视网膜脱离（RRD）患者脑结构和功能存在显著异常，但关于大规模静态和动态脑网络功能连接（FC）改变的综合研究仍缺乏。

方法：本研究采用独立成分分析（ICA）探讨 RRD 患者大规模脑网络 FC 的变化，运用支持向量机（SVM）对 RRD 患者和健康对照（HCs）进行分类，并分析异常脑区与临床眼科参数的相关性。

结果：与 HCs 相比，RRD 患者默认模式网络（DMN）和视觉网络（VN）的 FC 显著增加，而听觉网络（AN）和感觉运动网络（SMN）的 FC 显著降低。动态功能网络连接（dFNC）分析显示，RRD 患者处于状态 4 的时间占比（FT）显著高于 HCs。SVM 分析表明，基于 AN 和 FNC 特征的分类 AUC 值最高，分别为 0.828 和 0.819。此外，RRD 患者右侧额上回内侧（R-SFGmed）的 FC 值与眼轴长度呈正相关 $(r = 0.401, P = 0.038)$ 。

结论：本研究表明 RRD 患者脑功能网络同时存在损伤和适应性重塑，AN 和 FNC 的改变可能作为区分 RRD 患者与 HCs 的潜在神经影像生物标志物，为理解 RRD 患者视力丧失的机制提供了关键的神经影像学证据。

摘要编号：208705

基于眼部 B 超的先天性视盘凹陷性异常鉴别与视网膜脱离风险预测研究

第一作者：Qian YANG

共同作者：Xin HUANG

目的：临床中牵牛花综合征（morning glory syndrome, MGS）与其他先天性视盘凹陷性异常（Congenital Cavitory Optic Disc Anomaly, CODAs），如视盘周围葡萄肿（Peripapillary Staphyloma, PS）和大视盘合并视盘周围葡萄肿（Giant Papilla with Peripapillary Staphyloma, GPPS），常因眼底表现相似而难以鉴别。然而，这些疾病在致病机制、视网膜脱离（网

脱)发生率及视力预后方面存在显著差异。相较于其他检查,眼部B超检查具有患者配合度高、成本低、易操作等优点,本研究旨在明确可用于有效鉴别上述疾病的超声影像特征,并基于这些特征建立并发网脱的风险预测模型。

方法: 本研究为一项回顾性、观察性队列研究。纳入2015年1月至2025年1月期间于复旦大学附属眼耳鼻喉科医院就诊的先天性视盘凹陷性异常患者。首先,基于眼底照相结果明确诊断的76例患者纳入初始模型开发。随后,在203例视盘凹陷性异常患儿的队列中进行内部扩大验证。

结果: 患儿视力预后因是否并发网脱而存在显著差异($P < 0.001$)。在模型开发队列中,不同疾病类型的网脱发生率分别为: MGS 35例(64.8%)、PS 1例(7.7%)、GPPS 3例(37.5%),组间差异显著($P < 0.001$)。B超图像显示,不同疾病的视盘凹陷参数亦存在显著差异: MGS组的凹陷深度(4.19 ± 2.11 mm)显著大于PS组(2.24 ± 0.60 mm)和GPPS组(2.97 ± 1.19 mm, $P = 0.006$),而凹陷宽度在三组间无统计学差异($P = 0.336$)。根据B超图像将凹陷形态分为“碗形”与“非碗形”,结果显示PS与GPPS组以碗形为主(均为100%),而MGS组则以非碗形为主(75.7%),形态分布差异显著($P < 0.001$)。在内部验证队列中,与未发生网脱组相比,网脱组的凹陷深度(5.01 ± 2.16 mm vs. 3.46 ± 1.86 mm, $P < 0.001$)和宽度(5.16 ± 1.82 mm vs. 4.19 ± 1.94 mm, $P < 0.001$)均显著更大。凹陷形态分布亦存在显著差异(无网脱组碗形占53.8%,网脱组碗形占19.4%, $P < 0.001$)。此外,凹陷深度与宽度均与最终视力呈显著相关($P < 0.001$)。基于上述发现,构建网脱预测模型,设定如凹陷深度 ≥ 3.375 mm且形态为非碗形,则判定为易并发网脱。该模型在内部验证中表现出良好的区分能力,AUC值为0.73(95% CI: 0.66–0.81),对网脱识别的敏感度为61.7%,特异度为76.1%。

结论: 眼部B超图像中视盘凹陷的深度与形态特征,对于鉴别不同类型的先天性视盘凹陷性异常及预测其并发视网膜脱离的风险具有重要价值。本研究构建的临床预测模型有助于识别高网脱风险的患者,为临床加强随访与管理提供依据。

摘要编号: 209432

广域 SS-OCT 诊断完全性玻璃体后脱离的准确性

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目的: 与术中对比,评估广域扫频光学相干断层扫描(swept-source optical coherence tomography, SS-OCT)检测完全性玻璃体后脱离(posterior vitreous detachment, PVD)状态的准确性。

方法: 本回顾性研究纳入诊断为视网膜前膜或黄斑裂孔并行手术治疗的患者176人(176眼)。在术前一周内,散瞳后对所有眼进行以黄斑中心凹为中心的SS-OCT 33线水平扫描(模式:扫描长度16 mm,扫描深度3 mm)并评估PVD状态。当在任意B扫描中可见完全脱离的玻璃体后皮质,或在所有33线B扫描中均不可见黄斑前囊或玻璃体后皮质时,诊断为完全性PVD。评估两名观察者通过SS-OCT进行PVD分期的一致性。与玻璃体切除术中曲安奈德辅助评估的PVD状态作比较,统计SS-OCT检测完全性PVD的敏感度、特异度、阳性预测值和阴性预测值。

结果: 两名观察者通过SS-OCT进行PVD分期的一致性高(Kappa = 0.977, $P < 0.001$)。在SS-OCT诊断为完全性PVD的118眼中,术中发现114眼为完全性PVD(真阳性),4眼存在玻璃体粘连(假阳性)。在SS-OCT诊断为玻璃体粘连的58眼中,术中发现57眼存在玻璃体粘连(真阴性),1眼为完全性PVD(假阴性)。SS-OCT检测完全性PVD的敏感度为99.13%,特异度为93.44%,阳性预测值为96.61%,阴性预测值为98.28%。

结论: 广域SS-OCT对视网膜前膜和黄斑裂孔患者的完全性PVD诊断准确性高。

摘要编号: 209227

开发一种经济型眼底多光谱成像检测装置

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目的: 眼底光谱成像(FSI)将眼底照相与光谱技术融合,可同时获取视网膜的空间与光谱信息,用于视网膜疾病检测。尽管现有FSI系统在结构与功能成像上已显优势,却因成本高、光路复杂而难以普及。为此,我们提出一种低成本、光路极简的多光谱眼底相机:整机由商用现成光学件、3D打印结构件及光纤束耦合的多波长LED光源(470–740 nm)构成。系统还首创性地引入“同轴非分离偏

振反射抑制”技术，仅通过正交偏振片即可消除角膜反光；据我们所知，该架构为 FSI 领域首次应用。

方法：本研究开发的低成本 FSI 系统由照明光路和成像光路组成。研究分两阶段：第一阶段招募 9 名健康志愿者，采集双眼 9 个波长（474–740 nm）眼底图像，评估系统成像能力与光谱特性；第二阶段招募 300 名受试者，采集 5 个关键波长（474 nm、553 nm、610 nm、660 nm、740 nm）图像，并与商用眼底相机拍摄图像进行分析。

结果：使用模型眼测试显示，系统总视场（FOV）约 30°，中心视场空间分辨率可达 8.77 μm，能捕捉视网膜细微结构，且手动调焦可补偿患者 ± 15 D 的球面屈光度。本研究在医院对比了 FSI 与商用眼底相机在检测糖尿病视网膜病变（DR）、视盘旁萎缩弧（PPA）和脉络膜色素痣（CPN）中的效果。在 DR 中，FSI 在 610 nm 和 660 nm 波长下增强了视网膜深层结构对比度，使硬性渗出物识别更清晰；对于 PPA，FSI 在 660 nm 和 740 nm 波长下能更清晰地显示脉络膜脉管系统，有助于精准诊断和监测；CPN 是脉络膜内的良性病变，FSI 在 660 nm 和 740 nm 波长下能更明显地显示色素沉积，有助于长期监测并早期发现潜在变化。

结论：该装置在低成本条件下仍可获得高质量 FSI 图像，验证了工程可行性。临床数据进一步确认其对糖尿病视网膜病变、脉络膜色素痣的诊断价值，并首次实现视盘周围萎缩的光谱成像。其成像质量媲美传统彩色眼底照相，同时对脉络膜病变等深部病灶具有更优检出率，为资源受限地区提供了一种经济、可大规模部署的 FSI 实用方案。

摘要编号：209771

抑郁症与视网膜血管改变：炎症的中介作用探讨

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共同作者：Cong LI, Lei LIU, Xiaohong YANG, Honghua YU

目的：尽管研究已证实抑郁症患者存在视网膜血管改变，但其潜在机制尚不明确。现有证据表明，抑郁症与全身性炎症水平升高相关，且外周炎症可引发视网膜结构改变。本研究旨在探讨外周炎症是否介导了抑郁症与视网膜血管变化之间的关联。

方法：基于英国生物银行数据（UKB），我们排除了无眼底图像、患有全身性或眼部疾病的参与者。采用经过验证的 AutoMorph 深度学习算法对视网膜血管进行量化，并基于 C 反应蛋白、白细胞计数、血小板计数和中性粒细胞与淋巴细胞比值计算复合性低度慢性炎症评分。通过线性回归分析抑郁症与

血管参数及炎症指标的关联，并采用中介分析检验炎症在抑郁症相关血管改变中的作用。

结果：本研究为横断面研究，共纳入 39,198 名参与者（35,330 名对照；3,868 名抑郁症患者）。抑郁症患者的视网膜中央静脉等效直径和视网膜中央动脉等效直径显著增宽（ $\beta = 3.12$ 与 2.45, $p < 0.001$ ），该结果在校正混杂因素后仍保持显著。抑郁症组的炎症标志物水平显著升高。中介分析显示，INFLA 评分、白细胞计数和中性粒细胞计数分别介导了 9.64%、5.88% 和 5.71% 的视网膜中央静脉等效直径增宽效应。

结论：与对照组相比，抑郁症患者存在显著的视网膜动、静脉增宽现象，其中外周炎症部分介导了抑郁症与视网膜中央静脉等效直径的关联，表明慢性炎症是抑郁症视网膜血管改变的重要机制，这为利用眼底影像客观评估抑郁症提供了理论和科学依据。

摘要编号：208931

新生儿特纳综合征合并视网膜脱离一例

第一作者：Yu SU

共同作者：Changzheng CHEN, Lhamo TSERING

目的：报道一例特纳综合征新生儿合并视网膜脱离的病例。

方法：一个出生胎龄 38 周的新生儿出生第 7 天行眼底筛查发现右眼 360° 周边血管分支增多，伴渗出，嵴样改变；左眼视网膜脱离伴囊肿形成。婴儿生后第七天，经皮测黄疸值 12.8 mg/dl，全身皮肤和巩膜黄染，诊断新生儿高胆红素血症。染色体检查显示异常：母亲孕期行羊水细胞学检查提示染色体核型分析示 45,X[6]/46,X,i(X)(q10)[95];FISH 示受检者约有 18% 的细胞为 X 染色体单体细胞；CMA 示 X 染色体在 Xp22.33p11.21 缺失（变异分类为致病性），在区段 Xp11.21q28 嵌合重复（变异分类为致病性），推测可能的核型为 45X/46,X,i(Xq) 为 Turner 综合征特殊类型。

结果：患儿双眼眼底筛查显示右眼周边各象限血管末端扩张呈线、嵴状，360° 周边血管未发育；左眼 3 全视网膜脱离，视盘鼻侧大视网膜囊肿，后极部浅脱，中周部大量视网膜新生血管形成，伴多个视网膜上及视网膜下增殖条索，周边血管未发育。荧光素眼底血管造影显示右眼充盈时间迟缓，后极部明显异常荧光征象，颞侧、下方、上方、鼻侧各象限周边部血管扩张呈毛刷样改变，晚期渗漏不明显，周边部大片无血管区，左眼全视网膜脱离朦胧荧光，隐约见增殖条索带状高荧光。双眼造影后给予激光光凝治疗后视网膜脱离消退。

结论：特纳综合征罕见，其合并视网膜病变的报道仅两例，眼科医师应了解其可能出现的眼部改变，尽早发现病变并治疗。

摘要编号：208049

无后葡萄肿近视眼眼轴长度与眼球后壁弹性的相关性：基于剪切波弹性成像的横断面研究

第一作者：Tianwei QIAN

目的：利用剪切波弹性成像技术，探究无视盘后葡萄肿的近视眼中眼轴长度（AL）与眼球后壁弹性之间的相关性。

方法：这项横断面研究共纳入 87 只右眼，其中 29 只为高度近视（等效球镜度 ≤ -6.00 D），58 只为低度近视（ -6.00 D $<$ 等效球镜度 ≤ -0.50 D）。采用 Pentacam 测量眼轴长度，并使用剪切波弹性成像技术检测眼球壁不同区域（包括黄斑区、视神经附近及中周部邻近区域）的弹性特征。采用多元回归分析探讨眼轴长度与不同部位弹性之间的相关性。

结果：高度近视组在黄斑区、视神经鼻侧 3.5 mm 处、视神经颞侧与鼻侧以及水平与垂直方向中周部颞侧和鼻侧区域的弹性测量值均显著降低（ $P < 0.01$ ）。此外，黄斑区水平与垂直方向的弹性与眼轴长度均呈显著相关（ $P < 0.001$ ）。

结论：随着眼轴长度的增加，黄斑区眼球壁弹性降低，这可能是后巩膜葡萄肿好发于黄斑区的原因。高度近视患者应更加关注黄斑区变化。眼球后壁弹性的这种微观结构改变可能促进后巩膜葡萄肿的发展。

摘要编号：207896

机器学习分析利用异常脑白质功能对高度近视患者进行分类

第一作者：周琳

共同作者：吴晓蓉，季禹

目的：高度近视是全球导致不可逆视力丧失的主要病因，对患者生活质量造成长期显著影响。尽管已有大量研究记录了 HM 患者的灰质改变，但针对白质异常的研究仍较为有限。本研究旨在阐明高度近视如何影响大脑白质结构，从而深化对该病症的神经生物学理解，并为优化诊断和治疗策略提供帮助。

方法：本研究对 55 名临床确诊的高度近视患者和 55 名人口统计学匹配的健康对照组进行了静息态功能磁共振成像。通过低频振幅波动技术评估白质功能变化。随后，利用提取的 ALFF 特征训练支持向量机分类器，用于区分 HM 患者与健康对照组。

结果：与健康对照组相比，高度近视患者在多个白质区域显示出显著降低的低频波动振幅，涉及右矢状层（包含下纵束和下额枕束）、右上纵束、右前辐射冠以及左后丘脑辐射（涵盖视辐射）。经广义回归函数校正后，观察到的组间差异仍具有统计学意义，表明高度近视患者与健康对照组之间存在显著的神经结构改变。此外，支持向量机分类器展现出 71.82% 的准确率和 0.77 的曲线下面积，在鉴别高度近视方面具有可靠的区分性能。

结论：本研究揭示了高度近视患者白质的异常特征，主要影响与视觉和认知功能相关的脑区。此外，白质低频波动幅度可能成为区分高度近视与健康对照组的新颖神经影像学生物标志物。这些发现揭示了高度近视患者白质中广泛的功能性损伤，为现有结构研究提供了新的视角。

摘要编号：200653

浸润式 B 超在硅油填充眼人工晶状体屈光度计算中的应用价值

第一作者：Bao Tong

目的：评价浸润式 B 超分段声速测量法在硅油填充眼人工晶状体屈光度计算中的应用价值。

方法：选取拟行硅油取出、白内障摘除及人工晶状体植入手术的患者 30 例（30 眼）纳入研究，所有患眼屈光间质混浊严重，光学设备测量不能获取眼轴长度。手术前采用浸润式 B 超生物测量法测量眼轴长度并计算人工晶状体目标屈光度。眼轴长度为角膜厚度、前房深度、晶状体厚度、硅油泡长度、硅油泡水液层厚度的总和。手术后采用光学生物测量设备测量眼轴长度，与术前眼轴长度及目标屈光度对比，评价浸润式 B 超在硅油填充眼人工晶状体屈光度计算中的应用价值。

结果：30 例患眼中术前浸润式 B 超测量眼轴长度平均值为（ 25.96 ± 0.90 ），术后光学生物测量眼轴长度为（ 25.84 ± 0.91 ），差异均无统计学意义（ $t = 0.131$ ， $P = 0.897 > 0.05$ ）。用术前及术后测量的眼轴长度所计算的人工晶状体目标屈光度，差异均无统计学意义。

结论：在屈光间质混浊严重时，光学生物测量不能获得眼轴长度，此时应用浸润式 B 超分段声速测量法可以准确获得眼轴长度值，较好的解决了因眼轴测量不准确导致的人工晶状体屈光度计算误差。

摘要编号: 207964

糖尿病视网膜病变全病程的神经血管损害演变

第一作者: Chunran LAI

共同作者: Jiahui CAO, Zijing DU, Honghua YU

目的: 探讨糖尿病视网膜病变 (DR) 全病程中 (涵盖临床前 DR、非增殖性 DR 和增殖性 DR), 中心及周边视网膜神经血管和微结构损害的演变过程。

方法: 本研究采用单中心横断面设计, 全部受试者均来自广东省人民医院。共纳入 81 名受试者, 其中健康对照 23 名、临床前 DR 23 例、非增殖性 DR 13 例、增殖性 DR 22 例。综合应用超广角扫频源光学相干断层扫描血管成像、视网膜电图与自适应光学扫描激光检眼镜, 系统评估并量化视网膜结构与功能指标, 进而分析二者间的相关性。

结果: 在临床前 DR 阶段, DR 评估方案中的 ERG 振幅已显著降低 ($P = 0.003$), 但视网膜各层结构与光感受器细胞均未出现明显改变。进展至非增殖性 DR 阶段, 光感受器细胞功能出现显著损害 (均 $P < 0.05$), 具体表现为 ISCEV 明视闪烁反应潜伏期延迟、黄斑及内丛状层厚度增加、深层毛细血管丛的血管密度与灌注面积下降 (均 $P < 0.05$)。到了增殖性 DR 阶段, ISCEV 明视闪烁反应与 PhNR 反应的潜伏期均显著延迟, 振幅亦明显降低, 同时伴有广泛的神经血管损害 (均 $P < 0.05$)。相关性分析进一步证实, 视网膜功能参数与多项结构指标之间存在显著关联 (均 $P < 0.05$)。

结论: 本研究提示, 锥通路功能损害始于临床前 DR 阶段, 至非增殖性 DR 阶段已呈现明确的光感受器细胞功能障碍。未来, 采用视野更广、分辨率更高的影像学技术, 将能为揭示 DR 全病程的神经血管损害机制提供更为深入的见解。

摘要编号: 207950

视网膜脱离患者初级视皮层动态功能连接和有效连接异常的机器学习研究

第一作者: 季禹

共同作者: 吴晓蓉, 周琳

目的: 视网膜脱离 (RD) 是一种严重的眼部疾病, 若不及时治疗常导致失明。尽管先前的神经影像学研究发现 RD 患者脑功能活动的显著改变, 但这些研究主要集中于局部功能活动的变化。RD 患者初级视皮层 (V1) 内功能连接的方向性改变尚待阐明。

方法: 本研究采用基于种子点的功能连接分析和 Granger 因果分析, 探讨 RD 患者 V1 区动态功能连接 (dFC) 的方向性变化。最后, 使用支持向量

机 (SVM) 算法对 RD 患者和健康对照 (HCs) 进行分类。

结果: 与 HCs 相比, RD 患者视觉网络 (VN) 与默认模式网络 (DMN) 之间以及 VN 内部的动态功能连接 (dFC) 和动态有效连接 (dEC) 显著增加。相反, VN 与听觉网络 (AN) 之间的 dFC 显著降低, VN 与感觉运动网络 (SMN) 之间的 dEC 显著减少。在状态 4 中, 两组的频率存在显著差异, RD 患者的频率显著高于 HCs。值得注意的是, 左 V1 区的 dFC 变化显示出诊断效能, AUC 值达到 0.786。

结论: 本研究揭示了 RD 患者 VN 与 DMN 之间连接的显著改变, 这些变化可能破坏 RD 患者的视觉信息处理和高级认知整合。此外, 左 V1 区和全脑 dFC 的变化在辅助诊断 RD 方面显示出巨大的潜力。这些发现为理解 RD 相关视觉和认知障碍的神经机制提供了有价值的见解。

摘要编号: 206949

调节激励下高度近视眼视盘形变指数变化研究

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共同作者: Yilei SHAO, Meixiao SHEN, Jinsong WANG

目的: 纳入 62 名 18-30 岁健康受试者, 根据等效球镜度分为正视 / 低度近视组 ($n = 21$)、中度近视组 ($n = 18$) 和高度近视组 ($n = 23$)。用 OCT 分别采集在放松和 6 D 调节刺激状态下的睫状肌和视盘图像。测量并分析睫状肌最大厚度 (CMTMAX)、前部长度 (CMAL)、Bruch 膜开口距离 (BMOD)、前巩膜管开口距离 (ASCOD) 及相关角度参数的变化。通过标准化处理建立视盘形变指数 (视盘参数变化量与睫状肌参数变化量的比值), 评估不同程度近视眼视盘生物力学特性及其与眼轴的关系。

方法: 高度近视组的 BMOD 和 ASCOD 变化量显著大于中度近视组和正视 / 低度近视组; 而 CMTMAX 增加量显著小于其他两组。CMTMAX 变化量与眼轴呈显著负相关, BMOD 和 ASCOD 变化量与眼轴呈显著正相关。基于 CMTMAX 的视盘形变指数与眼轴显著相关, 其混合模型对高度近视的诊断效能最佳 ($AUC = 0.9330$)。

结果: 高度近视眼在调节过程中表现出更显著的视盘形变和较弱的睫状肌收缩反应, 提示其组织生物力学特性发生改变。本研究首次建立的视盘形变指数可作为评估近视眼组织生物力学特性的新指标, 有望为近视发展机制研究和并发症防控提供新的研究方向。

结论: 高度近视眼在调节过程中表现出更显著的视盘形变和较弱的睫状肌收缩反应, 提示其组织生物

力学特性发生改变。本研究首次建立的视盘形变指数可作为评估近视眼组织生物力学特性的新指标，有望为近视发展机制研究和并发症防控提供新的研究方向。

摘要编号：207662

超广角 OCTA 探索孔源性视网膜脱离患者对侧视网膜和脉络膜血管改变

第一作者：Xiaoyin ZHOU

共同作者：Xiangting CHEN, Haijun GONG, Wanqing HE, Yuqing LAN, Xuepei LI, Zhenping LI, Yun YU, Yunjiao ZHAO

目的：本研究旨在利用超广角扫描光源光学相干断层血管成像 (ultra-widefield swept-source optical coherence tomography angiography, UWF-SS-OCTA) 探讨和比较单侧孔源性视网膜脱离 (rhegmatogenous retinal detachment, RRD) 患者对侧眼与健康人群在视网膜与脉络膜血流灌注方面的差异。

方法：本研究共纳入 43 例单侧 RRD 患者的健眼及 55 例年龄性别匹配的健康受试者，采用 UWF-SS-OCTA 对整个视野及九个象限的视网膜和脉络膜血管密度进行定量评估。同时，使用超广角扫描眼底激光成像 (UWF-scanning laser ophthalmoscopy, UWF-SLO) 记录 RRD 患者对侧眼的眼底形态结构改变。

结果：RRD 组对侧眼的中央凹无血管区 (foveal avascular zone, FAZ) 较健康对照组显著扩大 ($P = 0.027$)，脉络膜厚度 (choroidal thickness, CT) 显著变薄。此外，视网膜浅层血管丛血管密度 (superficial vascular plexus, SVP, $P = 0.036$)、全视网膜血管密度 ($P = 0.031$)、脉络膜血管体积 (choroidal vascular volume, CVV, $P = 0.015$)、脉络膜血管指数 (choroidal vascularity index, CVI, $P = 0.039$) 以及脉络膜基质体积 (choroidal stromal volume, CSV, $P = 0.025$) 等参数均较对照组显著降低。UWF-SLO 图像揭示 RRD 对侧眼存在色素病变 (27.9%)、格子样变性 (16.3%) 及视网膜裂孔 (4.7%) 等周边病变。值得注意的是，部分患者虽在 SLO 中未见明确形态异常，但 OCTA 图像已显示出局灶性脉络膜血管灌注缺失。

结论：本研究发现，单侧 RRD 患者的对侧眼在形态尚未明显异常的状态下，已出现早期视网膜与脉络膜血流灌注异常，提示其存在潜在的双眼病理基础。

摘要编号：203141

高保真眼底图像修复助力基础模型临床部署

第一作者：Jinze ZHANG

共同作者：Jiaxiong LI, Peng XIAO

目的：眼底图像是眼科疾病监测与人工智能 (AI) 诊断的关键基础，其质量直接决定算法的可靠性。白内障等屈光介质混浊导致的图像模糊与细节缺失，显著影响 AI 模型的准确率和稳定性。现有图像修复方法虽能恢复整体清晰度，但往往难以保持视网膜血管等关键微结构的真实特征。本研究旨在开发一种高保真眼底图像修复算法，在提升图像质量的同时，保护精细视网膜特征，并验证其对基础模型诊断性能的实际促进作用。

方法：我们提出了一种基于生成对抗网络 (GAN) 的端到端修复框架，构建了自适应视网膜特征增强模块，用以在图像重建过程中平衡整体可视性与局部结构保真性。基于光学退化模型合成了 891 对模拟白内障图像用于训练，并在中山眼科中心及肇庆高要人民医院采集的真实配对图像进行验证。模型性能通过结构相似性指数 (SSIM)、峰值信噪比 (PSNR) 及六个血管形态参数 (包括血管长度、面积、分支点数量、密度、曲度及分形维度) 进行量化评估。此外，我们将修复前后的图像输入微调的眼科基础模型 RETFound，评估图像质量提升对 AI 诊断准确率的影响。

结果：所提模型在验证集上获得最高的 SSIM (0.9124) 和 PSNR (29.58)，在血管结构保留方面显著优于现有方法。定量分析显示，修复图像的血管形态参数与高质量参考图像无显著差异 (均 $p > 0.05$)。t-SNE 可视化结果显示修复图像在高维特征空间中与高质量图像分布高度重叠。临床验证中，修复图像的平均 SSIM 为 0.8035，在视盘和血管分支细节的还原方面明显优于对照算法。修复后图像输入微调的 RETFound 后，其多分类任务诊断性能较修复前平均提升约 9%，显著增强了基础模型的真实世界适应性。

结论：本研究提出的高保真眼底图像修复算法可在不损害血管结构完整性的前提下，有效克服屈光介质混浊导致的图像退化问题，恢复关键诊断细节并提升 AI 模型的准确性与一致性。通过保障图像输入质量与特征保真性，该方法为眼科基础模型在复杂、非标准化的真实世界影像环境中稳定部署提供了可靠支撑。

摘要编号: 208258

高度近视中视锥细胞丢失与深层视网膜血管密度降低及视网膜敏感度受损相关

第一作者: Wei CHI

共同作者: Dong FANG, Jia LIANG

目的: 评估非病理性高度近视 (HM) 患眼中视锥细胞形态、视网膜亚层厚度及血管密度 (VD) 的变化, 以及这些变化与视网膜敏感度 (RS) 的相关性。

方法: 本前瞻性研究纳入 43 例非病理性高度近视患者和 38 例年龄匹配的健康志愿者。所有参与者均接受了详细的眼科评估。采用自适应光学扫描激光眼底镜评估视锥细胞形态。通过光学相干断层扫描 (OCT) 测量肌样体 - 椭圆体带 (MEZ)、光感受器外节段 (OS)、黄斑中心凹及脉络膜的厚度。利用光学相干断层扫描血管造影术评估视网膜浅层和深层毛细血管丛 (DCP) 的血管密度, 同时通过微视野检查评估视网膜敏感度。并进行组间比较, 并探究这些参数之间的相关性。

结果: 与健康对照组相比, 高度近视组存在以下特征: 在 4 个象限 3° 偏心度处, 视锥细胞密度和规则性显著降低, 视锥细胞离散度和间距显著增加 (均 $p < 0.001$)。除两种毛细血管丛的中心凹血管密度及深层毛细血管丛的旁中心凹血管密度外 (均 $p > 0.05$), 其余区域血管密度均显著降低 (均 $p < 0.01$)。肌样体 - 椭圆体带、光感受器外节段、黄斑中心凹及脉络膜厚度均变薄 (均 $p < 0.001$)。多变量回归分析显示: 更高的视锥细胞密度与更短的眼轴长度 ($p = 0.013$) 及更高的深层毛细血管丛整体血管密度 ($p = 0.009$) 相关。更高的视网膜敏感度与更高的视锥细胞密度 ($p = 0.026$)、更厚的肌样体 - 椭圆体带 ($p < 0.001$)、更厚的脉络膜 ($p = 0.044$) 及更高的深层毛细血管丛整体血管密度 ($p = 0.009$) 相关。

结论: 研究结果表明, 在非病理性高度近视中, 深层毛细血管丛灌注受损可独立预测视锥细胞丢失, 且与眼轴伸长无关。视网膜敏感度受损与视锥细胞丢失、肌样体 - 椭圆体带变薄及深层毛细血管丛低灌注相关, 提示高度近视相关视功能损害中存在微血管和结构损伤的协同作用。

神经眼科

摘要编号: 209376

AFG3L2 F175S 突变通过功能获得性相互作用机制介导 PHB2 依赖性 OXA1L 的误导性降解——导致显性视神经萎缩

第一作者: Yan LI

共同作者: Xiuxiu JIN, Bo LEI, Ruotong YANG

目的: 本研究旨在证实 AFG3L2 F175S 突变导致显性视神经萎缩 (DOA), 并阐明其影响线粒体形态与功能的分子机制。

方法: 我们通过 CRISPR/Cas9 技术构建了 AFG3L2 F174S/+ 小鼠 (该位点与人类 F175S 同源), 并利用光学相干断层扫描、组织病理学、视网膜电图和视觉诱发电位评估视网膜完整性。在体内和体外分析了线粒体形态、呼吸功能、活性氧水平和膜电位。通过蛋白质组学分析、免疫共沉淀以及 AlphaFold 3 预测的结构建模, 鉴定了异常的蛋白质相互作用。功能验证包括免疫荧光、蓝色非变性聚丙烯酰胺凝胶电泳以及 OXA1L 过表达的挽救实验。

结果: AFG3L2 F174S/+ 小鼠表现出视网膜神经节细胞数量减少、视网膜厚度变薄和视神经传导受损。在 AFG3L2 F174S/+ 小鼠视网膜以及 AFG3L2 F175S/+ 细胞中均观察到异常的线粒体形态和升高的活性氧水平。F175S 突变使 AFG3L2 与 PHB2 的结合亲和力增强了 41 倍, 形成了一个过度活跃的蛋白酶复合物, 该复合物会招募呼吸链组装因子 OXA1L 并对其进行过度降解, 从而破坏了氧化磷酸化 (OXPHOS) 和线粒体膜电位。过表达 OXA1L 可恢复 OXPHOS 能力, 而敲低 PHB2 则消除了突变诱导的 OXA1L 不稳定性, 证实了 PHB2 作为底物招募支架的作用。

结论: 本研究证实, AFG3L2 F175S 突变通过 PHB2 介导的机制, 异常靶向并水解 OXA1L, 进而瓦解线粒体蛋白质稳态与能量代谢, 最终驱动了 DOA 的发病。上述发现阐明了 AFG3L2-PHB2-OXA1L 这一三元调控轴在视神经病变中的核心作用, 并提示稳定 OXA1L 可作为极具潜力的治疗新策略。

摘要编号: 204428

AFG3L2 基因突变导致常染色体显性遗传性视神经萎缩一例

第一作者: Xiuli CHEN

共同作者: Ying ZHAO

目的: 探讨表现为双眼视神经炎的常染色体显性遗传性视神经萎缩患者得临床及影像学资料。**方法:** 抽丝剥茧分析一例儿童双眼视力下降患者 6 年的临床资料及 OCT、眼眶磁共振等影像学资料。**结果:** 通过基因分析, 最终诊断为 AFG3L2 基因突变导致常染色体显性遗传性视神经萎缩。**结论:** 重视视神经疾病的鉴别诊断, 炎症机制可能参与常染色体显性遗传性视神经萎缩的发生。

摘要编号: 209370

Meige 综合征干眼症状与干眼鉴别

第一作者: Gang LIU

共同作者: Qiangying GUO, Xianzhong LIU, Jie XIANG, Zhen XU

目的: Meige 综合征又称眼睑痉挛 - 口下颌肌张力障碍, 常伴有眼部异常表现, 与干眼存在诸多相似之处, 易导致误诊误治。本研究旨在探讨 Meige 综合征眼部症状的特点, 明确其与干眼的鉴别要点, 为临床医生提供准确、可靠的诊断依据, 提高诊断率。**方法:** 本研究采用回顾性分析方法, 选择 2022 年 1-6 月在我院诊断为 Meige 综合征的患者 159 例, 统计患者基本信息、初始症状、伴随症状、早期诊断、泪液分泌质量、治疗效果及临床特征。**结果:** 本研究共纳入患者 159 例, 年龄 57.4 ± 9.3 岁, 男性 49 例 (30.8%), 女性 110 例 (69.2%), 职业分布: 农民 52 例 (32.7%)、退休 36 例 (22.6%), 无业 31 例 (19.5%), 工人 18 例 (11.3%), 个体 9 例 (5.7%), 共计 91.8%, 其他 13 例 (包括教师、医生、行政、技术员, 占 8.2%)。首发症状: 眼干涩、异物感 75 例 (47.2%), 眨眼频繁、睁眼困难 83 例 (52.2%), 其他 1 例 (0.6%)。干眼诊断: 明确 129 例 (81.1%), 未明确 30 例 (18.9%)。伴随畏光: 畏光 83 例 (52.2%), 轻度畏光 36 例 (22.6%), 无畏光 40 例 (25.2%)。是否行干眼治疗: 是 117 例 (73.6%), 否 42 例 (26.4%)。干眼治疗患者的相关分析 ($n = 117$): BUT 均值: OD 5.09 s, OS 4.73 s, 泪液分泌均值 OD 6.25 mm/5 min、OS 6.11 mm/5 min, 泪河高度均值 OD 0.17 mm、OS 0.16 mm。角膜染色: 阳性 3 例 (2.6%), 阴性 110 例 (94.0%), 无记录 4 例 (3.4%)。

干眼治疗是否缓解: 无缓解 109 例 (93.2%), 临时缓解 8 例 (6.8%)。

结论: Meige 综合征早期症状与干眼雷同, 极易误诊为干眼, 客观检查泪液质量基本正常, 两者病因不同, 且干眼治疗无效, 应予鉴别。

摘要编号: 208585

一例特殊双眼视盘水肿病例报道

第一作者: Yuzhi DING

目的: 汇报一例特殊的以视盘水肿为首发表现的远处播散转移的前列腺癌病例。**方法:** 该患者为 60 岁男性, 因双眼视力轻微下降 20 天至门诊就诊, 查双眼视盘水肿, 盘周出血, 网膜散在出血及渗出。排除颅内占位, 头颅 MRI 提示枕顶骨骨质增厚, 增强扫描不均匀强化, 临近静脉窦受压改变, 头颅 CT 显示枕骨骨质膨胀, 呈磨玻璃样改变, 局部可见小虫蚀样改变, 提示颅骨纤维瘤病; 病理免疫组化提示 (枕骨肿瘤) 破碎骨小梁间见异性细胞, 倾向前列腺来源。泌尿外科进一步诊治。**结果:** 以双侧视盘水肿为首发表现的患者, 在诊断时考虑颅高压, 完善颅脑 MR 及 CT 提示静脉窦受压, 枕骨病变, 最终明确为前列腺癌播散转移, 完成早期及时诊断。**结论:** 双眼视盘水肿可以是前列腺癌患者的首发表现, 前列腺癌患者在早期快速明确诊断可以提高患者的生活质量。

摘要编号: 209660

一种使用自组装纳米颗粒装载的甲氨蝶呤新型眼科制剂

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共同作者: Zhiqing LI

目的: 设计及合成甲氨蝶呤 (MTX) 及乳糖修饰的偶氮杯 [4] 芳烃 (LacAC4A) 复合物 MTX@LacAC4A, 鉴定其在眼后段的递送途径及效率, 并验证其对小鼠葡萄膜炎模型的初步治疗效果。**方法:** 设计并合成了 MTX@LacAC4A 制剂, 通过扫描电镜 (TEM)、GDA 滴定法对 LacAC4A 及 MTX@LacAC4A 进行表征。分离新西兰大白兔的眼球组织, 进行液质联用实验, 探讨 MTX@LacAc4A 到达眼后段的途径, 通过对 C57BL/6J 小鼠玻璃体、视网膜 - 脉络膜组织的液质联用实验, 探讨 MTX 在眼后段的分布。建立小鼠葡萄膜炎模型, 验证 MTX@LacAC4A 的治疗效果。

结果：设计了具有视网膜主动靶向性的乳糖修饰偶氮杯芳烃载体，以提升靶向能力。将主动靶向的乳糖基团引入到偶氮杯芳烃上缘。乳糖基团通过与疾病状态下表达半乳糖凝集素-3的视网膜相互作用，具有主动靶向病灶区域的潜力。MTX与LacAC4A键合常数为 $K_a = 9.4 \times 10^5 \text{ M}^{-1}$ 。在新西兰大白兔中，30 min、12 h、24 h 时 MTX@LacAC4A 在结膜-巩膜的分布高于角膜-晶体-玻璃体 8.51%、17.69%、31.62%，可以看出 MTX@LacAC4A 主要通过结膜-巩膜途径进入眼内。在 C57 小鼠中，30 min 时，MTX@LacAC4A 主要通过结膜-巩膜途径 MTX@LacAC4A 的分布是 MTX 的 5.92 倍，12 h 时，MTX@LacAC4A 的分布是 MTX 的 2.10 倍。与模型组相比，MTX@LacAC4A 组的小鼠视网膜渗液、玻璃体浑浊明显好转。

结论：MTX与LacAC4A有较强的结合力，且有克服动态及静态眼部屏障的能力，主要通过结膜-巩膜途径进入眼后段，并且对小鼠 EAU 模型具有可观的治疗效果。

摘要编号：204427

基于眼血流动力学的诺模图预测缺血性脑卒中

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共同作者：Zhuohua ZHOU

目的：缺血性脑卒中是一种具有高致死率和高致残率的脑血管疾病。由于眼部血管与脑血管在生理特征方面存在相似性，眼部血管特征可作为监测脑血管疾病的重要指标。本研究旨在探究缺血性脑卒中相关的眼部血流动力学改变，并基于眼部血流动力学特征构建缺血性脑卒中的列线图预测模型。

方法：本研究采用回顾性队列设计，共纳入 337 例患者，随机分为训练队列（235 例）和验证队列（102 例）。收集患者的一般资料，采用超声检测眼动脉、中央视网膜动脉及后睫状动脉的血流动力学参数，从彩色眼底图像中提取视网膜血管管径参数，同时收集相关实验室指标。通过 Logistic 回归分析筛选缺血性脑卒中的独立危险因素，构建列线图预测模型。采用受试者工作特征曲线（ROC）、Hosmer-Lemeshow 拟合优度检验及决策曲线分析（DCA）对模型的准确性与临床适用性进行评估。

结果：多因素回归分析结果显示，高血压（OR = 2.17, 95% CI: 1.16 ~ 4.08, P = 0.016）、高脂血症（OR = 2.21, 95% CI: 1.18 ~ 4.14, P = 0.013）及眼动脉阻力指数（OR = 5.98, 95% CI: 3.27 ~ 10.93, P < 0.001）为缺血性脑卒中的独立危险因素。训练队列 ROC 曲线下面积为 0.790（95% CI: 0.733 ~ 0.847），验证队列为 0.773（95% CI: 0.679 ~ 0.866），两者预测效能一致，

提示列线图对缺血性脑卒中中具有稳定的预测能力。训练队列和验证队列的平均绝对误差分别为 0.020 和 0.013。DCA 结果提示模型具有良好的临床获益。

结论：基于传统危险因素与眼动脉阻力指数构建的列线图模型对缺血性脑卒中中具有较好的预测价值。该结果提示，结合眼部血流动力学的预测模型可为早期诊断与干预提供参考。

摘要编号：208840

特发性硬脑膜炎合并动眼神经炎 1 例

第一作者：Yingzi LUO

共同作者：Shihui WEI, Huanfen ZHOU

目的：回顾分析 1 例特发性硬脑膜炎合并动眼神经炎病例，整理临床特点，梳理和总结诊疗思路。

方法：患者王某，男性，64 岁，主因“左眼上睑下垂 19 天”入院，症见：左眼上睑下垂伴眼眶隐痛不适，左眼上睑上抬后双眼有视物重影，头闷痛，头晕。眼科检查：第一眼位，L/R 约 15°，左眼外展外固定，上转 -1，内转 -2，下转 -3，左眼上睑下垂，完全遮盖角膜，提上睑肌肌力约 5 mm。入院后初步诊断为：左眼动眼神经麻痹。完善抽血及脑脊液检查、MRA、眼眶和颅脑核磁共振增强扫描，排除感染、炎症、血管性病变、占位性病变、糖尿病、重症肌无力等相关病因，眼眶和颅脑核磁共振增强扫描均可见硬脑膜广泛强化，眼眶核磁共振增强扫描水平位、冠状位及矢状位 T1 增强均可见动眼神经增粗，强化，并进一步排除多发性神经炎。最终考虑为特发性硬脑膜炎引起的左眼动眼神经炎。予大剂量激素冲击治疗，后续激素序贯减量，以及免疫抑制剂治疗，辅以营养神经和改善微循环治疗。

结果：该患者诊断为左眼动眼神经炎、特发性硬脑膜炎，经用药治疗 1 月后复查，患者头闷痛、头晕、上睑下垂、眼眶隐痛不适及双眼视物重影消失，已复查眼眶核磁共振增强扫描，结果待回报。

结论：1、本病例报道了一例特发性硬脑膜炎合并动眼神经炎患者，临床表现为典型的部分性动眼神经麻痹。动眼神经麻痹的病因较为复杂，在中老年患者中缺血病因居多，如有瞳孔受累的重要体征，需要排除动脉瘤，一旦确诊需作为神经眼科急症处理，因此首诊时瞳孔检查尤为重要，虽然动脉瘤发病率不高，但破裂后可危及生命，需要第一时间予以排除。掌握动眼神经麻痹的临床特征及病因可为临床神经眼科诊疗提供重要线索。2、硬脑膜炎发病率较低，病因包括为感染性、非感染性、肿瘤和外伤，可通过血液和脑脊液化验检查以明确病因，核磁共振增强扫描明确诊断，针对病因治疗。该患者有硬脑膜炎引起的持续性头闷痛及头晕不适的表

现，经检查找不到明确病因，核磁共振增强扫描提示硬脑膜强化是诊断的关键，考虑为特发性硬脑膜炎。

摘要编号：208463

眼肌型重症肌无力与 ANCA 相关性血管炎共存 1 例报告及 MG 共病探讨

第一作者：Yan LIU

共同作者：Xuemei LIN, Songdi WU

目的：报告 1 例眼肌型重症肌无力与 ANCA 相关性血管炎共存病例。

方法：病例报告。

结果：患者，女性，72 岁。主因“左侧眼睑下垂 1 月”于 2025 年 3 月 18 日就诊。患者于 1 月前无明显诱因出现左眼睑下垂，晨轻暮重，无其他不适，症状不缓解，来我院就诊。入院查体：左侧上睑下垂，疲劳试验阳性，中枢补偿抑制试验阳性。双耳听力减退，左耳为著，余查体正常。既往 2 月前因双耳听力下降，左耳为著，伴左耳鸣，就诊于耳鼻喉科考虑咽鼓管功能紊乱，无特殊治疗。入院完善血沉：29 mm/h (0-20 mm/h)；抗髓过氧化物酶抗体：30.85 RU/ml (0-20 RU/ml)，余化验正常。重复电刺激试验：阴性。肌无力抗体阴性。胸部 CT：双肺下叶少许间质性改变，未见胸腺异常。给予溴吡斯的明片 60 mg 3 次/日口服治疗后患者自觉左眼睑下垂稍好转。最终诊断：1. 眼肌型重症肌无力；2. 结缔组织病；3. 咽鼓管功能紊乱。嘱出院继续口服药物观察。1 月后患者门诊复诊诉自觉效果欠佳，因患者对激素顾虑大，故加用他克莫司胶囊 1 mg 2 次/日口服，服用 2 月后患者再次复诊左眼睑下垂完全恢复正常且听力明显好转。回顾病史及辅助检查，修正诊断为：1. 眼肌型重症肌无力；2. ANCA 相关血管炎。

结论：眼肌型重症肌无力 (OMG) 虽以局部症状为主要表现，但常可合并其他自身免疫性疾病。本例患者以“眼睑下垂”起病，虽具备典型 OMG 临床特征，但合并听力下降、肺部间质改变及自身抗体指标异常，提示存在系统性免疫异常可能。通过系统性抗体筛查及评估，最终明确 ANCA 相关性血管炎诊断。该病例提示我们，对于 OMG 患者，尤其是对单一治疗效果不佳或伴有系统性症状者，应积极筛查是否存在其他自身免疫共病，以实现早期识别、综合干预，改善预后。神经眼科医师在处理 MG 患者时，应具备共病筛查意识，完善自身抗体检测，避免漏诊潜在的自身免疫性疾病。

摘要编号：207563

重视司美格鲁肽相关非动脉炎性前部缺血性视神经病变

第一作者：Mingqian YU

共同作者：Liqiang WANG, Shihui WEI, Huanfen ZHOU

目的：强调司美格鲁肽与非动脉炎性前部缺血性视神经病变 (non-arteritic anterior ischemic optic neuropathy, NAION) 之间的相关性，提高临床对该潜在风险的认识。

方法：报告两例 2 型糖尿病患者在使用司美格鲁肽期间相继发生双眼 NAION 的临床病例。系统收集其临床资料并结合最新药物警戒信息进行分析。

结果：病例 1 为 58 岁女性，因血糖控制欠佳将司美格鲁肽用药剂量由 0.5 mg/周增至 1.0 mg/周，1 个月后突发右眼无痛性视野缺损伴视力下降，最佳矫正视力 (best-corrected visual acuity, BCVA) 降至 0.7，右眼视盘水肿，左眼无生理性视杯，光学相干断层扫描 (optical coherence tomography, OCT) 示右眼视网膜神经纤维层 (retinal nerve fiber layer, RNFL) 弥漫性增厚。外院诊断为右眼 NAION，给予口服糖皮质激素联合神经保护治疗，疗效不显著。将司美格鲁肽剂量减半后，患者主诉视野缺损有所改善。3 个月后患者突发左眼 NAION，BCVA 降至右眼 0.05，左眼 0.6，左眼视盘充血水肿，OCT 示右眼 RNFL 及黄斑区节细胞层明显薄变，左眼 RNFL 弥漫性增厚。停用司美格鲁肽并给予营养神经、改善循环治疗后，左眼 BCVA 提高至 0.8。病例 2 为 39 岁男性，持续使用司美格鲁肽 0.75 mg/周 2 年后发生右眼 NAION，因未及时识别药物关联而继续用药，半年后左眼亦受累。停药并给予营养神经、改善循环治疗后，视力稳定改善。两例患者均存在小视杯、糖尿病、高血压等 NAION 易感因素，但 NAION 发病与司美格鲁肽使用或剂量调整存在明确时间顺序关系，且减量或停药后症状明显缓解，强烈提示司美格鲁肽与其 NAION 的发病存在相关性。近期流行病学研究显示使用司美格鲁肽者 NAION 的发生风险约为未使用者的 2 倍。世界卫生组织药品安全咨询委员会已建议将 NAION 纳入其风险管理计划，欧洲药品管理局亦将 NAION 列为司美格鲁肽的“非常罕见”不良反应。

结论：司美格鲁肽与 NAION 的相关性已在药物警戒层面获权威机构证实，并已转化为临床警示及监管行动。使用该药进行血糖及体重管理时应谨慎评估治疗获益与视神经病变并发症风险之间的平衡，尤其在剂量调整期间，应密切监测视力、视野及 OCT 变化，必要时及时干预。

摘要编号: 207331

颅内静脉窦血栓合并硬脑膜动静脉瘘一例

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共同作者: Liqiang WANG, Shihui WEI, Huanfen ZHOU

目的: 报道一例以双眼视力下降及视盘水肿为首诊表现的继发性颅内压增高病例, 系由颅内静脉窦血栓形成 (cerebral venous sinus thrombosis, CVST) 合并硬脑膜动静脉瘘 (dural arteriovenous fistula, dAVF) 的罕见复合机制引起, 强调对疑似特发性颅内高压 (idiopathic intracranial hypertension, IIH) 患者应警惕复杂静脉系统病变, 并评估数字减影血管造影 (digital subtraction angiography, DSA) 的关键诊断价值。

方法: 回顾性分析 1 例 29 岁女性患者的诊疗经过。患者因双眼视力下降 4 月余就诊, 伴视物变形、视野缺损、头痛及晨起手麻。入院时右眼矫正视力 0.08, 左眼 0.6, 右眼相对性传入性瞳孔障碍阳性, 双眼视盘高度水肿。视野检查示右眼颞下方及鼻上方视野缺损; 视盘及黄斑光学相干断层扫描示左眼视网膜神经纤维层增厚及右眼神经节细胞层薄变。腰椎穿刺测脑脊液初压高于 300 mmH₂O。颅脑及眼眶磁共振成像 (magnetic resonance imaging, MRI) 示颅内软化灶及双侧视神经鞘积液。头颅磁共振静脉成像 (magnetic resonance venography, MRV) 及动脉成像 (magnetic resonance angiography, MRA) 示右侧横窦、双侧颈内静脉及乙状窦血栓形成; 多发迂曲增粗血管影, 考虑脑血管畸形。血清抗 $\beta 2$ 糖蛋白 I 抗体显著升高。

结果: DSA 证实双侧横窦乙状窦闭塞, 并发现左侧横窦区 dAVF, 由颈外及颈内动脉分支供血。据此实施经导管静脉窦支架置入联合 dAVF 栓塞术, 术后予双联抗血小板治疗。术后第 3 日脑脊液压力降至 270 mmH₂O。术后 1 周矫正视力提升至右眼 0.1, 左眼 1.0, 视盘水肿及视野缺损显著减轻, 复查 MRV、MRA 及颅脑 MRI 示: 静脉窦支架通畅, dAVF 供血动脉完全闭塞, 无残余分流; 脑实质无新发梗死或出血, 原软化灶稳定。

结论: 本例颅内压升高由 CVST 合并 dAVF 的罕见复合机制引起, CVST 致静脉窦闭塞与静脉高压, 诱发 dAVF, 后者又加重静脉淤滞与颅内高压, 形成恶性循环, 易被误诊为 IIH。抗 $\beta 2$ 糖蛋白 I 抗体升高提示抗磷脂抗体综合征 (antiphospholipid syndrome, APS) 可能, 而 APS 是 CVST 的已知致病因素, 若经国际标准重复检测确诊, 则可明确本例 CVST 的病因归属, 指导长期抗凝。对于疑似 IIH 患者, 尤其伴静脉影像异常者, 应高度警惕此

类复杂静脉病变。DSA 是确诊金标准, 早期联合介入治疗可有效逆转视功能损害。

视觉科学

摘要编号: 208847

NDUFS1 新变异引起 Leigh 综合征眼病的致病性及功能分析

第一作者: Zhenhui LIU

共同作者: Yiran FAN, Yan LI, Bo LEI

目的: 验证一例 Leigh 综合征 (LS) 眼病家系 NDUFS1 基因新变异的致病性, 并探讨变异对线粒体功能的影响。

方法: 回顾性研究, 纳入于河南省立眼科医院眼科确诊为 LS 眼病的一例家系。收集先证者及父母的临床资料, 采用我院自主研发的眼后段靶向基因检测 panel (PS400 试剂盒) 进行 Sanger 测序并行家系共分离验证。利用生物信息在线预测软件对变异致病性进行预测。构建相应细胞疾病模型, 检测其细胞 ROS、线粒体膜电位和 ATP 生成、呼吸链复合物 I 酶活性、复合物 I 组装水平、线粒体呼吸功能、线粒体形态变化、线粒体自噬及细胞铁死亡相关蛋白水平。

结果: 先证者双眼视力下降, 视神经萎缩伴眼球震颤, 脑白质发育不全。NDUFS1 基因发现母源 M1: c.64 (exon3) C>T p.R22* 和父源 M2: c.404 (exon6) G>A p.G135D 复合杂合变异, 其中 M2 为新发变异, 符合家系共分离。ACMG 评分指南分析变异为可能致病。体外实验显示该突变导致细胞 ROS 增加, 线粒体膜电位、ATP 生成和复合物 I 酶活性降低, 复合物 I 组装水平下降, 线粒体呼吸功能损害, 线粒体形态碎裂化并引发线粒体自噬和细胞铁死亡。补充 MFN2 可部分改善线粒体功能障碍表现。

结论: NDUFS1 基因新变异引起 Leigh 综合征视神经萎缩。该变异使 NDUFS1 蛋白质功能丧失, 引起线粒体呼吸链复合物 I 缺陷, 下调 MFN2 使线粒体质量控制失衡, GPX4 降低引发的细胞铁死亡而致病。

摘要编号: 208630

VTS⁴ 视觉训练系统对成人弱视的疗效观察

第一作者: Jin LIWEN

目的: 评估 VTS⁴ 视觉训练系统联合传统训练对成人弱视的疗效。

方法：招募 18 岁以上的成年弱视患者 45 例，按照患者自愿选择治疗方式分为基础对照组（n = 15）、家庭训练组（n = 15）和综合训练组（n = 15）。基础对照组在医学验光后予以屈光矫正及遮盖优势眼，家庭训练组在屈光矫正的基础上完成家庭训练方案，综合训练组在屈光矫正及家庭训练的基础上联合每周 1 ~ 2 次的个性化在院视觉训练，训练中使用 Vision Therapy System (VTS⁴) 视觉训练系统。三组患者治疗前和治疗后最佳矫正视力 (BCVA) 及双眼远、近立体视变化情况。

结果：入组患者共 45 例，其中包括远视型弱视 6 例，散光型弱视 5 例，散光型屈光参差型 10 例，远视型屈光参差性弱视 24 例。通过 2 个疗程的训练，综合训练组的有效率远远高于基础对照组和家庭训练组，对比有显著统计学意义， $P < 0.01$ 。对比训练前后的远、近立体视变化，综合训练组的远立体视跟其他两组对比有统计学意义， $P < 0.05$ ($P = 0.048$)，但在提升近立体视方面，余其他两组无统计学差别。

结论：VTS⁴、SVI 视觉训练系统联合传统的弱视治疗方法能有效提高成年弱视患者的视力并改善其双眼视功能，尤其是在提升远立体视方面有明显优势。

摘要编号：207504

周期性内斜手术效果的临床分析

第一作者：Liping QIAO

目的：通过对 13 例周期性内斜视的临床观察和手术治疗，了解周期性内斜的临床性质和手术治疗效果。

方法：回顾性分析研究方式，选取 2021 年 4 月至 2025 年 1 月在南昌洪城爱尔眼科诊断治疗的 13 例周期性内斜患者，年龄平均 10.6 (10 ± 0.4 , 8~15 岁)；斜视角在 $+20^\circ \sim +80^\circ$ ，平均 $+34.52^\circ$ ；术前分别测定患者的 3 个月的眼位变化、融像范围变化、屈光度变化、立体视锐度（远、近）、眼轴变化。所有患者均采取双眼内直肌后徙术，术后采集采用眼位变化、融像范围变化、屈光度变化、立体视锐度（远、近）、眼轴变化。

结果：术后 92.3% 可获得双眼同时视，4 例周期性内斜患者术前正位日及术后双眼视觉及近立体视锐度与正常人群相比无显著差异；9 例周期性内斜患者术前无双眼视功能。经过视觉训练可获得同时视；100% 可获得融合力，但融合力低于正常；65.2% 可获得远立体视，50% 获得不同程度近立体视；1 例周期性内斜患者术前无双眼视功能，术后 1 年仍无同时视及立体视觉。

结论：周期性内斜应尽量在周期性节律未破坏前手术，周期性内斜患者斜视角不稳定，手术量以斜视日最大斜视角进行设计手术，有利于双眼单眼视功能的恢复，达到眼位和功能双重康复的目的。

摘要编号：209661

基于间充质干细胞来源凋亡囊泡 ApoVs-PPP2CB 轴调控免疫平衡：自身免疫性葡萄膜炎的无细胞治疗新策略

第一作者：Wei CHI

共同作者：Dong FANG

目的：实验性自身免疫性葡萄膜炎 (EAU) 是一种典型的自身免疫性眼部炎症模型，目前主要依赖激素和免疫抑制剂治疗，但长期使用伴随多种严重不良反应。本研究探讨了脐带间充质干细胞来源的凋亡囊泡 (ApoVs) 在 EAU 治疗中的作用及其机制。

方法：构建实验性自身免疫性葡萄膜炎 (EAU) 小鼠模型，并采用静脉注射脐带间充质干细胞来源的凋亡囊泡 (ApoVs) 进行干预。利用临床评分与组织病理学分析评估视网膜及血管炎症程度。利用流式细胞术分析免疫细胞亚群的分化。采用蛋白质组学与生物信息学方法鉴定 ApoVs 中的关键功能蛋白；并运用基因敲低技术进行功能验证。

结果：静脉注射 ApoVs 可显著减轻 EAU 小鼠的视网膜炎症、血管炎及组织结构损伤，并降低临床和病理评分。ApoVs 通过抑制 Th1 和 Th17 细胞分化，促进 Treg 细胞分化进而参与调节免疫细胞平衡。蛋白质组学与生物信息学分析发现 PPP2CB 为 ApoVs 的关键功能蛋白。PPP2CB 通过调控 PI3K/Akt/mTOR 信号通路去磷酸化进而抑制 Th1 细胞分化，而敲低 PPP2CB 可部分削弱 ApoVs 的免疫调节功能。

结论：本研究揭示了 ApoVs 通过 PPP2CB 介导的免疫调节机制在 EAU 治疗中发挥重要作用，为葡萄膜炎的细胞无治疗策略提供了新思路 and 实验依据。

摘要编号：209365

整合蛋白质组学分析鉴定 STAT1 为视网膜衰老中炎症 - 氧化还原轴的核心调控因子

第一作者：Yiran FAN

共同作者：Xiuxiu JIN, Bo LEI

目的：衰老是导致视网膜神经变性的主要危险因素，但其分子机制尚未得到系统阐明。本研究旨在通过整合转录组与蛋白质组数据，描绘视网膜衰老的分子图谱，并筛选关键调控因子。

方法：选取年轻（4 月龄）和自然衰老（24 月龄）C57BL/6 小鼠视网膜，进行高通量 RNA 测序与定量蛋白质组学分析，结合生物信息学手段鉴定差异分子及其信号通路。通过 qPCR、western blot 及免疫荧光在小鼠组织中验证关键结果，并在氧化或基因毒性应激诱导的 ARPE-19 细胞衰老模型中进行功能验证。

结果：多组学分析共鉴定出 273 种差异表达蛋白和 1,410 个差异基因，转录组与蛋白质组间呈中等相关（ $r = 0.58$ ），提示存在显著的转录后调控。富集分析显示免疫和代谢通路显著上调，而光转导和结构维持通路下调。STAT1 被鉴定为核心调控枢纽因子，其在衰老视网膜及衰老 ARPE-19 细胞中均上调。STAT1 过表达可促进活性氧（ROS）积累、衰老标志物 p16 和 p21 上调及炎症小体激活。

结论：STAT1 在视网膜衰老中作为炎症与氧化还原稳态的核心调控因子。我们的研究揭示了 STAT1 作为潜在生物标志物及治疗靶点的可能性，为延缓年龄相关性视网膜退行性疾病提供了新的分子依据。

摘要编号：206618

翻译后修饰介导的免疫失衡在年龄相关性黄斑变性中的作用机制

第一作者：Mingming YANG

目的：翻译后修饰（PTMs）在免疫炎症因子稳态调控中起关键作用，但其在眼球衰老及老年性黄斑变性（AMD）进展中的调控机制尚不明确。本研究旨在揭示 AMD 中显著变化的免疫因子的 PTMs 特征及其分子机制。

方法：收集干性 AMD 患者血清样本（ $n = 50$ ）进行细胞因子阵列分析，并结合眼球捐献者视网膜组织的单细胞测序数据（AMD 组 vs 对照组），筛选差异表达的免疫因子。构建自然衰老（28 月龄）小鼠、AMD（碘酸钠诱导）小鼠及体外视网膜色素上皮细胞（RPE）氧化应激模型，检测关键免疫因子的磷酸化、乙酰化及泛素化水平。通过小分子药物抑制去泛素化酶和去乙酰化酶活性，观察免疫因子表达变化以鉴定关键调控酶。进一步构建关键酶敲除的 AMD 动物模型，评估视网膜形态及视觉电生理功能变化。

结果：AMD 患者血清细胞因子阵列显示补体因子变化最显著，单细胞测序数据表明 T 细胞应答相关受体差异最明显（ $P < 0.05$ ， $|\text{FoldChange}| \geq 2$ ）。其中，补体 CFB 显著上调，而 PD-L1 显著下调。在衰老及碘酸钠诱导的 AMD 小鼠模型中，视网膜及色素膜 CFB 表达升高，PD-L1 降低（ $P < 0.01$ ）。PTMs 分析显示，AMD 及衰老小鼠色素膜中 CFB 乙酰化水平显著降低，而磷酸化及泛素化水平无显

著变化；PD-L1 泛素化水平显著升高，磷酸化及乙酰化水平无明显改变。体外 RPE 氧化应激模型重现了上述 PTMs 变化。机制研究发现，抑制去乙酰化酶 SIRT4 可逆转 CFB 的表达变化，而抑制去泛素化酶 USP2 可增强 PD-L1 表达。敲除 SIRT4 或 USP2 后构建 AMD 模型，观察到 RPE 细胞凋亡增加，视网膜电图振幅降低且潜伏期延长。

结论：CFB 去乙酰化及 PD-L1 泛素化是促进 AMD 进展的关键 PTMs，二者修饰导致免疫细胞过度活化。去乙酰化酶 SIRT4 和去泛素化酶 USP2 在此过程中发挥核心调控作用，可能成为 AMD 治疗的潜在靶点。

角膜病、干眼症、外眼病、眼库

摘要编号：208415

AS-OCT 在眼移植抗宿主病眼表评估中的应用

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目的：应用 AS-OCT 及 AS-OCTA 技术，探讨异基因造血干细胞移植（allo-HSCT）后慢性眼移植抗宿主病（coGVHD）患者睑部泪腺及结膜血管的影像特征。

方法：本横断面对照研究纳入 36 例 coGVHD 患者、21 例重度泪液缺乏型干眼（ATD）患者及 21 名健康对照者。所有受试者均完成眼表及 AS-OCT 检查。睑部泪腺主要观察指标为腺泡、导管、血管、“千层糕”样结构。球结膜及上下睑结膜血流的主要观察指标为血管密度、平均血管长度及血管分支点密度。比较三组间差异，并分析 coGVHD 组的相关影响因素。

结果：除结膜纤维化，coGVHD 组与重度 ATD 组眼表状况相近。1) 睑部泪腺：与其它两组相比，coGVHD 组泪腺血管显著增多，小叶和导管略有减少（均 $P < 0.05$ ）。“千层糕”样结构仅见于 coGVHD 组。血管数量与移植后时间呈正相关，“千层糕”样结构与 coGVHD 严重程度和移植后时间呈正相关。2) 结膜血流：与其它两组相比，coGVHD 组的球结膜、上下睑结膜血管密度、平均血管长度及血管分支点密度均显著升高（均 $P < 0.05$ ）。结膜血流的改变与 coGVHD 严重程度、睑缘异常相关、女性供体-男性受体配型呈正相关。

结论: coGVHD 患者睑部泪腺具有“千层糕”样改变、血管增多的特征,且结膜血管密度及血管长度显著增加,这些改变与 coGVHD 的严重程度密切相关。AS-OCT 的非侵入性、客观定量特性使其有望成为评估 coGVHD 严重程度的新工具,为疾病诊断与监测提供更客观的依据。

摘要编号: 208711

LIF 通过调控能量代谢途径促进机械损伤角膜内皮修复

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目的: 验证白血病抑制因子 LIF 是否可以通过糖原代谢途径影响内皮细胞机械损伤后的恢复情况。

方法: 在治疗角膜内皮损伤的相关靶点上,我们观察到白血病抑制因子 LIF,可以在体外显著性的促进兔源角膜内皮原代细胞的增殖。通过机械划伤角膜内皮的方法建立新西兰大耳兔角膜内皮损伤的机械模型,并通过内皮细胞植片与 LIF 细胞因子前节注射的组合对内皮细胞损伤进行治疗。在生理上,我们在术后第 1、3、7 天对相应眼前节与 OCT 的检测,验证内皮细胞与角膜术后损伤情况。后续,我们对造模组与 LIF 治疗组的样本进行了冷冻电镜,Western blot 与免疫荧光检测,寻找 LIF 作用潜在的作用通路,并通过转录组学进行验证。最后,我们希望通过线粒体转移的方法观察是否可以在应用领域帮助角膜内皮细胞通过高能量状态降低机械损伤屏障功能损伤。

结果: 我们观察到,机械损伤造模组兔角膜出现了显著的水肿与不透明情况,而通过 LIF 注射,可以在一定程度上缓解这一现象。冷冻电镜的结果提示,在体外增殖的内皮细胞出现了显著的糖原堆积现象,而在体内则并没有显著差异。而在兔角膜内皮细胞上,我们观察到其排水功能相关离子泵相关的蛋白高表达,并且其能量代谢通路被受到显著上调。而后,针对转录组学呈现出的差异化基因结果进行 GO 功能与 Motif 富集分析,我们发现 LIF 诱导内皮细胞修复损伤的差异基因集中在内皮细胞排水功能相关机械感知相关 Piezo1 通路导致的钠钾离子通道激活上,LIF 通过维持细胞的能量状态,促进剩余内皮细胞行使排水功能,为角膜内皮外周更多健康细胞迁移与增殖争取时间。同时,应用外源线粒体转移的结果显示,内皮细胞能量状态在损伤情况的正常维持,其生理功能的维持有助于整体角膜内皮机械损伤的修复。

结论: LIF 可以通过维持内皮细胞的高能量状态,在角膜内皮机械损伤的情况下维持其离子转运与排水功能的稳态,从而降低角膜内皮机械性损伤。

摘要编号: 209607

MED1 敲除通过选择性激活 MAPK 通路调节角膜上皮干 / 祖细胞动态变化并促进角膜伤口愈合

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共同作者: Xianli DU

目的: 角膜上皮的稳态与再生依赖于角膜干 / 祖细胞的自我更新、分化、迁移和增殖等复杂动态过程。本研究旨在明确转录共激活因子 Mediator 1 (MED1) 在维持角膜稳态与创伤愈合中发挥的关键作用。

方法: 本研究首先比较了健康个体与角膜损伤患者的角膜上皮组织,以检测 MED1 在角膜中的表达情况。随后,建立了 Med1 条件性敲除 (Med1 cKO) 小鼠及角膜上皮损伤模型,以探讨 MED1 在角膜稳态与再生中的作用。通过 RNA 测序结合 KEGG 与 GSEA 分析,确定由 MED1 调控的关键信号通路为 MAPK 信号轴。进一步在体外实验中,利用 MAPK 抑制剂、免疫荧光 (IF)、Western blot (WB)、Transwell 迁移实验以及共免疫沉淀 (Co-IP) 等方法,更深入地阐明了 MED1 在角膜上皮干 / 祖细胞功能中的调控作用。

结果: 我们发现,在患者受损的角膜上皮组织样本中,MED1 的表达水平显著下调。在小鼠中,角膜上皮干细胞中条件性敲除 (cKO) Med1 可在稳态条件下增强细胞的干性与增殖能力,并通过促进细胞迁移和维持角膜上皮完整性来加速创伤愈合。我们进一步证实,小鼠角膜再生能力的增强依赖于 Med1 缺失所导致的丝裂原活化蛋白激酶 (MAPK) 信号通路的选择性激活。体外实验结果表明,MED1 通过介导细胞外信号调节激酶 (ERK) 和 P38 MAPK 的激活,选择性地增强细胞的干性、增殖和迁移。此外,MED1 还能通过促进 ERK 和 P38 的磷酸化及其泛素介导的降解来调控 MAPK 信号通路。

结论: 综上所述,本研究揭示了 MED1 通过调控 MAPK 信号在维持角膜组织稳态与促进再生中的关键作用,为通过靶向 MED1-MAPK 通路促进角膜修复的治疗策略提供了新的思路。

摘要编号: 209030

MyD88 在棘阿米巴角膜炎致病机制中的研究

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目的: 探索棘阿米巴对角膜体内和体外的损伤机制,研究 MyD88 在棘阿米巴角膜炎致病机制中的作用。

观察抑制 MyD88 对阿米巴角膜炎下游炎症因子表达的影响。

方法：本研究通过体外细胞实验和体内大鼠模型探讨 MyD88 因子在棘阿米巴角膜炎中的作用及干预效果。体外培养角膜上皮/基质细胞，设正常对照组 (NC)、棘阿米巴感染组 (AMB)、AMB+siRNA 组、AMB+CHX 组及 AMB+siRNA+CHX 组，通过活死染色观察细胞存活状态，流式细胞术检测巨噬细胞 M1/M2 比例，Western blot 检测 TLR4/MyD88/p-NFκB/p-ERK1/2 表达，PCR/ELISA 检测 IL-1β/IL-6/TNF-α 水平，IF 观察 TLR4/MyD88/NFκB 核定位；通过角膜基质注射建立大鼠模型，设对应对照组，裂隙灯观察角膜溃疡评分，病理切片分析组织损伤，IHC 检测角膜基质 α-SMA 表达(方法同细胞实验)。

结果：体外实验中，AMB 组角膜细胞活性降低、形态异常，TLR4/MyD88/p-NFκB/p-ERK1/2 表达上调，IL-1β/IL-6/TNF-α 水平升高，M1 型巨噬细胞比例增加；而 AMB+siRNA 或 AMB+siRNA+CHX 组可逆转上述改变，减轻细胞损伤与炎症。大鼠模型中，AMB 组出现明显角膜溃疡、炎症浸润及 α-SMA 表达升高（纤维化倾向），裂隙灯评分高；慢病毒 shRNA 结膜下注射（下调 MyD88）或 AMB+siRNA 组可显著改善溃疡、降低炎症因子及 α-SMA 表达，联合洗必泰效果更优。

结论：MyD88 及其下游信号通路在棘阿米巴角膜炎发病中发挥关键作用，下调 MyD88 表达联合抗菌治疗能有效减轻炎症反应、抑制角膜纤维化、保护角膜结构与功能。

摘要编号：209307

RIPK3 介导的坏死性凋亡驱动角膜碱烧伤后神经炎症和视网膜神经节细胞丢失

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目的：揭示受体相互作用蛋白激酶 3 (RIPK3) 在角膜碱烧伤诱导的神经炎症及视网膜神经节细胞 (RGCs) 丢失中的调控作用。

方法：采用氢氧化钠溶液建立 C57BL/6J 野生型小鼠和 RIPK3^{fl/fl}Cx3cr1^{+/cre} (RIPK3 基因敲除，RIPK3^{-/-}) 小鼠的角膜碱烧伤 (AB) 模型。通过苏木精-伊红 (H&E) 染色评估 RIPK3^{-/-} 对视网膜结构的影响；采用视网膜铺片免疫荧光染色检测 RGCs 的存活情况；通过冰冻切片免疫荧光染色和碘化丙啶 (PI) 染色分析视网膜小胶质细胞浸润及坏死性细胞死亡情况；Western blot 检测角膜碱烧伤后坏死性凋亡信号通路的激活状态。

结果：角膜碱烧伤后，坏死性凋亡相关蛋白 RIPK1、RIPK3 和混合谱系激酶样结构域蛋白 (MLKL) 表达在视网膜中显著上调并激活，其中 p-RIPK3 的升高最为明显。值得注意的是，升高的 p-RIPK3 主要与浸润的 Iba1 阳性小胶质细胞共定位。此外，RIPK3 敲除保护视网膜结构，在角膜碱烧伤的过程中，视网膜胶质细胞被激活，同时引发视网膜神经元数量下降；而 RIPK3 敲除可显著抑制碱烧伤诱导的小胶质细胞浸润及 RGCs 丢失。RIPK3 敲除小鼠中 PI 阳性的坏死性细胞死亡也明显减少。机制研究表明，碱烧伤诱导的坏死性凋亡促进 MLKL 和成纤维细胞生长因子 2 (FGF2) 的表达，而 RIPK3 缺失可抑制这一过程。

结论：本研究发现 RIPK3 介导的坏死性凋亡驱动视网膜神经炎症和 RGCs 丢失。靶向调控 RIPK3 可通过阻断 MLKL/FGF2 信号通路有效抑制这些病理反应，为角膜碱烧伤的视力挽救提供了新的潜在治疗策略。

摘要编号：209019

lnc003946 在角膜移植排斥反应中的调控作用研究

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共同作者：Ke LIU

目的：本研究旨在探究长链非编码 RNA lnc003946 在同种异体角膜移植排斥反应中的调控作用及其分子机制。

方法：体内实验使用 Wistar → Lewis 大鼠角膜移植排斥模型，结膜下注射 lnc003946 过表达腺病毒载体，设立 GFP 标签腺病毒对照组和 PBS 对照组。细胞实验使用原代培养大鼠骨髓来源巨噬细胞 (BMDMs)，慢病毒介导 lnc003946 敲减，LPS+IFN-γ 诱导 M1 极化，IL-4 诱导 M2 极化。进行 qPCR 检测 lnc003946 及炎症因子表达，Western blot 分析 HDAC10 等蛋白表达，流式细胞术检测巨噬细胞表型 (CD68+CD86+M1, CD68+CD163+M2)，免疫荧光观察蛋白亚细胞定位，巨噬细胞-T 细胞共培养实验 BrdU 法检测 PBMC 增殖以及 Treg 分化比例分析。

结果：体内实验发现 lnc003946 过表达组植片存活时间显著延长，植片混浊和水肿程度减轻，新生血管长入减少；免疫荧光显示 lnc003946 与 CD68⁺ 巨噬细胞巨噬细胞共定位。体外机制研究发现 lnc003946 过表达抑制 M1 型巨噬细胞极化，CD86 和 iNOS 表达下调，IL-6 和 IL-12 分泌减少，促进 Treg 细胞分化，抑制 PBMC 增殖。鉴定 HDAC10 为关键下游靶点，lnc003946 与 HDAC10 表达呈

负相关，影响 HDAC10 的核质定位，M1 极化诱导 HDAC10 表达上调。

结论：Inc003946 通过抑制巨噬细胞 M1 极化发挥免疫调节作用，其机制涉及对 HDAC10 的表观遗传调控，促进 Treg 分化和抑制淋巴细胞增殖是其延长植片存活的重要途径。

摘要编号：209853

pH 响应性甘草酸二钾水凝胶通过协同抗炎与杀菌靶向治疗角膜新生血管

第一作者：Yahong LI

共同作者：Xinyuan WANG

目的：角膜新生血管 (corneal neovascularization, CNV) 是一种威胁视力的病理过程，其临床治疗面临需同步控制炎症、预防感染及抑制血管生成的多重挑战。本研究旨在开发一种新型治疗策略以应对这一难题。

方法：我们成功构建了一种新型 pH 响应型智能胶束整合水凝胶 LEV@DG-HPMC。该体系通过甘草酸二钾 (dipotassium glycyrrhizinate, DG) 与羟丙基甲基纤维素 (hydroxypropyl methylcellulose, HPMC) 物理交联形成三维网络，用于负载左氧氟沙星 (levofloxacin, LEV)，其中 LEV 提供抗菌功能，而 DG 兼具载体结构与固有抗炎活性。为验证该体系，本研究依次开展了以下工作：首先，在体外表征了水凝胶的理化性质、不同 pH 条件下的药物释放行为及其流变学特性，验证了其 pH 响应性智能释药能力；其次，通过抗菌实验确认了其协同抗菌效应；最后，利用细胞和动物模型，系统评估了其生物相容性、组织安全性以及在减轻炎症、抑制新生血管和促进角膜修复方面的功效。

结果：实验结果表明，该水凝胶具备优异的生物相容性与显著延长的眼表滞留能力。其 pH 响应性释药行为与碱烧伤后病理微环境的时序性 pH 变化高度契合。尤为重要的是，该体系能通过协同作用，实现强效抗菌，并显著下调白介素-1 β 、白介素-6、肿瘤坏死因子- α 及核因子 κ B 等关键炎症因子，同时抑制血管内皮生长因子 A 与基质金属蛋白酶-9 等促血管生成因子的表达，从而有效抑制 CNV 进展、减轻角膜混浊并促进角膜修复。

结论：本研究所开发的 LEV@DG-HPMC 水凝胶通过多重协同机制，成功整合了抗菌、抗炎功能，其智能释药特性与病理微环境良好响应。该多功能递送系统为 CNV 的高效治疗提供了一种极具前景的新策略。

摘要编号：201622

β -葡聚糖纳米抗体-那他霉素给药体系在真菌性角膜炎中治疗作用

第一作者：Jing LIN

共同作者：Huijin DUAN, Junjie LUAN

目的：本研究旨在通过制备针对真菌细胞壁 β -葡聚糖的纳米抗体 (nanobody, Nb) 并将其与抗真菌药物那他霉素 (natamycin, NAT) 偶联，开发治疗真菌性角膜炎的新策略。

方法：采用基因工程方法构建表达特异性 β -葡聚糖 Nb 的重组载体，在其 C 端引入三个巯基位点，以实现功能基团的共价结合将 Nb 与 NAT 偶联。通过最小抑菌浓度 (MIC)、生物膜生物量测定、碘化丙啶 (PI) 摄取实验、calcofluor white 染色、茜素蓝染色、扫描电镜 (SEM) 及透射电镜 (TEM) 等方法，评估 Nb 及 Nb-NAT 对烟曲霉 (*Aspergillus fumigatus*) 的抗真菌活性。采用 CCK-8 检测、眼部刺激试验及角膜荧光素钠染色等方法评估 Nb 及 Nb-NAT 的生物相容性。在小鼠眼内建立真菌性角膜炎模型，通过临床评分、菌落计数及 HE 染色评估疾病严重程度；使用 qRT-PCR 及 ELISA 检测 Nb 及 NAT 的抗炎作用。

结果：研究发现，特异性 β -葡聚糖 Nb 可通过破坏真菌细胞壁及抑制生物膜形成来抑制真菌生长，且可降低真菌细胞壁中 β -葡聚糖的含量。Nb 还能减少真菌分生孢子对人角膜上皮细胞 (HCECs) 的黏附能力。进一步比较 NAT 与 Nb-NAT 的抗真菌效果，结果表明 Nb-NAT 较 NAT 具有更优的抗真菌活性，该差异可能源于 Nb 与 β -葡聚糖的特异性结合。此外，浓度低于 0.5 mg/mL 的 Nb 对 HCECs 无明显毒性，Nb-NAT 的细胞毒性及眼表刺激性均低于 NAT。特异性 β -葡聚糖 Nb 能够削弱烟曲霉的毒力并减轻真菌性角膜炎中的炎症反应，Nb-NAT 处理后角膜治疗效果较 NAT 显著增强，表现为临床评分降低及炎症因子表达水平下降。

结论：本研究通过制备针对 β -葡聚糖的 Nb 并负载 NAT，开发出一种治疗真菌性角膜炎的高效新策略。Nb 在真菌性角膜炎中发挥显著的抗真菌及抗炎作用。Nb 与 NAT 偶联后形成的 Nb-NAT 在体外显示出优异的抗真菌效果，且毒性和角膜刺激性均低于 NAT。Nb-NAT 治疗能够显著缓解真菌感染引起的角膜损伤，为真菌性角膜炎的临床治疗提供了新的思路。

摘要编号：210024

伪装成结膜黑色素瘤的真菌感染

第一作者：Yawen NIU

目的：报道一例真菌肿块误诊为色素性结膜黑色素瘤的病例。

方法：病例报告。

结果：一名 69 岁男性因色素结膜病变就诊，诊断为黑色素瘤。就诊前 1 月，患者既往糖尿病史，患眼曾因玻璃体出血，行白内障联合玻璃体切割手术。裂隙灯检查上睑结膜面中央见色素样改变，弥漫团块状黑色炭渣样肿物、深浅不一、局部附着灰白分泌物。取出肿块，进行培养，确认为真菌感染。

结论：在鉴别色素性结膜病变时应考虑深色真菌。

摘要编号：209088

光热响应可溶性微针用于睑板腺功能障碍治疗的研究

第一作者：Fei YU

目的：睑板腺功能障碍（MGD）是影响视觉质量的重大眼病，现有物理联合药物疗法在精准性和疗效方面存在不足，亟需探索更高效的睑板腺药物递送和 MGD 治疗方案。

方法：利用聚乙烯醇、环糊精改性的聚丙烯酸和光热材料 IR820 合成一种具有光热响应性的可溶性微针（MN），通过检测微针的光热效应、溶解性能、机械强度和生物相容性，明确微针递送睑板腺药物的可行性、安全性和药物缓释性能；在小鼠 MGD 模型中，通过大体检测、组织形态学及分子生物学分析，验证负载脂质代谢调节药物罗格列酮的微针（ROSI-MN）减轻 MGD 的效果及机制。

结果：通过优化材料配比得到了可达到适于 MGD 治疗温度的 MN，并且在近红外光的照射下，其溶解速度加快、药物缓释能力增强。体内外检测均证明 ROSI-MN 具备安全地穿透眼睑上皮递送药物于睑板腺组织的能力。此外，ROSI-MN 治疗组 MGD 小鼠的眼表损伤、睑板腺脂质堆积、腺体扩张和炎症浸润均显著下降，达到了最显著缓解 MGD 的效果。

结论：光热响应可溶性 MN 有望成为 MGD 及其他眼表疾病的高效给药策略，为临床提供一体化 MGD 治疗新策略。

摘要编号：209077

共载 PGRN/ 那他霉素纳米脂质体对烟曲霉菌性角膜炎的治疗研究

第一作者：Jing LIN

目的：本研究旨在探究颗粒蛋白前体（PGRN）在真菌性角膜炎中的作用及机制，并将其与抗真菌药物那他霉素（NATA）共负载于纳米脂质体（PGRN-NATA-LN），开发治疗真菌性角膜炎的新策略。

方法：建立小鼠烟曲霉菌性角膜炎模型及细胞模型，PCR 和 WB 检测烟曲霉菌侵袭前后 PGRN 表达变化。使用 PGRN 重组蛋白对角膜及细胞进行预处理，通过临床评分、菌落计数、免疫荧光评估其在小鼠角膜炎中治疗作用；通过 PCR 及 ELISA 检测细胞炎症因子表达变化；WB 检测自噬相关蛋白表达，免疫荧光及 TEM 观察自噬发生情况。使用 3-MA 抑制自噬，评估 PGRN 的治疗作用与自噬的关系。此外，通过薄膜水化法制备 PGRN-NATA-LN，利用 TEM、粒度电位仪、HPLC 和紫外分光光度计等方法评估 PGRN-NATA-LN 的性状。通过 CCK-8、Draize 眼毒性实验评估体内外药物毒性。通过 MIC、CFW、PI 染色及生物膜形成实验检测 PGRN-NATA-LN 的抗菌能力；在小鼠眼内建立真菌性角膜炎模型，通过临床评分、菌落计数评估疾病严重程度；使用 PCR、ELISA 及免疫荧光检测 PGRN-NATA-LN 的抗炎作用。

结果：在烟曲霉菌感染的小鼠角膜及细胞中 PGRN 含量均升高，PGRN 处理后可降低小鼠角膜炎临床评分、减轻角膜炎症反应及真菌负荷，降低细胞炎症因子的表达，调节巨噬细胞向 M2 型极化，并升高角膜及细胞中自噬相关蛋白表达，3-MA 可抑制此作用。制备成功的 PGRN-NATA-LN 为大小均匀的圆形囊性颗粒，其包封率、释放率及稳定率良好，生物安全性高。PGRN-NATA-LN 既能抑制烟曲霉菌的侵袭又并减轻炎症反应，降低小鼠角膜临床评分，抑制中性粒细胞的募集并降低角膜真菌负荷。

结论：本研究证实了 PGRN 可以通过调节自噬抑制烟曲霉菌性角膜炎炎症反应；增强巨噬细胞吞噬功能，减轻烟曲霉菌性角膜炎疾病程度，在烟曲霉菌性角膜炎中发挥保护作用。PGRN-NATA-LN 具有良好的安全性，兼具有效的抗真菌及抗炎作用，在烟曲霉菌性角膜炎中表现出更优的治疗效果，为真菌性角膜炎的临床治疗提供了新的思路。

摘要编号: 209258

利用红外光谱技术基于 Schirmer 试纸条进行泪液生物标志物分析的研究

第一作者: Haozhe YU

共同作者: Yun FENG

目的: 开发并验证一种基于衰减全反射 - 傅里叶变换红外 (ATR-FTIR) 光谱技术的、无标记分析平台, 该平台使用 Schirmer 试纸条进行泪液生物标志物分析, 并评估其在鉴别水液缺乏型干眼病 (DED) 亚型中的诊断效用。

方法: 泪液样本使用 Schirmer 试纸条采集, 样本来源包括接受常规眼科检查的个体以及患有水液缺乏型 DED (伴或不伴原发性干燥综合征) 的患者。对试纸条的湿润区域进行 ATR-FTIR 光谱分析。采用逐步线性回归来模拟单个蛋白质光谱对模拟泪液光谱的贡献。使用欧几里得距离量化光谱差异, 并通过 Spearman 相关性分析与生物标志物浓度及临床参数进行关联。随后应用稀疏偏最小二乘判别分析 (sPLS-DA) 对 DED 亚型进行分类。

结果: 在 $800\text{-}1700\text{ cm}^{-1}$ 和 $\sim 3000\text{ cm}^{-1}$ 区域观察到显著的光谱特征。随着蛋白质光谱的依次加入, 模拟泪液光谱的模型拟合度逐步提高。光谱欧几里得距离能有效捕捉生物标志物 (以乳铁蛋白为例) 的浓度梯度。该距离与泪膜破裂时间、脂质层厚度的相关性均强于其与 Schirmer 试纸湿润长度的相关性, 并且在洗脱后保持稳定。sPLS-DA 能够准确区分 DED 亚型, 曲线下面积 (AUC) 达 0.963, 其分类能力主要由蛋白质相关的光谱特征驱动。

结论: 这项基于 Schirmer 试纸条 ATR-FTIR 光谱技术的集成化泪液分析平台, 能够通过捕获泪液分子指纹, 实现 DED 亚型的准确、经济有效的鉴别, 为将基于泪液的精准医疗整合到常规临床工作流程中奠定了基础。

摘要编号: 210004

单细胞测序发现 CD8⁺ T 细胞介导的慢性炎症在圆锥角膜发病机制中的核心作用及分子机制

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共同作者: Panpan XIAO, Wenjuan ZHUANG, Shuang ZHANG

目的: 探讨圆锥角膜发病中慢性炎症的分子机制, 特别是解析角膜上皮细胞与免疫细胞间的相互作用, 并鉴定驱动病理进程的关键免疫细胞亚群及其调控网络, 为理解 KC 的进行性恶化提供新的视角。

方法: 对圆锥角膜患者及健康对照组的中央角膜上皮组织进行单细胞 RNA 测序。通过生物信息学方法, 进行差异基因表达分析、GO/KEGG 通路富

集、转录因子活性 (SCENIC) 及基因集变异分析 (GSVA), 并利用细胞通讯网络分析探究上皮与免疫细胞间的相互作用。

结果: 关键调控中枢的细胞特异性: 我们鉴定出 KC 样本中存在显著的免疫细胞浸润, 主要是 CD8⁺ T 细胞。SCENIC 分析揭示, 这些免疫细胞由淋巴细胞关键调控转录因子 IKZF1 和 RUNX3 驱动; 而角膜上皮细胞则主要由氧化应激主控转录因子 NFE2L2 调控, 提示疾病由上皮应激损伤和免疫失调共同驱动。细胞毒性 T 细胞亚群的鉴定与特征: 进一步鉴定出两个关键的 CD8⁺ T 细胞毒性亚群: CD8_Tox_JUN (代表持续激活状态) 和 CD8_Tox_GZMH (代表细胞毒性状态)。GSVA 分析显示, 这两个亚群呈现 T 细胞耗竭 (T-cell exhaustion) 的典型特征 (如 TCR 信号通路下调), 并伴有显著的脂质代谢 (尤其是花生四烯酸代谢) 重编程, 表明它们处于一种慢性但持续的炎症状态。炎症放大的恶性循环机制: 基于差异基因 (如 FKBP5, APP) 表达, 我们推断上皮来源的 APP (及其衍生物 A β) 是激活 T 细胞的慢性抗原。关键的是, 细胞通讯分析揭示, 作为配体的上皮细胞 APP 与作为受体的 CD8_Tox_GZMH 亚群 CD74 之间的相互作用在 KC 样本中显著增强, 形成了一个强有力的正反馈放大循环。

结论: 本研究首次揭示了圆锥角膜的慢性炎症是一种由特定 CD8⁺ T 细胞毒性亚群驱动的、类似于自身免疫的病理过程。我们提出一个新模型: 角膜上皮在应激下表达并释放 APP, 作为慢性抗原激活了 CD8⁺ T 细胞, 并使其分化为功能耗竭的细胞毒性亚群。然后, 上皮来源的 APP 通过与这些 T 细胞表面的 CD74 受体结合, 形成一个正反馈放大循环, 持续增强 T 细胞的生存和攻击能力, 最终导致进行性的角膜基质破坏。我们的发现不仅为圆锥角膜的发病机制提供了全新解释, 也提示靶向 APP-CD74 免疫轴心可能为 KC 的治疗提供全新策略。

摘要编号: 208763

可降解丝素蛋白膜作为人工角膜内皮移植替代物

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共同作者: Jing HONG, Rongmei PENG

目的: 角膜内皮功能障碍 (CED) 通过房水内流引发基质水肿, 破坏胶原结构并导致角膜混浊, 慢性病例可进展为纤维化。作为角膜盲的主要致病因素, CED 目前仍需通过角膜移植进行治疗。然而, 由于人类供体的短缺, 开发人工角膜内皮移植材料的需求迫在眉睫。此前报道的不可生物降解的聚合物材

料存在粘附性不足和挡水效率不佳的问题，长期植入还可能引发异物反应。

方法：本文通过旋涂、水退火和热压成型技术制备了甘油增塑的丝素蛋白膜，用作可降解人工角膜内皮层。体外验证其生物相容性和对细胞功能的影响。并在角膜内皮失代偿兔模型中验证其可恢复角膜透明性的作用，以及对内皮细胞迁移和炎症的影响。

结果：我们通过旋涂和水退火技术开发了丝素蛋白-增塑剂复合膜。甘油增塑的丝素蛋白膜具有优良的透光性与柔韧性，水退火处理进一步提高了薄膜力学强度便于眼内手术植入。体外水压力测试发现丝素膜能够长期承受等效于最大眼内压的压力而不发生破裂或渗漏超过 75 天。增塑剂的添加赋予丝素薄膜热塑性，能够通过热成型技术制备出具有合适厚度与眼内曲率的薄膜。丝素蛋白膜经环氧乙烷灭菌处理不影响其力学性能和细胞相容性。植入 CED 兔模型丝素蛋白膜紧密贴附于角膜基质，有效屏障房水进入角膜，同时允许营养物质扩散。在 3 个月观察期间，动物几乎无炎症反应和异物反应，并发现周边内皮细胞向 SF 膜表面迁移。

结论：丝素蛋白膜作为一种具有降解性的新型人工角膜内皮层材料，其优良的透光性、手术可操作性、挡水性与低异物反应等在治疗 CED 方面展现出巨大的临床应用潜力。

摘要编号：208166

基于 ROS/pH 智能响应的载药仿生涂层在泪道支架表面工程中的应用及其抗纤维化机制研究

第一作者：Guanghong ZHANG

共同作者：Chao QU

目的：本研究通过在传统泪道硅胶支架表面构建一种具有抗纤维化功能的亲水性生物相容性涂层，以减轻泪道置管术后黏膜纤维化愈合程度，提高手术成功率。

方法：该涂层采用多巴胺杂化 ZIF-8 纳米金属有机框架 (MOFs) 负载小分子药物维替泊芬 (VP)，能够在纤维化早期 (炎症阶段) 响应 ROS/pH 变化，实现药物可控释放，从而逆转纤维化进程。此外，MOFs 涂层表面通过点击化学方法接枝透明质酸，兼具药物缓释和增强生物相容性的作用。

结果：体外生物学评价显示，该涂层具有良好的抗细菌黏附、抗蛋白吸附、抗炎及抗纤维化性能。分子机制研究表明，该涂层释放的 VP 通过抑制 YAP/TAZ 蛋白核转位，有效阻断了纤维化信号通路。

结论：本研究研发的抗纤维化亲水涂层为泪道阻塞性疾病的治疗提供了新思路，并为抑制泪道黏膜纤维化的分子机制研究提供了潜在靶点。

摘要编号：202609

基于 cAMP 的纳米酶水凝胶通过膜保护性杀灭和抑制宿主炎症实现真菌性角膜炎的双靶向治疗

第一作者：李娜

目的：真菌性角膜炎 (FK) 是全球主要的致盲性眼病。目前常规抗真菌药物因角膜渗透性差、生物利用度低及角膜毒性等问题，在 FK 治疗中面临巨大挑战。本研究旨在开发一种新型治疗策略以克服这些局限性。

方法：本研究首先将环磷酸腺苷 (cAMP) 确定为治疗候选分子，并通过原位金属-有机配位反应构建了镱-cAMP 纳米酶 (SCN)。同时，通过十二胺有机分子笼与氧化结冷胶的缩合反应制备了束缚笼水凝胶 (TCH)，随后将 SCN 嵌入 TCH 中，最终得到水凝胶复合材料 (TCHC)。采用扫描电镜 (SEM) 和能谱 (EDS) mapping 分析对其形貌和元素分布进行表征。通过体外抗真菌实验、角膜伤口愈合实验和小鼠 FK 模型评估其疗效，并利用转录组学分析揭示其作用机制。

结果：成功制备了具有大孔结构且元素分布均匀的 TCHC 复合材料。体外实验表明，TCHC 在 24 小时内能清除 94.2% 的茄病镰刀菌，且不破坏真菌细胞膜。TCHC 能显著加速角膜伤口愈合，48 小时内修复率可达 94.1%。在小鼠 FK 模型中，TCHC 展现出有效的治疗效力。转录组学揭示其通过双重靶向治疗机制——同时干扰真菌 DNA 代谢并抑制宿主细胞质 DNA 传感——实现 FK 治疗。

结论：本研究开发的水凝胶复合材料 (TCHC) 通过独特的双重机制 (膜保护性杀灭真菌和抑制宿主炎症) 有效治疗 FK，凸显了其作为真菌感染性疾病治疗平台的巨大潜力。

摘要编号：204043

基于图案化精准定制化圆锥角膜交联技术应用研究

第一作者：Longhao KUANG

目的：评估图案化角膜光动交联平台控制兔圆锥角膜的有效性和安全性，探究照射强度、照射能量与圆锥角膜控制效果之间量-效关系。

方法：通过基于 DMD 芯片的 DLP 投影技术并结合智能眼追踪系统构建图案化光动交联平台，实现图案化角膜交联和精准的眼球追踪定位，并与美国 Avedro 公司角膜交联治疗系统 (KXL) 进行对比。利用 I 型胶原酶在角膜基质层注射的方式，构建兔圆锥角膜动物模型，根据不同的照射强度和照射

能量以及上皮状态进行随机化分组。设计鸟巢样和蜂窝样索穹顶交联图案，与传统圆形光斑交联的效果进行对比。角膜交联后 1 天、7 天、30 天、90 天、180 天进行随访，评估眼压、角膜地形图 (Sirius+)、眼前节 OCT、角膜共聚焦显微镜、H&E 染色、生物力学测试等。评估交联前和交联后不同时间点的差异，采用重复测量方差分析，结果以均值 $\pm$ 标准差表示， $p < 0.05$ 时认为有统计学意义。

结果：① 对照组与造模组在基质内注射胶原酶 I 前及注射后 90 天，眼压和角膜内皮细胞数量的变化未见明显差异 ($P > 0.05$)；注射后 90 天，造模组角膜前表面最大角膜曲率明显增高 ($P < 0.05$)、角膜最薄点厚度明显变薄 ($P < 0.05$)。② 各组试验兔在角膜交联前及交联后 90 天，眼压和角膜内皮细胞数量的变化未见明显差异 ($P > 0.05$)；各组试验兔在交联后 90 天角膜前表面最大角膜曲率和角膜最薄点角膜厚度的差异均具有显著统计学意义 ($P < 0.05$)，图案化光动交联平台 18 mw/5.4 J 能量下，平均减小的角膜曲率最大，为 3.53 D，而 18 mw/7.2 J 能量下，角膜最薄点角膜厚度变化值最小，为 10.5 mm。③ 通过 Biotester 双轴测试系统检查，三种图案角膜交联后，角膜的力学性能均得到了提升，鸟巢结构力学性能平均相对差异最大为 61.98% ($P < 0.05$)。

结论：① 兔角膜基质层注射 0.1 mg/mL I 型胶原酶可用于构建兔圆锥角膜动物模型。② 图案化光动交联平台和 KXL 系统均能有效的延缓圆锥角膜的进展，但图案化光动交联平台 ② 图案化光动交联平台和 KXL 系统均能有效的延缓圆锥角膜的进展，但图案化光动交联平台 18 mw/5.4 J 能量下，控制角膜曲率变化最优，18 mw/7.2 J 能量下，控制角膜厚度变薄最优。③ 鸟巢结构构交联后角膜生物力学性能最为突出，在减少紫外照射面积的情况下，可以通过设计特殊结构的方式来达到相似或者更好的交联效果。

摘要编号：200942

大切削区域 PRK 治疗 RCES 伴屈光不正的患者的有效性、安全性及屈光结果的研究

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共同作者：Shuangqing WU

目的：复发性角膜糜烂综合征 (Recurrent corneal erosion syndrome, RCES) 以角膜上皮反复糜烂剥脱为特征，常伴有角膜上皮缺损。难治性 RCES 患者，应考虑采取上皮清创术、前基质穿刺术、羊膜移植术及准分子激光治疗等。其中准分子激光治疗包括：治疗性角膜切削术 (phototherapeutic keratectomy, PTK)、经

上皮治疗性角膜切削术 (trans-epithelial PTK, TPTK) 以及屈光性角膜切削术 (photorefractive keratectomy, PRK)。本研究回顾性比较了 PRK 与 PTK 治疗复 RCES 的有效性及安全性，并评估了 PRK 与 TPRK 的视力及屈光结果。

方法：本研究为回顾性非随机对照研究，纳入了接受 PRK 或 PTK 治疗的 RCES 患者。其中，PRK 组的所有患者均被诊断为伴有近视的 RCES。详细记录了年龄、性别、患眼眼别、潜在病因以及最佳矫正视力 (best corrected visual acuity, BCVA)。手术参数如光学区直径、治疗区直径和切削深度均被完整记录。术后观察指标包括角膜上皮愈合时间、角膜上皮糜烂复发情况、并发症、视力以及屈光度等。

结果：共纳入 62 名患者的 79 只眼，其中 PTK 组 49 例患者 52 眼，PRK 组 16 例患者 16 眼，TPRK 组 11 例患者 11 眼。PRK 组治疗区直径 (8.92 ± 0.57 mm) 与 PTK 组 (9.15 ± 0.48 mm) 无显著性差异，但 PTK 组显著大于 TPRK 组 (8.55 ± 0.51 mm) ($p = 0.001$)。术后随访显示：PRK 组 1 眼在术后 1 年复发，经保守治疗缓解；PTK 组 3 眼出现上皮糜烂复发，其中 2 眼经角膜上皮清除联合绷带镜治疗后痊愈，1 眼需再次 PTK 治疗。角膜上皮延迟愈合发生率 PRK 组 2 眼 (12.50%)、PTK 组 8 眼 (15.38%)、TPRK 组 1 眼 (9.09%)，均伴随角膜云翳或 Haze 形成：PRK 组 1 眼与 PTK 组 1 眼在角膜上皮化 30-60 天后出现轻度角膜云翳；暂时性 Haze 见于 PRK 组 2 眼 (12.50%)、PTK 组 1 眼 (1.92%) 及 TPRK 组 2 眼 (18.18%)。视力改善方面，PRK 组与 TPRK 组末次随访时与目标等效球镜的偏差分别为 -0.25 ± 0.57 D 和 -0.13 ± 0.26 D，两组患者裸眼矫正视力均达 1.0 或更好。

结论：大切削区域的 PRK 治疗 RCES 在有效性和安全性方面与 PTK 相当，其屈光效果与 TPRK 相似。对于合并屈光不正的 RCES 患者，该术式在缓解症状的同时可获得理想的视力改善，故推荐临床采用。

摘要编号：201385

太阳光驱动氮掺杂碳点修饰二氧化钛的高效抗真菌作用及机制研究

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共同作者：Menghui CHI, Cui LI, Jing LIN

目的：真菌性角膜炎易导致严重的视力损伤，现有抗真菌药物存在耐药性强、刺激作用强、易耐药等问题。本研究旨在构建一种氮掺杂碳点 (N-CDs) 修饰的二氧化钛 (TiO₂) 纳米复合材料，利用太

阳光催化产生活性氧高效杀灭真菌并探索其作用机制，为眼科抗真菌治疗提供新方法。

方法：以壳聚糖为碳源和氮源，采用水热合成法制备 N-CDs，并将其与 TiO₂ 复合构建 N-CDs/TiO₂ 光催化材料。运用高分辨透射电镜（HR-TEM）、傅里叶变换红外光谱（FT-IR）及紫外-可见漫反射光谱（UV-Vis DRS）对复合材料形貌、化学结构与光吸收性能进行表征；通过瞬态光电流响应与莫特-肖特基测试分析能带结构及光生电荷分离效率；在模拟太阳光照射下测试 N-CDs/TiO₂ 的体外烟曲霉菌杀灭作用；采用电子顺磁共振（EPR）及自由基捕获试验检测光催化过程中产生的主要活性物种；使用 CCK-8 法与 EdU 染色检测光催化剂对人角膜上皮细胞（HCECs）活力和增殖影响。

结果：成功制备的 N-CDs/TiO₂ 中，N-CDs 通过 Ti-O-C 键锚定于 TiO₂，氮原子的掺杂有效拓宽材料可见光吸收范围，显著提升载流子分离效率。在模拟太阳光照射下，N-CDs/TiO₂ 表现出优异的光催化杀菌性能，照射 10 分钟杀菌率为 40%，30 分钟内可实现完全灭菌，在室温储存 3 周后仍保持高效的抗真菌活性。捕获剂和 EPR 结果表明，N-CDs/TiO₂ 在催化杀菌的过程中可产生大量的 $\cdot\text{OH}$ 、 $\cdot\text{O}_2^-$ 及空穴等多种活性物种，其中 $\cdot\text{OH}$ 在破坏真菌细胞结构中起主导作用。同时，CCK-8 与 EdU 染色实验表明 N-CDs/TiO₂ 在有效杀菌浓度下对 HCECs 未表现出明显细胞毒性或增殖抑制。

结论：本研究成功制备 N-CDs/TiO₂ 纳米材料，通过氮掺杂碳点显著增强 TiO₂ 的光催化作用，提高太阳光利用效率，优化其能带结构从而产生大量的活性氧，在太阳光照射下实现对烟曲霉菌的高效快速杀灭。该复合材料具有良好的生物安全性、稳定性和太阳光驱动杀菌作用，在真菌性角膜炎等真菌感染性疾病中具备良好的应用前景，为新型抗真菌策略提供了理论依据。

摘要编号：202204

富马酸二甲酯通过调节 Nrf2/STING 轴改善干眼

第一作者：Weijie OUYANG

共同作者：Dan YAN

目的：研究 Nrf2 激动剂富马酸二甲酯（DMF）对干眼的治疗作用及其机制。

方法：本研究使用东莨菪碱（0.5 mg/0.2 ml）皮下注射联合干燥环境建立小鼠干眼模型，并局部点眼给予 DMF 或溶剂。体外使用高渗（HS）诱导的人角膜上皮细胞（HCE）模型。检测指标包括：体内酚红棉线测泪液分泌，OGD 染色评角膜上皮完整性，PAS 染色定量结膜杯状细胞，免疫荧光检

测角膜 MMP-3、MMP-9 表达，TUNEL 法及 AC-Caspase-3/8 免疫荧光评估角膜凋亡，免疫组化检测角结膜氧化应激标记物 4-HNE、NOX4 表达；体外 CCK8 测 HCE 细胞活性，Annexin V-FITC/PI 流式及 Caspase-8 免疫荧光评估 HCE 凋亡，ROS 探针、3-NT 免疫荧光、Nrf2 及相关酶 qRT-PCR、总抗氧化能力试剂盒评估 HCE 氧化应激水平，Western 印迹检测 HCE 中 Nrf2/STING 通路相关蛋白。

结果：体外实验证明局部 DMF 治疗可有效增加小鼠泪液分泌量，保护角膜上皮屏障功能，逆转了干眼导致的结膜杯状细胞密度减少，抑制了角膜上皮 MMP-3、MMP-9 的表达，有效缓解了角膜上皮的凋亡，抑制了角结膜氧化应激水平。体内实验证明，DMF 可以保护 HCE 免受高渗毒性，抑制高渗引起的凋亡和氧化应激，并且证实 DMF 可能是通过调节 Nrf2/STING 轴对干眼起治疗作用。

结论：富马酸二甲酯可通过调节 Nrf2/STING 轴有效改善干眼，可作为治疗干眼症的潜在药物。

摘要编号：207984

强脉冲光疗法联合抗炎滴眼液对睑板腺功能障碍相关干眼中基质金属蛋白酶-9 表达变化的影响

第一作者：Haipai YAO

共同作者：Yulan WANG

目的：评估强脉冲光（IPL）疗法联合抗炎滴眼液对睑板腺功能障碍（MGD）相关干眼治疗中细胞外基质金属蛋白酶-9（MMP-9）水平及临床疗效的综合影响。

方法：本项前瞻性病例对照研究（每名患者纳入一只更严重的眼，两眼同样严重则纳入右眼）。纳入标准：（1）确诊为干眼症，诊断标准参照《中国干眼专家共识（2020 年）》；（2）诊断为睑板腺功能障碍（MGD），诊断标准参照《睑板腺功能障碍诊断与治疗专家共识（2017 年）》；（3）泪液分泌的 MMP-9 蛋白呈阳性（ $\geq 40 \text{ ng/ml}$ ）；（4）Fitzpatrick 皮肤分型为 I-IV 型；（5）了解不同治疗方案，并自愿参与本研究。排除标准：（1）感染性睑缘炎、脂溢性皮炎；（2）严重眼表异常或睑缘明显异常（ ≥ 3 次眼睑手术史）；（3）无法理解知情同意书及量表内容，且无法正常沟通者；（4）其他眼表疾病（如感染性角结膜炎、睑板腺炎症、结膜疾病）；（5）近期接受过任何抗炎治疗；（6）有眼部手术或外伤史、长期用药史。所有患者随机分为两组：（1）OPT 联合抗炎治疗组：接受 M22 强脉冲光治疗 3 次（间隔 2 周 $\pm$ 2 天）联合环孢素滴眼液（每日两次）；（2）单纯抗炎治疗组：环

胞素滴眼液（每日两次）治疗。评估方法：治疗前及治疗 6 周时分别检测：泪液 MMP-9 水平（根据条带深浅评分：强阳性 4 分，阳性 3 分，弱阳性 2 分，可疑阳性 1 分，阴性 0 分）、眼表疾病指数（OSDI）问卷评分（前后差值大于 5 视为症状好转）、泪膜破裂时间（TBUT）。采用线性混合模型（Linear mixed model）和广义估计方程（generalized estimating equations model）评估组间差异。

结果：本项研究纳入 37 眼，其中 OPT 联合抗炎治疗组（1 组）21 眼，单纯抗炎治疗组（2 组）16 眼。1 组症状好转 10 眼，2 组 3 眼；MMP9 水平好转 1 组 17 眼，2 组 10 眼；MMP9 水平转阴 1 组 13 眼，2 组 4 眼；TBUT 治疗 6 周前后差异 1 组 2.539 ± 0.580 秒， $P < 0.0005$ ，2 组 2.539 ± 0.580 ， $P < 0.05$ 。

结论：强脉冲光疗法联合抗炎滴眼液对睑板腺功能障碍（MGD）相关干眼治疗对眼表炎症及干眼症状有显著好转作用。

摘要编号：209027

糖尿病相关眼表病变的临床特征及 NAMPT 调控机制研究

第一作者：Hui LIU

共同作者：Qian GUO, Haini LIU

目的：本研究旨在系统解析烟酰胺磷酸核糖转移酶（NAMPT）在糖尿病性角膜病变中的调控作用。

方法：收集 2 型糖尿病患者与非糖尿病对照者的角膜及泪腺组织，通过免疫荧光染色检测 NAMPT 表达分布。动物模型：采用 db/db 小鼠（T2DM 模型）与 db/m 对照组，动态监测 8/12/16 周龄的眼表功能及 NAMPT 表达变化，高糖培养模拟糖尿病环境，甘露醇作为渗透压对照，NAMPT 干预：FK866 抑制剂、siRNA 沉默、P7C3 激动剂；线粒体自噬调控：CCCP 激活剂、PINK1-siRNA 沉默。在分子水平，检测 NAMPT、线粒体生物发生（NRF1/TFAM/TOMM20）、自噬（PINK1/Parkin/LC3B）、凋亡（BCL-2/BAX/CytC）蛋白表达。NAD⁺ 含量检测。在细胞功能水平 JC-1/TMRM 染色测线粒体膜电位，DCFH-DA/MitoSOX 染色评估 ROS，划痕实验测迁移能力，TUNEL 染色量化凋亡。在组织病理水平，H&E 染色分析角膜厚度， β III Tubulin 免疫荧光标记神经再生。

结果：糖尿病患者角膜及泪腺组织中 NAMPT 表达水平显著低于非糖尿病对照组。动物实验进一步证实，糖尿病模型小鼠的角膜和泪腺 NAMPT 表达随病程进展呈现进行性下降。高糖环境下，NAMPT 的减少主要发生在线粒体区室，而细胞质中 NAMPT 水平未表现显著变化，高糖培养的人角膜

上皮细胞表现出明显的线粒体 NAMPT 耗竭，伴随线粒体膜电位降低。线粒体生物发生相关调控因子表达受到抑制。糖尿病状态下，PINK1/Parkin 介导的线粒体自噬通路活性显著降低，导致受损线粒体清除效率下降。自噬标志物 LC3B-II/LC3B-I 比率的变化及 p62 积累证实自噬流受阻。高糖环境促使角膜上皮细胞呈现促凋亡倾向。细胞色素 C 释放增加。NAMPT 激活可显著促进 PINK1 在线粒体的定位，而 PINK1 基因沉默则部分抵消 NAMPT 的保护作用。NAMPT 对 PINK1 的调控表现出 NAD⁺ 依赖性，补充 NAD 前体能逆转 NAMPT 抑制导致的 PINK1 表达下调。NAMPT 激动剂 P7C3 点眼治疗后荧光素钠染色评分降低，泪液分泌功能得到部分恢复。治疗后角膜神经密度显著增加，神经纤维形态学特征改善。角膜中央神经漩涡状结构部分恢复，表明感觉神经功能可能得到修复。治疗组角膜水肿程度减轻，角膜厚度趋于正常化。角膜上皮细胞凋亡比例显著降低。

结论：糖尿病环境下 NAMPT 表达异常与角膜病变的因果关系，阐明了 NAMPT-PINK1/Parkin 通路在维持线粒体稳态中的核心作用。

摘要编号：209006

线粒体代谢异常介导 Fuchs 角膜内皮营养不良的发病机制研究

第一作者：Can ZHAO

共同作者：Ting WANG

目的：Fuchs 角膜内皮营养不良（FECD）是导致角膜移植的主要原因之一，主要表现为角膜内皮功能失代偿。本研究旨在通过分析 FECD 患者房水（AH）蛋白质组学变化，以阐明其潜在的生物标志物，探索线粒体代谢异常介导 FECD 的发病机制研究。

方法：本研究收集了 7 例 FECD 患者和 6 例对照患者的 13 个 AH 样本。采用 4D 无标记串联质谱法（4D-LC-MS/MS）和 MaxQuant 搜索引擎对 AH 中的蛋白质进行分析。同时，使用 ELISA、免疫荧光染色及超微结构观察对 UVA 刺激下的 FECD 患者样本及小鼠角膜内皮细胞（CECs）进行评估。通过慢病毒转染标记线粒体 GFP（Mito-GFP）追踪 CECs 中的线粒体动力学变化。

结果：在 1613 个鉴定的蛋白中，有 44 个蛋白在 FECD 患者 AH 中显著上调。GO 分析显示线粒体成分富集，进一步通过 ELISA 验证了线粒体相关蛋白如 SLC25A3、PC 和 PARK7 的上调。此外，FECD 患者及 UVA 照射小鼠的角膜内皮中线粒体外膜蛋白 20（TOM20）表达显著减少，并伴随线粒体损伤的迹象。透射电镜（TEM）分析显示，

UVA 处理后 CECs 内外均出现线粒体损伤。通过电镜观察、颗粒直径测量以及外泌体标志性蛋白检测等，证实了外泌体是角膜内皮细胞外排线粒体成分的途径；抑制外泌体形成，可以加重 FECD 的细胞损伤。健康线粒体移植能够有效防治 FECD。

结论：本研究首次在 FECD 患者的 AH 中检测到线粒体成分的显著富集，提示 FECD 的发病机制可能与线粒体功能障碍和线粒体代谢异常有关。结果强调了线粒体在 FECD 发病过程中的重要角色，可能为未来的生物标志物和治疗靶点提供新思路。

摘要编号：208896

细胞体积调控角膜缘干细胞命运用于修复角膜上皮损伤

第一作者：Yang ZHAI

共同作者：Miaomiao CHI, Jing HONG, Rongmei PENG

目的：通过调节渗透压改变细胞体积，探讨细胞体积变化在调控角膜缘干细胞干性维持及分化命运中的作用机制，并进一步评估通过减小细胞体积对角膜缘干细胞缺乏及角膜上皮损伤修复在体治疗效果，为角膜缘干细胞缺乏和角膜上皮损伤疾病的治疗提供新思路。

方法：在体外培养的角膜缘干细胞中分别加入不同浓度的聚乙二醇（PEG 300）以诱导细胞体积缩小，处理后通过荧光标记结合共聚焦显微镜三维扫描测量单细胞体积；采用免疫荧光和 qPCR 检测干性标志物（p63、ABCG2）及分化标志物（CK3、CK12）的表达；划痕实验及免疫荧光染色用于评估细胞体积变化对角膜上皮细胞增殖、迁移、粘附及紧密连接（ZO-1、E-cadherin）等功能的影响。在体内实验中，构建大鼠角膜碱烧伤角膜缘干细胞缺乏模型，将大鼠随机分为对照组（滴加生理盐水）和 PEG 滴眼液组（n=5）。于造模后 1 d、3 d、7 d 进行裂隙灯显微镜检查，评估角膜上皮缺损面积、愈合率及角膜透明度；实验结束后取材进行角膜组织学检查。

结果：PEG 300 处理可显著诱导角膜缘干细胞体积缩小。0.5% 与 1% PEG 组干性相关基因表达上调，角膜上皮细胞增殖和迁移能力增强。PEG 处理后上皮细胞紧密连接蛋白表达增强，提示细胞体积减小有助于维持角膜缘干细胞活性及促进上皮功能恢复。在动物实验中，PEG 滴眼液显著加快角膜上皮缺损愈合，恢复角膜透明。组织学结果显示，PEG 组角膜上皮结构较完整，炎症反应轻。提示在体内，PEG 可能通过维持角膜缘残余干细胞活性、促进角膜上皮细胞增殖和迁移来加速损伤修复。

结论：通过渗透压调节诱导细胞体积缩小可促进角膜缘干细胞干性维持、上皮分化及组织修复。PEG

滴眼液在体内同样可促进角膜上皮再生，具有成为角膜缘干细胞缺乏及角膜上皮损伤治疗新策略的潜力。

摘要编号：209687

缩短紫外线照射时长联合 A-CXL 治疗过薄圆锥角膜后 3 年期的临床观察

第一作者：Mingyan WANG

共同作者：周春阳，周跃华

目的：评估缩短紫外线照射时长的快速角膜胶原交联术（A-CXL）治疗过薄圆锥角膜（去上皮后角膜厚度小于 400 μm ）患者 3 年期的安全性和有效性。

方法：采用回顾性研究，纳入我院 2018 年 9 月-2021 年 3 月接受 A-CXL 术的进行性圆锥角膜患者（45 例，61 眼），将基质厚度 < 400 μm 且行缩短紫外线照射时长的 A-CXL 的眼别纳入 A 组（13 例，16 眼），将基质厚度 $\geq$ 400 μm 行常规 A-CXL 的眼别纳入 B 组（32 例，45 眼），两组随访时间均为 3 年。评估两组术前及术后 6 个月、12 个月、24 个月和 36 个月的最佳矫正视力、角膜最薄点厚度、角膜曲率、角膜后表面高度、角膜内皮细胞密度。记录随访期间的并发症如角膜感染、角膜内皮失代偿等。

结果：在有效性方面，A 组术后各时间点 Kvb 较术前无明显变化，术后 36 mo 时 BCVA、TCT、Kmax、K1、K2 较术前明显改善（ $P < 0.05$ ）。与此同时，B 组随访期间 TCT、Kmax、BCVA 较术前改善（ $P < 0.05$ ），Kvb 变化无统计学意义，而前表面 K1、K2 值较术前稍有升高；安全性方面，术后 12 mon 时 A 组患者 ECD 较术前增加，而 B 组较术前降低，但均无明显差异（ $P > 0.05$ ）。随访期间两组患者术眼均愈合良好，未发生不良事件。比较随访期间两组观察指标变化量发现，A 组术后 Kmax（36 个月）、角膜内皮细胞密度修复（12 个月）、K1 和 K2（12 个月）较常规组更明显，其余指标变化量无明显差异（ $P > 0.05$ ）。

结论：缩短紫外线时长 A-CXL 与常规 A-CXL 治疗圆锥角膜在术后中长期（3 年）内控制圆锥角膜进展上呈现相似疗效与相同的安全性，且缩短紫外线时长的 A-CXL 对角膜形态控制上更具优势。

摘要编号：205340

自主神经功能紊乱对抑郁相关干眼的作用机制研究

第一作者：Ruibo YANG

目的：探讨慢性应激诱导下抑郁大鼠的泪腺（LG）、睑板腺（MG）功能和组织病理的改变及自主神经功能失衡在其中的作用和机制。

方法：通过慢性不可预测轻度应激（CUMS）大鼠模型诱导抑郁症。通过行为测试评估抑郁样行为。通过角膜荧光素染色、泪膜破裂时间和泪液分泌检测干眼症指标。通过心率变异性（HRV）、ELISA、免疫荧光染色和蛋白质印迹法评估全身、LG 及 MG 自主神经功能状态。通过组织和分子检测评估 LG 与 MG 组织结构改变，炎症、氧化应激和细胞凋亡水平。建模后，给予 6-羟基多巴胺（6-OHDA）抑制交感神经，重复上述实验进一步比较评价干眼指标和 LG 及 MG 病理损伤的变化。

结果：CUMS 造模 8 周后，大鼠体重减轻，糖水偏好值降低，旷场运动距离缩短，大鼠出现抑郁样表型；大鼠全身（心率变异性、血液中交感 / 副交感神经递质）及 LG、MG 均表现为交感神经激活，副交感神经抑制；大鼠角膜 CFS 评分增加，泪液分泌减少，BUT 下降；LG 相对重量升高，LG 结缔组织间隙增大，导管扩张，腺泡细胞内液体滞留，LG 肌上皮细胞中 α -SMA 表达降低，凋亡和氧化应激水平增加，LG 促炎因子表达升高，但无明显炎症细胞浸润；41.67% 大鼠出现 MG 脂栓，腺泡细胞面积减小，油红 O 染色加深，促炎因子及脂质合成相关酶基因表达升高，MG 凋亡及氧化应激水平增加；全结膜囊结膜杯状细胞数量减少，粘蛋白 MUC5AC 基因表达水平下降。6-OHDA 阻断交感神经后，LG、MG 相应组织结构及功能均改善，活性氧水平和细胞凋亡下调，结膜杯状细胞 MUC5AC 基因表达上调，干眼临床指标改善。

结论：慢性不良刺激可诱发抑郁状态及干眼，表现为共病关系。其中，全身及眼局部自主神经功能紊乱（特别是交感神经激活）可能是导致 LG、MG 结构及功能紊乱，进而引发干眼的核心机制。

摘要编号：209002

阿奇霉素通过 PPAR γ 改善氧化应激诱导的人睑板腺上皮细胞异常脂质代谢

第一作者：Yue HUANG

共同作者：Yue HUANG, Liu YANG

目的：本研究旨在探讨阿奇霉素对氧化应激下人睑板腺上皮细胞脂质代谢的影响与机制，以探究睑板腺功能障碍（MGD）的治疗新靶点。

方法：通过细胞活力、迁移能力及形态学观察，确定选用含 200 μ M 过氧化氢（ H_2O_2 ）的培养基建立氧化应激模型，选用含 10 μ l/ml 阿奇霉素（AZM）的培养基作用于氧化应激模型。采用 F-actin 染色、光镜观察、苏木素染色、活性氧（ROS）、JC-1 染色、ANNEXIN V 染色、免疫荧光染色（IF）、蛋白质印迹分析（WB）、定量 PCR 以及油红 O 染色等多种技术手段，对阿奇霉素与氧化应激共刺激

下细胞形态、细胞炎症、细胞凋亡、细胞自噬及脂质代谢等指标进行分析。

结果：在氧化应激作用下，处于增殖状态与分化状态的人睑板腺上皮细胞均呈现形态学改变，并伴有细胞核固缩现象。活性氧（ROS）水平升高导致线粒体膜电位下降，细胞凋亡增加。WB 与 IF 检测结果显示，氧化应激条件下细胞内 IL-1 β 与 p53 蛋白表达均上调，而经 AZM 干预后，两者表达均显著降低。在 AZM 作用下，WB、IF 及 qPCR 分析进一步显示 Cyclin A2 表达下降，同时自噬相关蛋白 LC3、Beclin-1 及 p62 的表达水平上升。此外，通过 WB、IF 与 qPCR 检测发现，AZM 能够逆转由氧化应激引起的过氧化物酶体增殖物激活受体 γ （PPAR- γ ）、硬脂酰辅酶 A 去饱和酶 1（SCD1）及脂滴包被蛋白 2（PLIN2）表达下调；油红 O 染色结果也表明，AZM 干预后细胞内脂滴蓄积量显著增加。

结论：本研究证实阿奇霉素可通过上调 PPAR γ 及其下游脂质合成相关因子的表达，促进脂滴蓄积；同时抑制细胞凋亡与炎症反应，并抑制细胞增殖、调节自噬活性。

摘要编号：209496

青光眼患者睑板腺开口阻塞严重程度相关的危险因素分析：一项临床调查

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共同作者：Lan GONG, Tong LIN, Wushuang WANG, Yue YIN

目的：探讨青光眼病程时长与用药数量对青光眼患者睑板腺开口阻塞严重程度的协同影响，以期优化眼表保护治疗策略提供依据。

方法：本研究为回顾性研究，共纳入 120 例并发睑板腺功能障碍的青光眼患者。采用标准化标准对睑板腺开口阻塞进行评分。使用 Spearman 相关分析和广义线性模型评估阻塞评分与各临床因素之间的关系。

结果：睑板腺开口阻塞评分与青光眼病程时长（ $r = 0.309$, $P < 0.001$ ）、用药数量（ $r = 0.340$, $P < 0.001$ ）、含防腐剂滴眼液产品使用数量（ $r = 0.300$, $P < 0.001$ ）以及用药时长（ $r = 0.398$, $P < 0.001$ ）均存在显著相关性。广义线性模型结果显示，青光眼病程时长和用药数量均具有显著的主效应（ $P = 0.012$ 和 $P = 0.005$ ），且二者存在显著的交互作用（ $P = 0.020$ ）。在青光眼病程超过 3 年后，任何用药方案均比未治疗显著增加阻塞评分（均 $P < 0.05$ ）。三联或四联疗法相较于未用药，其阻塞评分显著更高（ $P = 0.002$ 和 $P = 0.008$ ）。

结论：青光眼病程时长与用药数量对睑板腺开口阻塞具有协同加重作用，且在病程超过一年后影响更为显著。本研究结果提示，对于长期罹患青光眼的患者，减少其用药负担至关重要。

摘要编号：208450

非洲爪蟾模型在眼科研究中的应用与展望

第一作者：李乔玉

目的：本综述旨在系统总结非洲爪蟾 (*X. laevis*) 模型在眼发育、疾病建模和药物筛选领域的应用价值、构建方法及研究意义，为基础眼科研究提供理论依据和方法学参考。

方法：通过系统文献综述方法，归纳非洲爪蟾在眼科研究中的模型构建和应用方案，分析其透明胚胎、快速发育等特性在眼发育观察中的优势。

结果：非洲爪蟾因其胚胎透明、发育快速等特点成为眼发育研究的理想模型，通过 CRISPR 等基因编辑技术可成功模拟青光眼、视网膜变性疾病等人类眼部疾病，并在药物筛选和治疗方法验证中展现出显著优势，其完整的基因组数据为精准基因操作提供支持。

结论：非洲爪蟾作为重要的模式生物，在眼科基础研究中具有不可替代的价值。其突出的胚胎学特征（如胚胎透明、体外发育）为实时观察眼发育过程提供了独特优势，而成熟的基因编辑技术体系则使其成为研究眼部疾病分子机制的有力工具。在眼发育研究方面，非洲爪蟾早期胚胎的透明特性使得研究者能够无创观察眼球原基形成、晶状体诱导、视网膜分层等关键发育事件，这对解析眼发育的分子调控网络具有重要意义。通过显微注射 mRNA 或形态寡核苷酸，可实现对特定基因的时空特异性调控，从而精确解析 Pax6、Rx 等关键基因在眼发育过程中的功能。在疾病建模领域，利用 CRISPR/Cas9 技术成功构建了模拟人类视网膜色素变性、先天性白内障等遗传性眼病的爪蟾模型。这些模型不仅重现了患者的主要病理特征，如光感受器细胞凋亡、晶状体蛋白异常聚集等，还为研究疾病发生发展的动态过程提供了独特窗口。

摘要编号：201364

鱼腥草外囊泡的制备及其在角膜修复中的应用

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目的：鱼腥草 (*Houttuynia cordata* Thunb.) 又称蕺菜，是国家卫生部确定的“药食两用”品种之一，收录于《中国药典》。鱼腥草滴眼液还被用于治疗结膜炎。本实验利用差速离心法从新鲜及冻

存后的鱼腥草根中提取外囊泡，比较两者外囊泡中 miRNA 的差异，此外考察了外囊泡的角膜细胞毒性及其在小鼠角膜碱烧伤后修复过程中的作用。

方法：用差速离心法提取新鲜和 -80 °C 冻存六个月后的鱼腥草根的外囊泡，用负染色电镜和纳米颗粒跟踪分析仪 (NTA) 表征外囊泡形貌和粒径，并对其进行 miRNA 测序分析和潜在靶基因富集分析。CCK-8 检测不同浓度外囊泡对角膜上皮细胞 (HCEs) 增殖的影响。小鼠角膜碱烧伤造模后，外囊泡 PBS 溶液点眼，8 天后取材，石蜡包埋切片并进行 H&E 染色。

结果：差速离心法分离出的外囊泡与常见外泌体大小形态类似，呈杯碟状，平均粒径为 149 nm，CCK-8 实验结果显示不同浓度外囊泡对角膜上皮细胞增殖均无影响 (图 1)。miRNA 测序分析结果显示，在 -80°C 储存六个月后，miRNA 的数量有下降趋势 (图 10)，其中 ath-miR159a、ath-miR319b、ath-miR319a、ath-miR396a-5p 和 ath-miR396b-5p 为高表达 miRNA (Readcount > 2000)。文献报道其中的 ath-miR159a 和 ath-miR396b-5p 具有抗炎活性。潜在靶基因的 GO 富集分析结果显示，靶基因集中于蛋白结合、氨基酸代谢等通路。H&E 染色结果显示，小鼠角膜未见明显炎症细胞浸润，各组角膜上皮层完整，单纯 PBS 滴眼组角膜基质水肿较重，外囊泡滴眼组角膜上皮有增生现象，基质胶原排列较整齐，但前房有炎症反应，可能是浓度配制较高刺激所致。

结论：差速离心法获得的外囊泡具有植物外囊泡的典型特征，但 -80°C 储存会影响其中 miRNA 的表达量。一定浓度的外囊泡不影响 HCEs 增殖。小鼠眼表损伤治疗的预实验结果显示，外囊泡滴眼可促进角膜上皮的愈合，维持基质层厚度。

近视

摘要编号：209378

BWFOM 主客一体双眼波前验光仪与传统验光方法的临床比较

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目的：比较 BWFOM 主客一体双眼波前验光仪与传统验光方法在球镜度数 (SPH)、柱镜度数 (CYL) 及矫正视力 (VA) 上的差异。

方法：本研究为自身对照研究。共纳入 126 例样本。为保持数据独立性并遵循方法学惯例，分析仅使用

受试者右眼数据。采用配对 t 检验对 BWFOM 验光与常规验光结果进行统计比较。

结果：球镜度数 (SPH)：BWFOM 验光结果 (1.21 ± 4.17 D) 显著高于常规验光 (0.98 ± 3.93 D)，差异具有统计学意义 ($t = 2.71, P = 0.008$)。柱镜度数 (CYL)：两种方法结果相近 (BWFOM: -1.67 ± 1.11 D; 常规: -1.68 ± 1.07 D)，差异无统计学意义 ($t = -1.136, P = 0.259$)。矫正视力 (VA)：BWFOM 验光 (4.91 ± 0.18) 显著优于常规验光 (4.87 ± 0.12)，差异具有高度统计学意义 ($t = 4.963, P < 0.001$)。

结论：BWFOM 主客一体双眼波前验光仪在矫正视力方面展现出显著优势，其测量结果能为患者提供更优的视觉矫正效果，为弱视儿童治疗及近视防控提供新的思路。

摘要编号：203156

S- 视蛋白通过胶原代谢调控角膜曲率诱导小鼠近视偏移

第一作者：Jin Fang HUANG

共同作者：Hong LIU, Yining SHEN, Leilei ZOU

目的：本研究旨在探究视网膜 S 视蛋白缺失对小鼠屈光各项参数以及角膜胶原结构和力学性能的影响。

方法：将 4 周龄野生型 (WT) 小鼠作为正常对照组，S 视蛋白基因敲除型 (*Opn1sw* -/-) 小鼠作为实验组，于正常光照条件下饲养 8 周，比较两组在屈光度、眼轴长度 (AL)、角膜曲率半径 (CCR) 以及角膜胶原形态等方面的差异，并利用高分辨多模式原子力显微镜检测角膜力学性能的变化。

结果：与 WT 小鼠相比，*Opn1sw* -/- 小鼠呈现近视化发展趋势。与传统模型中因 AL 延长所致近视不同，两组间 AL 未见显著差异，屈光度差异主要源于 CCR 的改变。*Opn1sw* -/- 组小鼠 CCR 显著减小，角膜更为陡峭，从而导致近视发生。进一步研究显示，*Opn1sw* -/- 小鼠角膜中 IV 型胶原蛋白表达升高，胶原纤维排列疏松，角膜弹性降低，质地变软。

结论：本研究说明，视网膜 S 视蛋白缺失可通过改变角膜形态促进近视发展，其机制可能与 IV 型胶原蛋白异常表达增加、胶原纤维结构紊乱及角膜生物力学性能下降密切相关。该结果不仅揭示了 S 视蛋白在角膜发育与屈光稳态维持中的新功能，还首次建立了“视网膜光信号 - 角膜细胞外基质代谢 - 角膜生物力学特性”的跨组织调控轴，为近视发病机制提供了新视角，提示针对角膜胶原代谢与力学性能的干预可能成为近视防控的新策略。

摘要编号：210218

miR369/CCND1 轴调控高度近视性巩膜重塑的作用和机制研究

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目的：高度近视是眼底疾病的高危因素，合并黄斑变性、黄斑新生血管和原发性开角型青光眼等威胁视力的并发症导致视力损害，严重可影响患者的生存质量。由于高度近视患者眼底具有巩膜重塑和视盘旋转、倾斜等特点，使得眼底合并症如青光眼诊断困难，亟需探究其分子调控机制。miRNA 对近视性眼底巩膜重塑的调控是近年来的研究热点。

方法：(1) 利用公共数据库进行生信分析寻找在高度近视中差异表达的 miRNA；(2) 验证 miRNA 可与靶向 mRNA 互作调控视网膜色素上皮层的眼内信号转导，参与眼部通路和机制调控；(3) 通过 ARPE-19 细胞系、动物建模、眼内组织或外周血获取等筛选流程包括进行高通量测序分析，进一步明确参与眼疾发生发展的具有差异表达的 miRNA，探索该基因在的功能；(4) 利用 RIP 实验寻找 RNA- 蛋白互作，并且阐明下游的靶基因和通路改变。挖掘其潜在的调控机制。

结果：(1) 高度近视 miRNA 表达谱的公共数据库筛选在高度近视中差异表达的 miRNA，并且将差异前 5 的 miRNA 的表达量在高度近视和非高度近视小鼠中进行检测，发现 miRNA-369 在高度近视中差异高表达；(2) 细胞实验提示，低表达 miRNA-369 可抑制 ARPE-19 细胞系增殖和阻滞细胞周期。(3) 通过在多个公共数据库中寻找和预测 miR-369 的靶 mRNA，从韦恩图总结出 225 个共同基因，经过严格的理论支撑和严谨的实验数据，我们聚焦于 CCND1；(4) 生信分析预测出 miR-369 与 CCND1 的 3' UTR 区存在互作。在 ARPE-19 细胞中，miR-369 的表达减少，CCND1 及其下游的 CDK-2 的 mRNA 和蛋白的表达水平也减少。进一步通过 RIP 实验发现 miR-369 与 CCND1 在分子层面存在互作。

结论：本研究发现 miR-369 在高度近视差异高表达，其与 CCND1 蛋白相互作用共同影响 RPE 细胞系的功能与机制调控，为预防和治疗高度近视提供理论依据和参考靶点。

摘要编号: 209185

一个高度近视家系中新发 P4HA2-E200K 突变的鉴定及功能机制研究

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目的: 高度近视 (High Myopia, HM) 是全球范围内导致不可逆视力损害和致盲的主要原因之一, 具有明显的遗传倾向。P4HA2 基因编码的胶原脯氨酰羟化酶是胶原合成过程中的关键酶, 初步研究表明其与遗传性 HM 发病相关, 但具体的致病分子机制尚未明确。本研究旨在鉴定一个新的 HM 家系中携带的 P4HA2 基因致病性突变位点, 并深入探究该突变在 HM 发生发展中的作用及其分子机制。

方法: 研究招募了一个 HM 家系, 收集先证者及其家庭成员的临床资料和外周血样本, 通过靶向外显子测序和 Sanger 测序筛选致病突变。利用生物信息学工具对突变位点进行保守性分析, 并通过 ProtScale 和 PyMOL 进行蛋白质疏水性分析和三维结构预测。提取原代人巩膜成纤维细胞 (HSFs) 进行培养, 构建包含突变位点的 P4HA2 过表达载体。采用 RT-qPCR 和 Western blot 验证过表达效率, 通过羟脯氨酸含量测定评估胶原羟化水平, 利用 BrdU 标记和细胞划痕实验检测细胞增殖和迁移能力。最后对三组 HSFs (空白对照、野生型 P4HA2 过表达、突变型 P4HA2 过表达) 进行转录组测序和生物信息学分析。

结果: 在 HM 家系中发现 P4HA2 基因第 6 外显子存在 c.598G > A (p.E200K) 杂合错义突变, 该突变与疾病表型共分离, 且在脊椎动物中高度保守。突变导致 P4HA2 蛋白局部疏水性下降和三维构象改变。细胞实验表明, 突变型 P4HA2 过表达细胞的羟脯氨酸水平显著降低, 细胞迁移和增殖能力明显弱于野生型组。转录组分析发现突变型与野生型组间存在 76 个差异表达基因, 这些基因显著富集于胶原代谢相关通路, 且该通路关键基因的表达水平在三组间呈现梯度上调趋势。

结论: 本研究鉴定了一个新的 P4HA2 基因 E200K 突变, 该突变通过改变蛋白质结构, 导致巩膜成纤维细胞胶原羟化能力下降、细胞增殖和迁移功能受损, 可能通过“P4HA2-胶原合成-巩膜 ECM 重塑”机制参与 HM 的发病过程。研究结果丰富了 HM 的致病基因谱, 为 HM 的早期遗传筛查和靶向治疗提供了理论依据。

摘要编号: 202279

一种改良的更为稳固的小鼠光学离焦性近视模型

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目的: 探索一种改良且更加稳固的小鼠光学离焦性近视 (lens-induced myopia, LIM) 模型的构建方法, 并评估其屈光学变化。

方法: 将 16 只 28 日龄 C57BL/6 小鼠分为 LIM 组和空白对照组 (NC) 组, 右眼造模, 左眼作为自身对照。LIM 组采用改良设计的头骨固定眼镜, 结合 3D 打印的金属框架和专为小鼠设计的耐磨耐抓树脂镜片, 并利用骨水泥及生物组织粘合剂增强稳定性。于实验前及造模后第 2、4 周, 在复方托吡卡胺散瞳后, 利用红外偏光摄影验光仪检测小鼠屈光度, 并通过光学相干断层扫描在体测量眼轴。同时记录小鼠眼镜脱落情况及眼部健康状况。

结果: 造模 4 周后, 与 NC 组相比, LIM 组造模眼屈光度比对侧眼向近视漂移 (5.19 ± 0.46) D ($t = -32.032$, $p < 0.0001$), 同时 AL 较对侧增长约 (110.00 ± 46.25) μm ($t = 6.727$, $p < 0.0001$)。随造模时间延长, 近视漂移程度增加。4 周内眼镜脱落率为 12.5%, 使用生物组织粘合剂可明显减少头皮渗液, 提高骨水泥固定稳定性。整个实验过程中, 造模眼及对照眼眼结膜炎患病率为 0。

结论: 本研究建立了一种改良且稳定性更高的小鼠 LIM 模型。经 4 周诱导, 小鼠屈光度显著向近视漂移, 眼轴显著增长, 同时模型脱落率低, 且易于保持小鼠眼部健康状态, 不影响其进食等正常生理活动。该方法为小鼠近视研究提供了可靠的实验模型参考。

摘要编号: 208165

不同色温 LED 白光对镜片诱导性近视豚鼠近视发育的影响

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共同作者: Ye SHEN, Jianping TONG

目的: 探究不同色温 LED 白光对镜片诱导近视 (LIM) 豚鼠屈光不正发展的影响。

方法: 将 3 周龄豚鼠 ($n = 90$) 分为三组, 分别在等亮度 (500 lx) 的白色 LED 灯 (CCT = 3000 K, 4500 K, 6500 K) 环境中饲养 4 周, 每组中一半的豚鼠 ($n = 15$) 右眼佩戴 -6 D 镜片, 另一半豚鼠 ($n = 15$) 未做处理设置为对照组。每只豚鼠仅纳入右眼。在基线、2 周和 4 周测量屈光度和眼轴长度。4 周后使用 OCTA 测脉络膜厚, HE 染色观察巩膜结

构及厚度,透射电镜观察巩膜胶原纤维直径,并检测巩膜 MMP2, Collagen1 和 TGF β 1 表达情况。

结果:光照 4 周后, LIM 眼睛的屈光度和眼轴向近视方向进展。与 4500 K 相比, 6500 K 显著延缓了 LIM 的近视偏移,伴随着屈光降低的延缓和眼轴增加的延缓,而 3000 K 组呈现相反的趋势。3000 K 组的 LIM 眼脉络膜厚度、巩膜厚度和胶原纤维直径显著小于 6500 K,胶原纤维间隙较大,排列较稀疏。三组对照眼间各数据无统计学意义。LIM 眼 3000 K 组巩膜 MMP2 表达上调, collagen 1 and TGF- β 1 表达下调。

结论:6500 K 白光可以延缓豚鼠晶体诱导的近视,这可能是通过参与巩膜重塑引起的。

摘要编号: 202747

个性化健康宣教对全飞秒 Smile 角膜屈光手术患者术后遵医行为及并发症预防的作用

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目的:全飞秒 Smile 角膜屈光手术以其微创、无瓣、恢复快等优势,成为众多屈光不正患者的选择。然而,术后患者的遵医行为及并发症预防对手术效果及视力长期稳定至关重要。本研究旨在探讨个性化健康宣教在全飞秒 Smile 角膜屈光手术患者中的应用效果,通过对比常规宣教组与个性化宣教组患者术后遵医行为及并发症发生情况,发现个性化健康宣教可显著提升患者术后遵医行为依从性,有效降低并发症发生率,对提高手术成功率及患者视觉质量具有积极意义。

方法:对象:2025 年 6-7 月我院 20 例 Smile 手术患者,随机分两组各 10 例,一般资料无差异 ($P > 0.05$)。干预:常规组:统一手册+口头讲解基础注意事项;个性化组:术前评估职业、用眼习惯等,定制方案(如程序员用眼指导、运动爱好者恢复计划)+心理疏导+并发症专项指导。指标:遵医行为问卷(满分 100 分)、术后 1 个月并发症(干眼、角膜上皮延迟愈合、屈光回退)。统计:SPSS 26.0, t 检验/ χ^2 检验, $P < 0.05$ 有意义。

结果:遵医行为:个性化组 (92.3 ± 4.5) 分显著高于常规组 (75.6 ± 6.8) 分 ($t = 6.723, P < 0.001$),各维度(滴眼药、用眼等)均更优 (P 均 < 0.01)。并发症:个性化组发生率 10.0% (1 例轻度干眼),低于常规组 60.0% (4 例干眼、1 例角膜上皮延迟愈合、1 例屈光回退) ($\chi^2 = 5.714, P = 0.017$)。

结论:个性化健康宣教可显著提升 Smile 手术患者术后遵医行为,降低并发症发生率,为术后恢复提供优质护理保障,值得临床推广。

摘要编号: 207908

儿童屈光参差非近视眼近视进展的研究现状

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目的:两眼屈光状态不一致被称为屈光参差,当两眼屈光度相差球镜 ≥ 1.50 D,柱镜 ≥ 1 D 时为屈光参差。随着近视防控工作的不断推进,屈光参差矫正方法在控制近视进展方面得到了广泛应用。近年来研究显示,单眼近视青少年单眼矫正后,对侧眼的眼轴增长速度明显快于正视眼。为系统剖析屈光参差患者矫正后非近视眼或低屈光度眼眼轴增长过快的原因,本文对相关研究进行综述。

方法:大规模队列研究证实,单眼接受屈光矫正者非矫正眼的年化眼轴增长速率较自然近视进程加快 37% (95% CI 25-49%)。这种特殊现象挑战了传统屈光矫正理论,提示双眼协同机制在近视调控中具有重要作用。2023 年 Chen 等通过动态屈光地形图发现,单眼接受屈光矫正后对侧眼周边视网膜呈现特征性远视离焦模式 (平均 $+1.25 \pm 0.38$ D),可能与眼轴加速增长直接相关。然而,在屈光参差近视儿童中,单眼矫正后,常常出现非近视眼或低屈光度眼眼轴增长过快的现象,这一问题引起了视光界的关注。了解其原因对于提高近视防控效果、保障儿童视觉健康具有重要的临床意义。

结果:越来越多的研究证明,单眼近视青少年单眼矫正后,对侧眼的眼轴增长速度明显快于矫正后眼的眼轴增长速度。在相同的环境因素影响下(如遗传、营养、阅读与近距离用眼、光线、睡眠等),双眼的近视化程度却存在很大差异,这种现象暗示了可能有内在的视觉调节机制在起作用。基于此,屈光参差患者单眼矫正后非近视眼眼轴和近视度数进展更快的现象,可能和多种因素密切相关。

结论:调节功能代偿失衡、双眼协同作用改变、视觉抑制、外隐斜视、周边离焦信号差异、遗传环境和 Troxler 现象和抑制中的适应性反应涉及到复杂的单眼和双眼视觉系统机制,包括对亚阈值模糊的适应和对感知消退的响应。这些机制不仅涉及神经元的适应过程,还可能涉及到处理目标和背景信息的竞争过程。需要探索这些机制对于深入了解屈光参差性近视的视觉系统具有不同的重要意义。

摘要编号: 210316

儿童青少年近视中西医综合防控临床疗效评价

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共同作者: Yuqing LAN, Xiaoyin ZHOU

目的:基于中医特色防控理论体系和中西医综合防控方案,采用前瞻性队列研究,评估儿童青少年近

视中西医结合综合防控临床疗效，验证中医特色技术体系防控近视发生发展的有效性和群体可推广性。

方法：本研究采用前瞻性队列研究设计，以示范学校 1556 名小学 1-4 年级学龄儿童作为队列研究对象。依据诊断、纳入和排除标准将其分为三组：非近视组；近视前期组： $SER \leq +0.75 D$ 且 $> -0.50 D$ ；低度近视组： $-6.00 DS < SER \leq -0.50 DS$ 。对其进行对应干预：（1）低度近视组：筛查建档 + 健康宣教（用眼行为习惯、眼保健操、户外活动等指导）+ 中适宜技术（耳穴压丸联合耳穴揸针）+ 足矫配镜；（2）近视前期组：筛查建档 + 健康宣教（用眼行为习惯、眼保健操、户外活动等指导）+ 耳穴压丸；（3）非近视组：筛查建档 + 健康宣教。收集并记录所有儿童的信息，包括一般资料（年龄、性别、民族等）、病史及既往治疗史、过敏史、合并疾病及治疗等。所有纳入研究的儿童需完成干预开始前（基线），干预 20 周、干预 40 周的随访检查，包括：裸眼视力检查、屈光度检查、眼压测量、生物测量仪检查等。使用 SPSS 22.0 对研究数据进行分析。

结果：1. 本研究共纳入了 2023 年至 2025 年期间在示范学校就读的 1556 名小学 1-4 年级学龄儿童。根据屈光度分组，非近视组：86 人（172 眼）；近视前期组：899 人（1798 眼）；近视组：571（1142 眼）。三组儿童的 AL 之间有统计学差异（ $P < 0.001$ ），近视儿童的 AL 最长，非儿童的 AL 最短。三组儿童的 ACD 之间有统计学差异（ $P < 0.001$ ），近视儿童的 ACD 最大，非近视儿童的 ACD 最小。三组儿童的 VCD 之间有统计学差异（ $P < 0.001$ ），近视儿童的 VCD 最大，非近视儿童的 VCD 最小。非近视儿童和近视前期儿童的 LT 之间没有统计学差异（ $P > 0.05$ ），两组儿童和近视儿童的 LT 之间均有统计学差异（均有 $P < 0.001$ ）。2. 所有儿童中，干预后屈光度控制率为 52.60%（1637/3112），眼轴控制率为 71.30%（2219/3112）。近视前期儿童屈光度控制率为 54.56%（981/1789），眼轴控制率为 69.69%（1235/1789）；近视儿童屈光度控制率为 51.05%（583/1142），眼轴控制率为 76.62%（875/1142）。实施耳穴压丸和耳穴揸针干预的近视前期儿童和近视儿童中屈光度控制率和眼轴控制率均高于仅实施健康宣教的非近视儿童。非近视组，除 ACD 外，屈光度、AL、其它眼生物学参数自身前后对照有统计学意义（均有 $P < 0.05$ ）。近视前期组，屈光度、AL 及眼生物学参数自身前后对照均有统计学意义（均有 $P < 0.05$ ）。近视组，除 K1、K2 外，屈光度、AL、其它眼生物学参数自身前后对照有统计学意义（均有 $P < 0.05$ ）。

结论：中西医结合近视防控策略可有效延缓近视进展、减慢近视度数增长、控制眼轴增长。

摘要编号：200572

口服递法明片对儿童近视控制的疗效评估

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共同作者：刘晶莹，宋艳萍，张香闰

目的：探讨口服递法明片对儿童近视进展及眼底微循环的干预效果。

方法：本研究为前瞻性、随机双盲对照研究，共纳入 112 例儿童，分为 A、B 两组。A 组前 6 个月佩戴单光框架眼镜并每日口服递法明片，后 6 个月停药仅佩戴单光框架眼镜；B 组前 6 个月仅佩戴单光框架眼镜，后 6 个月佩戴单光框架眼镜并每日口服递法明片。在基线及入组后 6、12 个月进行随访，观察指标包括眼轴长度（AL）、屈光度（SE）、中心视网膜厚度（CRT）、黄斑中心凹下脉络膜厚度（SFCT）。

结果：共 100 例受试者完成随访。治疗 6 个月后，A 组受试者右眼眼轴变化值明显小于 B 组，差异具有统计学意义（ $P \leq 0.001$ ），左眼眼轴变化值小于 B 组，差异具有统计学意义（ $P = 0.037$ ）。A 组受试者右眼和左眼的屈光度变化均小于 B 组，其中右眼屈光度差异具有统计学意义（ $P = 0.001$ ）。A 组受试者在停药后的 6 个月与治疗前 6 个月的眼轴变化对比，差异无统计学意义（ $P = 0.647$ 和 $P = 0.556$ ）。B 组受试者在口服递法明片后的 6 个月与前 6 个月的眼轴长度和屈光度变化对比，差异均具有统计学意义（均 $P < 0.001$ ）。B 组受试者后 6 个月与前 6 个月的双眼 CRT 差值变化，差异均无统计学意义（均 $P > 0.05$ ）；双眼 SFCT 差值变化，差异均有统计学意义（均 $P < 0.05$ ）。

结论：口服递法明片可有效延缓青少年近视眼轴和屈光度的进展，并可能改善眼底脉络膜微循环，具有良好的干预潜力。作为一种口服形式的近视控制手段，递法明片为儿童近视防控提供了新的可行策略。

摘要编号：209672

多光谱屈光地形图在屈光参差患者视网膜周边离焦量评估中的应用分析

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共同作者：Jiwen YANG

目的：运用多光谱视网膜屈光地形图（MRT）测量屈光参差儿童周边视网膜离焦量（RPRE），观察双眼 RPRE 差异，探讨屈光度、眼轴与不同区域 RPRE 的相关性。

方法：采用描述性研究，收集 2021 年 10 月 -2024 年 6 月辽宁爱尔眼科医院视光科 6 ~ 15 岁屈光参差儿童 120 例 240 眼（男 61 例，女 59 例，平均

年龄 10.67 ± 1.85 岁)。测量双眼屈光度、眼轴,按等效球镜(SE)相差分组: < 1.00 D 为屈光不正组, ≥ 1.00 D 为低度屈光参差组, 2.00 D ~ 3.00 D 为高度屈光参差组。应用 MRT 测量双眼总离焦值、各象限(上、下、鼻、颞侧)及不同偏心度($0^\circ \sim 15^\circ$ 、 $15^\circ \sim 30^\circ$ 、 $30^\circ \sim 45^\circ$ 、 $45^\circ \sim 53^\circ$) RPRE。采用配对样本 t 检验、单因素方差分析及相关性分析处理数据。

结果: 儿童周边视网膜屈光分布不对称;屈光参差儿童双眼 RPRE 存在差异,屈光度较高眼多为远视性离焦,较低眼多为近视性离焦;随屈光参差程度增加,下方、颞侧象限及 $30^\circ \sim 53^\circ$ 偏心度范围 RPRE 的差异显著;颞侧象限及 $30^\circ \sim 53^\circ$ 偏心度范围 RPRE 与屈光度呈负相关,与眼轴呈正相关。

结论: 屈光参差儿童周边视网膜离焦呈特征性分布,屈光度和眼轴与部分区域 RPRE 相关,提示屈光参差对视网膜周边离焦的影响存在区域选择性,且影响程度随屈光参差程度增加而增强。

摘要编号: 208939

姿势异常与屈光不正的关联: 来自学生群体的客观摄影测量分析

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目的: 探讨中国资阳市青少年中客观测量的姿势异常(包括头部倾斜、高低肩及前倾头位)与屈光不正(近视、屈光参差)及眼部生物参数之间的关联性。

方法: 采用横断面研究设计,以学校为基础招募 567 名 12-18 岁学生为研究对象。所有参与者均接受全面眼部检查,项目包括视力测定、睫状肌麻痹下自动验光及眼轴长度测量。采用摄影测量分析系统对标准化体位照片进行姿势参数量化评估。

结果: 研究人群平均年龄为 14.96 ± 1.60 岁,男性占比 43.39%。近视率达 82.54%,屈光参差(双眼等效球镜差值 ≥ 1.00 D)率为 34.74%。多因素回归分析显示:更大的年龄、女性及高低肩是较高的近视度数的独立影响因素。高低肩的存在与较高的近视度数($\beta = -0.48, P = 0.030$)及更长的眼轴($\beta = 0.24, P = 0.025$)显著相关;头部倾斜的存在不仅是屈光参差的独立危险因素($OR = 1.71, P = 0.013$),同时与较大的双眼等效球镜度差值($\beta = 0.22, P = 0.026$)和双眼的眼轴长度差值($\beta = 0.11, P = 0.007$)显著相关。前倾头位与各项屈光参数均无显著关联,所有姿势参数与视力水平均无显著相关性。

结论: 异常姿势与青少年屈光不正存在特异性关联:存在头部倾斜主要影响屈光参差的发生风险与程

度,而存在高低肩则与近视严重程度及更长的眼轴密切相关。这些发现提示姿势评估在近视防控体系中具有重要应用价值。

摘要编号: 206857

无缝线可降解支架植入术治疗病理性近视: 对视网膜曲率形态改善与近视控制的效果评估

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共同作者: Zhang SHAOCHONG

目的: 病理性近视常导致不可逆的视力损害,其核心病理改变为眼轴的进行性伸长及相关视网膜、脉络膜病变。当前缺乏能够有效逆转此进程且兼顾安全性的治疗手段。本研究旨在开发一种新型的可降解、无细胞、无缝线组织支架植入物,实现有效控制并部分逆转眼轴的异常增长,同时通过改善后巩膜胶原结构,重塑视网膜曲率与形态,从而为病理性近视提供一种创新性治疗策略。

方法: 本研究设计了一种双层复合组织支架:表层为提供适宜细胞生长微环境的 GelMA 水凝胶层,底层为提供机械支撑与引导性降解的聚乳酸微静电纺丝薄膜层。我们选用幼龄新西兰白兔,建立形觉剥夺性近视模型。实验动物被随机分为三组:实验组(近视+支架植入组, $n = 12$),接受支架后巩膜植入术;模型对照组(近视组, $n = 12$),仅造模不进行治疗;空白对照组($n = 12$),为健康未干预眼。术后采用超声动态监测眼轴长度及后巩膜曲率的变化。安全性评估包括全视野视网膜电图以评估视网膜神经功能,非接触式眼压计监测眼压波动, TUNEL 染色检测视网膜及巩膜细胞的凋亡情况。此外,通过苏木精-伊红及 Masson 三色染色,详细观察了支架降解过程、新生组织形态及巩膜自身胶原纤维的排列与密度。最后,我们利用有限元分析进行了力学仿真,量化比较支架植入前后后极部视网膜所受的牵引力变化。

结果: 建模成功后,近视组表现出显著的眼轴增长,其眼轴长度与视网膜曲率均显著高于空白对照组。支架植入展现了快速且持久的干预效果:术后第 2 周,实验组眼轴长度(13.79 ± 0.23 mm)即显著短于近视组(15.15 ± 0.33 mm)与对照组(14.70 ± 0.18 mm) ($p < 0.001$)。这一控制效应在长达 48 周的观察期内持续存在,且实验组眼轴曲线逐步向正常生理轨迹回归。在安全性方面,实验组的视网膜电图波形、振幅及潜伏期与健康对照组无统计学差异,眼压始终维持在正常范围内,且未发现异常细胞凋亡。超声显示实验眼后巩膜曲率逐渐趋于正常,组织切片可见支架在引导宿主细胞浸润和血管化的同时缓慢降解,并原位再生出结构规整、富含胶原的类巩膜组织,同时毗邻的自身巩膜组织

也表现出胶原合成增强的迹象。力学仿真结果从生物力学角度证实，支架植入有效分散并缓解了后极部视网膜因眼轴拉长而承受的异常牵张力。

结论：本研究成功验证了一种基于可降解无缝线组织支架的创新疗法。该方案通过“机械支撑、生物降解、原位再生”的协同作用机制，实现了对近视眼轴过度增长的有效干预与部分逆转，并能同步改善视网膜形态与生物力学环境。整个治疗过程操作便捷，生物相容性优异，避免了传统植入物永久存留的潜在风险，为病理性近视的治疗提供了一种创新外科解决方案，具有广阔的临床转化前景。

摘要编号：207653

激光手术/微笑手术前干眼管理的重要性；以及如何安全地转换 (Importance of dry eyes management before lasik/smile; and how to convert safely)

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共同作者：Meiliaty Ariesta ANGKY

目的：干眼症 (DED) 是寻求 LASIK 和 SMILE 等屈光手术的患者常见的并发症。术前妥善管理干眼症对于确保最佳手术效果、患者满意度以及最大程度减少术后并发症至关重要。本病例报告旨在强调屈光手术前管理干眼症的重要性，并概述安全有效的转换策略，尤其适用于从其他屈光手术过渡的患者。

方法：病例报告：44 岁男性患者，因屈光矫正就诊。患者有吸烟史、糖尿病史，并报告持续性干眼症状。矫正后双眼视力为 20/20；然而，患者反复出现干眼不适。评估与结果 干眼评估：泪膜破裂时间缩短 (< 7 秒)。眼表染色显示点状上皮糜烂。睑板腺评估显示轻度睑板腺功能障碍。角膜及眼表状态：角膜地形图稳定，但担心干眼可能导致角膜表面不规则。SMILE 手术期间，周边区域出现大黑点，右眼手术成功。左眼手术延期，24 小时后再次进行 LASIK 激光手术。

结果：术前干眼症管理可显著提高手术准确性和患者舒适度。关键步骤包括通过泪膜评估、眼表染色和问卷调查进行全面的干眼症评估。人工泪液、局部环孢素和眼睑清洁等治疗方法可有效稳定眼表。严重干眼症患者在接受 LASIK 或 SMILE 手术前，需要进行眼表稳定；否则可能会出现黑点等并发症。为了安全地进行手术转换，尤其是从 SMILE 手术转换为 LASIK 手术，仔细评估角膜厚度、基质稳定性和眼表健康状况至关重要。

结论：在接受 LASIK 或 SMILE 手术前管理干眼症对于获得最佳手术效果和最大程度减少术后并发症

至关重要。系统性的方法包括准确的诊断、有针对性的治疗和全面的评估，可以促进从各种屈光矫正方法安全地转换。

摘要编号：209843

照明的相关色温对阅读时近距离工作诱导性暂时性近视及调节滞后的影响

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共同作者：Ningli WANG, Shifei WEI

目的：本研究旨在评估不同相关色温照明对调节滞后 (LAG) 和近距离工作诱导的短暂性近视 (NITM) 的影响，为该领域研究提供初步依据。

方法：选取 31 名青年受试者 (男性 11 名)，分别在 4274 K 和 1877 K 照明条件下阅读 30 分钟和 60 分钟后，使用开放式自动验光仪测量 33 cm 处的屈光状态。在基线时和每 30 分钟，客观评估初始近距离工作诱导性暂时性近视和调节滞后情况。两种相关色温照明的使用顺序通过随机数字表确定。

结果：在低相关色温照明条件下阅读 30 分钟后，平均调节滞后量略低于高相关色温照明条件 (-0.97 ± 0.53 D vs -1.21 ± 0.50 D, $P = 0.10$)；阅读 60 分钟后，差异具有统计学意义 (-1.09 ± 0.55 D vs -1.36 ± 0.51 D, $P = 0.048$)。按近视程度分组后，轻度近视者 (阅读 30 分钟: -1.11 ± 0.43 D vs -1.38 ± 0.60 D, $P = 0.38$; 阅读 60 分钟: -1.34 ± 0.27 D vs -1.50 ± 0.54 D, $P = 0.53$) 和中度近视者 (阅读 30 分钟: -0.90 ± 0.57 D vs -1.12 ± 0.42 D, $P = 0.16$; 阅读 60 分钟: -0.96 ± 0.61 D vs -1.28 ± 0.50 D, $P = 0.05$) 在低相关色温照明下的调节滞后量均低于高相关色温照明，但差异无统计学意义。近距离工作诱导的短暂性近视方面，两组相关色温在各分组中均未表现出统计学差异。

结论：在低相关色温照明 (1877K) 下阅读的调节滞后量低于高相关色温照明 (4274K)，提示低相关色温照明可能有助于减少近距离工作时的调节滞后量。

摘要编号：204189

电针通过 lncRNA-XR_002789763.1 介导的线粒体自噬减轻近视视网膜神经节细胞损伤

第一作者：Xuejun WANG

共同作者：Xingtao ZHOU

目的：本研究探讨电针对长链非编码 RNA (lncRNA) 介导的近视视网膜神经节细胞 (RGCs) 线粒体自噬的影响。

方法：通过 RNA 测序分析电针干预后近视豚鼠 RGCs 中 lncRNA 和 mRNA 的表达谱，并构建竞争性内源 RNA (competing endogenous RNA, ceRNA) 网络。将线粒体自噬相关基因 PINK1 纳入核心 ceRNA 网络，探索电针调控近视 RGCs 中 lncRNA 与线粒体自噬的关系。本研究还采集了近视和高度近视成人的眼球，进一步验证其机制结果。

结果：电针干预延迟了近视豚鼠的屈光降低和轴长增加。进一步研究发现，电针可以通过促进线粒体自噬相关的 PINK1/Parkin 信号通路，诱导近视豚鼠 RGCs 线粒体自噬。此外，高度近视成人视网膜的线粒体自噬被抑制。通过 RNA 测序显示，并将 PINK1 纳入并构建核心 ceRNA 网络，本研究发现电针可通过 lncRNA-XR_002789763.1 海绵化 miR-342-5p，激活 PINK1/Parkin 信号通路。

结论：电针可通过 lncRNA-XR_002789763.1 海绵化 miR-342-5p，激活线粒体自噬相关 PINK1/Parkin 信号通路，促进 Mfn2 泛素化，从而减轻 RGC 损伤，延缓近视进展（图 1）。综上所述，本研究为电针防控近视进展的分子机制提供了新见解。

摘要编号：208432

眼健康科普的实践与创新

第一作者：Hailong NI

目的：阐述当前开展眼健康科普活动及科普创作所面临的机遇与挑战以及评价与创新。

方法：通过 20 余年作者自身的近视防控科普实践和科普创作，结合当前国家的双翼论“科学普及与科技创新同等重要”的时代背景，社会各界对科普的重视、投入以及科学技术普及法的修订，展开并提出医务工作者要身体力行，要自觉承担起健康科普的责任，要借助新媒体、人工智能等新科技创新科普的内涵与形式，形成示范作用，开展更有深度和广度的科普活动与科学传播。

结果：20 余年在全国各地开展的 300 多场科普活动及部分线上融合直播总触达上亿受众。作者主编的《孩子的护眼宝典》《倪海龙医生漫画谈近视防控》荣获科技部 2020 年和 2022 年全国优秀科普作品奖，《孩子的第一本护眼书》荣获浙江科学传播大赛最高奖一等奖，总 30 次印刷发行超 30 万册。科普成果首批获得浙江省科学技术进步奖。科普能实现高质量的社会效益，能体现创新性。科普成果能被社会各界广泛肯定，能获得各级科学技术进步奖，医务工作者能荣获全国科普工作先进工作者荣誉等。

结论：眼健康科普正当时。健康科普需立身（扎根专业领域的科普）、立心（做服务大众的科普）、立新（与时俱进创新的科普）。健康科普既服务社会，亦促进自身与团队全面发展。

摘要编号：209590

眼脑肾综合征合并病理性近视患者的巩膜镜验配一例

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目的：探讨眼脑肾综合征（Lowe 综合征）合并病理性近视及特殊眼表条件患者的巩膜镜验配策略及临床效果。

方法：跟踪回顾我院 1 例 4 岁女性 Lowe 综合征合并超高度近视患者（双眼病理性近视、后巩膜加固术后、先天性内斜视术后、感音性耳聋、肾小管重吸收障碍）的屈光矫正诊疗过程。该患者屈光检查结果：R - 22.00 D - 0.1/L - 22.00 D - 0.1；眼轴 R: 32.11 mm/L: 32.11 mm；眼压 R: 18.6 mm/L: 20.6 mm。因框架眼镜矫正效果差双眼验配 RGP，予双眼 RGP 处方 R: 8.0/-20.00/9.4, L: 7.8/-20.00/9.4，取镜后 1 个月内左眼由于眼球突出、倒睫问题反复出现镜片移位丢失、角膜上皮点染，无法耐受传统角膜接触镜，采用个性化定制巩膜镜（直径 14.8 mm，高透氧材料）验配，通过荧光染色评估镜片适配性，针对性调整矢高、直径等参数，予左眼巩膜镜处方 L: 3200/-17.75/14.8。

结果：患者左眼巩膜镜取镜，矫正视力从 0.1 (RGP) 提升至 0.25 (巩膜镜)，戴镜 1 年，矫正视力提升至 0.4，戴镜过程中无不适，随访 1 个月显示眼表状态改善，无角结膜损伤或镜片相关并发症。后续随访过程中，因眼轴增长较快，经过肾内科对肾功能情况综合评估后，予每日 1 次 1 滴 0.01% 阿托品滴眼液点眼延缓眼轴增长，效果显著。

结论：针对 Lowe 综合征合并病理性近视及特殊眼表条件患者，巩膜镜通过非接触角膜设计、泪液池缓冲及个性化参数调整，可有效提升矫正视力并保护眼表，为传统矫正手段失效后的患者提供了安全且高效的替代选择。在验配和随访过程中，需充分考量患者全身疾病特征与眼部生物力学特性，同时着重强调眼表状态优化及多学科联合随访管理的必要性。

摘要编号: 209396

红光疗法通过重编程视网膜代谢抑制透镜诱导的雏鸡近视

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目的: 旨在阐明重复低强度红光疗法在雏鸡透镜诱导性近视模型中, 抑制近视进展的视网膜代谢机制。

方法: 将 7 日龄雏鸡随机分为三组 (每组 $n = 7$): 正常对照组、透镜诱导性近视组 (佩戴 -10 D 透镜) 以及红光干预性近视组 (在透镜诱导基础上接受红光干预: 650 nm , 4.7 mW/cm^2 , 每日两次, 每次 3 分钟, 持续 7 天)。在实验开始前和第 7 天分别测量眼轴长度和屈光度。获取视网膜组织进行非靶向液相色谱-质谱法代谢组学分析, 并通过多元统计分析和通路富集方法处理数据。

结果: 红光干预显著减轻了近视漂移 (平均双眼屈光差: $-3.82 \pm 0.8\text{ D}$ 对比 $-7.75 \pm 1.2\text{ D}$, $p = 0.0003$) 和眼轴伸长 ($0.508 \pm 0.04\text{ mm}$ 对比 $0.644 \pm 0.03\text{ mm}$, $p = 0.0022$), 抑制率分别达 50.6% 和 43.3。透镜诱导性近视导致了氨基酸、脂质和抗氧化途径的广泛紊乱。而红光暴露与神经保护相关代谢物 (N-乙酰天冬氨酸谷氨酸) 和视觉功能相关代谢物 (视黄醛) 水平的升高, 以及与炎症相关代谢物 (花生四烯酸) 和血管调节紊乱相关代谢物 (不对称二甲基精氨酸) 水平的降低相关。

结论: 红光干预与近视进展的减缓以及视网膜代谢物谱的改变相关, 这些改变与线粒体能量产生和视觉循环功能的增强相一致。该干预还改善了视网膜炎症环境并调节了一氧化氮相关通路。这些观察结果揭示了红光可能对视网膜结构和功能发挥保护作用的潜在机制。

摘要编号: 204076

角膜塑形镜偏心对中国儿童近视眼轴增长的影响: 一项 Meta 分析

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共同作者: Juan HUANG, Jiaqi WANG, Junhan WEI, Lu YE

目的: 角膜塑形镜 (orthokeratology, OK 镜) 已成为常用的近视防控手段。然而, 镜片偏心作为常见并发症, 可能影响其近视控制效果。本研究旨在通过 Meta 分析系统评估 OK 镜偏心对中国儿童近视眼轴增长 (axial length growth, ALG) 的影响。

方法: 检索 PubMed、Embase 及 Cochrane Library 数据库, 纳入 2000 年至 2024 年间相关文献。主要结局指标为中心配戴组与偏心组之间 ALG

的标准化均数差 (SMD)。采用 Cochrane Q 检验和 I^2 统计量评估研究间异质性, 并通过漏斗图及视觉检查分析发表偏倚。

结果: 共纳入 9 项回顾性研究, 涉及 1503 例年龄 8–15 岁的近视儿童。其中 6 项提供 12 个月随访数据, 合并分析显示偏心组 ALG 显著降低 (SMD = -0.45 , 95% CI: -0.66 至 -0.24 , $p < 0.0001$), 异质性中等 ($I^2 = 59.1\%$)。按发表年份和样本量的亚组分析提示结果存在时间和方法学差异, 早期研究显示抑制效果更为显著。敏感性分析验证了结果稳健性, 仅合并效应值有轻微变化。三项提供 24 个月数据的研究亦显示 ALG 显著降低 (SMD = -0.46 , 95% CI: -0.68 至 -0.24 , $p < 0.0001$), 异质性可忽略不计 ($I^2 = 0\%$)。漏斗图提示可能存在发表偏倚, 主要受一项离群研究影响。

结论: OK 镜偏心可显著抑制近视儿童的眼轴增长, 提示其在近视防控中的潜在价值。但研究间存在一定异质性, 可能与设计及样本差异有关。后续仍需大样本、长期随访研究加以验证。

摘要编号: 210273

重复低强度红光联合角膜塑形镜与点扩散镜片在儿童近视控制中的疗效对比研究

第一作者: Hui REN

目的: 比较重复低强度红光 (RLRL) 联合角膜塑形镜 (OK) 与 OK 单用及点扩散镜片 (DOT) 在控制儿童近视进展中的疗效与安全性。

方法: 前瞻性对照研究, 纳入 8–14 岁近视儿童共 77 例 (147 眼), 等效球镜 $-1.00 \sim -5.00\text{ D}$ 。按干预分为 RLRL + OK 组 (30 例)、OK 组 (17 例) 及 DOT 组 (30 例)。RLRL 照射波长 $650 \pm 10\text{ nm}$, 每日 2 次、每次 3 min, 间隔 $\geq 4\text{ h}$, 随访 3 个月。主要结局指标为眼轴, 次要指标包括黄斑脉络膜厚度、视力。

结果: 3 个月后, 三组眼轴变化分别为: RLRL + OK 组 -0.02 mm (95% CI $-0.08 \sim 0.03\text{ mm}$)、OK 组 0.27 mm ($0.19 \sim 0.34\text{ mm}$)、DOT 组 0.18 mm ($0.10 \sim 0.25\text{ mm}$); RLRL + OK 较 OK 组眼轴增长减少 0.29 mm ($P < 0.001$)。眼轴年增长 $< 0.10\text{ mm}$ 者比例 RLRL + OK 组为 86.2%, DOT 组 36.7%, OK 组 14.3%。RLRL+OK 组脉络膜显著增厚 ($+28.8\text{ }\mu\text{m}$), 视力改善率三组相近 ($P > 0.05$), 未见严重不良事件。

结论: RLRL 联合 OK 镜能显著抑制儿童眼轴延长, 效果优于 OK 或 DOT 单用, 安全性良好, 提示重复低强度红光与光学离焦的联合可为儿童近视防控提供更优方案。

摘要编号: 209054

长期配戴角膜塑形镜后的周边屈光研究

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目的: 以低中度近视儿童及青少年为研究对象, 测量受试者在两种不同的近视矫正方式下戴镜前后的水平和垂直方向上不同角度的视网膜周边屈光度的变化情况及眼轴增长情况, 旨在探讨长期配戴角膜塑形镜与框架眼镜后, 视网膜水平与垂直方向各个角度周边屈光度变化情况及其与近视进展的相关性。

方法: 本研究共纳入 78 例受试者, 年龄范围为 8~14 岁, 平均年龄 (10.63 ± 1.73) 岁, 球镜度数范围为 -0.75 D~ 5.0 D, 散光度数范围为 0 ~ 1.5 D。根据受试者实际选择的近视矫正方式, 将受试者分为两组, 其中框架镜组 (39 名), OK 镜组 (39 名), 男女比例为 $1.44 : 1$ 。分别测量了受试者在配戴前、配戴半年后及一年后的视网膜周边屈光度, 测量参数包括水平方向、垂直方向以及中央区域共 13 个角度的周边屈光度数。其中包括颞侧与鼻侧的 10° 、 20° 、 30° 位置; 上方与下方的 5° 、 10° 、 15° 位置。测量两组受试者的眼轴长度。最后进行长期配戴角膜塑形镜后的周边屈光参数的变化及其和框架组的比较分析, 并分析眼轴变化量与周边屈光参数的相关性。

结果: 1、戴镜前后视网膜周边屈光的变化 OK 镜组与戴镜前相比, 相对周边屈光度在水平和垂直的各个角度均表现为近视离焦, 相对周边屈光度除上方 5° 之外, 其余点位戴镜前后均存在差异。而框架组与戴镜前相比, 相对周边屈光度在水平和垂直的各个角度均无明显差异。2、戴镜前后眼轴的变化在半年与 1 年的随访中, OK 镜组眼轴增量始终小于框架组 ($P < 0.05$)。3、视网膜相对周边屈光与眼轴增长的相关性 眼轴变化量与周边屈光参数之间均没有显著相关性 (所有 $P > 0.05$)。

结论: 1、本研究不仅验证了长期配戴角膜塑形镜后的水平方向视网膜周边屈光度的变化, 还发现垂直方向视网膜周边屈光度的变化同样呈现近视性离焦。长期配戴框架镜后在大多数角度的周边屈光度未观察到明显的变化。2、长期配戴角膜塑形镜的受试者眼轴增长量显著小于配戴框架镜的受试者。3、本研究未发现眼轴增长量与各角度周边屈光参数之间存在明确的线性相关性。

摘要编号: 209372

青少年佩戴近视离焦眼镜后散光变化的对比分析

第一作者: Zhang JUN

目的: 比较佩戴近视离焦眼镜和单光眼镜的青少年近视儿童, 随访散光度数变化的差异, 进一步明确离焦眼镜与散光增长的关联性。

方法: 本研究采用回顾性队列分析。纳入 80 名 7-13 岁的青少年近视患者, 根据其佩戴的镜片类型分为两组: 离焦镜组 ($n = 40$, 佩戴高非球微透镜片) 与单光镜组 ($n = 40$, 佩戴普通单光镜片)。收集分析两组患者基线及佩戴后第 12 个月、第 24 个月的屈光变化, 包括等效球镜度数 (SE) 和柱镜度数 (散光) 及眼轴数据。主要观察两组间散光度数年均变化量的差异。

结果: 经过 24 个月的观察, 离焦镜组和单光镜组的散光度数均表现出轻度进展, 其年均变化量分别为 (-0.1 ± 0.14) D 和 (-0.12 ± 0.16) D。两组间的散光变化量无统计学显著差异 ($p > 0.05$)。此外, 两组在角膜散光 (由角膜地形图测量) 的变化量上无显著差异 ($p > 0.05$)。在近视控制方面, 离焦镜组的眼轴年均增长值 (0.17 ± 0.09 mm) 显著低于单光镜组 (0.39 ± 0.11 mm) ($p < 0.01$)。

结论: 在为期两年的观察期内, 青少年佩戴离焦镜片与佩戴单光镜片在散光度数的进展上未发现显著差异。离焦镜片在有效延缓眼轴增长和近视进展的同时, 未表现出相较单光镜片增加或减少散光的作用。散光的进展可能主要与个体眼球自身的生长发育相关, 与是否使用离焦镜片无关联性。

摘要编号: 208600

高度近视增加肝功异常者重症肝病风险

第一作者: Linge JIAN

目的: 尽管高度近视主要累及眼部, 但越来越多的证据表明, 其亦与全身炎症及代谢紊乱相关。肝脏在代谢与炎症调控中居于核心地位, 可能与高度近视共享病理通路。然而, 目前尚无人群研究探讨高度近视与肝脏疾病进展之间的关联。本研究基于 UK Biobank 数据, 系统分析近视严重程度与严重肝病之间的关系, 并进一步探讨炎症标志物或代谢物是否在其中发挥中介作用。

方法: 本研究纳入 70 774 名基线无严重肝病的 UK Biobank 参与者, 前瞻随访 14.1 年。依据等效球镜度数将屈光状态分为正视、低 - 中度近视与高度近视。采用 Cox 比例风险模型评估肝病风险, 并按基线天冬氨酸转氨酶 (AST) 水平 (≥ 40 vs. < 40

U/L) 进行分层分析; 进一步运用中介效应模型评估炎症标志物及代谢产物的潜在中介作用。

结果: 在 $AST \geq 40$ U/L 人群中, 高度近视显著增加肝纤维化及肝硬化风险 (风险比 [HR] = 2.64, 95% 置信区间 [CI] = 1.44–4.85, $p = 0.002$), 并呈剂量 – 反应趋势 ($p = 0.004$); 而在 $AST < 40$ U/L 人群中未观察到显著关联。C- 反应蛋白 (CRP) 部分介导了上述关联; 经多重校正后, 未发现任何代谢物具有显著中介效应。

结论: 在基线 AST 升高的个体中, 高度近视为肝纤维化及肝硬化风险的独立危险因素, 其机制部分由 CRR 相关炎症通路介导。屈光状态评估可用于识别亚临床肝损伤人群中的高危个体, 并为后续抗炎干预研究提供理论依据。

青光眼

摘要编号: 208890

CPAMD8 双等位基因突变导致色素性青光眼 1 例

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目的: 色素播散综合征 (PDS) / 色素性青光眼 (PG) 是一系列以虹膜色素播散和小梁网色素沉着为特征的眼部疾病。PDS/PG 多数表现为散发病例, 但在一些家系中可以观察到明显的常染色体遗传模式, 然而与其直接相关的基因证据较少。CPAMD8 基因是近年发现的与眼前节发育相关的基因, 其突变与多种类型青光眼的发病有密切关系。在本研究中, 我们报告了一例携带 CPAMD8 双等位基因突变的 PG 病例, 其中 c.5202dupC (p.C1735Lfs*39) 位点尚未见报道。

方法: 对患者 (先证者) 及其家属 (先证者的父亲和同母异父的姐姐) 进行了全外显子组基因测序。Mutation Taster 和中国罕见病数据库 (RDDC) 用于评估突变位点的致病性, SIFT 和 DUET 用于预测突变位点的功能影响, 人群等位基因频率数据来源于 gnomAD 数据库。

结果: 全外显子基因测序提示先证者存在 CPAMD8 c.5202dupC (p.C1735Lfs*39) 和 CPAMD8 c.215C>(p.P72L) 的复合杂合变异。父亲测序验证结果表明携带 CPAMD8 c.215C>T (p.P72L) 杂合变异, 无法追溯患者母亲的变异情况 (病逝), 同母异父的姐姐未发现以上两者变异。其中 CPAMD8 c.5202dupC:p.C1735Lfs*39 不存在于 gnomAD

数据库中, 且尚未见文献报道。该位点突变导致蛋白提前 39 个氨基酸终止, 应该对该蛋白功能造成了影响。通过在线软件 Mutation Taster、RDDC 分析, 其致病性结果均为 disease causing (致病)。CPAMD8 c.215C>T (p.P72L) 由 SIFT 和 DUET 均预测为有害变异, 曾在散发病例中有报道。此外未发现其他导致该表型的疑似致病基因。

结论: 本研究报道了 1 例与 CPAMD8 基因突变相关的 PG 患者, 且发现了一个新的变异位点 C1735Lfs*39, 该突变因其母亲病逝未追溯到来源 (另一突变来自父亲), 不排除该突变为新发突变。尽管该突变的具体致病性尚需进一步功能验证, 但其为 CPAMD8 参与 PDS/PG 遗传提供了新的证据、扩展了其突变谱, 并强调了 CPAMD8 在 PDS/PG 中的复合杂合遗传机制。

摘要编号: 208751

EFEMP1 基因变异对大鼠眼压的影响

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目的: 探究 EFEMP1 基因的一种终止密码子突变对大鼠的眼压 (IOP) 和小梁网组织中纤维连接蛋白 (FN) 表达的影响。

方法: 分别构建表达人类 EFEMP1 基因野生型的慢病毒载体 (rLV-hEFEMP1-GFP; hE) 和终止密码子突变型的慢病毒载体 (rLV-hEFEMP1-X4-GFP; X4)。大鼠单眼的前房分别注射 4 μ L 的 hE 或 X4 载体, 对侧眼均为未处理的空白对照组。IOP 变化由 TonoLab 回弹式眼压计进行检测。前房是否有炎症反应的情况由裂隙灯进行监测。眼球荧光的表达由 Micron IV 型视网膜成像仪进行监测。免疫荧光染色法检测小梁网组织中 FN 的变化。

结果: GFP 荧光信号主要集中于大鼠的眼前房角。hE 组和 X4 组大鼠的两侧基础 IOP 均无显著性差异; 在注射后第 3 天, hE 组大鼠的 IOP 出现显著降低, 而 X4 组大鼠的 IOP 显著升高; 两组大鼠的 IOP 变化均维持至第 21 天 (取材)。在对照组大鼠的眼小梁网组织中, FN 呈高水平表达, 且以均匀但部分聚集的形式分布; hE 组的眼小梁网组织 FN 表达出现显著减少, 而 X4 组的表现显著增强。

结论: 野生型 EFEMP1 蛋白在小梁网组织中具有调节房水流出阻力的功能, 而 EFEMP1 基因的终止密码子突变可能导致 EFEMP1 蛋白的调节能力受损, 进而引起 IOP 升高。

摘要编号: 209136

Posner-Schlossman 综合征患者外周血单个核细胞的转录组分析揭示关键免疫及病毒感染相关机制第一作者: *Shiming PENG*

目的: 为探究 Posner-Schlossman 综合征 (PSS) 的潜在发病机制, 我们比较了急性发作期 (APSS)、间歇期 (IPSS) 患者及健康对照者外周血单个核细胞 (PBMCs) 的转录组谱。

方法: 提取 APSS 组 ($n = 4$)、IPSS 组 ($n = 3$) 及对照组 ($n = 3$) 的 PBMCs RNA 进行转录组测序。通过基因表达谱分析, 采用独立样本 t 检验比较 IPSS 组、对照组与 APSS 组的 PBMCs 组成差异。对筛选的差异表达基因进行分类及 KEGG 通路富集分析。采用酶联免疫吸附试验 (ELISA) 验证 IFITM2、ISG15 和 SOCS1 蛋白在 PSS 患者与对照间的表达差异。

结果: APSS 组与 IPSS 组、对照组存在显著差异, 而后两组间差异基因数量相近。参与抗人巨细胞病毒反应的干扰素诱导基因 (IFITM2、ISG15 和 SOCS1) 表达下调, 转录组测序与 ELISA 结果一致。泛素-蛋白酶体系统 (包括 SKP1、RBX1、PSMF1、PSMB2、PSMB3 和 PSMD13) 受到抑制。抗原提呈相关细胞因子及适应性免疫通路因子表达下调, 而与天然免疫中巨噬细胞相关的因子表达上调。

结论: IPSS 组的免疫转录谱趋于正常化, 与疾病活动性减弱相符。虽然天然免疫与适应性免疫共同参与 PSS 发病, 但天然免疫中的巨噬细胞可能起主导作用。

摘要编号: 209868

TGF β 1 通过 Wnt/ β -catenin/CRYAB 信号通路诱导结膜成纤维细胞的纤维化反应第一作者: *Biting ZHOU*共同作者: *Kaiping CHEN, Yihua ZHU*

目的: 探究结膜纤维化的潜在机制。

方法: 培养原代人结膜成纤维细胞 (HConFs), 使用 TGF β 1 诱导结膜纤维化的体外模型, 以 ICG-001 作为 Wnt/ β -catenin 通路的拮抗剂。采用 4D-DIA 技术研究不同处理条件下 HConFs 的差异表达蛋白及 KEGG 通路富集情况。利用蛋白质-蛋白质相互作用 (PPI) 网络分析, 探讨 Wnt/ β -catenin 通路在结膜纤维化中的潜在下游因子。显微镜下观察细胞形态, Hoechst 染色和 CCK8 检测细胞活力。利用 EdU 实验分析细胞增殖, 划痕实验和

Transwell 迁移实验评估细胞迁移。胶原凝胶收缩实验用于测量 HConF 的收缩能力。此外, 用鬼笔环肽标记 HConF 的 F-肌动蛋白, 以可视化细胞骨架的排列情况。并且, 通过 qRT-PCR、免疫印迹和免疫细胞化学检测 Wnt/ β -catenin 通路相关调节因子、纤维化相关蛋白、CRYAB 和泛素的表达。

结果: 4D-DIA 组学结果和实验数据表明, TGF β 1 诱导的 HConFs 中 Wnt/ β -catenin 通路被激活。ICG-001 处理有效抑制了 TGF β 1 诱导的 HConFs 的细胞增殖和迁移, 减少细胞外基质 (ECM) 蛋白的生成, 降低 α -SMA 的表达水平并抑制了 TGF β 1 处理的 HConF 的细胞收缩活力。蛋白质组学数据进一步表明, CRYAB 是 Wnt/ β -catenin 的下游靶点, TGF β 1 上调 CRYAB, 而 ICG-001 下调 CRYAB。免疫印迹实验也表明, ICG-001 减少了 TGF β 1 处理的 HConF 中的泛素和 β -catenin 的表达, 提示 CRYAB 通过抑制其泛素化降解稳定了 β -catenin。外源 CRYAB 在 TGF β 1 刺激下促进细胞活力, 增加 ECM 蛋白水平并上调 HConF 的 α -SMA 表达。此外, CRYAB 恢复了 TGF β 1 诱导的被 ICG-001 抑制的纤维化反应。

结论: Wnt/ β -catenin/CRYAB 轴在结膜纤维化中发挥正向调节作用, 为减少 GFS 术后结膜瘢痕提供了一个潜在的治疗靶点。

摘要编号: 208917

TXNDC 5 在 POAG 中促进细胞外基质蛋白积聚和升高眼内压

第一作者: 郭涛

目的: 细胞外基质 (ECM) 蛋白在小梁网 (TM) 中的过度积累导致对房水 (AH) 流出的阻力增加, 并导致原发性开角型青光眼 (POAG) 中眼内压 (IOP) 随之增加。目前, 没有有效的治疗方法来解决 POAG 的这种致病机制。筛选与 TM ECM 积累有关的关键蛋白并进一步开发针对这些机制的药物是至关重要的。

方法: 通过无标记定量蛋白质组学技术筛选在转化生长因子 β 2 (TGF β 2) 诱导的 TM 中显著上调的蛋白质, 通过 qPCR、Western 印迹和免疫组织化学分析 TXNDC 5 和 ECM 蛋白之间的关系, 应用自噬抑制剂 (CQ) 和蛋白合成抑制剂 (CHX), 并调节分子伴侣介导的自噬 (CMA) 活性以验证 TXNDC 5 的降解途径依赖性机制。

结果: 我们证实, 在人 TM 细胞中, TXNDC 5 通过增加 TGF β R2 的表达而促进 ECM 的积累。我们还证明 TXNDC 5 通过 CMA 途径被降解, 并且 AR7 能够逆转 TGF β 2 诱导的 TM ECM 积累。最重要的是, 体内实验表明, TXNDC 5 的敲低显著

降低了小鼠 TM 组织中 TGF β 2 诱导的 ECM 蛋白积累,并降低了 TGF β 2 诱导的高眼压。

结论: 我们揭示了 TXNDC 5 导致 TM ECM 积聚和 IOP 升高的作用和可能机制,表明靶向升高 TXNDC 5 是一种潜在的减少 POAG TM ECM 蛋白积聚的新治疗方法。

摘要编号: 209256

UCP 联合抗 VEGF 治疗新生血管性青光眼

第一作者: Ling WANG

目的: 观察 UCP (超声睫状体成形术) 联合玻璃体腔注射抗新生血管 (VEGF) 药物治疗新生血管性青光眼的临床疗效。

方法: 2025 年 1 月至 9 月, UCP 联合玻璃体腔抗 VEGF 药物 (国产阿柏西普 0.05 ml, 每月 1 次, 共 3 次), 治疗新生血管性青光眼共 4 例 4 眼, 女 1 例, 男 3 例, 患者 62-74 岁, 继发于视网膜静脉阻塞 2 例、糖尿病性视网膜病变 2 例。患者术前最少使用 3 种降眼压眼药水, 眼压高于 30 mmHg。视力: 1 例无光感, 3 例 0.02-0.2。根据角膜白到白、眼轴长选择相应型号的 UCP 探头, 治疗 10 扇区。首次玻璃体腔抗 VEGF 药物的时机: 1 例在 UCP 术前 1 周, 1 例在 UCP 术后 2 周, 2 例在 UCP 同时。UCP 治疗后观察了 4-8 月: 观察视力、眼压、前房炎症、虹膜新生血管。

结果: 患者疼痛减轻、UCP 后前房炎症反应轻微、视力未见降低、虹膜新生血管消退, 眼压使用 0-2 种降眼压药物后不超过 24 mmHg。

结论: 不论 UCP 术前、术中、术后联合使用玻璃体腔抗 VEGF 药物, 均可有效降低新生血管性青光眼的眼压。UCP 治疗新生血管性青光眼, 应与抗 VEGF 联合。

摘要编号: 209796

VZV 感染性葡萄膜炎继发青光眼行 PCP 手术治疗一例

第一作者: Qin QIU

目的: 报道 PCP 联合白内障及瞳孔再造手术治疗葡萄膜炎继发青光眼一例, 探究诊疗方案及有效性。

方法: 患者男, 51 岁, 因右眼反复眼红伴眼压升高、视物模糊 2 年余于我科就诊, 既往最高眼压 40+ mmHg, 外院行房水检测出水痘-带状疱疹病毒 (VZV), 诊断为“右眼青睫综合征”, 予以三联降眼压药物、激素及抗病毒治疗, 右眼眼压反复升高, 1 年前于外院行“右眼小梁切除术”, 查体: 眼压: 右眼 35 mmHg (派立明、美开朗), 左眼

18 mmHg (派立明、美开朗), 视力 OD: 0.3 矫正 0.5 OS: 0.8 矫正 1.0。右眼结膜充血 ++, 上方滤过泡充血、低平弥散, 角膜透明, 少许点状上皮脱落, 下方角膜后见尘埃状 KP, 颞侧虹膜萎缩, 瞳孔欠圆, 向颞下方移位, 直径 6*4 mm, 对光反射消失, 晶体后囊浑浊。诊断: 1. 右眼继发性青光眼; 2. 右眼病毒性葡萄膜炎; 3. 右眼并发性白内障, 房角镜提示双眼房角开放, 于 2022 年 4 月 25 日行右眼 PCP 手术 (术中抽前房液行 MetaCAP™ 病原微生物核算高通量测序)、2022 年 8 月 17 日行右眼白内障联合瞳孔再造手术, 术后随访 2 年, 右眼眼压波动于 12 ~ 19 mmHg。MetaCAP™ 病原微生物核算高通量测序报告提示: 前房液未检出病毒。2024 年 8 月 19 日行右眼囊袋冲洗 + 房角分离 + 瞳孔再造手术, 术后予以妥布霉素地塞米松、双氯芬酸钠滴眼液消炎, 口服阿昔洛韦及更昔洛韦眼液抗病毒治疗, 口服维生素 B1、甲钴胺营养神经, 国医大师廖品正教授带状疱疹协定中药处方, 滋阴养血, 平肝息风, 具体药味如下: 细辛 5 g、白芷 15 g、麸炒苍术 10 g、姜厚朴 15 g、陈皮 10 g、当归 10 g、酒川芎 12 g、赤芍 15 g、蝉蜕 10 g、甘草片 6 g、白芍 15 g、水煎 300 mL, 日一剂, 一日三次。

结果: 术后 1 天, VOD 0.4, 眼压 16 mmHg。术后 2 天, VOD 0.4, 眼压 13 mmHg。术后 1 年, VOD 0.5, 眼压 14.5 mmHg。查体: 右眼滤过泡低平, 角膜透明, 虹膜周切孔畅通, 瞳孔稍不圆, 直径 4 mm。患者畏光症状较前明显缓解, 术后 1 年内眼压控制可, 波动于 13 ~ 17 mmHg, 门诊复查。

结论: 该病例为葡萄膜炎引起继发性青光眼, 眼内炎症严重, 既往前房液查出带状疱疹病毒, 予以抗病毒对因治疗及中药治疗, 行白内障及瞳孔再造手术后, 提高患者视功能, 眼压控制良好。

摘要编号: 208359

XEN 凝胶引流管植入术在多种青光眼治疗中的有效性及安全性分析

第一作者: Xiaoli XING

共同作者: Muyao XIN, Bo YU

目的: 初步评估 XEN 凝胶引流管植入术在多种青光眼治疗中的有效性及安全性。

方法: 选取 2021 年 12 月至 2024 年 4 月于天津医科大学眼科医院行 XEN 凝胶引流管植入术的青光眼患者 24 例, 共 26 只眼。分别在术前及手术后随访的 6-24 个月的随访过程中观察患者的眼压, 青光眼药物使用数量, 术后并发症情况等, 评估手术疗效。

结果：基线眼压 26.22 ± 8.26 mmHg，术后 1 天平均 IOP 为 12.26 ± 4.37 ($P < 0.001$)，术后 IOP 下降 53.2%。随访 6 个月，平均 IOP 为 16.88 ± 4.54 ($P < 0.001$)，IOP 下降 35.6%；随访 12 个月，平均 IOP 为 16.35 ± 5.56 ($P < 0.001$)，IOP 下降 37.6%；随访 18 个月，平均 IOP 为 16.8 ± 3.47 ($P < 0.001$)，IOP 下降 35.9%。随访 24 个月，平均 IOP 为 17.51 ± 2.87 ($P < 0.001$)，IOP 下降 33.2%。基线时降压药使用率为 2.40 ± 0.91 种，6 个月时的平均用药种类为 0.4 ± 0.82 种 ($P < 0.001$)；12 个月时的平均用药种类为 0.57 ± 0.79 种 ($P < 0.001$)；18 个月时的平均用药种类为 0.83 ± 0.92 种 ($P < 0.01$)；24 个月时的平均用药种类为 0.82 ± 0.75 种 ($P < 0.01$)。6 个月时，POAG 组成功率 100%，RG 组成功率 70.6%，总成功率 80.8% ($P = 0.129$)；12 个月时，POAG 组成功率 100%，RG 组成功率 50.0%，总成功率 65.2% ($P = 0.052$)；18 个月时，POAG 组成功率 80.0%，RG 组成功率 46.2%，总成功率 55.6% ($P = 0.314$)；24 个月时，POAG 组成功率 50.0%，RG 组成功率 44.4%，总成功率 45.5% ($P = 1.000$)。

结论：XEN 凝胶引流管植入术是青光眼一种有效的外科治疗方法，在 6-24 个月的随访中，患者的眼压及降眼压药物使用数量显著降低。

摘要编号：**208753**

一个中国原发性先天性青光眼合并心脏病家系的临床与分子遗传学分析

第一作者：Zhou ZHOU

共同作者：Chumou LIU, Guo LIU, Xuyang LIU, Jiankai ZHAO

目的：研究一个患有原发性先天性青光眼与先天性心脏病的中国家系中 FOXC1 和 GATA4 基因的变异，并探究原发性先天性青光眼与先天性心脏病的遗传关联性。

方法：所有纳入本研究的家系成员均接受了全面的眼科检查和全身系统检查。研究通过全外显子组测序 (WES)、长片段 PCR 实验 (long-range PCR) 及断点分析 (breakpoint analysis) 等技术，以筛选并鉴定致病性变异。

结果：先证者同时患有原发性先天性青光眼与先天性心脏病（包括房间隔缺损和室间隔缺损），其父亲患有心脏病（表现为心肌肥大）；其余家庭成员均未发现心脏或眼部异常。在先证者及其父亲中均检测到一种 GATA4 基因杂合变异 (NM_002052:c.1124G > A:p.Gly375Glu)，该变异与先天性心脏病的临床表型呈共分离关系，遗传模式符合常染色体显性遗传。经 Sanger 测序

法验证，先证者还携带一种 FOXC1 基因杂合变异 (NM_001453:c.292A > T:p.Lys98X)，由于该变异在其余家庭成员中均未检出，故判定为新发突变。

结论：这是首次报道由 FOXC1 基因 c.292A > T 和 GATA4 基因 c.1124G > A 这两种新型杂合变异突变背景下出现原发性先天性青光眼与先天性心脏病的病例。研究结果提示，FOXC1 和 GATA4 基因的致病性编码区变异可能共同参与了该家系原发性先天性青光眼与先天性心脏病的共病发病机制，并在一定程度上影响先证者临床表型的严重程度。

摘要编号：**208157**

一种新型依布硒林磷脂衍生物通过抑制铁死亡保护青光眼视网膜神经节细胞的研究

第一作者：Bo YU

共同作者：Xiaoli XING

目的：青光眼是全球首位不可逆致盲性眼病，会导致的视神经进行性损伤。现有治疗仅降眼压，无法解决神经退行性病变。铁死亡是视网膜神经节细胞 (RGCs) 损伤的关键机制，与氧化应激和脂质过氧化密切相关。依布硒林 (Ebselen) 作为 GPX4 拟似剂具抗铁死亡潜力，但水溶性差、膜滞留时间短限制其应用。本研究旨在开发一种新型 Ebselen 磷脂衍生物，通过增强细胞膜亲和力和滞留性，提升其神经保护效果。

方法：通过化学修饰将 Ebselen 与磷脂脂肪酸链结合，构建脂质样衍生物。采用 R28 谷氨酸毒性细胞模型，通过 CCK8、凋亡染色、MDA 及 Fe^{2+} 检测验证其保护作用。利用 NMDA 诱导的 RGCs 损伤和激素性高眼压小鼠模型，经玻璃体腔注射后，通过 HE、OCT、凋亡染色、VEP 及 RGCs 染色评估其对 RGCs 和视功能的保护效果，并通过 Western blot 检测 GPX4 和 SLC7A11 表达。

结果：新型衍生物显著延长细胞膜滞留时间，体外实验显示其提高神经细胞活力、减少凋亡、降低 Fe^{2+} 和 MDA 积累。动物模型中，较 Ebselen 更有效减少 RGCs 凋亡、改善视网膜结构损伤并保护视功能。机制研究证实其通过激活 GPX4 通路、抑制脂质过氧化发挥神经保护作用。

结论：本研究成功开发了一种新型 Ebselen 磷脂衍生物，通过优化药物递送和膜滞留性，显著增强对青光眼 RGCs 损伤的治疗作用，为神经保护治疗提供新策略，具临床转化潜力。

摘要编号: 210138

亚热带季风气候下急性原发性闭角型青光眼入院率的月际波动与气候因素关联性分析

第一作者: Aixia JIN

共同作者: Yanting FENG, Xiaohua PAN, Jiao SI, Yufei TAO, Mingmin YANG

目的: 探究深圳市急性原发性闭角型青光眼 (APAC) 入院人数的月度分布规律及其与气候因素的关联。**方法:** 对深圳眼科医院 2017 至 2021 年收治的 997 例 APAC 住院患者开展五年回顾性研究。通过调阅病历资料及政府网站气象数据, 比较月度 APAC 入院情况, 并分析与降水量、气压、气温、日照时长、湿度和蒸发量等气候因子的相关性。**结果:** APAC 患者平均年龄 64.63 ± 9.89 岁, 女性占比显著 (72.12%), 且眼轴长度明显短于男性 (22.26 ± 0.89 mm vs 22.87 ± 0.87 mm, $P < 0.001$)。5 月为 APAC 入院高峰, 尤以 65 岁以下男性突出。入院人数与湿度 ($r = 0.498$, $P < 0.01$)、降水量 ($r = 0.306$, $P < 0.05$) 呈显著正相关, 与蒸发量负相关 ($r = -0.333$, $P < 0.05$)。高湿度条件下男性 APAC 风险显著升高 ($OR = 2.76$, $P = 0.004$), 而气压上升 ($OR = 0.12$; 95% CI: 0.07–0.19)、气温升高 ($OR = 0.22$; 95% CI: 0.15–0.31) 及蒸发量增大 ($OR = 0.92$; 95% CI: 0.90–0.94) 均对该湿度相关风险具有保护作用 (P 均 < 0.001)。**结论:** 深圳地区 APAC 入院率在 5 月达峰值, 尤以 65 岁以下男性为著。相对湿度升高是主要气候驱动因素, 显著增加 APAC 发作风险。

摘要编号: 209627

原发性闭角型青光眼晶状体因素的临床研究

第一作者: 陈晶

共同作者: 张蕊, 李丹

目的: 比较原发性闭角型青光眼 (PACG) 急、慢性型晶状体形态结构变化特征, 以期了解晶状体因素在不同类型 PACG 发病机制中的作用。**方法:** 病例对照研究。研究对象均来自于 2023 年 1 月至 2024 年 10 月就诊于我院的 PACG 患者 (包括急性原发性闭角型青光眼 APACG 发作眼组及其对侧眼组和慢性原发性闭角型青光眼 CPACG 进展眼组及其对侧眼组, 以下均以 A1、A2、B1、B2 组表示; APACG 组、CPACG 组均以 A、B 组表示), 应用 IOL Master 700 分别对不同组晶状体和眼球进行生物学检测: 1. 晶状体核密度 (LND); 2. 晶状体皮质密度 (LCD); 3. 晶状体皮质 / 核密度比 (LCD/LND); 4. 晶状体厚度 (LT); 5. 晶状体皮质厚度 (LCT); 6. 晶状体核厚度 (LNT); 7. 晶状体皮质厚度占比 (LCT/LT); 8. 晶状体核厚度占比 (LNT/LT), 计算相应的晶状体位置 (LP) 和晶状体相对位置 (RLP) 并作对比分析。统计学方法采用 Kruskal-Wallis 秩和检验、单因素方差分析、Mann-Whitney U 检验以及独立样本 T 检验, 以 $P < 0.05$ 认定为差异具有统计学意义。**结果:** 1. 基本信息: A 组 47 例 (94 眼)、年龄为 65.5 (7.9) 岁; B 组 47 例 (94 眼)、年龄为 63.3 (7.9) 岁, 差异无统计学意义 ($P > 0.05$)。A1、A2、B1、B2 组眼轴为: 22.19 (1.32) / 22.23 (1.30) / 22.66 (0.68) / 22.17 (2.9) mm, 差异无统计学意义 ($P > 0.05$)。2. A1、A2、B1、B2 组晶状体参数结果: LND = 54.59 (21.38) / 56.30 (16.91) / 54.75 (15.35) / 54.45 (16.63), P 值 > 0.05 ; LCT = 2.23 (0.33) / 2.19 (0.32) / 2.05 (0.28) / 2.07 (0.29) mm, P 值 < 0.05 ; P 值 > 0.05 , LT = 5.09 (0.34) / 5.06 (0.31) / 4.90 (0.31) / 4.90 (0.32) mm, P 值 < 0.05 ; LCT/LT = 0.44 (0.04) / 0.43 (0.04) / 0.42 (0.04) / 0.42 (0.04), P 值 > 0.05 ; LNT/LT = 0.56 (0.04) / 0.57 (0.04) / 0.58 (0.04) / 0.58 (0.04), P 值 > 0.05 。3. 晶状体参数组间比较: LCT 中 A1 $>$ B1、A1 $>$ B2、A2 $>$ B1, 差异均有统计学意义 (P 值均 < 0.05); LT 中 A1 $>$ B1、A1 $>$ B2、A2 $>$ B1、A2 $>$ B2, 差异均有统计学意义 (P 值均 < 0.05)。PACG 急性型患者发病与晶状体皮质膨胀增厚且晶状体位置靠前相关。**结论:** PACG 急性型患者发病与晶状体皮质膨胀增厚且晶状体位置靠前相关。

摘要编号: 209466

在线阈上值视野检查程序 (Perimouse) 在远程青光眼视野筛查中的评估: 与 Humphrey 视野计的比较

第一作者: Xiaoyuan SHEN

共同作者: Zidong CHEN, Yangfan YANG, Minbin YU

目的: 评估一种在线阈上值视野筛查程序 (Perimouse) 在检测青光眼性视野缺损时, 与 Humphrey 视野计 (HFA) 的诊断效能及空间一致性。**方法:** 前瞻性诊断研究共纳入 174 名受试者 (283 只眼), 包括健康人群及原发性开角型或正常眼压性青光眼患者。所有受试者均接受 Perimouse 阈上值测试和 HFA SITA Standard 24-2 程序检查。以 Perimouse 检测遗漏的刺激点及 HFA 总体偏差概率图中 $P < 0.5\%$ 的点作为异常点, 对两种方法的异常点数量进行线性回归、Spearman 相关、组内相关系数 (ICC) 及 Bland-Altman 一致性分析。

进一步采用可接受总误差 / 误差限 (ATE/LER) 法评估临床可接受范围。通过受试者工作特征曲线 (ROC) 和精确率-召回率 (PR) 分析评估诊断性能, 并计算逐点 Cohen's κ 系数及 ROC 曲线下面积 (AUC) 以探索空间对应关系。

结果: Perimouse 与 HFA 的异常点数量高度相关 ($r = 0.88$, $P < 0.001$), 并与 HFA 平均偏差 (MD) 呈显著负相关 ($r = -0.80$, $P < 0.001$)。两种方法间一致性良好 (ICC = 0.93), Bland-Altman 分析显示平均偏差适中, 仅少数离群值。ATE/LER 分析显示绝大多数数据点落于临床可接受范围内, 仅少部分超出误差限。以异常点 ≥ 5 为诊断整体视野缺损的最佳阈值, 灵敏度为 85.9%, 特异度 97.9%, 准确率 91.9%, F1 值 0.91 (AUC = 0.97)。诊断性能随疾病严重程度增加而逐渐提升。逐点 Cohen's κ 范围为 0.32-0.78, 对应 AUC 范围为 0.66-0.96; 生理盲点附近颞侧 κ 值较低, 鼻侧较高。Perimouse 平均测试时间显著短于 HFA (2.64 ± 1.83 分钟 vs 6.27 ± 2.18 分钟, $P < 0.05$)。

结论: Perimouse 与 HFA 在检测青光眼性视野损害方面具有良好的相关性和一致性, 并能快速、可靠地识别异常视野。研究结果支持其作为一种实用、低成本的远程或家庭视野筛查工具的可行性。

摘要编号: 208084

基于多模态数据的深度学习在青光眼诊断和严重程度分级中的应用

第一作者: Chaoxu QIAN

共同作者: Hua ZHONG

目的: 基于多模态数据开发能诊断青光眼并识别严重程度的深度学习模型。

方法: 采用诊断试验研究方法, 收集正常人群 86 人 145 眼和不同严重程度原发性开角型青光眼患者 314 例 507 眼的彩色眼底照相和视野检查结果, 并根据视野的平均缺损值将青光眼分为早期 (154 眼)、中期 (113 眼) 和晚期 (240 眼)。分别采用 DenseNet 121、ResNet 50 和 VGG 19 卷积神经网络 (CNN) 建立人工智能 (AI) 青光眼严重程度分级模型, 评估单模态数据与多模态数据对于分类结果的影响, 并确定适合多模态数据的 CNN 网络架构。

结果: 同时具有彩色眼底照相和视野检查结果者有 652 眼, 按照 4:1 的比率随机 (计算机抽取法) 分配图片到训练集和测试集。不同 CNN 架构建立的青光眼严重程度分级模型均具有较高的准确性, DenseNet 121 各有效性指标高于 ResNet 50 及 VGG 19。在彩色眼底照相单模态 AI 模型中, 识别早期青光眼的受试者工作特征曲线下面积 (AUC)

为 0.87; 在视野单模态 AI 模型中, 识别早期青光眼的 AUC 为 0.93; 在彩色眼底照相联合视野的多模态 AI 模型中, 识别早期青光眼的 AUC 为 0.95。

结论: 结构联合功能更符合实际临床工作中对青光眼的评估, 基于多模态数据能建立具有高准确性的青光眼诊断和严重程度分级工具。

摘要编号: 210051

急性房角关闭危象患者角膜共聚焦显微镜临床特征

第一作者: Weiwei WANG

目的: 应用角膜共聚焦显微镜探讨急性房角关闭危象 (AACC) 患者角膜临床特征。

方法: 分析单眼发病的 AACC 患者以及年龄匹配的白内障患者 (对照组) 角膜共聚焦显微镜角膜上皮细胞、上皮神经纤维丛、基质细胞和内皮细胞。

结果: 41 名单眼发病 AACC 患者 (82 只眼) 和 20 名健康对照 (40 只眼), 共聚焦显微镜显示, AACC 眼的角膜神经纤维密度、角膜神经分支密度和角膜神经纤维长度明显降低。基质细胞肿胀, 内皮细胞大小不均匀, 在表面沉积点状高反射的角膜沉着物。在严重病例中, 细胞体积增大, 变形并融合。在对侧眼中, 角膜上皮神经纤维丛、基质层和内皮层未见异常, 内皮细胞密度为 2601 ± 529 个/ mm^2 , 高于 AACC 眼的 1654 ± 999 个/ mm^2 ($P < 0.001$)。角膜水肿导致 17 只眼无法使用角膜内皮镜检查, 只有四只眼无法用共聚焦显微镜检查。在 AACC 眼和对侧眼中, 共聚焦显微镜和角膜内皮镜检查中内皮细胞密度无显著差异 ($P = 0.674$, $P = 0.247$)。与对侧眼相比, 角膜六边形细胞比例显著降低 ($P < 0.001$), 平均细胞大小和内皮细胞变异系数显著增加 ($P < 0.001$, $P = 0.008$)。

结论: AACC 眼角膜上皮神经纤维丛密度降低、长度减少, 基质细胞活化, 内皮细胞异型性增加, 密度减少。

摘要编号: 210001

托吡酯和氢氯噻嗪低剂量联合用药致早期急性近视和房角变窄: 病例报告

第一作者: Zhaoqiang LIU

目的: 报告 1 例托吡酯和氢氯噻嗪联合使用导致急性近视和房角变窄的罕见病例。

方法: 一名 34 岁的亚洲女性在仅服用 1 次含有 25 毫克托吡酯、25 毫克氢氯噻嗪和 22.4 毫克氟西汀减肥药 6 小时后, 双眼视力显著下降。随后被诊断为急性双侧近视和房角变窄, 并开始使用局部治疗。

结果：初步检查显示双眼视力下降至 20/100，右眼眼压 23 毫米汞柱，左眼眼压 24 毫米汞柱，伴有脉络膜上腔积液和房角变窄。在停用这些药物并使用降眼压药物后，患者完全康复。

结论：我们推测托吡酯和氢氯噻嗪之间可能存在药物相互作用，可能在短时间内低剂量使用就导致房角变窄。及时停药通常可在数天至数周内完全恢复。

摘要编号：209974

改良 Ahmed 青光眼引流阀植入术治疗难治性青光眼

第一作者：Yihua ZHU

共同作者：Xiyao LIN, Biting ZHOU

目的：探讨改良 Ahmed 青光眼引流阀植入术治疗新生血管性青光眼（NVG）及其他难治性青光眼（refractory glaucoma, RG）的差异性，探究 AGV 治疗不同类型难治性青光眼的临床疗效。

方法：真实世界临床研究。研究对象为 2022 年 11 月至 2025 年 2 月期间在福建医科大学附属第一医院被诊断为难治性青光眼的患者，共 49 例，53 眼。所有患者入院后均接受由同一位医师完成的改良 AGV 植入术治疗。根据病因学特征将患者分为两组：新生血管性青光眼（NVG）组 26 例 28 眼；其他难治性青光眼（其他 RG）组 23 例 25 眼，收集分析两组患者术前及术后各随访时间点的眼压、视力、抗青光眼药物种数、术后并发症情况、手术成功率。

结果：NVG 组和其他 RG 组术后 1 d、1 w、2 w、1 mo、3 mo、6 mo 的眼压测量平均值较术前均下降，存在显著的统计学差异（ $P < 0.001$ ），NVG 组术后早期眼压存在波动，于术后 2 w 左右眼压控制稳定。NVG 组平均眼压从术前（ 40.46 ± 9.00 ）mmHg 下降到末次随访时的（ 19.54 ± 5.83 ）mmHg；其他 RG 组的平均眼压由术前（ 37.96 ± 10.50 ）mmHg 下降到末次随访时的（ 17.36 ± 5.77 ）mmHg。通过重复测量方差分析比较，NVG 组和其他 RG 组在术后各随访时间点的眼压水平相当，差异无统计学意义（ $P > 0.05$ ）。NVG 组抗青光眼药物的平均数量从术前（ 2.50 ± 0.92 ）种下降到末次随访时的（ 0.89 ± 0.99 ）（ $P < 0.001$ ）。其他 RG 组抗青光眼药物的平均数量从术前（ 2.80 ± 0.87 ）种下降到末次随访时的（ 0.68 ± 0.90 ）种（ $P < 0.001$ ）。两组患者术后 1 mo、3 mo、6 mo 随访时间点的最佳矫正视力相较术前均有所提高（ $P < 0.05$ ），两组间各随访时间节点最佳矫正视力无统计学差异（ $P > 0.05$ ）。至随访结束，NVG 组患者手术总成功率为 78.57%，RG 组患者手术总成功率为 80.00%。改良 AGV 主要并发症有浅前房及低眼压、引流装置相关并发症、前房出血、脉络膜脱离。

结论：改良 Ahmed 青光眼引流阀植入术在对 NVG 和其他 RG 的临床治疗上均具有显著效果，具有操作简便、组织创伤小等优点，是难治性青光眼的有效手术选择。新生血管性青光眼患者在术后早期眼压的稳定性相对较差，这可能与该类患者的眼部病理生理特点有关。

摘要编号：200823

改良外路 XEN 凝胶支架植入术治疗晚期青光眼的有效性及安全性

第一作者：Peiyun XIE

共同作者：Junhua LI

目的：评估改良外路 XEN 凝胶支架植入术治疗晚期青光眼的有效性及安全性。

方法：回顾性病例系列研究。纳入 2021 年 12 月至 2023 年 4 月于温州医科大学附属眼视光医院确诊为晚期青光眼并接受改良外路 XEN 凝胶支架植入术的患者 12 例（15 眼）。收集并分析患者术前，术后 1 周及 1、3、6、12 个月和末次随访的视力、眼压、降眼压药物数量、滤过泡形态、引流管位置、前房深度、手术并发症等。采用 Wilcoxon 符号秩和检验比较手术前后眼压和降眼压药物数量变化。使用 Kaplan-Meier 生存分析曲线分析手术成功率。

结果：随访时间 18.0（17.0，27.0）个月。末次随访时眼压由术前 25.0（20.4，41.5）mmHg 下降至 14.0（11.6，16.2）mmHg（ $P = 0.003$ ），局部降眼压药物数量由 4.0（2.0，4.0）种减少为 0.0（0.0，2.0）种（ $P = 0.001$ ）。术后 18 个月的手术总体成功率为 87%，完全成功率为 55%。2 眼分别于术后 2 个月和 7 个月再次行抗青光眼手术。术后并发症主要包括睫状体脱离（47%）、浅前房（33%）和引流管内口阻塞（20%）。所有术眼均未出现严重并发症。

结论：改良外路 XEN 凝胶支架植入术可以显著降低术眼眼压和减少降眼压药物数量，在晚期青光眼的治疗中展现出较高的成功率和安全性。

摘要编号：207651

斑马鱼 Angpt1 基因敲降系的眼部异常提示 ANGPT-TIE 信号在房水外流中的作用

第一作者：Shisong RONG

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目的：在人类和小鼠中，Angpt-Tie 信号通路调控着房水排出所必需的特化淋巴管——Schlemm 管的发育。斑马鱼因其发育迅速和胚胎产量高，被广泛用于眼病研究并适合开展高通量实验。本研究旨

在建立并研究斑马鱼 *Angpt1* 基因敲降 (KD) 系, 以探讨 *Angpt-Tie* 信号在前节发育及青光眼发生中的作用。

方法: 采用 CRISPR/Cas9 技术在 *Angpt1* 基因第 5 外显子删除 11 个碱基对, 从而建立 *Angpt1* KD 系, 并通过测序及 RT-qPCR 进行验证。在 1 月龄 (1 mpf) 测量 KD 组与野生型 (WT) 斑马鱼的前房 (AC) 及眼球大小。在 10 天 (10 dpf)、17 天 (17 dpf) 及 1 月龄时行荧光原位杂交 (FISH) 检测 *Angpt1* 的空间表达。通过在 AC 内注射 3 kDa 可固定赖氨酸修饰的地塞糖 (20 mg/mL) 以量化房水外流情况。

结果: 在 1 mpf 时, *Angpt1* 纯合 KD 斑马鱼的 AC 显著增大 ($P = 0.041$), 眼球直径亦明显增加 ($P < 0.001$), 与 WT 相比差异具有统计学意义。光学显微镜下 KD 组眼前房角腹侧小管状网络的发育异常 (该结构是关键的前房水外流通道)。FISH 检测显示 *Angpt1* 在 10 dpf 和 17 dpf 时定位表达于该区域, KD 组信号减弱。同时, *Angpt1* 亦在面部淋巴管中被检测到。地塞糖注射实验显示房水可通过前房角腹侧小管状网络及面部淋巴管排出, 与 *Angpt1* 表达分布一致。

结论: *Angpt1* 参与斑马鱼房水外流通路的发育, 支持 *ANGPT-TIE* 信号通路在不同物种中具有保守作用。该 KD 模型为研究遗传变异及潜在治疗靶点提供了全新的平台。

摘要编号: 209799

新型微创内路三联手术 (3T) 联合青光眼复明合计治疗原发开角型青光眼 POAG 一例

第一作者: Qin QIU

目的: 报道新型微创内路三联手术 (3T) 联合青光眼复明合计治疗原发性开角型青光眼一例, 探究诊疗方案及有效性。

方法: 患者男, 54 岁, 因发现双眼眼压升高 2 年余于我科就诊。既往最高眼压右眼 28 mmHg, 左眼 60 mmHg。使用美开朗眼液、派立明眼液、拉坦眼液点双眼 1 年余。查体: VOD 戴镜 0.8; VOS 戴镜 0.8; 眼压: 右眼 27 mmHg, 左眼 25 mmHg; 房角镜检查双眼房角开放。视野: MD 值右眼为 -3.72 dB, 左眼为 -9.08 dB。中医查体: 舌红, 苔薄白, 脉细数。西医诊断: 双眼原发性开角型青光眼, 双眼屈光不正; 中医诊断: 双眼青风内障。西医治疗: 双眼眼压高, 房角开放, 杯盘比增大, 2025 年 3 月先后行行“双眼 3T 术”, 术后予以左氧氟沙星、醋酸泼尼松龙、双氯芬酸钠滴眼液预防感染, 口服维生素 B1、甲钴胺营养神经。中医治疗: 予以青光眼复明合计 (枸杞子 10 g 菊花

6 g 地黄 10 g 山萸肉 6 g 山药 10 g 茯苓 10 g 牡丹皮 6 g 盐泽泻 6 g 灵芝 6 g 炒诸实子 6 g 石菖蒲 6 g) 日一剂。

结果: 左眼术后 1 天, Vos 裸眼 CF/50 cm, 左眼 52 mmHg, 予以甘露醇静滴降眼压。左眼术后第 2 天, Vos 戴镜 0.5-, 眼压左眼 20 mmHg, 停用甘露醇。右眼术后 1 天, Vod 0.25, 眼压 15 mmHg, 术后第 2 天, Vod 0.4, 眼压 16 mmHg。术后眼压控制可, 双眼术后 6 月, 双眼视力戴镜 1.0, 眼压右眼 17 mmHg, 左眼 17 mmHg。复查视野: MD 值右眼为 -0.07 dB, 左眼为 -2.23 dB。目前患者病情稳定, 门诊复查。

结论: 该病例为 POAG 行微创 3T 手术降眼压治疗及青光眼复明合计口服滋补肝肾治疗一例, 术后眼压控制良好, 视神经康复。希望通过本病例能为眼科医生提供青光眼中中西医结合治疗的新方案。

摘要编号: 210037

普通张力环缝线固定治疗晶状体半脱位继发性青光眼一例

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共同作者: Suju LIU

目的: 探讨外伤性晶状体半脱位继发性青光眼手术中普通张力环缝合固定的治疗特点及效果。

方法: 个案报告: 患者杨某某, 70 岁男性, 右眼外伤后出现眼红、眼痛、视物模糊, 并伴同侧头部胀痛 1 月余, 于 2025 年 8 月 25 日就诊。入院时视力右眼裸眼 0.2, 矫正 0.6, 左眼裸眼 0.6 矫正 0.9, 右眼眼压 30 mmHg、左眼眼压 14 mmHg。右眼结膜下片状出血, 角膜雾状水肿, 下方前房积血, 虹膜震颤, 瞳孔散大约 6 mm, 对光反射迟钝, 晶体震颤、混浊 (C2N2P2)。入院诊断为“1. 右眼外伤性晶状体不全脱位, 2 右眼继发性青光眼”。于 2025 年 8 月 27 日在局麻下实施“右眼白内障超声乳化吸除 + 人工晶体植入 + 张力环 (CTR) 植入 + 张力环悬吊术 + 前部玻璃体切除术。”手术步骤: 表面麻醉下, 于颞下方角膜缘作侧切口, 颞上方角膜缘作主切口; 注入粘弹剂, 完成环形撕囊后, 分别于鼻、颞、上、下方角膜缘作切口, 放置囊袋拉钩支撑囊袋; 行超声乳化吸核及皮质吸除, 保证囊袋完整。玻璃体自鼻侧溢出, 遂行前部玻璃体切除术。将带双弯针的 10-0 缝线一针套扎于普通张力环一孔上, 植入张力环于囊袋内, 缝线绕过囊袋口并经颞下方角膜缘外 2 mm 睫状沟穿出眼球, 植入人工晶体后, 10-0 缝线固定于巩膜层间。术毕吸除粘弹剂, 缩瞳, 水密切口。

结果: 手术顺利, 术后角膜透明, 前房深度恢复正常, 眼压稳定于正常范围内。术后随访 1 月, 右眼视力

裸眼 0.6 矫正视力 0.8, 眼压 15 mmHg, 角膜透明, 前房 (-), 人工晶体居中良好, 囊袋及 CTR 位置稳定。

结论: 晶状体半脱位的患者行白内障手术时, 植入带缝线的普通张力环并将缝线于巩膜层间固定, 张力环能够有效保留囊袋结构, 使人工晶体居中稳定, 该术式较传统去除囊袋并行 IOL 悬吊术操作更简便、结构更符合生理, 并发症少, 具有良好的临床推广价值。

摘要编号: **210052**

晶状体不全脱位继发青光眼的治疗

第一作者: **Weiwei WANG**

目的: 探讨晶状体不全脱位继发青光眼的临床表现和治疗。

方法: 系列病例研究。

结果: 晶状体不全脱位常继发于外伤、遗传性疾病或呈自发性。当前组悬韧带损伤, 临床表现为晶状体前移, 前房变浅、房角关闭, 眼压升高, 出现继发性青光眼。眼部生物参数测量脱位眼晶状体厚度较对侧眼增加。裂隙灯显微镜下可见双眼前房深度不同, 晶状体不全脱位眼前房变浅, 深度不均。当后组悬韧带损伤时, 前房加深, 可见玻璃体疝。UBM 可见晶状体赤道部与睫状突距离增大。白内障超声乳化吸除联合张力环植入、人工晶状体植入术是常规手术方式, 有玻璃疝时需联合前部玻璃体切割术, 悬韧带损伤严重时根据眼压情况一期或二期人工晶状体固定术。

结论: 白内障超声乳化吸除联合张力环植入、人工晶状体植入术可有效治疗晶状体不全脱位继发青光眼。

摘要编号: **207712**

激光周边虹膜切除术对可疑原发性房角关闭患者角膜生物力学参数的影响及其与房角结构的关联探讨

第一作者: **Qian LIU**

共同作者: **Qianyu WU**

目的: 探讨可疑原发性房角关闭患者 (PACS) 行激光周边虹膜切除术 (LPI) 后前房、晶状体及角膜生物力学参数的变化, 以明确其对治疗预后的影响。

方法: 本研究纳入可疑原发性房角关闭患者 (PACS) 患者 30 例 (42 只眼)。采用扫频源光学相干断层成像眼前节分析仪 (CASIA2) 和可视化角膜生物力学分析仪 (Corvis ST, CST) 测量 LPI 术前后的

前房参数、晶状体参数及角膜生物力学参数。使用广义估计方程分析 LPI 术后前房、晶状体及角膜参数的变化, 并通过多元线性回归分析筛选与术后角膜生物力学参数变化相关的影响因素。

结果: 患者平均眼压 (IOP) 从基线时的 15.64 ± 4.77 mmHg 降至 LPI 术后的 13.96 ± 3.29 mmHg。晶状体参数在 LPI 术后无显著变化。除 180° 房角隐窝面积 (ARA500) 外, 术后 500 μm 和 750 μm 位置的所有房角参数均显著增加。多元线性回归分析显示, 270° 房角开放距离 (AOD500)、ARA500、ARA750、小梁网虹膜空间面积 (TISA500)、TISA750 和小梁虹膜角 (TIA500) 的变化与最大形变幅度比 (DA ratio max) 呈正相关。角膜断层生物力学指数 (TBI) 与 270° TIA750 呈显著负相关。

结论: LPI 术后角膜生物力学参数 (形变幅度 (DA)、DLL、DLA) 显著增加, PACS 患者术后角膜硬度明显降低。DA max 比值和 TBI 可能作为潜在生物标志物, 用于评估 LPI 治疗效果及监测 PACS 患眼的青光眼治疗和病情进展。

摘要编号: **209068**

玻璃体切除联合硅油填充术后高眼压的危险因素分析: 一项回顾性研究

第一作者: **Xinxing ZHU**

目的: 本研究旨在探讨原发性孔源性视网膜脱离 (RRD) 患者接受玻璃体切除联合硅油填充术后发生高眼压的相关危险因素。

方法: 回顾性收集 2019 年 1 月 -2022 年 12 月于我院就诊的原发性孔源性视网膜脱离患者的临床资料。术后随访时间为 6 个月, 分别记录患者术后 1 天、7 天、1 个月、3 个月及 6 个月的眼压数据。采用 Student's t 检验、卡方检验、Fisher 精确检验、多因素 Logistic 回归模型以及限制性立方样条 (RCS) 分析, 评估各项临床指标与术后高眼压之间的关联。

结果: 共纳入 209 例接受玻璃体切除联合硅油填充术的原发性孔源性视网膜脱离患者。在 6 个月随访期间, 117 眼 (55.98%) 出现高眼压。单因素分析显示, 年龄、眼轴长度、多发裂孔、裂孔累及多个象限、术中硅油填充量以及高度近视既往史与术后高眼压相关 (均 $P < 0.05$)。多因素 Logistic 回归分析进一步表明, 年龄与多发裂孔是术后高眼压的独立危险因素。限制性立方样条分析提示, 年龄小于 55 岁的患者术后发生高眼压的风险更高。

结论: 年龄和多发裂孔是原发性孔源性视网膜脱离患者行玻璃体切除联合硅油填充术后发生高眼压的

独立危险因素。对于年龄较轻 (< 55 岁) 及存在多发裂孔的患者, 临床应予以更密切的随访监测, 并及时采取干预措施以控制眼压。

摘要编号: 208685

睫状体平坦部光凝治疗难治性青光眼临床观察

第一作者: Tiantian WANG

共同作者: Xun AN, Chao MA, Shuai WANG

目的: 评估巩膜两切口 532 nm 激光光凝睫状体平坦部治疗玻切术后难治性青光眼的安全性及有效性。

方法: 对 10 例 (10 只眼) 玻切术后继发难治性青光眼并接受巩膜两切口 532 nm 激光光凝睫状体平坦部手术治疗的患者术后随访 3 个月, 对术前与术后 2 周、术后 3 月的眼压进行统计学分析。

结果: 患者术前与术后 2 周、术后 3 月眼压均降低 $P < 0.05$ 差异均有统计学意义, 术后 2 周与术后 3 月眼压稳定, $P > 0.05$, 差异无统计学意义。

结论: 本研究 10 名睫状体平坦部光凝的患者术前与术后 2 周、术后 3 个月眼压下降幅度显著且差异有统计学意义, 说明睫状体平坦部光凝的手术方法有效, 且术后 2 周与术后 3 个月眼压差异没有统计学意义, 说明降眼压效果稳定。本研究通过激光光凝睫状体平坦部达到控制眼压的目的, 且因为睫状体平坦部房水生成功能低于睫状突, 出现低眼压并发症可能性小, 本研究 10 例中无 1 例出现低眼压情况, 且 3 个月内眼压稳定, 未出现眼压反复升高。可见巩膜两切口 532 nm 激光光凝睫状体平坦部治疗玻切术后难治性青光眼相对安全有效。

摘要编号: 209909

肠道菌群干预在青光眼防治中的作用与研究进展

第一作者: Zefeng KANG

目的: 综述肠道菌群干预在青光眼防治中的关联机制、干预效果及研究局限性, 为青光眼的多靶点防治提供理论参考。

方法: 从三个主要方向分析肠道菌群与青光眼的关联: 1. 青光眼患者肠道菌群组成及代谢物; 2. 肠道菌群通过“肠-眼轴”调控眼部免疫炎症的机制; 3. 肠道菌群代谢物对眼压调节及视神经保护的作用。同时, 评估肠道菌群相关干预措施的效果, 包括粪菌移植、益生菌 (如乳杆菌、双歧杆菌)、益生元、合生元及后生元补充, 以及高纤维饮食、地中海饮食等特定饮食干预。

结果: 青光眼患者普遍存在肠道菌群紊乱, 表现为有益菌 (如双歧杆菌、乳杆菌) 丰度降低, 有害菌 (如肠杆菌科、变形菌门) 丰度升高, 且伴随短链脂肪酸、吲哚丙酸等保护性代谢物减少。肠道菌群干预可通过以下途径发挥青光眼防治潜力: 1. 调节眼部免疫微环境, 减轻视神经周围炎症反应; 2. 改善肠道屏障功能, 减少内毒素入血, 降低全身性炎症对眼部的损伤; 3. 通过代谢物介导的神经保护作用, 延缓视神经节细胞凋亡, 维持视神经功能; 4. 部分益生菌干预可辅助降低眼压, 与传统降眼压药物形成协同作用。然而, 相关研究存在明显局限性: 1. 临床研究样本量小, 多为动物实验或横断面研究, 缺乏大样本随机对照试验; 2. 肠道菌群与青光眼的因果关系尚未明确, “肠-眼轴”具体调控通路 (如迷走神经、免疫细胞迁移) 仍需进一步解析; 3. 干预方案 (如益生菌菌株选择、剂量、干预时长) 不统一, 个体差异对干预效果的影响较大; 4. 长期干预的安全性 (如对肠道菌群稳态的长期影响、与降眼压药物的相互作用) 数据不足。

结论: 肠道菌群干预为青光眼的防治提供了潜在新靶点, 可通过调节“肠-眼轴”改善眼部炎症、保护视神经, 甚至辅助调节眼压。但当前研究仍处于初步阶段, 需充分重视样本量、机制解析、干预方案标准化及安全性等局限性, 未来需开展更多高质量临床研究, 明确其作用机制及最优干预策略, 推动肠道菌群干预成为青光眼综合防治的重要组成部分。

摘要编号: 209417

脉冲电磁场对视神经损伤的作用及机制作用

第一作者: Bin RUAN

目的: 脉冲电磁场 (Pulsed Electromagnetic Fields, PEMFs) 已被证明可以用于治疗神经退行性疾病, 但对视神经损伤的作用尚不明确。本研究旨在探究 PEMF 在小鼠视神经损伤模型中的神经保护作用及其潜在机制。

方法: 选取 6-8 周 C57BL/6J 的雄性小鼠建立 ONC 模型, 在特制的脉冲电磁场设备下对其进行干预。通过 RBPMS 标记视网膜神经节细胞 (retinal ganglion cells, RGCs) 以评估 PEMF 对 RGCs 的保护作用。采用视网膜冰冻切片及铺片的 Iba1 和 CD68 的免疫荧光染色来可视化小胶质细胞并量化细胞数量, 通过评估细胞形态和吞噬活性对小胶质细胞的活化水平进行评分。同时, 为进一步分析 PEMF 治疗对少突胶质细胞前体细胞 (Oligodendrocyte Precursor Cell, OPC) 的影响, 构建了 NG2-creERT2;tdTomato 基因小鼠,

于 ONC 造模前 7 天通过 Tamoxifen 诱导以标记 OPC，并通过 CC1 染色追踪 OPC 的分化情况。

结果：ONC 后小鼠视网膜铺片及冰冻切片的免疫荧光染色发现，治疗 2 周的视网膜 RGCs 的存活较对照组无明显差异，而治疗 4 周及以上的视网膜 RGCs 存活较对照组显著增多。同时通过免疫荧光染色发现 ONC 小鼠经 PEMF 治疗后，视网膜小胶质细胞数量较对照组虽未见明显的差异，但组织形态上更趋于正常。同时通过免疫荧光标记视神经上的小胶质细胞也有同样的发现，此外，PEMF 治疗组的视神经上有更多的 OPC 表达了 CC1，提示 PEMF 促进了 OPC 分化。

结论：长期的 PEMF 治疗对于 ONC 损伤后 RGCs 具有保护作用；PEMF 治疗能缓解慢性炎症中小胶质细胞的持续活化，促进其表型向静息态转化，具有抗炎作用；PEMF 治疗促进了 OPC 的分化。这些研究表明 PEMF 干预在视神经损伤修复过程中具有极大潜力。

摘要编号：209383

视神经损伤和视网膜缺血 / 再灌注后的铜代谢变化

第一作者：Bing ZHANG

共同作者：Yiqing LI, Jiahui TANG, Qi ZHANG

目的：成年哺乳动物的视神经 (ON) 损伤会导致有限的再生和显著的视网膜节细胞 (RGCs) 损失。我们之前的研究表明，ON 损伤后内侧小层中的 Zn^{2+} 迅速增加，导致 RGC 受损。铜 (Cu) 是一种过渡金属，在神经元能量代谢、神经递质合成和突触调节中起关键作用。目前尚不清楚铜代谢失调是否也在急性视神经和视网膜损伤后介导 RGC 损失。本研究旨在探讨在视神经压迫 (ONC) 和缺血再灌注 (I/R) 模型中铜代谢的变化，目标是开发保护 RGC、促进视神经再生和视力恢复的治疗方法。

方法：使用铜探针测量小鼠视网膜中 Cu^{+} 水平 ($n = 5$)。通过玻璃体内注射 ATTM ($n = 6$) 或对照载体 ($n = 6$) 验证铜螯合剂的神经保护作用。通过免疫荧光法测量视网膜中的 ATP7A 水平。在 ONC 后 14 天，解剖视网膜和视神经，量化存活的 RGCs 和再生的轴突。统计分析采用未配对学生 t 检验和单因素方差分析。

结果：在视网膜损伤后 1 至 5 天，铜离子浓度保持不变，但在视网膜缺血再灌注后 1 天，铜离子浓度增加了约 70%。铜螯合剂适度保护了视网膜神经节细胞 ($p \leq 0.01$)，并与对照组相比，促进了轴突再生 (在 0.25 毫米处 $p \leq 0.05$)。在视神经挫伤后 3 天，铜转运蛋白 ATP7A 减少了约 50%。

结论：在 ONC 后，铜水平在 5 天内保持不变。但在 I/R 早期阶段，铜含量增加。铜螯合剂适度保护了视网膜神经节细胞并促进了视神经再生。本研究发现了急性视神经和视网膜损伤后的铜代谢变化，为视网膜神经节细胞保护和神经修复的治疗提供了新的见解。

摘要编号：209490

超声乳化、房角分离术对晚期原发性闭角型青光眼合并白内障的疗效观察

第一作者：Qi WANG

共同作者：Junmei ZHAO

目的：观察超声乳化、房角分离术对晚期原发性闭角型青光眼合并白内障的临床疗效。

方法：回顾性分析山西省眼科医院 2023 年 6 月 1 日至 2023 年 10 月 1 日行白内障联合房角分离手术的原发性闭角型青光眼患者，记录术前生物测量、视野、UBM 结果，观察术前、术后 1 周、1 月、3 月、6 月的视力、眼压，抗青光眼的用药及并发症的情况。

结果：收集 48 例 (56 眼)，年龄为 47-86 (66.62 $\pm$ 9.10) 岁，女性患者 32 例 (66.66%)。术前视力为 0.375 $\pm$ 0.245，视野的平均 MD 为 -25.04 $\pm$ 5.59 dB，PSD 为 6.516 $\pm$ 3.042。所有患眼均为晚期原发性闭角型青光眼，平均 MD 为 -25.243 $\pm$ 6.550 dB，PSD 为 6.516 $\pm$ 3.042，PEL+GSL 术后眼压从术前 27.84 $\pm$ 11.47 mmHg，降至最后一次随访的眼压 13.696 $\pm$ 1.69 mmHg，视力从术前的 3.75 $\pm$ 2.45 提高至 5.45 $\pm$ 2.24，抗青光眼药物从术前的 2.52 $\pm$ 0.50 下降至 0.11 $\pm$ 0.37。

结论：白内障联合房角分离手术是治疗晚期原发性闭角型青光眼合并白内障的有效方法，可以显著的降低眼压，且并发症少。

摘要编号：210073

青睫综合征患者前房液病毒检测与临床特征的相关性：33 眼回顾性研究

第一作者：Suju LIU

共同作者：Liuzhi ZENG

目的：通过青睫综合征前房液病毒检测探讨青睫综合征发病原因，为临床治疗青睫综合征提供参考依据。

方法：收集 2022 年 11 月 -2025 年 7 月成都市第一人民医院收治的 32 例 (33 眼) 青睫综合征患者，将所有患者的前房液进行病毒检测，结果与相关因素进行分析。

结果: 1. 所有患者共 32 例 33 眼, 其中男性 19 例 19 眼 (59.38%) 多于女性 13 例 14 眼 (40.63%), 平均确诊年龄为 39.97 ± 2.47 岁。2. 检出率: 病毒抗体阳性有 25 例 25 眼 (75.76%), 其中巨细胞病毒 19 例 19 眼 (57.58%), 水痘带状疱疹病毒 3 例 3 眼 (9.09%), 单纯疱疹病毒 2 例 2 眼 (6.06%), 风疹病毒 1 例 1 眼 (3.03%)。3. 巨细胞病毒阳性患者, 男性: 女性 = 6:13, 平均年龄 37.21 ± 9.60 , 平均最高眼压为 46.89 ± 7.70 。水痘带状疱疹病毒患者, 男性: 女性 = 2:1, 平均年龄 59.00 ± 4.00 , 平均最高眼压为 46.67 ± 13.32 。4. 多因素 Logistic 回归分析显示, 发病年龄与病毒阳性呈正相关 (OR = 1.125, 95% CI: 1.0–1.27, P = 0.045), 与病程长短、最高眼压无明显相关性。比较病毒阳性组与阴性组在发病年龄、病程长短及最高眼压方面的差异。结果显示, 两组间发病年龄 (P = 0.400)、病程长短 (P = 0.527) 及最高眼压 (P = 0.717) 差异均无统计学意义。

结论: 青睫综合征发病的相关因素中, 病毒感染是被提及最多的发病原因, 其中巨细胞病毒是最常见的病毒之一。青睫综合征是继发青光眼之一, 发作时眼压较高, 长期对视神经造成不可逆损伤, 并且随年龄增大阳性率逐渐增加。

摘要编号: **210047**

顽固性高眼压与颈动脉海绵窦瘘

第一作者: **Weiwei WANG**

共同作者: **Jianrong LIU**

目的: 探讨颈动脉海绵窦瘘导致的药物难以控制的高眼压。

方法: 系列病例分析。

结果: 6 例患者均为女性, 年龄 53–73 岁; 视力波动于 0.3 ~ 0.8; 用药后眼压右 16.9 ~ 32.2 mmHg, 左眼 20.2 ~ 31.6 mmHg。单眼发病者 1 例, 双眼发病者 5 例。1 例患者曾在当地医院行小梁切除术, 4 例患者曾行 YAG 激光虹膜周边切开术, 术后均表现为药物难以控制的高眼压。眼部典型体征为眼球前突, 结膜血管迂曲扩张, 呈螺旋状, 周边前房浅。眼眶 CT: 3 例患者可见眼上静脉增宽。眼眶 MRI: 2 例患者可见双侧诸眼外肌增粗。DSA: 5 例患者为颈动脉海绵窦瘘, 1 例患者为颈外动脉硬脑膜分支海绵窦瘘。所有患者均在全麻下给予动静脉瘘栓塞术, 术后患者眼红、眼突等表现均消失, 眼压恢复正常。

结论: 颈动脉海绵窦瘘可因上巩膜静脉压增高出现药物难以控制的高眼压。封闭瘘口后, 眼压降至正常。

视频

人工智慧、数位创新与虚拟健康

摘要编号: 201656

基于深度学习实时监测视盘状态辅助玻璃体视网膜手术

第一作者: Hongzhuang CHENG

共同作者: Shuangwen KANG, Jie ZHONG

目的: 开发经济高效的视盘状态监测系统, 降低因视网膜手术操作导致的高灌注压对视神经的损害风险。

方法: 本研究利用 MobileNetV3 替换 YoloV5 的骨干特征提取网络并基于 56,708 张视盘标注图像构建视盘状态双阶段监测系统: 首先采用改进后的 Yolo 实现对视盘的实时追踪, 其次将视盘区域按照 RGB 加权系数量化为灌注状态指数。模型在灌注状态指数增幅超过预设阈值时自动触发报警系统并记录持续时间, 从而为手术医师提供实时的眼内灌注风险评估。

结果: 该模型在外部验证集上针对视盘追踪任务达到 86% 的精确率、89.8% 的召回率、93.9% 的 mAP@0.5 和 87.8% 的 F1 分数, 并且改进后的模型体积被体积较原模型缩小 95%, 单帧图像处理速度提升 185 ms ($P < 0.05$)。在视盘状态评估方面, 研究结果显示高灌注状态视盘的灌注状态指数较基线水平平均增幅达 21 (95% CI: 17-25; $P < 0.05$)。

结论: 该系统能够实时监测视盘状态变化, 降低眼内高灌注压对视神经的损伤风险, 兼具低成本部署和高效运算的双重优势。

屈光手术

摘要编号: 209936

晶状体半脱位的全程视力解决方案

第一作者: Shunhua ZHANG

目的: 通过视频展示 240 度悬韧带断裂患者的白内障摘除联合三焦点人工晶状体植入, 给出晶状体半脱位患者的全程视力解决方案。

方法: 使用飞秒激光辅助设备制作以囊袋为中心直径 5.2 mm 的 CCC 联合晶状体核裂解, 穿刺进入前房, 曲安奈德染色下行前部玻璃体切除清除前房玻璃体, 使用核周皮质软壳保护技术清除核块, 粘弹剂保护下吸除核周皮质, 检查囊袋完整, 6-0 Porline 线分别于 7 点和 10 点位固定囊袋, 囊袋内植入 13.0 mm 张力环, 前后囊膜抛光, 囊袋内植入三焦点 IOL (839), 进一步使用前部玻璃体切除清除前房残余玻璃体, 缩瞳检查瞳孔正圆居中, 水密切口。

结果: 术后第一天人工晶状体居中位正, 裸眼远中近视力分别为 0.9、0.8、0.8, 最佳矫正视力 1.0。术后 6 个月随访显示人工晶状体居中位正, 裸眼远中近视力分别为 1.0、0.8、0.8, 最佳矫正视力 1.0; 前节 OCT 显示人工晶状体位正居中, IOL 倾斜 2.8 度, 偏心 0.37 mm, 均在理想范围。

结论: 囊袋张力环符合体巩膜固定联合囊袋内植入三焦点人工晶状体可以使晶状体半脱位患者实现囊袋内植入 IOL 并实现全程视力, 提高生活质量。

摘要编号: 204970

飞秒微透镜角膜基质取出术中结膜卷入主动失吸 1 例

第一作者: Wei CHEN

目的: 报道飞秒微透镜角膜基质取出术中结膜卷入, 但是未完失吸, 激光层面倾斜, 及时主动失吸并成功处理的特殊病例。

方法: 患者, 女, 18 岁, 在飞秒微透镜角膜基质取出术中扫描激光时, 由于紧张、Bell 现象、眼球向上转动、角膜直径较小 (10.83 mm), 结膜松弛等原因, 下方结膜被大量负压吸引入手术区。卷入

的结膜填入下方负压环与角膜的间隙，使负压环与眼球的间隙仍闭合达要要求的负压，未完全失吸，故激光未自动终止。术者评估这时激光扫描角膜透镜的上层已发生明显倾斜，立即主动按下了失吸键，失去负压，使眼球脱离负压环，激光终止。术者立即重新中心对位，并负压吸引，未改变任何参数，重新扫描了透镜上层及微切口，结膜未再卷入，并顺利分离透镜。

结果：术后复查结果，裸眼视力 1 天，1 周均为 20/20；电脑验光示术后 1 天 +0.75 DS/-1.25 DC*70，等效球镜为 +0.25；术后 1 周 +0.50 DS/-1.00 DC*70，等效球镜为 0。

结论：对于角膜直径较小的患者要加强全飞秒术中失吸的预防，一旦半失吸，结膜卷入手术区，在扫描透镜上层时需及时主动终止激光，可不改变参数立即重吸扫描上层及边切，完成手术，可获得较好视力。

摘要编号：207698

飞秒微透镜角膜基质取出术中部分失吸致帽穿孔 1 例

第一作者：Wei CHEN

目的：报道飞秒微透镜角膜基质取出术中部分失吸，结膜卷入边缘，术者未主动失吸，激光扫描全部，分离角膜透镜时致帽穿孔的 1 例特殊病例。

方法：患者，女，23 岁，右眼屈光度 -7.0 DS/-0.75 DC*115，角膜横径 11.24 mm，角膜曲率 K1 为 43.56，K2 为 44.30，角膜中央厚度 583 um。在全飞秒术中扫描激光时，可能由于紧张、眼球向上转动等原因，颞下方结膜被负压吸引入透镜边缘。卷入的结膜填入下方负压环与角膜的间隙，使负压环与眼球的间隙仍闭合且达要要求的负压，未完全失吸，故激光未自动终止，术者未及时主动失吸，而使激光扫完。

结果：分离角膜透镜上层时发生颞下方角膜穿孔而终止手术。

结论：对于角膜直径较小的患者术前要加强全飞秒术中配合的宣教，扫描激光时一旦发生部分被动失吸，结膜卷入光学区，激光仍可扫描的情况下透镜上层扫描可能已发生倾斜，需及时尽早主动失吸终止手术，防止角膜穿孔等并发症的出现，并为其它的解决方案争取机会。

斜视与小儿眼科

摘要编号：204327

一例特殊的儿童黄斑前膜及其四年随访

第一作者：Xuan LIU

目的：对一例特殊的儿童黄斑前膜四年的随访进行总结。

方法：陈 XX，男，9 岁，以“右眼视物不清 1 个月”只主诉入我院，入院查体：视力：右：0.1，左：0.8，眼压：右 8.8 mmHg，左：14 mmHg。双眼虹膜可见力氏结节，右眼玻璃体絮状混浊，下方少量出血；左眼玻璃体清亮。右眼黄斑部血管迂曲，可见黄斑前膜状物。并可见视网膜折叠。入院诊断：右眼增殖性玻璃体视网膜病变诊疗经过：入院行全麻右眼玻璃体切除并黄斑前膜剥除术，并硅油填充。2 月后常规取硅油。随访情况：右：0.4（矫正 1.0），左：0.8，眼压：右 12 mmHg，左：14 mmHg。双眼虹膜可见力氏结节，右眼玻璃体清亮，黄斑部未见膜状物，视网膜平伏。OCT 显示黄斑部结构存在。后期随访时发现驱赶可见咖啡牛奶斑，并确诊神经纤维瘤病 1 型。

结果：原黄斑前膜可能因神经纤维瘤病 1 型伴发的视网膜及视网膜色素上皮联合错构瘤。

结论：随着随访时间的延长，全身咖啡牛奶斑逐渐增多，但眼底错构瘤依然安静（图 6）。说明手术可能是解决视网膜错构瘤的一种手段。

摘要编号：209768

一束照进云岭的光 副标题：一例德昂族 Rop5 期患儿诊治启示录

第一作者：Yang JINGYING

目的：呼吁完善云南边疆地区（尤其是德昂族等少数民族聚居地）早产儿眼底筛查体系，填补筛查覆盖缺口，降低 ROP 导致的失明风险，保障边疆少数民族早产儿的视觉健康权益。

方法：1. 对云南省内早产儿开展眼底筛查工作，持续推进筛查覆盖至各大地州；2. 为确诊 ROP 5 期的德昂族早产儿实施精细眼部手术，包括角膜前入路切口、注入粘弹剂撑开前房、切除晶体、剥离视网膜致密前膜等操作；3. 提出针对性建议：为德昂村寨制作双语眼底筛查防盲手册，为县医院配备眼底筛查基本设备。

结果：1. 手术成功使德昂族早产儿脱离的视网膜基本展平，术后孩子对光产生反应，获得了认知世界的初步可能；2. 过去十年间，云南早产儿眼底筛查

已逐步覆盖各大地州，但在茶山等偏远少数民族地区仍存在“最后一公里”覆盖缺口，导致部分早产儿错失黄金筛查期，发展为罕见的 ROP 5 期。

结论：边疆少数民族地区早产儿眼底筛查工作仍需完善，通过补充筛查手册、配备基础设备等措施打通“最后一公里”，才能从源头减少 ROP 重症病例，让所有民族的早产儿都能平等享有光明，这需要医疗从业者及社会各界持续接力推进。

白内障

摘要编号：208886

人工晶状体后囊夹持术

第一作者：Zhen SHAO

共同作者：Dongmei LIU

目的：展示不同类型人工晶状体的后囊夹持术。术中将人工晶状体的光学区夹持于后囊下以预防白内障术后的视轴区混浊。

方法：术中使用角巩膜缘切口，环形撕开晶状体前囊膜，吸除晶状体，放在囊袋内植入人工晶状体后，在眼内注入粘弹剂，环形撕开后囊，在将人工晶状体轴向对准目标轴位后，将人工晶状体光学区夹持于后囊下。

结果：患者术中及术后无严重不良反应发生，术后长期随访均未发生视轴区混浊。对于散光矫正型的人工晶状体采用后囊夹持术可以使人工晶状体轴向更稳定。

结论：儿童白内障术中使用人工晶状体光学部后囊夹持是一种预防术后视轴区混浊的方法，减少了对玻璃体的及眼球发育的影响，其术后长期效果稳定；该种手术方式在儿童屈光性白内障中，特别是散光矫正型人工晶状体植入的患者中更具优势。

摘要编号：209689

改良式一片式人工晶体缝线固定术的探讨

第一作者：Shanna CHEN

目的：探讨改良式一片式人工晶体缝线固定术的应用安全性和便利性。

方法：对无晶状体眼患者 14 人 14 眼，局麻下行一片式人工晶体缝线固定术。采用 8-0 聚丙烯线经 9:00、距角膜缘 2 mm 经巩膜穿刺进入玻璃体腔内，再经上方 2.4 mm 透明角膜缘主切口引出眼外，缝线固定于一片式人工晶体（IOL）的下襻，IOL 折叠放置助推器后注入前房，上襻留置并卡在角膜缘切口；同样的办法，8-0 聚丙烯线经 3:00、距角膜

缘 2 mm 经巩膜穿刺进入玻璃体腔内，并缝线固定 IOL 的上襻并送入眼内。拉紧两缝线使 IOL 位居中，并分别巩膜层间“V”形穿梭，紧贴结膜面剪断线端。术后常规眼部用药。

结果：对无晶状体眼患者 14 人 14 眼，局麻下行一片式人工晶体缝线固定术。采用 8-0 聚丙烯线经 9:00、距角膜缘 2 mm 经巩膜穿刺进入玻璃体腔内，再经上方 2.4 mm 透明角膜缘主切口引出眼外，缝线固定于一片式人工晶体（IOL）的下襻，IOL 折叠放置助推器后注入前房，上襻留置并卡在角膜缘切口；同样的办法，8-0 聚丙烯线经 3:00、距角膜缘 2 mm 经巩膜穿刺进入玻璃体腔内，并缝线固定 IOL 的上襻并送入眼内。拉紧两缝线使 IOL 位居中，并分别巩膜层间“V”形穿梭，紧贴结膜面剪断线端。术后常规眼部用药。

结论：改良式一片式人工晶体缝线固定术操作简单、切口小，巩膜及结膜无缝线、术后无刺激症状、视力恢复快，适用于所有一片式 IOL。

眼外伤

摘要编号：207979

晶状体半脱位囊袋缝合效果的长期随访观察

第一作者：Jianwei LIU

目的：研究外伤性晶体半脱位患者，5.0 聚丙烯缝线缝合脱位囊袋的安全性及有效性以及长期随访结果。

方法：回顾性分析 2022 年 6 月至 2024 年 5 月在我院住院的 23 例外伤性晶体半脱位患者，均行白内障超声乳化 + 张力环植入 + 5.0 聚丙烯缝线囊袋缝合 + 人工晶体植入，部分患者行前部玻璃体切割手术。分析手术的安全性及有效性及随访超过 1 年的效果。

结果：术中：3 例患者出现虹膜损伤、出血，4 例患者出现 5.0 聚丙烯缝线钩偏位，旋转现象，术中均通过合理措施得以修复。所有患者均随访一年以上，20 例患者，术后视力为 0.4-1.0，术后 2 例患者眼压高，均行抗青光眼手术。术后一月以上，部分患者囊袋出现机化，未出现囊袋脱位、偏位现象。所有患者随访超过 1 年，视力均稳定，较 1 月时差距无统计学意义，囊袋稳定。

结论：5.0 聚丙烯缝线囊袋缝合手术安全性高，尤其适合大范围晶状体脱位患者。长期效果好。

摘要编号: 210055

组织纤溶酶原激活剂 (t-PA) 联合玻璃体手术 治疗眼球破裂伤后无光感眼一例

第一作者: Dan ZHOU

共同作者: Yuxin FANG

目的: 探讨眼球破裂伤缝合术后脉络膜上腔广泛积血无光感眼应用组织纤溶酶原激活剂 (t-PA) 联合玻璃体手术挽救患者眼球结构及视功能。

方法: 69 岁女性, 左眼破裂伤外院缝合后 10 天, 左眼: NLP, 眼压: 左眼: 6 mmHg CDI: 左眼全周视网膜脱离, 脉络膜脱离, 弥漫脉络膜上腔积血呈“对吻征”。玻璃体切除手术前一天行 t-PA 经巩膜脉络膜上腔注射, 参照超声引导脉络膜隆起最高位置 (约 3 点及 9 点方位) 分别注射两个象限, 每象限 50 ug/0.1 ml。玻璃体切除术中首先前房灌注下, 颞侧角膜缘后约 10 mm 巩膜切开放出大量液化脉络膜上腔积血。脉络膜脱离“对吻征”消失后, 常规玻璃体腔灌注下, 行玻璃体切除 + 视网膜复位 + 硅油填充术。

结果: 术后患者两月复查左眼视力 0.02#0.04, 眼压 10 mmHg, 视网膜复位良好。

结论: 眼球破裂伤后严重脉络膜上腔积血患者应用 t-PA 有助于液化及引流积血, 为玻璃体手术提供手术空间及更早的时机, 挽救患者视力。

眼底外科

摘要编号: 207637

一例 Terson 综合征内界膜下出血的玻璃体切除术

第一作者: Chen ZHIQING

目的: Terson 综合征是指由急性颅内出血或创伤性脑损伤引起的颅内压急剧升高, 进而导致玻璃体、视网膜前或视网膜下等多层次眼内出血的临床病症。其核心病理机制在于颅内压升高通过视神经鞘传导, 压迫视网膜中央静脉, 导致静脉回流受阻、血管内压力骤增而破裂出血。探讨玻璃体切除术的时机与疗效非常重要。

方法: 患者主要表现为突发性视力下降或丧失。诊断主要依靠存在原发性颅内病变的病史, 结合眼科检查。眼底镜检查与 B 型超声和 CT 是诊断眼内出血的关键工具, 而光学相干断层扫描 (OCT) 能精细评估内界膜下出血、黄斑结构改变等并发症。

结果: 治疗策略取决于出血的严重程度和持续时间。对于轻度出血, 可采取保守观察, 部分病例可自行

吸收。对于持续不吸收的致密玻璃体出血或出现并发症 (如黄斑前膜、黄斑裂孔和视网膜脱离) 的患者, 经平坦部玻璃体切除术 (PPV) 是恢复视力的有效手段。微创手术系统的应用改善了手术安全性与效率。关于手术时机虽存争议, 但多数研究支持若观察 1-3 个月无吸收迹象, 应积极考虑手术, 早期干预有助于更快视功能恢复并降低儿童弱视风险。总体视觉预后良好, 多数患者术后视力可获得显著改善。预后影响因素包括初始视力、颅内原发病的严重性、手术时机及是否出现黄斑光感受器损伤等并发症。

结论: Terson 综合征是一种严重的神经眼科交叉性疾病。其管理需要神经外科与眼科的紧密协作, 优先处理危及生命的颅内疾病, 并及时进行眼科评估与干预。玻璃体切除术是治疗持续性玻璃体积血的金标准。未来的研究应致力于明确最佳手术时机、探索长期视网膜微观结构改变, 并利用多学科协作与先进影像技术进一步优化患者预后。

摘要编号: 202426

抓虫记

第一作者: Rongping DAI

目的: 描述一例结膜吸吮线虫进入玻璃体腔, 并手术取出的病例。

方法: 玻璃体切除手术, 完整吸除线虫。

结果: 结膜吸吮线虫自角膜切口进入前房, 并通过悬韧带或后囊切开口进入玻璃体腔, 2 天后线虫顺利取出, 患者病情稳定, 无后续炎症反应。

结论: 结膜吸吮线虫可以通过角膜切口进入玻璃体腔, 完整取出虫体非常重要。

摘要编号: 206370

知易行难? ——巨大黄斑裂孔手术的思考

第一作者: Yingxiang HUANG

共同作者: Lie YANG

目的: 探讨黄斑裂孔手术的关键步骤, 强调黄斑裂孔边缘的移动决定裂孔闭合的可能性。

方法: 回顾一例直径 1198 um 黄斑裂孔的 79 岁患者的手术录像。

结果: 通过玻璃体后界膜撕除联合内界膜覆盖, 按摩孔缘, 最后空气填充, 术后黄斑孔完美闭合。

结论: 解除黄斑孔周牵拉, 并松解孔缘组织, 可促进裂孔封闭。

摘要编号: 200428

镜花水月——玻璃体积血合并角膜瘢痕的玻璃体切除术

第一作者: Xuchuan WANG

目的: 患眼曾被一根铁丝贯穿, 一期行眼球破裂伤修补术。

方法: 由于外伤造成角膜瘢痕及玻璃体腔积血, 视力仅剩光感。二期手术中, 角膜瘢痕仿佛一个“磨花的镜头”导致玻切术中视野受限, 术者仍巧妙地切除玻璃体积血, 并对外伤造成的“新月形”眼底视网膜裂孔病灶激光光凝。

结果: 最终顺利完成手术, 术后患者视力改善。

结论: 复杂眼外伤可能需多次手术治疗, 合理的手术设计最终使患者获益。

眼整形眼眶病

摘要编号: 203652

使用带蒂鼻黏膜瓣的泪道再造术临床观察

第一作者: Pang ZUOXIANG

目的: 介绍一种使用带蒂鼻黏膜瓣再造泪道的手术方法及疗效观察。

方法: 自 2022 年 11 月至今开展使用带蒂鼻黏膜瓣再造泪道的泪道再造术共 9 例(鼻黏膜组)。手术过程: 鼻内镜下制作宽约 8-10 mm 的蒂在鼻丘上方的鼻黏膜瓣, 使用咬骨钳和磨钻去除上颌骨额突暴露泪囊后, 切开泪囊内侧壁; 再经内眦入路锐性分离至泪囊窝前缘, 切开骨膜进入鼻腔, 将鼻黏膜瓣经切口牵引至内眦, 经内眦切口置入泪道支撑管(润视 RS-7 管)后将鼻黏膜包绕置管, 使用可吸收缝线将黏膜缝合管状, 前端开口与结膜切口吻合。术后均使用抗菌素、激素滴眼液滴眼, 使用曲安奈德喷鼻剂喷鼻腔; 术后 3-4 月内定期复查, 后期不定期复诊。

结果: 6 例术后至今 1 年以上(13-28 个月), 3 例术后至今 5-8 个月, 其中 8 例保持长期置管状态, 均无溢泪; 染色剂消失实验 DDT (-), 内眦部置管在位, 鼻腔内造口形成好, 周围黏膜覆盖。该 8 例中, 1 例术后半年时拔管后仍有溢泪症状, 半月后重新置管, 恢复好; 2 例用力擤鼻涕时出现置管脱出的情况, 来院重新置管, 并将置管鼻腔内部分剪短, 恢复好。1 例患有强直性脊柱炎的患者术后半年因需要到国外居住要求拔管, 拔管 1 周后发生急性虹膜炎, 溢泪复发, 后失访。

结论: 对于难以修复再通的上泪道阻塞, 使用带蒂鼻黏膜瓣转位行泪道再造术可以形成一个有生理功能的泪水引流通道, 缓解病情。术后建议长期置管, 可剪短鼻腔内部分, 减少脱落风险; 有自身免疫疾病的患者应充分评估后手术。

摘要编号: 209076

鼻内镜下视神经管内海绵状血管瘤摘除术一例及手术视频展示

第一作者: Rongxin CHEN

共同作者: Xiaofeng WU, Huasheng YANG

目的: 探讨视神经管内罕见占位性病变 - 海绵状血管瘤的临床特点、诊断要点, 并展示经鼻内镜视神经管减压及肿瘤摘除术的手术技巧与疗效。

方法: 报告一例 49 岁女性患者, 因“右眼视物模糊伴颞侧遮挡 2 年余”就诊, 辗转多家医院未能确诊。入院检查右眼视力为手动 /10 厘米(矫正无提高)。影像学检查提示“右眼视神经管内海绵状血管瘤”。采用“鼻内镜下经鼻视神经管开放及肿瘤摘除术 OD”, 在全程瞳孔监测下, 于视神经鞘膜内精细操作, 完整切除肿瘤。

结果: 手术成功完整摘除肿瘤, 术中和术后未发生视神经、眼动脉损伤或其它严重并发症。患者术后右眼视力恢复至 0.04, 恢复良好, 无复发迹象。

结论: 视神经管内海绵状血管瘤虽罕见, 但可导致严重的视力损害。精确的术前影像学评估是诊断的关键。鼻内镜下经鼻入路为此类深部、狭小空间内的病变提供了直接、微创且有效的手术路径, 在完整切除肿瘤的同时, 能够最大限度地保护视功能, 并显著降低手术创伤及并发症, 是视神经管内占位的治疗选择。

青光眼

摘要编号: 208240

Ahmed 引流阀植入治疗儿童葡萄膜炎继发青光眼的安全性和有效性分析

第一作者: Liu HETING

共同作者: Mohan LI, Liming TAO, Xinchun WANG, Tongcheng XU

目的: 评估 Ahmed 引流阀植入治疗儿童葡萄膜炎继发青光眼的安全性和有效性。

方法: 收集在我科就诊的 8 名儿童(12 眼)葡萄膜炎继发性青光眼患儿资料, 包括最佳矫正视力(best-corrected visual acuity, BCVA)、眼压、

视野指数 (visual field index, VFI)、前房闪辉程度。手术方式为做以角膜缘为基底的穹窿部结膜切口, 打开筋膜囊, 0.4 mg/ml 丝裂霉素棉片放置筋膜囊内 3 min, 生理盐水冲洗角膜表面及结膜囊; 用 5-0 不可吸收缝线将 Ahmed 引流阀固定于角膜缘后 9 mm 浅层巩膜上; 于距角膜缘 4 mm 处的巩膜处进针, 针头在板层巩膜间穿行至角膜缘后 1.5 mm 处, 改变针头方向穿刺进入前房, 调整引流管位置; 缝合筋膜和球结膜。每名患儿在治疗前和术后不同间隔 (包括 1 天、7 天、1 个月、3 个月和 6 个月) 接受综合评估。完全成功的标准定义为眼压在 10–21 mmHg 范围内, 并且从基线水平至少降低 20%, 无需降眼压药物或再次手术即可实现。合格成功的定义与完全成功的定义相似, 只是需要降眼压药物。我们采用 Wilcoxon 秩和检验进行统计分析。

结果: 所有参与者都成功完成了至少六个月的随访。12 只眼中有 10 只 (83.3%) 取得了完全成功, 2 只眼 (16.7%) 获得了合格成功。术前平均眼压为 (37.1 ± 8.8) mmHg, 术后 6 月明显下降至 (15.4 ± 4.1) mmHg。在所有术后时间点, 平均眼压与术前值相比均明显下降, 具有统计学意义 ($P < 0.05$)。术前平均 BCVA 为 0.38 ± 0.24 , 术后为 0.37 ± 0.24 , 差异无统计学意义 ($P > 0.05$)。术前, 参与者平均使用 2.5 种局部降压药物, 术后减少到 0.4 种。主要并发症包括前房积血 ($n = 4$)、浅前房 ($n = 4$) 和前房闪辉加重 ($n = 6$)。截止到 6 个月的随访结束, 没有出现如需手术冲洗的前房积血、感染、眼压失控等严重并发症发生。同样, 经过 6 个月的随访, 患儿 VFI 也没有统计学意义上的变化。

结论: Ahmed 引流阀植入治疗儿童葡萄膜炎继发青光眼既安全又有效。然而, 儿童葡萄膜炎是一类非常复杂且难治的疾病, 在治疗并发症的同时, 更应该注意原发病的规范治疗。

摘要编号: **208111**

XEN 青光眼引流管植入术

第一作者: **Qian TAN**

共同作者: **Ding LIN**

目的: 介绍 XEN 青光眼引流管植入手术。

方法: 视频展示多个案例 XEN 青光眼引流管植入手术的详细步骤以及术后效果。

结果: XEN 青光眼引流管植入手术在原发性青光眼以及小梁切除术后高眼压患者中都有良好的降眼压效果。

结论: XEN 青光眼引流管植入是一种有效的降眼压微创手术方式。

摘要编号: **208500**

一例年轻高风险 PACG 患者的后节灌注辅助多术式联合治疗

第一作者: **Dan CAO**

共同作者: **Liang ZHANG**

目的: 39 岁女性, 双眼慢性闭角型青光眼 (晚期), 右眼在外院行小梁切除术后出现高眼压、浅前房, 外院行 phaco + 前段玻切, 术中出现爆发性脉络膜上腔出血。

方法: 入院后右眼行 PPV + 2 期 IOL 植入 + 经内路睫状体光凝, 左眼术前最大量降眼压药物下眼压为 35–40 mmHg, 左眼在球后麻醉下行。后节主动灌注下后入路局限玻璃体切割术 + PEI + GSL + GT (120°) + 后囊切开区。

结果: 术后左眼在 1 种降眼压药物下眼压 11–13 mmHg。

结论: 年轻 PACG 患者更加需要个体化的评估, 术中眼压、前房深度的稳定控制非常重要, PPV + phaco + IOL + GSL + GT 在本例年轻晚期 PACG 中效果良好。

摘要编号: **209789**

一种新的微创青光眼手术 – 新型微创内路三联手术

第一作者: **Liuzhi ZENG**

共同作者: **Qin QIU**

目的: 提供一个全面的新型微创内路三联手术 (3T 手术) 操作指南, 作为一个专门的 3T 的手术手册, 以便于更好的临床实践。

方法: 本方案已获得成都市中西医结合医院伦理委员会批准, 且在为教育目的制作视频前, 已从患者处获得知情同意。3T 手术关键操作步骤如下:

1. 于右眼颞下或左眼鼻上方透明角膜缘 15° 辅助切口, 注入粘弹剂升至 30 mmHg 后, 于颞上方/颞侧作 1.8 mm 主切口。
2. 经辅助切口预置微导管, 使用 Zeng's 小梁刀切开鼻侧小梁网及 Schlemm 管内壁约 2 mm, 粘弹剂扩张切开口并推开回血。
3. 将微导管头端逆时针插入 Schlemm 管内, 每前行 2–3 个钟点注射粘弹剂扩张, 完成 360° 穿行后继续前行 1 个钟点位。
4. 于右眼 3 / 4 点位或左眼 7 / 8 点位透明角膜缘内制备第二辅助切口 (与角膜缘呈 $30\text{--}45^\circ$ 夹角)。
5. 房角镜下用眼内镊夹出微导管头端 2 mm, 结扎 10-0 聚丙烯线于头端 1–2 mm 处 (双结固定), 退回带线微导管至前房后用

U 型固定器固定另一端。6. 牵拉微导管将缝线引入 Schlemm 管内，同步每退行 2-3 个钟点注射粘弹剂扩张，完成全周退行后预留眼外缝线 3-5 mm 并剪断。7. 在房角镜下用粘弹剂扩大开窗口（右眼 3-5 点/左眼 7-9 点，范围 60°）。8. 带线弯针从右眼 3 点/左眼 7 点辅助切口穿入前房，于另一端缝线下方经对侧角膜缘（右眼 5 点/左眼 9 点）穿出，沿角膜缘层间浅行（右眼 5→3 点/左眼 7→9 点）后经辅助切口旁 3/7 点位返回前房，眼外预留 10 mm 缝线后剪除多余部分。9. 勾出两端缝线。10. 冲洗前房粘弹剂降低眼压，行外科三重打结后剪线，调整线结至前房角并水化角膜切口恢复前房。11. 最后前房注气升压至轻度偏高完成手术。结果：3T 是治疗 POAG 的一种有前景的微创手术技术，术后 24 个月的眼压显著降低，药物负担减轻，安全性良好。

结果：3T 是治疗 POAG 的一种有前景的微创手术技术，术后 24 个月的眼压显著降低，药物负担减轻，安全性良好。

结论：通过详细、分步的视频和文本指南，揭开 3T 手术的复杂性，缩短青光眼医生的学习时间，提高手术熟练度，加速这项创新技术在临床实践中的整合，最终通过促使更多适宜患者受益于这一具有良好风险效益比的手术，进而改善其视觉健康。

摘要编号：209954

穿透性 Schlemm 管成形术 (PCP) 联合前部玻璃体切除术治疗真性小眼球继发青光眼的术视频演示

第一作者：Liuzhi ZENG

目的：真性小眼球因眼球容积小、巩膜增厚及前房角狭窄，继发青光眼的手术干预风险极高，传统滤过性手术易导致低眼压、浅前房及脉络膜出血等并发症。本研究通过手术视频展示穿透性 Schlemm 管成形术联合前部玻璃体切除术 (PCP)，旨在探讨其在控制眼压的同时减少并发症的可行性。

方法：患者女，35 岁，既往最高眼压双眼 35 mmHg。现使用双眼派立明滴眼液、美开朗滴眼液控制眼压。查体：VOU 裸眼 0.06；f 眼底：C/D = 1.0。诊断：1、双眼继发性青光眼，2、双眼真性小眼球，3、双眼屈光不正（高度远视）。左眼采用 PCP 联合前部玻璃体切除术，具体手术步骤如下：1. 患者取平卧位，爱尔凯因眼液术眼表面麻醉 3 次，常规消毒，铺巾，开睑器开睑；2. 上方角膜缘牵引缝线，先做以穹窿为基底的结膜瓣，再做以角膜缘基底的巩膜瓣，巩膜瓣约 3 mm x 3 mm，再做深层巩膜瓣约 2 mm x 2 mm，巩膜池成形，切开粘小管外壁，微导管自切开粘小管导入，走行 360°，每

走一个钟点位打一次粘弹剂，扩张粘小管，并自另一端穿出，在微导管头端膨大处以 10/0 聚丙烯缝线打结，再自穿入端缓缓退出微导管，每退一个钟点位打一次粘弹剂，使 10/0 缝线随微导管在粘小管内走形一圈并留置于粘小管内；3. 题上做侧切口，行前房穿刺，并注入适量粘弹剂，剪除深层巩膜瓣，瓣下切除小梁 1.5 mm x 1 mm，再行虹膜周切，烧灼并剪除肥厚睫状体，自虹膜周切孔剪开玻璃体前界膜，剪除部分前部玻璃体，将粘小管内留置缝线打结，保持适当张力，成形粘小管，巩膜瓣间断严密缝合，埋线，球结膜间断缝合，冲洗前房内粘弹剂并成形前房。4. 妥布霉素地塞米松眼膏涂眼，无菌纱布敷盖术眼。

结果：术后第 1 天左眼眼压降至 25 mmHg，第 2 天左眼眼压 15 mmHg，无需抗青光眼药物。随访 6 个月眼压稳定，无术后并发症等。视神经损害未进展。

结论：PCP 术式通过以下机制提高安全性：① 外路打开 Schlemm 管，切除局部小梁，恢复生理性房水外流；② 巩膜池促进房水通过小梁开口向脉络膜上腔引流；③ 利用缝线长期扩张 Schlemm 管；该手术视频直观呈现了特殊眼球条件下的操作要点，为同类复杂病例提供技术参考。

論文發言

人工智慧、數位創新與虛擬健康

摘要編號: 207933

視網膜色素變性黃斑水腫之治療療效比較

第一作者: Hsi-an YANG

共同作者: Wun-long ZHENG

目的: 視網膜色素變性 (retinitis pigmentosa, RP) 為遺傳性視網膜營養不良疾病, 約 10–50% 患者可併發黃斑囊樣水腫, 為中心視力受損的主要原因之一。為改善黃斑水腫及提升視力, 臨床上已嘗試多種治療策略, 包括全身性或局部使用碳酸酐酶抑制劑 (carbonic anhydrase inhibitors, CAIs)、糖皮質激素、抗血管內皮生長因子 (anti-VEGF) 藥物及幹細胞治療等。然而, 既往研究結果不盡一致, 目前尚無針對 RP 相關黃斑水腫的最佳治療共識。本研究旨在綜合分析不同治療方式之療效, 藉由網絡統合分析 (network meta-analysis) 比較其相對效益, 為臨床決策提供更明確的依據。

方法: 本研究系統性檢索 PubMed、Cochrane Library 及 Web of Science 資料庫, 納入比較下列任兩種以上治療方式之文獻: 安慰劑、口服乙酰唑胺 (acetazolamide, 500 mg/日)、口服甲唑胺 (methazolamide, 50 或 100 mg/日)、局部多佐胺 (dorzolamide 2%, 每日三次)、局部酮咯酸 (ketorolac 0.5%, 每日四次)、靜脈輸注臍帶間質幹細胞 (UCMSC)、玻璃體內注射地塞米松植入物 (dexamethasone, DEX, 0.7 mg)、玻璃體內注射曲安奈德 (intravitreal triamcinolone, IVTA, 40 mg)、玻璃體內注射貝伐單抗 (intravitreal bevacizumab, IVB, 1.25 mg), 以及玻璃體內注射雷珠單抗 (intravitreal ranibizumab, IVR, 0.5 mg)。評估指標包括中心黃斑厚度 (CMT) 變化及最佳矯正視力 (BCVA) 的改善。

結果: 共 12 篇文獻被納入進行網絡統合分析。結果顯示, 在治療後 2 至 4 週, 口服 acetazolamide、口服 methazolamide 與局部 dorzolamide 在提升 BCVA (增益 ≥ 5 個 ETDRS 字母) 方面

無顯著差異。於治療後 3 至 4 個月時, 單次注射 DEX 0.7 mg、口服 acetazolamide、口服 methazolamide 及局部 dorzolamide 在 CMT 改善方面無顯著差異, 但其療效均優於 IVB、IVR、IVTA 及 UCMSC。根據 SUCRA (Surface under the cumulative ranking curve) 值的療效 (%) 排序如下: DEX (79.3%) > 口服或局部 CAIs (60.4–68.4%) > 局部 ketorolac (57.2%) > IVB 或 IVR (37.8–42.4%) > IVTA (34.9%)。在 3 至 4 個月時, 於 BCVA 改善方面, DEX 0.7 mg、dorzolamide 與 ketorolac 間無顯著差異; 而 acetazolamide 之 BCVA 改善優於 IVB 與 IVR。於 6 個月時, acetazolamide 在改善 CMT 的療效優於 methazolamide、IVB、IVR、IVTA 及 UCMSC, 而 DEX 0.7 mg、dorzolamide 及 ketorolac 之間無顯著差異。

結論: 對視網膜色素變性合併黃斑水腫的患者而言, 玻璃體內注射地塞米松及口服 (或局部使用) CAI 均可作為有效的治療選擇, 兩者在改善 CMT 與 BCVA 方面療效接近, 且優於 IVR、IVB 及 IVTA 於 3 至 6 個月內的療效表現。然而, 未來仍需更多嚴謹的隨機對照試驗以驗證本研究結果。

角膜病、乾眼症、外眼病、眼庫

摘要編號: 208757

三重功能超小聚多巴胺奈米顆粒打破 ROS-發炎-血管生成的病理循環: 跨上皮治療角膜新生血管的新策略

第一作者: Yue WU

共同作者: Jinhai HUANG, Mei YANG, Xingtao ZHOU

目的: 角膜新生血管 (corneal neovascularization, CoNV) 是導致角膜瘢痕形成及視功能喪失的重要原因。在其發生與發展過程中, 發炎反應與氧化壓力相互作用, 形成 ROS-發炎-血管生成的病理循環, 成為治療中的關鍵難題。本研究旨在研發一種具備高效抗氧化、抗發炎及抗血管生成能力的超小聚多巴胺奈米顆粒 (UPDA NPs), 以實現對角膜新生血管的一體化精準介入。

方法：透過尺寸可控的自聚合策略製備 UPDA NPs，並系統性表徵其理化性質、生物相容性及自由基清除能力。採用 HCEC 與 HUVEC 等細胞株建立模型，全面評估其抗發炎、抗氧化及抗血管生成活性，並透過 Western blot、qPCR 及免疫螢光分析 NRF2/HO-1 訊息途徑及促血管生成基因的變化。進一步於鹼燒傷誘導之小鼠角膜新生血管模型中，評估 UPDA NPs 的體內治療效果與安全性。

結果：UPDA NPs 具有均一的超小尺寸（約 3 nm）與顯著的自由基清除活性，能夠有效降低細胞內 ROS 水平並恢復氧化還原平衡。其可顯著抑制發炎因子表達與內皮細胞成管形成，同時活化 NRF2/HO-1 抗氧化途徑，並下調 VCAM-1、ESM-1、ANGPT2、FLT1 等促血管生成基因的表達。在體內實驗中，UPDA NPs 局部給藥可顯著減少角膜新生血管的面積與長度，促進角膜修復，且未見明顯的局部或全身毒性反應。

結論：本研究提出一項基於超小 UPDA 奈米酶的無創跨上皮遞送與三重功能協同新型奈米治療策略，能有效打斷 ROS-發炎-血管生成的病理環路。該系統在角膜新生血管治療中展現出優異的療效與安全性，為眼表疾病的精準奈米介入提供具創新性與轉譯潛力的研究方向。

瞳孔直徑與眼軸變化亦無顯著相關（ $r^2 = 0.182$, $p = 0.066$ ）。· 鏡片 B（傳統 VST 設計）：大瞳孔組之眼軸增量顯著低於小瞳孔組（ 0.08 ± 0.05 mm vs 0.16 ± 0.07 mm; $F = 26.04$, $p < 0.001$ ），瞳孔面積與眼軸增長呈顯著負相關（ $r^2 = 0.421$, $p < 0.001$ ）。

結論：在 6 個月的觀察期間，點對點設計的角膜塑形鏡（鏡片 A）之療效不受瞳孔大小影響；相對地，傳統 VST 設計（鏡片 B）的眼軸控制效果則明顯依賴瞳孔直徑。此結果顯示，點對點設計可適用於更廣泛的瞳孔大小族群，而 VST 設計在臨床應用上需更謹慎評估患者的瞳孔參數，以達到最佳控制效果。

近視

摘要編號：209775

瞳孔直徑對兩種不同設計角膜塑形鏡短期眼軸控制效果的影響

第一作者：Menqiong LI

目的：比較兩種角膜塑形鏡設計——點對點軸線對齊設計（鏡片 A）與傳統 VST 設計（鏡片 B）——在 6 個月內對近視兒童眼軸增長控制的效果，並評估瞳孔直徑對治療成效的調節作用。

方法：共納入 60 名 8 至 12 歲近視兒童，隨機分為鏡片 A 組（ $n = 27$ ）與鏡片 B 組（ $n = 33$ ）。在 300 LUX 標準化照明條件下，以自動驗光儀量測基線瞳孔直徑（三次取平均值），並以中位數（ 4.53 ± 0.58 mm）劃分為大、小瞳孔亞組。所有受試者均接受睫狀肌麻痹驗光與光學生物測量儀之眼軸長測定，並於 6 個月後追蹤。資料以線性混合效應模型分析瞳孔大小與鏡片設計間之交互作用。

結果：共有 57 名受試者完成研究（鏡片 A 組 26 人，鏡片 B 組 31 人）。· 鏡片 A（點對點設計）：大瞳孔與小瞳孔組之眼軸增量無顯著差異（ 0.07 ± 0.04 mm vs 0.08 ± 0.05 mm; $F = 0.47$, $p = 0.50$ ），

壁報

人工智慧、數位創新與虛擬健康

摘要編號 : 209569

Panel No.: ADV-1129

在門診環境中使用遠程問診評估兒科患者的可能性

第一作者: Karen **WONG**

共同作者: Clare **ROBERTS**, Maria **THEODOROU**

目的: 分析在門診環境中使用遠程問診的兒科患者人口統計資料及結果。

方法: 我們回顧性分析了所有於 2025 年 9 月至 10 月期間，利用視頻問診平台就診於英國倫敦莫菲爾德眼科醫院的兒科患者（18 歲以下）的電子病歷資料。分析了非緊急門診患者的統計資料及就診結果的數據。

結果: 在兩個月的期間內，共進行了 102 次視頻會診。患者年齡範圍介於 1 個月到 17 歲之間（平均 6.91 歲），女性患者略多。參加視頻會診的患者中，86% 的病例為複診；10% 的患者為新病例，4% 的患者為外部醫院尋求第二意見的轉介。觀察的各種病例，包括眼瞼腫塊、眼瞼下垂、過敏性結膜炎、其他結膜炎、斜視、眼球震顫、以及其他眼瞼和神經系統疾病。36% 的患者在會診後不需要複診；6% 的患者被列入手術名單；其餘的患者則預約了面對面或視頻會診的複診。

結論: 遠程醫療諮詢有可能在兒科門診中使用，以減少新病患和復診病患的面對面就診。它可以通過提供及時的管理和建議，改善患者和家長的體驗，同時節省患者的交通時間和費用，亦有助於減少對上學時間的干擾，特別是離醫院相對較遠的患者。隨著技術的進一步發展，未來視頻會診有可能向更多種類的疾病以及更複雜的病例提供遠程諮詢服務。

眼底內科

摘要編號 : 207602

Panel No.: RME-1223

Faricimab 於 4 劑負荷期內治療黃斑新生血管之療效與安全性研究

第一作者: Sin **U HONG**

目的: 探討新藥 Faricimab 於 4 劑負荷期內治療 2 型 MNV 及息肉狀脈絡膜血管病變 (PCV) 的療效及安全性。

方法: 納入 2024 年 01 月至 11 月在澳門鏡湖醫院初診且未經治療的 2 型 MNV 及 PCV 患者共 11 例，患者接受 Faricimab (6 mg/0.05 ml) 玻璃體腔注射（每 4 周 1 劑，共 4 劑）。於注射前及每劑後 4 周，記錄最佳矯正視力 (LogMAR)、眼壓、黃斑中心凹視網膜平均厚度 (CST) 和色素上皮脫離最大高度 (PED)，分析各指標在每間隔 4 周的變化及併發症的發生率。

結果: 經 16 周治療，兩組視功能及黃斑部解剖結構均有顯著改善 ($P < 0.05$)。兩組各觀察指標從 0 w 到 16 w 分別為：最佳矯正視力 (LogMAR) 從 0.47 ± 0.49 提高至 0.33 ± 0.44 (2 型 MNV 組)；從 0.62 ± 0.44 提高至 0.31 ± 0.28 (PCV 組)，CST 從 $263.8 \pm 81.6 \mu\text{m}$ 減少至 $219.3 \pm 77.9 \mu\text{m}$ (2 型 MNV 組)；從 $320.8 \pm 121.8 \mu\text{m}$ 減少至 $251.2 \pm 125.5 \mu\text{m}$ (PCV 組)，PED 從 $225.2 \pm 123.9 \mu\text{m}$ 降低至 $120.5 \pm 87.9 \mu\text{m}$ (2 型 MNV 組)；從 $332.6 \pm 146.6 \mu\text{m}$ 降低至 $161.0 \pm 71.2 \mu\text{m}$ (PCV 組)。3 例中有 5 劑次 (11.4%) 發生一過性眼壓升高，未見嚴重眼部或全身不良事件。

結論: Faricimab 於 4 劑負荷期內治療 2 型 MNV 及 PCV 患者均有顯著療效且安全性好。其起效快速、作用穩定、持久，兩組亞型獲益相當。

電子壁報

人工智慧、數位創新與虛擬健康

摘要編號 : 209582

DRNovosight Plus : 結構對位與糖尿病視網膜病變之個人化生成模擬架構

第一作者: Hsi-an YANG

共同作者: Yi-hsing CHEN, Wun-long JHENG

目的: 目前眼科醫師在向糖尿病視網膜病變患者說明後續治療時(如抗血管新生藥物等), 常需借用其他患者影像幫助解釋, 然而, 因無法呈現患者自身眼底於治療後的可能樣貌, 容易導致溝通理解不足。本研究開發一套個人化生成式架構(名為DRNovosight Plus), 輸入患者治療前彩色眼底影像(Fundus image), 即可生成該患者接受抗血管新生藥物治療後之預測模擬眼底影像, 本研究採用結構對位與視網膜專屬預訓練特徵, 以提升生成影像的可信度與臨床解釋性, 以期未來能用於協助眼科醫師與患者之間的醫病溝通與衛教。

方法: 本研究採用糖尿病視網膜影像資料庫(EyePACS 與 APTOS) 共 71,000 張彩色眼底影像, 並依國際糖尿病視網膜病變嚴重度分級(ICDR 0-4) 標註。基礎架構包含病灶遮罩輔助之生成模型與嚴重度分類器, 本研究於此基礎再進一步導入視網膜領域中已證實具泛化能力之預訓練模型取代原編碼骨幹, 並於生成階段加入血管與病灶布局等結構提示(layout-aware constraint) 以維持生成影像與真實解剖之對位。模型效能以 AUC、FID、SSIM、PSNR 作為指標, 以 Grad-CAM 與 SHAP 評估病灶遮罩之重疊比例, 並且以對抗生成網路(generative adversarial network) 作為生成對照。

結果: DRNovosight Plus 於預測抗血管新生藥物治療後之生成影像分類之 AUC 達 0.89, 展現了其應用於臨床的潛力。影像保真度方面, FID 為 32.1、SSIM 為 0.77、PSNR 為 22.9 dB, 顯示 DRNovosight Plus 所生成影像之品質與細節保留度表現俱佳。Grad-CAM 與 SHAP 與病灶遮罩之重疊比例達 84% (對抗生成網路則為 57%), 表示生成後之變化區域主要集中於臨床病灶與血管相關位置, 顯示 DRNovosight Plus 偏離真實解剖基

準之風險較對抗生成網路低。整體結果顯示, 視網膜預訓練模型與結構提示之導入可在不犧牲生成穩定性的前提下, 同步提升辨識性能與影像保真度。

結論: 本研究建立之 DRNovosight Plus, 能呈現患者於抗血管新生藥物注射後之可能的眼底變化, 並兼顧影像品質與解剖一致性。透過該模型, 可協助眼科醫師向患者解釋接受治療後的效益。本研究以結構證據支持生成可信度, 未來該模型將進一步整合眼球光學電腦斷層掃描(OCT) 圖片與患者的糖化血色素數據, 以提升其預測準確性與臨床實用度。

眼內炎, 葡萄膜炎, 鞏膜炎

摘要編號 : 207700

成人雙眼弓蟲性眼炎以脈絡膜增厚樣病變表現: 一個診斷延誤的偽裝者

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共同作者: Huai-wen HSU, Chia-yi LEE, Chenghao SUNG

目的: 弓蟲性眼炎(ocular toxocariasis, OT) 為犬貓體內 Toxocara 屬幼蟲感染所致的人畜共通寄生蟲病, 成人罕見。由於臨床表現多樣, 常被誤診為其他脈絡膜或葡萄膜疾病。本研究報告一例 50 歲免疫功能正常男性, 初期以雙眼視力模糊及脈絡膜增厚樣病變表現, 最終確診為雙眼弓蟲性眼炎之病例, 藉此提醒臨床醫師對成人新發視力下降應納入人畜共通感染之考量。

方法: 病人為中華民國臺南市居住男性, 主訴半年來雙眼視力逐漸模糊, 左眼先發後波及右眼, 合併頭痛與噁心。既往有糖尿病與脈絡膜血管瘤樣病變(PCV) 病史。外院初步診斷為 Vogt-Koyanagi-Harada 症候群(VKH), 接受類固醇與 Ozurdex 治療反應不佳。入院檢查顯示雙眼前房細胞、黃斑水腫、視乳頭充血及多處黃白色斑塊。光學同調斷層(OCT) 呈現界限清楚之次網膜高反射結節及漿液性網膜下液; 螢光血管攝影顯示脈絡膜充盈延遲及 RPE 層滲漏。常規免疫學與感染檢查均陰性, 惟血液及房水 Toxocara IgG 抗體呈陽性, 確立弓蟲性眼炎診斷。治療初期使用甲苯咪唑合併口服類固醇與硫唑嘌呤, 待取得進口藥後改用阿苯達唑。

因病情持續惡化，雙眼後續施行玻璃體切除合併網膜切開引流、羊膜移植及 SF6 填塞。

結果：術後分析顯示網膜下液 Toxocara IgG 陽性。病理檢體未見幼蟲，但符合慢性肉芽腫性發炎表現。病程中雙眼視力持續下降，最終右眼 BCVA 0.01，左眼 0.5。此病例呈現典型「假脈絡膜病變」(pachychoroid-like) 外觀，早期與 PCV 及 VKH 極易混淆，致診斷延誤。文獻回顧指出，成人 OT 雖少見，但可因與犬貓接觸或環境暴露而感染，常呈慢性雙側表現，且抗體檢測為重要診斷依據。

結論：本病例顯示，弓蟲性眼炎可於成人中以非典型脈絡膜增厚樣病變表現，易誤為 PCV 或 VKH 等免疫性疾病而延誤治療。對於有犬貓接觸史或環境暴露史且以不明原因視力模糊、網膜下液及黃白斑塊為特徵的病人，應高度懷疑弓蟲感染，及早進行血清或房水 Toxocara 抗體檢測。合併抗寄生蟲藥物與免疫調節治療可控制發炎，但預後與診斷時機密切相關。本例提醒臨床醫師在 pachychoroid 樣表現下仍須警覺潛在的人畜共通感染。

眼底內科

摘要編號：208889

近視性脈絡膜新生血管治療之長期療效及相關影響因子

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共同作者：Shihjen CHEN, Yubai CHOU, Dekuang HWANG, Taichi LIN

目的：高度近視常導致多種威脅視力之併發症，包括近視性黃斑部病變、青光眼、白內障、視網膜剝離及高度近視性脈絡膜新生血管 (myopic choroidal neovascularization, mCNV)。其中，mCNV 既為致盲性併發症，亦為可治療疾病。本研究旨在評估抗血管內皮生長因子 (anti-vascular endothelial growth factor, anti-VEGF) 治療 mCNV 之長期視力與解剖學結果，並探討與療效相關之影響因子。

方法：本回溯性研究於臺北榮民總醫院進行，納入 2016 年至 2022 年間經健保核准接受玻璃體內注射治療之 mCNV，且追蹤期至少三年之患者。主要觀察指標為基準至三年之最佳矯正視力 (BCVA) 變化、復發率及失明率；同時分析年齡、基準視力、中央黃斑厚度 (CMT)、脈絡膜厚度、近視性黃斑病變分級、是否合併視網膜下液 (SRF)、視網膜內液 (IRF)、出血、視網膜下高反射物質 (SHRM) 及注射次數等因子與結果之關聯。排除追蹤不足三

年、嚴重青光眼、合併其他視網膜血管疾病或顯著黃斑前膜者。

結果：共納入 118 位患者 125 眼，平均年齡 55 歲，女性佔 75.2%。治療藥物包括 bevacizumab (30.4%)、aflibercept (40.8%) 及 ranibizumab (28.8%)。平均眼軸長 29.27 mm，脈絡膜厚度 86.9 μm ，黃斑病變平均分級 1.82 級。基準 OCT 顯示 SRF 佔 32%、IRF 佔 17%、SHRM 佔 7%、出血佔 35%。平均視力由 logMAR 0.57 $\pm$ 0.29 改善至注射後 1 個月 0.43 $\pm$ 0.30，6 個月達高峰 0.33 $\pm$ 0.27，隨後逐漸下降，1、2、3 年分別為 0.34、0.36 與 0.43，但三年視力仍較基準有顯著統計學意義之改善 ($p < 0.05$)。平均 CMT 由 302.2 μm 降至 264.5 μm 。注射次數以第一年最多 (平均 2.68 次)，其後逐年減少；三年間 CNV 復發率為 29%。進一步分析顯示，年齡較高、基線視力較佳及黃斑病變分級較高者，視力改善幅度較小；黃斑病變分級越高者，失明風險亦顯著增加。基線脈絡膜較厚者傾向需更多次注射以維持穩定。

結論：抗 VEGF 治療可於三年內提供顯著且持久之視覺與解剖學改善。雖視力於初期改善後略有下降，但整體仍優於治療前，顯示其長期療效。疾病活動多集中於首年，符合過去文獻之結果。黃斑病變分級與脈絡膜特性為預後關鍵，早期治療與密切追蹤可望提升長期視覺預後並降低永久性視力喪失風險。

眼腫瘤學、病理學

摘要編號：207496

以眼性斜頸為初始表現的眼附屬器淋巴瘤合併單一上直肌侵犯：病例報告

第一作者：Shang-te MA

目的：發表一位以斜視與斜頸為初始表現之眼窩淋巴瘤病人，雖然眼窩淋巴瘤侵犯眼外肌並不罕見，但斜視為初始表現之病人卻很容易疏忽。

方法：病例報告。

結果：一名 63 歲男性，病史僅有高血壓，因持續 2 年的雙眼複視逐漸加劇前來就診。症狀在將頭部向右側傾斜時可獲得緩解。患者否認有視力模糊、眼痛、頭痛或體重減輕。檢查顯示雙眼視力皆為 16/20，眼壓正常。正位檢查可見左眼上斜視與外斜視。眼內結構與眼底檢查皆正常。血液學檢查、血清生化、甲狀腺功能與自體免疫抗體檢查結果亦皆正常。Hess 視野檢查顯示左眼上偏斜，伴隨左上直肌與左下斜肌過度作用，以及左下直肌作用不

足。同時，在裂隙燈檢查下於左眼上方球結膜發現一處 12 × 15 mm 鮭魚色樣病灶。眼眶磁共振造影（MRI）顯示左眼眶僅有上直肌腫脹，視神經路徑並無其他佔位病灶。與患者討論後，進行了上直肌與結膜病灶切片檢查，結果診斷為結外邊緣區淋巴瘤（Extranodal marginal zone lymphoma, EMZL）。最終分期為 Ann Arbor stage 1E。

結論：本病例強調，當臨床上遇到非典型的眼外肌增大時，醫師應警覺其他可能造成單一肌肉浸潤的病因。完整的全身性評估結合多專科團隊合作，對於及時診斷與妥善治療至關重要。

角膜病、乾眼症、外眼病、眼庫

摘要編號：208762

溫敏抗氧化碳點水凝膠眼藥：針對乾眼病的高效奈米治療策略

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共同作者：Xin CHEN, Jinhai HUANG, Mei YANG, Xingtao ZHOU

目的：乾眼病（dry eye disease, DED）是一種以淚膜不穩定與慢性炎症為特徵的常見眼表疾病。其病程中氧化壓力與炎症反應相互促進，導致角膜上皮損傷與淚液分泌功能下降。本研究旨在開發一種基於氮摻雜碳點（N-doped carbon dots, CDs）的溫敏水凝膠（F-CD hydrogel），以協同抗氧化、抗發炎與抗凋亡機制達成眼表修復與乾眼治療。

方法：CDs 由檸檬酸與聯氨水合物經水熱法製備（平均粒徑約 3–6 nm），並嵌入 Pluronic F127 形成溫敏水凝膠。系統性表徵其理化性質、抗氧化活性及生物相容性。體外使用 HCEC 細胞模型評估其 ROS 清除、線粒體保護及抗炎作用；並通過 Western blot、qPCR 及 RNA-seq 分析 NLRP3 炎症小體及氧化應激相關基因。進一步於苯扎氯銨誘導的乾眼小鼠模型中，驗證其治療效果與安全性。

結果：F-CD 顯示出顯著的自由基清除能力（ $\cdot\text{OH}$ 、 $\text{O}_2\cdot^-$ 、DPPH），能有效降低細胞內 ROS 水平並恢復氧化還原平衡，抑制 NLRP3/Caspase-1 活化，減少炎症因子 IL-1 β 與 TNF- α 的表達。F-CD 水凝膠於 37 °C 可快速凝膠化，顯著延長眼表滯留時間（> 90 min）。在體內，F-CD 眼藥水能修復角膜上皮、促進杯狀細胞分泌並恢復淚液穩定性，未見明顯毒性。

結論：本研究提出一種基於氮摻雜碳點的無金屬抗氧化水凝膠眼藥，可協同抑制氧化壓力與炎症反應，

實現乾眼病的高效、安全與長效治療，具顯著臨床轉譯潛力。

青光眼

摘要編號：208888

IP3R 介導視神經損傷後突觸信號失調

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共同作者：Yiqing LI, Jiahui TANG, Qi ZHANG, Yehong ZHUO

目的：成年哺乳動物的視神經在損傷後難以再生。我們前期工作首次揭示：無長突細胞（ACs）通過釋放鋅離子（ Zn^{2+} ）和多巴胺，跨突觸調控視神經損傷後視網膜神經節細胞（RGCs）的存活和軸突再生（PNAS, 2017; Sci Adv, 2024）。然而，RGCs 軸突損傷如何觸發 ACs 中 Zn^{2+} 升高的上游分子機制尚屬未知。本研究旨在闡明：1) IP3R 在視神經鉗夾（ONC）損傷信號從 RGCs 向 ACs 傳遞中的作用；2) 抑制 IP3R 能否促進 RGCs 存活與軸突再生。

方法：1. 利用 ONC 模型，通過免疫螢光評估未損傷視神經以及 ONC 後 1 天、3 天、5 天中 IP3R 的表達。2. ONC 後玻璃體腔注射 IP3R 抑制劑（2-APB）。分別在損傷後 1 天通過金屬自顯影法（AMG）評估視網膜中的 Zn^{2+} 水準。3. ONC 後玻璃體腔注射 2-APB，兩周後使用 RBPMS/Tuj1 染色和 CTB 標記評估 RGC 存活和軸突再生。4. 敲低 IP3R 後行 ONC 術，2 周後使用 CTB 標記（對照組：n = 5，敲低組：n = 5）評估 RGC 軸突再生。

結果：1. ONC 後第 1–5 天，近端視神經中的 IP3R 水準顯著升高。2. AMG 提示抑制 IP3R 顯著降低了 ONC 後 1 天內叢狀層（IPL）的 Zn^{2+} 積累。3. 2-APB 處理顯著提高了 RGC 存活率，但未顯著增強軸突再生（距離損傷點 0.25 mm 處 p = 0.0533）。4. 敲低 IP3R 顯著抑制 RGCs 軸突再生（距離損傷點 0.25 mm, 0.5 mm 處 p 值分別為 < 0.0001, 0.0006）。

結論：ONC 後近端視神經中的 IP3R 顯著上調。抑制 IP3R 可減輕 IPL 中 Zn^{2+} 的升高，表明 IP3R 在從 RGC 軸突向 ACs 傳遞損傷信號中起關鍵作用。儘管 2-APB 處理部分促進了 RGC 存活，但並未顯著增強軸突再生，而敲低 IP3R 抑制軸突再生，提示 IP3R 對 RGC 存活與再生的複雜調控作用。這些發現揭示了 ONC 後 IP3R 介導的損傷信號傳遞機制，為視神經再生提供了新的分子靶點。